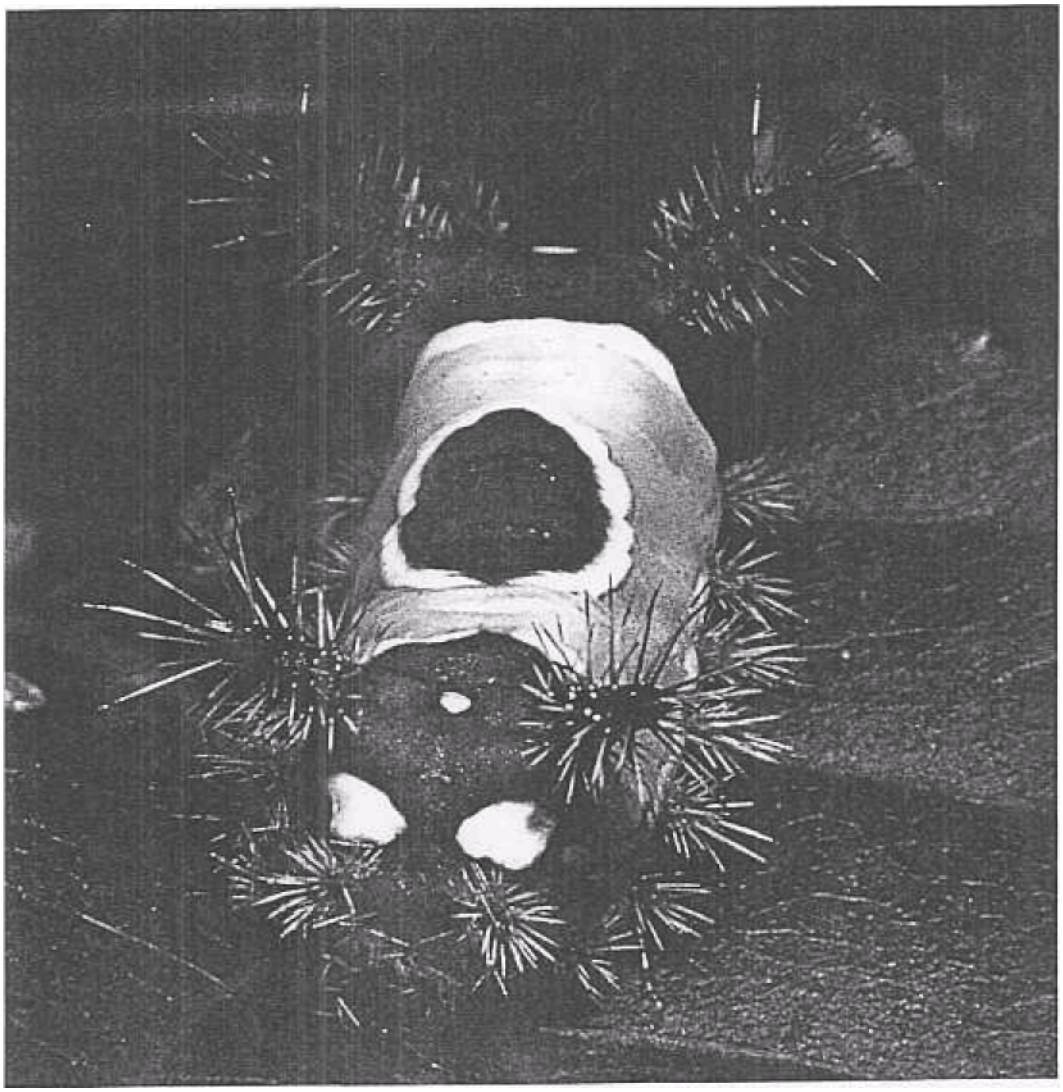
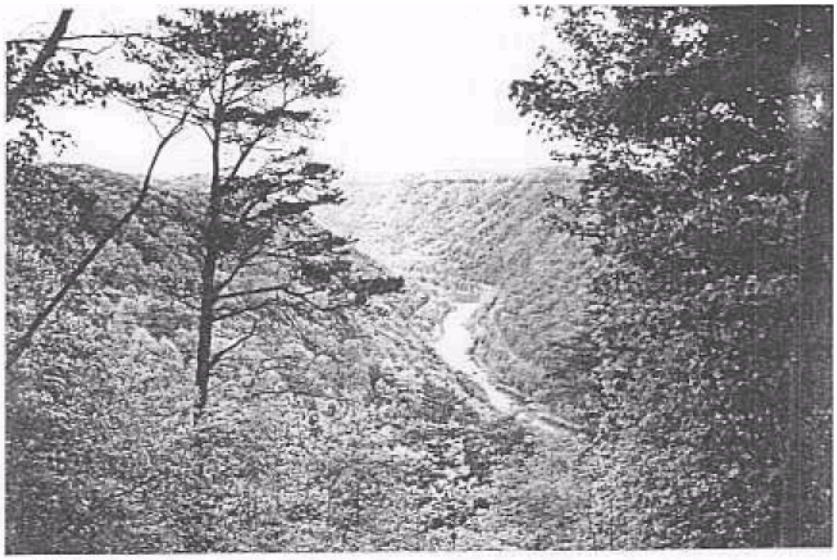
A Naturalist's View
of the
New River Gorge National River

KURT ANDREW BUHLMANN



Saddleback moth caterpillar



View from Canyon Rim

CHAPTER ONE

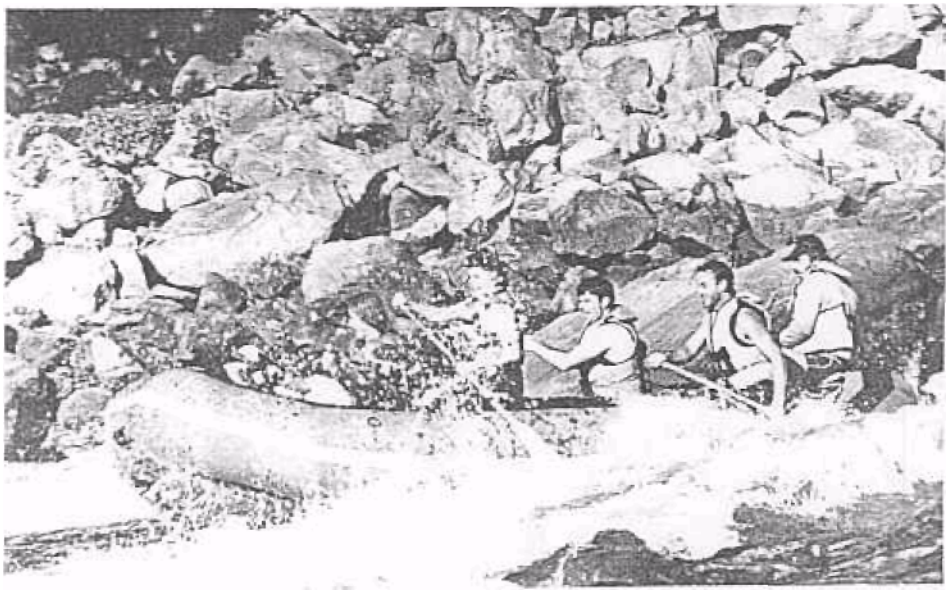
Introduction

Just a six-hour drive west of Washington, DC, awaits a land of rugged mountains and spectacular beauty, apart of unspoiled America, preserved for all 10 enjoy and visit. The New River Gorge National River in southern West Virginia is one of the newer additions to the National Park system. Those who corns here to visit will surely not be disappointed.

From its beginnings in North Carolina, the New River winds its way north wand through southern West Virginia. For nearly 320 mites, the river traverses a land of diverse topography and spectacular scenery, A 52-mile stretch in West Virginia, from Hinton to Fayette Station, comprises the park area. It was established in 1978 as a National River by an act of Congress for the purpose of conserving and interpreting its outstanding natural, scenic, and histori-cal values and for preserving it as a free-flowing stream for the benefit and enjoyment of present and future generations.

The New River Gorge National River offers a wide variety of recreational and educational activities. Take a train ride on a steam locomotive or lest your skill and courage on a whitewater raft trip. If you prefer more contemplative pastimes, pack a lunch and hike the hillsides and ridge tops of this scenic region. Whatever your pleasure, most activities will lead to encounters with the many plants and animals that make the New River Gorge National River their home.

Whitewater rafting on the New



The stretch of river from Hinton to Sandstone Falls is one of the most popular fishing areas in West Virgina. The New River Gorge is also a bird watcher's paradise, for many species of songbirds migrate along this natural corridor to the north in late spring and return by the same route in autumn. Other species of wildlife abound in the mountains surrounding the river, including deer, squirrel, bear, bobcat, fox and wild turkey. During the winter flocks of ducks often rest on me river. On a lazy summer evening about dusk, sharp eyes may spot beaver and muskrat paddling in the river near quiet backwaters.

In the fall, particularly in October the thickly-wooded mountains explode with color. Nor to be outdone, spring's wildflowers produce vibrant splashes of color as they pop up from the forest floor after warming temperatures remove blankets of snow and break winter's icy grip.

This area of West Virginia has a relatively mild climate with an average annual temperature of 52 F. Annual precipitation, in the range of 36 to 48 inches, is evenly distributed throughout the seasons. Summers are ideally suited for water activities such as swimming and canoeing, while winters are moderately cold with short, very brisk spells. Sunny winter days are usually warmer at the bottom of the Gorge than on the

adjacent plateaus, and snow cover along the river is usually less and of shorter duration.

Cool mornings and rising mist are to be expected along the New River, especially in summer when the ridge tups may be obscured in dense fog until mid-morning,

In order to fully appreciate the New River Gorge you must visit, though one trip may not be enough. The New River Gorge National River encompasses 62,000 acres of river corridor, steep rock cliffs and upland forest. "This book is designed to introduce the various habitats and wildlife found in the New River area. It will help to plan a visit, or re-visit, and enable different things to be seen each time.

First, let's learn a little more a-bout the physical makeup of the New River Gorge, To do that we must look back at the events that made the New River Gorge what it is today.

Geologic History in Brief

Geologists arc not in agreement as to the age of the New River the Following discussion represents just one possible explanation of its history.

The New River's origins can be traced back to the birth of the Appalachian mountains and an ancient river called the Teays, Late in the Pateozoic Era, 500 million years ago. the North American and African continents collided, buckling and shattering the earth's crust and forcing the Appalachians up towards the sky. Scientists estimate that these mountains were equal to or greater in height than the Rockies we know today in the western United States, The Teays River, with headwaters near present-day Blowing Rock, NC, drained the slopes of the new



The course of the ancient Teays River, with present-clay boundaries shown in gray

mountain range. It then began a Northward trek across land now known as North Carolina, Virginia, and West Virginia.

Although the river had great cut-ting power and was a main force eroding the mountains, wind and rain did their share as well. Some 60 million years ago, at the end of the Mesozoic Era, the Appalachians had been worn down to a level plain and the Teays River meandered through the roots of the once-mighty mountains,

Once again, though, geologic forces raised the land toward the skies, this time without the buckling and folding of the earth's crust which had produced the original mountains. This time the land was elevated as one huge block by forces deep beneath the earth. The eastern edge was ripped just slightly higher than the western one, and as the Teays picked up speed and power it again began cutting through the roots of the old mountains, all the while maintaining its northerly flow. This action continues today in the spectacular New River Gorge, where in some places the river has cut 1500 feet down through the old Appalachians to create a deep canyon. Here, the river slices into coal-bearing Carboniferous Period sediments, some of the thickest through which any river flows. According to theory, twenty feet of compacted plant material were further crushed to produce one foot of coal.

As mentioned earlier, this is just one possible explanation. Now let's look at a better-known portion of history and at other forces which helped to create the New River as we see it today. Let's step back one million years to the beginning of the Pleistocene Era. the Ice Age, to complete this geologic history.

Glaciers stopped their march southward just short of the northern panhandle of West Virginia, However, to the southwest glaciers dammed the Teays River and the result was drastic change. The original Teays flowed out of the Gorge and towards the present site of St. Albans near Charleston, West Virginia. A portion of this section is now occupied by the Kanawha River, which begins where the New joins the Gauley immediately upstream of Kanawha Falls. The Teays then cut westward towards present-

day Huntington. West Virginia, where it occupied a river valley two miles wide. (It was between Charleston and Huntington that geologist W.G. Tight first discovered evidence of the ancestral Teays. In 1903, he named the river after the town of Teays, which is located in the valley.)

Beyond Huntington the Teays struck out across southern Ohio and on to Indiana and Illinois, eventually emptying into the Gulf of Mexico near St. Louis. At that lime the heartland of North America was submerged under a vast inland sea. During the trek to the Gulf some tributaries fed the Teays, most notably the Mississippi and Missouri. which were then mere infants compared to the Teays. However, after the glaciers dammed the Teays River near Chillicothe, Ohio, it backed up to form a huge lake called Teays Lake. As the water level rose, the Teays found a new outlet near St. Albans and moved in a more northerly route towards Ohio. When the glaciers receded and the lake drained nearly ten thousand years ago, the river continued to flow in its new channel as the Kanawha River and never returned to the old Teays channel.

Although millions of years have passed, within the boundaries of the New River Gorge National River the waterway still flows in the same channel, gnawing away at the ancient Appalachians. These years of earth's history are available to us like an open book as we paddle a raft between the steep gorge walls or stand on a sandstone ridge top. Between Meadow Creek and Fayetteville we see Pennsylvanian age sandstone, shale and coal. The sandstone is hard and conducive to cliff formation. The river here is narrow, swift and lined with large sandstone blocks which have fallen from die



Fern Creek Falls

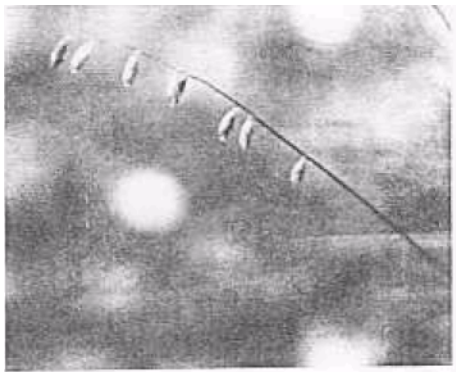
canyon sides. The depth of the gorge ranges from over 1400 feet at Grandview State Park to 900 feet at the Canyon Rim Visitor Center. In the southern pan of the Gorge, from Hinton to Meadow Creek, we see Mississippian age shale, silt stone and limestone. Overtime these softer rocks have eroded and left riparian floodplains and a wider, slower-moving river in the channel. The depth of the Gorge at Hinton is about 600 feet.

Natural History and Man's Influence or the Gorge

Because the New River is so old, its habitats and wildlife have been able to achieve a form of stability. Millions of years of available passage have allowed many species of plants and animals to move in and persist in the area. Since the New River cuts from east to west across the Appalachians, we find species that are typically Atlantic coastal plain and piedmont, such as melic grass, living with northern mountain species. Because time has favored the New River Gorge, certain unique species have been able to carve their own niches here. Several species of fish have evolved that are endemic (found nowhere else) to this river.

Although the river has supported plums and wildlife for millions of years, only a blink ago in geologic time another of earth's inhabitants made an appearance here. Iroquois and Cherokee Indians traveled the area, hunting and fishing on their way, but continuous habitation did not occur until the Europeans arrived. The earliest discovery of the

Melic grass



New River was recorded in 1671 by the Batts-Fallam Expedition. Another white man—John Peter Sailing (Salley) - explored the New River Gorge in 1742. He referred to the river as Woods River, and his log mentions hunting buffalo for hides to cover the frame of his boat. Various stories are told concerning the naming of the river; apparently there is no one accepted theory. Quite possibly it received the name 'New' by virtue of being the first river settlers encountered after crossing the Alleghenies.

In the late 1700's the Virginia legislature proposed establishing the New as a major transportation route, wh ich would join the James River to the Kanawha, Studies determined it could never be tamed enough for navigation, but railroad lines could certainly be built along the its banks.

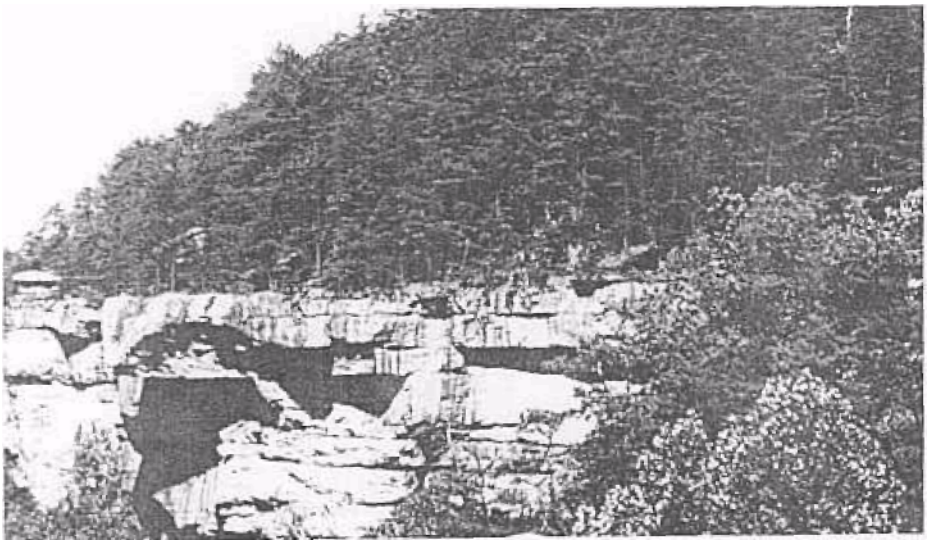
The completion of the railroad in 1873 opened the rich coal reserves of the area to mining, and for the next eighty years the New River Gorge was a bustling place. The first settlement in the gorge was Bowyers Ferry, established around 1798. In 1871, that settlement was renamed Sewell, when it became a thriving coal mining community. Sewell existed until 1958 and was located on the river below present-day Babcock State Park,

With the miners came the loggers, and a vast expanse of virgin forest fell under the onslaught of axes and saws. Photographs from the early 1900's show mountainsides along the gorge dotted with small dwellings and devoid of vegetation. For a while, there was a town for every mile of river, but most vanished into history as the coal was depleted, though the last ones remained into the 1960's, The peak year for coal production in the New River Gorge was 1947. Nature has since reclaimed many of the old town sites and gradually the effects of man have been masked, although some still remain. Through it all the river flowed on, virtually unchanged by the activities of man until recently. Two major dams, Claytor in Virginia and Bluestone near Hinton, West Virginia, alter the natural flow of this ancient river, Bluestone Dam, completed in 1950, is a flood control facility only, but Claytor Dam is an electric power generating site and produces river flow conditions unlike those which would naturally occur. Later we will look at the effects this may have on the wildlife and habitats within the New River Gorge National River.

Now that we know a little history of the area, let's explore its habitats and special places. We will encounter many of the plants and animals found here and discuss the roles they play and the effects that man's presence has had on them.

Early explorers to the New River valley saw an abundance of wildlife, including wolves, elk, deer, mountain lions, bear and buffalo. They found vast virgin forests of chestnut, oak, hemlock and hickory. Unfortunately, many of these animals are gone, probably forever, from the New River Gorge. However, if the mountain lion were someday to return to this near wilderness, it would first view the gorge from a ridge top perch dominated by pines. Buffeted by winds, the big cat would lie on a sandstone ledge and look down at the river winding far below, all the while scanning the wooded slopes. It is from this ridgetop overlook that we too shall begin our exploration of the New River Gorge.

Sandstone ridgetop and pines



CHAPTER TWO
The Ridgetops

Most first-time visitors to the New River Gorge are thrilled by the many panoramic views scattered throughout the area. Three easily accessible spots are at Grandview State Park, Babcock State Park and Canyon Rim, nest to the spectacular Route 19 bridges.

From the overlooks at Grand-view and Canyon Rim, the river can be seen winding far below. From Canyon Rim, and with the aid of binoculars, rafts filled with white-water adventurers are visible bouncing along in the thundering rapids, Whitewater rafting is a very popular summer and fall activity, Grand-view State Park provides several viewing areas, including the Main Overtook, from which the river between Glade Creek and Prince can be seen in one sweeping glance, and Turkey Spur Overlook, which pro-vides a view of Stretcher's Neck where the New River makes a dramatic horseshoe bend, Turkey Spur was not named after the wild turkey, but more likely after the turkey vultures that soar among the cliffs here. The distance from the Main Overlook at Grandview to the New River below is 1400 feet. This is the deepest section in the New River Gorge National River.

Several ridgetop hiking trails at Babcock State Park make it easy to become familiar with the habitat. The park also features a swimming pool and a lake for fishing and boating. The lake is stocked with trout, and is home 10 largemouth bass and bluegill sunfish. Camping facilities and cabins are also available here.

The ridgetops have received their share of human disturbance. About the turn of the century, full-scale logging operations altered much of what eventually would be the New River Gorge National River. Grandview State Park was the site of the world's first overhead log skidder, which transported sawed timber from the mountain top to ihe railroad on the canyon floor below. Presently, strip mining for coal is in progress on several plateaus surrounding the National River. This activity has altered some of the ridge top sites, but has also created some unique habitats. They will be discussed in Chapter Seven.

The ridgeitops provide the opportunity to view the New River, the ancient waterway that may have lured us here in the first place. But what about the ridge top habitat? What kinds of plants and animals might one see here? Some of them won't be found down by the river, so let's not rush the ridgetop visit, because it can be most interesting.

The West Virginia Department of Commerce, Division of Parks and Recreation, created a nature trail which traverses the rim of the gorge at Grandview. It's a good place to start our visit.

Flora of the Ridgetops

Imagine that it is late spring, maybe early morning in the middle of May. A cool breeze rushes up the mountainside from the river below, making a sweater or jacket essential. The mist which settled last night hangs low in the gorge and obscures the view of the water, but the sun



shines brightly overhead. The forest here is different than the one along the river, The ridge top trees are adapted to the constant winds, cold winter temperatures and rocky, dry soils. This is called a xeric habitat association. The trees include Virginia pine, pitch pine, chestnut, oak, American holly, sourwood and white pine, as well as a few hardy species from the moister forest below --- red oak, tulip poplar and some eastern hemlock in the shaded coves in the cliffs. The flora here must be tolerant of the acidic soils produced by the resins and tannins of the pines and oaks. The trees in the understory include dogwood, sourwood, witch hazel, striped maple, service berry, scrub oak and post oak. Members of the heath family, which includes rhododendron, mountain laurel and blueberry, are commonly associated with these acidic soils. The heaths are adapted to the dry soils and harsher environmental conditions. Many have woody stems and waxy, evergreen leaves, which enable them to tolerate drought stress and resist the drying effect of the wind, The evergreen leaves make photosynthesis possible even during the winter.

Elsewhere in the understory, ingles of greenbrier vines inter-vine with wild hydrangea, scrub it and bracken tern. The term understory vegetation refers to the grasses, shrubs and sapling trees that grow underneath the forest canopy. The canopy itself consists of the gorge dominant trees in the forest. Catawba rhododendron, mountain rose bay, is thick in places and will provide a beautiful display of flowers by late May/early June, especially at Grand view State Park. rhododendron, also found on Ridgetops and slopes, will bloom in July. It is usually more common



Pink lady slipper

Wild flower displays are not as spectacular here as they are along the river, but several species, including the pink lady slipper orchid or moccasin flower, are sure to delight us if we take time to look for them. The lady slipper has become rare along roads and trails due to needless picking. Take a photograph and please leave the flower for others to enjoy.

Trailing arbutus, a fragrant heath, signals spring by blooming in late March, Look for its white or pink flower clusters and oval, evergreen leaves. Downy yellow foxglove with its bell-shaped flowers blooms between July and September. This plant is parasitic on the roots of oak trees, and taps into them to obtain nutrients that it is unable to obtain from the acidic soil. Galax, with its waxy everygreen leaves and small while flowers on a single stalk, blooms in June/July. Indian cucumber root, a member of the lily family with greenish-yellow flowers, may be found blooming in the ridgetop under story during May.

Other types of flora are found here as well. Masses must be well adapted to hold water that would otherwise quickly leach into the dry soil. Cushion or white moss is also adapted to the acid soil conditions. Ground pine *(Lycopodium sp.}* forms miniature forests within the forest. Though rarely more than a few inches tall, it is easy to imagine how the landscape looked when the giant ancestors of these fern relatives formed the forest canopy millions of years ago. Ferns, such as the blunt-lobed woodsia, grow in crevices on the cliff face.

Lichens grow on rock outcrop-pings and produce secretions that act slowly to reduce the rocks to soil. Lichens are actually two organisms living together, consisting of a fungus and either a blue-green or green algae. This is a mutualistic relation-ship, meaning that both organisms benefit from the arrangement.



Lichens Ridgetop

Wildlife

A look at the wildlife starts with songbirds. Spring-migrating species such as the bay-breasted and black-throated green warblers may be heard and possibly seen — be sure to have binoculars handy, Learning the unique calls of songbirds can become a challenging and rewarding hobby. Some other birds that may be seen or heard during the visit include rose-breasted gros-

beaks, ovenbirds, chipping sparrows, ruby-crowned kinglets and Carolina chickadees. The male summer tanager, a bright red bird much like a cardinal, has been sighted occasionally along ridgetops in the New River Gorge National River, A bright splash of blue in the top of a Virginia pine alerts us to the presence of an indigo bunting.

The bird species found in an area are dependent upon many different environmental factors. The bay-breasted warblers can be found looking for insects in oak trees during spring migration, and other species may choose habitats of a certain elevation. Particular favorite foods may occur in one habitat and not another, thereby influencing which specks comprise the community.

The turkey vulture is a common resident of the New River Gorge and is frequently seen soaring on rising thermal currents during mid-morning. This large bird has a wingspan of nearly six feet and is black with a naked, red head. Vultures nest in cliffs where they raise two young per year. The turkey vultures are occasionally accompanied by smaller black vultures, which are distinguished by their black heads and white 'windows' on the undersides of their wingtips. Vultures do their part to keep the environment clean, as their diet consists mainly of dead animals.

Ravens are occasionally seen soaring along the cliffs in the gorge. These larger relatives of the craw are distinguished by their wedge-shaped tails and nasal-sounding call. Ravens occur throughout the Appalachian region, and may nest in the gorge.

Since the ridge top habitats have not been overly disturbed by man. they provide refuge to some of the larger mammals- Sightings of black bear are reported from time to time at Grandview State Park. These are generally secretive animals, and wu may count ourselves fortunate to see one. Bears are omnivores, meaning that they cat a variety of both plant and animal foods. Bears become dormant during the winter months and hole up in rock crevices and tree hollows. It is during the winter that the female usually gives birth to two cubs. Bears have large home ranges and also use other habitats in the gorge.

The bobcat is another secretive animal whose ear-piercing scream in sometimes heard at night along the ridgetops. Although bobcats are rarely seen, their tracks are often found along dirt roads or trails.

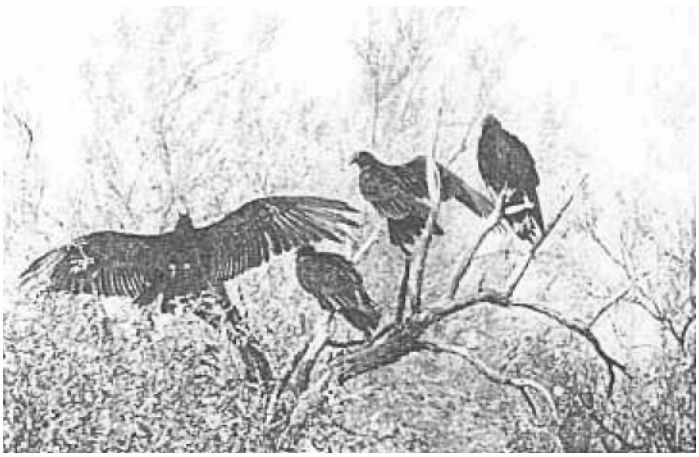


Bobcat

Although the eastern cougar, also called mountain lion or 'painter,' has not been seen or heard in West Virginia for many years, it almost certainly once hunted along ridgetops around the New River Gorge. This animal was probably exterminated by early settlers, who cleared the forests for farms and feared for the safety of their livestock.

Although its cousins, gray and fox. squirrels, are found else where in

Turkey vultures



Black bear





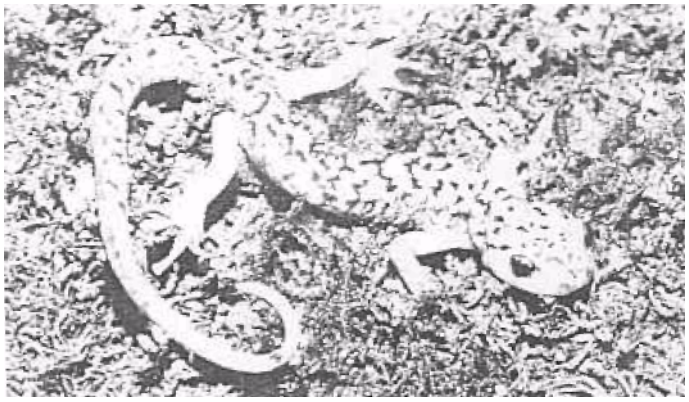
Red squirrel

In the Gorge, the ridgetop is the only place to see the red squirrel. These squirrels are at home in the pines where they feed predominantly on the seed cones. Red squirrels have a loud, ratchet-like call. This squirrel is mainly a northern species, being common in the spruce and pine forests of Canada and the northern United States. Populations into the southeastern United States along Appalachian ridgetops. Not surprisingly, the northern vegetation is also found here, due to a combination of temperature and elevation which has created a climate typically found farther north.

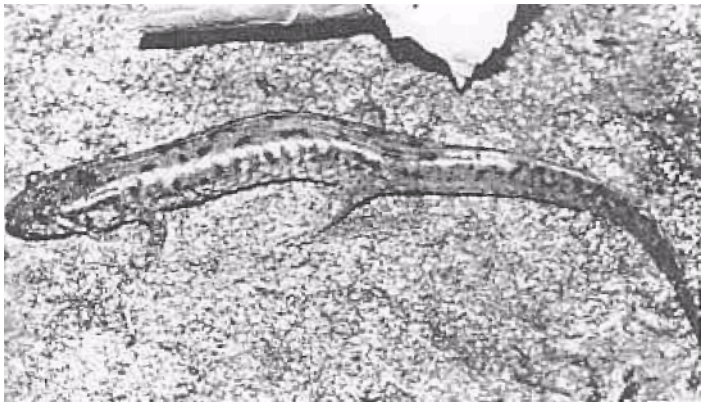
ing the ridgerop sites is the eastern woodrat. The woodrat chooses this habitat partly for the forest type and elevation, but mainly for the presence of the blocky, sandstone cliffs. Here the animal builds a nest of leaves stuffed into the horizontal cracks in the rocks. The woodrat is nocturnal (active at night) and feeds on nuts and seeds. It is a handsome, brownish-gray animal, about squirrel size, with a hairy tail. This, and the fact that it does not associate with human dwellings, distinguishes it from the introduced Norway rat, which has a naked, scaled tail.

Eastern chipmunks scurry about on the forest floor and among small rock crevices, and are particularly easy to spot in the fall. They are less specialized in their habitat requirements than the woodrat and also live in floodplain and mixed hardwood forest habitats.

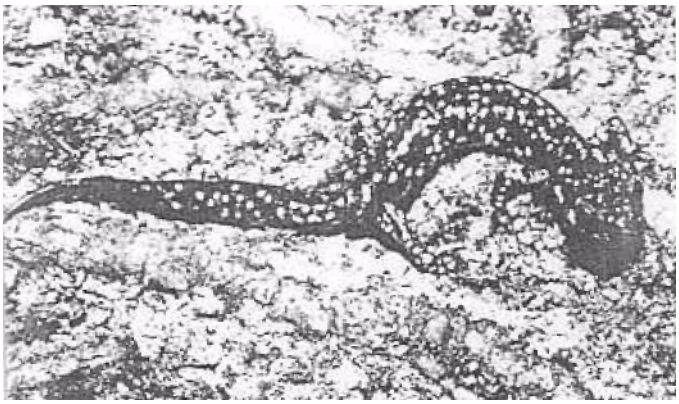
The lack of water and the harsh winters make conditions less than optimal formost species of amphibians, although some may be found here. The rare green salamander and the slimy salamander inhabit moist, east-facing sandstone cliffs. These salamanders are primarily nocturnal. With flashlights, they may be spotted out on the faces of the cliffs on wet or rainy summer nights, when they hunt for food in the form of small insects and earthworms. During the day they retreat back into the

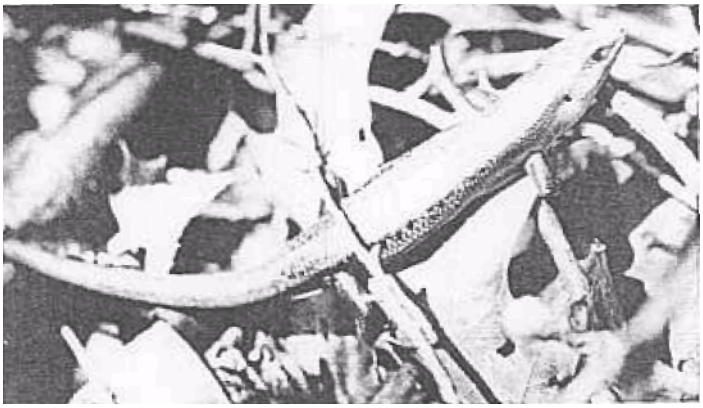


green salamander
slimy salamander



Seal salamander
Five-lined skink







Peregrine falcon

damp cracks in the cliffs. Overcollecting by humans is probably the main threat to the survival of the green salamander.

The dry, rocky, ridgetop sites are home to several specie s of snakes and lizards. Copperheads and five-lined skinks (a lizard) are occasionally seen along the boardwalk at Canyon Rim or sunning themselves on rock ledges. Timber rattlesnakes are rare, but also occur in ridgetop habitats. Snakes and lizards are not able to regulate their body temperatures internally as humans and other mammal do, so their range and distribution is limited by the environment. Many species of reptiles are found in the New River Gorge and will be described more fully in later chapters.

Although we have focused on ridgetops in the spring months, a visit here at any time of year is bound to be worthwhile. During September and October bird watchers may ob-serve the southward migration of the raptors (a collective word for birds of prey such as hawks, eagles, falcons and ospreys). These birds use the Ne w Ri ver as a corridor on the ir way south. Though not as many birds fly along the New River as along the Blue Ridge Parkway or Skyline Drive in Shenandoah National Park, Virginia, a visit to a ridgetop overlook between 9 a.m. and noon should reward us with some raptor sightings. Broad-winged hawks usually are the earliest migrators, passing through the gorge in mid-Spetember, Ospreys occasionally appear throughout September and early October, while Cooper's and sharp-shinned hawks are seen in greatest numbers around the middle of October.

Migrating warblers also return south through the New River Gorge National River corridor. Identification is difficult since breeding plumage is gone at this time of year and most are similarly drab in appearance. However, some species of birds that winter in the New River Gorge may be seen at this lime, including golden-crowned kinglets, red-breasted nuthatches and brown creepers.

Fall Colors

The ridgetop habitats are prime places to visit during autumn as the trees turn color, A view from the ridgetops in mid to late October clearly points out ihe various forest types in the New River Gorge. Summer shades of green tend to blend together, but in autumn the ridgetops remain basically dark green, due to the presence of pines. The mixed hardwood forests below are a mosaic of reds, yellows and oranges, with vertical stripes of green where hemlock stands betray the locations of small, mountain streams. Down along the river the floodplain tree species display green and yellow. Due to warmer temperatures, and moister conditions, the floodplain trees will be the last to lose their leaves.

Winter

A winter hike along the ridgetop trails will present us with some exciting natural beauty. Red berries of the female holly tree contrast sharply with the tree's evergreen leaves. On the ground, the red berries of wintergreen may still be visible from beneath a light dusting of snow. Holly berries provide valuable food for winter birds, while wintergreen berries are reportedly rich in vitamin C. Some of the birds, such as chickadees, nuthatches and golden-crowned kinglets, are more easily observed without the cover of summer foliage. Tracks of fox and other mammals may be found in the snow, and even the elusive bobcat is sometimes spotted at Babcock and Grandview State Parks during the winter months.



Holly

How to Get There

To reach Grandview State Park from Beckley, West Virginia, take I-77 south to I-64 east. Exit I-64 at

the Grandview exit, then follow the signs to Grandview State Park. Phone (304) 763-3145 or 1-800-CALLWVA.

To reach Babcock Slate Park from the National Park Service Canyon Rim Visitor Center on Route 19 near Fayetteville, West Virginia, take Route 19 north to Route 60 east. Follow Route 60 east, to Route 41 south. The entrance to Babcock will be on the right. Phone (304) 438-6205 or 1-800-CALL WVA.

The Canyon Rim Visitor Center is located next to the Route 19 bridge over the New River Gorge on the east side of the river.



Golden-crowned kinglet

View from Beauty Mountain



CHAPTER THREE

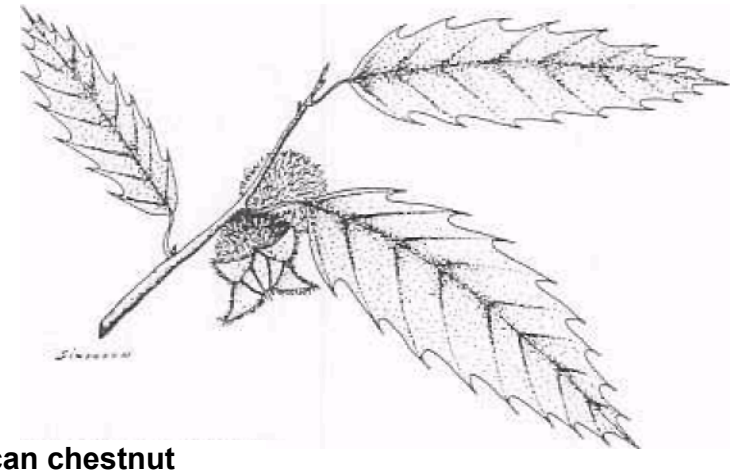
Mixed Hardwood Forests

The Habitat

The richly-forested slopes of the New River Gorge are covered with mixed hardwoods, with oak. hickory, tulip poplar and black cherry comprising the majority of the over-story. This habitat is referred to as mesic, and is wetter than the xeric habitat of the ridge tops, The mixed hardwood forest is not uniform throughout the gorge. The actual tree species composition at any given location results from many environ-mental factors including climate, geology, soils, moisture, elevation, slope and aspect (the direction which1 the slope faces). In the gorge, the slopes are angled mostly southeast and northwest. The upper slopes tend to be drier and dominated by black oak, chestnut oak and hickory. The lower slopes are moister and covered with American beech, tulip poplar, black cherry, white and red oak, buckeye and red maple.

Little virgin timber remains in the gorge. Logging operations around the turn of the century harvested most of the slopes in response to the needs of a growing nation. Today, the sawmills are gone and the forest has reclaimed its territory. It is a second growth forest, having sprouted from the roots of fallen parents. In some areas, many years must still pass before the forests will reach maturity and majestic status.

Nature has made changes in the forest that are indirect results of man's activities. Once, the dominant tree in the Appalachian region was the American chestnut. The chestnut grew to a height of 100 feet and produced large nuts which were eaten by gray squirrels, white-tail deer, black bear, wild turkeys and other wildlife. These nuts were also priced by early homesteaders in the region. The American chestnut was sought also for its lumber, which

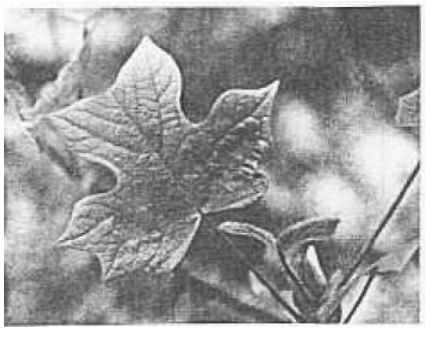


American chestnut

Black cherry



Tulip poplar



Buckeye



resisted rot better than most other woods. Many barns, fences and homes were constructed from chestnut; some remain standing today.

Unfortunately, disaster struck in 1904. A fungus was brought to this country with Chinese chestnut trees, which were being imported as ornamentals. Although not fatal to Chinese chestnuts, the fungus spread to the American chestnuts, which had no resistance to it. By the 1950's most chestnuts in the eastern United States were dead or dying. The fungus, or chestnut blight as it is called, attacks the young saplings once they begirt to mature and their smooth bark cracks and becomes blocky, The fungus enters the tree through these cracks and effectively girdles the trunk or limb at that point, cutting off the supply of water and nutrients to the rest of the tree. The fungal spores are carried on the wind, so halting their spread is nearly impossible. However, some hope for the tree exists. The fungus does not affect the roots, and suckers still sprout from root systems. But most are killed before they reach flowering age, so they can't reproduce. Several individual trees have been found around the country that appear to be surviving the blight attack. These few specimens are being studied with hope that they may have the genetic ability to resist the fungus. If so, they'll provide the stock for re-establishing the tree.

It is difficult to imagine how the forest looked with the chestnut as the dominant tree. Certainly wildlife was affected by the loss of a major food supply, but forunately no spe-cies losses have been attributed to it. When the chestnut died large expanses of forest were left stark and white. These areas have been claimed by other species, most notably the oaks and hickories.

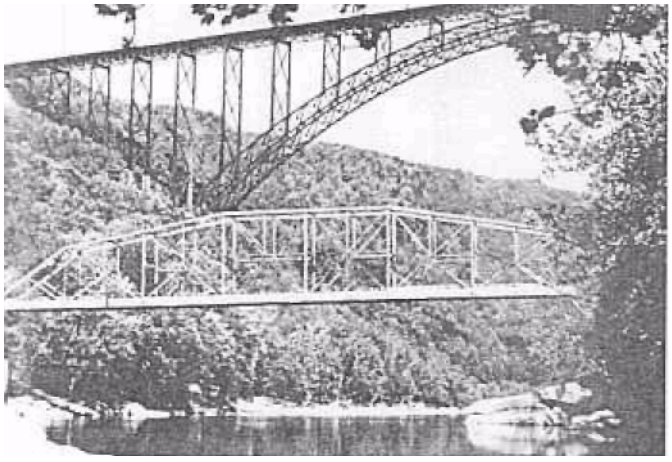
Coal miners, loggers, railroaders and farmers have all left their marks on the forest. Evidence of old coal mining towns can be found in the remains of stone buildings, abandoned railway systems and entrance to drift mines.

If you'd like to drive, McKendree Road is one of the best avenues for exploration. Beginning just next to the Stretcher Neck tunnel on Route 41 near Prince, this dirt road runs alone the gorge at mid-slope and ends at Stone Cliff bridge near Thurmond. The road is narrow and four-wheel drive may be required at some times of the year. Look for the McKendree Hospital along the way. The once-imposing building, constructed in 1901, was known as Miners Hospital No. 2. From 1910 to 1941 it was a training school for nurses, and between 1941 and 1956 served as a home for elderly black citizens. Today only the stone foundations remain and the landscape has returned to forest. The road also passes the town of Thayer before crossing over the New River at Stonecliff.

You can either drive or walk along a din road at the base of Grandview State Park. This road begins on the east side of the river next to the Route 41 bridge at Prince, West Virginia. A four-wheel drive vehicle may be needed. Drive this road for about 3 miles to reach Mill Creek. To continue past this point, you must park, cross over Mill Creek, and continue on foot to Glade Creek. The Glade Creek area has experienced little human disturbance and has a near wilderness quality, The distance from Mill Creek to Glade Creek is approximately 2 miles.

A third area of interest is located in the northernmost section of the gorge near the Route 19 bridge. Take Route 82 (old Fayette Station road) from the west side of the river down into the gorge. This is a steep, one-lane road, so exercise caution. After passing underneath the big bridge.

Fayette Station and Route 19 bridges







Pawlownia

stop at the next switchback and park well off the pavement. Walk down the path until you reach a foot bridge across Wolf Creek, The Kaymoor Trail (also called the Mary Ingies Trail) begins on the other side of this bridge and is brightly marked with yellow blazes. This trail is not only a nature trail, but one of historic interest as well. The one hour and 10 minute walk to the abandoned mining town of Kaymoor passes through a mixed hardwood forest with many royal pawlownia trees. During late fall their empty nut shells litter the forest floor. In late April their lavender, bell-shaped flowers brighten the forest canopy. Through breaks in the foliage glimpses of the thundering rapids on the river below are visible. Better views may be had of the river during the winter months. Entrances to coal mines and ruins of buildings mark the sites of hustling human enterprise in days gone by. Notice how fast nature is reclaiming the land. The Kaymoor mines were the last to close. and they did so in 1963, Please stay away from building structures and mine entrances. They do not meet National Park Service safety standards.

Flora

A beautiful pastel of wildflowers begins in April, when blue phlox and wild geranium cover the forest floor in pale violet. Other plants include



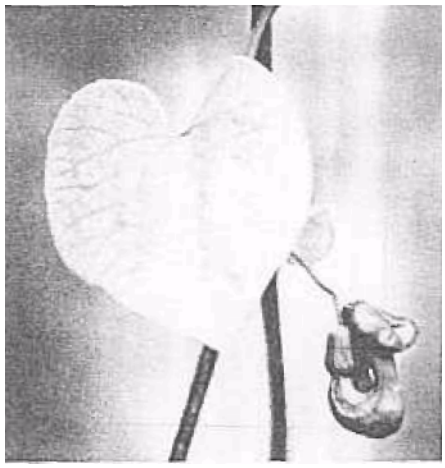
Blue phlox



Wild geranium

blood root, named for the red liquid that oozes from broken stems, and sweet cicily, which has fern-like leaves, an aggregate cluster of small while flowers, and roots which smell like licorice. Also look for tall bellflower, twin leaf, christmas fern, Canada violet, red trillium (wake-robin), dutchman's britches, squir-rel corn and woodland sunflower.

Dutchman's pipe





Purple-flowering raspberry

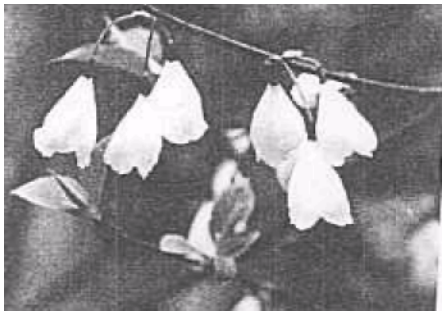
Dutchman's pipe, a vine with a purple-brown pipe-shaped flower, and johnny-jump-ups (a violet) are found along the Kaymoor trail and McKendree Road. May apples also cover the forest floor in moist areas. By June they will produce a fruit, under the protection of umbrella-like 1eaves. Along the dirt road at the base of Grandview State Park can be found toadshade trillium, an uncommon plane in the New River Gorge.

Several trees bloom in spring, including flowering dogwoods with their large white blossoms and Fraser magnolias with yellow blossoms. Red bud, a small brightens the gray winter forest in early April with rose-purple buds.

In May, bright pint flowers on thorny stems hint at the delicious berries that will he produced by the purple-flowering raspberry late in

White trillium





Silverbell

the summer. Although it is not a forest plant, this plant of old fields and hedges has invaded the forests along the roadsides where adequate sunlight reaches the ground.

Ginseng is also found in the mixed hardwood understory. The roots are believed to have medicinal value and are often harvested by local resident. This activity is called 'sanging' find occurs in late summer when the red berries and early turning leaves make the plant easier to find, It often takes several years to produce a good root, so experienced 'sang' hunters know not to collect all (the plants so there will be some to ensure future harvests. Unfortunately, others gather all they can find as it used to be. The digging of ginseng is prohibited in federally-owned land within the boundaries of the National River, The West Virginia Department of Natural Re-sources, Agriculture and Forestry Division, has a season and limit on ginseng harvesting in other areas of the state.

Look carefully at the leaves and moss-covered logs on the forest floor and you may spot tiny, red, British soldier lichen, scarlet cup fungus, or the white stalk of the Indian pipe. These organisms feed on the decaying plant matter and play an important role in recycling nutrients in the ecosystem.



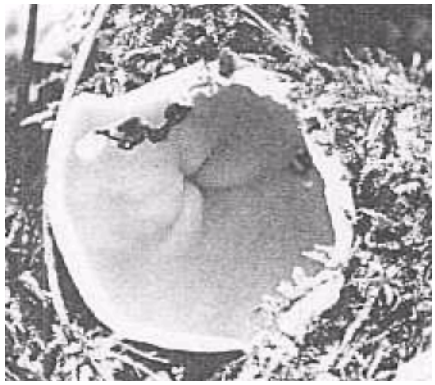
Red admiral butterfly

uds. Later on, the question mark

admiral feeds primarily on the flowers of the stinging nettle, a prickly plant of the forest understory.

Along McKendree Road during the early summer, the foliage is thick and it's difficult to see very far. A bird calling from a tall tulip poplar and a sudden flash of bright red signal the presence of a scarlet tanager. A robin-sized bird with a red body and black wings, the tanager is at home in the upper layers of the forest canopy. Other birds who live in the canopy include cerulean warblers, parula warblers and black-throated green warblers.

Probably the most common bird or the mixed hardwood forest is the red-eyed vireo. The vireo is easily heard, although it is difficult to see. Listen for the song which seems to



Scarlet cup fungus

Fiddlehead fern



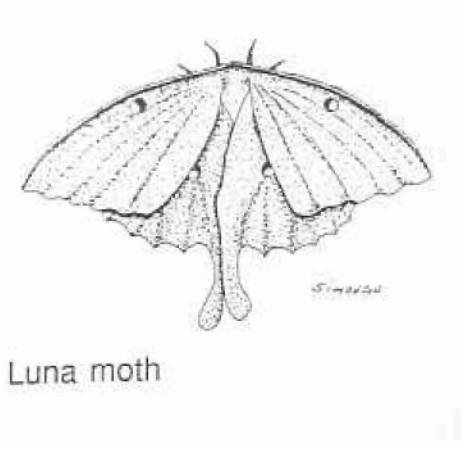
During the fall, trees in the mixed hardwood forest become brightly colored. Generally, the oak leaves turn red, those of the hickories and beech turn brown and orange, and tulip poplar leaves turn yellow.

Wildlife

In April, one of the earliest butterflies, the mourning cloak, makes its appearance. It is a large, purple-brown butterfly with yellow borders which are dotted with blue. It floats lazily through the forest searching for nectar in elm and poplar flower

Black and white warbler





Luna moth

say: 'Hear me, see me, here I am.

The black and white warbler is easily recognized by its behavior and coloration. It stalks up and down the tree trunks, much like a nuthatch, searching for insects and grubs under the bark.

Some birds prefer to live in the underbrush or in dense stands of sapling-size trees. Here you might hear and see the forest, cousin of the robin, the wood thrush. The thrush is a brown-backed bird with a spotted white breast. This bird's song is similar to the red-eyed virco's although it is slower and much more melodic.

The worm-eating warbler is a small brown bird with n dark, striped head. This inconspicuous species is fairly common in the mixed hardwood forest. It is a ground-nesting bird and blends in well with the dead leaves and branches. Its song is a



Pileated woodpecker

rapid trill. Other birds of the understory include Kentucky warblers, hooded warblers and Carolina wrens. The wren is a year-round resident of the gorge. Its song, a loud one from one of the smallest birds, is a belting 'teakettle, teakettle, teakettle.'

The wild turkey is the majestic bird of the forest. Benjamin Franklin proposed it for our national symbol. Turkeys are frequently spotted in early morning along the dirt road beneath Grandview State Park, but are common in the mixed hardwood forest throughout the gorge. Male turkeys or 'gobblers' are often heard calling around dawn on early spring days. Later, during the months of May and June, hen turkeys are often seen with their young, called poults.

Wild turkeys need old growth hardwood forests. They roost in the big trees at night and rely heavily on acorns and other nuts for food. The poults feed primarily on insects, so the hen brings them to grassy openings or to the edges of fields to find food. Young poults easily succumb to inclement weather in the spring, when rain is associated with cold temperatures. This is often a major morality factor in wild turkey populations.

One of the tastiest game birds and a favorite among hunters, the ruffed grouse is common in the forests. Keep your wits about you when walking the Kaymoor Trail and you may glimpse one disappearing into the trees after a sudden explosion of beating wings.

Woodpeckers are numerous in this forest, and the hammering of a downy or pileated woodpecker will undoubtedly be heard on a bird watching trip here. Pileated woodpeckers forage in the bark of dead trees for carpenter ants, their favorite food. Often, young forests do not contain enough large, dead snags necessary for the woodpeckers.

Quite possibly, during the spring months, you may see a medium-sized raptor winging swiftly among the trees. This bird with a grayish-blue-back and white breast streaked with rust is a Cooper's hawk. Notice

Wood thrush



Wild turkey



Ruffed grouse







Flicker

White-breasted nuthatch

American redstart





worm-eating warbler

the songbirds will stop singing. they are prime targets during the hawks forages. This hawk has porter, more rounded wings than ...tyrs that hunt over fields or spend time soaring. These wings enable it maneuver quickly arid powerfully between the trees in dense forest. During the winter months the .. communities inhabiting the mixed hardwoods will change. The scarlet tanagers, wood thrushes and most warblers will be gone to places south, and some northern species will move in to make this their winter home. These birds include dark-eyed juncos, golden-crowned king-Jets, brown creepers, yellow-bellied sapsuckers, and winter wrens. The year-round residents include white-breasted nuthatches, Carolina chickadees, tufted titmice, American gold finches, cardinals and others. So, bird watching in the mixed hardwood forest can be interesting during the winter months.

Now, which mammals, reptiles and amphibians inhabit the forest? Small mammals such as shrews and mice are abundant, although they are rarely seen. Deer mice have large black eyes, gray-brown fur and bi-colored tails nearly as long as their bodies. They forage on the forest floor for a variety of seeds, nuts and insects. Another small rodent is the red-backed vole, a small mouse-like

Deer mouse



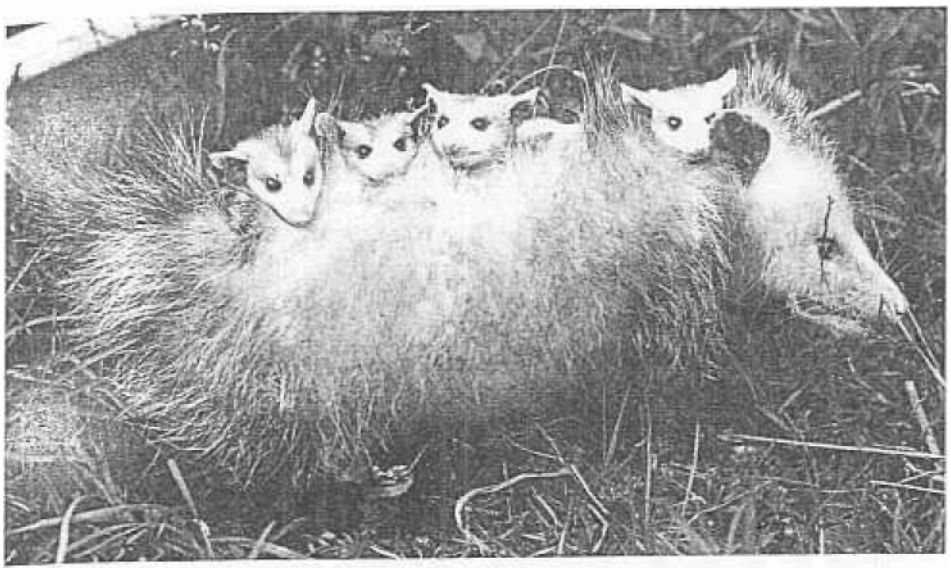
animal with a short tail and fur of a rich, reddish-brown color. The vole is a habitat "specialist." whereas the deer mouse is a habitat 'generalist.' Red-backed voles live only on wet slopes in the Forest, where the ground is cool and moist, and plenty of moss-covered rocks are present. Deer mice are found in a variety of habitat types, including wet and dry forests, old fields and even in the floodplain forests along the river,

The woodland jumping mouse is brown with yellow sides and a tail nearly twice its body length. This mouse is true to its name and bounds away when startled, like a super-charged frog.

Other small mammals of the forest include moles and shrews, which are primarily carnivorous creatures with incredibly fast metabolisms and ferocious appetites. They have small, beady eyes, concealed ears, and the largest shrew weighs less than a half ounce — the equivalent of a dime. Shrews found here include the short-tailed masked and smoky. Moles live their lives underground, where they use their shovel-like front feet to excavate burrows in the loose soil They eat earthworms.

In Chapter 2 we talked about the red squirrel. The mixed hardwood forest is home to his slightly larger cousin. The abundance of acorns and hickory nuts make this habitat ideal for the eastern gray squirrel. Squirrels reproduce quickly and may raise two litters per year. One set of young is born in February, usually in a hollow of a large tree. The second litter is born in late summer and is often reared in a nest constructed of leaves, twigs and branches, set among the limbs of a spreading oak. During winter, when the trees are bare, leaf nests are easily spotted.

Another relative of the squirrel is the eastern chipmunk, a brown ground squirrel with black and white



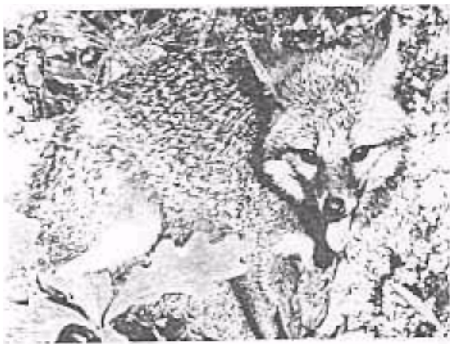
Opossum and babies

stripes. This noisy little animal often fools bird watchers with its whistle like warning call.

Larger mammals live here as well, of course. Raccoon, opossum and striped skunk are frequently seen in the light of car headlights, or their trucks spotted along the edges of dirt roads. Raccoon tracks resemble the prints of small human hands. Opossum tracks are easily identified by the 'big toe' on the hind foot which points backwards,

At any time a gray fox may dan across the path, although nothing more than a fleeting glimpse is likely. Red fox also live here, though they are more common along the edges of

Gray fox



to detect the presence of fox, or the even more wary bobcat.

White-tailed deer are present in the New River Gorge and may be seen almost anywhere. The best time to see them is during the early morning hour; or at dusk. They prefer forest areas that border on old fields or croplands where they can supplement their forest diet of acorns or 'mast' with succulent greens. The 'interspersion' of different habitats

White-tailed deer





Wood frog

is important to deer.

Other species of vertebrates in the forests include the reptiles and amphibians. Amphibians are the group that includes salamanders, frogs and loads. All of these animals have moist skin and need to spend part or all of their 1ives close to water. The amphibians were the first animals to emerge from the water mil-lions of years ago to colonize the land. Mow ever, they were not able In free themselves totally from a de-pendency on water. All frogs, toads and most salamanders must lay their eggs in water, where they hatch and the young go through a larval stage in which they breathe with gills. Some species of salamanders are able to lay eggs in very moist environments, such as moss or rotting logs. These

Common toad





Newt

larval stage within the egg and emerge as miniatures of their parents. Such is the case with me red-backed salamander, probably the most abundant animal in the mixed hardwood forest. Turn over a few rocks or logs where the forest floor is damp, and you should be able to locate one of these salamanders without a great deal of searching. However, please return the stones and logs to their original positions; they are home to many creatures including mice, shrews, salamanders and countless others. The red-back is a small, slender salamander about 2 inches long with a reddish back and black underpants specked with white. They are unusual in that they possess neither gills nor lungs. These salamanders breathe through their skin, which must be kept moist, so don't hold one in your hand for long.

Another salamander that may be found is the red-spotted newt. This animal has two different life stages. During the spring months the adults are found breeding in roadside ditches. They are a greenish color with red dots on their backs. Their stomachs are yellow, with black spots. When the eggs hatch, the young possess external, feathery gills. Then they develop lungs and leave the water. Their color changes to a bright fire-red and they move into the forest where they are called 'efts.' He re they m ay remain for two to three years. After that time they mature, lose their red color, and re-turn to the water to breed and live out the rest of their lives, They retain their lungs and must surface to breathe.

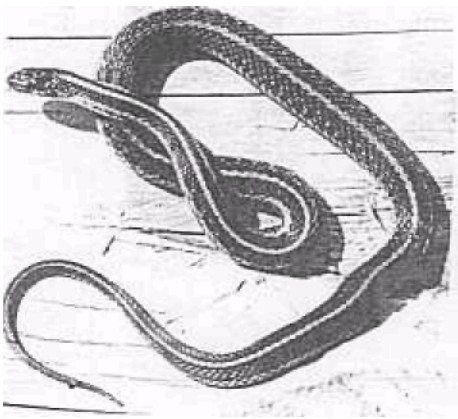
Other large salamanders live in the moist forests and breed in small woodland ponds. The spotted salamander is about 6 inches long, and is black with large yellow spots. A relative, the Jefferson's salamander, is about the same size but blue-gray in color with many faint whitish- blue speckles. These salamanders belong to a group called 'mole' salamanders. True to their name, they live most of their lives underground and are usually only seen at their breeding ponds in late February or early March. They can sometimes be seen crossing the roads on warm, rainy summer nights, when they are out foraging for food.

Reptiles are related to amphibians but have made the separation from water. Many species such as the water snake and aquatic turtles prefer aquatic habitats, but must come out of the water to lay eggs. When they hatch the young are fully-equipped, miniature replicas of their parents. Reptiles do not have slimy skin; instead they have scales and are dry to the touch. They are a misunderstood group of animals and many people have fears born of folklore and myths. It is true that some snakes are poisonous, but these are few in number and can easily be told from the numerous non-poisonous species with little study. Twenty-two species of snakes are found in West Virginia; only two are poisonous. Snakes are an important part of the ecosystem and several species help control the populations of small mammals.

Common harmless species found in the mixed hardwoods include the black rat snake, garter snake and ringneck snake. The black rat snake is one of the larger snakes in the region, attaining a length of nearly 6 feet. They are adept tree climbers and feed on small mammals and occasionally birds. The garter snake is smaller, only a about 2 feet in length, with black and ye 1low stripes along its body. It feeds on insects, frogs, roads, salamanders and small mice. The temperament of black rat and garter snakes varies with the individuals. Some are very tame while others make it clear that they want no part of an encounter with humans.

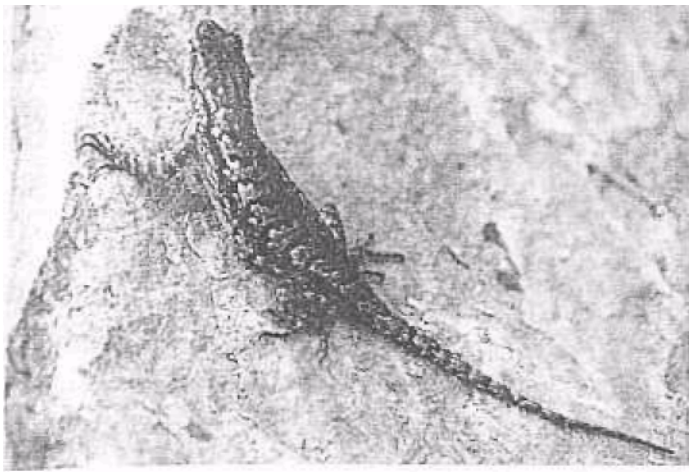
Ringneck snakes are quiet, shy creatures that never attempt to bite. They are approximately 1 foot long and the diameter of a pencil. They are black above, bright yellow or orange

Garter snake

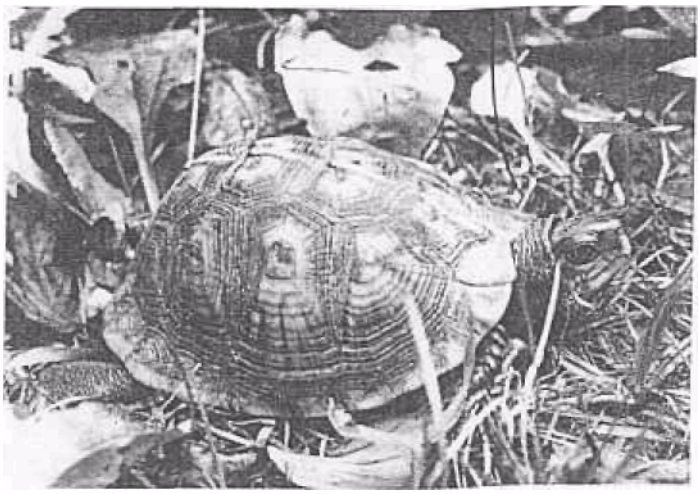


Copperhead





Fence lizard



Box turtle

below, with a yellow neck band. A ringneck snake may be discovered when looking for red-backed salamanders, since they like similar habitats. These snakes eat earthworms and salamanders.

Two poisonous snakes occur in the New River Gorge, The northern copperhead and timber rattlesnake prefer dry, rocky areas that receive plenty of sunlight. Be alert if you are hiking in this type of habitat, and respect any snakes you encounter.

Poisonous snakes are distinguished from harmless species by their triangular heads and heat-sensing pits in front of their eyes, hence the name 'pit vipers.' These pits help them delect warm-blooded prey, such as mice. Copperheads and rattlesnakes have cat-like pupils; all other West Virginia harmless species have round pupils.

Unless you know where to look for them, it isn't likely that you'11 see any lizards. Although similar in appearance to salamanders, lizards are totally different. Their dry, scaled skin, clawed feet, speed and association with dry rocky habitats are just a few of the things that set them apart. Remember, salamanders are amphibians; lizards are reptiles.

The northern fence lizard (also called 'fence swift') is a brown-gray creature that might be seen basking on rocks in forest openings or cliffs. Males are distinguished from females by their blue stomachs. The five-lined skink prefers to hide among piles of branches and dry leaves on the forest floor. The skink is 6 inches long with black and yellow stripes, and a bright blue tail. In older adults this bright coloration may fade. A lizard's tail may break off if a predator grabs it, thus giving the lizard an opportunity to escape, The tail will grow back, although it is usually not as colorful as before.

All of the turtles found in the New River Gorge are aquatic except for the box turtle. This brightly-colored terrestrial tunic is at home in open fields and mixed hardwood forests. Box turtles are well protected from predators and are able to completely close their shells when they feel threatened. They feed on a variety of foods including strawberries, blackberries, earthworms, in-sects and mushrooms. It is not un-usual to find box turtles with faces stained purple from berries. Unfortunately, box turtles often cross roads during the spring and summer months and many are hit by cars.

There are quite a few other plants, birds, mammals and herptiles found in this habitat. The ones described he re are the most common. If your interest in these plants and animals increases, there are many good field guides that will provide in-depth descriptions. The National Park Service has several field guides available at their Visitor Centers and others are available in bookstores and libraries. It is important to think about how all the plains and animals in a community are interrelated, Of-ten in the past, man has exterminated animals that were considered pests, or overharvested plants and trees. This does not make for a healthy environment. The survival of each individual part is necessary to ensure the survival of the entire community.

CHAPTER FOUR

Tributary Streams

The river is a manifestation of all the small streams that feed it. The tributaries bring nutrients and act as avenues of dispersal for plants and animals. The tributaries help the river wear down the land through which they pass. The river itself is a tributary of sorts, carrying nutrients, sediments and pollutants to other, larger river systems, and eventually to the oceans. The New River is a tributary to the Kanawha River, which is in turn a tributary to the Ohio, which feeds the Mississippi.

The tributary streams that feed the New River all blend together to form it. Usually, they give up their identities when they meet the river. Depending on their size, they may have the power to influence the conditions of the river through changes in temperature, currents and turbidity. Before they meet the fiver, the tributaries are unique, and each is slightly different from the next. They possess their own communities of plants and animals which may differ significantly from those found in the river. The steepness of the mountain slope, the types of rocks it flows over, and the amount of sunlight reaching its waters affect the character of each tributary.

Man has also affected the tributary habitats, often adversely. They are sensitive habitats and many of the plants and animals do no t adjust well to environmental disturbance. Activities such as logging, acid discharge from mining, sedimentation and the dumping of sewage and trash can destroy the intricate community that is found here.

Winter stream

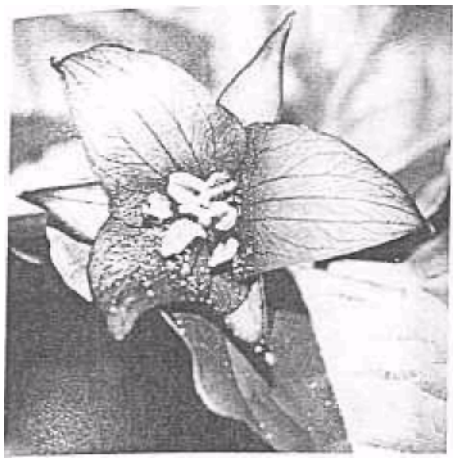


Vegetation

Tributary streams in the New River Gorge flow primarily through mixed hardwood forests. However the forest bordering each tributary is uniquely different from that surrounding it. Instead of oaks, hickories and poplars, stands of eastern hemlock, yellow birch, muscle-wood, beech, red maple, buckeye, magnolia and rose bay rhododendron comprise the dominant vegetative community. These trees and shrubs are adapted to the cool, moist, shaded environment. Mountain elderberry is normally found at higher elevations, but can survive here because of the cool environment, Spicebush is also found here, and its fragrant leaves have been used to treat a variety of ailments, including dysentery, coughs and colds.

Mountain elderberry





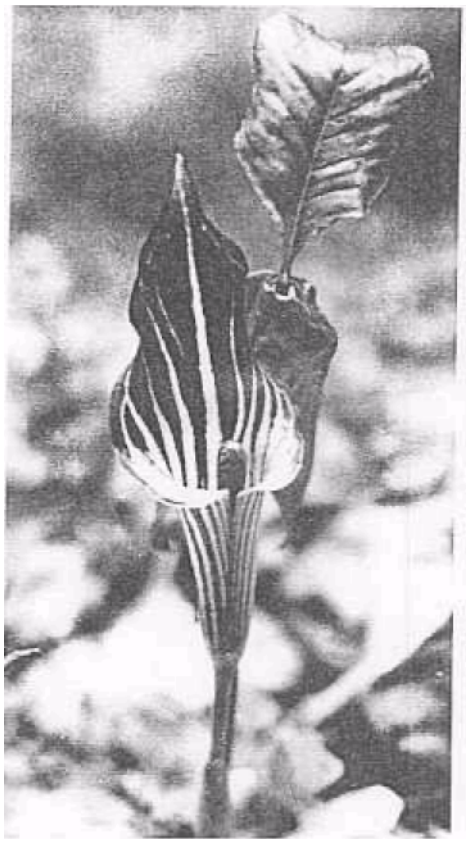
Wake-robin

Many beautiful and fragile flowering plants grow in this habitat. If wildflowers are a special interest, the n you'11 enjoy a hike along one of the tributaries in the New River Gorge. Take only pictures, please, and leave the plants undisturbed. You will need a flash for your cam-era, as the thick canopy of hemlocks will often keep the ground well shaded even at mid-day. Many of the flowers appear in early spring, right after the snow melts and before the leaves open on the tress. Trout lily, red trillium (wake-robin), mayapple, solomon's seal and jack-in-the -pulpit may usually be found. A field guide is handy should you find something rare or unusual, such as the Fraser's sedge.

Let's take a look at some accessible areas and discuss what might be found at each.

Where Are They

Wolf Creek is located along Route 82 (old Fayelte Station road) on the west side of the river. The directions are the same as those for the Kaymoor Trail, given in Chapter 3. At Wolf Creek a new foot bridge was recently constructed, and next to it stand the remains of an old log bridge which once provided access



Jack-in-the-pulpit

for trucks and other vehicles to the mining town of Kaymoor. Today, the old log bridge is in ruin and the road up the mountain is severely eroded, passable only as a hiking trail, Nature has been quick to erase the scars left by man's presence.

Manns Creek and Glade Creek are located in Babcock State Park and are full of human history as well as being extremely beautiful streams. Manns Creek gorge once served as an important link between the hustling towns on the ridgetops and the flourishing community of Sewell along the river. A narrow gauge railway was completed along the creek in 1886 and hauled coal from mines at the top of the gorge to the coke ovens at Sewell. At several locations the railway passed over the tributary on wooden trestles. In 1908 a logging operation began in the area and the railway hauled timber to the



Wolf Creek

sawmill. During this era, the Manns Creek gorge was stripped of its virgin hemlock and birch forests. Here again, nature is reclaiming what men have abandoned. Many people who hike from Babcock State Park to fish along the New River probably do not realize that the trail they use was once an old railway bed, traveled by small but mighty steam locomotives.

If you travel along McKendree Road you may wish to stop and explore Dowdy Creek, a pretty stream in a steep, narrow ravine. The road crosses the creek about one-half mile south of the old hospital site.

Traveling to Thurmond on Route 25, perhaps to embark on a white-water raft trip, you will travel paral-lel to another pretty stream: Dunloup Creek, like Manns Creek, was the site of a railway out of the New River Gorge, This one connected Thurmond with Glen Jean. Nearby. Arbuckie Creek guided another railroad to Thurmond from Minden.

Lumber companies and sawmills were located at the mouths of

several other tributaries in the New River Gorge. These include the New River sawmill at Long Bottom, near the mouth of Fall Branch, and the Glade sawmill on Glade Creek (a different creek near the town of Glade).

Fauna of the Tributary Community

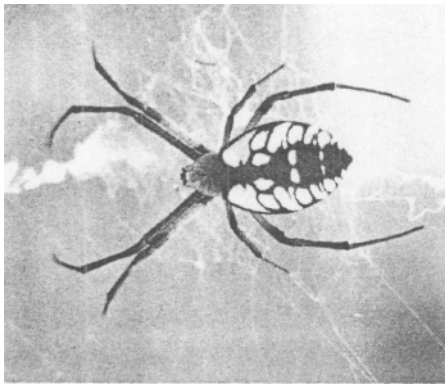
During a hike along any of these tributaries, several species of birds may be encountered, though it may be hard to hear their songs over the roar of cascading water. Black-throated blue warblers and Louisiana waterthrushes are two birds that arrive in spring and nest in these areas. During the winter months, ruffed grouse use the thick evergreen underbrush of rhododendron and other cover to hide from predators and escape the cold bite of winter.

Raccoons hunt along the edges of the creeks, flipping stones for tasty, but risky, meals of crayfish. White-tail deer use the tributaries as passages up and down the slopes. Like the grouse, they bed down in the thick, protective undergrowth.

Shrews and moles are common

Raccoon





Orb-weaving spider

in this habitat, probably because of the insects, earthworms and salamanders that also live in the damp soil. The hairy-tailed mole builds tunnels and runways right under the surface of the soil using powerful front feet. Moles are nearly blind and rely on sense of smell to locate earthworms. The long-tail shrew hunts for centipedes, spiders and other insects. Possibly, the rare northern water shrew occurs here as well. This shrew readily takes to water, where it is known to feed on aquatic insects.

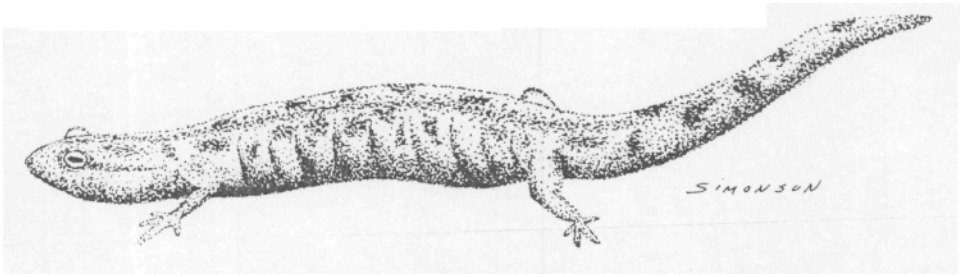
Several species of salamanders may be found along the streams and in the forests directly surrounding them. Careful observation reveals that each species has its own moisture preference. Slimy and red-backed salamanders prefer the leaf litter in the forest. Brightly colored spring and red salamanders will most likely be found under rocks, where the depressions fill with water once the rock is removed. Rocks at the edge of the stream may have any of several species of dusky salamanders hiding beneath them. You must move quickly to catch one of these creatures, for as soon as its rock is turned it will dart out into the stream, only to hide under another rock or be lost from sight in the fast-flowing water.

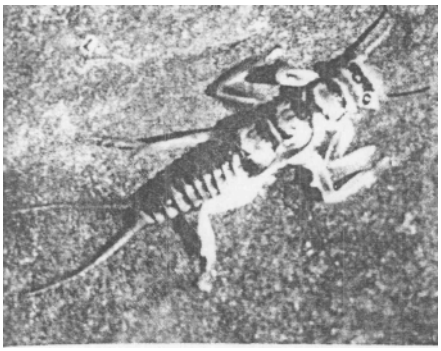
The black-bellied salamander, a brown and black mottled salamander about 6 inches long, is the rarest and largest dusky salamander. This species seems to be especially susceptible to pollutants, so its presence probably signals a healthy stream. These salamanders are at the top of the aquatic food chain in streams without trout. Dusky salamanders are often collectively referred to as 'spring lizards' by the people who use them as fish bait.

Queen snakes are small brown water snakes with cream-colored sides, at home in the streams where they feed exclusively on crayfish. They are passive, harmless creatures that cannot be provoked to bite.

Many of the tributaries have stocked populations of brook, brown or rainbow trout. Trout streams are Wolf Creek, Glade Creek (in Babcock State Park), Dunloup Creek, Pinch Creek and Meadow Creek. Glade Creek (near the town of Glade) is probably the best trout stream in southern West Virginia. It is a beautiful stream with house-size boulders and waterfalls. If you wish to fish, be sure to get a West Virginia fishing license and a

Black-bellied dusky salamander





Stonefly

trout stamp. Trout live only in streams with clear, cold water, where they feed on a variety of aquatic insects including mayflies, stoneflies and caddisflies. Other small species of fish, such as dace, chubs and minnows, are found in the tributaries. Some of these species will not be found in the larger New River.

Turn over a rock in the stream and look closely at it. The strange looking insects with long, forked tails are stoneflies and mayflies, which live most of their lives in the water. When they mature, they will climb out of the water, split out of their skins, and fly away as totally different-looking winged insects. As adults, many live only long enough to mate, lay eggs in the stream and die.

Another interesting aquatic in-sect is the caddisfly. It is a soft-bodied insect with little natural protection that makes a tasty morsel for the trout. In order to protect itself, the caddisfly constructs a cylinder of small sand grains which it cements together with mucous. It lives inside this little fortress and carries it along wherever it goes. There are many species of caddisflies. Some use leaves, grasses, small twigs or pebbles, while others make no home at all. The caddisfly spins its own net to collect the tiny drift organisms on which it feeds.



Sassafras

Several species of butterflies and moths occur in the moist forests surrounding tributaries. These include little wood satyrs, blues, question marks and lo moths.

The tributary streams are interesting places to visit no matter the time of year. During the winter they provide shelter from wind due to their ravine-type topography and thick forests. In spring they are the first areas to produce colorful wildflowers. During the summer they are pleasant places to picnic and avoid a hot, humid day.

lo moth



Bullfrog



CHAPTER FIVE

Floodplains

Floodplain habitats along rivers are unique and varied. Often, these areas support more species of wildlife and plants than the adjacent uplands. Floodplain forests are referred to as 'riparian,' which means that they are periodically flooded by the river. However, this does not mean they are areas with permanently standing bodies of water such as marshes, swamps or other wetlands. Soils in floodplain areas are referred to as 'hydric,' which means they are often saturated with water.

There are several different riparian types within the New River Gorge National River. In the southern section, the river channel is wide and the water is relatively slow-moving. Silt and mud sediments have been deposited, providing for the establishment of wide floodplain forests. The Greenbrier River meets the New at Hinton, bringing loads of sediment with it. Numerous islands have formed where these rivers meet and for several miles downstream, as well.

In the northern part of the gorge, fast flowing water, a narrow channel and steep sandstone cliffs do not allow for much sediment to be deposited. Therefore, in this section, riparian floodplains are not as common.

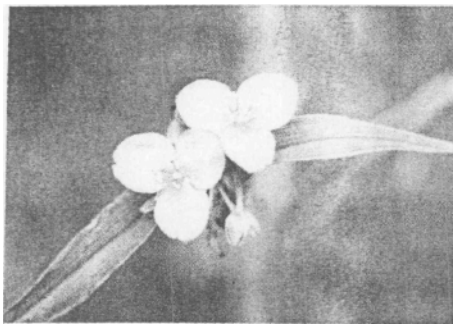
Vegetation of the Riparian Habitat

The species of trees and other plants in floodplain habitats vary with the intensity and duration of the flooding they receive. Some areas along the river's edge are flooded throughout the winter and spring months. These areas have a ground cover of stream cobble on which trees such as willows, sycamores and river birches try to make a living. These trees have a shrubby and stunted appearance due to harsh environmental conditions. During winter months, ice floes attempt to scour them away, while spring floods wash away those whose roots are not deep enough. Understory plants include water willow and the three-square sedge.

In areas where sediments have accumulated instead of eroded, thick silt soils and log debris provide the base for a variety of plant life. Usually, these areas are only flooded during the highest spring flows and are more stable habitats. The canopy trees are sycamore, river birch, silver maple and honey locust. Some less common trees also make their appearances here, including catalpa, Kentucky coffee tree, tree of heaven and fringetree. The Kentucky coffee tree is a member of the legume (pea) family, although it does not produce the nitrogen-fixing nodules on its roots like other members of this family. During the Civil War, seeds from this tree were roasted as a coffee substitute, hence the name. Fringetree is a member of the olive family. Its

Riparian edge near Terry





Spiderwort

flowers are in clusters of 4 to 6 narrow white petals, and it blooms in late April.

Understory shrubs include buttonbush, hazel alder and red-osier dogwood. Some tall, bushy plants include ironweed and joe-pye-weed, which are members of the daisy family. They produce flat-topped purple flower clusters in late summer.

Some wide floodplain forests are found along the river below Brooks Falls, near Longbottom at the mouth of Glade Creek, and slightly downstream of Terry, on the left side of the river. In middle sections of the gorge, floodplain forests are rare, but forested slopes there do flood, so are considered riparian. Traveling by canoe you can see steep rock slopes with natural rock-rip-rap comprising the ground cover. Some typically riparian trees may be interspersed with mixed hardwood forest trees like red oak, hemlock, beech, tulip poplar and buckeye. An area that fits is description is found along the ft side of the river directly upstream 'the 1-64 bridge. This is the typical riparian habitat between Terry and Thurmond.

A white-water raft trip through the northern section of the gorge will reveal yet another riparian habitat. There, large sandstone slabs which have sloughed off the adjacent cliffs the dominant features. Between se large boulders grow the floodplain tree species, along with an occasional sweet gum, a tall and straight tree with star-shaped leaves. The wood from this tree is highly prized for furniture and veneer.

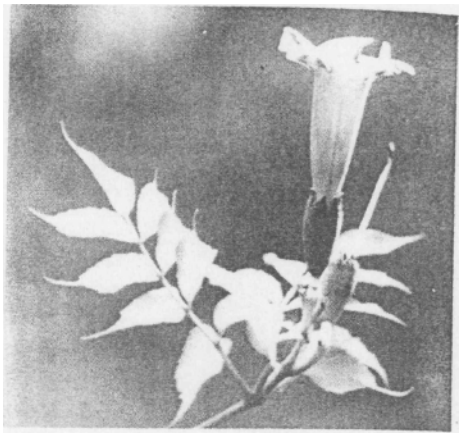
Riparian Wilderness

The shrubby riparian habitats have fewer species of flowering plants than the forests and islands. Here, plants must be adapted to flooding even in the summer months. Both spotted and pale yellow jewelweed (touch-me-not) grow here. Their seedpods open with an explosion if they are touched when ripe. Spiderwort, with purple flowers and long slender leaves, will begin blooming in mid-May. Water willow, an emergent plant with small purple flowers, grows at the water's edge.

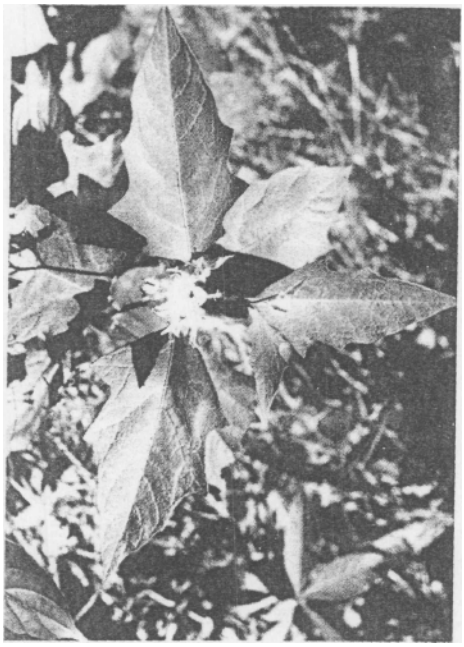
Many colorful wildflowers are found in the understory of the riparian floodplain forests, but their abundance varies from year to year. When spring floodwaters remain high into summer, understory diversity will be less than in years of low spring flows. The early bloomers in-

Cardinal flower





Trumpet creeper



Horse nettle

clude bedstraw, bluebell, false blue indigo. Spiderwort, lyre-leaved sage and tickseed. Later in the summer, mistflower, cardinal flower, trumpet creeper, pale spike lobelia, wild senna, soapwort, horse nettle and garden phlox will add color to the understory. Field bindweed and wild potato vine, cousins of the morning glory, produce large white flowers which lie close to the ground. Horsetails, close relatives of ferns, cover the understory on floodplains near Longbottom and at Glade Creek.

Whenever you walk in flood-plain forests, take care to avoid poison ivy. Easily identified by its fuzzy, tree-climbing vine, it also forms a carpet of individual plants on the forest floor. Look for the leaves in triplets. They are shiny and red in the fall, but that does not help the summer camper or hiker identify them. Stinging nettle is also common here. It is covered with coarse, stinging hairs, and has toothed, heart-shaped leaves.

Butterflies

Associated with the great variety of flowering plants is a diverse group of butterflies. During the summer months, you may see a dozen or more butterflies congregating along roadside puddles to quench their thirst. The butterfly uncoils its proboscis — a slender, tubular tongue — and uses it to suck liquids into its mouth. Butterflies have mutualistic relationships with the plants they feed on. The flowers provide food, while the butterflies pick up pollen and carry it to other plants for fertilization.

The most common species include tiger swallowtails (with yellow and black markings), zebra swallowtails (with white and black markings), pipevine swallowtails and spicebush swallowtails. Other less common species include the diana, giant swallowtail and red-spotted purple. The diana is sexually dimorphic, meaning that males and females are different colors. Males are brown with orange borders, while females are dark blue with light blue and white borders. Female dianas are often confused with red-spotted purples. Identifying butterflies can be a fascinating hobby and several comprehensive field guides are available on this subject.



Male diana butterfly

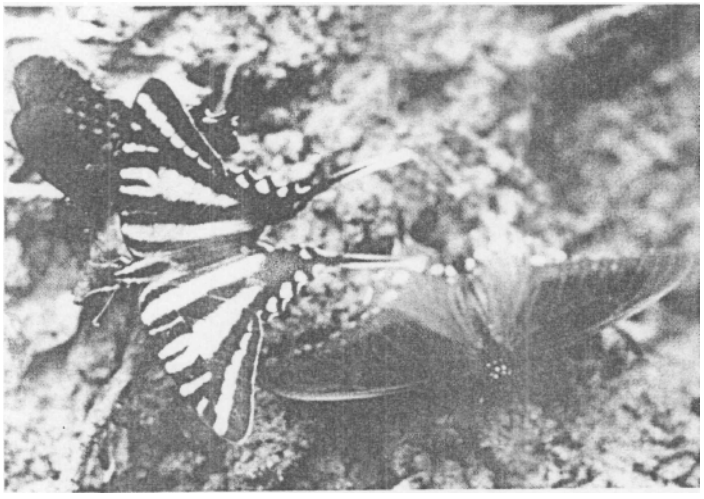
Another common insect is the silver-spotted skipper. Neither butterfly nor moth, the skipper has the characteristically heavy body of a moth, while displaying the slender stalk antennae of a butterfly. Moths commonly have hairy or comb-like antennae. Skippers are brown with a reflective silver spot on the under-side of each wing. Honey locust flowers are a favorite food in spring, later they will concentrate around the lavender flowers of the water willow.

Wildlife

Many species of wildlife are found in the riparian forests of the New River Gorge. Raccoons and opossums are common because of the abundance of food associated with the river. Mink, muskrat and beaver are closely tied to the flood-plains and adjacent water because of their habitat requirements.

Songbirds are abundant in floodplain forests. Earlier chapters explained how species composition can change with different habitats. In floodplain forests, the bird-watcher will find parula warblers, northern orioles, acadian flycatchers, great-crested flycatchers, pee-

Zebra and pipevine swallowtails



Spicebush swallowtail caterpillar





Tree felled by beaver



Beaver

vees, phoebes, yellow warblers and yellow-throated warblers, just to name a few. Cerulean warblers are found in the densest floodplain forests, while warbling vireos make nests in large sycamores in open habitat. The tree swallows and rough-winged swallows nest in tree cavities in flood-plain forests, and forage for hatching aquatic insects over the river. The ' caw, caw' of the American crow is a familiar sound along the river's edge. Grackles, red-winged black birds, song spar-rows and meadowlarks are found along the floodplain where farming practices have established open field habitats.



Ruby-throated hummingbird



Common winter residents of these forests include myrtle (yellow-rumped) warblers, white-throated sparrows, red-bellied woodpeckers and eastern phoebes.

The most common small mammals in floodplain forests are deer mice and eastern chipmunks. Both of these can return to uplands to avoid flood waters, then re-colonize the floodplains when the water re-cedes. In years of low water, some of the shrews and moles may also come from the uplands and make their homes on the floodplain.

The largest tree squirrel is found in floodplain forests. The eastern fox squirrel prefers this habitat and is distinguished from the gray squirrel by its larger size and golden-colored tail. The southern flying squirrel (actually a glider) also lives in the floodplain forests. It is nocturnal and rarely seen by park visitors.

Owls, also nocturnal, have large eyes which enable them to see well in the dark as they whisk silently through the forest and pounce upon unwary, small animals. Barred, screech and great horned owls are all found along the New River and



American toad

can be recognized by their distinctive calls. Playing a cassette tape of their calls will often draw owls in close enough to be observed.

Reptiles and amphibians abound in floodplain habitats, although many are tied to the aquatic habitat of the river. The terrestrial inhabitants include box turtles, garter snakes, black rat snakes and toads. Two distinct species of toads live here. Close inspection will reveal that American toads have one or two warts in each dark spot on their backs, while fowler's toads have three or more warts in each spot. Contrary to popular belief, handling toads will not cause warts.

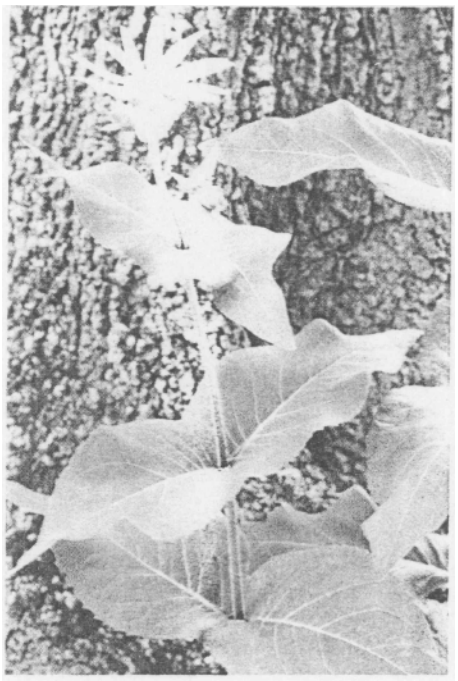
The beautiful, emerald-colored, rough green snake may be seen as it climbs the trunk of a large tree, its body hugging the grooves in the bark while it makes what appears to be an impossible ascent. Rough green snakes are harmless. They hunt crickets and grasshoppers in the green foliage where they blend so perfectly.

Terrestrial salamanders are rarely found in floodplain habitats, probably because they are not fast enough to avoid rapidly rising flood waters.

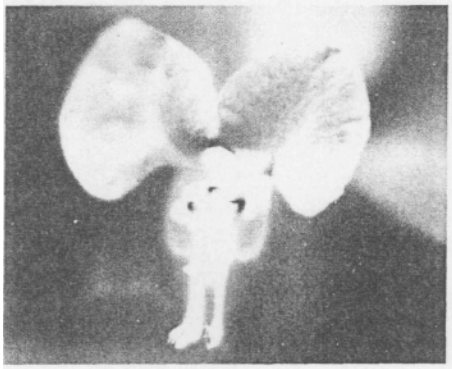
Human Impacts

Riparian habitats have been altered by man. They are systems which are adapted to flooding. The presence of flood control dams on rivers often reduces the high spring flows, and increases normally low summer flows. It is difficult to say what the long-term effects of these changed flooding cycles will be on riparian vegetation. Predictably, reduced flooding may allow upland vegetation to become established on the floodplains.

Riparian areas offer some of the

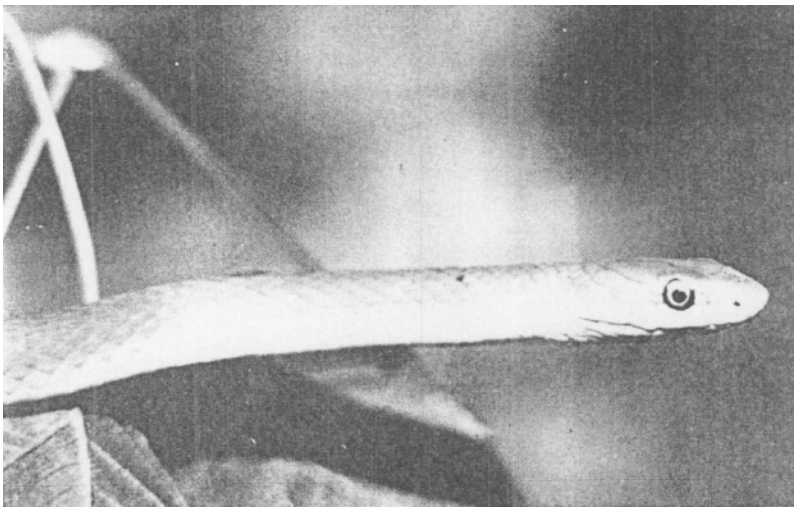


Cup plant

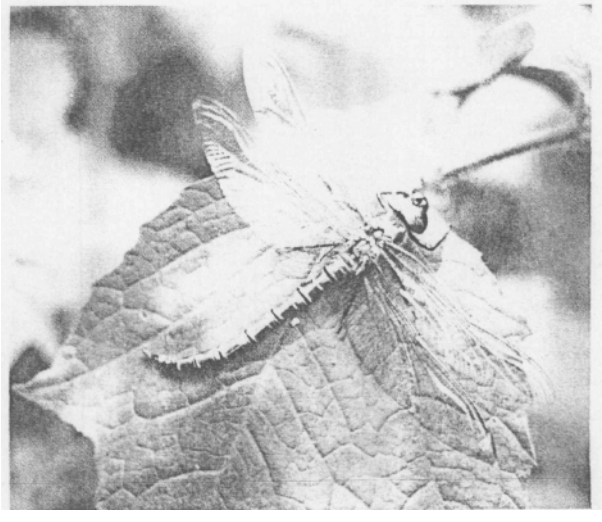


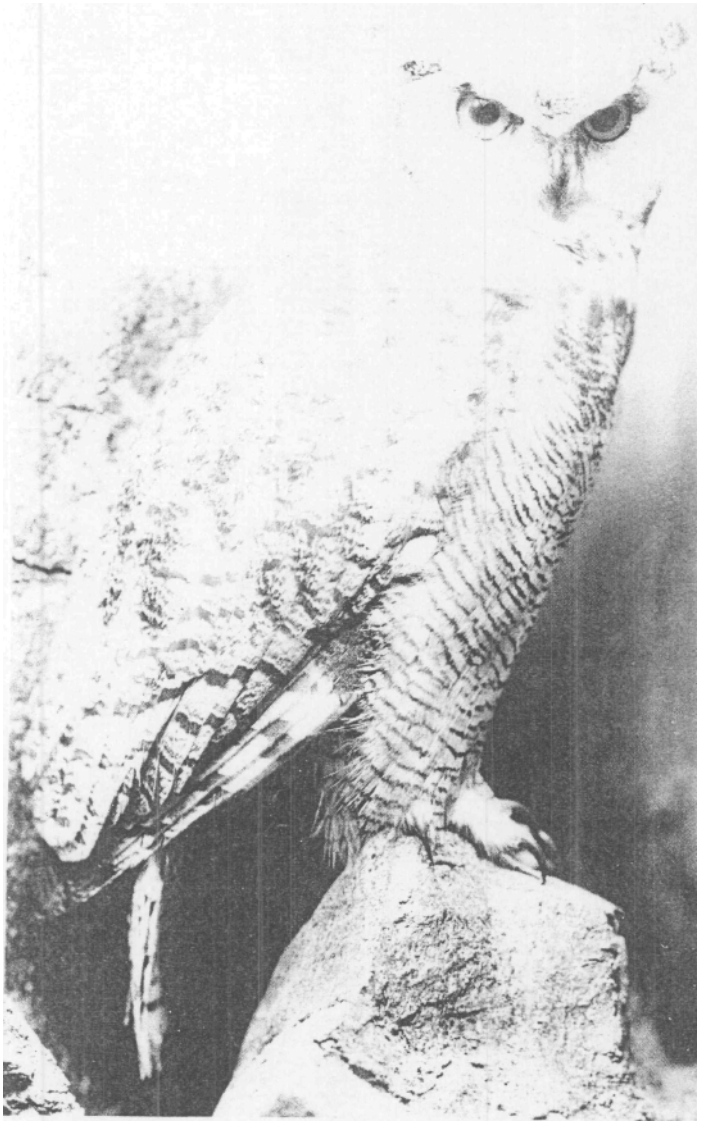
Asiatic dayflower

Rough green snake



Dragonfly





Great horned owl

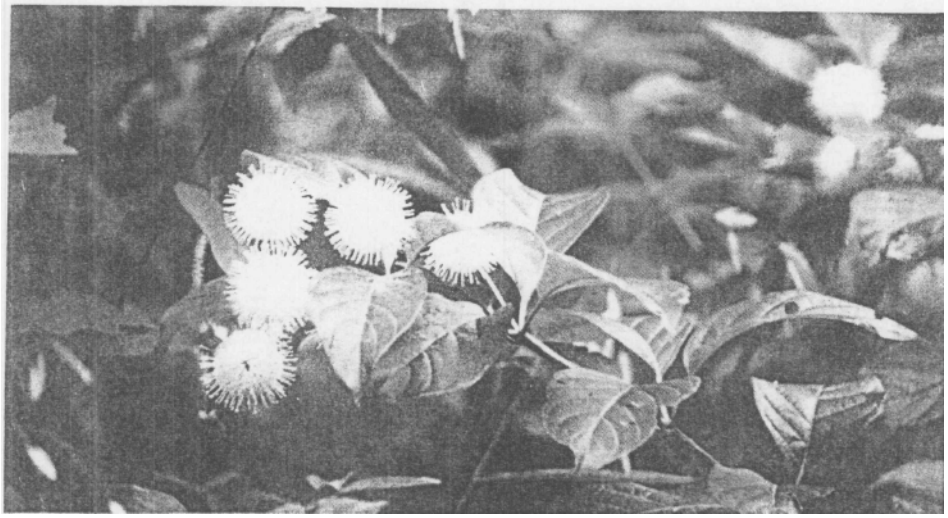


Red-tailed hawk

richest soils for farming, yet without trees and natural vegetation to protect them, flood waters will strip away the land. Floodplain vegetation and soils act as natural filters for surface waters entering the river. Runoff from improperly farmed floodplains muddies the water of the river and adversely affects the aquatic species living there.

The life of the river is inextricably tied to the floodplain habitats surrounding it. To protect the integrity of the river, we must also protect its terrestrial borders, the floodplains.

Buttonbush



CHAPTER SIX

Aquatic Habitats: On and Under the River's Surface

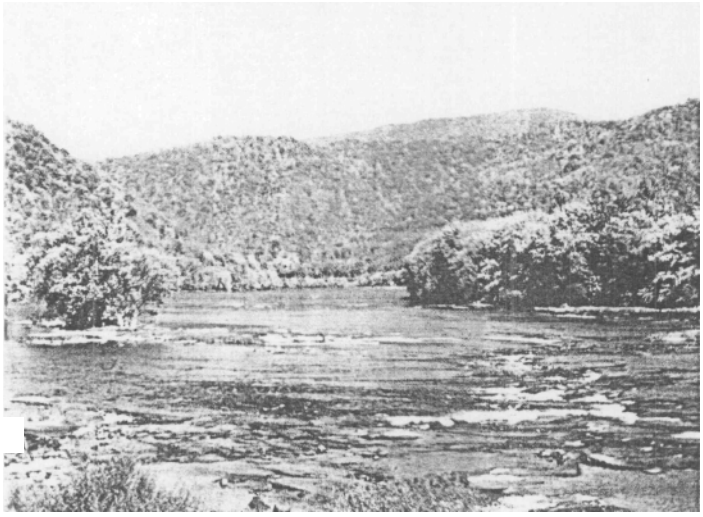
Aquatic habitats are as diverse as terrestrial ones. Currents, depths, bottom type and aquatic vegetation may combine to create distinctly different underwater habitat conditions. This chapter will discuss the inhabitants of two different aquatic habitats: riffles and pools.

Pool habitats are areas of slow-moving water. Edges of pools generally have mud bottoms and support aquatic plants such as elodea. Deeper areas of pools may have beds of eelgrass or water stargrass. Because of slow currents, sediments drop out and settle to the bottom. Often is-lands and sandbars form in these pool habitats.

Riffles and rapids are areas of greater slope with faster-moving water. Because of the speed and power of the water, light sediments do not usually settle or collect here. The substrates in riffle habitats are usually a combination of gravel, cobble and boulders, with amounts of the larger sizes increasing with the strength of the currents. Generally, we will find more pool-like conditions in the southern part of the gorge, from Hinton to Glade, and more riffle and rapid conditions north into the true gorge itself.

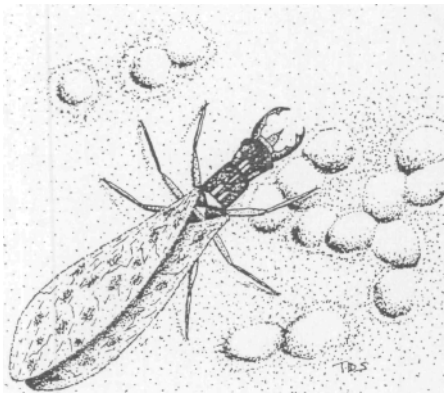
In order to understand how the plants and animals in the aquatic communities are related, we must look at all components of the system. The food chain in aquatic systems starts with the phytoplankton. These are microscopic plants which float in the water column. They create their own food, in the form of carbohydrates (glucose), from carbon dioxide, water and sunlight, in a process called photosynthesis. They become food for the zooplankton, which are microscopic animals. Larval fish and larger aquatic insects, including mayflies and stoneflies, feed on the zooplankton. Blackfly larvae filter organic matter and bacteria from the flowing water. Although annoying pests to humans in their adult stage, these 'filter feeders' are an integral part of the food chain. Blackfly feces are a major source of food for caddisflies and mussels. The blackflies themselves are eaten by hellgrammites, which are fearsome predators with strong pinchers. Hellgrammites are a major food source for bass and catfish, which are sought by fishermen. The adult hellgrammite is called a dobsonfly and is a large, ungainly, flying insect. Female dobsonflies lay thousands of

Looking downstream from Hinton

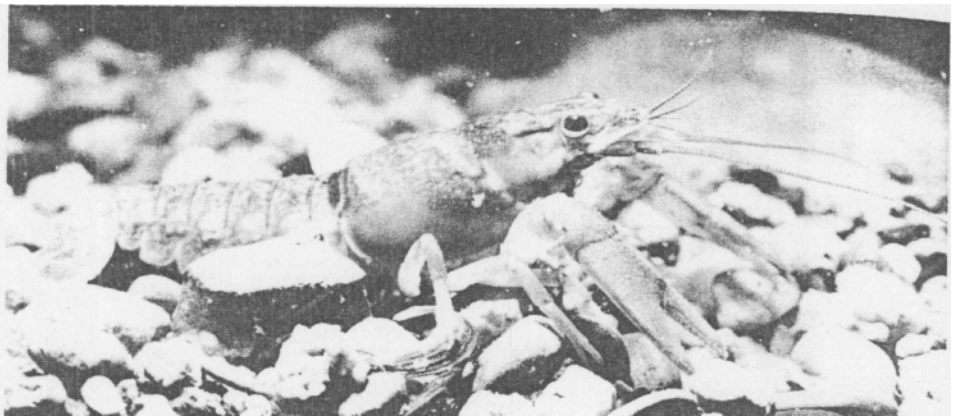


Riffle and rapids at Nuttalburg





Female dobsonfly w/ eggs



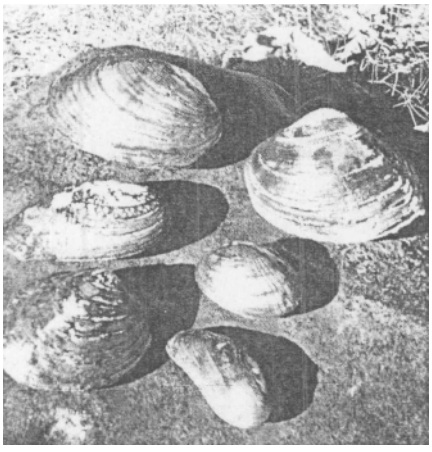
Crayfish

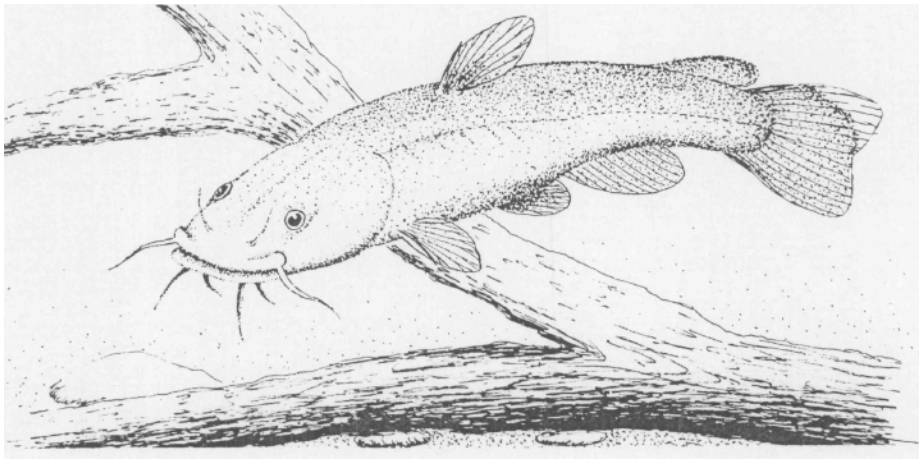
eggs in white clusters on exposed rocks and logs in late summer. The young hatch and fall into the river, where they live under cobble and boulders in the riffle habitats. After a period of up to two years they crawl out of the water and into the riparian floodplains. Here they burrow under rocks and logs and undergo a metamorphosis, much like a butterfly, and mature into winged dobsonflies. In the shallow areas of the New River are a variety of creatures living under stones, including hellgrammites and crayfish. Watch out when exploring; both creatures can be handled, but take care to avoid being pinched. Crayfish are another important link in the food chain and are eaten by catfish, bass, turtles, mink and many other wildlife species. Crayfish in the New River grow to a length of 6 inches. Females produce clusters of eggs in the spring which they carry around under their tails until the eggs hatch.

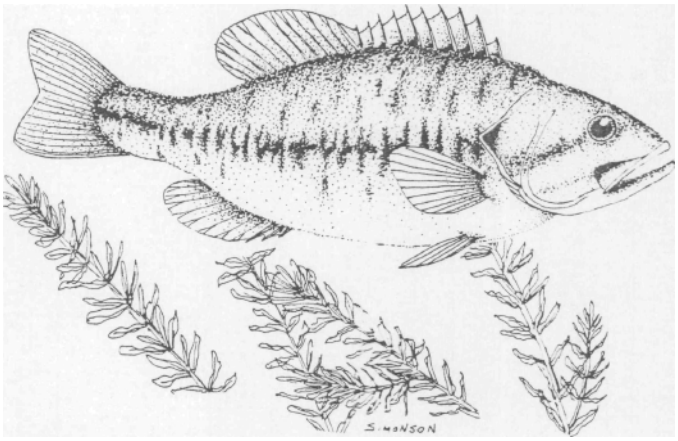
Freshwater mussels account for a large percentage of the bottom or 'benthic' life in the river. At least seven species of mussels are found in the New River Gorge, in addition to the asiatic clam, an introduced species. Mussel species go by common names of mucket, purple warty-back, buckhorn (pistol-grip), pocketbook, elk-toe, spike, and wavy-rayed lampmussel. Mussels are generally found in areas with sand-gravel substrates, however some are specific to silt-sand habitats. They are filter feeders, meaning that they collect small food particles that float by in the water column. Mussels are susceptible to pollutants and sediment. Muddy river flows due to improper farming practices and poorly planned construction will cover mussel beds with silt, and clog the mussels' gills, thereby suffocating them. Mussels are eaten by muskrats, mink and raccoons. They have tough flesh, but are edible to humans and were eaten by American Indians. Their shells were also used for digging implements and utensils. The smaller asiatic clam is collected and eaten by local residents.

Fish

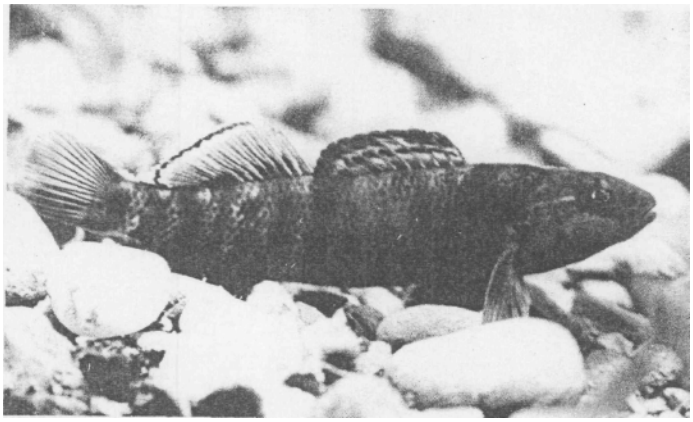
Fish are the most conspicuous members of the aquatic community.







Spotted bass in elodea grass

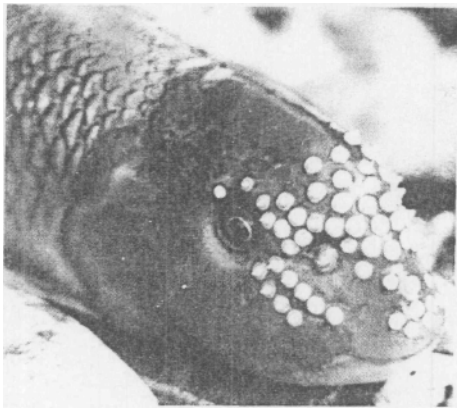


Rainbow darter

Fishing in the New River Gorge National River is excellent. The section between Bluestone Dam and Sandstone Falls is the most popular stretch of river in West Virginia for fishing. The New River leads the state in number of citation-size sport fish caught. Several rafting companies offer float and fish trips through the Whitewater stretch of the gorge. The most abundant species are smallmouth bass, flathead catfish ('mudcats'), channel catfish and rock bass ('redeyes'). Others commonly caught in the river include spotted bass, red-ear and bluegill sunfish, crappie and carp. Muskel-lunge ('musky'), walleye, white bass and white/striped hybrid bass are reported as well.

Fishing for smallmouth and rock bass is particularly good in riffle habitats, whereas spotted bass, flathead catfish and sunfish are taken in pool habitats. Flatheads are caught on trotlines. Local residents tell of catfish "as big as railroad ties." Current state records for smallmouth bass, striped bass, walleye and white bass are held by fish from the New River.

Many smaller species of fish inhabit the river, but few are noticed by fishermen and visitors. Several beautiful species of darters live in spaces between rocks in the shallow riffle habitats. During the spring breeding season, male rainbow darters are a brilliant blue and orange with a blue spot on each side of the face.



Bigmouth chub

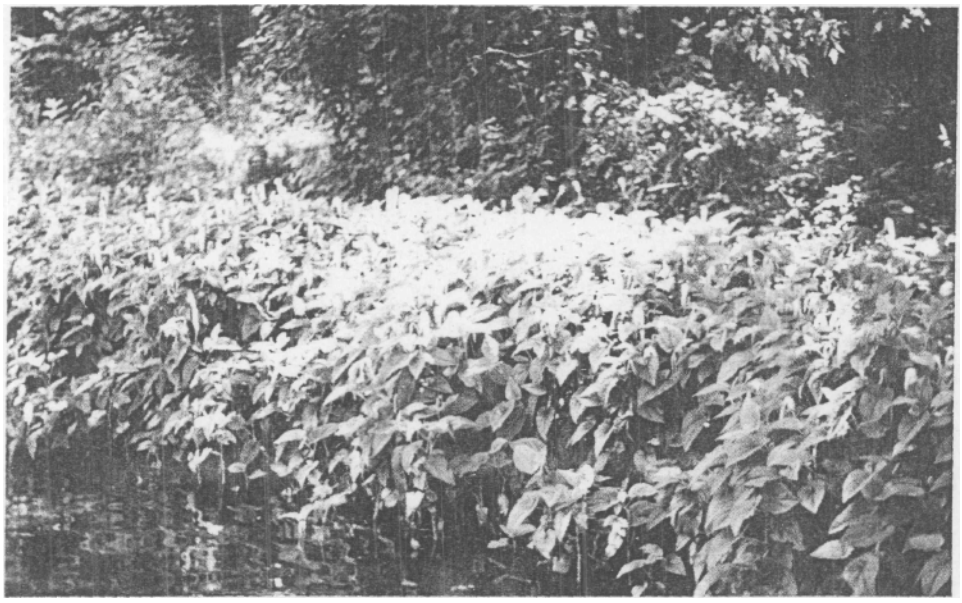
Roanoke, sharp-nose and green-side darters are also found in the New River. These darters feed on the blackflies, stoneflies and other in-sects which hide under rocks with them. Among fish, darters have the unique ability to turn their heads from side to side. This adaptation probably helps them see and avoid predators, while it helps them capture prey.

In the pools live logperch, which also belong to the darter family. These darters occasionally appear to walk on the bottom, using their pec-toral fins as legs.

Many species of fish spawn in the shallow, weedy edges of the river in spring when the water level is high. Later in the summer, these areas may be exposed and dry. When people step in and alter the river with a dam, water flow must be carefully monitored so the river's flow doesn't change drastically and flora and fauna are impacted as little as possible.

The bigmouth chub is a species which is endemic to the New River. From late April to mid-June the chubs construct small mounds with stream gravel, approximately two feet in diameter and one and a half feet high. They have suction-like mouths which they use to carry the stones. The chubs deposit their eggs inside these mounds and guard them until the eggs hatch. During the summer, after the water level has dropped, these mounds are often exposed along the edges of riffle habitats.

At least eight species of shiners ('minnows') commonly occur in the main channel of the New River; others are found in the tributaries. Of-ten, only a fisheries biologist can identify them by counting fin rays and scales and making various measurements. Shiners are abundant and provide food for many of the larger game fish. A larger member of the



Lizard tail

minnow family (but not a shiner) is the stoneroller, probably one of the most abundant fishes in the riffle habitats.

Plants and Other Animals

Among the more conspicuous plants and animals found in the river system is one species of 'submergent' plant called water stargrass. It produces yellow flowers which float at the surface in mid-summer. Also in mid-summer, large masses of elodea wave in the gentle current of the pool habitats and shelter young fish from predators.

At the water's edge is lizard tail, which in August produces tall spikes of small, white flowers. It is an 'emergent' plant because the flower emerges above the water and the roots are buried in the river bottom.

Many animals make the river their home. Mudpuppies ('water-dogs') are large, harmless salamanders which live under rocks and in aquatic vegetation. They can be greater than a foot in length and have large, red, feathery, external gills. They feed on small fish and insects and are often caught on hook and line.

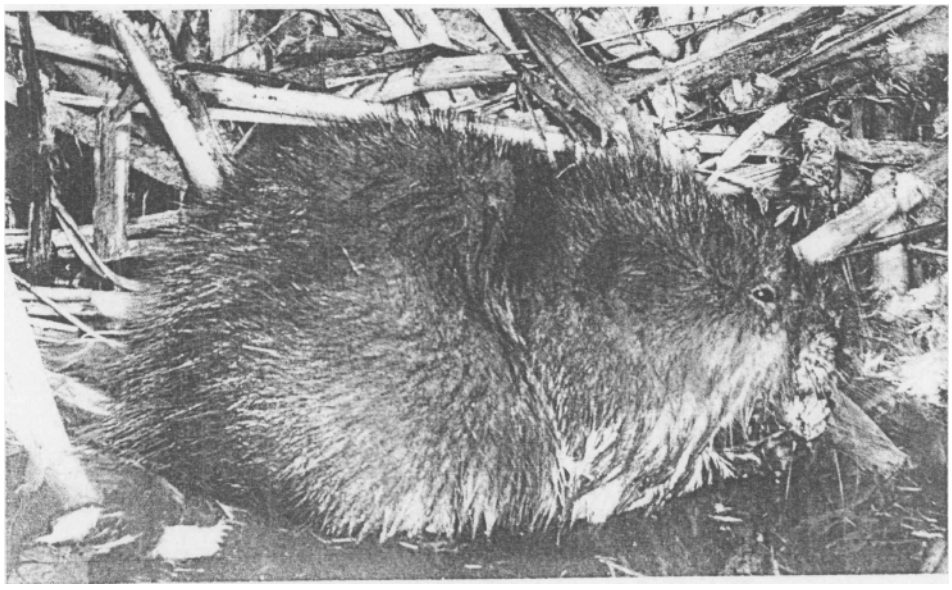
Mink use burrows along the river's banks, convenient when they wish to hunt for crayfish. Young mink emerge from the dens in June. If you are very lucky you may catch sight of the youngsters curiously scampering about and fighting over fish and crayfish brought to them by their mother. Look carefully and you may find a mink 'midden' (a stash of crayfish shells and claws) in a hollow at the base of a tree or large rock. This is a certain sign that mink live nearby.

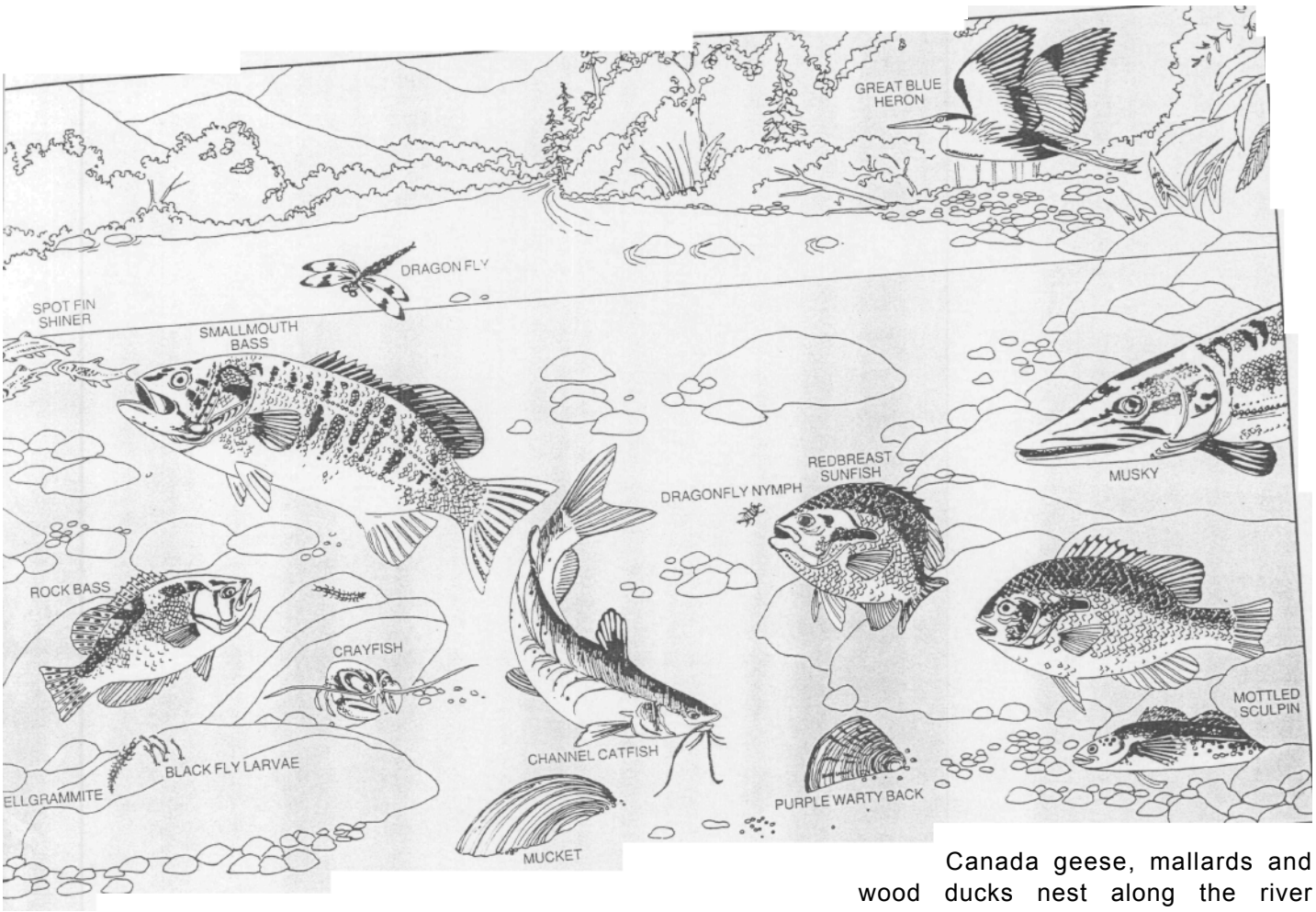
Another animal which lives in New River pools is the beaver. It doesn't build dams or lodges here, but instead lives in dens hollowed out under banks. Chewed sticks, felled trees and large footprints on muddy banks will indicate the presence of beaver.

Muskrat also live in the river. They are often confused with beaver, although they are smaller and have slender tails while the beaver's tail is large and paddle-shaped. Muskrats are often seen sitting on rocks in the morning, eating asiatic clams or small mussels. They leave telltale piles of empty shells.

Wading birds, such as great blue and green-backed herons, are frequently seen along the river during the summer months. They stalk quiet coves, backwaters and pools, constantly on the lookout for unwary fish, frogs or crayfish. Smaller shorebirds such as killdeer and spotted sandpipers are often seen on

Muskrat



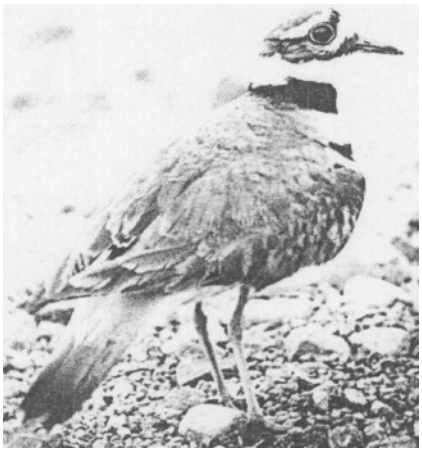


liver life

Killdeer

Green-backed heron

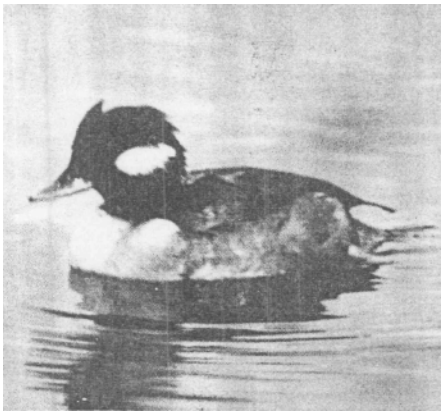




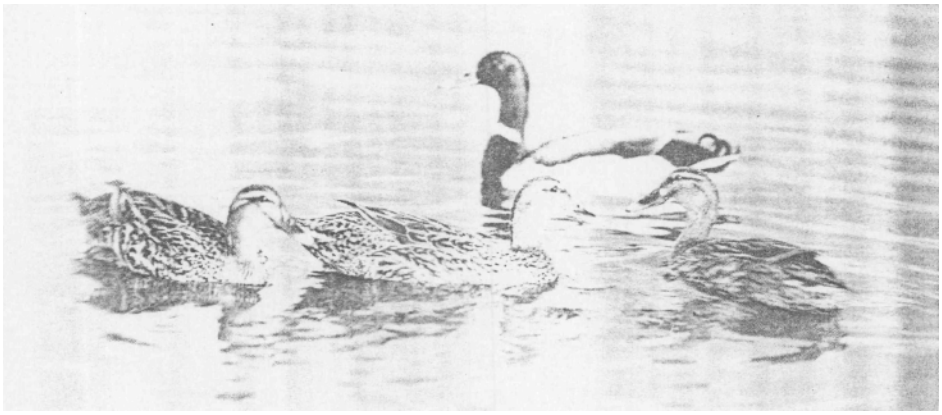
exposed sandbars, where they poke through the mud and capture worms and benthic invertebrates with their long bills. Double-crested cormorants, common terns and ospreys occasionally pass through the gorge during the summer; however, none are known to nest here.

Canada geese, mallards and wood ducks nest along the river during the summer and broods are often seen. Wood ducks do not make nests on the ground, but instead nest in tree cavities. When the young are less than one day old, the female wood duck will call them out of the cavity and they will jump to the ground --- sometimes as far as 25 feet. Wood duck nesting requirements illustrate the need for retaining large, old trees along the river.

During the winter months a variety of ducks frequent the river. Both dabbling (puddle) ducks and diving ducks are found here. It is easy to tell them apart by the way they take off from the water's surface. Puddle ducks (mallards, black ducks, widgeon and teal) explode directly off the water and into the air. Diving ducks (buffleheads, goldeneyes,



Female bufflehead



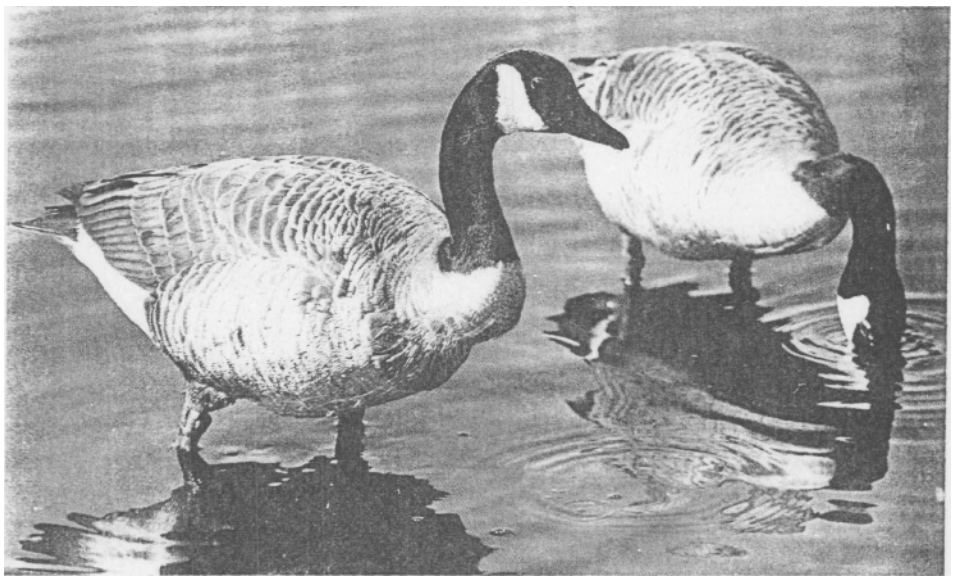
Mallards

hooded mergansers, ring-necked ducks and scaup) run across the surface of the water and take off when they have enough speed. The diving ducks spend a lot of time underwater, searching for vegetable matter, fish and other animal food. Puddle ducks feed in shallow water where they 'tip up' to reach aquatic plants and the invertebrates found in them. Their survival is often dependant on low winter flows which allow them to reach the vegetation below the surface.

Green-winged and blue-winged teal pass through the gorge for a short time in spring and fall, either on their way to northern breeding grounds or southern wintering areas. Other ducks which appear occasionally include gadwalls, widgeons and common mergansers. The diving ducks winter on the New River, as do large flocks of black ducks, which are close relatives of the mallard. The largest concentrations of winter waterfowl are found above Sandstone Falls and below Bluestone Dam.

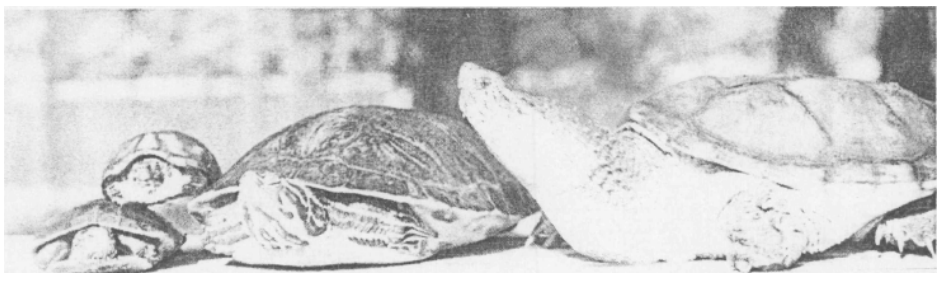
On a warm spring or summer light, bullfrogs, green frogs and pickerel frogs call from backwater pools. The nocturnal snapping turtle locally called 'mud' turtle) patrols he river bottom searching for crayfish and dead fish. Actually, the primary food in this aggressive turtle's diet is aquatic vegetation. It is distinguished from the other turtles in the river by its long, toothed tail and serrated points at the rear of the carapace (top shell). A turtle's bottom shell is called the 'plastron.'

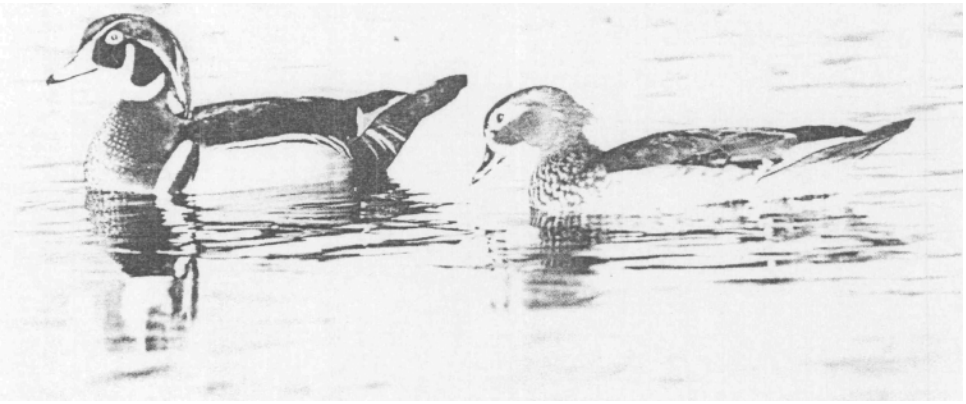
Canada geese



Other turtles found in the gorge include painted, musk (called 'pots' locally), and river cooters. On warm, sunny days a dozen or more of these turtles may be seen basking on logs and rocks. Painted turtles are small (less than six inches) and have

Left to right: **painted turtle, musk turtle, river cooter, snapping turtle**





Wood ducks

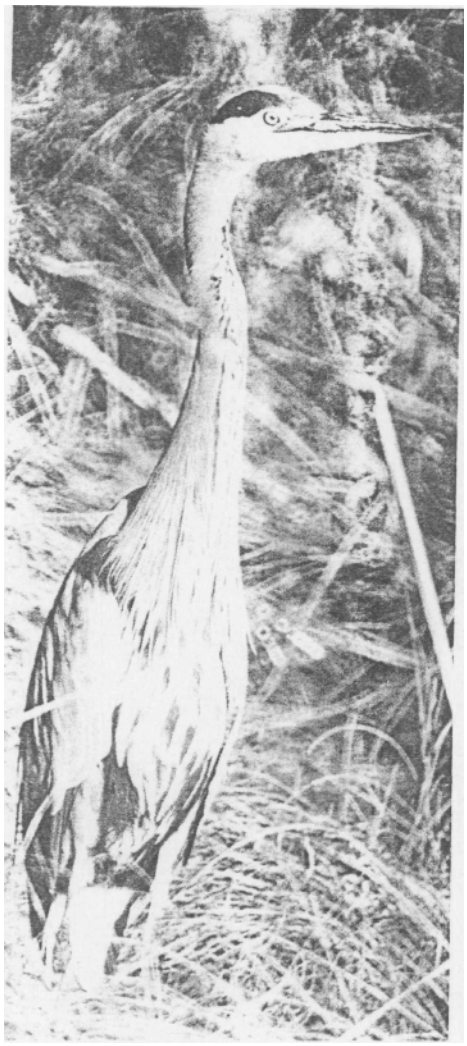
yellow and red stripes on their heads and legs. The New River is home to two subspecies of painted turtle. The eastern form is generally found east of the Appalachian mountains, while the midland form is found west of them. Because the New River flows from east to west across the mountains, eastern painted turtles have invaded the haunts of their cousins. Since they are not that different, the two types interbreed in the New River and the turtles here show characteristics of both subspecies.

River cooters are much larger (more than 12 inches), but are similar to painted turtles except they lack the red stripes. Cooters in the New River are interesting because they are isolated from other cooter populations. It is speculated that they moved into the New River thousands of years ago through tributaries which once connected the New to the James and Roanoke Rivers in Virginia, where there are also populations of cooters. Through geologic change, the New and James/Roanoke Rivers are no longer connected and the small population of cooters here is isolated from others in the southeastern United States.

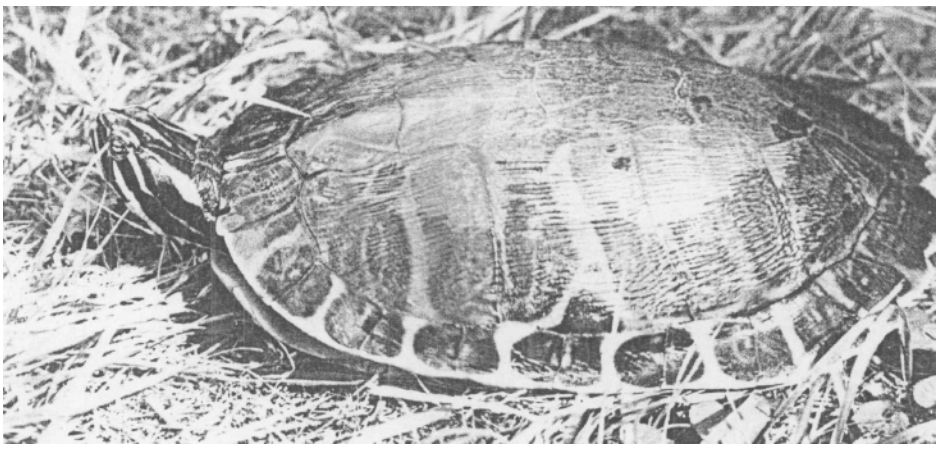
Musk turtles are small, usually less than four inches, with high, domed shells and two yellow stripes on each side of the head. They are frequently captured on hook and line by fishermen. When disturbed, musk turtles secrete a foul odor, hence the name.

The northern water snake is a brown-banded snake found along much of the New River. It is not poisonous, although it will not hesitate to bite the hand which attempts to hold it. Contrary to local belief, the poisonous cottonmouth moccasin does not occur in West Virginia. The nearest population of this snake is in the Dismal Swamp in southeastern Virginia. Snakes are an important pan of the ecosystem and should not be killed needlessly.

Hopefully this brief overview will encourage you to further investigate life in the river. A fascinating world waits for those who wish to explore it, whether it be by canoe or raft, with a dipnet, or even by snorkeling or SCUBA.



Great blue heron



River cooter

CHAPTER SEVEN

Altered Habitats

Man-made changes in the environment are not always detrimental to wildlife. Man has created openings in large expanses of forest for farming and established bodies of water where there were none before. In the New River Gorge National River, habitats now exist that were not here 200 years ago. In the southern section near Sandstone Falls are areas of farmland and old fields. Often these-habitats have some introduced tree species associated with them, such as apple, mulberry or Chinese chestnut. These areas boast a wide variety of wildflowers like deptford pink, ox-eye daisy, golden-rod, St. John's wort, bergamot and butterflyweed.

Old fields represent a 'successional' stage of a forest. First, the forests were cleared and the areas were fanned or homesteaded. Now, they are abandoned and grasses and shrubs which grow well in open sunlight thrive there. The red cedar is one of the first trees to grow in an abandoned field. It provides shade under which saplings of mixed hardwood forest species will grow. Eventually, they will replace the cedars and the forest will revert to its original state.

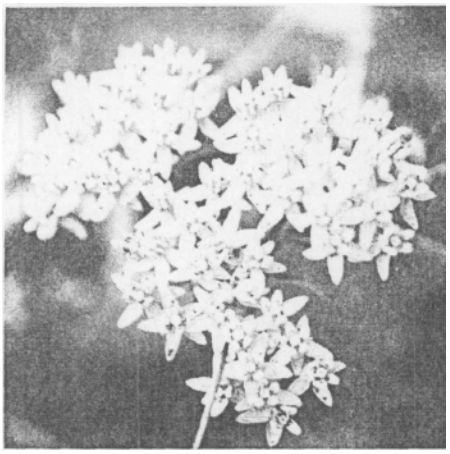
Old fields provide habitat for birds and animals that might not occur in the gorge were it not for man's alterations. Eastern meadowlarks, bluebirds, cowbirds, mourning doves, field sparrows, yellow-breasted chats and robins are some of the birds that thrive in open habitats. Old fields are used by meadow voles, relatives of the forest-dwelling red-backed voles discussed in Chapter 3. Red fox hunt cottontail rabbits, mice and woodchucks in these areas.

Roadsides and railroad right-of-ways are other man-made habitats. They act as avenues for dispersal of plants and animals, as does the river, although on a much shorter time scale. Roadside wildflowers found

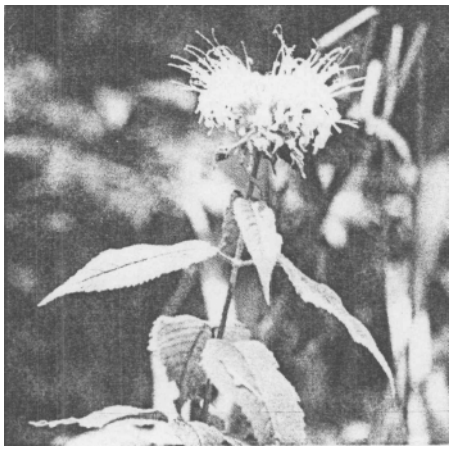


Red fox

Butterfly weed

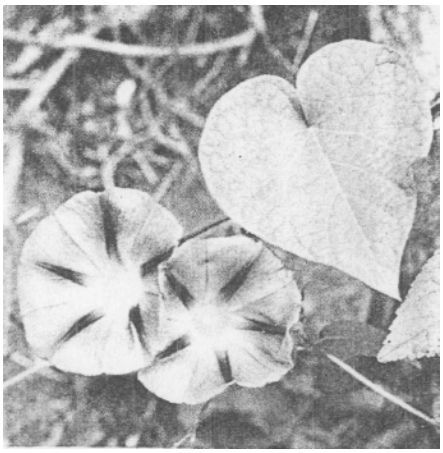


Bergamot



Woodchuck





Morning glory

here include chicory, daisy fleabane, morning glory, butterflyweed, purple milkweed, everlasting pea, mal-low, teasel, red clover, burdock, pokeweed and wingstem. Associating with these plants and habitat types are alfalfa, sulfur and monarch butterflies, and other interesting in-sects like the praying mantis and milkweed bug.

Throughout the gorge, road-sides which border sandstone cliffs may provide suitable substrates for hairy lip fern, fire pink and moss pink.

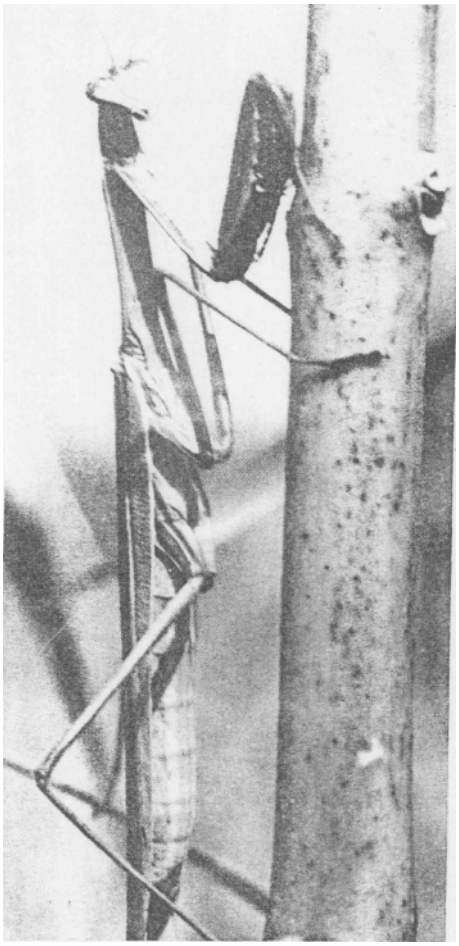
Construction sites and strip mines create some habitat for certain wildflowers, such as common mullein. However, if not supervised carefully, runoff from these sites may add silt, machine oils and contaminants to the river ecosystem. Strip mines often produce acid run-off which can destroy the fragile insect and fish communities found in the small tributary streams. But, new species will colonize these areas once they are properly reclaimed. Grasshopper sparrows and homed larks may inhabit the grassy areas. Small temporary ponds may form in abandoned ditches. These can nur-ture typical wetland plants such as cattails and may become breeding ponds for various species of am-



Fire pink

phibians. A reclaimed strip mine like this exists above the old mining town of Caperton.

During the mining activity of the past 100 years, many drift mines were driven into the walls of the gorge. Some of those abandoned



Praying mantis

Cattail marsh





Pipestrel bat



Hooded warbler

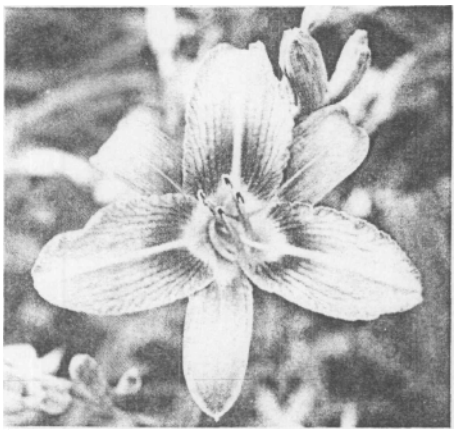


Burreed

mines are now home to eastern pipistrel bats and possibly other species as well.

Where man goes, he often brings new species of plants and animals. Some are probably harmless to the natural community. Abandoned town sites and graveyards support once cultivated plants and trees which continue to persist. These include daffodils, bleeding hearts, periwinkles and pawlownia. However, negative impacts do occur. Kudzu vine, originally from Asia, now infests areas of the mixed hardwood forest where it chokes the vegetation underneath it. Wild goats,

Day lily



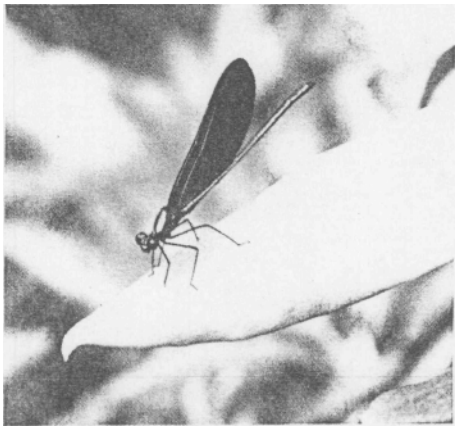
cats and dogs may impact on the native plants and wildlife.

Altered habitats are not always caused by man. In the headwaters of Glade Creek, near Interstate 64, is a small wetland area known as Kate's Branch wetland. Created by beaver, the area became flooded and a marsh habitat was formed where none existed before. Several species of birds, including white-eyed vireos, chimney swifts, hooded warblers, rufous-sided towhees and broad winged hawks have found suitable habitat here as a result of the beavers' activity. Burreed grows here, while pink lady slipper and lily-of-the-valley orchids grow in the now moist woods and bloom in early spring. Colorful species of damselflies with green or blue bodies may be found in mid-summer and sunfish live in the shallow water.

Conclusions

The New River Gorge National River is a beautiful place to visit, abounding with natural beauty and rich in cultural history. It offers a chance to escape to a more simple and natural time. For this reason we should preserve the flora and fauna of the New River Gorge and areas like it. To do this we need to under-stand the interactions that take place between organisms and their environment. As we have seen in this book, the physical characteristics of the habitat determine the compositon of the plant and animal communities found there. Truly, the richest re-sources of West Virginia and the nation in general lie in the great diversity of habitats, plants and animals. Man is not separate from his environment, he is a pan of it; and he must respect and take care of it in order to ensure his own survival.

Damsel fly



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