

State Wildlife Grants
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Landscape Conservation Tools and Technical Guidance

Interim Report for Project Year
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
TRENTON, NJ 08625



PERFORMANCE REPORT

STATE: New Jersey

PROJECT NUMBER: T-11-T-1

PROJECT TYPE: Research and/or Management

PROJECT TITLE: Landscape Conservation Tools and Technical Guidance

STUDY NUMBER AND TITLE: 1. The Landscape Project

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

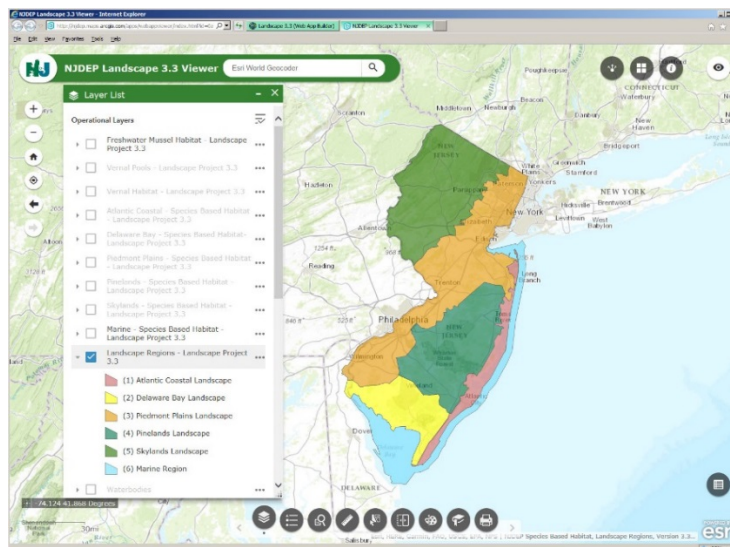
JOB NUMBER AND TITLE: 1A. Landscape Project Mapping

Prepared by: Patrick Woerner

Objective: Design, refine and make available wildlife habitat designations using the most current data on rare species populations and land cover types.

Key Findings:

- Research and development for future versions of the mapping were underway during this period.
- GIS staff is in coordination with NJDEP's Bureau of GIS regarding the 2015 LULC change update project and its applicability to the next version of Landscape mapping. Staff has reviewed preliminary drafts for portions of the state. The 2015 LULC data will be available in early 2019. It will form the basis of the next version of the Landscape Project habitat base layer.
- Staff began to investigate and compile the best available data for re-mapping riparian corridors including a composite of FEMA flood data (Q3, Preliminary FIRMS, DFIRMS), USGS flood-prone areas and SSURGO hydric soils. Final creation of the riparian corridor for inclusion in the next version of the Landscape Project is awaiting updated hydrography (NHD) and wetlands data from the 2015 Land-use/Land-cover (LULC) change update project.
- GIS staff continued to work with the Bureau of GIS (BGIS) to maintain and enhance the new ArcGIS Online (AGO) application called [Landscape 3.3 Viewer](#), which has provided a more user-friendly way to interact with Landscape data and look up associated species and habitat information.



- Staff began the process of migrating from the ArcGIS 10.x platform to ArcGIS Pro. To date, the effort has involved training, testing and transference of geodatabases and geoprocessing models used to create the Landscape Project.
- GIS staff summarized a list of species that would be added to the Landscape Project if species status assessments result in legal changes to the lists of endangered and nongame wildlife. A total of 63 species that were not previously mapped in Landscape could be included, while nine species currently mapped would be removed from the Landscape Project. Of those that would be newly added to the Landscape Project, 48 may be proposed Special Concern, six proposed Threatened and nine proposed Endangered. The species that may be proposed Threatened and Endangered that would be newly added to Landscape Project include four bats, three birds, one reptile, three fish, and four butterflies.
- Landscape Project staff met with the Bureau of Freshwater Fisheries to discuss potential methods of developing habitat mapping for newly proposed fish species for inclusion in the Landscape Project.
- All Version 3.3 Landscape Project GIS data continued to be made available in file geodatabase format and are fully documented with Federal Geographic Data Committee (FGDC) compliant metadata. The data is served on the NJDEP Bureau of GIS (BGIS) website for [download](http://www.nj.gov/dep/gis/landscape.html) (<http://www.nj.gov/dep/gis/landscape.html>) as well as on the NJDEP interactive mapping application ([NJ-GeoWeb](#)).
- ENSP continued to maintain the Landscape Project website: <http://www.state.nj.us/dep/fgw/ensp/landscape/index.htm>

Conclusions:

- Statewide Landscape Version 3.3 mapping accompanied by thorough documentation continued to provide agencies, citizens and conservation groups with the best information on habitats used by listed wildlife species in NJ.
- ENSP expects the next version of the Landscape Project to be released in the next 1.5 – 2 years to coincide with the adoption of species list changes.
- Utilizing a geodatabase structure and geoprocessing models is an effective means of generating species-specific habitat patches.
- The [Landscape 3.3 Viewer](#), has provided a more user-friendly way to interact with Landscape data and look up associated species and habitat information, with over 7,000 views per year.

Recommendations:

- Continue to investigate enhancements to the next version including riparian corridor mapping, the inclusion of newly proposed species, and applicability of the 2015 LULC change update.
- Work with the Bureau of GIS (BGIS) to ensure the Department continues to support the creation of the Land Use Land Cover data, which is the base for Landscape Project mapping.
- Continue research and development work on new data components and methodology for Version 3.4 or 4.x of the Landscape Project.
- Begin work on base layer creation for Landscape Project including new roads, riparian corridor and 2015 LULC, when available statewide.
- Continue to migrate models and scripts from the ArcMap 10.x to the ArcGIS Pro platform.
- Continue the peer review process on new methodologies as they are developed.
- Continue maintenance and enhancement of the ArcGIS Online (AGO) [Landscape 3.3 Viewer](#).

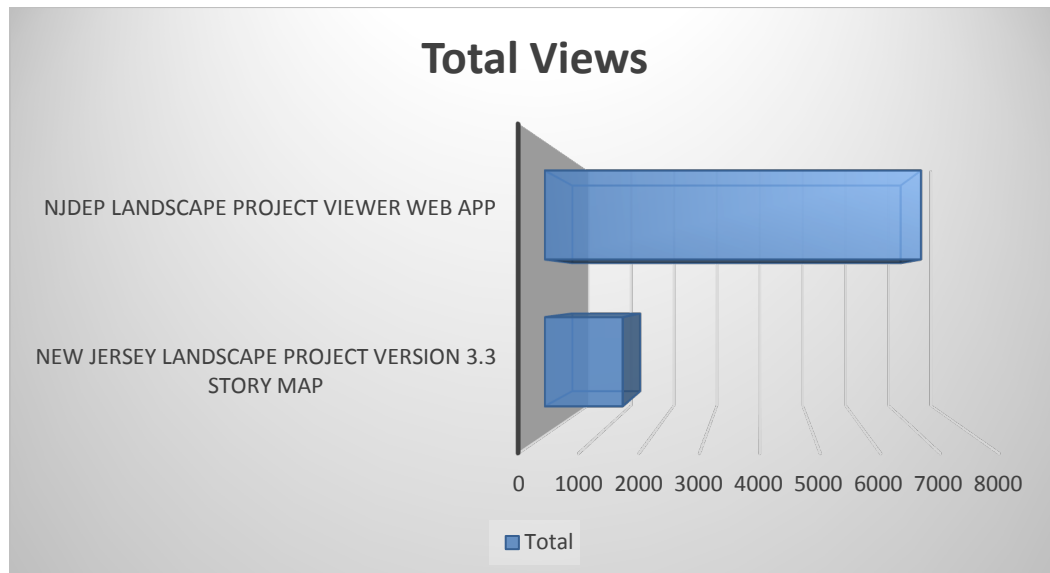
JOB NUMBER AND TITLE: 1B. Training, Information and Technical Guidance Program

Prepared by: Patrick Woerner and Brian Henderson

Objective: Build knowledge of critical habitat locations and disseminate Landscape Project data and training to guide land management, habitat conservation and acquisition, and land planning at all levels of government and non-government organizations.

Key Findings:

- GIS staff coordinated and conducted six Landscape Project GIS training/information sessions attended by a total of approximately 200 people.
- GIS training and/or guidance on Landscape Project Version 3.3 was provided to representatives of municipal agencies, environmental commissions, county planning agencies, state agencies, NGOs, private consulting firms, and the general public. Examples of some of the organizations represented by individuals that attended GIS training or information sessions include USFWS, USDA-NRCS, Rutgers University, NJ Highlands Council, Cumberland County, Mercer County, Morris County, Hudson County, Somerset County, US Army Corps, Readington Township, Shrewsbury Township, Passaic River Coalition, NJ Audubon, Antler Ridge Wildlife Sanctuary, Quinton Sportsmen’s Club, Maple Shade Sportsmen’s Club, Great Egg Harbor Watershed Association and various private environmental consultant firms.
- GIS staff designed, produced and continued to prepare GIS training materials related to Version 3.3 Landscape Project data and tools, including presentations, tutorials, and other supplemental products to facilitate use of the Landscape Project’s wildlife habitat mapping.
- Staff continued to provide the Landscape Project Training and Information Webinar program over Citrix GoToWebinar software to allow users to participate remotely until DEP’s license was terminated in July of 2018. GIS Staff are working with DOIT and performing testing regarding migrating the Citrix GoToWebinar Landscape Training program to the Skype for Business platform.
- GIS staff completed edits to the [Landscape Project Story Map](#) and the AGO [Landscape Project Viewer Web App](#), including the addition of a [tutorial](#) to make it more user-friendly.
- Over the reporting period the [Landscape Project Story Map](#) received ~1,500 views while the AGO [Landscape Project Viewer Web App](#) received over 7,000 views.



- ENSP GIS staff continued to coordinate and collaborate with the Highlands Council technical staff to incorporate Landscape Project Version 3.3-derived data into the Highlands Regional Master Plan and Critical Wildlife Habitat designations.

- GIS staff was invited to the NJ Division Allegheny Society of American Foresters 2018 Annual Training & Business Meeting where the project leader presented on the Landscape Project, Version 3.3.
- GIS staff continued to participate, as a member of the Science Advisory Committee and Rare Species work group, in the development of the NJ Conservation Blueprint Project (<https://www.njmap2.com/blueprint/>) to prioritize land preservation targets. Staff worked with The Nature Conservancy (TNC) and the New Jersey Conservation Foundation (NJCF) to revise and finalize a Rare Species component for inclusion in the Conservation Blueprint Ecological Priorities and reviewed a document developed by TNC on the Ecological Ranking Data Sources and Methods of the Conservation Blueprint project with particular attention to the Rare Species component that included data extracted from the [Landscape Project](#), [Natural Heritage Priority Sites](#), and [Nature's Network](#).
- At the behest of management ENSP, met with DEP's Bureau of GIS (BGIS) regarding access to past versions of the Landscape Project for permitting purposes. The meeting concluded that access to previous versions is not a technical hurdle, but rather a policy decision that would have to be addressed by DEP Management.
- ENSP GIS staff supported the Division of Land Use Regulation (DLUR) by providing applicable analysis and GIS data derived from the Landscape Project for regulatory reviews.
- GIS staff presented on Landscape Project, Version 3.3 as part of the Division of Natural and Historic Resources (NHR), Land Management Review (LMR) Roll Out of Revised Process meeting in January of 2018. The meeting aimed at instructing potential LMR applicants (i.e., State Park Superintendents, WMA managers) how to use a new screening tool to determine programs with an interest in reviewing potential activity applications.
- GIS Staff participated in the 31st Annual NJDEP Mapping Contest and won the 8th Annual Gail Carter Science Award for a map entitled [Nature's Network Conservation Design](#). GIS Staff also entered the [Landscape Project Story Map](#) and the AGO [Landscape Project Viewer Web App](#).
- Staff continued to provide Landscape Project support to the Division of Natural and Historic Resources' (NHR) Land Management Review Policy *Standard Operating Procedure* for screening management and other actions to determine if they will have an adverse impact on threatened and endangered species habitat.

Conclusions:

- Both the utility of Landscape data and the impact of outreach and dissemination efforts are reflected in the volume of [data download](#) requests as well as usage statistics for the new ArcGIS Online (AGO) [NJDEP Landscape 3.3 Viewer](#) and [Landscape Project Story Map](#).
- Communication and information on the Landscape maps and their limitations are vital as the Department references the mapping in various rules and regulations and continues to incorporate the mapping into policy decisions.
- Providing Landscape Project GIS training and information sessions is an essential means of disseminating guidance information and proactively addressing potential misinterpretation and misuse of Landscape Project products.
- [New Jersey Landscape Project Version 3.3](#) ESRI Story Map continues to be a valuable public information tool to provide an overview of the purpose of the Landscape Project and to showcase the data and methodology used to create the version 3.3 update and examples of Landscape Project applications.
- Landscape Project data serves as a vital basis for analysis and review such as the Highlands Critical Wildlife Habitat designations in the Highlands Regional Master Plan, the [NJ Conservation Blueprint Project](#), NHR's Land Management Review (LMR) policy and other habitat prioritization projects and environmental review.

Recommendations:

- Continue to provide guidance to state, federal, and municipal agencies and conservation groups.

- Continue to promote the appropriate application of Landscape Project maps to land-use regulation and conservation planning. In doing so, the Department will continue to afford transparency and predictability to the land-use permitting and development process.
- Continue to maintain and develop online mapping tools including the ArcGIS Online (AGO) [NJDEP Landscape 3.3 Viewer](#) and [Landscape Project Version 3.3 Story Map](#).
- Continue to support state and regional planning efforts such as the NJ Conservation Blueprint Project and the Highlands Regional Master Plan by providing applicable Landscape Project data and guidance.
- Continue to migrate the Citrix GoToWebinar Landscape Training program to the Skype for Business platform to support outreach and dissemination efforts.
- Continue to promote the integration and use of Landscape Project GIS data among and municipal and county planners.

JOB NUMBER AND TITLE: 2. Biotics Database

Prepared by: Gretchen Fowles

Objective: Update and maintain the most current data on rare species populations in New Jersey.

Key Findings:

- Updates continued to be made to the comprehensive, written data management protocol that was developed last year by ENSP to explicitly describe how observation data from various sources is processed and managed from receipt to entry into the Biotics database to serve as a user guide to train new data managers.
- A data exchange of element updates from the Biotics central database to the NJ local Biotics database was completed in March 2018, which updated some of the taxonomic information.
- Biotics staff worked with NatureServe to bulk-upload some elements, particularly bee species, that were not represented yet in the NJ local Biotics instance. That work will continue into the next reporting period.
- Calculations of the following numbers were between 9/1/2017 and 8/31/2018 to allow comparison to the previous years' 12 month reporting periods. Biotics staff received approximately 1,157 additional rare animal records, 326 from the public, and 831 from ENSP staff and partners. Approximately 800 rare animal records were entered into Biotics. There remains a backlog of approximately 980 endangered and threatened species records that have been reviewed and accepted by biologists and await entry into Biotics. The backlog of special concern species records that have been reviewed and accepted by biologists and are awaiting entry into Biotics is approximately 571.
- Biotics staff has continued to use a new tool made available by NatureServe that allows batch uploading of source feature and element occurrence data into Biotics to help streamline the data entry process. New templates have been created for ENSP biologists and partners to use based on the schema needed to implement the batch upload tool. This is allowing for more efficient processing of species observation data.
- ENSP completed development of NJ Wildlife Tracker, an ArcGIS Online mobile-friendly application, with the help of the DEP's Bureau of GIS. The intent of the application is for staff, consultants and the general public to report rare species observations as well as roadkill data to ENSP. The application uses the schema needed for the batch upload tool described above, which will streamline data management. Currently, users will need an AGO account login to use the application, which is very limiting and will not enable crowd sourced data that we desire in order for the general public to use the application. ENSP also needs to work with the BGIS to manage the flow of data on the backside of the application, including allowing biologists to review observations assigned to them online.
- The next update to the Species Occurrence Area (SOA), Sensitive Area, and Source Features files will be done in early 2019.

Conclusions:

- The recent data exchange of information from the Biotics central database to the NJ local Biotics database updated taxonomic information for many species so that our Biotics database is now more up-to-date. Next, our local ENSP database will need to be updated with that same species information.
- The number of rare animal records received was less than half what it was the previous year.
- The number of records were entered this year was less than half of what it was last year, and over half of the records entered were due to a short term contract awarded to Conserve Wildlife Foundation of NJ (CWF) to help reduce the backlog of E, T, SC herptile records. That contract will end at the end of 2018.
- The number of records in the backlog has increased for threatened and endangered species, and decreased for special concern species observations compared to last year, but it is still >1,500 records without the usual amount of ENSP staff-generated data, and despite a short-term contractor specifically charged with reducing the backlog. There are also several species status changes pending for 2019, which will increase the number of listed and tracked species, likely increasing the backlog.
- About 43% of animal records in Biotics still need to be quality-controlled.

- NatureServe's new batch upload tool is helping to streamline data entry, which is important at this time of staff limitations.
- The development of a template that follows the batch upload schema, for use by our ENSP biologists and partners has made the processing of species observation survey data much more efficient.
- Staff finished developing NJ Wildlife Tracker, a pilot ArcGIS Online option for reporting of rare species data to ENSP via DEP's Bureau of GIS. The application has great potential to make submittal of observations much more user-friendly for staff, consultants, and the public. Also, by using the schema required for NatureServe's new batch upload tool, gathering data through the application should tremendously streamline the data flow into Biotics. We are still working on solutions for the application to be usable by the public while still offering security of the data, and the data flow on the backend of the database still needs to be worked out.

Recommendations:

- Continue to update and improve the data management protocol to help ensure standardization in data management. Protocol can be used to help train new data management staff, but not without oversight from an experienced data manager. Once that oversight is in place, find additional staffing resources to limit the amount of backlog of records to be entered into Biotics that has been developing this reporting period.
- Continue to work to streamline the data management protocol, while adhering to the data standards required by ENSP and NatureServe, as much as possible, such as with the new batch upload tool and templates developed for staff and partners based on the schema needed for the upload tool.
- Encourage ENSP staff to submit their survey data so that it is not all submitted immediately prior to a planned update of the SOA.
- Increase the number of data managers and ensure there is one experienced staff data manager overseeing the flow of data on-site.
- Continue to work with the Bureau of GIS to finalize an application for the submittal of rare species to ENSP that the public can use and still enable data security, and that allows for online review of records by assigned biologists.
- Work to meet the deadlines and work procedures put in place to ensure an update of the SOA and Source Feature files are ready for release every six months. Lack of sufficient staff was the main limitation.

JOB NUMBER AND TITLE: 3. Habitat Connectivity Project

Prepared by: Gretchen Fowles, Brian Zarate, and MacKenzie Hall

Objective: To develop a strategic plan for wildlife conservation that will identify key areas and the actions needed for preserving and restoring habitat connectivity for terrestrial wildlife in New Jersey.

Key Findings:

- ENSP continued to engage the Full Working Group as well as core teams for Mapping, Guidance Document, and Communication, to develop the habitat connectivity project, now called Connecting Habitat Across New Jersey, or **CHANJ**. There are over 100 individuals in the Full Working Group, over 40 on the Mapping and Guidance Document core teams, and over 20 on the Communication core team made up of partners from both government and non-government agencies. During the reporting period, the three core teams met for a final time in December to offer feedback on the draft products, implementation plan, and communication strategy, and then the Full Working Group was re-convened in February for ENSP staff to offer demonstrations of the draft products, receive feedback, and to solicit sign up for implementation teams.
- The Communication team, led by ENSP, worked on both internal working group communications efforts, as well as public outreach products in anticipation of the release of the CHANJ products.
 - The team added content to our CHANJ public website (www.CHANJ.nj.gov), highlighting current projects and species that stand to benefit, and marking placeholders for soon-to-be-released CHANJ products.
 - The team developed a list of talking points for the project to convey a unified message, and developed a PowerPoint presentation that is appropriate for a general public audience.
 - The team created a CHANJ listserv through the Division of Fish and Wildlife's GovDelivery service as a way to share connectivity-related stories and information with partners and the public. The listserv already has more than 5,000 subscribers.
 - The team began working with NJDFW Information & Education bureau on a standard CHANJ branding for logo/image usage, color scheme, informational handouts, swag, etc.
 - ENSP gave presentations on CHANJ during the reporting period in local, regional, and national forums. ENSP staff presented at the Wildlife Society annual conference in Albuquerque, NM as an invited speaker in a special session called "Freedom to Roam – Wildlife Connectivity in Action from Data to Implementation and Assessment" (Sept. 2017), at the League of Municipalities in Atlantic City, NJ (Nov. 2017), at the New Jersey County Planners Association meeting in Lincroft, NJ (July 2018) and at the Northeast Transportation and Wildlife Conference in Amherst, MA (Sept. 2018). We also featured CHANJ draft products at a display table at the NJ Land Conservation Rally (Mar 2018) and at the Northeast Transportation and Wildlife Conference in Amherst, MA (Sept. 2018).
- ENSP staff worked with members of the Mapping and Guidance Document core teams during the reporting period to finish developing the GIS-based map and the Guidance Document.
 - The statewide CHANJ mapping of core and corridor habitat mapping, plus road segments within those areas, was reviewed by species and landscape experts in different regions of the state, one final time by the Mapping and Guidance teams, as well as by the Full Working Group.
 - Mapping methodology documentation and summary statistics were developed for review by the core teams and Full Working Group.
 - Additional CHANJ mapping tools that the team plan to make part of the CHANJ Version 1 release have been developed and reviewed as well including:
 - Stepping Stones – small core habitat areas (<12.56 ha in size) that occur within CHANJ Corridors and may provide "live-in" habitat for smaller, less vagile species.
 - NAACC Culvert Inventory – the NJ component of the 13 state North Atlantic Aquatic Connectivity Collaborative Database identifying road/stream crossings, thus likely

crossing structures across the state as well as inventory results of those that have been surveyed according to the NAACC survey protocol. Currently the scores depict aquatic wildlife passability. The CHANJ team is working with UMass and MA TNC to integrate terrestrial wildlife passability measurements and scoring into the database as well.

- Road/Wildlife Mitigation Projects – Existing and proposed structures that provide safe passage for terrestrial wildlife across roadways in NJ.
 - CHANJ Action Regions - Delineate the regions within which CHANJ Action Teams (comprised of wildlife experts, transportation planning, habitat management, and land acquisition professionals) will coordinate work on habitat connectivity.
 - Terrestrial Wildlife Habitat (TWH) Preserved Lands - Areas that have terrestrial wildlife habitat value now, have a high likelihood of being managed for wildlife conservation, and are permanently protected. This layer was still being developed during the reporting period in collaboration with the Green Acres Program.
- A pilot web application was developed displaying the various CHANJ mapping tools in an online interactive mapping format that was used for demonstration purposes at the Full Working Group meeting, as well as to start developing a public-ready CHANJ web application once the products are ready to be released.
 - [A web application](#) specifically for the NJ component of the NAACC Culvert Inventory data was developed and made publicly available. The CHANJ team collaborated with the Bureau of GIS and the NAACC database developer to create a web service representing just the NJ component of the database that is updated regularly.
 - Preparation of metadata documentation and review of some of the mapping products by the Bureau of GIS was begun.
 - The teams continued to improve early drafts of the Guidance Document both internally and by incorporating partner feedback. Additional sub-chapters were developed to provide further guidance and resources for habitat protection, management, and road mitigation. We are now working with our Information & Education bureau to produce a visually-appealing final draft for review for "soft release" to the Full Working Group by the end of 2018, followed by an official public release in the months ahead.
- ENSP presented CHANJ to the DEP's Office of Science and Research's Science Advisory Board (SAB) in July. The SAB provides independent peer review and advice on scientific and technical issues relevant to the DEP's mission and ENSP had requested that they review the CHANJ project with a focus on a) what additional tools/resources/analyses we could develop and include in future CHANJ iterations, b) ways in which we can prioritize areas within the full statewide mapping to target implementation work, and c) assessing our planned implantation approach and providing feedback on ways it can be improved. We expect their report during early 2019.
 - ENSP staff did not meet with the Roads and Wildlife Working Group made up of CHANJ partners from DOT, USFWS, and DEP (Division of Land Use Regulation and ENSP) during the reporting period, but worked with the members via email and web meetings to develop roads and wildlife specific guidance document content.
 - The ENSP CHANJ team began work under another federal grant to collaborate with partners to collect road assessment and culvert inventory data to be applied ultimately as a product of CHANJ to help further inform implementation actions.
 - The Road/Wildlife Mitigation database (an ArcGIS Online Survey 123 application developed in collaboration with the DEP Bureau of GIS, DOT, and DLUR during the last reporting period), was populated with new and proposed projects across the state. In the long term the tools can be used by counties and municipalities to help plan and implement road/wildlife work as part of CHANJ.
 - The ENSP CHANJ team in collaboration with the DEP Bureau of GIS also finished developing a mobile friendly ArcGIS Online application to use to document wildlife roadkill called NJ Wildlife Tracker. ENSP and partner staff started piloting the application during the reporting period.

- ENSP staff continued providing technical guidance on CHANJ and effective design of wildlife crossing structures, specific to new DEP Flood Hazard Area Control Act Rules to require dry passage to be incorporated where a new (or existing) bridge or culvert in a roadway that fragments threatened, endangered, or special concern species habitat.
- The statewide CHANJ products were not yet complete during the reporting period, but projects that enhance habitat connectivity are occurring in New Jersey, through land protection, management and restoration, and road mitigation.
 - ENSP staff continued to use and develop tools and protocols for project monitoring, such as remotely triggered cameras as well as collaborate with partners to collect data that will inform the project, such as wildlife on-road data and a culvert inventory.
 - ENSP staff continued to regularly meet with land managers and planners and transportation planners, to provide critical review and develop projects that will enhance habitat connectivity where appropriate.
 - ENSP staff presented to and discussed the implementation of CHANJ at the State Land Acquisition meeting in June, and met with Bureau of Lands Management staff in March.
 - CHANJ data provided the basis for projects that are being pursued under separate funding.
 - ENSP staff secured Transportation Alternatives Program (TAP) funding and progress is being made toward installing a series of amphibian tunnels and associated fencing at a major cross-road migration site along Waterloo Road, in Byram Twp, Sussex County (construction is planned for fall 2019).

Conclusions:

- Staff continued to successfully engage a multi-partner, multi-disciplinary working group to finish developing Connecting Habitat Across New Jersey, including three core teams: Mapping, Guidance Document, and Communication.
- Several communications efforts are underway to keep the CHANJ working group engaged in the project and are already being used to reach out to public audiences in anticipation of the release of the CHANJ products.
- ENSP CHANJ staff gave presentations on CHANJ at local, regional and national forums, and attended several wildlife and wildlife/transportation conferences to keep abreast of the latest developments in road ecology research to inform the CHANJ projects.
- Draft statewide habitat core and corridor mapping, as well as development of 5 other CHANJ tools were completed and reviewed by the core teams and the Full Working Group. The CHANJ staff are working with the Bureau of GIS to finalize the layers for public release early next reporting period.
- The Guidance Document team developed additional content, refined and improved earlier draft documents, and began formatting final draft layout and design.
- ENSP enlisted the DEP's Office of Science and Research Science Advisory Board (SAB) to provide independent review and advice on the implementation of CHANJ as well as improvements for future versions of the products.
- ENSP continued to provide technical guidance for CHANJ projects in relation to new Flood Hazard Area Control Act Rules calling for the design of dry passage for terrestrial wildlife when a bridge or culvert is built or replaced. ENSP also met with DEP's Green Acres Program and Bureau of Lands Management to coordinate with those programs on the use of CHANJ for guiding land acquisition and management. The Communication and Guidance Document teams worked on mechanisms, tools, and materials for the provision of additional technical guidance as part of the CHANJ product release.
- ENSP staff are implementing, researching and testing the tools that will be needed for future phases of CHANJ, including project monitoring and tracking.

Recommendations:

- Continue to engage and lead the core teams, as well as the Full Working Group and make the transition to the implementation phase of the project when products are released publicly.
- Finalize the CHANJ products, including the CHANJ mapping and the five additional mapping tools in collaboration with the Bureau of GIS, as well as the Guidance Document for a “soft release” of the products to the Full Working Group at the end of 2018.
- Work with the administration to release the CHANJ products in 2018/early 2019.
- Transition to the implementation phase of CHANJ, including recruiting, engaging with, coordinating the work of implementation partners across the state.
- Continue to develop communications products such as the CHANJ promotional video and an engaging website, as well as other products that highlight habitat connectivity work to inform the public about CHANJ and the importance of a connected landscape. Continue to work with the DEP Communications Office to try to expedite approval to release completed products.
- Continue to lead the Communication and Guidance Document teams to develop mechanisms, tools, and materials that will provide technical guidance on CHANJ.
- Continue to research and develop tools related to project monitoring and tracking, including collaboration with partners to collect data that will inform the project.
- Continue to stay abreast of research and ideas on habitat connectivity.

JOB NUMBER AND TITLE: 4. Habitat Change Analysis Project (HCAP)

Prepared by: Patrick Woerner and Sharon Petzinger

Objective: Develop and conduct habitat change analysis that will allow for the ongoing examination of wildlife habitat transition and fragmentation trends over a time.

Key Findings:

- ENSP staff continued to collaborate with Rowan University to develop and execute automated geo-processing and statistical routines to analyze habitat change taking a programmatic, reproducible approach for ongoing examination of wildlife habitat transition and fragmentation trends over time. ENSP received the deliverables from Rowan University covering four time periods: 1986-1995 (T1), 1995-2002 (T2), 2002-2007 (T3) and 2007-2012 (T4).
- GIS staff began development of a scope of work for creating data visualizations serving up HCAP data internally and externally.
- GIS staff worked with Rowan University to make requested changes to deliverables and provided analysis output results that can be utilized in the development of species status assessments and recovery plans.
- Staff organized all deliverables to date and placed them on an internal file sharing site for staff to review and use in species status assessments and other internal conservation initiatives. The HCAP directory includes:
 - feature classes on habitat change and fragmentation for each of the 60+ species analyzed as well as species range extents, road-bound blocks and relevant geodatabase tables
 - excel files with predetermined habitat calculations and fragmentation statistics for each of the 60+ species.
 - a composite of statewide E&T habitat change.
 - a compilation of derivative maps, charts and other data visualization outputs.
 - deliverables related to habitat change on Wildlife Management Areas (WMAs).
- GIS staff will use input from biologist staff on HCAP products help staff prepare species status assessments and recovery plans.
- ENSP continued to maintain range extents for 59 species covering 66 unique species-occurrence type combinations. Range extents were typically developed by applying minimum bounding geometry in the form of a convex hull to available species occurrence data. Where occurrence data was spatially disparate, separate hulls were generated for a given species-occurrence type combination. Finally, range extent polygons were hand-edited to accurately represent the occupied range and to generally conform to habitat regions bounded by major roads.
- Habitat associations based on 1986, 1995, 2002, 2007, and 2012 LULC level III Anderson codes were maintained for each of the 66 unique species-occurrence type combinations.
- ENSP and Rowan University have provided draft pilot products of data visualizations that will inform development of an interactive dashboard that enables non-technical staff to explore the findings in a guided way, and end-user documentation that explains how the dashboard and/or reports can be used to answer land-use/land-management related questions.
- Staff began testing ESRI Insights software and will investigate obtaining a professional Tableau license to experiment with HCAP data prior to finalizing a scope of work for creating data visualization products and dashboards to serve up HCAP products.
- ENSP staff is preparing to create a new habitat base layer from the 2015 Land Use/Land Cover (LULC) when it becomes available to create a consistent basis for comparative analysis across all LULC datasets (1986, 1995, 2002, 2007, 2012, 2015).

Conclusions:

- Implementing a programmatic approach to analysis has proved an effective and efficient way of obtaining nuanced multi-level estimates of habitat change for an extensive list of species.

- Finalizing a scope of work was delayed because of the potential cost-benefits of awaiting the availability of the 2015 LULC for incorporation into the next round of analysis and because staff requires time to test in-house options including ESRI Insights and Tableau Professional as they relate to creating data visualization products and dashboards to serve up HCAP products.
- The development of species range extent data products can have ancillary benefits for other conservation planning projects (e.g., Wildlife Management Area planning, Focal Species mapping for Wildlife Action Plan development, no-net-loss habitat conservation plans).
- Results can be used for secondary analysis of Wildlife Management Areas, preservation areas (Highlands, Pinelands, CAFRA) and regulated areas.
- ENSP review of preliminary outputs confirmed that analysis results will be a useful component to determine trends in habitat loss and conversion, and for development of species status assessments and recovery plans.

Recommendations:

- Utilize analysis results (and obtain feedback on the analysis) for its use in the development of species status assessments and recovery plans.
- Continue testing ESRI Insights software and investigating obtaining a professional Tableau license to experiment with HCAP data prior to finalizing a scope of work for creating data visualization products and dashboards to serve up HCAP products.
- Incorporate the 2015 LULC change update into the next round of analysis, when available.
- Provide additional funding for contract work with Rowan University to expand the analysis and further develop data interpretation products/visualizations and an interactive dashboard.
- Continue to collaborate with Rowan to develop and implement GIS and statistical routines to analyze wildlife habitat change and fragmentation utilizing a programmatic approach.
- Update species range extents and habitat associations as new data become available.
- As they are updated, incorporate the latest Land Use/Land Cover (LULC), range extents, species-habitat associations and road-bound blocks into the HCAP database, analysis routines and report outputs.
- Explore leveraging analysis results to guide and monitor effectiveness of habitat conservation planning, land-use regulation and planning, land management, restoration and preservation efforts.
- Gain proficiency in leveraging PostgreSQL and PostGIS in order to manage habitat change database and run automated scripts to produce data outputs and reporting components.
- Continue to develop guidance and interpretive products to package with analysis outputs to guide use and application of change analysis data.

JOB NUMBER AND TITLE: Job 5 - Technical Guidance on Behalf of SGCN

Prepared by: John H. Heilferty

Objectives:

To identify projects, proposals, policies or management plans which have the potential for adverse impacts to populations of SGCN and/or the habitat(s) essential for their long-term viability.

To provide consultation on projects, proposals, policies and management plans proposed or conducted by federal, State, county, municipal, NGO, commercial and/or private residents in order to minimize adverse effects and maximize beneficial effects to endangered, threatened, special concern and rare wildlife. Consultation shall include: targeted environmental impact assessments of specific projects, activities or management plans; habitat and/or environmental assessments; development of planning tools such as habitat-, activity- or species-specific “best management practices;” or the generation of applicable GIS data or tools for constituent use in performing site assessments, species and/or critical habitat investigations or regional planning efforts.

JOB 5A. Project Review

Key Findings:

- In this reporting period over 36 state, federal, and local agencies or programs requested or were provided input and guidance from ENSP on projects and activities related to SGCN wildlife and habitats, resulting in 579 reviews completed by ENSP staff. A listing of the reviews by category is found in Table 1.
- ENSP biologists continued to perform impact assessments and review resource reports and/or proposed mitigation efforts for a variety of projects including but not limited to 1) a proposed project by the NJ Department of Transportation to minimize rock fall onto a major highway, a review conducted in collaboration with the National Park Service; 2) Transco NE Supply Enhancement Project; 3) a bridge replacement project by the NJ DOT; 4) a dam replacement project at Yards Creek Reservoir, Warren County; and 5) a dam removal project on the Paulins Kill River (Columbia Lake dam).
- Staff continued working with NRCS biologists on Working Lands for Wildlife, which focused on managing early successional habitat specifically to benefit golden-winged warblers. ENSP staff worked with NRCS biologists to assess and provide guidance for applicants interested in participating in this program.
- Staff continued to consult with other DEP agencies and the USFWS on bald eagle nest area protections in the face of proposed developments, including working with USFWS staff to develop conditions included in permits issued pursuant to the Bald and Golden Eagle Protection Act.
- ENSP staff continued to review projects on behalf of the US Department of Housing and Urban Development (“HUD”), in their capacity as the action agency for the rebuilding of homes and businesses after Hurricane Sandy in the coastal zone, to assess whether the proposed plans had the potential to negatively impact federally listed species (including piping plover, red knot and northern long-eared bat) and to determine whether consultation with USFWS should be initiated. Staff also reviewed projects relating to state listed species to determine what, if any, impacts were expected and how to mitigate or prevent those impacts.
- Staff continued to review coastal development projects related to the elevation of existing structures to new state/FEMA standards, new coastal hardening projects (private landowners), extensive coastal beach-fill projects (USACE) to screen for potential impacts to state- or federally-listed species. Staff also reviewed numerous projects for the Division of Coastal Engineering and U.S. Army Corps of Engineers on beach stabilizing projects (beach fills, groins, etc.) to reduce impacts on beach nesting birds and other species.
- Staff contributed to the review of US Army Corp Feasibility Report and Integrated Environmental Assessment (10-18-17), New Jersey Beneficial Use of Dredge Material for the Delaware River, Feasibility Report and Integrated Environmental Assessment, providing specifications for creating/restoring high quality horseshoe crab spawning and red knot/shorebird foraging habitat in Delaware Bay. This USACE project was connected to proposed State-Municipal coastal resiliency/habitat restoration projects (horseshoe crabs, shorebirds) in three Delaware Bay communities (Lower Township, Gandy’s Beach, and Fortescue).

Table 1. Number of Technical Guidance reviews and consultations conducted by ENSP by category, 10/1/17 through 9/30/18.	Number of Reviews: 10/1/17 – 9/30/18
1. State: reviews	
DEP Land Use Regulation Program (Freshwater Wetland Act, CAFRA, Waterfront Development, Stream Encroachment, Highlands Act, Pinelands Act)	137
Bureau of Coastal and Land Use Enforcement	0
Sandy Related: HUD/CDBG/Debris removal Reviews	9
Division of Watershed Management	0
Division of Water Quality	2
Division of Construction and Engineering	9
Office of Program Coordination and Environmental Review	49
Office of Dredging and Sediment Technology	5
Office of Permit Information and Assistance	0
Division of Parks and Forestry	10
NJDEP Review of Activities Proposed for N&HR-Administered Lands and Waters	186
Division of Solid and Hazardous Waste Management	0
Site Remediation Program	2
Bureau of Surface Water Permitting	0
Bureau of Wastewater Management	1
Bureau of Marine Water Monitoring	0
Office of Water Policy	0
Office of the Commissioner	5
New Jersey Department of Transportation	3
New Jersey Pinelands Commission	1
Office of Policy, Planning and Science	0
Office of Sustainability and Green Energy	0
Office of Coastal and Land Use Planning	1
Bureau of Land Management	22
Division of Fish and Wildlife, Exotic and Nongame Permits Office: Scientific Collecting Permits	109
2. U.S. Government: reviews and consultations	
U.S. Fish and Wildlife Service	70
Army Corps of Engineers	8
Federal Emergency Management Agency (FEMA)	0
Nuclear Regulatory Commission	0
National Marine Fisheries Service	1
National Park Service	10
Natural Resource Conservation Service	3
National Oceanic and Atmospheric Administration (NOAA)	0
Environmental Protection Agency	1
Federal Energy Regulatory Commission	0
U.S. Military: Army, Navy, Air Force, Coast Guard	5
Bureau of Ocean Energy Management	3
3. Interstate Commissions, etc.: reviews and consultations	0
Delaware River Basin Commission	0
NY/NJ Port Authority	1
Atlantic States Marine Fisheries Commission	3
Meadowlands Commission	0
Atlantic Flyway Council	1
US Fish & Wildlife Service, Atlantic Coast Joint Venture	1
Other officially recognized interstate committees and cooperatives	0
4. County and Local Entities: reviews and consultations	0
County Mosquito Commissions	1
County and Local Park Commissions	4
Watershed Associations	1
Local Municipalities	4
Local and Regional Environmental Commissions	0
5. Private, Non-Profit Conservation Organizations: reviews	0
National Fish and Wildlife Foundation	1
State and county Federations of Sportsmen's Clubs	0
The Nature Conservancy, Natural Lands Trusts, NJ Audubon, etc.	17
NJ Conservation Foundation	3
Other (other direct-contact project reviews)	5
Total:	579

Conclusions:

- Within this reporting period over 36 state, federal, and local agencies or programs requested input and guidance from ENSP on projects/activities related to SGCN and their habitat, with 579 reviews completed by ENSP staff. The ENSP clearly serves an instrumental role in representing the needs of rare wildlife on behalf of the NJDEP.
- ENSP staff has served a particularly critical role in performing efficient, knowledgeable technical guidance regarding impacts to federally-listed species for state and federally-implemented projects where rapid and accurate response or assessment was critical to delivery of project goals.
- Interstate and Flyway organizations, 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.

Recommendations:

- This job should continue to be funded continuously since it allows ENSP staff to thoroughly and proactively consider impacts to State- and federally-protected endangered, threatened, special concern, and nongame wildlife habitat in the course of applications for government-issued permits.

Job 5B. Policy and Planning**Key Findings:**

- Staff met with the DEP's Division of Land Use Regulation and discussed plans to revise the current Habitat Evaluation Model used to assess lands for mitigation purposes.
- Staff began coordinating with USFWS and NJDOT on a formal bridge inspection program for bats, following the recent adoption of a Range-wide Programmatic Agreement between the Service and Federal Highway Administration requiring bat inspections prior to bridge repairs or modifications that may affect federally listed Indiana Bats or Northern Long-eared Bats. Where colonies of non-federally listed bats are documented, state protections against take will apply as per New Jersey's Endangered and Nongame Species Conservation Act.
- Staff continued work on a programmatic consultation for the bog turtle with NJ Department of Transportation, US Fish and Wildlife Service–New Jersey Field Office, and state Division of Land Use Regulation. An ongoing effort, previous funding from the Federal Highways Administration had been exhausted. The programmatic will cover transportation projects in NJ receiving federal funding that may affect the bog turtle.
- Staff continued work on a programmatic consultation for the piping plover with US Army Corps of Engineers, NJ Division of Coastal Engineering, US Fish and Wildlife Service–New Jersey Field Office, and Division of Land Use Regulation staff.
- Staff worked with NJ Division of Parks and Forestry and U.S. Fish and Wildlife Service–NJ Field Office, to hone the approach to predator management, while abating public concerns, for the benefit of endangered beach nesting birds.
- Staff worked with U.S. Fish and Wildlife Service, and their contractors, and the NJ Division of Parks and Forestry to update or create beach management plans for the benefit of beach nesting birds in municipalities and state parks along the coast. These plans were then implemented by NJDFW.
- Staff spent extensive time on the newly-revived Forest Stewardship Advisory Council reviewing the Forest Action Plan and advising on forestry policies.
- GIS staff continued to participate in the [NJ Conservation Blueprint](#) Project's Science Advisory and Rare Species work groups and provided guidance on GIS data for inclusion, including [Landscape Project](#) and [Nature's Network](#) data.
- Staff spent significant time working on the following committees of the Atlantic States Marine Fisheries Commission:
 - The Delaware Bay Ecosystem Technical Committee: ENSP staff conducted data analysis, reviewed reports, stock assessments and harvest allocation recommendations, and other duties in preparation for bi-annual meetings.

- The Adaptive Resource Management (ARM) Subcommittee: ENSP staff contributed red knot data (aerial survey, re-sightings of marked birds) and technical guidance for developing annual harvest allocation with ARM Model (implemented in 2013).
- Staff conducted a detailed review of Atlantic States Marine Fisheries Commission (ASMFC) Addenda and annual reports to identify data they collect on number, sex, and mortality of biomedical horseshoe crabs (i.e., crabs collected and bled to produce *Limulus Amebocyte Lysate*). This review, prompted by the New Jersey Endangered and Nongame Species Advisory Committee (ENSAC), was conducted in response to the lack of increase in Delaware Bay horseshoe crabs given 20 years of bait harvest reductions focused primarily on increasing females. ENSAC is responsible for status review of horseshoe crab and shorebird food resources (i.e., horseshoe crab eggs) pursuant to NJ's legislated moratorium on the bait harvest of crabs.
- In response to the Programmatic Biological Assessment (PBA) for intertidal structural aquaculture, completed in 2016 by ENSP and Bureau of Shellfisheries, the USFWS issued a Programmatic Biological Opinion (PBO) to the US Army of Engineers concerning issuance of Nationwide Permits for shellfish aquaculture in a portion of Delaware Bay. The PBO provides conservation measures for aquaculture operations and a ten-year framework to conduct new studies (impacts of aquaculture on red knots, horseshoe crabs, benthic invertebrates) and present new information to inform, and potentially revise, conservation measures. To implement the PBO, three work groups were formed: a Stakeholder Group, mainly aquaculture and conservation interests, a Science Advisory Group convened as needed, and an Agency Work Group to oversee this process (NJDFW, NJ Dept. of Agriculture, USFWS, US Army Corps). In 2017 the Stakeholder Group adopted by-laws and a schedule for annual presentation of new information regarding potential changes to Conservation Measures (November), and government agency review/adoption/revision to Conservation Measures (December/January). In 2018 the Stakeholder Group presented new information and requested two changes to conservation measures; 1 was adopted, 1 was rejected by the Agency Work Group.
- Staff of ENSP and Bureau of Law Enforcement continued to cooperate with the USFWS–NJ Field Office regarding their ongoing assessment of banner plane disturbance to federally-threatened red knots. The USFWS guidance document, with best practices to avoid red knot disturbance, was issued to five banner plane companies operating in New Jersey along Delaware Bay (spring, May-early June) and Atlantic Coasts (summer- Mid-July through September). USFWS follow-up in 2018 included a letter to banner plane companies outlining legal implications of ESA/disturbance which garnered greater cooperation (documented by systematic field observation on Delaware Bay).
- Staff of ENSP provided technical guidance (two reports) on migrant shorebird abundance and use of North Brigantine Natural Area, including the importance of this area to red knots. The guidance, provided to NJ Division of Parks and Forestry, was used to review and update seasonal recreation management to reduce disturbances to red knot and habitat.
- ENSP staff assessed and worked on revisions to the Program's best management practice (BMP) document regarding routine vegetation management on overhead transmission line rights-of-way (ROW). Based on the demonstrated utility of such BMPs and their usefulness informing and expediting certain types of project reviews, the original BMP document is being expanded to address a wider range of standard maintenance activities (including activities requiring excavation or grading) on any form of maintained utility ROW (not merely overhead transmission lines).
- Program staff made recommendations or provided technical guidance to Department or State agencies regarding changes or amendments to federal law, regulations or policies, including the Migratory Bird Treaty Act and the Endangered Species Act.

Conclusions:

- ENSP staff contributed to a number of state and federally initiated planning efforts, delivering important regional expertise on species abundance, trends and habitat needs, helping to assess regional threats and to identify the actions which might address them.
- ENSP staff has also helped steer State or local policies or regulations in a manner which advocate for wildlife needs.

Recommendations:

- This job should continue to be funded continuously since it allows ENSP staff to remain engaged in the development of federal, State and local planning or policy initiatives, which will help advance the needs of State and federally protected wildlife.