

### **3. Tuckahoe River Watershed**

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#### **a. Habitats**

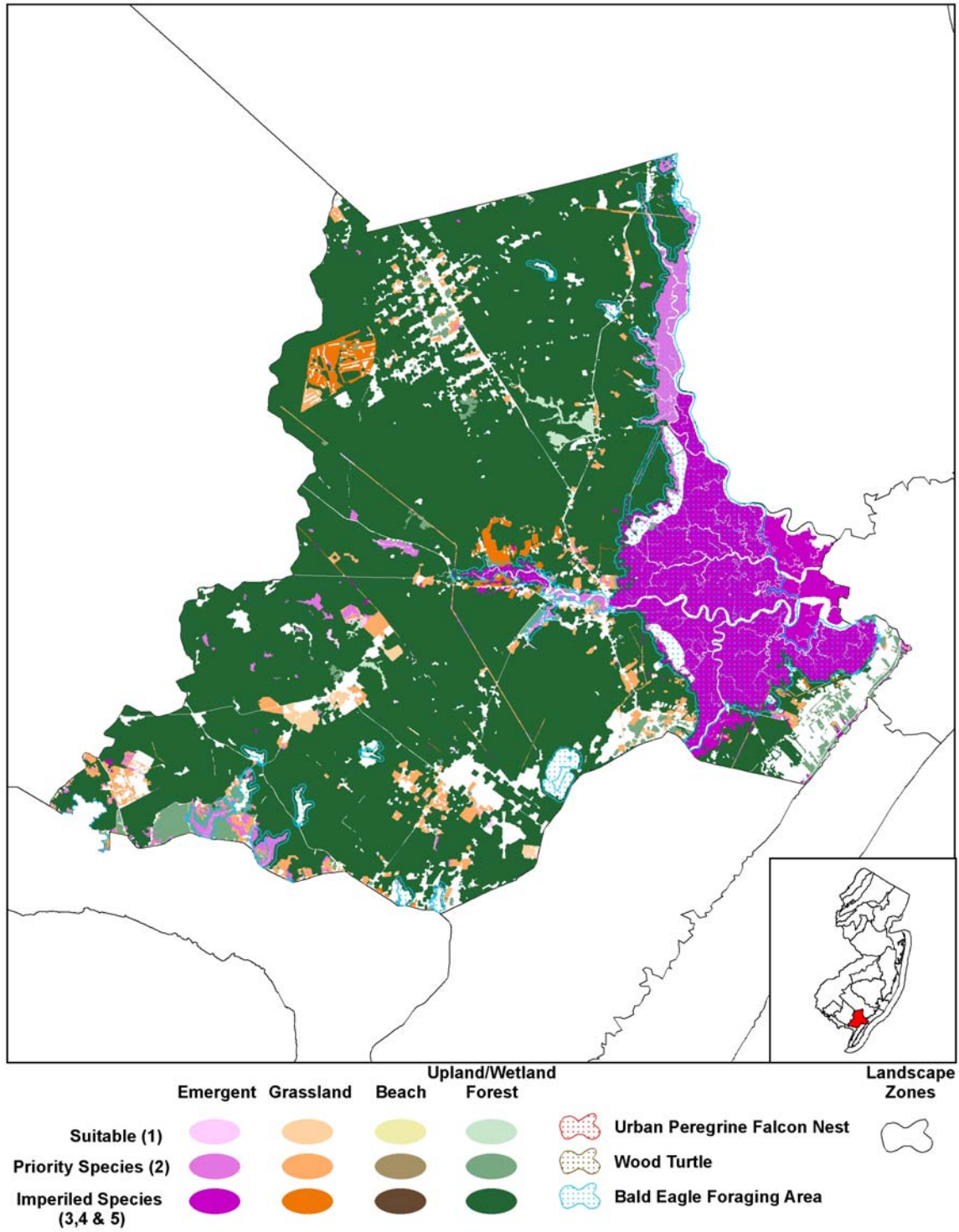
The Tuckahoe River Watershed fans upstream from Great Egg Harbor's open waters to the expansive marshes and lowland forests of Tuckahoe WMA, the Atlantic white cedar swamps, mixed hardwood swamps, and oak-hickory forest of Belleplaine State Forest (Figure 14). It also includes parts of the pine-oak forests of Peaslee WMA, as well as the Corbin City WMA and Great Egg Harbor Greenway land.

#### **b. Wildlife of Greatest Conservation Need**

In the diverse array of habitats in the Tuckahoe River Watershed, of highest importance are forested uplands and wetlands. This zone is similar in many ways to the Maurice River zone in that it provides large, contiguous forest essential to southern New Jersey's forest bird populations, including barred owls and red-shouldered hawks. If these species are to thrive in southern New Jersey, the large forests of the Tuckahoe and Maurice River areas must be preserved and enhanced. This goal will also serve to support the large autumn bird migration through the Cape May Peninsula to the south, where habitat loss is seriously threatening this nationally important migration.

The wildlife of the Tuckahoe River Watershed includes six state endangered, 10 state threatened, and 66 special concern/regional priority species. The diverse forested wetlands and upland forests support bald eagles, cavity-nesters, forest passerines, scrub-shrub/open field birds, northern pine snakes, timber rattlesnakes, Cope's gray treefrogs, eastern tiger salamanders, Pine Barrens treefrogs, and frosted elfins. Open saltwater, impounded coastal marshes, tidal marshes and creeks of the Tuckahoe River are foraging habitat for bald eagles, common terns, ospreys, peregrine falcons, red knots and other migratory shorebirds, northern harriers and other coastal marsh birds, and foraging colonial waterbirds. In addition, summer populations of forest-dwelling bat species, potentially including the federal endangered Indiana bat, are suspected to occur here. Tables DB22 – DB28 identify the species of greatest conservation need within this zone.

**Figure 14.** Critical landscape habitats within the Tuckahoe River Watershed conservation zone, as identified through the Landscape Map (v2).



Wildlife Species and Associated Habitats of Tuckahoe River Watershed

Table DB22. Federal Endangered Species\*

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Mammals</b>				
Indiana bat				X**

\*All Federal Endangered and Threatened species have an Endangered status on the NJ List of Endangered Wildlife

\*\*Potential presence.

X: Species occurs within the identified habitat.

Table DB23. State Endangered Species

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Mammals</b>				
Bobcat				R
<b>Birds</b>				
American bittern		R		
Bald eagle		X	X	X
Least tern		X		
Northern harrier		X	X	
Peregrine falcon		X		
Red-shouldered hawk				X
<b>Reptiles</b>				
Timber rattlesnake				R
<b>Amphibians</b>				
Cope's gray treefrog		X		X
Eastern tiger salamander				X

R: Proposed research and/ or reintroduction of species.

X: Species occurs within the identified habitat.

Table DB24. State Threatened Species

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Birds</b>				
Barred owl				X
Black-crowned night heron		X		
Cooper's hawk				X
Long-eared owl				X
Osprey		X		
Red-headed woodpecker				X
Yellow-crowned night heron		X		
<b>Reptiles</b>				
Northern pine snake				X
<b>Amphibians</b>				
Pine Barrens treefrog		X		X
<b>Insects</b>				
Frosted elfin		X	X	X

X: Species occurs within the identified habitat.

Table DB25. Nongame Species of Conservation Concern

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Mammals</b>				
Eastern red bat				X*
Eastern small-footed myotis				X*
Hoary bat				X*
Silver-haired bat				X*
Southern bog lemming			X	X
<b>Birds</b>				
Acadian flycatcher				X
American kestrel			X	

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Nongame Species of Conservation Concern (continued)

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Birds (continued)</b>				
American oystercatcher		X		
Baltimore oriole				X
Black-and-white warbler				X
Black-billed cuckoo				X
Blackburnian warbler				X
Black-throated green warbler				X
Blue-winged warbler				X
Broad-winged hawk				X
Brown thrasher				X
Canada warbler				X
Cattle egret		X	X	
Chimney swift			X	
Chuck-will's-widow				X
Common barn owl			X	
Common tern		X		
Eastern kingbird			X	X
Eastern meadowlark			X	
Eastern screech-owl				X
Eastern towhee				X
Eastern wood-peegee				X
Field sparrow			X	
Forster's tern		X		
Glossy ibis		X		
Gray catbird			X	X
Great blue heron		X		
Great crested flycatcher				X
Great egret		X		
Green heron		X		
Hooded warbler				X
Indigo bunting			X	
Kentucky warbler				X
King rail		X		
Least bittern		X		
Least tern		X		
Little blue heron		X		
Louisiana waterthrush				X
Marsh wren		X		
Northern flicker				X
Northern parula				X
Pine warbler				X
Prairie warbler				X
Prothonotary warbler				X
Rose-breasted grosbeak				X
Saltmarsh sharp-tailed sparrow		X		
Scarlet tanager				X
Seaside sparrow		X		
Sharp-shinned hawk				X
Snowy egret		X		
Spotted sandpiper		X		
Tri-colored heron		X		
Veery				X
Whip-poor-will				X
Willet		X		
Willow flycatcher				X
Wood thrush				X
Worm-eating warbler				X
Yellow-billed cuckoo				X
Yellow-breasted chat				X
Yellow-throated vireo				X
Yellow-throated warbler				X
<b>Reptiles</b>				
Eastern box turtle				X

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Nongame Species of Conservation Concern (continued)

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Reptiles (continued)</b>				
Eastern kingsnake				X
Northern diamondback terrapin		X		
Spotted turtle		X		X
<b>Amphibians</b>				
Carpenter frog		X		X
Fowlers toad		X		X
Marbled salamander		X		X
<b>Insects</b>				
A noctuid moth, <i>Meropleon cosmion</i>		X		
Chain fern borer moth, <i>Papaipema stenocelis</i>				X
Pine Barrens bluet, <i>Enallagma recurvatum</i>		X		
Precious underwing, <i>Catocala pretiosa pretiosa</i>				X
Rare skipper, <i>Problema bulenta</i>				X
Regal moth, <i>Citheronia regalis</i>				X
Rippled wave, <i>Idaea obfusaria</i>			X	
Scarlet bluet, <i>Enallagma pictum</i>		X	X	
<b>Fish</b>				
Atlantic sturgeon	X			

\*Potential presence.

X: Species occurs within the identified habitat.

Table DB26. Game Species of Regional Priority

Note: Species identified within the table have seasonal harvests within New Jersey.

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Birds</b>				
American black duck	X	X		
American woodcock				X
Bufflehead	X	X		
Canada Goose (Atlantic population)	X	X		
Canvasback	X	X		
Clapper rail		X		
Greater scaup	X	X		
Lesser scaup	X	X		
Northern bobwhite quail			X	X
Northern pintail	X	X		
Virginia rail		X		
Wood duck		X		

X: Species occurs within the identified habitat.

Table DB27. Fish Species

Note: Species identified within the table are nongame species within New Jersey, currently without state or regional status.

Common Name	Water
<b>Fish</b>	
Hickory shad	X

X: Species occurs within the identified habitat.

Table DB28. Game Species

Note: Species identified within the table have seasonal harvests within New Jersey and currently are not identified as regional priority species, but they are considered by NJDFW to be species of concern.

Common Name	Water	Wetlands	Grasslands	Forests and Forested Wetlands
<b>Mammals</b>				
River otter	X	X		
<b>Birds</b>				
Sora rail		X		

X: Species occurs within the identified habitat.

**c. Threats to the Wildlife and Habitats of the Tuckahoe River Watershed**

For complete literature review on the impacts of habitat loss and fragmentation, please see New Jersey’s Landscape Project Report, Attachment A or visit our website:

[www.njfishandwildlife.com/ensp/landscape/lp\\_report.pdf](http://www.njfishandwildlife.com/ensp/landscape/lp_report.pdf)

Fragmentation and loss of forest habitats are the greatest threats in this area. Expanding development associated with residential development for a growing human population is the main cause, particularly in Upper Township. Sand and gravel operations have created large gaps in habitats, and threaten to impinge further on upland and swamp forests. Recreational activities such as off-road vehicle use in Belleplain SF and Peaslee WMA disturb and degrade habitats for forest species. Aggressive forest harvest actions on Belleplain SF may threaten forest-interior nesting birds by creating openings that promote invasive and competing species, and by creating even-aged stands that depress wildlife diversity. Pressure on groundwater resources threatens Cope’s gray treefrogs and other amphibians that depend on high quality breeding pools. Illegal off-road vehicles damage sensitive habitats, including vernal pools and wetlands, and are a particular problem on public lands. Contaminants (primarily organochlorines) from unknown sources continue to be detected in the area’s bald eagles, ospreys and peregrine falcons. Invasive plants and animals threaten the ecological integrity of habitats in the region. Also see Section I-E “Threats to Wildlife and Habitats” (page 17) of this document.

**d. Conservation Goals**

- Identify, protect, enhance and/or restore endangered, threatened and special concern wildlife and fish populations and their habitats through full implementation of Landscape Project.
- Protect, enhance, and restore large, contiguous tracts of forests as identified by the Landscape Project for long-term viability of large-area and mature forest birds, primarily barred owl and red-shouldered hawk. Maintain and enhance (where necessary) the connections of these forests to the Maurice River and Cape May Peninsula zones, as well as to the Pinelands landscape region.
- Identify, protect, and enhance small habitats and alternative-purpose habitats (e.g., rights-of-way) as identified by the Landscape Project to benefit frosted elfin populations and scrub-shrub bird communities. Scrub-shrub habitats consisting of areas with >25% woody vegetation <20 feet in height.
- Identify and protect freshwater and tidal salt marsh habitats as identified by the Landscape Project for wintering and foraging bald eagles, nesting ospreys and peregrine falcon, nesting rails, foraging colonial waterbirds and waterfowl, and migratory

shorebirds. Identify forested areas adjacent to riverine and tidal marshes necessary to maintain and expand bald eagle nesting and wintering populations.

- Identify, protect, maintain, enhance, and restore vernal pools and other wetlands and critical, permanent aquatic habitats as identified by the Landscape Project and the NJ DEP’s vernal pool map to maintain viable populations of Cope’s gray treefrog and eastern tiger salamander, Pine Barrens treefrog and other rare amphibians and reptiles, rare damselflies and dragonflies, and rare fish species.
- Protect and enhance water quality to preserve aquatic ecosystems, particularly for species of conservation concern that rely on high water quality.
- Inventory, determine distribution, and monitor forest interior birds, bald eagles, and marsh nesting and foraging birds, rare amphibian and reptile populations, and other rare wildlife and fish species.
- Prevent, stabilize, and reverse declines of forest interior wildlife and endangered, threatened, and special concern fish species such as the Atlantic sturgeon and hickory shad. Stabilize populations of northern pine snakes, frosted elfins, coastal marsh birds, colonial waterbirds, migratory birds, freshwater wetland birds, and listed and special concern reptiles and amphibians, where most appropriate.
- Maintain bald eagle, osprey, peregrine falcon, northern harrier, northern pine snake, corn snake, and Pine Barrens treefrog populations.
- Monitor, maintain, and enhance populations of breeding, migratory and wintering waterfowl of conservation concern.
- Support the restoration of coastal marsh bird populations by recognizing and enhancing foraging habitats.
- Maintain ecological integrity of natural communities and regional biodiversity by controlling invasive species and overabundant wildlife
- Prevent illegal collection of rare reptiles and amphibians.
- Protect and enhance important and unique natural communities.
- Assess large-scale habitat change (every five to 10 years).
- Promote public education and awareness, wildlife conservation, and viewing opportunities.

**e. Conservation Actions**

The actions below are identified as primary (1° or priority) and secondary (2°). Prioritization was determined by the Delaware Bay Regional Landscape stakeholders during a meeting held on September 12, 2007 (see *Attachment J*). These actions, with a focus on the priority actions, should be incorporated in planning and project development in conjunction with the priority state-level objectives (goals) and strategies (actions).

Priority	Conservation Actions
<b>Protect wildlife habitat through implementation of Landscape Project mapping</b>	
1°	Revise existing Landscape Project species occurrence areas through research and, where lacking, develop new species occurrence areas as data on species habitat requirements become available. Develop, review, and improve species-habitat associations as new land use/land cover data become available. ( <i>Protect habitat – Landscape Project</i> )



Priority	Conservation Actions (continued)
1°	Identify, prioritize, and reclaim degraded rare species habitats by working with land management agencies to determine the appropriate actions needed to restore habitat value for the documented species. Appropriate actions might include the control of harmful, invasive, vegetation, restoring natural stream flows, revegetation with native plants or restoring habitat structure. <i>(Evaluate restoration – invasives)</i>
1°	Develop, implement, and evaluate best management practices and guidelines to maintain and enhance public and private as a significant bald eagle and raptor wintering area, nesting ospreys, and in the entire zone for forest-interior passerines and raptors. <i>(Conserve wildlife – rare wildlife)</i>
2°	Use GIS, other remote sensing tools, and surveys to identify and map significant natural vegetative communities that may host wildlife species of conservation need, particularly on public lands and lands that serve as wildlife corridors. <i>(Conserve wildlife – rare wildlife)</i>
<b>Protect large contiguous tracts of forests</b>	
1°	<p>Increase the area of forest managed to contain a mix of seral (successional) stages to provide habitat for a wide range of forest-dwelling species (e.g., woodland raptors, pine snakes, corn snakes, black-throated green, ruffed grouse, and woodcock) within large contiguous tracts while maintaining suitability for area-sensitive species per the Forest Management Guidelines for Nongame Species in New Jersey (in prep).</p> <ul style="list-style-type: none"> <li>• The primary goal being to maintain or manage for large and contiguous areas of mature and near-mature forests with large trees and an uneven-age structure that is suitable for woodland nesting raptors (forest raptors).</li> <li>• Selected areas of second-growth forested wetlands of moderate wildlife value should be allowed to mature to create optimal habitat for barred owl and red-shouldered hawk habitat.</li> <li>• Take action to minimize loss of older forest stands with large trees in large, contiguous tracts by protecting, maintaining, enhancing, and/or restoring habitat on public and private lands through programs such as fee purchases, conservation easements, landowner incentives, and/or forest management and stewardship plans.</li> <li>• These forest types to also include but are not limited to: an uneven-age structure; mature forests and near-mature forest with &gt;80% canopy closure, 65-80% canopy closure and structural diversity; limited areas of pine-oak with &lt; 25% canopy closure; scrub-oak communities; and regenerating stands of forests (e.g., Atlantic white cedar).</li> </ul> <p><i>(Silviculture – Land management; Protect habitat – Landscape Project, migratory birds, rare wildlife)</i></p>
1°	Develop, implement, and evaluate best management practices and guidelines to maintain and enhance public and private lands for bald eagle and forest-interior passerines and raptors. <i>(Conserve wildlife – rare wildlife)</i>



Priority	Conservation Actions (continued)
2°	Use GIS, other remote sensing tools, and surveys to identify critical core forests and assess their condition for forest-nesting birds and bald eagles, maintain information, and incorporate all new survey and mapping data into the Landscape Project and Biotics database. Identify protection strategies (e.g., landowner incentives and acquisition) to maintain large core areas in perpetuity. Identify adjacent habitats that can be managed to enhance the total size of forest habitat. <i>(Conserve wildlife – rare wildlife; Protect habitat – Landscape Project)</i>
2°	Increase the effective size and connectivity of forests on permanently protected public lands and surrounding private lands through incentive programs and targeted land acquisition. Use GIS measures, other remote sensing tools, and surveys to identify important corridors that connect large, contiguous tracts of forest and target these areas for acquisition to maintain a system of large, connected tracts of forest within and between conservation zones. Where appropriate, enhance and restore forested habitat through reforestation, revegetation, forest improvement cuts, and other forest management prescriptions. <i>(Enhance habitat – private lands; Corridors – sprawl, migratory birds; Protect habitat – Landscape Project)</i>
2°	Collaborate with Division of Parks and Forests to enhance Belleplain State Forest for wildlife species of conservation concern: uneven-age stand management, preserve standing and fallen dead biomass, eliminate harvest practices in wetland forests and manage adjacent upland forest for older-growth. <i>(Silviculture – land management; Protect habitat – Landscape Project)</i>
2°	Protect habitats through innovative public and private partnerships. Promote existing landowner incentives for protecting and managing wildlife habitat and develop landowner cooperative agreements to protect significant bald eagle and forest-interior wildlife sites. <i>(Protect habitat – migratory birds, Landscape Project; Conserve wildlife – rare wildlife; Enhance habitat – private lands)</i>
<b>Identify, protect, and enhance habitats for scrub-shrub communities</b>	
1°	Use GIS measures, other remote sensing tools, and surveys to identify critical scrub-shrub (areas with >25% woody vegetation <20 feet in height) and open field habitats, assess their condition for local populations of frosted elfins (e.g., on powerlines), nesting birds (e.g., yellow-breasted chat, blue-winged warbler, brown thrasher), marsh-edge birds (e.g., sedge wrens), and other wildlife, maintain information, and incorporate all new survey and mapping data into the Landscape Project and Biotics database. Identify protection (e.g., landowner incentives, farmland preservation, and acquisition) and management strategies (e.g., timing restrictions for management, cooperative agreements with utility companies for maintenance of rights-of-ways) to maintain, enhance, and/or create them. <i>(Conserve wildlife – rare wildlife; Enhance habitat – private lands; Agriculture – land management Protect habitat – sprawl, Landscape Project, development)</i>

Priority	Conservation Actions (continued)
2°	Develop, implement, and evaluate best management practices (BMPs) for rights-of-way that benefit species with small area requirements (e.g., frosted elfin and early-successional birds). BMPs should focus on maintaining existing early succession habitats and work to establish new grassland and scrub-shrub habitats along utility line rights-of-way, at field/forest edges, and adjacent to fire breaks where appropriate for small-area species. <i>(Conserve wildlife – rare wildlife)</i>
2°	Develop, implement, and evaluate best management practices to protect, maintain, and/or enhance habitats that support frosted elfin populations and scrub-shrub bird communities. <i>(Conserve wildlife – rare wildlife)</i>
<b>Identify and protect freshwater and salt marsh habitats</b>	
1°	Work with NJDEP-OCE, USACE, and other appropriate agencies to develop, implement, and evaluate best management practices for making dredged material deposition sites attractive to breeding, migrating, and wintering wildlife. <i>(Conserve wildlife – rare wildlife; Other practices – land management)</i>
1°	Identify and protect critical areas of submerged aquatic vegetation to benefit waterfowl, finfish, and shellfish species through surveys, GIS measures and other remote sensing tools, expert opinion, and historical records. Reestablish/restore historically important submerged aquatic vegetation beds in Delaware Bay tributaries to benefit waterfowl and waterbirds. <i>(Conserve wildlife – game species)</i>
2°	Investigate and improve current marsh management techniques to benefit critical wildlife species, in particular high marsh nesting birds and waterfowl, and include in marsh BMPs and species dependent on mudflats and impoundments. <i>(Conserve wildlife – rare wildlife, game species)</i>
2°	Identify areas that may benefit from marine conservation zone status to protect sensitive habitats and species from human disturbance. Develop and implement protection measures in marine and riverine habitats. <i>(Protect habitat – humans)</i>
<b>Protect critical wetland and other aquatic habitats identified in the Landscape Project</b>	
1°	Locate potential vernal pools through aerial imagery and surveys, conduct species surveys, and integrate certified vernal pool data into the NJ DEP regulations database and Landscape Project. <i>(Protect habitat – Landscape Project)</i>
1°	Identify and protect habitat for fish by plotting distributions of special concern fish species, and integrate those data into the Biotics database. <i>(Monitor wildlife – fish; Protect habitat – Landscape Project)</i>
1°	Develop, implement, and evaluate best management practices to enhance and/or restore aquatic and adjacent riparian habitats supporting populations of special concern and rare fish such as by removing obstructions to fish passage in rivers and streams. <i>(Protect habitat – fish; Monitor wildlife - fish)</i>

Priority	Conservation Actions (continued)
2°	Use GIS measures, other remote sensing tools, and surveys to identify and assess core forested wetland and riparian/floodplain habitat for forest-dependent breeding species: forest raptors (red-shouldered hawk, long-eared owl, and barred owl) and forest-interior songbirds. Take action to minimize habitat loss by restoring, enhancing and/or protecting habitat on public and private lands through programs such as fee purchases, conservation easements, landowner incentives, and/or forest management and stewardship plans. ( <i>Silviculture – land management; Protect habitat – Landscape Project, development; Enhance habitat – private lands</i> )
2°	Identify threats to vernal pools through systematic monitoring and devise strategies to protect vernal pool dependent species. ( <i>Conserve wildlife – rare wildlife</i> )
<b>Protect and enhance water quality</b>	
1°	Maintain optimal biological buffers (beyond regulatory requirements) around wetlands, riparian, and floodplain areas and minimize destruction per the NJ DEP Wetland Buffer Guidelines for Species of Conservation Concern in New Jersey (in prep). Stabilize wetland buffers and streambanks by encouraging plantings of native vegetation through public education, volunteer programs, and land managers to stabilize wetland buffers and stream banks and prevent erosion. ( <i>Protect habitat – Landscape Project, sprawl, rare wildlife, fish; Enhance habitat – private lands</i> )
1°	Protect water quality and aquatic-dependent species by appropriately designating Category One waters. ( <i>Protect habitat – rare wildlife, fish</i> )
1°	Seek appropriate classifications for stream segments based on IBI results that do not fulfill Category One requirements. ( <i>Protect habitat – rare wildlife, fish</i> )
1°	Prevent chemical contamination, siltation, eutrophication, and other forms of pollution/contamination to wetlands used by wildlife especially as breeding sites that could directly harm breeding species or their food supply (including birds, amphibians, and invertebrates). Evaluate protection efforts through regular monitoring of water quality. ( <i>Conserve wildlife – contaminants</i> )
<b>Inventory, determine distribution, and monitor rare fish and wildlife</b>	
1°	Use the Biotics database and Landscape Project to identify where species location data and monitoring gaps exist. Design and implement coordinated presence/absence surveys and monitoring to acquire data in those areas.
1°	Survey suitable habitats to determine distribution of forest wildlife of greatest conservation need and establish baseline information and trends. Survey and monitor bald eagle nesting and production. Annually survey and monitor ospreys every two-three years, woodland raptors and passerines every four years. Develop indices to monitor productivity of forest birds, especially listed and indicator species. Survey and monitor vernal pool habitats and populations. ( <i>Conserve wildlife – rare wildlife; Monitor wildlife – long-term monitoring</i> )
1°	Conduct concentrated field sampling for listed or special concern fish species in areas indicated by Fish Track Database queries and incorporate data into the Biotics database. ( <i>Status – fish; Monitor wildlife – fish; Native wildlife – fish</i> )

Priority	Conservation Actions (continued)
1°	Identify and research water quality parameters for vernal pool obligate and facultative species. <i>(Conserve wildlife – rare wildlife; Protect aquatic wildlife - humans, development)</i>
1°	Conduct surveys in suitable, previously un-surveyed areas to determine if listed or special concern freshwater mussel species are present. Repeat surveys every four years to monitor populations. Incorporate freshwater mussel survey results into the Biotics database and determine critical areas for listed species. <i>(Protect habitat - mussels)</i>
2°	Conduct surveys in appropriate habitats for frosted elfins, bronze coppers, and Hessel’s hairstreaks and work with partners in conservation to determine species distribution and identify critical habitats and protection needs. <i>(Conserve wildlife – rare wildlife; Protect habitat – Landscape Project)</i>
2°	Survey suitable habitats to determine presence and distribution of timber rattlesnakes. Encourage landowners to report timber rattlesnake sightings for inclusion in the distribution mapping and potential inclusion in a telemetry study. Monitor habitat use and survival of encountered animals using radio-telemetry to locate dens and identify critical habitats. <i>(Conserve wildlife – rare wildlife)</i>
2°	Develop and conduct nighttime surveys to inventory nightjars (whip-poor-wills, chuck-will’s-widows, common nighthawks), northern saw-whet owls, and eastern screech-owls. <i>(Conserve wildlife – rare wildlife; Monitor wildlife – long-term monitoring)</i>
2°	Conduct sampling (e.g., mist netting) to determine distribution, range, and habitat use of summer bats. Long-term sampling of forest dwelling bat species should be conducted to determine population trends and species response to changes in habitats. <i>(Protect habitat - Landscape Project; Monitor wildlife – long-term monitoring)</i>
2°	Continue volunteer-based summer bat concentration surveys to locate maternity sites and determine roost characteristics. Trap bats at summer concentration sites to identify bat species; apply colored, plastic bands to Indiana bats to aid in recognition during hibernation surveys. <i>(Monitor wildlife – long-term monitoring)</i>
2°	If Indiana bats are found, conduct telemetry study during summer months to determine roost characteristics and habitat requirements for Indiana bat maternity colonies. <i>(Protect habitat – Landscape Project)</i>
2°	Investigate the habitat suitability and techniques for restoring bobcats to this zone. Conduct presence/absence surveys for bobcat using scent-post surveys within suitable habitat. <i>(Conserve wildlife – rare wildlife)</i>
2°	Continue ground surveys of all known great blue heron rookeries every 3-5 years. Improve census methods to capture population and reproductive success metrics at a finer scale. <i>(Monitor wildlife – long-term monitoring; Conserve wildlife – rare wildlife)</i>

Priority	Conservation Actions (continued)
2°	Establish a formal ground survey for inland colonies of colonial waterbirds, with a particular emphasis on black and yellow-crowned night herons. Once the survey is instituted, continue on a rotation of once every other year. ( <i>Monitor wildlife – long-term monitoring; Conserve wildlife – rare wildlife</i> )
<b>Prevent, stabilize, and reverse declines of rare forest wildlife</b>	
1°	ENSP biologists will be responsible for notifying the NJ Division of Fish and Wildlife’s Bureau of Law Enforcement and the Division of Parks and Forestry Bureau of Law Enforcement and managers, where and when appropriate, of critical sites (nesting, basking, gestation, dens) to implement stringent enforcement of endangered species laws, including protection of wildlife from illegal collection (northern pine snakes, corn snakes, timber rattlesnakes) and human disturbance (off-road vehicles). ( <i>Protect wildlife – humans; recreational vehicles</i> )
1°	Research the intensity and characteristics of threats to wildlife species of conservation concern and their habitat, including causes and effects of habitat loss, degradation, and alteration, edge, disturbance, impacts of roads, predation, competition by invasive plants and animals, disease, contaminants, food availability, hybridization, and how water quality degradation and contaminants affect rare species. ( <i>Protect habitat – sprawl, recreational vehicles, humans; Conserve wildlife – contaminants, invasives, rare wildlife, subsidized predator; Evaluate restoration – roads</i> )
1°	Develop and implement proactive habitat conservation goals that will meet and maintain the recovery needs of all endangered and threatened wildlife and fish populations, particularly for forest-interior species and bald eagle. ( <i>Conserve wildlife – rare wildlife; Protect habitat – Landscape Project</i> )
1°	Develop, implement, and evaluate proactive habitat conservation goals that will meet and maintain the recovery needs of colonial waterbirds and freshwater wetland birds (consistent with the North American Waterbird Conservation Plan), and plans for amphibian and reptile populations (consistent with NE Amphibian and Reptile Conservation). ( <i>Conserve wildlife – rare wildlife; Protect habitat – Landscape Project; Monitor wildlife – long-term monitoring</i> )
1°	Research the habitat requirements for species of conservation concern (e.g., forest passerines and woodland raptors, northern pine snakes, Cope’s gray treefrogs, and eastern tiger salamanders) and implement planned silviculture practices as needed to enhance forests for forest-dependent species. ( <i>Protect habitat – Landscape Project; Silviculture – land management; Conserve wildlife – rare wildlife</i> )
1°	Protect wildlife species of conservation concern, especially slow moving terrestrial-bound species (e.g. reptiles, amphibians) and sensitive forest nesters (e.g. red-shouldered hawks, barred owls) by prohibiting off-road vehicles from all public and private conservation lands except where authorized by the governing agency by working with law enforcement agencies and implementing other means as they are developed. ( <i>Protect habitat – recreational vehicles; Conserve wildlife - recreational vehicles</i> )

Priority	Conservation Actions (continued)
1°	Conduct surveys determine locations of, and identify habitat management requirements for, secretive marsh nesting birds. <i>(Conserve wildlife – rare wildlife)</i>
2°	Work with state and non-government agencies to evaluate the impacts of enduro events on listed species and species of special concern. If such events are to be permitted in the future, work with the Divisions of Parks & Forestry and Fish & Wildlife to designate riding areas develop/implement BMPs. <i>(Conserve wildlife – rare wildlife; Protect habitat – humans)</i>
2°	Evaluate the impacts of roads on endangered and threatened species and other nongame wildlife. Research, develop, and implement methods to reduce roadside mortality of wildlife (e.g., implementing wildlife underpasses, road closures). <i>(Corridors – roads, sprawl; Protect habitat – roads, fish, mussels)</i>
<b>Maintain bald eagle, osprey, peregrine falcon, northern harrier, northern pine snake, and Pine Barrens treefrog populations</b>	
1°	Develop, implement, and evaluate best management practices to maintain and enhance the Tuckahoe River as a significant bald eagle and raptor wintering area. <i>(Conserve wildlife – rare wildlife; Protect habitat – migratory birds)</i>
1°	Develop, implement, and evaluate best management practices and guidelines to maintain, enhance, and/or restore habitat on public and private lands with significant forest bird areas, bald eagle, rare amphibian, and freshwater wetland bird populations. <i>(Conserve wildlife – rare wildlife)</i>
1°	Develop, implement, and evaluate best management practices and guidelines to maintain, enhance, and/or restore tidal marsh habitats to support northern harrier and osprey populations. <i>(Conserve wildlife – rare wildlife)</i>
1°	Develop and implement proactive habitat conservation plans that will help meet and maintain recovery goals for northern harrier and other high-marsh species. <i>(Conserve wildlife – rare wildlife; Protect habitat – Landscape Project)</i>
1°	Research the terrestrial habitat requirements for northern pine snakes, Cope’s gray treefrogs, eastern tiger salamanders, and Pine Barrens treefrogs, and recommend appropriate management and regulations based on the results. <i>(Conserve wildlife – rare wildlife; Protect habitat – Landscape Project)</i>
2°	Protect habitats through innovative public and private partnerships. Promote existing landowner incentives for protecting and managing wildlife habitat and develop landowner cooperative agreements to protect significant populations of bald eagle, forest-interior wildlife, and rare amphibian and invertebrates. <i>(Protect habitat – migratory birds, Landscape Project; Conserve wildlife – rare wildlife; Enhance habitat – private lands)</i>
2°	Research the impact of land use patterns on Pine Barrens treefrog, northern pine snake, and corn snake populations. <i>(Protect habitat – sprawl; Corridors - sprawl)</i>



Priority	Conservation Actions (continued)
<b>Monitor, maintain, and enhance populations of breeding, migratory and wintering waterfowl of conservation concern</b>	
1°	Use GIS, other remote sensing tools, and surveys to identify critical aquatic and wetland habitats and assess their condition for migratory and wintering waterfowl, finfish, and shellfish populations of conservation concern. Take action to minimize habitat loss by restoring, enhancing, and/or protecting habitat on public and private lands through protection strategies (e.g., acquisition, landowner incentives) and to maintain/ enhance existing waterfowl habitat where such management complements rare species management. <i>(Conserve wildlife – game species )</i>
2°	Conduct the annual Mid-Winter Waterfowl Survey to monitor population trends. <i>(Conserve wildlife – game species; Monitor wildlife – long-term monitoring)</i>
2°	Conduct the Atlantic Flyway Breeding Waterfowl Survey annually to monitor population trends. <i>(Conserve wildlife – game species; Monitor wildlife – long-term monitoring)</i>
2°	Determine carrying capacity of area marshes for wintering American black ducks to inform decisions in setting Atlantic Flyway population objectives and to guide management actions. <i>(Conserve wildlife – game species; Monitor wildlife – long-term monitoring)</i>
<b>Support the restoration of coastal marsh bird populations</b>	
1°	Develop, implement, and evaluate best management practices in tidal marshes, including management for native vegetation and mosquito control beneficial to coastal birds. <i>(Other practices – land management)</i>
2°	Develop and evaluate the creation of a marine conservation area to minimize human disturbances and concomitant damage to habitat in areas of breeding and foraging marsh wildlife. <i>(Conserve wildlife - recreational vehicles; Evaluate restoration - recreational vehicles)</i>
<b>Maintain natural biodiversity, community integrity and structure and ecosystem function by controlling invasive and overabundant species</b>	
1°	Identify areas where invasive, non-indigenous plants and animals are either already established or are becoming established through GIS, other remote sensing tools, surveys, public participation, and creating a system for reporting and qualifying new locations of invasive species. Prioritize areas in need of control projects according to the potential level of impact on the ecosystem and species of conservation concern and the likelihood of success. <i>(Conserve wildlife – invasives; Evaluate restoration – invasives)</i>
1°	Work with appropriate government agencies to survey and monitor the spread of invasive insect species that jeopardize forest health. The species of primary concern include the southern pine beetle, orange-striped oakworm, gypsy moth, and oak lace bug. Take appropriate control methods to reduce tree damage and limit the spread of infestations, provided such methods avoid excessive direct or indirect harm to non-target species. <i>(Conserve wildlife – invasives)</i>



Priority	Conservation Actions (continued)
1°	Use appropriate measures to control the spread of phragmites (common reed) and restore the marshes to native species. <i>(Conserve wildlife – invasives)</i>
1°	Work with public and private landowners and managers and regulatory agencies to employ physical, chemical, or biological control measures, or a combination of these, to reduce invasive, non-indigenous plants in areas that are identified as providing critical habitat for endangered, threatened, or priority wildlife species and are being threatened by such plants. <i>(Conserve wildlife – invasives)</i>
1°	Develop, implement, and evaluate management strategies to reduce the impacts of mute swan herbivory on native vegetation in impoundments and marshes of the Cohansey River supporting species of conservation concern. <i>(Conserve wildlife – invasives)</i>
1°	Monitor and evaluate the impacts of vegetative damage to the wild rice marshes by resident Canada geese. Develop, implement, and evaluate management strategies to maintain and enhance the wild rice marshes by minimizing goose damage and controlling resident Canada goose populations. <i>(Conserve wildlife – invasives; Evaluate restoration – invasives)</i>
2°	The NJ Division of Fish and Wildlife, Bureau of Wildlife Management will consider forest health and biodiversity as one of the primary determinants in making deer management decisions regarding deer densities. Forest health and biodiversity will be determined by using long term monitoring of forest regeneration via a system of exclosures and vegetative sample plots (or other methods that will empirically and objectively measure the effect of deer herbivory) throughout New Jersey in order to evaluate habitat health in response to changing deer densities. DFW will recommend adjustments to existing Deer Management Zone deer densities goals and recommend changes to zone specific deer harvest and control strategies, as required in order to meet this objective. <i>(Conserve wildlife – deer; Evaluate restoration - deer)</i>
2°	Develop area-specific deer density or percent-reduction targets to reduce herd size to a sustainable level where regeneration of native vegetative communities is possible and to enhance forest health and biodiversity. <i>(Evaluate restoration – deer; Conserve wildlife – deer, rare wildlife)</i>
2°	Where appropriate, continue to develop and expand incentives for harvesting antlerless deer.
<b>Prevent illegal collection of rare reptiles and amphibians</b>	
1°	ENSP biologists will be responsible for notifying the NJ Division of Fish and Wildlife’s Bureau of Law Enforcement and the Division of Parks and Forestry Bureau of Law Enforcement and managers, where and when appropriate, of critical sites (nesting, basking, gestation, dens) to implement stringent enforcement of endangered species laws, including protection of wildlife from illegal collection (northern pine snakes, corn snakes, timber rattlesnakes) and human disturbance (off-road vehicles). <i>(Protect wildlife – humans, recreational vehicles)</i>

Priority	Conservation Actions (continued)
2°	Recruit and provide training for local law enforcement personnel that are willing to assist in the enforcement of endangered species laws. Develop a partnership between local law enforcement, USFWS-NWR officers, the NJ Division of Fish and Wildlife's Bureau of Law Enforcement, and the Division of Parks and Forestry Bureau of Law Enforcement to enforce protection of native wildlife from illegal collection (northern pine snakes), and human disturbance (off-road vehicles). <i>(Protect wildlife – humans, recreational vehicles)</i>
<b>Protect and enhance important and unique habitats</b>	
1°	Protect (through incentive programs and land acquisition), and enhance (through incentive programs and best management practices) lands surrounding Belleplain State Forest and Peaslee Wildlife Management Area for forest and forest-interior wildlife. <i>(Protect habitat – migratory birds; Corridors – migratory birds; Conserve wildlife – rare wildlife)</i>
2°	Incorporate ENSP approved sightings data from nominated and approved Important Bird Areas into the Biotics database and Landscape Project mapping providing the sightings meet the ENSP Biotics and Landscape Project standards. <i>(Corridors – migratory birds; Protect habitat – migratory birds, Landscape Project)</i>
2°	Identify (through Landscape Project, radar studies, IBAs, and surveys), protect (through incentive programs and land acquisition), and enhance (through incentive programs and best management practices) the marsh and wetland forests of the Tuckahoe, and the marsh and upland edge of the Great Egg Harbor River system. <i>(Protect habitat – migratory birds; Corridors – migratory birds)</i>
<b>Assess large-scale habitat change every five years</b>	
1°	Collaborate with NJ DEP's Bureau of Geographic Information and Analysis and Rutgers Center for Remote Sensing and Spatial Analysis to develop methods to update DEP's land use/land cover data every five years and perform critical habitat change analysis to assess trend in habitat loss and conversion.
<b>Promote public education and awareness and wildlife conservation</b>	
1°	Raise public awareness of the Tuckahoe River as a significant bald eagle and raptor wintering area through newsletters, press releases, brochures, presentations, and web pages. <i>(Education – humans)</i>
1°	Preventing establishment of non-indigenous species is the simplest and most cost-effective means of stopping invasions. Encourage native plant use in landscaping through public awareness and discouraging sales of non-native ornamental plants which are often a major source of non-indigenous species that invade natural plant communities. <i>(Education – humans)</i>

Priority	Conservation Actions (continued)
1°	Educate public about the importance of keeping cats indoors through newsletters, press releases, brochures, presentations, web pages, etc. Work to develop a statewide policy for local communities to discourage managed cat colonies and trap, neuter and release programs; encourage academic research that examines the full range of impacts of feral cat colonies on local wildlife populations and of feral cat colony management (including TNR) on local wildlife populations and local feral cat populations. <i>(Education – humans)</i>
1°	Engage landowners and NJ citizens in protection and survey efforts for endangered species by increasing enrollment in landowner incentives, forest stewardship, backyard habitat management, and Citizen Science Program. <i>(Education – humans; Conserve wildlife – rare wildlife)</i>
1°	Develop brochures and posters regarding the most aggressive, invasive non-indigenous plants to educate and involve the public in detecting problem areas early while they are still manageable. Early recognition of the establishment of new populations is the key to successful control. <i>(Education – humans; Conserve wildlife – invasives)</i>
2°	Develop and maintain educational brochures and posters and viewing opportunities for the public consistent with species recovery goals to enhance public awareness of wildlife conservation and environmental issues by cooperating with federal, state, and local government, and non-governmental organization partners. <i>(Education – humans)</i>
2°	Develop brochures and posters to educate the public and increase awareness of New Jersey’s indigenous nongame fish species. <i>(Education – humans)</i>
2°	Educate the public about the importance of the habitats within this zone to the Atlantic coast bird, bat, and Lepidopteran species’ migration through newsletters, press releases, brochures, presentations, and web pages. <i>(Education – humans)</i>
2°	Educate homeowners, through newsletters, press releases, brochures, presentations, etc., on the proper eviction of house-dwelling bat populations and the importance of providing alternative roosting structures for maternity colonies. <i>(Education – humans)</i>
2°	Preventing establishment of non-indigenous species is the simplest and most cost-effective means of stopping invasions. Encourage native plant use in landscaping through public awareness and discouraging sales of non-native ornamental plants which are often a major source of non-indigenous species that invade natural plant communities. <i>(Education – humans; Conserve wildlife – invasives)</i>

**f. Potential Partnerships to Deliver Conservation**

Private Landowners

- Protect and enhance habitat through innovative partnerships with private landowners.
  - Implement best management practices that protect and enhance habitat for forest birds, bald eagles, forest passerines and raptors, and coastal marsh birds.
  - Utilize incentive programs that encourage the management of forest communities.

- Through incentive programs, target private landowners surrounding public natural lands to manage land for forests in order to increase effective size and connectivity of forest patches.
- Encourage farmers to preserve farmland through conservation easements through partnerships with Green Acres, The Nature Conservancy, Natural Lands Trust, and local municipalities for the conservation of forest communities.
- Work with landowners to maintain/enhance existing habitats where listed special concern fish species occur.
- In the context of landowner incentive programs such as LIP and Forestry Stewardship, work with landowners to develop and implement deer management plans that achieve desired deer densities.

#### Public

- Expand volunteer Citizen Scientist recruitment and activities.
  - Collaborate with conservation groups such as NJ Audubon Society, D&R Greenway, local land trusts, The Nature Conservancy, NJ Conservation Foundation, and other environmental, member-based organizations to recruit and train Citizen Scientists to locate, survey, and monitor wildlife habitats and populations in a systematic manner to achieve short- and long-term monitoring goals.
  - Involve Citizen Scientists in monitoring and management projects, such as protection and posting of bald eagle nesting areas, surveying forest birds, and building osprey nest structures.
  - Recruit North American Butterfly Association volunteers to conduct surveys for rare butterfly and moth species.
- Promote backyard habitat management for resident and migratory birds, and for vernal pools where appropriate.
- Collaborate with NJ Audubon Society to educate public on the effects of feral cats on wildlife species of conservation concern.

#### Wildlife Professionals

- Collaborate with researchers in Delaware, Maryland, Virginia, New York, and Pennsylvania to continue to develop best management practices and conservation plans for bald eagle nesting, foraging and wintering areas.
- Consult with entomologists to design and conduct surveys for listed and rare invertebrates in appropriate habitats, and then develop best management practices and conservation plans.

#### Conservation Organizations

- Partner with watershed and conservation organizations such as NJ Audubon Society (NJAS) and The Nature Conservancy (TNC) to protect and enhance habitats for rare species.
  - Protect and enhance large tracts of contiguous forest; focus acquisition and protection adjacent to Tuckahoe, Belleplain and Peaslee state lands.
  - Protect bald eagle, osprey, and raptor nesting, foraging and wintering areas.
  - Identify, protect and enhance sites hosting significant populations of rare dragonflies, damselflies, butterflies, and moths.
- Consult with conservation organizations to develop educational programs such as classroom curricula and wildlife festivals.

- Encourage the use of the Landscape Project's critical habitat mapping to guide land acquisition by conservation organizations through programs such as Green Acres, State Agricultural Development Committee (SADC) Farmland Preservation, and local land trusts.
- Conservation organizations should act as advocates for legislation and regulatory reform that address integrating deer management goals into farmland tax assessment laws, farmland preservation programs, and other farm conservation programs.
- NJDFW to partner with land trusts to develop and implement deer management plans that achieve desired deer densities on preserved lands.

#### Academic Institutions

- Partner with Rutgers and other academic institutions to conduct studies necessary to better understand the impacts of deer on biodiversity, forest health, and ecosystem processes and to develop habitat-specific or landscape-specific deer density targets.

#### Local Government, Other State and Federal Agencies

- Partner with local, state, and federal government agencies, including municipal and county planning boards, USDA-NRCS, USFWS, and the DCA, Office of Smart Growth to protect, enhance, and create habitats, and to protect NJ's native wildlife.
  - NJ Department of Environmental Protection's (DEP) Division of Fish and Wildlife (DFW) to maintain and protect bald eagle and interior-forest bird nesting and foraging sites, with special focus on Tuckahoe, Peaslee and Belleplain state lands.
  - Expand efforts to create habitat and implement best management practices for forest passerines and raptors, forest reptiles, and bald eagles on state lands with DFW and DEP's Division of Parks and Forestry (DPF), and with natural resource managers, county and municipal utility authorities and planners.
  - DFW and DPF to work with the DEP's Office of Natural Lands Management, Natural Heritage Program (NHP) to develop mapping of significant natural vegetative communities, particularly on public lands and lands that serve as wildlife corridors, to be incorporated as a layer within the Landscape Map. Sensitive information would be a separate layer for use within the NJ Department of Environmental Protection only.
  - DFW and DPF to collaborate on forest management guidelines to achieve forest management goals for listed and rare wildlife, on both public and private lands.
  - DFW to develop a plan with wildlife law enforcement agents to protect sensitive endangered/threatened species areas from disturbance.
  - DFW to coordinate with state and federal law enforcement to maintain adequate surveillance of bald eagle sites.
  - Implement best management practices for scrub-shrub wildlife on power lines that cross Wildlife Management Areas, State Forests, and conservation lands.
  - Encourage greater buffers for important riparian and floodplain areas such as the Tuckahoe and associated rivers with Division of Watershed Management. Partner with them to investigate water quality and threats of contaminants/pollution.
  - DFW and conservation organizations to work with the DEP's Land Use Regulation Program work to identify and protect vernal pools and appropriately classify wetlands for Cope's gray treefrogs, eastern tiger salamanders, Pine Barrens treefrogs, and rare invertebrate populations.

- DFW and other agencies to promote the establishment of marine conservation areas in critical salt marsh habitats.
- DFW to lead in the development of specific conservation plans for special concern reptiles and amphibians on state lands.
- DFW to work with state and county mosquito commissions to reduce the use of deleterious insecticides and biological controls at known amphibian breeding sites.
- DFW and DEP's Bureau of Water Monitoring and Standards to work together to recommend classification upgrades in water bodies where listed or special concern species occur.
- DFW to partner with local, county and state authorities to establish best management practices in areas where listed or special concern fish and wildlife species occur.
- DFW to work with the Land Use Regulation Program to make recommendations on stream encroachment permit issues for areas where listed or special concern species occur.
- DFW to work with USFWS and other state, federal, and non-governmental partners to implement North American Waterfowl Management Plan as appropriate.
- DFW to work with USFWS and other state and federal partners to implement the American Woodcock Management Plan, seeking areas where such management complements rare species management.
- DFW to work with federal and state agencies, including USFWS, USCG, National Oceanic and Atmospheric Administration, NJ Bureau of Emergency Response, and NJ Office of Natural Resources Restoration (NRCS), to plan for and assist with emergency oil spill response.
- DFW and DPF to work with the USFWS to develop effective plans to eradicate invasive non-indigenous plants on federal and state lands that are threatening critical wildlife habitats.
- DFW to work with USDA through NRCS and the WHIP program to control purple loosestrife, Japanese sedge and other invasive plants in critical wildlife habitats.
- DFW to work with USDA-NRCS to ensure that deer management goals are integrated into farm conservation plans that include measurable outcomes.
- DFW to work with land management agencies at the state, local, and federal levels to implement deer management plans and harvest quotas that achieve desired deer densities to maintain ecological integrity of natural communities.
- DFW to determine groundwater recharge areas for Cope's gray treefrog sites and vernal pools with the Division of Water Quality (DWQ) and the NJ Geological Survey. NJDFW to work with DWQ to minimize impacts on water quality and conduct hydrological monitoring in these areas.
- DFW to lead in the development of educational materials for the public and private landowners about the importance of the area for forest birds, bald eagles, and marsh birds, as well as the fall bird migration.
- DFW, conservation organizations, and park commissions to expand public outreach through on-site programs, wildlife festivals, and wildlife viewing opportunities.
- DEP to encourage the use of the Landscape Project's critical habitat mapping to guide habitat protection and land acquisition by federal, state, and local governments through programs such as DEP's Green Acres Program, State Agricultural Development Committee Farmland Preservation, local land trusts, and through mitigation.

- DEP to encourage the use of the Landscape Project's critical habitat mapping to guide land use planning and zoning decisions by planning agencies at the federal, state, and local level.

**g. Monitoring Success**

- Conduct habitat assessment and monitor habitat changes over time; monitor efficacy of habitat management and restoration efforts.
- Annually monitor abundance, productivity, distribution, and trends of bald eagle, forest raptor and passerine (2-4 years), osprey (2-3 years), peregrine falcon, coastal marsh nesting and foraging bird (2-4 years), and freshwater wetland bird (2-4 years) populations.
- Monitor populations of breeding, migratory and wintering waterfowl of conservation concern.
- Monitor contaminant levels that may impact raptor populations.
- Routinely monitor the population trends of vernal pool wildlife.
- Monitor population trends, breeding success, and habitat of reptiles near the edge of their range.
- Continue the long-term monitoring of reptile and amphibian populations through the Herp Atlas Project, the Calling Amphibian Monitoring Program, and the vernal pool project, focusing on special concern reptiles, eastern tiger salamanders, Cope's gray treefrogs, and vernal pool obligate and facultative species, species that depend wholly or significantly on vernal pools for breeding.
- Develop indicator metrics for monitoring forest health and implement at the scale necessary to monitor effectiveness of deer management strategies.
- Employ/implement adaptive management techniques for the goals and conservation actions established for species of greatest conservation need. Review effectiveness of research and management, and improve techniques as necessary.