

# SONGBIRDS AT THE CROSSROADS OF MIGRATION

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### **NEW JERSEY’S NATURAL COMMUNITIES**

New Jersey is a special place where one can witness phenomenal natural history events. Part of the reason for this fact is New Jersey’s geographic location, in addition to its geologic past, have created a diversity of natural communities. We identify New Jersey’s shape by its borders - the Delaware and Hudson Rivers and the arbitrary line that separates the state from New York. But in essence, the land that makes up New Jersey exists as part of several larger ecological regions.

Natural communities do not just appear and disappear – they exist because of a complex series of events. For the most part, a plant community exists in a particular area because of the soil that exists there. The soil is there as a result of the underlying geology, since eroded bits of bedrock comprise the base for the soil. In the relatively small area of New Jersey, portions of larger geologic formations exist. Our northwestern mountains are part of the Ridge and Valley geologic province that stretches from Canada to the southern United States. Sedimentary ridges with broad limestone or shale valleys characterize this area and the resultant natural communities are thick deciduous forests with sugar maple and oak as the dominant species. The Highlands, which is sandwiched between the Ridge and Valley and the Piedmont regions, is also part of a larger geologic formation. The Highlands contains some of the oldest granite gneiss rocks in the country. Different from the Ridge and Valley in its structure, with broad topped ridges and steep slopes leading to narrow valleys, the Highlands also contains thick mixed oak forests, glacial ponds and wetlands. To the southeast of the Highlands is the Piedmont, the outwash of a long eroding highland mass. The northwest to southeast sloping region is mostly sedimentary shale with occasional sandstone ridges and several basalt ridges called the Watchung Mountains. The Piedmont is part of a geologic region that extends from Massachusetts down through New Jersey and Pennsylvania into Maryland and Virginia. Because of the variety of soils produced from the bedrock, there are a number of natural plant communities that exist in the Piedmont. Lastly, the bulk of New Jersey’s land area is part of larger region called the Coastal Plain that extends from Long Island into Mexico. This entire region was covered with an ancient sea and as sea levels dropped, the underlying land was exposed. Much of the soil in this area tends to be sandy, loamy or have high clay content. Quite different than the rest of New Jersey’s soil, it results entirely different types of natural communities.

Breeding bird distribution depends on the distribution of habitats and many birds, especially songbirds, are very specific in their habitat requirements needed for breeding. Black-throated Blue Warblers like to nest in dense rhododendron thickets. Black-throated Green Warblers nest where there are thick stands of hemlock forests. Baltimore Orioles nest in deciduous trees,

preferably on a draping branch that sticks out over a stream, river, or open field. The more these birds can find these types of intact habitats, the more likely they will be successful breeding.

Likewise as birds migrate back and forth between their breeding and wintering grounds, they utilize specific habitats for resting and feeding. Since our physiographic regions are not in isolation, but part of a greater continental or hemispheric system, birds migrating from north to south or south to north tend to follow physiographic cues. They follow ridgelines, rivers, river valleys and coastlines. New Jersey has all of these things, as well as the historical habitats to support an amazing diversity of breeding species.

## **A MIGRATION PRIMER**

### **What is Migration?**

Migration is movement. It is a process. It is an observable phenomenon for those willing to see it, and is almost always evocative when witnessed. Migration applies to animals as well as plants. It occurs worldwide to populations as well as to species within a microclimate. The very existence of migration drives scientists to study it as surely as it inspires artists to render it and poets to capture its essence in words.

Migration can be defined in numerous ways. The Random House Dictionary (1973) defines migrate as “to pass periodically from one region to another, as certain birds, fishes, and animals.” Other sources say that since many migration studies have focused on a single taxonomic order – such as birds or fish or mammals, the definition of migration should be tailored to reflect the characteristics of each specific order. In addition to all the different definitions for migration there are also various theories as to how the process of migration came to be and how animals truly navigate our globe. Scientists around the world conduct ongoing research to answer these questions and as one question is answered, many more questions are raised. Questions such as how does the Baltimore Oriole, a striking orange and black songbird, find its way from the forests of Panama to the exact same tree in Morris County which it nested the previous three seasons? Why do Blackpoll Warblers, tiny songbirds weighing a mere 20 grams, choose to fly nonstop for 2,000 km over water from the Maritime Provinces in Canada to northern coast of South America? (Greenberg and Lumpkin, 1991) It is avian feats like this that drive scientists and birdwatchers alike to marvel at this ancient phenomenon; shaking their heads in amazement each time they witness its awesomeness.

For the purpose of *Songbirds at the Crossroads of Migration*, and synthesized from numerous resources including Dr. David S. Mizrahi, Vice President for Research, New Jersey Audubon Society (personal communication, January 2001), migration is defined as *the predictable movement of an animal from one location and climate to another location and climate. Typically these movements are linked to resource availability, seasonal changes and reproduction.* From the smallest invertebrates to the largest vertebrates, animals move about territories, along coastlines and ridges and between continents to put themselves in an optimum position to carry out their life cycle. Although there are several types of movement (foraging for food, outlining a territory, and dispersing away from or to an area), a migratory movement should exhibit five characteristics (Dingle, 1996).

- 1) The movement should be persistent. In other words, the migrant should be carried “beyond its original habitat where it obtained resources to a new one in which it also gathers resources.”
- 2) The movement should be straight. This implies that the animal has direction and intent toward movement rather than just foraging within a territory.
- 3) Migrants should be “undistracted by those stimuli” to which they would normally respond. These stimuli could be connected to breeding, food gathering and other reasons for territoriality.
- 4) Migrants should “exhibit distinct behaviors of leaving and arriving.” These distinct behaviors may include increased feeding or flocking.
- 5) Finally, migrants should “reallocate energy specifically to support movement.”

Neotropical songbirds, those birds that breed in northern temperate latitudes and winter in the Tropics, exhibit all of these characteristics when they migrate. The birds participate in a twice-yearly cycle of movement from tropical habitats to temperate latitudes. At each endpoint they rely on the available food resources and appropriate space to carry out their life cycles. These birds also have direction and intent. As long as people have been watching nature and natural phenomena, they have witnessed and documented the movement of birds at specific times of the year, moving in specific directions. For the most part, these birds ignore territorial behavior during migration; they fly in mixed flocks and they feed in mixed flocks. According to birdwatchers who witness fall migration unfold in Cape May, New Jersey, flocks of many different species of birds fly over the Cape May Point (Vince Elia, personal communication, March 18, 2002). Warblers fly next to orioles, which fly next to vireos, flycatchers, thrushes, and tanagers. As long as there is sufficient food and space for these species to refuel and rest, there is little competition and little aggressive behavior toward each other off the breeding grounds.

### **Why Do Birds Migrate?**

Whatever the distance, duration, altitude or migration strategy may be, the question remains-- why migrate? “Ultimately, long-distance seasonal migratory movements are driven by the resources available in the breeding habitat. The rich food supplies of the vast Arctic and North Temperate land masses or of the southern oceans, to cite prime examples, are present only for a limited period. To exploit these resources requires not only the ability to reach them, but also to escape with the onset of winter. For migratory birds, whales or other long-lived organisms, this factor has resulted in the repeated evolution of long round-trip journeys often accompanied by sophisticated navigation to precise breeding and wintering sites” (Dingle, 1996). Like so many other things, migration has its costs and its benefits. Migration is energetically expensive for a specific animal and potentially hazardous due to the obstacles the animal encounters along the way.

Adverse weather conditions, buildings, glass windows, tower wires, and predators all take their toll on songbird populations. They also are affected by alterations in breeding and wintering habitats, as well as to changes in the habitats they use to rest and replenish energy stores en route between destinations (Moore, Gauthreaux, Kerlinger and Simons, 1993). The availability of suitable “stopover” habitats along the migration route that provide the food resources necessary for birds to accumulate energy quickly and safely is essential to their ability to complete migration successfully (Moore et al., 1995). If one of these stopover areas is destroyed or

degraded, it may compromise a bird's ability to reach its goal (Terlough, 1992). Additionally, for birds migrating to the breeding grounds, loss or degradation of stopover habitats could affect nesting success and eventually, population viability. Think of the Wood Thrush, a warm brown, robin-type bird that has an ethereal flute-like "e-o-lay" song that captures the essence of northeastern deciduous woods. It spends eight months out of the year in Central America and northwestern Colombia, and then flies over 2,500 miles to the forested habitats of New Jersey where it spends several months while it breeds and raises young. If during its northward migration the thrush only finds wooded suburban neighborhoods rather than contiguous forests, it has to spend more time finding food to sustain its energy level. By the time the thrush reaches its breeding grounds, other birds will have had the time to establish their nesting territories and the thrush is unable to find the required space it needs. Or perhaps the space that it does find is not ideal and the nest becomes more vulnerable to predators including cats, other birds, skunks, and raccoons. Regardless of the bird's success or failure at breeding, at the end of the season, it returns to its wintering site, once again flying thousands of miles. A researcher in New Jersey recaptured a wood thrush that was banded (with a lightweight numerical aluminum ring) close to seven years prior (Terres, 1980). It is likely that this bird flew at least 35,000+ miles up to that point in its life, migrating to and from the tropics to New Jersey. The Wood Thrush is not alone in its incredible journey and in its struggle to complete this journey year after year.

## **WHAT IS A SONGBIRD?**

Ornithologists have divided all birds or the Class Aves into two major categories: those birds that perch and those that do not. Perching birds, or passerines, have four toes – three in the front of the foot and one in the back. This allows them to grasp hold of a twig or other horizontal structure in order to sit. Although species as ducks, herons, shorebirds, woodpeckers and hummingbirds may be able to perch in a tree or bush, they do not have the anatomical structure attributed to passerines. Since birds in the Order Passeriformes make up about 60% of all bird species (Ehrlich, Dobkin and Wheye, 1988) this Order is subdivided further into songbirds and non-songbirds. Songbirds, or birds in the Suborder Oscine have the most highly developed ability to sing. Although most birds have distinctive calls, songbirds warble and twitter to the likes of no other group of birds.

Songbirds are further categorized into groups, one of which are the Neotropical songbirds. That is, these are the birds that spend eight months of the year in Central and South America and only visit North American temperate latitudes during the summer months to breed and raise their young. Eleven of the 96 Neotropical songbird species are currently considered to be endangered, threatened, or being of management concern, while another 65 Neotropical songbird species show measurable population declines (Degraaf and Rappole, 1995).

## **SONGBIRD SIGNIFICANCE**

In North America fall and spring migrations tend to be more concentrated and spectacular, but animals, especially birds, migrate throughout the seasons. Animals migrate in every part of the world, on every continent and over every ocean. Animals also migrate nearly everywhere in New Jersey. There are certain places throughout the world and certain places in New Jersey, where the paths of migratory animals cross and concentrate, the same way tributaries feed into a river. The migratory paths of birds, insects and flying mammals unite into flyways and New Jersey is at the confluence of the Atlantic, Hudson and Delaware Valley flyways. "If we

conceive of migration as a transit system, New Jersey is the hub where the major flight lanes along the coast, the river valleys, and the mountains converge and radiate out to destinations north and south” (Dunne, Ed., 1989).

Since New Jersey has the corner on the market for a superb location and since its geologic history created diverse physiographic regions that support a variety of habitats including freshwater wetlands, deciduous and coniferous forests, grasslands and coastal salt marshes, a historic precedence was set. Neotropical bird species that evolved migratory patterns became accustomed to exploiting the state’s rich array of natural resources. These resources sustained migratory populations as well as supported those species that remained in these habitats to breed.

At the present time, 42% of New Jersey’s 4.98 million acres is forested (NJDEP, 2000). A great proportion of this land is owned by private landowners and has the potential for being sold for residential, commercial or industrial purposes. Without protection by a government entity or conservation-minded organizations, this land is in jeopardy of becoming more of what people desire and less of what the birds require.

As a general rule, Neotropical songbirds prefer forested habitats. The “migrants filter slowly northward traveling an average of only 50 kilometers a day and taking as long as six weeks to reach their breeding grounds. In large flocks, these birds closely track the bloom of hatching insect larvae on newly leafing trees” (Greenberg and Lumpkin). Think of it as a “road trip.” The birds do the same thing that we would do, although they don’t have the luxury of advance planning. They have to deal with each day and situation as it unfolds. As the pace of forest clearing, wetland draining, and grassland conversion quickens, birds are finding less quality habitats to provide them with their needs along the way. Without the technology and foresight to conserve vital stopover habitats, as well as breeding habitats and wintering habitats, these migrant populations will reach a point where they are no longer sustainable.

In the past, coal miners would take a caged canary into the mineshafts with them. This was not to have canary song permeate the dark tunnels; instead, the life of this small bird would be sacrificed to save the lives of many miners. If, during excavation, the miners opened up a pocket of toxic, but odorless gas, the canary would be affected first. This would give the miners time to evacuate before succumbing to the deadly gas. Unknowingly birds do the same thing today, but in a slightly different setting. The decline of Bald Eagles, Ospreys, and Peregrine Falcons warned us of the lethal effects of DDT. With its ban, these species populations have rebounded. Likewise, the decline of songbirds tells those that want to hear it, there is still, or again, something drastically wrong with the ecosystem balance. With songbirds, though, it is much more complicated.

People see songbirds in their neighborhoods, but these are not the birds that are warning us that something is amiss. Neotropical songbirds tend to be small, usually inconspicuous, and often do not attract the attention of larger more showy species. Their decline can be attributed to a number of factors and these are not nearly as easy to trace as the dreaded DDT. Habitat decline throughout the hemisphere – both quality and quantity – is the major factor. Within this major category, there are numerous reasons for habitat decline including forest fragmentation, invasive plant and animal species that out compete native species, development, and insect control (a

major food source of these species). Couple habitat decline with the more mundane things that a bird has to overcome during migration – such as tall glass buildings, cats, other natural predators, bad weather, towers with guy wires and it is a wonder that any of these birds survive at all.

Although declining bird populations warn us of potential environmental disaster in regards to habitat quality, we can use this information to halt or reverse this trend. The most difficult thing is to do it quickly, before critical habitats are lost forever to alteration or destruction. With the advance of technology, satellite imagery, and other sophisticated programs, it is possible to identify those habitats that are most important to migratory birds. It is these habitats, along with sites at both ends of these birds' journeys that need to be protected.