

1.10 Wildlife and Fish Communities

Watershed Management Area 6 contains relatively large tracts of contiguous forest that provide habitat for a variety of wildlife species. Common species include; wild turkey, white-tailed deer, black bear, eastern chipmunk, eastern cottontail, woodchuck, beaver, bobcat, coyote, red fox, raptors, and a diversity of small mammals, amphibians, birds, insects, fish and reptiles. See Appendix 1.10.1 for a representative listing of wildlife species by physiographic province.

The great species diversity that is supported throughout the region is an indication of the high ecological value of this habitat. Trout are the most extensive and widespread cold and cool water species; brook, brown, and rainbow trout are the predominant species. There are a number of streams classified as trout production waters; these support naturally reproducing brook trout populations. Additionally, there are many rivers, streams, and creeks that are managed as trout fisheries through various stocking strategies. Water quality is a primary determinant in all trout waters, especially where native populations occur. Suitable trout habitat depends on adequate forest buffers and tree canopies to provide good water quality and stable temperatures.

In addition to riverine habitats, the watershed contains numerous lakes, ponds, and reservoirs. Trout species and smallmouth bass tend to dominate the cold and cooler water systems, while yellow perch, largemouth and smallmouth bass are found in the warmer water lakes, ponds, and impoundments. Other important species that are found in these waterbodies include members of the following families: lampreys, suckers, sunfish, sculpin, minnows and carp, killifishes, pikes, and perches.

A healthy fish population, particularly a healthy trout population, generally is an indication of good water quality. Macroinvertebrates serve as a food supply to higher order species, and collection of macroinvertebrates (mostly insect larvae/nymphs) can serve as an economical and more convenient means (as compared to counting fish) of assessing environmental conditions. Species vary in their tolerance to pollutants, thus particular species make useful “indicators” of conditions over a time span of weeks or months, depending upon the lifespan of the particular species. Macroinvertebrate communities of the Rockaway River watershed and of the Great Swamp watershed have been sampled in recent years by Leland W. Pollock, Ph.D. of the Department of Biology at Drew University.

The summer 2001 studies in the Rockaway River watershed showed diverse macroinvertebrate communities along the river from Berkshire Valley to just below Washington Forge Pond. Further downstream, after the river passes through a series of urbanized areas, conditions reflected much stress. Crooked Brook (considerable upstream development) and Green Pond Brook (runs through Picatinny Arsenal) showed the most stress of the streams sampled. Stony Brook, Mill Brook and Jackson Brook also showed signs of stress, conditions were better at sites on Beaver Brook and Hibernia Brook, and the highest values were found at a site on Russia Brook, which serves as a relatively undisturbed “reference” site. Although the upper reaches of several of these

Rockaway River tributaries are classified as trout production waters, the studied sites were located close to downstream connections to the Rockaway River. These sites generally fell into the “fair” category, based on a regionally-generated B-IBI index (Benthic Index of Biological Integrity). This analysis “leads to questions about how much of a decline in quality do these streams experience as they approach the Rockaway River.”¹

Dr. Pollock conducted studies in the Great Swamp watershed in the summers of 2000, 2001 and 2002 for the Ten Towns Great Swamp Watershed Management Committee. The 2002 study indicated that the range of environmental conditions as reflected in the macroinvertebrate communities is very wide in the Great Swamp watershed. Greater stresses were revealed in the streams toward the east side of the watershed, and the challenge is to prevent deterioration of the more pristine sites to the west side of the watershed. The Indian Grave Brook site had a “good” rating and serves as a reference site. Three Passaic River sites ranged from “good” to “poor”. Primrose Brook sites were “good” to “fair”. Two sites on Great Brook were “poor” and two were “very poor”. The two “poor” sites did show an improvement from the 2001 study. Each of four sites on Loantaka Brook earned a “very poor” rating, and the two sites on Black Brook were rated “very poor”. For some of the sites, elevated temperatures, reduced oxygen, and spill over nutrients/production from upstream ponds appeared to be the likely source of the decline in the macroinvertebrate community. Discharge of sediment from upstream ponds also was cited as having an adverse impact. Improved management of the ponds could lead to improved downstream conditions.²

WMA 6 contains 174 square miles (48%) that are considered critical habitat (Niles et al., 2000). Critical habitats are defined as contiguous natural areas that provide habitat for state and federal threatened and endangered species. The watershed management area also contains portions of 11 NJDEP Natural Heritage Program sites, which are areas defined as the best habitats for rare plant and animal species and natural communities (Plate 1.15.1). There are 24 threatened and endangered vertebrate species on state and federal inventories (Appendix 1.10.2).

There are approximately 8,024 acres of state and federally owned protected open space and recreation areas, which include wildlife management areas, state parks and water supply management areas (Plate 1.18.1). The biggest threat to wildlife is the fragmentation and loss of habitat due to urbanization. Between 1986 and 1995 there was a loss of 6,775 acres (5.2 %) of forest and wetland habitat that was converted to agriculture or urban land uses.

¹ Pollock, Leland W., Ph.D., Department of Biology, Drew University, The Macroinvertebrate Communities of the Rockaway River Watershed, Summer, 2001, A Report to the Rockaway Cabinet, October 2001.

² Pollock, Leland W., Ph. D., department of Biology, Drew University, The Macroinvertebrate Communities of the Great Swamp Watershed, Summer, 2002, A Report to the Ten Towns Great Swamp Watershed Management Committee, October 2002.

Historic Forests of New Jersey

Pre-Columbian New Jersey was nearly completely forested. Native Americans manipulated forests through burning and clearing small areas of forests for cultivation, wildlife habitat and protection. It has been theorized that greater than 40% of these forests were American Chestnut forests.

European settlers cleared larger areas of forest for agriculture, animal grazing and building materials. In the 1800's, even larger areas of the forest in WMA 3 were cleared for charcoal and iron ore production. By 1900, there was virtually no forested land left in the area.

In 1900, the Chestnut Blight (a fungus) was also introduced through nursery stock in New York City. By 1940, the Chestnut was gone from New Jersey Forests. Root sprouts can still be found but few if any reach maturity. Many of these Chestnut forests have been replaced by Oak-Hickory forests.

Dutch Elm Disease was first found in 1930, has now spread throughout the country and killed half of all Elm trees. The disease was particularly devastating in suburban areas where the Elm tree was a popular street tree and the disease spread via root grafting or bark beetles.

Large areas of land were reforested by the Civilian Conservation Corps (CCC) between 1933 and 1942 under a Depression Era program implemented by President Franklin Delanor Roosevelt to combat soil erosion, lack of forest resources and rampant unemployment.

Current State of Forests in WMA 6

WMA 6 is 34% forested, mainly in the Rockaway River Watershed, much of which is in public ownership, State Parks and Wildlife Management Areas as well as undeveloped county owned land. There are many areas that could and should be reforested. Forest fragmentation is a serious issue that reduces the available habitat for many species of wildlife, particularly interior nesting birds.

The majority of forests in WMA 6 fall into the Oak-Hickory type. In Oak-Hickory forests you will typically find Red Oak, White Oak, Black Oak, Scarlet Oak and Chestnut Oak. Pignut Hickory and Shagbark Hickory are common minor components of this forest type. The mixture may also contain Tulip Poplar, White Ash, American Elm, Sugar Maple, Red Maple, Black Birch, Black Cherry and Black Walnut. Pignut Hickory and Chestnut Oak are more common on dry rocky ridges found throughout WMA3. These Oak-Hickory forests without disturbance will overtime convert to more shade tolerant Sugar Maple, Red Maple, Black Birch and Beech forests. Understory and shrubs species associated with this forest type include Flowering Dogwood, Sassafras, Downy Serviceberry, Blueberry, Mountain Laurel and Rubus spp.

The Northern Hardwood forest type is less common in WMA 6. Northern Hardwood forests commonly include Sugar Maple, Yellow Birch, American Beech, Blackgum,

American Basswood, Black Birch, Tulip Poplar and Hemlock. Other associated species include Red Maple, White Ash, American Elm, Eastern White Pine and various oaks. Understory and shrubs species associated with this forest type include Eastern Hophornbeam, Witch Hazel, Maple-leafed Viburnum and Hornbeam.

Upper reaches in first and second order stream riparian forests would include Yellow Birch, White Ash and Tulip Poplar. Lower reaches of the basin with wide flood plains the riparian forest type likely found would be a Boxelder Maple, Silver Maple, Pin Oak and Sycamore forests.

Benefits of a Healthy Forest

Healthy riparian and community forests would be of great benefit to WMA 6 in reducing non-point source runoff, reducing spiky peak flows by protecting soils into which water would slowly percolate to be released more slowly maintaining baseflows. It is the forest soils that serve as the sponges and cleansers of precipitation falling in the watershed.

Recent studies have shown that riparian forest buffers can reduce both point and non-point source pollution on 1st to 5th order streams. Reforested streams have healthier stream biota more adept at using nutrients particularly nitrogen and phosphorus and are more likely to have non-filamentous algae species and are more likely to produce green than blue-green algae which cause taste and odor problems in drinking water. Many reforestation projects fail due to poor planning (wrong tree for the sites poor maintenance), poor planting techniques and deer predation.

A reforested buffer will also discourage the Canada goose, which is largely responsible for the fecal coliform problems within the Passaic River Basin.

Current Forest Health Issues

There are many areas in WMA 6 in which individual trees or entire stands of trees have been killed by repeated attacks by the Gypsy Moth, recurrent drought or a combination of both. Many of these sites are on ridgetops and steep slopes where there is a danger of severe erosion or mud slides. The Gypsy Moth was introduced in 1869 and feeds on dozens of tree species but favors oak. Gypsy Moth outbreaks occur cyclically. Infestations in 2000-2002 were particularly severe defoliating over 100,000 acres each of these years. A large percentage of this defoliation occurred in WMA 6.

The Hemlock Woolly Adelgid (introduced in 1924) has decimated Eastern Hemlock populations throughout its range. New Jersey has been particularly hard hit by this insect. Eastern Hemlock is an important species since it typically grows in steep, cool ravines. Loss of this cover will have a significant impact on local water quality.

Other forest health issues to be monitored for are Asian Longhorned Beetle, which has been found in New York and Chicago and in warehouses in New Jersey. It is transported in pallet wood from Asia. For the first time in October of 2002 it has been discovered in the environs in Jersey City. The only known controls are removal of all woody vegetation in the area. Other diseases of concern are Sudden Oak Death, which has only

been found in California and Oregon but is capable of affecting eastern oak forests as well. It is fatal within one year of infection. New Jersey is currently classified as a moderate risk. The last is Bacterial Leaf Scorch, which has affected the Red Oak in Southern and Central New Jersey. The disease has not been detected in Northern New Jersey Plots to date. The heaviest infestation is found in and around the Philadelphia metro region.

In urban and community forests the loss of an individual tree is more detrimental than loss of an individual tree in a forest setting, given the prevalence of street and yard trees. Urban trees and forest are typically more stressed and are much more susceptible to insect or disease outbreaks and treatment and removal costs are much higher. Recent studies in Baltimore and Atlanta have developed dollar values for the benefit of urban trees and forests particularly for heating, cooling and stormwater management.

Deer predation has become a concern in recent years. In many areas deer densities are at a level that has interrupted the natural regeneration of forest and created unnatural “park-like forests” with little or no shrub or floor species.

Several non-native and invasive plants are found in WMA 6 including Japanese Barberry, Multiflora Rose, Winged Euonymus, Porcelain berry, Norway Maple, Ailanthus, Northern Catalpa, Purple Loosestrife, Japanese Knotweed, and Asiatic Bittersweet. These invasive plants out compete native vegetation and are altering natural communities. Deer browsing native woody vegetation, which would favor non-native plant species, may aid the spread of these species.

Reforestation, forest management and ecological restoration efforts would prove beneficial to water quality, the forest ecosystem and wildlife in WMA 6.

Wildlife Increases and Declines

Along with reforestation of the landscape many animal species returned or were reintroduced to the area. Several species are continuing to expand their population particularly the black bear, white-tailed deer, wild turkey, beaver and porcupine. Bald eagles are year round residents in WMA 6 although no nesting site has been discovered to date. The bobcat was reintroduced in the 1970's to New Jersey in neighboring WMA 3. The coyote, although not historically native to the area, moved into New Jersey with first documented specimen hit by a car in West Milford in the early 1970's. Species may migrate from WMA 3 to WMA 6 (and the reverse) through connecting forests.

Species of concern and those with declining populations in the watershed include species that are dependent on wetlands or vernal pools, including Bog Turtle, Wood Turtle, Eastern Box Turtle, American Bitterns, Pied-billed Grebe and Northern Harrier; species that are dependent on old field habitats that through succession are becoming forests again include Bobolink, Grasshopper Sparrow, Vesper Sparrow (all are very rare in WMA 6); and species that are dependent on early successional forests such as the Golden Winged Warbler and Ruffed Grouse. Other species that are declining include interior forest nesting birds and ground nesters including Ovenbird and Barred Owl.

Appendix 1.10.1

Representative List of Vegetative Communities and Wildlife Species by Physiographic Province in Watershed Management Area 6

Highlands

Vegetative Communities

Chestnut Oak Forest

Chestnut oak
Red oak
Black birch
Tulip tree
White ash
Basswood
Sugar maple
Flowering dogwood
Wild ginger
Wild sarsaparilla
Black snakeroot
Columbine
Ferns and mosses
Grasses, sedges and annuals

Mixed-Oak Forest

Red oak
White oak
Black oak
Hickory
Red maple
Sugar maple
White ash
Tulip tree
American beech
Black cherry
Black birch
Sour gum
American elm
Flowering dogwood
Hop hornbeam
Sassafras
Ironwood
Maple-leaved viburnum
Black haw
Arrowwood

Spicebush
Witch hazel
Blueberry
Huckleberry
Poison ivy
Virginia creeper
Japanese honeysuckle
Wild grape

Hemlock-Mixed Hardwood Forest

Eastern hemlock
Red oak
Black birch
Chestnut oak
Black oak
Red maple
American beech
Yellow birch
White ash
Striped maple
Hop hornbeam
Flowering dogwood

Sugar Maple-Mixed Hardwood Forest

White oak
Black oak
Red oak
White ash
Tulip tree
Black birch
Yellow birch
Red maple
Basswood
American beech
Hickory
White pine
American elm
Black walnut

Wildlife Species

Cooper's hawk
Northern goshawk
Barred owl
Red-shouldered hawk
Wild turkey
Black bear
Beaver
Bobcat
Coyote
River otter
White-tailed deer
Diversity of small mammals
Butterflies
Moths
Dragonflies
Bog turtle
Wood turtle

Newark Basin

Vegetative Communities

Mixed-Oak Forest

White oak
Black oak
Red oak
Pignut hickory
Sugar maple
Red maple
American beech
White ash
Norway maple
Pin oak
Sour gum
Black cherry
Sweet cherry
Flowering dogwood
Maple-leaved viburnum
Black haw
Spicebush
Arrowwood

Herbs of Moist Woodlands

Mayapple
Jack-in-the-pulpit
Solomon's-seal
Aster
Goldenrod
New York fern
Christmas fern

Hardwood Swamp Communities

Red maple
Pin oak
Black willow
Swamp white oak
American elm
White ash
Silver maple
Basswood
Green ash
Box-elder maple

Meadowland Communities

Cattail
Flood tolerant shrubs, grasses and herbs

Abandoned Farm Fields

Eastern red cedar
Sassafras
Big-toothed aspen
Tulip tree
Gray birch
Black locust
Black cherry
Red maple
Crabgrass
Wintercress
Common mullein
Canada thistle
Yarrow
Butter-and-eggs
Orchard grass

Mowed Roadside Fields

Common cinquefoil
Wild strawberry
Common dandelion
English plantain
Chichory
Hawkweed
Goldenrod
Common ragweed
Variety of grasses

Wildlife Species

White-tailed deer
Red fox
Variety of toads and turtles
Eastern chipmunk
Gray squirrel
Eastern cottontail
Woodchuck
White-tailed deer
Endangered avian grassland species

Appendix 1.10.2

Threatened and Endangered Species (taken from USFS Highlands Study)

Faunal Species

Bobcat
Lake Chub sucker
Northern Cricket Frog
Bog Turtle
Timber Rattlesnake
Wood Turtle
Pied-billed Grebe
Cooper's Hawk
Northern Goshawk
Northern Harrier
Red-shouldered Hawk
Osprey
Bald Eagle
Peregrine Falcon
American Bittern
Great Blue Heron
Barred Owl
Short-eared Owl
Redheaded Woodpecker
Cliff Swallow
Bobolink
Savannah Sparrow
Grasshopper Sparrow
Vesper Sparrow
American Burying Beetle
Dwarf Wedge Mussell

Habitat

Swamps, Forest
Lakes
Wetland Buffer
Bogs, Sluggish Streams
Mountain Slopes
Streams, Buffers
Ponds w/reed margins
Forest
Forest
Ridges, Fields, Marshes
Swamps, Forest
Ridges, Water Areas
Ridges, Water Areas
Ridges, Water Areas
Marshes
Swamp, Marsh, Pond
Swamp, Moist Woods
Fields, Farms
Ridges, Swamps
Dams, Bridges, Buildings
Uncut Fields
Uncut Fields
Uncut Fields
Farmland, Fields
Generalist / Oak Hickory Forest
Streams, Rivers

Floral Species

Long's bitter cress
Variable sedge
Small whorled pogonia
Swamp-pink
Alleghany plum
Spreading globe flower
Trailing tick-trefoil
Small white lady's slipper
Heart leaf plantain

Cardamine longii
Carex Polymorpha
Isotria medeoloides
Helonias bullata
Prunus alleghaniensis
Trollius laxus
Desmodium humifusum
Cypripedium candidum
Plantago cordata