

Endangered and Nongame Species Program
Monthly Report for 16 January 2022 – 15 February 2022
Plus highlights from the 2021 grant reports

Staff:

John Heilferty, Chief
Kathy Clark, Supervising Zoologist
Christina “Kashi” Davis, Environmental Specialist II
Amanda Dey, Principal Zoologist (retired as of 2/1/22)
Gretchen Fowles, GIS Specialist
MacKenzie Hall, Environmental Specialist II
Emily Heiser, Assistant Biologist
Sharon Petzinger, Senior Zoologist
Bill Pitts, Senior Zoologist
Kris Schantz, Principal Zoologist
Robert Somes, Senior Zoologist
Brian Zarate, Senior Zoologist

Administration – J. Heilferty

During this period, the Department’s return to office-based work was modified to allow remote work two-three days per week. Staff biologists completed federal reports for five grants.

Proposed changes to our Conserve Wildlife Matching Grants Program were published in the NJ Register on February 7; a public comment period is open for 60 days.

Landscape Project – J. Heilferty

No new report.

Habitat Change Analysis Project (HCAP) –S. Petzinger

No new report.

Technical Guidance & Policy/Planning – all staff

Staff continued to review and provide guidance regarding offshore wind energy planning.

In 2020 and 2021, the ENSP researched opportunities to limit the use of soil erosion and sediment control products that incorporate netting made of plastics and other synthetic materials harmful to wildlife and the environment. ENSP staff held meetings with the NJ Dept. of Transportation (DOT), attempted to engage the Dept. of Agriculture regarding state soil erosion control standards, and presented our objective to the NJ National Resources Conservation Service (NRCS) State Office. Currently, ENSP staff has drafted a potential DEP policy to address this matter on DEP owned, leased, managed and regulated lands. The draft policy is under review within the ENSP and requires further discussion within the Division.

In 2021, ENSP biologists provided input and guidance on 432 projects and activities involving SGCN wildlife and habitats to 38 different state, federal, and local agencies or programs. In many cases, the ENSP reviews were performed in association with local, state and/or federal regulatory reviews where the ENSP staff guidance ensured that agencies could find compliance with E&T species regulations or that project proposals were altered or denied to avoid adverse impacts. Important examples included routine coordination with the Department’s Division of Watershed Protection and Restoration, with whom more than 70 reviews were performed in 2021.

With the NJ DEP’s commitment to renewable energy generation, we saw an increase in policy and project-related consultations during the grant period. In 2021, ENSP staff continued reviewing off-shore wind energy project proposals, attended meetings and training regarding wildlife impact minimization, research and

monitoring, and began planning for specific research and monitoring initiatives related to wildlife migration and interaction with wind energy development off-shore of NJ.

Staff assumed duties of issuing DFW Scientific Collecting Permits for native, nongame species.

Biotics Database – G. Fowles

2021 Summary of Activities/Results:

Due to FTE limitations, ENSP's Biotics program continues to rely temporary services staff as our sole data managers.

An entire reconfiguration of how data are processed was the focus of the Biotics staff to update the system from handling most data in paper form to a more streamlined, purely electronic data system. The new system includes a mobile-friendly online submittal system called NJ Wildlife Tracker, which is designed to work seamlessly with new customized NJ batch-upload tools that enable more efficient data entry into Biotics. The system also enables online review of submitted observations by Program biologists. The new system is being tested and refined.

Biotics staff finalized and released the next version of the SOA dataset (version 13). The dataset is being used to update the Landscape Project mapping.

Connecting Habitat Across New Jersey (CHANJ) – G. Fowles, B. Zarate, M. Hall

G. Fowles organized and led our bi-monthly Roads and Wildlife Working Group meeting on Feb 10, which was attended by the usual participants from NJDOT, DEP and USFWS, as well as a representative from the Federal Highway Administration. The main topic of this meeting was the new Infrastructure Investment and Jobs Act, and details of project eligibility, timeline, priority, and who would apply for funding for wildlife crossing/passage projects.

2021 Summary: Having rolled out the two main CHANJ products, CHANJ Mapping and Guidance Document (both accessible from the CHANJ website), to the public in April, 2019, the CHANJ Team has focused on updating layers, developing additional tools and resources, and reaching out to potential implementers to demonstrate the CHANJ tools and discuss how their groups might use and apply these tools to help preserve and reconnect habitats for wildlife.

The CHANJ website continues to be accessed consistently over 1,500 times per month, and the CHANJ Web Viewer continues to be accessed approximately 5,000 times per year.

The CHANJ Team continues to develop new tools and resources to enhance the project, include a video tutorial of the CHANJ mapping, an application for the public to report roadkill observations, an application for Action Team members to identify habitat connectivity work being conducted and to coordinate efforts, and an application for agencies working on transportation planning at the state level to better communicate and coordinate on opportunities to enhance habitat connectivity.

The CHANJ layers have been incorporated into several other mapping applications outside of ENSP.

Staff continued bi-monthly meetings with the multi-partner, multi-disciplinary Roads and Wildlife Working Group to facilitate road mitigation implementation and monitoring opportunities.

There have now been >600 road/stream culverts evaluated for terrestrial passability across the state.

Despite the pandemic limiting in-person activities for two years, the CHANJ team were able to accomplish a great deal of communications through web meetings and presentations. We also used listserv posts to engage a large audience of public and partner subscribers about habitat connectivity topics. Listserv posts have drawn measurable attention to the CHANJ website and Mapping tool.

Habitat Conservation Management on Public Lands – All staff

2021 Summary of Activities/Results:

Year 3 forestry activities in Stand 12 at Sparta Mountain WMA, a 9.2-acre modified seed tree treatment, began in February 2021 and was completed in March 2021. The purpose of treating the 9.2 acres was to create habitat for SGCN, specifically golden-winged warblers and other species dependent upon young forest habitat. Cavity trees and trees with sloughing bark were also targeted for retention for Indiana bat roosts.

After a 30-day public comment period, the Addendum to the current Forest Stewardship Plan for Sparta Mountain WMA was finalized in July 2021. In response to concerns and stipulations expressed by stakeholder groups, this Addendum contained the site-selection criteria in addition to location maps and timelines of where and when activities will occur.

The site for Year 4 forestry activities in Stand 9 at Sparta Mountain WMA was selected based on the criteria in the Addendum and in accordance with the approved Forest Stewardship Plan for Sparta Mountain WMA. The purpose of treating the 10 acres is to open the forest canopy for golden-winged warbler post-fledging habitat and other species dependent upon open-canopy forest habitat. Cavity trees and trees with sloughing bark were also targeted for retention for Indiana bat roosts. The draft location map and prescription for Stand 9 activities went out for a 30-day public comment period in July 2021 and implementation will likely occur February through March 2022.

Eleven management sites were surveyed for birds on Sparta Mountain and Weldon Brook WMAs in 2021: one pre-management and ten post-management. During the 2021 surveys, 44 species (17 of which are SGCN) were observed in at least one of the nine managed sites on Sparta Mountain WMA. Based on observations from 2012 through 2021, 82 different bird species, 30 of which are SGCN, have been observed using managed sites on Sparta Mountain WMA.

In just a few years after opening the forest canopy to create young regenerating forests within the larger forested landscape of Sparta Mountain WMA, the average number of bird species observed using the sites during the breeding season more than doubled, and the average number of bird species of concern tripled, compared to those observed in closed-canopy mature forests prior to the treatment.

ENSP snake biologist (K. Schantz) met with pine barrens snake researchers to discuss potential habitat management strategies. Most agreed that if habitat management occurs, it should be limited to creating small, dispersed openings that mimic natural “blow downs” (e.g., felling 1-3 trees) and to provide habitat likely to become suitable for shedding, basking, or denning over time (e.g., creating living snags, leaving 3-4-ft trunks, some tree trunks still partially connected to the stumps, felled logs, etc.). One researcher expressed concern over the potential to damage or destroy critical habitat features already being used by snakes, though perhaps not yet specifically documented by the Division. ENSP continues to communicate with these researchers in determining an appropriate path forward. In central NJ, habitat management conducted by a conservation partner with ENSP funding had success, with eastern copperheads found basking in managed areas. Lastly, in northern New Jersey’s montane habitat, no habitat management for rare snakes was pursued due to activity constraints associated with the occurrence of rare plants identified by DEP botanists. Pursuing habitat management in potential rare plant sites will require the ENSP to contract 12-months of plant surveys for each site.

Species Status Review – K. Clark

Work to draft the regulatory language that would adopt revised endangered and nongame wildlife lists continued.

State Wildlife Action Plan – All staff

ENSP staff met with Office of Fish and Wildlife Information Systems (OFWIS) to finalize revisions to Conservation Focal Areas and get revised mapping posted online.

In 2021, ENSP staff continued to format data in preparation for an online database. In addition, staff participated in regular meetings of the Northeast Association of Fish & Wildlife Agencies technical groups focusing on the coordination of state actions and planning within the region and revising the criteria and ultimate categorization of regional species of Greatest Conservation Need (RSGCN).

HERPTILES

Snake Fungal Disease – K. Schantz

No new report.

Snakes – K. Schantz

K. Schantz is working with research partners planning 2022 supply and personnel needs.

In 2021, the Venomous Snake Response Team (VSRT) continued to provide an invaluable service to citizens and recreational visitors by moderating the real and perceived threats from New Jersey's rare venomous snakes. The ENSP receives more than 100 calls from concerned citizens and recreational visitors regarding the presence of venomous snakes on private lands and public recreation areas; this excludes calls made directly to VSRT members. Often approximately 10% of the callers have accurately identified the snake species, with most snake complaints being non-venomous species. However, in 2021, nearly 35% of callers had accurately identified venomous snakes. It is unclear if this is due to increased outreach and education efforts or citizens in local "hotspots" becoming more familiar with identification.

The ENSP continued research partnerships focused on obtaining critical information about corn snakes and eastern copperheads that will contribute to our improved understanding of their habitat needs, activity ranges, and dispersal distances, in addition to identifying previously undocumented dens and nesting areas/rookeries. Additionally, our research partners are testing the feasibility of various survey techniques for corn snakes (endangered species) to help guide future regulatory survey requirements. This information will contribute to both conservation and regulatory efforts.

SGCN Turtles – B. Zarate and B. Pitts

2021 Highlights: In the world of bog turtles, ENSP received an observation of a turtle from a new area of Salem County. This unique record represents a fourth new sighting over a four-year period, indicating that additional populations are still to be discovered. In addition, we were made aware of a wetland with highly suitable habitat that had recently been acquired by the state. Based on initial on-site inspection and evaluation, it's likely bog turtles will be found there, representing yet another new population. B. Pitts continued to coordinate the restoration of bog turtle habitat in a showcase project, also in Salem County. In cooperation with internal and external partners, this restoration aims to expand the amount of suitable habitat and reconnect fragmented wetland areas. Also in 2021, ENSP was awarded \$122,500 in federal competitive State Wildlife Grants (CSWG) as part of a larger award package to continue regional wood turtle conservation. This is now the second CSWG award for wood turtle, in addition to a prior Regional Conservation Needs grant award, bringing a total of now almost a decade of regionally funded and collaborative work on this at-risk species for Northeast state partners. ENSP staff also participated in other regional work with focus on turtle species of regional conservation concern, including spotted turtle, eastern box turtle, and northern diamond-backed terrapin.

In the last month, staff presented and participated in a two-day bog turtle recovery planning meeting to provide updates to partners and share information on habitat restoration techniques, survey efforts, genetic sampling results, and brainstorming sessions on landowner outreach and radio-telemetry techniques.

Eastern Tiger Salamander – B. Pitts

Due to a very dry fall, most tiger salamander pools were dry or at very low levels throughout this period. Snow and rains in early February improved conditions and some egg laying was observed the week of February 7.

B. Pitts has been participating in monthly calls with biologists from VA to NY to discuss tiger salamander population health, monitoring techniques, and management tools to secure the stability of the species throughout its northeastern range extent.

Using the methodology established by Zappalorti in 1982-1984, ENSP and Herpetological Associates (HA) identified two pools for egg mass translocation in a newly acquired parcel in Cumberland County. Donor sites included those with threats to long term viability, which include development, fragmentation, sea level rise, and saltwater intrusion. This project will also serve to connect known breeding populations in upper Cape May and lower Cumberland Counties.

Diamondback Terrapins - B. Zarate

A draft “white paper” on this species is in review by ENSP staff.

MAMMALS

Bobcat Project – G. Fowles

2021 Report: A new wildlife detection dog, “Fly,” is proving effective at surveying for bobcat scat in northern and southern New Jersey. She has done well finding scat in northern NJ (79 bobcat scats representing 30 individuals) but has found only one bobcat scat in central/southern NJ where there are very few confirmed records. Fly is proving to be an effective PR tool as well, with a temperament compatible with demonstrations of her work to partners.

Remotely triggered cameras have been deployed in southern NJ since July 2020 and are being maintained by WCC volunteers as another tool to try to better understand bobcat distribution in the state. There have been no bobcat pictures yet.

ENSP continues to collaborate with the National Genomics Center for Wildlife and Fish Conservation on analyzing the tissue, scat, and hair samples collected in NJ, the results of which have all been added to the long-term NJ bobcat database that ENSP maintains. ENSP also continues to collaborate with the lab on evaluating the substructure and gene flow of the NJ bobcat population. The analysis was not updated in 2021 because additional samples from southern NY are being genotyped. Any bobcat samples from central and southern NJ will also be added if obtained.

ENSP has continued to track bobcat roadkills over time, with 2021 being the highest recorded number of bobcat roadkills in a year, after very few in 2020 (likely related to decreased traffic at the onset of COVID). ENSP also continues to work with the Bureau of Wildlife Management (BWM) to respond as quickly as possible to reported incidentally trapped bobcats to have the best chance of releasing the bobcats successfully. The numbers of reported trapped bobcats have fluctuated over the reporting period due to several factors that may include COVID and winter storm events.

The necropsies and sample analyses (DNA, teeth, reproductive tracts, rodenticide testing of livers, body condition scores) are improving our understanding of bobcat status and health and are contributing valuable information to the bobcat assessment and recovery plan. Some results are also contributing to regional analyses, such as the rodenticide exposure.

ENSP continued close collaboration with partners at the University of Delaware where a master’s degree student completed her thesis in 2021. The analyses she conducted on a statewide bobcat habitat suitability index, statewide habitat connectivity assessment, and spatially explicit simulation modeling focused on establishment of bobcat populations in central and southern NJ (which continues to be refined) are helping to inform bobcat recovery plan metrics. The connectivity analyses provide a basis, along with CHANJ mapping, for identifying key corridors to protect and road barriers to mitigate, particularly in central New Jersey where fragmented habitat impedes gene flow.

Bat Conservation – M. Hall

Planning is underway for a bat monitoring symposium at the upcoming NEAFWA conference; M. Hall is on the symposium committee.

M. Hall joined USFWS and Magnolia Land Partners on a field visit of a Sussex Co. property which could become NJ's first parcel acquired for an Indiana bat mitigation program that is being established.

M. Hall and USFWS met to begin planning a new phase of outreach to local and regional transportation managers, engineers and contractors regarding bats' use of bridges. Over the past three years we've been coordinating bridge inspections with NJDOT and training their personnel to conduct bridge-bat surveys during routine bridge inspections. Overall, 247 bridges have been surveyed in advance of scheduled maintenance work, with 20 (8%) of them having bat colonies or evidence of bats. For bridges where bats are known, timing restrictions and conservation measures are put into place to protect the colonies from harm. To date, two bridges are known to be used by Northern long-eared bats – a federally threatened species which may soon be up-listed to endangered status.

2021 Summary: In addition, ENSP completed our fifth consecutive year of long-term summer acoustic monitoring with the North American Bat Monitoring Program (NABat), with results showing relatively stable amounts of activity by tree-roosting migratory species, an increasing trend in Big brown bats, and a consistently low representation of White-nose vulnerable *Myotis* and *Perimyotis* bat species across the survey years. We continued education and outreach to Nuisance Wildlife Control Operators across the state and provided technical guidance to approx. 64 residents and NWCOs with specific bats in buildings issues. Our bat team collaborated with Virginia Tech on a regional migratory bat study in the fall, catching and attaching nanotag transmitters to 40 Eastern red bats and 2 Silver-haired bats in NJ to learn about the bats' migration pathways, particularly as they relate to offshore wind energy development. Nanotags depend on a landscape network of Motus receiver stations to detect tagged animals, so while some bats returned no data, others were detected by as many as 6 different Motus stations, with bats covering up to ~400 km during the approx. month-long battery life of the transmitters. Bat intakes at the NJDOH Rabies Lab supplied us with records and physical data for another 13 Silver-haired bats, 2 Northern long-eared bats, and additional species of interest encountered in and around homes and buildings.

Allegheny Woodrat – G. Fowles

2021 Summary: In 2021, we conducted a standard trapping protocol and captured 24 unique individuals, for a capture index of 2.86 individuals captured/10 trap nights. This represents a return to higher levels similar to those observed in 2016-2019 (after the translocation of woodrats from PA); in 2020 an unusual number of non-target animals helped lower the woodrat capture index. All woodrats were sexed, weighed and ear-tagged at the point of capture. An ear punch from each ear was taken from each newly captured individual for genetic analysis.

ENSP continued our collaboration with a geneticist at Towson University who maintains the Allegheny woodrat genetic library, including all past NJ samples. The mean observed heterozygosity (H_o) was evaluated through 2021 using tissue samples, and showed sustained higher levels since the translocation of woodrats from PA between 2015 and 2017.

In the fall of 2021, ENSP conducted a habitat assessment by quantifying mast trees and other vegetation in sampled areas for the first time at occupied woodrat sites in the Palisades. This availability of food resources will be compared to results of use of food resources based on analyses of chloroplast DNA in woodrat scats being conducted by Towson University.

Analysis results of raccoon scats collected in 2021 indicate a continuing trend of very low to no prevalence of *B. procyonis* egg loads in raccoon scat since the implementation of the year-round comprehensive roundworm mitigation plan at the Palisades.

G. Fowles helped formed a regional Allegheny woodrat working group in 2020 that continues today, including ~60 individuals from 13 states. The working group has led to several collaborative efforts, standardized protocols, data sharing, and generation of new ideas. In addition, a captive breeding subgroup was formed in 2021 to develop a protocol for captive breeding programs to be initiated at the Toledo Zoo and the Maryland Zoo in Baltimore.

BIRDS

Colonial Waterbirds – C. Davis

2021 summary of results:

The aerial survey of the Atlantic coastal marshes by helicopter continued to be the most efficient way to survey the large area in a short period of time. Downsides include that it represents a snapshot of the season and can only be considered an inventory count (versus a census) and that dark-plumaged bird numbers are likely underestimated since they blend into the surrounding vegetation so well. However, in 2021, the survey took place in a helicopter with increased visibility and observers reported this improved detectability and quality of the count.

In 2021, we surveyed wading birds as well as gulls and terns. Due to constraints of the survey, it continues to be difficult to determine trends and population estimates and few statistically sound conclusions can be drawn. In addition, the impacts of a strong nor'easter over Memorial Day weekend likely affected the number of gulls and terns as they were in the process of re-nesting (wading birds were counted just before the storm). Nonetheless, the survey provides the only comprehensive dataset on the NJ Atlantic coast wading birds and some trends are apparent. A number of populations appear to be rising or stable. Prior to the nor'easter, the warm and calm weather of spring 2021 was conducive to breeding and increases in numbers this year may have been a result of this boon.

The snapshot technique is useful to show occupancy and distribution, which will become increasingly important as sea level rise and subsidence continue to change the coastal landscape. In 2013, there were 43 occupied colonies (defined as one or more pairs nesting) and in 2021 there were 25. There has been a gradual decline in the number of colonies and it appears this is at least partially due to erosion/increase of flooding in nesting areas. A long-term trend of eroding and disappearing islands is noticeable, especially in the Barnegat Bay and around Atlantic City. Some islands that are on maps have disappeared entirely; others exist as shrinking versions of themselves. The snapshot survey also provides critical information used for environmental review, where presence/absence and suitable habitat is more important than count data. The trend among wading birds appears to be mimicking that of other coastal avian groups, like beach-nesting birds, where the number of individuals is not necessarily declining, but they are being funneled into ever smaller numbers of active sites.

Beach-Nesting Birds - C. Davis & E. Heiser

Planning for the 2022 season is well underway.

Summary of 2021 results and activities:

A peak count of 502 incubating adult black skimmers were at active sites. The more even distribution across multiple colonies was a positive trend in the last 3 years. The resight rate of banded skimmers continued to be high and provide valuable information on migration and wintering activities. Initial data (final data not available during this reporting period) from individuals outfitted with transmitters is promising to provide even more specific data about the movements of birds during the breeding season.

A total of 1,153 adult Least Terns were tallied at the peak census period. The statewide breeding population continued to be relatively stable, but the lack of productivity from most sites was a concern. Predators continue to be the overwhelming limiting factor for higher productivity. Although predation management is occurring at many locations in the state, the colonial nature of this species means it only takes a few individual predators keyed into a nesting area to cause significant damage.

A total of 138 piping plover pairs nested in 2021, the second-highest ever recorded since listing and is attributed to the above-average productivity in recent years and the likely influx of plovers from surrounding states. Pairs nested at 28 sites; the distribution continues to heavily favor the federal properties in the north and central part of the state, but growth was continued to be observed in the south in Cape May County (15 pairs in 2021 vs. 3 in 2018). The statewide productivity rate was 1.24, 1.29, and 0.85 fledglings/pair in 2019, 2020, and 2021, respectively. These are all below the federal recovery goal of 1.5 fledglings/pair.

After 7 years of strong reproductive success for piping plover, productivity took a steep dive in 2021. This was especially difficult as the work that went into producing the chicks from the last few years was paying off with a significant pair increase and staff hoped to produce an eighth year of success. However, the combination of the nor'easter and other weather events coupled with predator pressure proved to be too much. In 2014-2020, flooding was the cause of nest failure 11-21% of the time, but in 2021, it caused the loss of 36% of nests.

Along with flooding and storms, predators were a major factor during the reporting period, in terms of hatch success and fledge rates. Where possible, managers increased the amount of predation management that took place, with mixed results. Although it is known that predation management can increase productivity, determining species-specific strategies continues to be a challenge.

Bald Eagle Monitoring - K. Clark

Bald Eagle Project nest monitors are checking nests for incubation as well as the earliest hatching. As of Feb. 15, 108 nests were documented incubating, and six had hatched; the first nest hatched earlier than ever, on January 28.

The 2021 report is available online here: <https://nj.gov/dep/fgw/ensp/pdf/eglrpt21.pdf>. ENSP, CWF, and 130 volunteer nest monitors documented 248 territories including 222 active nests. Two hundred-fifteen known-outcome nests fledged 296 young for a productivity rate of 1.37 young/nest. The failure rate, 17%, was in the normal range of 15-20%. About half of all nests are located in the Delaware Bay region of Salem, Cumberland and Cape May counties. Every county in NJ has at least one nest, including the predominantly urban counties where eagles use the major rivers (e.g., Hackensack, Passaic, Hudson), and where some nest in large trees in older residential areas. ENSP is working with the Office of Wildlife Health & Forensics and UPenn to analyze archived eagle tissues for rodenticides, lead, and organochlorines that affect eagle health.

Peregrine Falcon Monitoring – K. Clark

In January, K. Clark organized a meeting of mid-Atlantic region eagle and peregrine biologists to discuss current status and research/management.

The 2021 report is available online here: https://nj.gov/dep/fgw/ensp/pdf/pefa21_report.pdf. ENSP and volunteers checked 44 occupied territories and documented 39 active nest sites. Overall nest success was 71%. By region, there were 17 coastal nests, 9 natural nests, 8 urban nests, and 5 Delaware River nests. Nest productivity was highest in the Delaware River (2.80 young/nest) and coastal regions (2.18), followed by urban (1.50) and natural (1.38) regions. ENSP removed the last nest structure that was within 3km of Delaware Bay shoreline before the 2021 season, but the territory remained active with a ground nest. ENSP worked with Little Egg Foundation on a pilot project using cameras at four peregrine nests to record prey delivered; analysis of the photos is ongoing, but the project will be expanded in 2022. ENSP staff monitored peregrine use of beach-nesting bird beaches to look for patterns and identify individuals that exhibit territorial or unnatural behaviors; this will continue in 2022.

American Kestrel – B. Pitts

B. Pitts is preparing to submit a letter to the Journal of Raptor Research on the findings of ENSP's kestrel nest box camera monitoring system. The system was first deployed in 2019 to document and categorize prey deliveries to nestling kestrels in the hopes of better understanding the cause for nest failures. In 2021, the system

documented kestrels utilizing the Brood X cicada emergence in a 12km radius of Ringoes, NJ. This led to higher occupancy rates and nestling weights in this region.

2021 was also the best year of the American kestrel nest box project's 16 years. A total of 97 nesting attempts produced 316 chicks from 78 successful boxes. A success rate of 80% is second only to 2020's rate of 84%, and 3.26 young/nest was the best overall productivity of the project. Since 2015, ENSP has increased partnerships in installing and monitoring nest boxes. In 2021, half of the available nest boxes in central and southern NJ were partner boxes, and 44 attempts (44%) and 34 successes (44%) were in partner boxes.

Osprey Monitoring – K. Clark

2021 Report: ENSP partner, Conserve Wildlife Foundation of NJ (CWF), helped coordinate nest surveys for the 2019-2021 period. In 2021, CWF and volunteers documented 703 occupied nests, which is the most ever recorded in New Jersey. Eighty-six percent were along the Atlantic Coast, 10% along Delaware Bay, and the remainder in the north from the Meadowlands to the Delaware River. Staff and volunteers recorded production of 883 young from 532 active/known-outcome nests for a rate of 1.66, below the five-year average but well above the 1.0 minimum needed to sustain the population. Two hundred-nineteen osprey nestlings were banded during nest checks.

The Delaware Bay colony, with 10% of the state's population, overcame a history of reduced productivity related to contaminants, and now has a 20-year trend of higher productivity than the overall Atlantic Coastal population. The availability of nest platforms likely limits population growth in this area, but suitable trees are plentiful, unlike the Atlantic Coast.

Other Raptors – K. Clark

In 2021, K. Clark worked with partners (CWF-NJ, Natural Lands, Conservation Global) to identify sites to expand and support the barn owl population in the coastal marshes. The long-term (30+ year) study of barn owls in Salem and Cumberland counties by Colvin and Hegdal determined that barn owls in agricultural landscapes proximate to coastal marshes declined much less than those in agricultural areas alone, suggesting barn owls do well foraging in both landscapes. CWF will be installing and monitoring additional nest boxes in coastal areas in 2022.

Migratory Shorebirds –

2021 Report summary: Peak abundance of red knots in Delaware Bay (aerial/ground counts) had been low and relatively stable for much of the last decade, 2009 to 2016 (24,000 to 21,128) and varied more between 2017 and 2021. In 2021, despite widely available egg resources starting early in May, we recorded the lowest number of red knots (6,880 individuals), ruddy turnstones (10,785), and other shorebirds in our surveys. However, in 2021, the superpopulation estimate for the red knot stopover was 42,271 (95% CI: 35,948-55,210), similar to estimates of previous years. The estimate is derived from bay-wide resightings of individually-marked red knots using a Jolly-Seber mark-recapture model that accounts for turnover (Lyons et al. 2016). Red knot weights are linked to adult survival and Arctic productivity. The proportion of red knots reaching 180 grams (P180) at time of normal departure (May 26-28) is useful as an index of shorebird foraging conditions. The proportion of red knots reaching ≥ 180 grams was 0.46, 0.43, and 0.35 in 2018-2020, respectively. In 2021, P180 was similar, at 0.44.

Shorebird stewards were recruited, trained, and fielded at 13 beaches during the peak stopover period to help prevent human disturbances to foraging shorebirds.

There was anecdotal evidence of shorebird harassment by peregrine falcons, but no data were available on locations or sighting frequency, nor data identifying peregrines by age class or bands. Peregrines that have been identified by NJDFW at beach-nesting bird colonies during spring-summer, 2019-2021, have been sub-adult, non-breeding birds. As a result of the study by Watts and Truitt (2021), which found a correlation of reduced knot density and peregrine nests within 3km of knot foraging beaches, NJDFW removed the last peregrine nest

structure located within 3km of Delaware Bay shore, leaving one known nest structure that is >4km distant. The Division continues to monitor this issue.

Scrub-shrub/Open Field birds (GWWA) – S. Petzinger

2021 Golden-winged Warbler Monitoring Results:

In 2021, 127 locations with suitable breeding habitat for golden-winged warblers (GWWAs) were surveyed in New Jersey. Only ten GWWAs were detected during the surveys, and we observed a net loss of four potential breeding GWWA pairs in five locations, which was a reduction of 28% of the observed population and 35% of the known locations in 2020. All GWWAs observed in 2021 were in locations with >75% forest cover (naïve occupancy = 0.112). When looking at only sites surveyed that contained suitable GWWA habitat with >75% forest cover, a greater proportion of GWWAs were detected in actively managed forest sites than in powerlines and passively managed wetland sites (naïve occupancy=0.167, 0.111, and 0.097, respectively).

If nothing is done to increase GWWA recruitment or productivity in NJ and this rate of decline continues, there is an 88% chance that NJ's breeding population of GWWAs will be extirpated within the next 10 years and 100% chance of extirpation within 20 years (Vortex 10.5.5). There is still hope, however. If we can create nesting and post-breeding habitat to increase adult recruitment and decrease juvenile mortality each by 10%, the chance of extirpation drops to 35% in the next 10 years and 65% in the next 20 years.

Bird Response to Forest Management targeting GWWAs:

In 2014–2021, both total bird species richness (SPP) and number of bird species of concern (BSC) in passively managed shrubby wetland sites had declining trends (-0.27 and -0.13 per year, respectively), while SPP and BSC in actively managed forest sites had increasing trends (0.20 and 0.18 per year, respectively). Based on a paired T-test, actively managed forest sites continued to have a significantly greater number of SPP and BSC compared to the passively managed wetland sites (two-tailed; P=0.022 for SPP; P<0.001 for BSC).

Even in its early stages, young forest management has benefited many songbird species and attracted a greater diversity of bird species than passively managed shrubby wetland sites. When compared with the average number of bird species detected before management, opening the forest canopy to create GWWA breeding habitat nearly doubled the average number of bird species, and more than doubled the average number of bird species of concern, using the site during the breeding season. However, most of the managed forest sites are still too young to attract golden-winged warblers, as ideally, they prefer forest habitats in the 5 to 15-year class.

Secretive Marsh Birds– C. Davis & E. Heiser

2021 Report summary: A focused black rail survey was initiated in 2015 and continued 2019 and 2021 with heightened concerns over the security of the black rail population on the eastern seaboard, and particularly the mid-Atlantic. Staff conducted call-playback surveys by boat, and deployed 9 acoustic recording units (ARUs) in marshes, rotating them every two weeks from late April to mid-July. In 2021, volunteers also surveyed road-based sites. In 2019 and 2021, we had one seasonal, six contracted freelance biologists per season and eight volunteers (2021 only) survey at a combined 65 water-based points, 29 road-based call-playback points, 27 'troll' lines, and 20 passive-listening volunteer sites.

No black rail were detected in 2019 and four were detected in 2021. One was on a call-playback survey, two were captured on ARU, and one was via the volunteer survey. Least bittern, clapper rail, and Virginia rail were also heard. The very low detections to date mean, simply, that black rail are not yet extirpated from the state and that birds were calling during the breeding season. This is still not a true statewide survey, but USFWS Refuge survey effort allowed ENSP to survey some new areas, and volunteers covered areas as well.

Regional & National Bird Coordination – S. Petzinger

No new report.

INVERTEBRATES & AQUATICS

Freshwater Mussels/Aquatics – R. Somes

In September 2021, the ENSP's freshwater mussel biologist, Jeanette Bowers-Altman, retired. Her responsibilities were transferred to Robert Somes. In 2021, the Division was also awarded \$100,000 in funding for Brook Floater (*Alasmidonta varicosa*) conservation work, in association with a multi-state "Competitive State Wildlife Grant" (C-SWG) awarded to the State of Massachusetts, with whom the states of New Jersey, Virginia and South Carolina are actively partnering.

R. Somes participated in several Brook Floater Working Group Meetings to assess field work needs for the upcoming year and to coordinate activities proposed under the C-SWG award. This includes evaluating the feasibility of developing a freshwater mussel hatchery in New Jersey.

R. Somes participated in the Northeastern Regional Species of Greatest Conservation Need (NE-RSGCN) working group meetings to update the NE-RSGCN list and share data and information for freshwater mussels.

R. Somes met with USFWS staff to discuss Dwarf Wedgemussel survey needs for the upcoming field season.

R. Somes has been working with the DEP Land Resource Protection to address freshwater mussel impacts on several roadway and bridge projects.

Pollinator Conservation – R. Somes

R. Somes participated in the Northeastern Regional Species of Greatest Conservation Need (NE-RSGCN) working group meetings to update the NE-RSGCN list and share data and information for pollinating bees.

Lepidoptera, Odonata, Coleoptera- R. Somes

R. Somes participated in the Northeastern Regional Species of Greatest Conservation Need (NE-RSGCN) working group meetings to update the NE-RSGCN list and share data and information for butterflies and moths, tiger beetles and dragonflies and damselflies.

2021 Summary:

Northern Metalmark surveys at five known populations found a range of 1-10 individuals. Population counts are highly variable with some years ranging 25-50. However, NJ's Northern Metalmark are reduced to 3 metapopulations. Two of these populations are larger and often have 10-50 individuals observed; the third is smaller, <20 individuals. The single biggest threat to Northern Metalmark is invasive plant species takeover and habitat succession. The species naturally occurs in cedar glades that are mid-successional that quickly become overgrown and shaded out without disturbance and invasive plant control.

Leonard's Skipper surveys at six known sites found 2-5 individuals. There were no reports of Leonard's Skipper in southern NJ from local volunteer groups. In recent years, north Jersey populations persist and new colonies have been found in suitable habitat; however, it's not been observed in south Jersey in recent years.

Bronze Copper surveys at four known locations found a range of 1-7 individuals. One site has decreased in numbers due to land-use changes.

Arogos Skipper surveys were extensive at 20 historic and potential sites; 5 individuals were observed at one south Jersey site and 1-2 individuals at two sites in north Jersey. The species is often found in low density with highly dispersed individuals, making detection challenging. The largest remaining area of occupied habitat is on JBDML government land. The north Jersey colonies are on utility rights of way.

Frosted Elfin surveys at three known sites documented only single individuals. A new occurrence was documented in Ocean County for the first time. Surveys in the last several years found low numbers at just four core populations; many historic sites appear to be extirpated.

Invasive woody shrubs (primarily Autumn Olive, Japanese Honeysuckle, Japanese Barberry, Multiflora Rose, Oriental Bittersweet) were removed from four Northern Metalmark sites. Habitat management for pollinators was promoted with planting of pollinator seed-mix plots at various locations, and the planting of approximately 3,200 plants of 20 different nectar source and butterfly foodplants at 20 gardens and restoration sites. Partnering

with the North American Butterfly Association-North Jersey Chapter and the South Jersey Butterfly Club has increased data submissions.

Staff conducted limited surveys for Scarlet Bluet, Pine Barrens Bluet, and New England Bluet as part of a regional effort. Surveys were conducted at three historic locations on 4 dates documenting Scarlet and Pine Barrens Bluet at two historic locations.

Surveys for Grey Petaltail yielded a new population. A regional survey in Mercer and Monmouth counties for Odonata at 10 sites failed to document any listed species despite finding some potential habitat.

Cicindelidae (Tiger Beetles- Ellipsoptera)

NJ Pine Barrens Tiger Beetle was documented in eight locations over four survey days and a new population was documented. This is a species highly dependent on wildfire for maintenance of its habitat. More baseline surveys are needed to understand the status and distribution of the tiger beetles identified as SGCN in the NJ SWAP.

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