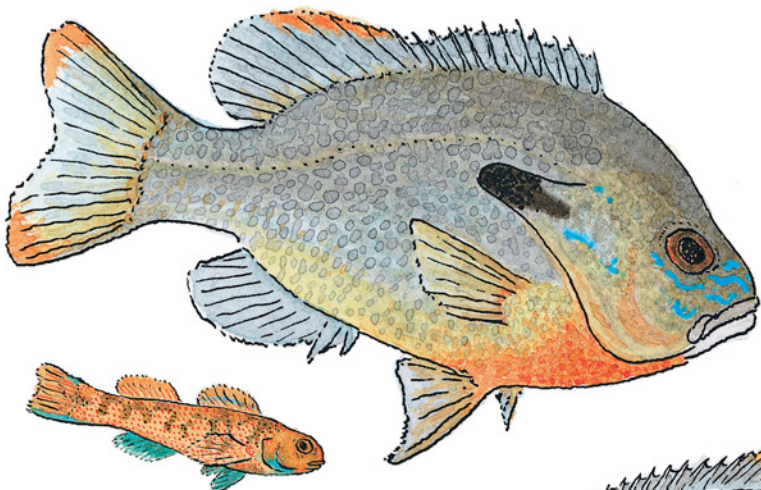


The Mountain Fishes

O F N O R T H C A R O L I N A

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION





The Mountain Fishes

O F N O R T H C A R O L I N A



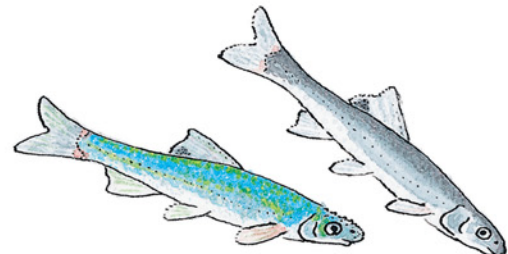
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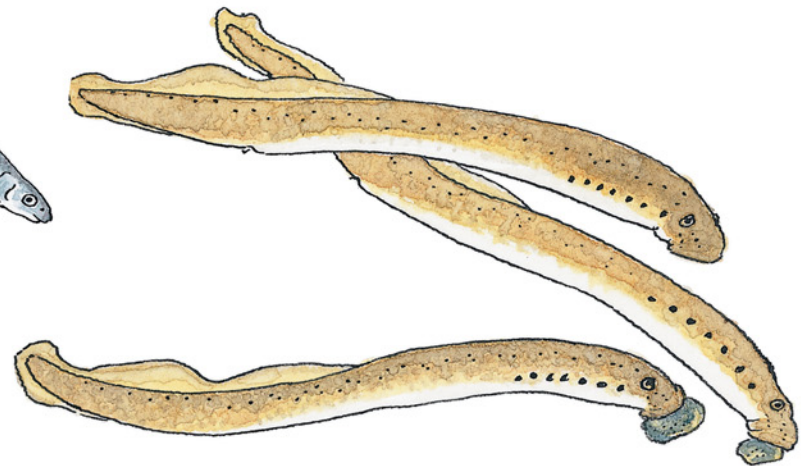


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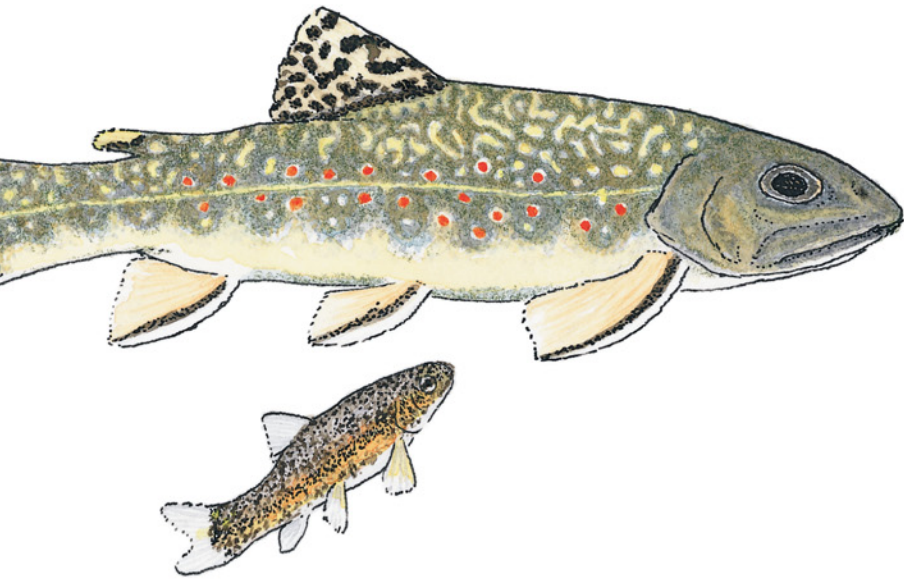
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This booklet and a companion poster may be purchased online at www.ncwildlife.org or by calling 1-866-WILDSHOP (1-866-945-3746).



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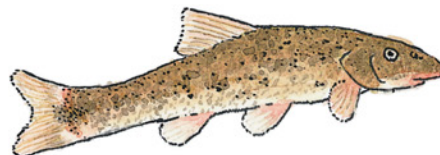
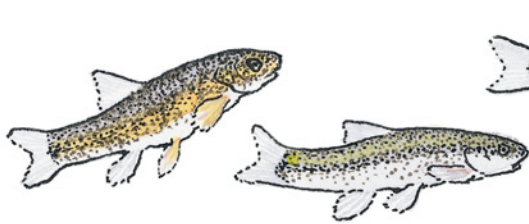
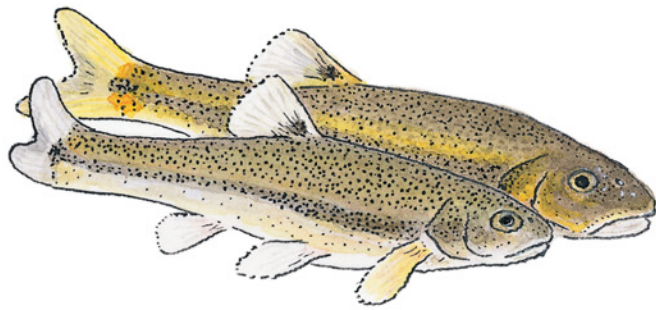
Introduction

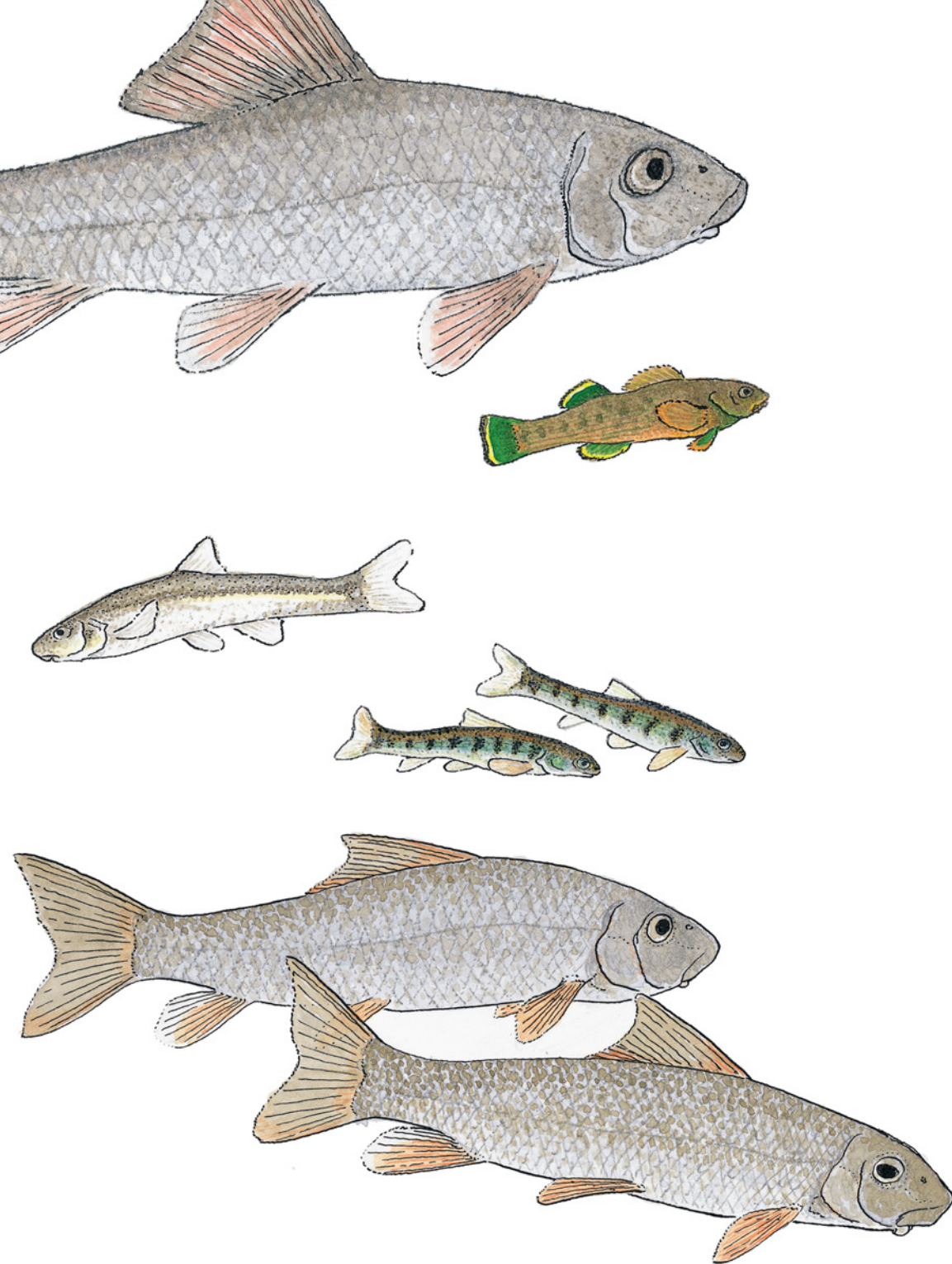
When we think of freshwater fishes, we usually think of the ones that people catch to eat, such as trout, bass and perch. Our streams and rivers, however, are filled with many other fishes that carry out their intricate lives largely unobserved by us. If we look closely enough, they can feed our senses with color and drama.

Some are like underwater engineers when they build special structures for spawning. Others change colors and act out unusual rituals as they breed. Some scavenge debris and insect larvae from creeks and rivers. Others provide bait for sportfishing. Each makes a link in a food chain that can lead to one of us.

This booklet describes 44 freshwater fish species that occur in North Carolina's mountains—about a third of the 139 or so fishes that live in a region described as one of the most diverse in the United States. It complements the “Mountain Fishes of North Carolina” poster, which depicts these fishes and the waters where they occur. A description of the region and the waters that flow there follow this introduction. You'll also find a guide to using this booklet with the poster and an introduction to fish anatomy.

You can find out more about these fishes in the references listed at the end of this booklet. When exploring streams, take care not to disturb the habitat or trample on nests. And please remember that any fish captured for identification should be handled gently, observed quickly in a clean container to minimize handling and returned to the water from which it was collected. Whether common or rare, it plays a role in stream ecology.





The Mountain Region

The Mountain Region is defined for this booklet and poster as the 25 westernmost counties of North Carolina—the counties that make up the Appalachian Mountain Province. This region has an average elevation of 2,700 feet, with some peaks rising to more than 6,000 feet. Its eastern boundary marks the western edge of the Piedmont.

The Mountain Region's cool, clear and fast-running streams flow over bottom layers of rock, gravel or sand. Many wind around large boulders and rocks. They drain into nine major rivers: the Hiwassee; the Little Tennessee; the northernmost reaches of the Savannah; the French Broad; the Watauga; the New; and the westernmost reaches of the Broad, Catawba and Yadkin-Pee Dee. Figures 1 and 2 on pages 4 and 5 show the Mountain Region's river basins—the drainage areas of its major rivers.

Freshwater fishes live in these natural waterways and in ponds and manmade reservoirs. Ponds and manmade reservoirs consist of still or standing water, but most mountain waters consist of moving or flowing water. The word "stream" refers to flowing water, and it is used here to describe both rivers and creeks. Rivers are long streams that are at least 30 meters (98 feet) wide; creeks may be very narrow or up to that width.

WHERE MOUNTAIN WATERS FLOW

The Eastern Continental Divide, which roughly follows the Appalachian Mountains, divides the region's moving waters into two groups: those that empty into the Gulf of Mexico and those that empty into the Atlantic Ocean.

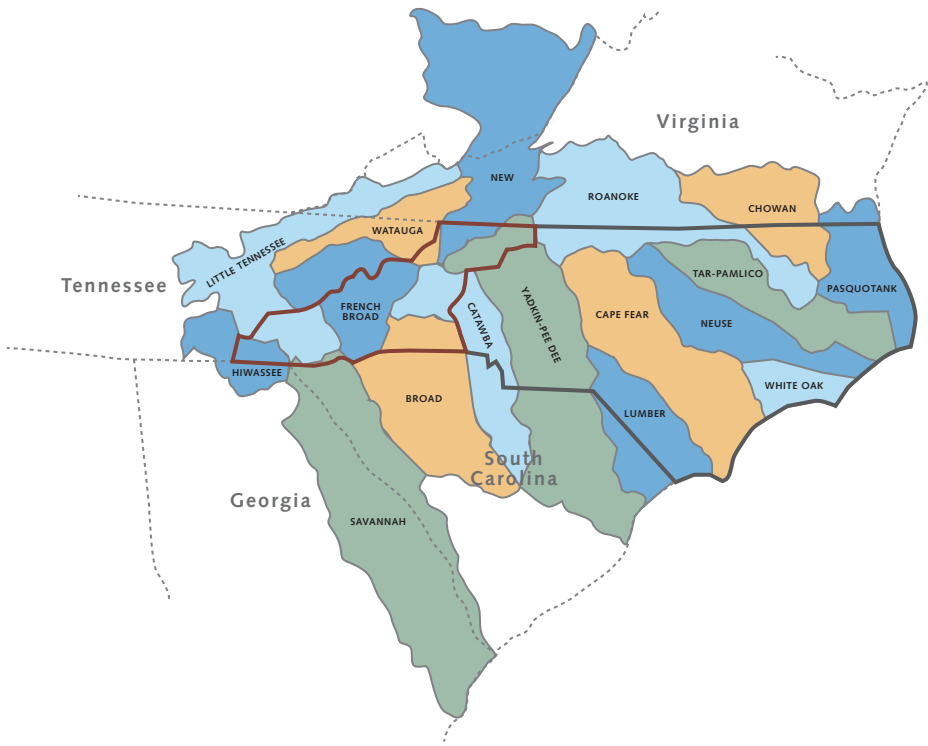


Figure 1. North Carolina's River Basins

Gulf of Mexico The New River heads north into Virginia. There it flows into the Kanawha River and then the Ohio and the Mississippi, which flows into the Gulf of Mexico. Six other mountain rivers flow west and southwest into the Tennessee River and are thus part of the Tennessee drainage that flows to the Gulf: The Hiwassee and the Little Tennessee enter the Tennessee River directly, while the Pigeon and the Toe join the French Broad to flow to the Tennessee. The Watauga flows to the Holston River in Tennessee. The Holston and the French Broad combine to form the Tennessee River, which leads to the Ohio and the Mississippi.

Atlantic Slope The rivers and their tributaries in the Mountain Region that flow east and southeast empty into the Atlantic Ocean and are thus part of the Atlantic slope. They include the streams in the westernmost reaches of the Yadkin-Pee Dee, Catawba and Broad river basins, which together reach the Atlantic via the Santee River in South Carolina. The Atlantic slope waters in the region also include some small streams in the northernmost reaches of the Savannah River basin.

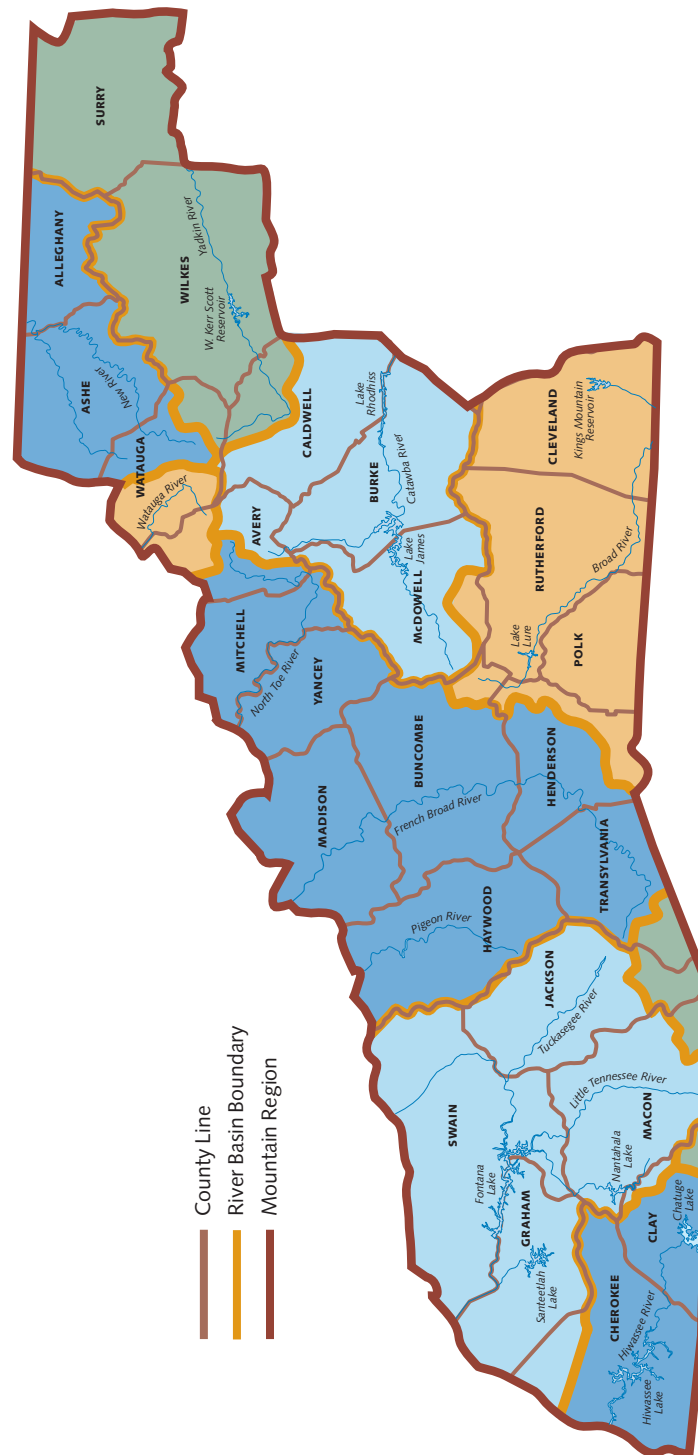
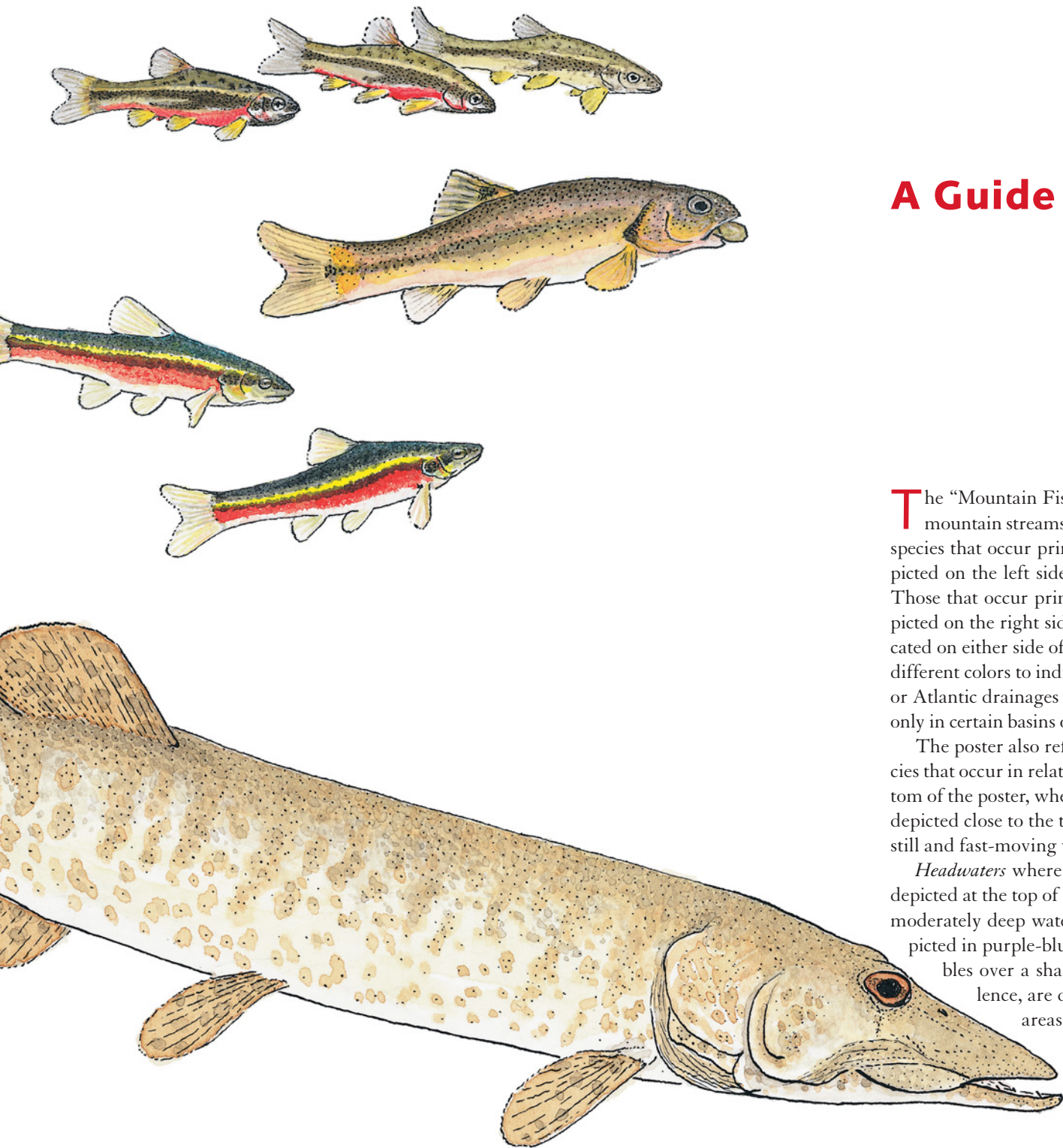


Figure 2. Rivers, River Basins and Counties in the Appalachian Mountain Region



A Guide to the Poster

The “Mountain Fishes of North Carolina” poster reflects the flow of mountain streams to the Gulf of Mexico and the Atlantic Ocean. Fish species that occur primarily in the streams draining to the Gulf are depicted on the left side of the rocks and boulders that divide the poster. Those that occur primarily in the streams of the Atlantic slope are depicted on the right side. Species that can occur in either drainage are located on either side of the rocks. The names of the fishes appear in three different colors to indicate which ones occur in either the Gulf of Mexico or Atlantic drainages and which ones occur in both. A few species dwell only in certain basins or streams as noted later in this booklet.

The poster also reflects the habitats in which these fishes occur. Species that occur in relatively large, deep streams are depicted near the bottom of the poster, whereas those that occur in small, shallow streams are depicted close to the top. Likewise, the poster depicts areas of relatively still and fast-moving water.

Headwaters where mountain streams begin as brooks or torrents are depicted at the top of the poster in pale gray-green. *Runs* of fast-moving, moderately deep water over a relatively smooth stream bottom are depicted in purple-blue tones on the poster. *Riffles* where the water tumbles over a shallow, rough stream bottom, creating some turbulence, are depicted in yellow-green tones. *Pools*—the deeper areas of streams where the current is slow and where sediments and organic matter have settled to the

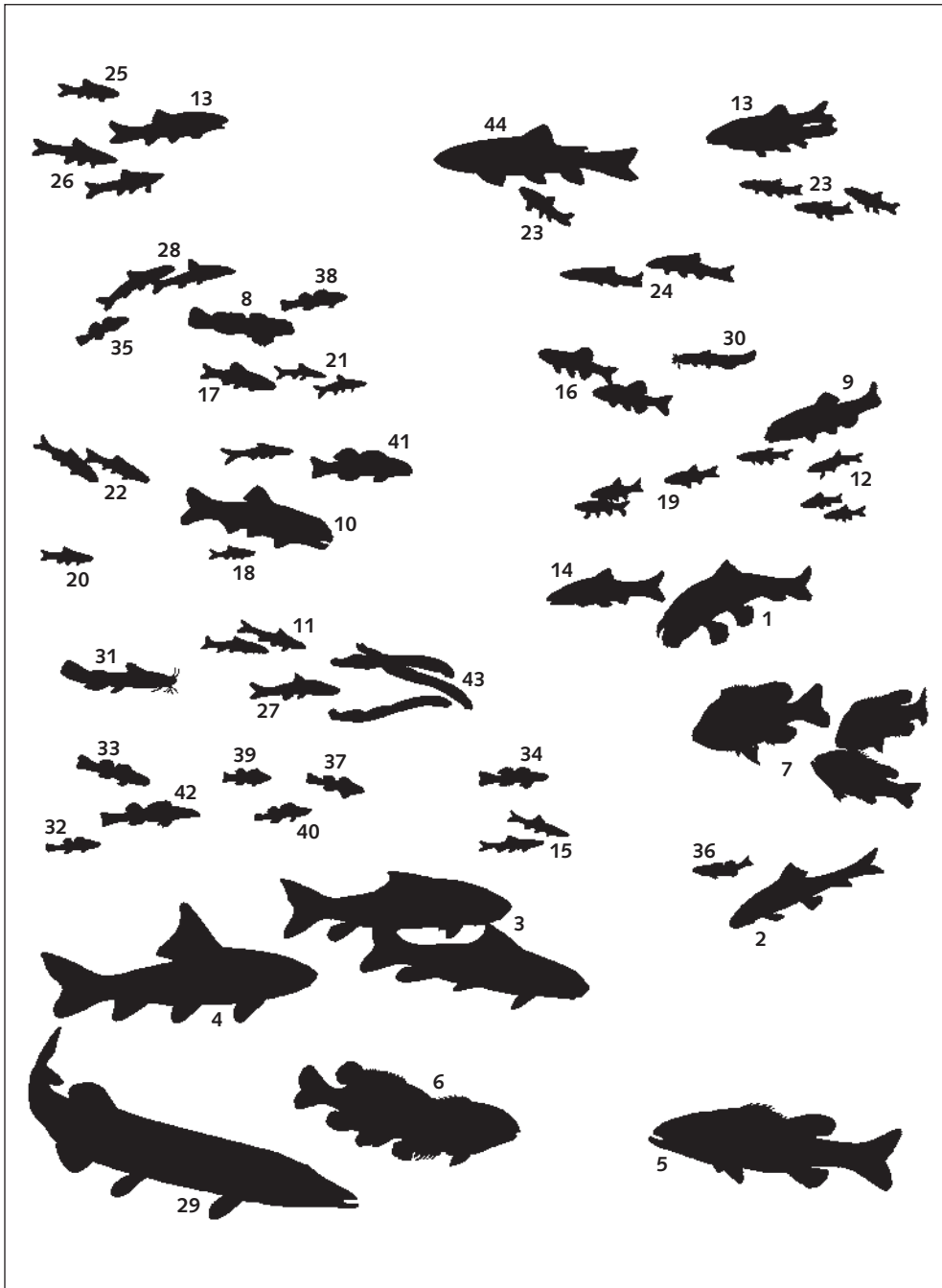


Figure 3. Description Numbers for Poster Illustrations

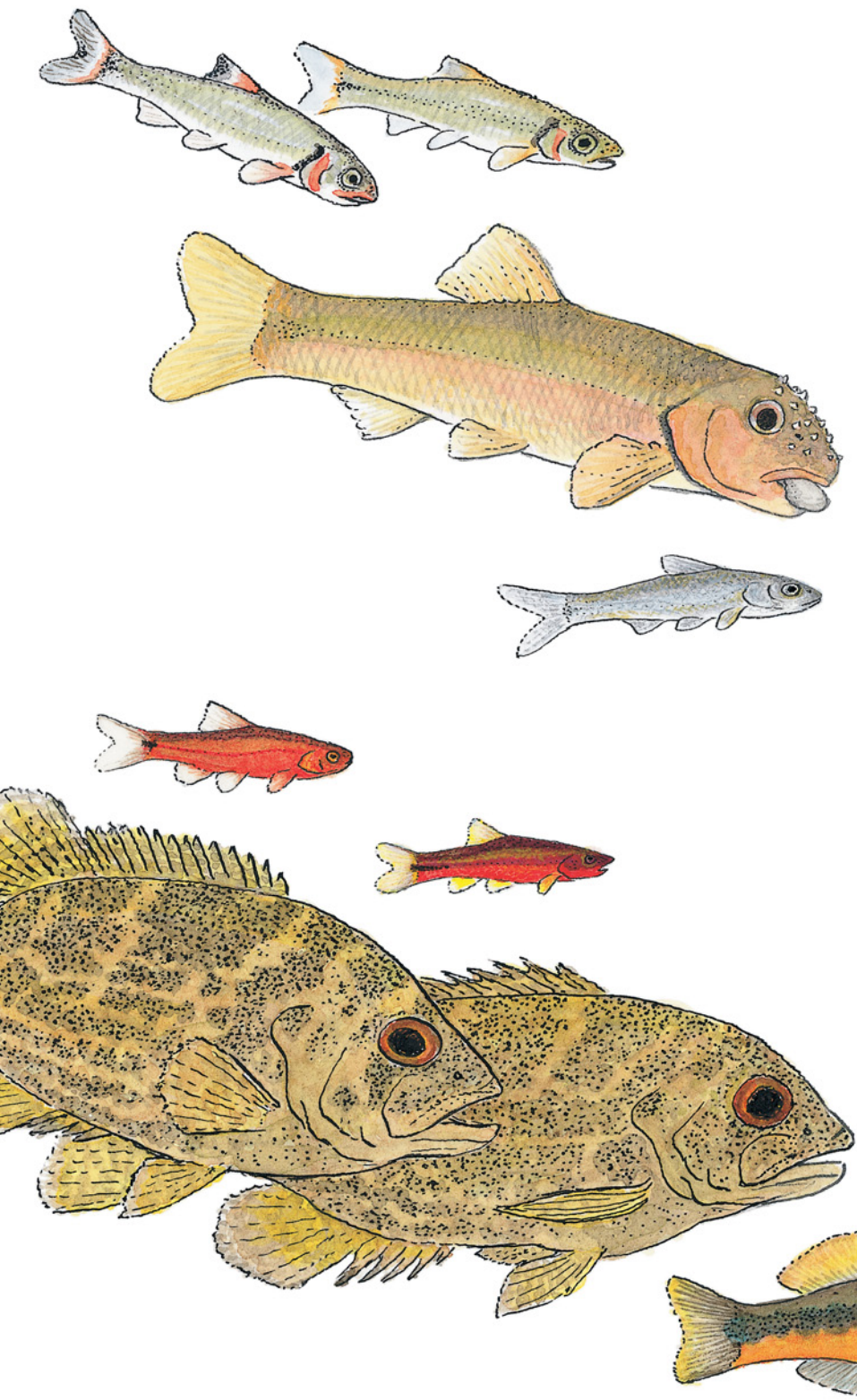
bottom—are depicted in pale-blue tones. The tan tones indicate areas of change where flowing pools turn into gentle runs and moderate riffles.

For example, one small group of darters (the banded, olive, redline, greenside, Swannanoa and sharphead darters) is pictured on the left side of the boulders because each species in the group occurs in streams that drain to the Gulf of Mexico. They are grouped together because all of them occur in streams that drain to the Tennessee River. They are between the bottom and middle of the poster because they live in medium to large streams. And they are placed on a yellow-green background because they occur in fast riffles.

Figure 3 indicates the placement of each species on the poster. Each number on Figure 3 matches a description in this booklet. You can also use the alphabetical index at the back of the booklet to match each species name to its description.

Description Numbers and Common Names

- | | |
|-------------------------------|----------------------------------|
| 1 Northern hog sucker | 23 Blacknose dace |
| 2 Striped jumprock | 24 Longnose dace |
| 3 Black redhorse | 25 Mountain redbelly dace |
| 4 Sicklefins redhorse | 26 Rosyside dace |
| 5 Smallmouth bass | 27 Fatlips minnow |
| 6 Rock bass | 28 Kanawha minnow |
| 7 Redbreast sunfish | 29 Muskellunge |
| 8 Mottled sculpin | 30 Margined madtom |
| 9 Bluehead chub | 31 Stonecat |
| 10 River chub | 32 Banded darter |
| 11 Blotched chub | 33 Greenside darter |
| 12 Highback chub | 34 Tuckasegee darter |
| 13 Creek chub | 35 Kanawha darter |
| 14 Central stoneroller | 36 Seagreen darter |
| 15 Spotfin chub | 37 Swannanoa darter |
| 16 Fieryblack shiner | 38 Greenfin darter |
| 17 Whitetail shiner | 39 Sharphead darter |
| 18 Saffron shiner | 40 Redline darter |
| 19 Greenhead shiner | 41 Tangerine darter |
| 20 Tennessee shiner | 42 Olive darter |
| 21 Mirror shiner | 43 Mountain brook lamprey |
| 22 Warpaint shiner | 44 Brook trout |



What Makes a Fish?

A fish is a vertebrate (an animal with a backbone) that spends its life in water and breathes through gills. Fishes basically have a head, body and usually fins, which they use for movement. Most of the freshwater fishes in North Carolina have a skeleton and an outside covering of thin, flexible scales. A bony flap, the opercle or operculum, protects the gills. A narrow area just before the tail fin, called the caudal peduncle, transfers the sway of the body to the tail fin, giving the fish a forward thrust as it moves.

Most freshwater fishes have a dorsal fin on the back, an anal fin and two sets of paired fins beneath. Fins have rays and spines that support them. The number and kind of spines and rays are some of the characteristics that biologists use to identify fish. The lateral line located along the mid-side of most fish species consists of ducts that extend from beneath the skin outward to pores in the scales (or in the skin if the fish lacks scales). These ducts have very sensitive nerve endings that can detect delicate changes in water pressure.

Although fishes don't have ears and cannot hear, the lateral-line system gives them the ability to detect the intensity and duration of changes in water pressure. This sensory information, along with sight, smell, taste and touch, helps a fish to respond to its ever-shifting watery environment. Figures 4a and 4b on page 13 show these characteristics and their placement on most fish. Lampreys are an exception: They are classified as primitive fish even though they don't have paired fins, scales, jaws, paired nostrils or bones.

The 44 species depicted in this booklet and on the poster represent the nine different fish families that are native to North Carolina's Mountain Region.

The poster depicts a time in spring when many species spawn and display their breeding colors. Usually it is the male that changes color during the breeding season. For species depicted in breeding colors, male (♂) and female (♀) symbols indicate which sex is pictured on the poster.

The descriptions that begin on page 15 are categorized by family, and they include the common and scientific names for each fish. The scientific name indicates the genus to which a fish belongs and its species name. A genus is a grouping of closely related species within a family and may contain from one to many species.

A range notation indicates the river basin or basins where each species occurs within the state's Mountain Region. If the range extends across or beyond the region, however, or if it is confined to a specific river, that is noted. The range notation also indicates if a species is native to some waters but introduced to others.

The length notation in each description refers to the total length of the fish, from the tip of the snout to the caudal fin.

The descriptions that follow also indicate which species are federally or state listed as threatened, endangered or of special concern. Fish populations can be affected adversely by many factors. Misuse of agricultural and industrial chemicals threaten the waterways where fish live. Runoff and sediment from urban development also affect water quality. And dams that impede streams affect the movement and spawning of some species.

You can help keep fish populations healthy by working to establish buffer areas near the streams in your community. These buffer areas can be planted to help filter runoff and keep soil in place. And by being cautious about using fertilizers and pesticides in your own yard, you can reduce pollution in nearby streams. Becoming involved in a local organization that focuses on water quality is another way to conserve aquatic habitats and ensure that North Carolina's fishes continue to thrive. For additional information, visit the Wildlife Commission's Web site at www.ncwildlife.org and link to "Wildlife Species & Conservation."

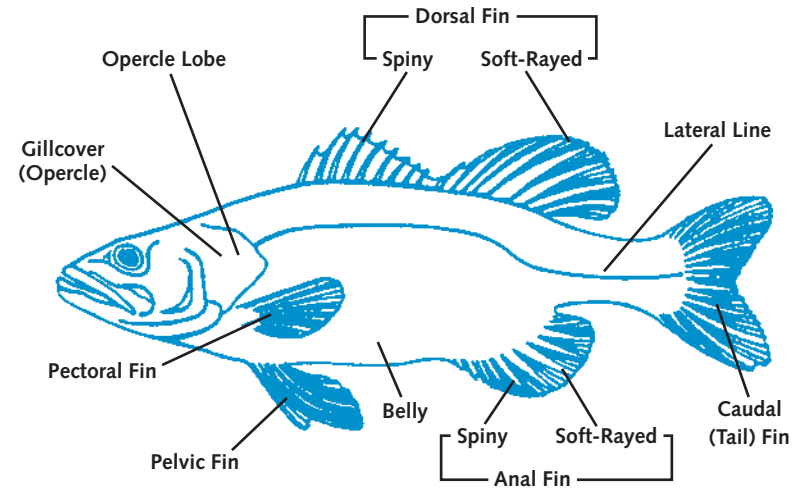


Figure 4a. Fish External Body Parts—A General Overview

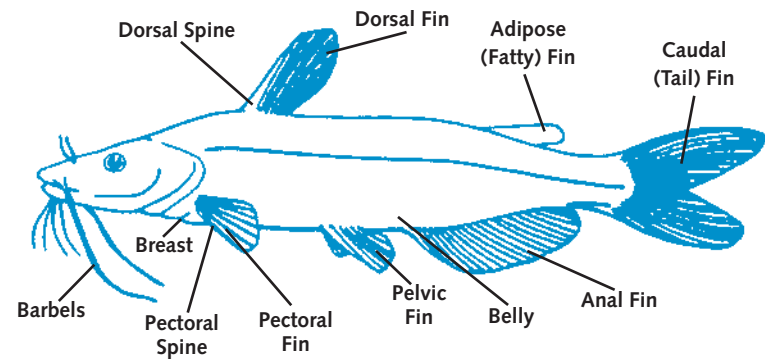
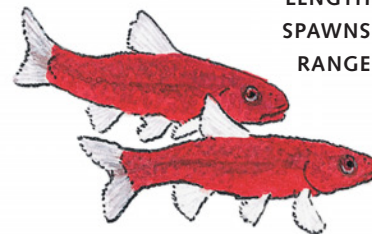
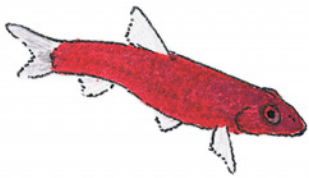
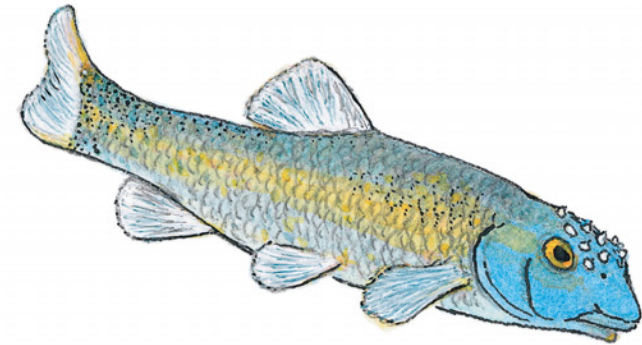
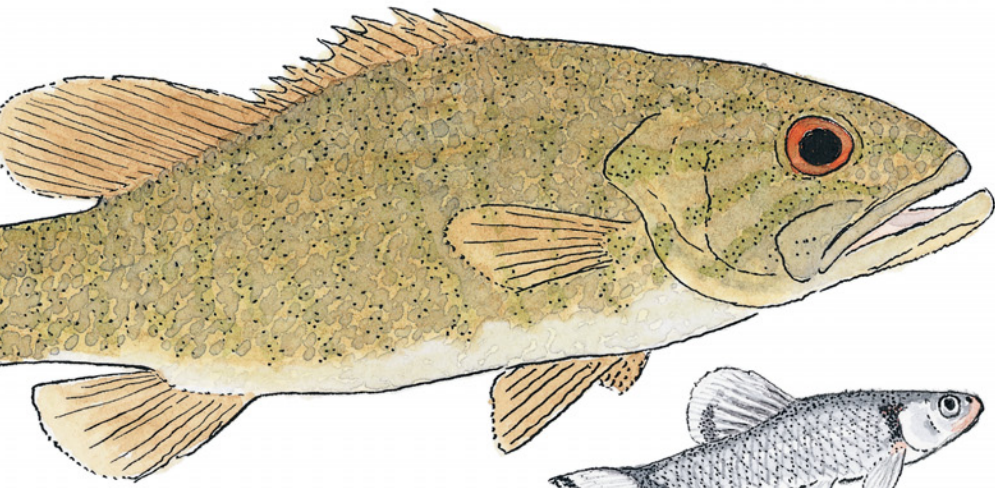


Figure 4b. Fish External Body Parts—Body Shape Variation

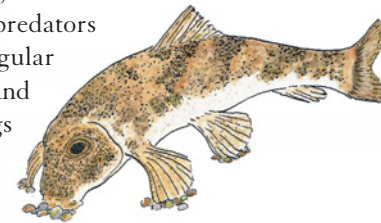


The Fishes

SUCKERS (FAMILY CATOSTOMIDAE)

Fifteen species in the sucker family occur in the Mountain Region. These relatively large fish have a mouth that is usually located on the underside of the head, spineless pelvic and pectoral fins attached low on the body and thick, fleshy lips. They have just one dorsal fin, and the caudal fin is forked. Although some species can reach a length of about 40 inches, most are less than 24 inches long. They generally feed on aquatic insects and other invertebrates. Most occur in the riffles and runs of small to large rivers over rubble, gravel or sand.

- 1 The northern hog sucker (*Hypentelium nigricans*) is easy to recognize because of its feeding habits. When feeding, it braces itself on its extended pectoral and pelvic fins and arches its back to root for food in stream bottoms. During this rapid digging, it voids sand through its gill openings and watches for predators through eyes placed high on its large, rectangular head. Three to six dark saddles mark the side and back of its brown body. It eats algae, fish eggs and small mollusks as well as aquatic insects.



LENGTH: To 18 inches

SPAWNS: Late March to early June

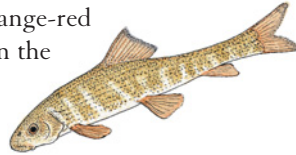
RANGE: Mountain and Piedmont regions

2 The striped jumprock (*Scartomyzon rupiscartes*) is another widespread fish. Jumprocks usually have dark and light stripes on the body, and this species shows those markings well. Its light-brown body is marked by black- or brown-and-white stripes and dull orange-red ventral fins. Jumprocks can sometimes be found in the fast, deep water near bedrock and boulders.

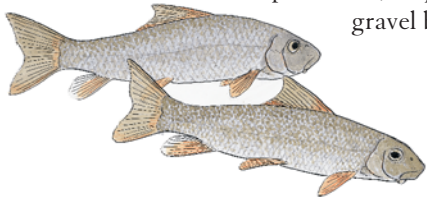
LENGTH: 6 to 11 inches

SPAWNS: March to May

RANGE: Broad and Catawba; introduced to the Yadkin



3 The black redhorse (*Moxostoma duquesnei*) is one of seven redhorse species that occur in the region. It can be found in the deeper runs and pools of rivers and creeks and occasionally in lakes. Its pectoral, pelvic and anal fins are light orange. Because it is sensitive to silt and other pollutants, its presence indicates clean water. It spawns on gravel beds in riffle areas.



LENGTH: 8 to 20 inches

SPAWNS: April to May

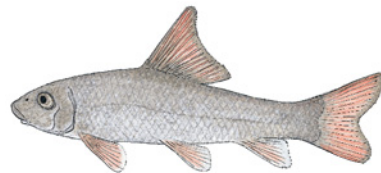
RANGE: Hiwassee, Little Tennessee, French Broad and Watauga

4 The distinctive sicklefin redhorse (*Moxostoma* sp.) has been discovered only in recent years. It has yet to be described formally in scientific literature or assigned a scientific species name. Although it may be common in some sites, its entire range is small and restricted by dams. The sicklefin spawns in moderate to fast current over gravel and cobble, and it feeds mainly on small insects and microcrustaceans. It is federally listed as a species of concern.

LENGTH: 13 to 21 inches

SPAWNS: Late April to early May

RANGE: Little Tennessee and Hiwassee



Special Concern

SUNFISHES (FAMILY CENTRARCHIDAE)

Fourteen different species of sunfishes occur in the region, including those commonly known as sunfishes, black basses and crappies. Among them are several game fish such as redbreast sunfish, largemouth bass and bluegill. All have a deep, fleshy body. The dorsal fin consists of a front portion with stiff spines and a rear portion with soft rays. They

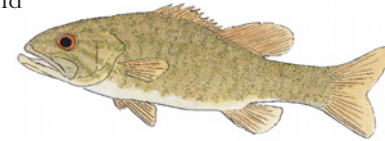
often occur in deep water around boulders, tree roots or branches, where they feed upon crayfishes, aquatic insects and smaller fishes.

5 The smallmouth bass (*Micropterus dolomieu*) has a greenish or bronze back and dark bars on the side of its head. Though it doesn't grow as large as the largemouth bass, it is an important game fish that is commonly found in Mountain Region waters. The male fans out a nest 2 to 4 feet wide in gravel, usually in water that's 1 to 4 feet deep. He may spawn with several females, and he guards the nest until the eggs hatch and the fry (young fish) leave.

LENGTH: 7.9 to 27 inches

SPAWNS: May

RANGE: Native to the New, Hiwassee, Little Tennessee, French Broad and Watauga; introduced to the Atlantic Slope

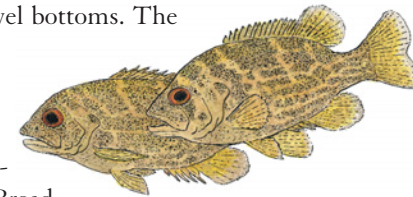


6 The rock bass (*Ambloplites rupestris*) has a short, dark-olive-brown body and a red eye, which is why it is often called the "redesteye." The dark spots on its side seem to form rows. It inhabits cool to warm creeks and rivers that have rock and gravel bottoms. The rock bass strikes a variety of fishing lures.

LENGTH: 5.7 to 16.9 inches

SPAWNS: May and June

RANGE: Native to the New, Hiwassee, Little Tennessee, French Broad and Watauga; introduced to the Broad, Catawba and Yadkin

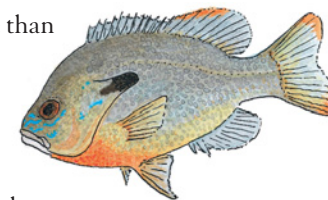


7 The redbreast sunfish (*Lepomis auritus*) is known as "robin" in many areas because of the male's bright-orange throat and belly. When breeding, the male's greenish-gray upper body takes on a sky-blue cast. The female has a yellow throat and belly, and her body is a duller green than that of the male. Redbreasts nest near cover such as stumps and logs. They seldom weigh more than a pound but are known to be especially tasty.

LENGTH: 2.4 to 9.4 inches

SPAWN: April to June over sandy areas

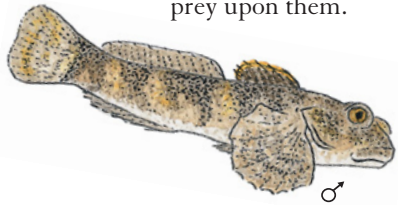
RANGE: Native to the Broad, Catawba and Yadkin-Pee Dee; introduced across the state



SCULPINS (FAMILY COTTIDAE)

Two sculpins occur in the Mountain Region. (A third newly recognized species, *Cottus caeruleomentum*, occurs only in the Dan River of the Piedmont Region.) They are small with wide heads and slender, mottled-brown bodies that taper to a narrow caudal peduncle. They have big eyes and mouths, two dorsal fins—one spiny and one soft—that run the length of the back, and a long anal fin. Sculpins occur only in clean, clear streams with rock shelters; their presence indicates stream health. They feed on aquatic insects, crustaceans, small fishes and some vegetation. The home range of the banded sculpin (*Cottus caroliniae*) barely enters North Carolina, and the species is therefore listed as threatened here.

- 8 The mottled sculpin (*Cottus bairdii*) is quite common in the mountains but rarely seen. It usually dwells on stream bottoms where its mottled color provides camouflage. The male establishes a territory around a rock or log where females deposit their eggs on the underside or in debris. The young grow rapidly, but snakes and other fishes prey upon them.



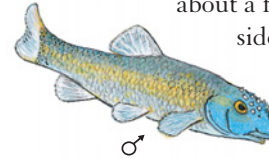
LENGTH: 2 to 6 inches
SPAWN: January to May
RANGE: Native to the New, Hiwassee, Little Tennessee, French Broad and Watauga; possibly native to the Savannah and Broad

CARPS AND MINNOWS (FAMILY CYPRINIDAE)

The largest and most diverse family of fishes in the world includes 47 species that occur in the Mountain Region. Some are native, but others have been introduced. What makes them alike? Minnows have one dorsal fin, abdominal pelvic fins and cycloid scales that lack small spines. Many have a lateral line. Although they do not have teeth in their mouths, they do have them on bones associated with the gills that lie in their throats. These pharyngeal teeth tear and grind food against a tough pad on the underside of the skull. The species in the Mountain Region include many fascinating small fish known commonly as chubs, shiners, dace and minnows. Their common names do not necessarily indicate the genus grouping to which they belong.

Minnows in the genus *Nocomis* are large in comparison to other minnows. They have stout, bronze-colored bodies. The scales on their backs and sides are edged in black, which gives them a crosshatch pattern, and their large mouths have a small barbel (a fleshy projection) in the corner. Their reproductive habits make them especially interesting because of the males' physical changes and nest-building abilities. They prefer clear, cool waters over a rocky bottom layer. They feed on insects, small crustaceans, crayfishes, snails and small fishes.

- 9 The bluehead chub (*Nocomis leptcephalus*) has a short, rounded snout. When breeding, the male develops a blue head with a large hump on the top where hard tubercles protrude. He carries gravel and stones in his mouth to build a mounded nest in water that's about a foot deep. As he grasps a receptive female between his side and the upper surface of one pectoral fin, they release milt and eggs into a trench in the nest. The nest attracts smaller fish species that congregate around it to spawn and feed.

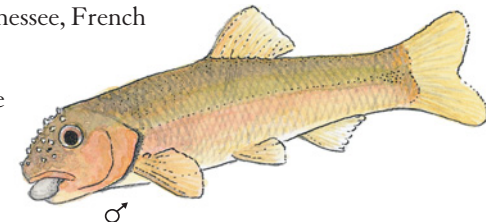


LENGTH: 2.9 to 10.2 inches
SPAWNS: May and June
RANGE: Native to the Catawba, Broad and Yadkin-Pee Dee; introduced to the New, Little Tennessee and French Broad

- 10 The river chub (*Nocomis micropogon*) is a bit larger and has a longer snout than the bluehead, but it also develops a hump and tubercles on its head when breeding. The breeding male's head and lower body are pink-blue, and its fins are red or orange. Like the bluehead chub male, the river chub male builds a gravel nest mound. Its mounds can be 3 feet or more across and 6 to 7 inches deep. It likewise grasps the female when breeding.

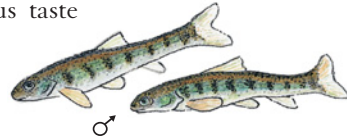
LENGTH: 3.6 to 12.6 inches
SPAWNS: May and June
RANGE: Hiwassee, Little Tennessee, French Broad and Watauga

Some other minnows in the Mountain Region are also commonly known as chubs, but they belong to different genera.



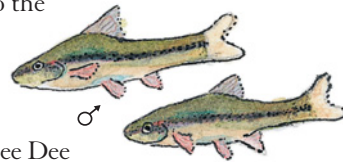
11 The blotched chub (*Erimystax insignis*) is generally uncommon, but it may be populous in certain habitats that suit it. It prefers the gravel riffles and runs of small- to medium-sized rivers with strong currents. An iridescent green-yellow stripe marks its side along with seven to nine dark-gray or black blotches. As it gropes along on river bottoms, it uses numerous taste buds to find food.

LENGTH: 2.1 to 3.6 inches
SPAWNS: Late spring to early summer
RANGE: Hiwassee and French Broad



12 The highback chub (*Hybopsis hysinotus*) occurs in small creeks to medium-sized rivers with sand or rock bottoms, and it can tolerate somewhat warm and turbid water. Its body has a strong arch, which gives it a highback appearance. It is dark olive above, and a purple or black lateral stripe extends onto the snout. The fins of breeding males are red.

LENGTH: 1.7 to 2.8 inches
SPAWNS: Late spring to mid-summer
RANGE: Broad, Catawba and Yadkin-Pee Dee



13 The creek chub (*Semotilus atromaculatus*) is a common minnow that is often used as bait. It occurs in creeks that have rubble, gravel and sand bottoms. A black spot marks the start of its dorsal fin, and its mid-side is a green-silver color with a dark strip that extends from snout to tail fin. The male builds a nest pit by digging up mouthfuls of gravel at the pit's upstream edge. If he attracts a female to the pit, the pair spawn over it. After covering the eggs with gravel, the male digs another pit downstream. Creek chub nests attract other fish species.



LENGTH: 3 to 10 inches
SPAWNS: late March to early May
RANGE: Mountain and Piedmont regions

14 The central stoneroller (*Campostoma anomalum*) is another common minnow used as bait that builds gravel pits for nesting. The male moves pebbles with his mouth and uses his body to loosen gravel that the current carries downstream. To move large stones, he uses his back and head. The stoneroller occurs in the rocky riffles, runs and

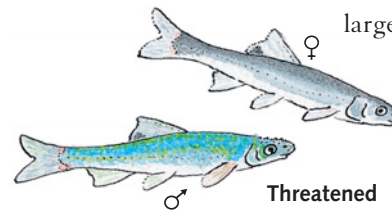
pools of streams with clear, cool water. It uses its blade-like lower lip for scraping algae from rocks. When breeding, the male's tan body turns orange and his lips become white. The upper lip develops a white projection, and extremely sharp tubercles grow on the head and upper body.

LENGTH: 4.8 to 9.4 inches
SPAWNS: April to May
RANGE: Mountain Region



Minnows in the genus *Cyprinella* include several fish commonly known as shiners and one that is often called a chub. They can be difficult to identify, especially as juveniles. They occur in the rocky runs and pools of creeks and small to medium rivers. These fish have distinctive vertical, diamond-shaped scales and a black blotch in the dorsal fin. They eat the larvae and nymphs of flies, gnats and mayflies as well as other aquatic insects. During courtship, they make sounds that may help them to recognize members of their own species. Large males vigorously guard territories along crevices in rocks or logs. Females pass through these territories and deposit their eggs little by little over the long spawning season.

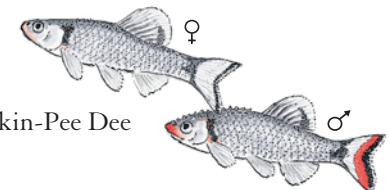
15 The spotfin chub (*Cyprinella monacha*), also known as the turquoise shiner, now occurs only in one river in North Carolina; it is both state and federally listed as threatened. The population is very fragile. Its slender body has a long snout that extends over its mouth, which has a small barbel at each corner. Breeding males have two large white bars on their brilliant blue-green sides and white edges on their dark-blue fins.



LENGTH: 2.6 to 4.2 inches
SPAWNS: mid-May to mid-August
RANGE: Little Tennessee River; formerly in the French Broad

16 The fieryblack shiner (*Cyprinella pyrrhomelas*) has a distinctive red snout and a black bar on its side that's located behind its head. The tail fin has black edging. Adults develop white and red bands on the tail fin.

LENGTH: 1.8 to 4.4 inches
SPAWNS: May and June
RANGE: Broad, Catawba, Yadkin-Pee Dee

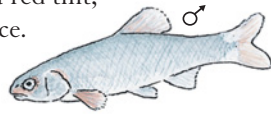


- 17 The whitetail shiner (*Cyprinella galactura*) is fairly common in its range. It can be identified by the two large, creamy-white spots located at the base of its caudal fin. When spawning, the male has a slight color change: Its dorsal fin often takes on a red tint, while its body acquires a blue-and-pink iridescence.

LENGTH: 1.7 to 5.9 inches

SPAWNS: May and June

RANGE: Native to the Hiwassee, Little Tennessee, French Broad and Watauga; introduced to isolated locations in the Savannah, Broad and Catawba



Minnows in the genus *Notropis* are also commonly known as shiners. Scientists are still trying to determine the composition of this genus, which currently includes 22 species that occur in the Mountain Region. Much variety exists among them, but they share a few characteristics: eight dorsal fin rays, scales on the nape that are the same size as those on the upper side, a short intestine and a lack of barbels. Little is known about many of these species. Most spawn in the spring, and their food generally consists of insect larvae, algae and small crustaceans.

- 18 The saffron shiner (*Notropis rubricroceus*) has a black stripe on its side that starts behind its head. Its body has a clear spot at the rear end of the dorsal fin insertion. In breeding season, the male becomes a brilliant red with yellow fins. It prefers creeks that are clear and cold where it feeds upon insects, worms, spiders, plants and algae. The saffron shiner spawns over chub nests and in gravel runs.

LENGTH: 1.9 to 3.3 inches

SPAWNS: mid-May to late July

RANGE: French Broad and New



- 19 The greenhead shiner (*Notropis chlorocephalus*) occurs in the pools and runs of small creeks and streams that have sandy or rocky bottoms. It has a dark lateral stripe and a reddish-brown back and upper side. Breeding males and females are red with bright white fins.

LENGTH: 1.9 to 3 inches

SPAWNS: Spring

RANGE: Catawba River arm of the Santee basin

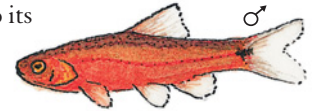


- 20 The Tennessee shiner (*Notropis leuciodus*) is native to the Tennessee drainage, as its name implies. This silvery shiner has black dashes along the lateral line and a distinct black rectangle at the base of the caudal fin. A bright-green stripe marks its upper side. Dark wavy lines also occur on its back and upper side. When breeding, the male acquires an iridescent red tint to its body and fins. It spawns over chub nests.

LENGTH: 1.7 to 3.2 inches

SPAWNS: mid-May–late June

RANGE: Hiwassee, Little Tennessee, French Broad and Watauga; possibly introduced in the New



- 21 The mirror shiner (*Notropis spectrunculus*) occurs in the gentle runs or pools of large creeks. It has a slender body and a broad head with a rounded snout and a small mouth. Its eyes are directed somewhat upward. No scales occur on the nape, and a black, wedge-shaped spot appears on the caudal fin. Breeding males have red-orange fins with a white edge.

LENGTH: 1.7 to 3 inches

SPAWNS: Unknown, probably spring

RANGE: Hiwassee, Little Tennessee, French Broad and Watauga



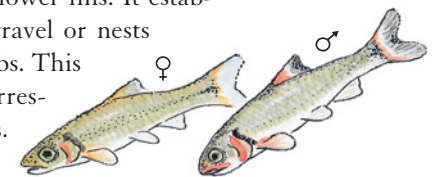
Another fish in the Mountain Region that is commonly known as a shiner belongs to a different genus:

- 22 The warpaint shiner (*Luxiulus coccogenis*) is a large minnow with a deep body that has large lateral scales and a red bar on its opercle. A black slash occurs on the side behind the opercle, and a dark stripe marks the edge of each caudal and dorsal fin. The breeding male has a red snout, red upper lip and white lower fins. It establishes a territory for spawning over gravel or nests built by other minnows, especially chubs. This shiner feeds at the surface on fallen terrestrial insects or emerging aquatic insects.

LENGTH: 3 to 5.9 inches

SPAWNS: mid-May–mid-July

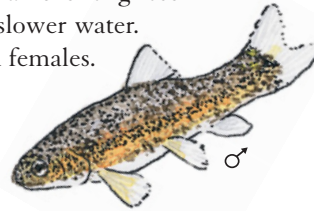
RANGE: Native to the Hiwassee, Little Tennessee, French Broad and Watauga; introduced to the New and mountainous reaches of the Broad, Catawba and Yadkin



Two minnows in the genus *Rhinichthys* occur throughout the western reaches of the Mountain Region. Commonly known as dace, they have pointed snouts and cylindrical bodies with fine scales. Their bodies are distinctively dark above and light below, usually with black speckles. They prefer small to medium-sized creeks with cool, flowing water over gravel or rock. Small aquatic insects, crustaceans and annelid worms make up their diet.

- 23 The blacknose dace (*Rhinichthys atratulus*) has a black stripe on its side that runs from its snout to its tail and separates its brownish back from its pale lower half. It is chubbier than the longnose dace and usually prefers smaller streams and slower water. The male is territorial and spawns with several females.

LENGTH: 1.7 to 3.9 inches
SPAWNS: April to June
RANGE: Mountain Region



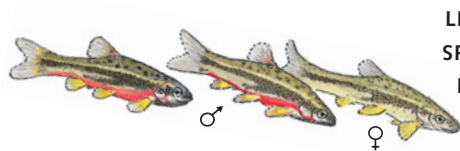
- 24 The longnose dace (*Rhinichthys cataractae*) is larger and more slender than the blacknose and has a fleshy snout. The black stripe on its side is usually not distinct, especially in large specimens. It prefers bigger streams and faster currents than the blacknose dace.



LENGTH: 2.9 to 6.3 inches
SPAWNS: April to June
RANGE: Mountain Region

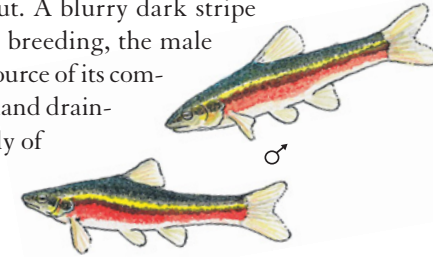
Some other minnows in the Mountain Region are also commonly known as dace, but they belong to different genera. These fishes occur in clear headwater creeks and small rivers, usually in pools and runs over sand, gravel or rock.

- 25 The mountain redbelly dace (*Phoxinus oreas*) is a small fish with tiny embedded scales that are difficult to see. Large black spots mark its back and upper side, and a broken black stripe extends along its sides. In breeding season, the belly, lower head and dorsal fin of breeding males and females turn a brilliant red, and males have a black chin and breast and yellow fins. This dace spawns over chub nests. It feeds on algae and small invertebrates.



LENGTH: 1.7 to 3.1 inches
SPAWNS: March to June
RANGE: Native to the New; introduced to the northern Piedmont

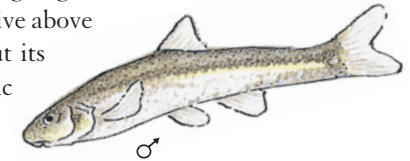
- 26 The rosyside dace (*Clinostomus funduloides*) can be recognized by its large, slanting mouth and pointed snout. A blurry dark stripe marks the side of its olive body. When breeding, the male develops a bright-red lower side—the source of its common name. It is quite common in the upland drainages where it occurs. Diet consists mostly of aquatic and terrestrial insects.



LENGTH: 2.2 to 4.3 inches
SPAWNS: early April to late June
RANGE: New, Broad, Catawba and Yadkin; northern Piedmont Region (The smoky dace, a closely related species, occurs in the Little Tennessee and Hiwassee.)

Two minnows in the genus *Phenacobius* occur in limited areas within the Mountain Region. They are known as “suckermouth minnows” because their mouths are completely beneath their snouts. They occur in the runs and riffles of clear, mountain creeks and small- to medium-sized rivers over gravel, rubble and boulders.

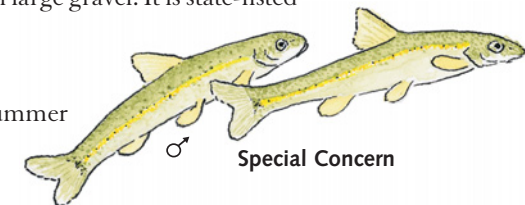
- 27 The fatlips minnow (*Phenacobius crassilabrum*) has a long, cylindrical body and a round snout. Papillae protrude from its large, fleshy lips. A dark lateral stripe topped by a light-green streak divides its background colors of dark olive above and silver below. Little is known about its habits, but it probably feeds on aquatic insects, worms and snails.



LENGTH: 2.4 to 4.2 inches
SPAWNS: Spring to early summer
RANGE: Little Tennessee and French Broad

- 28 The Kanawha minnow (*Phenacobius teretulus*) has the same shape and feeding habits as the fatlips minnow, but its body is gray-brown to olive and lacks the light-green streak above the lateral stripe. The Kanawha minnow is restricted to the northwest corner of North Carolina where it inhabits runs with large gravel. It is state-listed as a species of special concern.

LENGTH: 2.4 to 4.2 inches
SPAWNS: Spring to early summer
RANGE: New

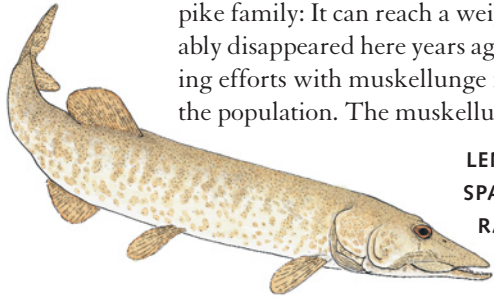


Special Concern

PIKES (FAMILY ESOCIDAE)

Commonly known as pickerels and pikes, members of this family can be identified by their elongated bodies, duck-like snouts with sharp teeth, forked caudal fins and complete lateral lines. Their spineless dorsal and anal fins are located toward the body's rear. These predatory fishes hide in aquatic vegetation and dart out to capture fishes and other vertebrates.

- 29 The muskellunge (*Esox masquinongy*) is a popular sport fish often stocked in lakes, reservoirs and rivers where it occurs in deep pools and swift water. It is highly predatory and the largest member of the pike family: It can reach a weight of almost 70 pounds. Natives probably disappeared here years ago because of water pollution, but stocking efforts with muskellunge from northern U. S. lakes have revived the population. The muskellunge spawns in aquatic vegetation.



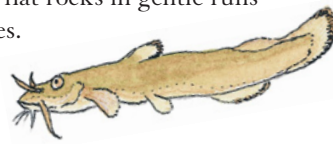
LENGTH: 26.8 to 72 inches
SPAWNS: mid-April to late June
RANGE: New, Hiwassee, Little Tennessee and French Broad

CATFISHES (FAMILY ICTALURIDAE)

Nine species of catfishes occur in the Mountain Region, including the well-known bullhead, flathead and channel species. The two small species featured on this poster are often referred to as “madtoms.” Care should be used in handling them because the pectoral fins have spines that the fish can lock into position for protection. These spines can cause a puncture wound that bleeds and stings. Unlike larger catfishes, the madtom species have an adipose fin that lies low and connects to the upper lobe of the caudal fin. These fish feed on small crustaceans and insects.

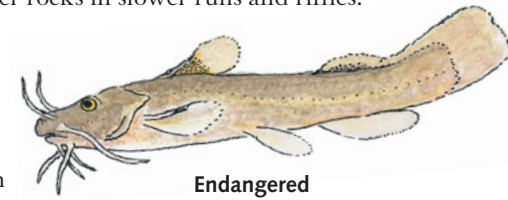
- 30 The margined madtom (*Noturus insignis*) has a dull-yellow to slate-gray body, and its median fins have a faint black edge. The upper jaw sticks out slightly beyond the lower. It can be found in almost any stream in its range, but it nests beneath flat rocks in gentle runs and in the slow water above and below riffles.

LENGTH: 2.2 to 5.9 inches
SPAWNS: May to August
RANGE: Native to the Broad, Catawba and Yadkin-Pee Dee; introduced to the Watauga



- 31 The stonecat (*Noturus flavus*) is very rare and known from only a few specimens. It is listed as endangered in North Carolina. It has a uniform gray-brown color and a creamy-white spot on its back just behind the dorsal fin. It occurs under rocks in slower runs and riffles.

LENGTH: 2.8 to 3.8 inches
SPAWNS: May to August
RANGE: Little Tennessee; Toe River in the French Broad basin



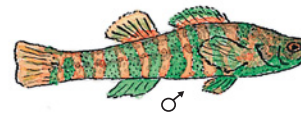
Endangered

PERCHES (FAMILY PERCIDAE)

Worldwide this large family of fishes comprises approximately 160 species, including the well-known yellow perch. The yellow perch has been introduced to the Mountain Region, and 27 small perch species known as “darters” are native to the region. They have two dorsal fins, either separate or barely joined. The first dorsal fin has spines, and one or two spines occur in the anal fin. Many species in this family have a black teardrop-shaped bar under the eye. Darters generally occur in the riffles of creeks and small- to medium-sized rivers where the current is moderate to swift over rock, rubble or gravel. They feed primarily on aquatic insects and insect larvae. Scientists assign darters to a subfamily known as Etheostominae. Within that subfamily are several genera, some of which share related characteristics. A subgenus is a group of species assigned to one or more genera that share related characteristics.

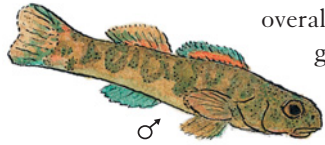
Darters in the subgenus *Etheostoma* have a complete, straight lateral line and dark, saddle-like blotches on their backs. They have blunt snouts, well-separated pelvic fins and large pectoral fins that are longer than their heads.

- 32 The banded darter (*Etheostoma zonale*) has a first dorsal fin edged with green that lies above a red band. The male has nine or more dark-green bars on the side that extend down to its belly. On females and juveniles, the bars are a yellowish tan. This darter most commonly occurs in the fast riffles of rivers and large creeks.



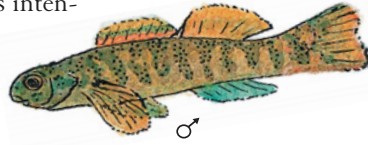
LENGTH: 2.1 to 3.1 inches
SPAWNS: Late spring
RANGE: Hiwassee, Little Tennessee and French Broad

- 33 The greenside darter (*Etheostoma blennioides*) is one of the largest darters. It has green W- or U-shaped markings on its side, which overall is a yellow-green. Breeding males become deep blue-green, and the male sometimes develops green bars on its side and fins and a red base on the dorsal fin. He establishes and defends a territory while the smaller female attaches its eggs to algae and aquatic mosses.



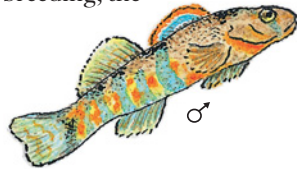
LENGTH: 3.1 to 6.5 inches
SPAWNS: Late spring
RANGE: New. (Closely related species occur in the Hiwassee and French Broad.)

- 34 The Tuckasegee darter (*Etheostoma gutselli*) closely resembles the greenside darter, and it has been classified as a subspecies of that darter in the past. Biologists now recognize it as a separate species that is slightly smaller than the greenside with fewer lateral lines and a different coloration. Breeding males intensify in color and establish a territory.



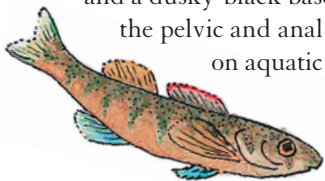
LENGTH: 3 to 6 inches
SPAWNS: Late spring
RANGE: Little Tennessee; Pigeon River in portions of the French Broad basin

- 35 The Kanawha darter (*Etheostoma kanawhae*) is one of the most colorful native fish in the Mountain Region. Its back has large, dark-green saddles, while its side has alternating bars of green and orange, with the orange bars thinner than the green. When breeding, the male has a bright-orange belly and gill area.



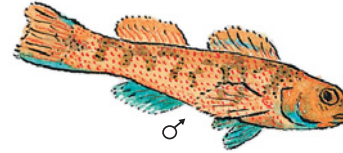
LENGTH: 2.6 to 3.5 inches
SPAWNS: Mid- to late spring
RANGE: New

- 36 The seagreen darter (*Etheostoma thalassinum*) has seven dark-brown saddles and blotches on its side. The first dorsal fin has a red edge and a dusky-black base. The second dorsal is reddish-orange, while the pelvic and anal fins are blue. It inhabits fast riffles and feeds on aquatic insects. Little is known about its habits.



LENGTH: 2.1 to 3.1 inches
SPAWNS: Mid-spring to late summer
RANGE: Broad and Catawba basins

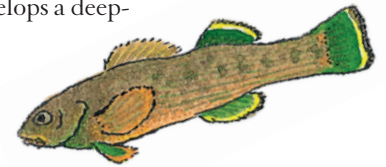
- 37 The Swannanoa darter (*Etheostoma swannanoa*) has six black saddles on its back and eight or nine black blotches on its side. Rows of small red spots also appear on the side. The edge of its first dorsal fin is red. Breeding males change color slightly: The anal and pelvic fins become bluish green.



LENGTH: 3.1 to 3.5 inches
SPAWNS: Mid-spring to late summer
RANGE: French Broad (It might not occur in the Pigeon River portion of the basin.)

Darters in the subgenus *Nothonotus* have distinctive slab-shaped sides with alternating dark and light stripes. The membranes of the first dorsal fin are dark, and these fish generally have pointed snouts. When breeding, the males have very noticeable color changes. These darters primarily eat aquatic insect larvae, particularly fly larvae.

- 38 The greenfin darter (*Etheostoma chlorobranchium*) is unlike the other species in the subgenus because it has a rounded snout rather than a pointed one. Its brown body has small black and reddish-brown spots on the side. Its rear fins have dark edges bordered by pale bands. When breeding, the male develops a deep-green body and fins.



LENGTH: 2.1 to 3.9 inches
SPAWNS: Summer
RANGE: Little Tennessee, French Broad and Watauga

- 39 The sharphead darter (*Etheostoma acuticeps*) has a sharply pointed snout, as its common name implies, and dusky bars on its side. The female's body color is yellowish-brown, while the breeding male's body and fins are olive to blue-green. This localized fish is considered threatened in North Carolina and occurs here only in isolated portions of one river.



Threatened

LENGTH: 1.6 to 3.3 inches
SPAWNS: Summer
RANGE: Upper Nolichucky River in the French Broad basin (It also occurs in Virginia in the South Fork of the Holston River.)

40 The redline darter (*Etheostoma rufilineatum*) is one of the region's most colorful. It can be identified by the black dashes on its operculum. The male's side is marked with red spots, and a red-orange band occurs below the black edge of the fins. The female's body has a similar pattern in different colors: Its first dorsal fin and anal fin are yellowish with dark spots.

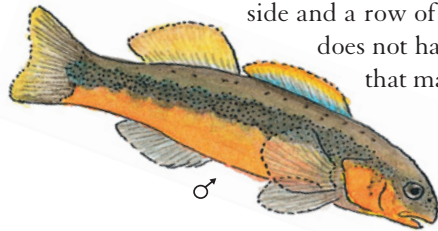
LENGTH: 2 to 3.3 inches

SPAWNS: Summer

RANGE: Hiwassee, Little Tennessee and French Broad



41 The tangerine darter (*Percina aurantiaca*) is most active during the early afternoon in the runs around boulders in large creeks and small rivers. The young have a light lower side and belly that change to yellow on the mature female and to a bright tangerine red in the mature male, making him one of the most colorful of any species. This darter has a broad black stripe of 8 to 12 fused blotches on its side and a row of small brown spots on the upper side. It does not have the black teardrop bar under the eye that marks many darters.



LENGTH: 4.3 to 7.1 inches

SPAWNS: May to July

RANGE: Hiwassee, Little Tennessee, French Broad and Watauga

42 The olive darter (*Percina squamata*) has a pale orange band beneath the margin of the first dorsal fin and a black spot at the base of the caudal fin. It has a very sharp snout and a fully scaled breast. Ten to 12 dark-brown bands mark its sides. It lives in fast-flowing waters.

LENGTH: 2.8 to 5.1 inches

SPAWNS: May and June

RANGE: Hiwassee and Little Tennessee; northernmost reaches of the French Broad



LAMPREYS (FAMILY PETROMYZONTIDAE)

Two small species of these eel-like creatures occur in the Mountain Region. Lampreys have a thin, smooth, slimy body without some fish characteristics such as paired fins, scales, jaws, paired nostrils and bones. They

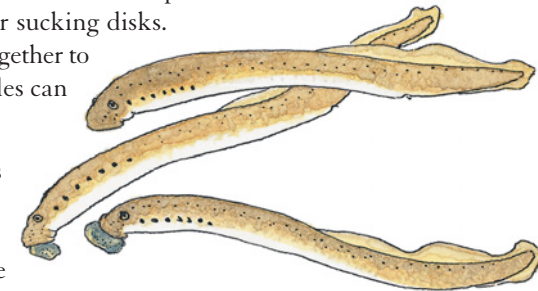
are among the most primitive of vertebrates in that they lack bony vertebrae and have only cartilage. Instead of having enamel teeth, they suck in food through an oval sucking disk with teeth made of keratin. They begin life as larvae that hatch from eggs spawned in sand and gravel. The larvae feed on organic matter until they mature to the adult stage. Some lampreys migrate to saltwater to mature, but the two species that occur in our mountains live entirely in freshwater. Adults of some species are parasitic on other fishes and have strong teeth that can rasp through skin and suck blood. The species definitely known in the N.C. mountains are nonparasitic, but parasitic species may occur in large rivers. The American brook lamprey (*Lampetra appendix*) occurs only in Madison County and is state-listed as threatened.

43 The mountain brook lamprey (*Ichthyomyzon greeleyi*) is fairly common but unknown to most people. It has a single, continuous dorsal fin and occurs in the riffles of small streams that have a gravel and rubble bottom. Spawning adults excavate pit nests on stream bottoms by using their sucking disks. Several adults usually work together to create a nest where the females can deposit their eggs.

LENGTH: 4.3 to 6.8 inches

SPAWNS: April to May

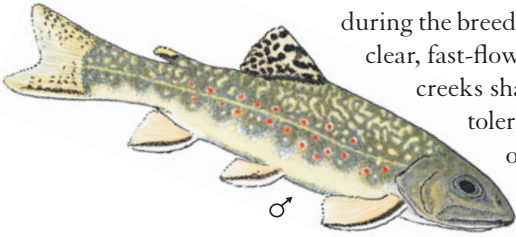
RANGE: Hiwassee, Little Tennessee and French Broad



TROUT (FAMILY SALMONIDAE)

Three species of trout occur in the Mountain Region. Like other species in this family of fishes, they have commercial and recreational value. Their elongated bodies have an adipose fin, a single dorsal fin and paired, spineless fins placed low on the body. Their skin has tiny spineless scales. Their jaws have teeth, and patches of teeth occur on a bone located on the roofs of their mouths. The rainbow trout was introduced here from the western United States, and the brown trout was introduced from Europe. Only the brook trout is native to the mountains. Its range has decreased, however, over the past century. Introduced rainbow and brown trouts have probably forced brook trout from several of their former habitats.

44 The colorful native brook trout (*Salvelinus fontinalis*) has a white margin on all of its fins except the dorsal. Its back is dark olive with light-colored, squiggly markings, while its side is lighter with red spots that have blue halos. The lower side is bright orange in males, especially during the breeding season. Brook trout thrive in cold, clear, fast-flowing streams and often occur in small creeks shaded by rhododendron. They cannot tolerate silt or other pollutants. Trout feed on aquatic insects and fallen terrestrial insects. The female digs a nest several inches wide and an inch or two deep, and the male defends the nest.



LENGTH: 7.9 to 20 inches

SPAWNS: October to November

RANGE: Native to the Hiwassee, Little Tennesse, French Broad and Watauga; probably introduced to the mountain reaches of the Broad, Catawba and Yadkin-Pee Dee

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