

## **E. Threats to Wildlife and Habitats**

For a complete literature review on impacts of habitat loss and fragmentation, please see New Jersey's Landscape Project Report, Appendix III.

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

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Global threats such as global warming and reduced air and water quality continue to jeopardize the future of our natural systems and quality of life in New Jersey. During the Wildlife Action Plan Implementation Meetings held on February 23 and April 6, 2006, stakeholders and partners in conservation recognized that while global warming and air quality are important issues, the magnitude of these threats are too great for one state to address. However, NJ's partners in conservation acknowledge that in order to determine the effects of global warming on our wildlife and their habitats long-term research and monitoring is required. Therefore when appropriate, future research will collect data addressing global warming threats such as increased water temperatures, rising sea level, vegetation changes, changes in food source emergence (e.g., insects), changes in migratory routes and timing, and appearance and disappearance of climate sensitive species.

Additionally, the NJ Department of Environmental Protection continues to be a strong advocate for decreasing both air and water pollution through strict regulations that will ultimately protect water quality in important waterways that support sensitive species. DEP has been a leader in such regulations and considers protection of our quality of life and natural resources an important priority.

### **1. National and Interstate Threats:**

- Invasive species (both native and exotic terrestrial and aquatic animals, plants, invertebrates, and exotic pathogens) cause significant impacts and permanent loss of terrestrial and aquatic ecosystems. The cost of restoring habitat destroyed by invasive species can be prohibitive and requires persistent and long-term dedicated management. Without swift and significant intervention, losses of natural communities and wildlife may be permanent.
- Suburban "sprawl" and large-acre zoning cause extensive habitat loss and fragmentation. Many communities limit development by creating large-acre zoning. While large-acre zoning (usually five-plus acres) limits the human population within a locality, it dramatically fragments existing habitat, rendering remaining habitat remnants unsuitable for area-sensitive forest and grassland species. Driveways and roads can fragment habitat and limit movement of many wildlife species. Additionally, development degrades patches of adjacent habitat through an increase in predators associated with humans (e.g., raccoons and foxes), and point- and non-point source pollutants (road salt, motor oil, fertilizers, and pesticides). Development may also isolate habitat patches and prevent wildlife movement between patches, which can be particularly devastating to populations that are long-lived and produce few young (such as turtles and snakes). These cumulative impacts of development on wildlife populations and habitats are rarely considered at the regional scale.

- Motorized recreation vehicles on or near public natural lands and waterways (e.g., off-road vehicles and personal watercrafts) cause disturbance and habitat destruction and are major threats to wildlife and their habitats. One of the most destructive aspects of motorized recreation is that it occurs mainly during spring and summer when animals are attempting to breed and plants are in their primary growing season. Acute and chronic noise disturbance can cause animals to abandon suitable breeding areas and/or result in reproductive failure. Motorized vehicles also cause direct mortality of wildlife, especially to reptiles and amphibians.
- Free-roaming and feral house cats kill millions of birds, small mammals and reptiles each year in the United States. Feral cat “colonies” contribute to the problem of anthropogenic (caused by man) wildlife mortality and can pose a serious threat to local wildlife populations. Policies and local ordinances that seek to address the public health, nuisance and animal welfare concerns of free-roaming and feral cats must consider and effectively address impacts to wildlife.
- Oil spills threaten freshwater and salt marsh ecosystems and the wildlife that rely on them. The Atlantic states host an abundance of species that are dependent on riverine and estuarine systems, including larval fish, horseshoe crabs, migratory shorebirds, breeding eagles and large populations of wintering waterfowl. Heavy oiling kills wildlife, but ingestion of lesser amounts of oil impacts reproduction and survival. In addition, the impacts to aquatic habitats are difficult to quantify and monitor.
- Contaminants from point and non-point sources degrade habitat and in wildlife cause developmental and behavioral abnormalities and reproductive failure. Substances from point- and non-point sources (e.g., road salt and oil, residential and agricultural fertilizers/pesticides, PCBs and other environmental estrogens and organochlorines, heavy metals, and municipal and commercial wastes) are sources of contamination that can cause aquatic habitats to become unsuitable for invertebrates and vertebrates, cause physical abnormalities in amphibians and chronic reproductive failure in raptors via embryonic death or wasting disease of their hatchlings.
- Overharvesting of horseshoe crabs has diminished the abundance and availability of horseshoe crab eggs, a critical food source for the red knot (*Calidris canutus rufa*). The dramatic decline in red knot numbers on the Delaware Bay has resulted in the call for federal listing of the red knot. The strong reliance of red knots on horseshoe crab eggs has been evidenced by the declines in red knots concurrent to the declines in horseshoe crabs and horseshoe crab eggs (Clark et al. 1993).

## 2. Statewide Threats:

Virtually all of the threats faced by New Jersey’s wildlife are ultimately linked to human activities. For convenience or organizational clarity, human impacts can be described as "direct" or "indirect". Direct impacts include intentional killing or destruction of animals or their nests or homes, human disturbance, and collection. Without discounting the importance of direct impacts, indirect human impacts pose the greater threat to wildlife. The majority of these are linked to the pattern of human changes to New Jersey’s landscape, especially the vast changes brought about by sprawl development over the past half century. Indirect human impacts include habitat destruction, alteration, fragmentation, invasive species’ infestation and contamination. Moreover, the NJ Comparative Risk Project Report, written by an independent panel, listed habitat loss and fragmentation as the top risks to NJ ecosystems.

Human activities resulting in changes, including changes to the landscape, can benefit some species. However, species that benefit from human activity can, in turn, negatively affect other species or their habitats.

***Direct Human Impacts***

- Illegal collection of reptiles, butterflies, and freshwater mussels.
- Wanton (and illegal) killing of snakes.
- Vandalism to mines and caves supporting colonies of wintering bats, which are highly susceptible to large-scale mortality during hibernation.
- Recreational use of caves and mines poses a major threat to hibernating Indiana and other wintering bats. These disturbances force bats to unexpectedly arouse from hibernation, thereby depleting critical fat reserves needed to support them through the winter.
- Recreational rock climbing and rock scrambling can make habitats unsuitable for habitat-sensitive, cliff-nesting peregrine falcons, and basking/gestating timber rattlesnakes and northern copperheads.
- Recreational use of some beaches disturbs beach-nesting birds, resulting in diminished nesting success and brood survival, and interferes with the foraging and resting of migratory shorebirds.
- Mechanical beach cleaning reduces substrates necessary for foraging by beach-nesting birds and migratory shorebirds.
- Vehicle use on beaches, including permitted private vehicles and “official” vehicles, creates disturbance, harms foraging habitats, can destroy habitats for northeastern beach tiger beetles and causes direct mortality of beach-nesting birds.
- Unlawful off-road vehicle (ORV) use on public land has become a major threat to wildlife habitat. Human disturbance and wildlife mortality from vehicles occur in the most important and intact wildlife habitats in the state. Heavy ORV use renders habitat unsuitable for most wildlife. Other impacts include damage to vegetation, soil compaction, soil erosion and siltation from dirt trails.
- Many commercial fishing practices, including long lines and gill nets, are a threat to sea turtles, whales, pinnipeds (such as seals), pelagic birds, and some fish species such as Atlantic sturgeon. Impacts of aquaculture and back-bay hydraulic crab dredging on marine habitats are largely unmeasured and poorly understood.
- Over-fishing in riparian, estuarine and oceanic systems can reduce reproductive success of colonial waterbirds, bald eagles, ospreys, and red knots due to depleted food resources.
- Personal watercraft and recreational boating can cause reduced reproductive success or abandonment of nesting areas and interfere with bird foraging (waterbirds, bald eagles and ospreys).
- Ship strikes pose a threat to sea turtles, pinnipeds, and especially whales. Ingestion of plastic (pollution/ litter) also threatens these species.
- Burgeoning predator populations, especially of species that are human-subsidized and/or that are accidentally or purposefully provisioned by people (e.g., feral cats, red foxes, crow species, gull species, raccoons, and skunks), severely impair nesting success and productivity of beach-nesting birds, colonial waterbirds, northern diamondback terrapins, freshwater mussels, songbirds, small mammals, reptiles, and amphibians.
- Unleashed dogs may disturb nest sites and breeding areas of birds, reptiles, amphibians, and small mammals.

- Controlled water releases from reservoirs, along with illegal releases from impoundments, may negatively impact fishes, freshwater mussels, dragonflies, and damselflies, and other aquatic organisms by altering natural flow regimes. Water releases can also affect dissolved oxygen levels downstream during summer months.
- Illegal draw-downs of lakes and ponds during the spring can cause desiccation of spawning nests and egg mortality in fishes. Freshwater mussels, amphibians, and other aquatic species are also at risk.
- Although the potential impacts of offshore wind energy development to migratory and pelagic birds, migratory bats, sea turtles, and marine mammals are poorly understood at this time, offshore wind structures may pose significant threats to these wildlife.
- Water intake systems (e.g., power plants) pose a threat through the entrainment and impingement of aquatic organisms.
- Acoustic effects in freshwater, such as pile driving and underwater drilling can deter migrating anadromous fishes such as American shad and river herring.

### ***Development***

Development eliminates terrestrial and aquatic species habitat and in most cases is irreversible. Moreover, in New Jersey, natural public lands have become a magnet attracting development that surrounds, isolates, and potentially degrades natural lands. As described above, the impacts on natural communities from adjacent development can be many, but some of the more significant include the following:

- Lotic and lentic systems (e.g., swiftly and slowly moving streams and waterways) are threatened by land development, including erosion and deposition from storm water discharge, alteration of temperature and nutrient regimes from pavement and lawns, ecological disruption from pesticide applications, and decreased flow due to water draw-downs.
- Increased silt loads and shifting stream bottoms caused by erosion threaten freshwater mussel habitats, as do contaminants such as heavy metals, pesticides, and sewage treatment plant effluent. In addition, increased turbidity deters anadromous fish from completing their normal migration to breeding areas.
- Unspoiled headwater streams are one of the most threatened habitats in North America for fishes and aquatic insects, especially rare dragonflies. Removing the forest canopy can increase water temperatures and silt loading, which can reduce dissolved oxygen levels.
- Groundwater withdraws at headwaters can alter stream flow or cause tributaries and seepages to dry completely. At risk are rare dragonflies and damselflies restricted to these habitats.
- Dragonflies, damselflies, and other aquatic invertebrates also are threatened by alteration or removal of upland forests and fields surrounding the aquatic habitat. These adjacent areas provide critical shelter for newly emerged dragonflies and damselflies and are later used for breeding and foraging.
- Clearing upland vegetation from around wetlands exposes wetlands to increased runoff (siltation and contaminants) and increased desiccation and higher temperatures from exposure to wind and sun. It also favors the establishment of invasive and exotic plants.
- Small freshwater wetlands suffer from lowered water tables caused by heavy residential use of ground water.

- Large wetlands become surrounded by development and become degraded from runoff non-point source pollution, impacts from human disturbance, invasive/exotic plants, and introduced mammalian and avian predators, including housecats.
- Removal of snags (e.g., stream cleaning projects), which provide food and shelter for fishes, invertebrates and amphibians, threatens stream communities by decreasing the available detritus that normally accumulates behind stream obstructions.
- Channelization and dredging threatens freshwater mussels, fishes, dragonflies, damselflies, and other aquatic organisms by disrupting stream bottom habitat. These practices also cause higher ranges in tidal volume and a subsequent loss of shallow water habitat, which affects the reproductive success of fish.
- Dams alter the physical, chemical and biological stream environment, sometimes destroying 30-60 percent of the freshwater mussel fauna upstream and downstream of the structure. The most detrimental effect of dams on freshwater mussels, however, is the elimination of host fish species, which disrupts the mussels' reproductive cycles. Dam construction also results in rare stream dragonflies being replaced by common pond species and blocks the migration of anadromous fishes.

### ***Roads***

New Jersey's extensive road network fragments habitat, causes significant wildlife mortality and can present significant barriers to wildlife movement. The impact of vehicular mortality on wildlife populations is only beginning to be quantified. However, some of the more significant impacts are:

- Direct mortality of animals that are slow moving (i.e. reptiles, amphibians), long-lived, produce few young, or already have a small population size can severely impact the viability of that population.
- Roads can act as barriers to wildlife dispersal, which can cause inbreeding and prevent movement when habitat is destroyed or becomes unsuitable, resulting in the direct loss of these individuals from the population.
- Declines in freshwater biodiversity have been attributed to in-stream habitat degradation caused by the removal of forest and the construction of roads and impoundments.
- Traffic noise creates disturbances that render adjacent habitats unsuitable for breeding birds.
- Roads promote dispersal of exotic species, degrade the surrounding environment, and tend to result in new developments, deforestation, and habitat fragmentation.
- Runoff from roads and developed areas degrades water quality (contaminants, erosion, silt deposition) and impacts aquatic wildlife and habitats and the terrestrial wildlife that rely upon them.

### ***White-tailed Deer***

High densities of white-tailed deer pose a significant threat to forest health and forest regeneration. New Jersey's progressive deer management strategy and the hunter's contribution through increased antlerless deer harvests have reduced the deer herd in many areas of the state. Damage from deer browse coupled with human-related effects described above severely impact some of New Jersey's remaining public and private natural lands. The unintended consequence is the destruction of some of our remaining natural lands.

- Deer directly damage wildlife habitat and can eliminate rare plant communities.

- High numbers of deer find refuge in residential areas or on private land where hunting is not allowed.
- Over-browse by deer eliminates the native shrub layer, which deprives breeding habitat for many species, particularly shrub-nesting birds.
- Deer over-browse creates a favorable environment for invasive plants to germinate and crowd out native species.
- Deer selectively browse on native species, which allows non-native plants to become established and thrive.

### ***Invasive Species and Exotic Pathogens***

New Jersey is currently suffering from an onslaught of invasive, non-indigenous species that threaten the state's natural resources and natural diversity. These include terrestrial and aquatic plants and animals (insects, mollusks) and exotic pathogens. These invasives negatively impact our forests, streams, lakes, bays, marshes, and backyards. Over 1,000 non-indigenous plant species have become established in New Jersey and many more occur throughout our region but have not yet found their way into the state. Human actions, both non-deliberate and deliberate, are the primary means of invasive species introductions. Some specific examples that occur statewide include:

- Insects such as the Asian long-horned beetle (*Anoplophora glabripennis*), emerald ash borer (*Agrilus planipennis*), and hemlock wooly adelgid (*Adelges tsugae*) kill off large tracts of trees and may significantly change the composition of our forests.
- Sudden oak death fungus (*Phytophthora ramorum*) may severely restrict oak regeneration within our forests and negatively impact the wildlife that relies on oak mast.
- Japanese barberry (*Berberis thunbergii*), tree-of-heaven (*Ailanthus altissima*), and Norway maple (*Acer platanoides*) likely cause long-term loss of forest regeneration and native understory.
- Common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*) can severely reduce habitat suitability of freshwater and coastal wetlands for many marsh nesting birds and other species such as bog turtle (*Glyptemys muhlenbergii*).
- Autumn olive (*Elaeagnus umbellata* Thun. var. *parvefolia*), Chinese bush-clover (*Lespedeza cuneata*), Japanese honeysuckle (*Lonicera japonica*), and multi-flora rose (*Rosa multiflora*) impede growth of native grasses, shrubs, and forbs, including host plants and nectar sources for many butterflies.
- Non-indigenous aquatic plant species such as Eurasian water-milfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*) reduce the diversity of indigenous aquatic plants, are of less value as a food source for waterfowl and deplete oxygen levels in the water.
- The Asian clam (*Corbicula*) is the most widespread exotic bivalve in North America. Often competing for space and food with native freshwater mussels, *Corbicula* in high densities have been implicated in the decline of native mussels.
- Zebra mussels, not yet reported in New Jersey, pose a significant threat to freshwater ecosystems. All aquatic organisms that are subject to attachment would be at risk. Phytoplankton would also be at risk statewide, as would entire ecosystems that depend on them. All inland freshwater ecosystems could experience dramatic changes in habitat structure and food web dynamics.

- Mute swans (*Cygnus olor*) are established throughout New Jersey and are responsible for excessive herbivory to submerged aquatic vegetation in wetland habitats during key portions of the growing season.
- Exotic fish species, such as the flathead catfish and northern snakehead in the Delaware River drainage, can disrupt aquatic ecosystems by competing for food with native predator species.
- The illegal stocking of carp and grass carp can disrupt benthic (bottom-dwelling) communities and severely impact aquatic vegetation.
- European starlings (*Sturnus vulgaris*) and house wrens compete with many species of woodpeckers and eastern bluebirds for nesting cavities, which is usually the limiting factor for these species.

***Unsustainable Land Management Practices on both Private and Conserved Lands and Waters***

Approximately 21 percent of New Jersey is protected as federal, state and local lands and through conservation organizations and land trusts (e.g., NJ Audubon Society, The Nature Conservancy, The NJ Conservation Foundation). Although these lands are protected from development, only some lands are actively managed for habitat and wildlife protection. Many natural land areas face the threats listed previously, including over-browse of native plants due to high deer populations, invasive plants replacing native vegetative communities and human disturbance in sensitive areas. At sites where active management occurs, management practices vary according to different organization goals and may not be optimal for maintaining ecological integrity of natural communities, promoting regional biodiversity and protecting critical habitats of rare wildlife. Some practices that could potentially harm native species include:

- Forestry practices, including unsustainable clear cutting and even-aged stand management, can result in forests that are low in vegetative structural diversity, low in living and dead biomass, and consequently, low in biological diversity and ecological integrity.
- Vegetation management, including mowing, cutting and herbicide use on utility rights-of-way and roadsides during the breeding season, increases mortality and reduces productivity of many species, especially birds, invertebrates and small mammals.
- Agricultural use of state lands, particularly Wildlife Management Areas, cultivate crops that do not provide habitat for many species of wildlife.
- Insufficient consideration of the ecology of sensitive habitats when selecting and altering areas for human recreational use causes fragmentation and loss of critical habitat for rare and declining wildlife.
- Lack of active management for wildlife diversity.
- Nutrients from fertilizers used for agriculture, primarily nitrogen and phosphorus, can lead to algae blooms and contribute to eutrophication in aquatic systems. Pesticides, as well as waste from livestock, also threaten waterways. Impacts to aquatic systems and rare species from aquacultural activities are largely unknown, but potential exists for significant negative impacts.