Interim Report
State Wildlife Grants
T-9-R-2

New Jersey's Landscape Project

Interim Report for Project Year
September 1, 2012 – August 31, 2013

NJ Department of Environmental Protection

DIVISION OF FISH AND WILDLIFE
ENDANGERED AND NONGAME SPECIES PROGRAM
P.O. BOX 420
TRENTON, NJ 08625

EXECUTIVE SUMMARY

Project: **New Jersey's Landscape Project**
Federal Aid Project: T-9-R-1 (State Wildlife Grants)
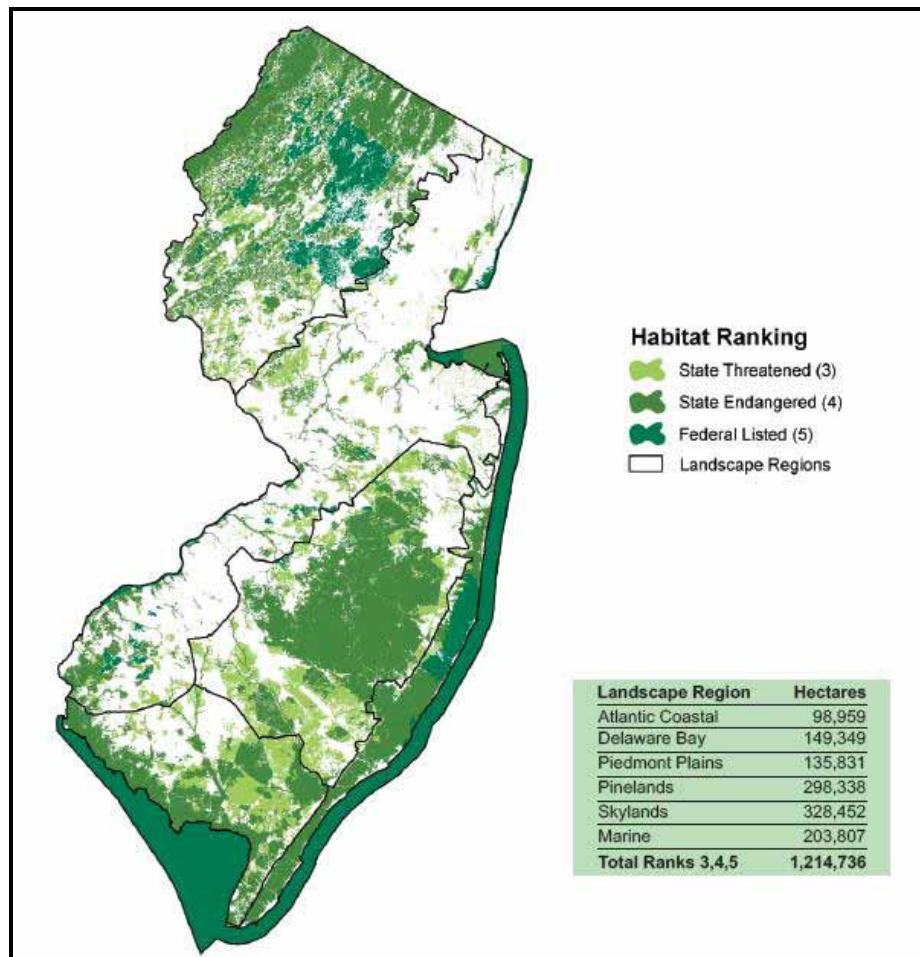Segment dates: September 1, 2012 to August 31, 2013

JOB 1: Wildlife Habitat Mapping

Project Leader: Peter Winkler

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

Key Findings:

- Version 3.1 was completed and released to the public in February of 2012. The release of the updated mapping was coordinated with revisions to the state list of threatened and endangered species. Finalized mapping for each of the six Landscape regions was completed for all listed species. This mapping incorporates the previous eight GIS layers per Landscape region into one GIS layer per Landscape region. This will likely eliminate some user error.

Habitat Ranking

State Threatened (3)
State Endangered (4)
Federal Listed (5)
Landscape Regions

Landscape Region	Hectares
Atlantic Coastal	98,959
Delaware Bay	149,349
Piedmont Plains	135,831
Pinelands	298,338
Skylands	328,452
Marine	203,807
Total Ranks 3,4,5	**1,214,736**

- All Landscape Project GIS data continue to be made available in both Shapefile and file geodatabase format and fully documented with Federal Geographic Data Committee (FGDC) compliant metadata. The data is served on the NJDEP Bureau of GIS website for download (http://www.nj.gov/dep/gis/landscape.html) as well as on the NJDEP interactive mapping application (NJ-GeoWeb).
- ENSP updated the Landscape Project website to reflect the changes to the updated version. http://www.state.nj.us/dep/fgw/ensp/landscape/index.htm
    - Landscape Project Version 3.1 has been fully documented in a 1,490 page report available for download on the Landscape Project website
    - The report is organized as follows
        - New Jersey's Landscape Project (Version 3.1)
        - Appendix I – Protocol for Accepting or Rejecting Species Sighting Reports
        - Appendix II - Species Occurrence Area Justifications
        - Appendix III - NJDEP 2007 Land Use/Land Cover Categories
        - Appendix IV - Land Use/Land Cover Analysis for Species and their Feature Label Components
        - Appendix V - Land Use/Land Cover Selections and Patch Type Justifications

- ENSP incorporated approximately 1,000 new or updated Species Occurrence Areas (SOA) for use in the next update to the Landscape mapping since Landscape Version 3.1 was released.
- Work on Version 3.2 of the Landscape Project was started and is ongoing (~27% complete) with an approximate completion date of February of 2014.
- Using ArcGIS Model Builder, GIS staff created models to complete all aspects of Landscape Project Mapping. Previous versions of Landscape combined ArcGIS and MS Access to query and compile the tabular data exported from ArcGIS. Incorporating all aspects of Landscape creation within the ArcGIS platform will enable a more automated, standardized and efficient process.
- In the delineation of Species-Based Habitat, each Species-feature label combination is assigned a "Patch Type" or category that describes the method employed to form the valued habitat. There are four main Patch Types; Limited Extent, Contiguous Area, Cardinal-Proximate and Stream Centerline. Below is the ArcGIS model for the Contiguous Area patch type.

- Utilizing Citrix, Version 3 methodologies were developed and documented in a Microsoft Access database for all listed species. This enabled staff to enter and access their species attributes in one centralized database without having to travel to the Trenton office.
- ENSP biologist staff upgraded to ESRI's ArcGIS 10.x from older versions of GIS software. This upgrade facilitated collaboration on the creation of GIS data for the development of Version 3.2 Landscape Project.
- All listed mussel occurrences were mapped in a new statewide streams layer.
- ENSP staff met with the Division of Land Use Regulation (DLUR) and performed a review of new mapping methodologies for some of the most controversial species for certain land use regulations. We worked with DLUR to collaboratively produce a mapping product for those species so we were all satisfied with the end result.
- No peer review committee meetings were conducted. However, we sought new peer review committee members, and a few potential GIS-specific experts were identified for future participation.

Conclusions:

- In January, 2012, ENSP published the new statewide mapping using Version 3 methodology, concurrent with revised lists of endangered and nongame wildlife. This was a major accomplishment and provided agencies, citizens and conservation groups with the best information on habitats used by species of greatest conservation need in NJ. Release of the new map products was accompanied by thorough documentation of the data and methodologies employed to create them.
- Creating a statewide version of the Landscape Project that incorporates Version 3 methodologies was more time consuming than anticipated. If more detailed and species-specific mapping is going to be developed then more staff time and resources must be devoted to Landscape Project mapping.
- Due to the cleanup efforts related to Hurricane Sandy (debris cleanup removal, HUD CDBG projects), GIS staff spent more time than anticipated in duties described in the T-11-9-2 Technical Guidance State Wildlife Grant.

Recommendations:

- Now that Version 3.1 method has been solidified, continue to develop modeling within the ArcGIS platform that will speed up the update process.
- Continue the peer review process on new methodologies as they are developed.
- Develop a plan for releasing the Landscape Project products and, to the extent possible, minimize delays in product updates.
- Work with the Department's Bureau of GIS to ensure the Department continues to support the creation of the Land Use Land Cover data which is the base for Landscape Project mapping.
- Develop methods to automate the baselayer creation for Landscape Project. The Department has started the process of updating the Land Use Land Cover data from the current 2007 to 2012.
- Recreate Landscape Project using the updated 2012 Land Use Land Cover data when available.

JOB 2: Biotics Database

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

Key Findings:
- ENSP contracted with the Conserve Wildlife Foundation of NJ (CWF) for professional assistance with entering and maintaining records in the Biotics database. All activities described below have been completed with staff assistance from the ENSP and the CWF.
- Biotics staff received approximately 2,032 additional rare animal records during the 2012-13 segment, 778 from the public and 1,254 from ENSP staff. Approximately 2,729 rare animal records were entered into Biotics and of those approximately 929 were updates to previously mapped records. There remains a backlog of approximately 1,134 endangered and threatened species records that have been reviewed and accepted by biologists and are awaiting entry into Biotics.
- Staff exported data, developed, and released Version 9 of the Species Occurrence Area (SOA), Sensitive Area, and Source Features files in March. Staff exported data and began developing Version 10 in August, but had not finished developing the products by the end of the grant period. SOA_10 will be used to update V. 3.1 of the Landscape Project mapping in early 2014. There were approximately 1,075 new source feature records with rank 3, 4 or 5 (state or federally endangered or threatened species) included in SOA_9.
- Staff continued to participate in a pilot program in the roll-out of NatureServe's Kestrel, a mobile observation system that is a component of the next generation of the Biotics database (Biotics 5) and which will allow for online data entry of observation data as well as integrate with the Biotics database. Staff worked with NatureServe to set up a New Jersey instance of the application. Staff have also been testing the application by having staff biologists use Kestrel to enter incidental rare species sightings, ENSP staff have been using it to enter data from ENSP's American Kestrel Nestbox Project, and the application has also been used by to enter survey data for a roadkill project conducted by a Montclair State University graduate student in collaboration with ENSP staff.
- Staff have participated in NatureServe-led webinars and have been working with a pilot review application of Biotics 5 in order to become familiar with the new version and understand what preparations will need to be made prior to the conversion.
- A data exchange with NatureServe did not occur during the reporting period in anticipation of the conversion to Biotics 5 in the summer 2013. The conversion to Biotics 5 will enable automatic data exchanges, unlike the current system that entails about a week of staff time. New Jersey is now scheduled to convert to Biotics 5 January 2014.
- There were no outreach efforts this reporting period related to the rare species database, procedure for submitting data, and how the data is used.

Conclusions:
- The number of rare animals records received (2,032) was similar to the last reporting period (2,022). Biotics staff entered more records into Biotics than were received during this segment. The number of records in the backlog has increased for the past three consecutive years: 558, 889, and 1,134 respectively.
- Approximately 37% of animal records in Biotics still need to be quality-controlled.
- A schedule of releasing an updated SOA file every six months was not achieved during this segment. The data was exported on the six month schedule, but the development and release of each version was delayed due to shortage of staff time.
- A customized NJ system of NatureServe's Kestrel product has been successfully set up and a review of it has begun by ENSP. It has the potential to be much less costly in the long-term and integrate more seamlessly with the Biotics database than *NJ Wildlife Tracker*. There are known updates NatureServe plans to make to the product, but their focus is on the full release of Biotics 5 first, which should be complete in 2014.
- Staff have begun preparing for the conversion to Biotics 5 which is schedule to take place in January 2014.

- The delay of the release of Biotics 5 resulted in the NJ dataset in NatureServe to be increasingly outdated. It is ideal to have NatureServe handle data requests for multi-jurisdictional rare species data to avoid having ENSP staff time spent on preparing datasets, but that becomes a less viable option as the dataset becomes more outdated. This will be rectified in January 2014 when NJ converts to Biotics 5, which allows for automatic exchanges.

Recommendations:
- Continue to allow a small number of staff in field offices to enter data into Biotics via Citrix to help with the backlog of data entry and quality control. Hire contract employees and seasonal interns as funding allows to further reduce backlog. Consider expansion of the role of ENSP staff in entering data, which promises to be a much less onerous task once Biotics 5 is in place.
- Continue to follow 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.
- Continue to review the NJ specific Kestrel system and offer feedback to NatureServe.
- Continue open lines of communication with NatureServe and among ENSP, CWF, and Natural Heritage Program staff so that proper preparations can be made for the conversion to Biotics 5 in January 2014.
- Develop new work procedures for data entry and database maintenance as needed to streamline the processes post conversion to Biotics 5.

JOB 3: Landscape Project Implementation

Project Leader: Patrick Woerner

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:
- The project leader provided six Landscape Project GIS training/information sessions attended by a total of approximately 250 people.
- The project leader coordinated and conducted GIS training and provided guidance to representatives of municipal agencies, environmental commissions, county planning agencies, state agencies, NGOs, private consulting firms, and the general public.
- Project staff participated in a New Jersey Municipal Asset Profiler (NJ MAP) Focus Group meeting hosted by Rowan University. NJMAP is a web mapping tool that Rowan University's GEOLAB is developing to showcase, and make easily accessible, important data sets for local decision making. The project is broadly focused on planning metrics and environmental themes, including Landscape Project data: http://njmap.rowan.edu/themes.html.
- Staff conducted a Landscape Project session as part of a day-long wildlife habitat training for USDA Natural Resources Conservation Service (NRCS), New Jersey field staff. NRCS field employees use the Landscape Project maps on a daily basis for conservation planning and were given an overview of the mapping updates and enhancements included in Version 3.1.
- Staff presented "*Wildlife Habitat Mapping for Community Land-use Planning and Species Conservation*" and submitted a Landscape Project Version 3.1 map to the Map Gallery at the Mid-Atlantic Chapter of URISA 2012 Conference held in Atlantic City, NJ.
- Project staff won an award ("Best Analytic Presentation") for a *Landscape Project 3.1* map submitted at the 2012 Esri Mid-Atlantic User Conference held in Baltimore, MD.

- Staff presented on the *Landscape Project (Version 3.1)* habitat mapping methodology at the national NatureServe Conservation & Natural Heritage Conference, "Biodiversity Without Boundaries 2013" held in Baltimore, MD.
- Staff provided the NJ Forest Service with updated species lists based on Version 3.1 of the Landscape Project mapping and the most recent occurrence data for consideration and inclusion in the Whiting Wildlife Management Area Natural Resource Stewardship Plan and for a draft plan being developed for Double Trouble State Park.
- Staff partnered with the GeoLab at Rowan University to design a habitat change analysis pilot project and investigate the development of automated mapping and analysis routines to examine wildlife habitat transition and fragmentation over time. Habitat base layers were generated from available LULC (1986, 1995, 2002 and 2007) to create a consistent basis for comparative analysis. Species range extents were developed for: Arogos skipper, barred owl, black-crowned night-heron, bobcat, bobolink, golden-winged warbler, Indiana bat, northern harrier, timber rattlesnake and wood turtle. The GeoLab at Rowan University presented preliminary results of the habitat change analysis for timber rattlesnake and ENSP provided input on analysis methodology that GeoLab will incorporate into automated GIS analysis routines.
- The Landscape Project Training and Information Webinar program over Citrix GoToWebinar software was expanded allowing for users to participate remotely.
- Landscape Project data was the fifth-most downloaded DEP GIS data set with a total of 2,884 download requests between August 2012 and July 2013:
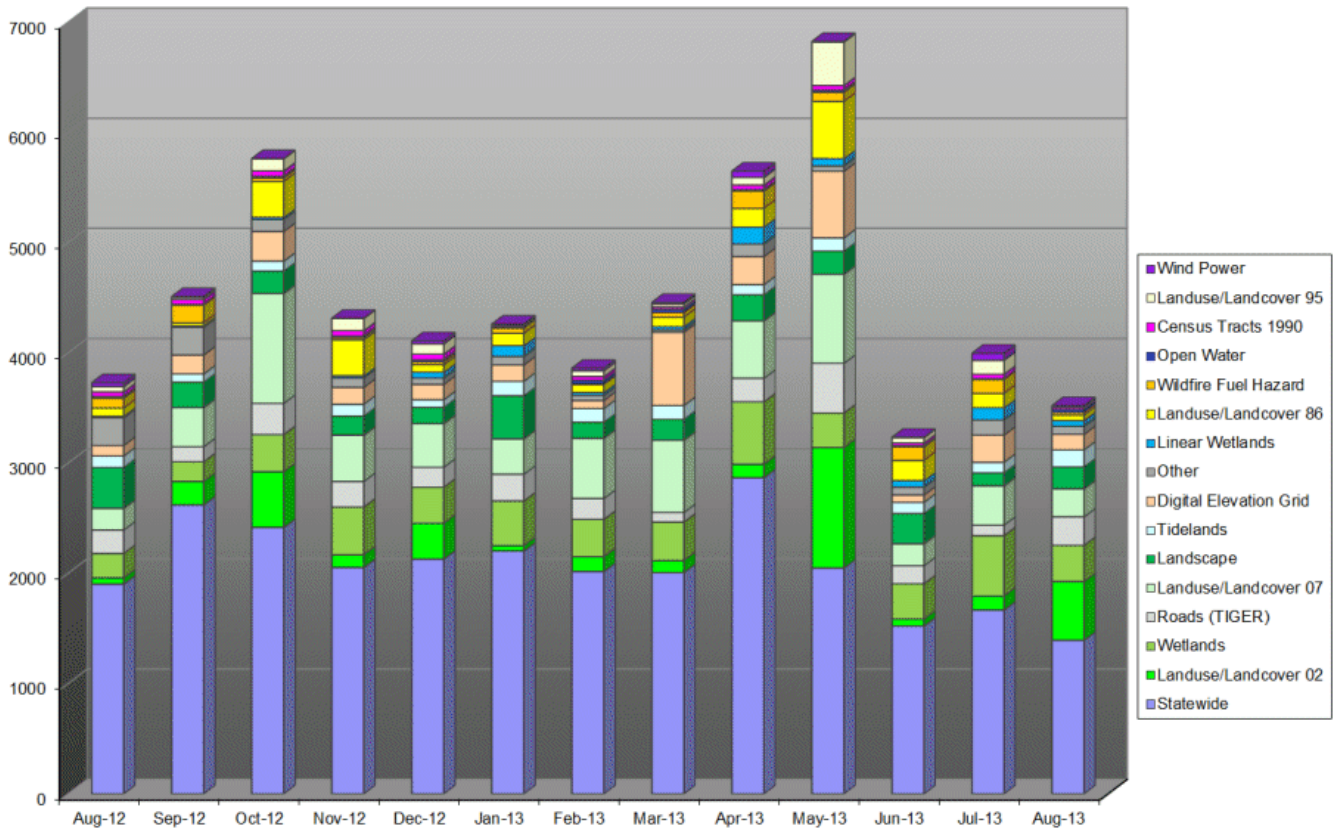
NJDEP GIS Internet – Digital Data Download Requests: August 2012 – August 2013

(Sorted Alphabetically)

Directory	Aug 2012	Sep 2012	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013	Aug 2013	Year Total
Census Tracts 1990	42	45	49	96	53	16	35	22	41	44	26	42	21	532
Cross Acceptance (see detail table)	155	166	20	9	12	10	28	15	9	25	23	24	12	508
Digital Elevation Grid	96	172	269	153	139	148	73	664	255	605	66	247	141	3028
Integrated Reports 2002	31	41	16	19	19	17		4	41	5	12	37	31	273
Integrated Reports 2004	34	25	31	34	10	9	1	1	29		19	43	16	252
Integrated Reports 2008	13	6	9	10	3	9	4	4	11	4	5	9	3	90
Integrated Reports 2010	19	14	33	13	13	33	13	13	24	14	13	24	10	236
Landscape	371	230	203	173	147	390	146	189	236	209	273	118	199	2884
Landuse/Landcover 86	74	28	326	52	67	112	74	85	170	519	184	131	49	1871
Landuse/Landcover 95	48	19	110	25	92	7	52	26	69	394	48	125	14	1029
Landuse/Landcover 02	56	213	505	115	324	50	134	109	122	1092	63	127	532	3442
Landuse/Landcover 07	196	355	997	419	395	321	545	655	520	808	199	356	254	6020
Linear Wetlands	13	12	20	33	54	97	26	28	153	67	58	110	52	723
Open Water	15	6	13	14	17	9	26	25	14	17	8	6	24	194
Roads (TIGER)	213	137	283	233	182	243	190	87	215	452	164	95	259	2753
Statewide (see detail table)	1904	2622	2418	2054	2131	2203	2018	2008	2869	2050	1523	1668	1394	26862
Tidelands	104	75	90	108	70	132	125	126	93	120	103	96	155	1397
Wetlands	222	179	338	434	328	405	339	350	566	314	321	549	329	4674
Wildfire Fuel Hazard	90	161	33	22	27	49	10	46	157	84	124	127	27	957
Wind Power	35	7	2	18	28	3	24	16	57	5	4	65	1	265
Total	3731	4513	5765	4034	4111	4263	3863	4473	5651	6828	3236	3999	3523	57990

Source: NJDEP, Bureau of Geographic Information Systems

NJDEP GIS Internet - Digital Data Download Requests: Aug 2012 - Aug 2013

Legend:
- Wind Power
- Landuse/Landcover 95
- Census Tracts 1990
- Open Water
- Wildfire Fuel Hazard
- Landuse/Landcover 86
- Linear Wetlands
- Other
- Digital Elevation Grid
- Tidelands
- Landscape
- Landuse/Landcover 07
- Roads (TIGER)
- Wetlands
- Landuse/Landcover 02
- Statewide

Source: NJDEP, Bureau of Geographic Information Systems

- Staff continued to provide support to the Division of Natural and Historic Resources' (NHR) *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:
- 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.
- Communication and information on the Landscape maps and their limitations are vital as the Department incorporates the mapping into rules and regulations.
- Expanding the Landscape Training and Information program by offering a GoToWebinar option for remote participants is an effective means for reaching a wider user audience.
- Both the utility of Landscape data and the impact of outreach and dissemination efforts are reflected in the volume of data download requests.
- Landscape Project data serves as a vital basis for analysis such as habitat prioritization 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 coordinate with Rowan University's Geospatial Research Lab to incorporate Landscape Project data and municipal-level metrics on endangered and threatened species habitat into Rowan's New Jersey Municipal Asset Profiler (NJ MAP) web mapping platform: http://njmap.rowan.edu/. Additional metrics may include a listing of endangered and threatened species habitat within a municipality or user-defined region.
- Continue to promote the integration and use of Landscape Project GIS data among and municipal and county planners.
- Continue to meet with public land managers and others as opportunities arise to promote integration of wildlife habitat management into existing or developing management plans
- Continue development and use of the GoToWebinar tool to support outreach and dissemination efforts.
- In coordination with NJDEP's Bureau of GIS, continue to track data download statistics for Landscape Project data.
- Produce materials upon the next update to the Landscape Project to support the training and information program including printing of reports, presentations, tutorials, and other supplemental products in order to facilitate use of the Landscape Project's wildlife habitat mapping.
- Continue to partner with Rowan University to develop a new project that analyzes and summarizes wildlife habitat change/conversion and habitat fragmentation trends.