Fish ID Key

Background: Review Chapter 5: *Fish Identification and Life History* and 6: *Fish Anatomy* in Going Fishing

Duration: 30-45 minutes

Materials: Fish Anatomy poster, dichotomous key worksheet for each student, fish illustrations.

Objectives: Students will learn how to identify South Dakota fish species, how to use a dichotomous key and review fish anatomy and adaptations.

Background: Scientific classification is a method by which scientists group and categorize species of organisms. Modern classification has its roots in the work of Carl Linnaeus, who grouped species according to shared physical characteristics. A hierarchal system with eight divisions is used to classify all of the organisms on earth. From broadest to narrowest, the levels of classification are: domain, kingdom, phylum, class, order, family, genus, and species.

With millions of species on our planet, scientists rely on a type of identification key, called a dichotomous key, to identify items in the natural world. From reptiles to rocks, flowers to fish, the format of dichotomous key is always the same.

The word dichotomous originates from Greek. The prefix 'di' means two while the root word originates from 'temnein', which means to cut. Two choices are given at each step in the form of a couplet, eventually leading to the correct answer. For example:

1. a. Flower has 3 petals.....Go to 2
   b. Flower has 4 petals.....Go to 4
2. a. Petals' edges are smooth.....Trillium
   b. Petals' edges are fringed.....Go to 3

By reading the two statements of each couplet, you progress through the key from typically broad characteristics to narrower characteristics until only a single choice remains.

Preparation: Prior to the activity, set up fish identification stations using the numbered fish illustrations (species information can be printed on or taped to the back of the illustrations, but should not be referenced while keying out the species. Information can be used during discussion after the activity.) Make copies of the dichotomous key worksheets. Divide students into groups of three or four and give each student a dichotomous key worksheet.

Warm up: Tell students that over 100 species of fish are found in South Dakota lakes, rivers and streams. Review the anatomy of a fish.

Activity: Give instructions on how to use a dichotomous key. Explain that each question on the key has only one correct answer. Following the directions after each answer will lead down a path to the next question until a fish is identified, much like a Choose Your Own Adventure Story.
Each group will start at a different station.
Allow each group a few minutes at their station, and then rotate groups to the next station.
After students have gone through all ten stations, identify each species and tally results on a blackboard. Discuss the characteristics listed with each species.

Wrap up: What fish were difficult to key? Why? What fish were easy to key? Why? Why do the fish all look so different? As the fish evolved, each species developed unique structures and body shapes suited for survival in a particular microhabitat.

Compare the mouth of the shorthead redhorse to the mouth of the northern pike. What does this tell us about what/where it eats? (Redhorse eat from the bottom, northern pike eat prey near the surface of the water.)
Compare the body shape of a trout to that of a redear sunfish. What clue does this offer about the speed of the fish? (Trout are known for their speed – often necessary for survival. Redear, like other sunfish, are adapted to maneuver in dense vegetation and cover.)
Look at the barbels on the catfish. What purpose might these serve? What might this tell us about where it lives? (Barbels are sensors – catfish are often found in dark, murky water where sight is impaired.)
Why would a fish like the crappie need a spiny dorsal fin? (If a predator comes up behind the crappie to swallow it, the crappie can extend its spines to prevent the predator from swallowing it.)
Are all bluegill the same color? (No, male bluegill can develop a bright orange belly when spawning. It is believed this helps attract a mate.) This is why colors aren't always the best clue to identifying a species.
Encourage any other thoughts on differences/adaptations.

OPTION: Students create their own dichotomous keys for five different items of their choice. Encourage students to become creative with those items they key.

FISH OF SOUTH DAKOTA DICHOTOMOUS KEY WORKSHEET

Name_____

1. a. The fish has an adipose fin.....Go to 2
   b. The fish does not have an adipose fin.....Go to 3

2. a. The fish has barbels.....Go to 4
   b. The fish does not have barbels.....

3. a. The fish has one dorsal fin (can have two parts that are connected together).....Go to 5
   b. The fish has two separate dorsal fins (adipose fin is not a dorsal fin).....Go to 6

4. a. The fish has a forked tail fin.....
   b. The fish has a rounded tail fin.....

5. a. The dorsal fin has sharp spines.....Go to 7
   b. The dorsal fin does not have sharp spines.....Go to 8

6. a. The fish has vertical stripes on its sides.....
   b. The fish has a long horizontal stripe on its side.....

7. a. The fish has dark spots all over its body and fins.....
   b. The fish has stripes on its sides .....Go to 9

8. a. The dorsal fin is near the back of the fish's body, above the anal fin.....
   b. The dorsal fin is near the center of the fish's body, in front of the anal fin.....

9. a. The fish has a large mouth that reaches back to its eye.....
   b. The fish has a small mouth that is in front of its eye.....

Fish of South Dakota Dichotomous Key Answers

1. a. The fish has an adipose fin.....Go to 2
   b. The fish does not have an adipose fin.....Go to 3

2. a. The fish has barbels.....Go to 4
   b. The fish does not have barbels.....**Rainbow Trout**

3. a. The fish has one dorsal fin (can have two parts that are connected together).....Go to 5
   b. The fish has two separate dorsal fins (adipose fin is not a dorsal fin).....Go to 6

4. a. The fish has a forked tail fin.....**Channel Catfish**
   b. The fish has a rounded tail fin.....**Black Bullhead**

5. a. The dorsal fin has sharp spines.....Go to 7
   b. The dorsal fin does not have sharp spines.....Go to 8

6. a. The fish has vertical stripes on its sides.....**Yellow Perch**
   b. The fish has a long horizontal stripe on its side.....**Brook Silverside**

7. a. The fish has dark spots all over its body and fins.....**Black Crappie**
   b. The fish has stripes on its sides .....Go to 9

8. a. The dorsal fin is near the back of the fish's body, above the anal fin.....**Northern Pike**
   b. The dorsal fin is near the center of the fish's body, in front of the anal fin.....**Shorthead Redhorse**

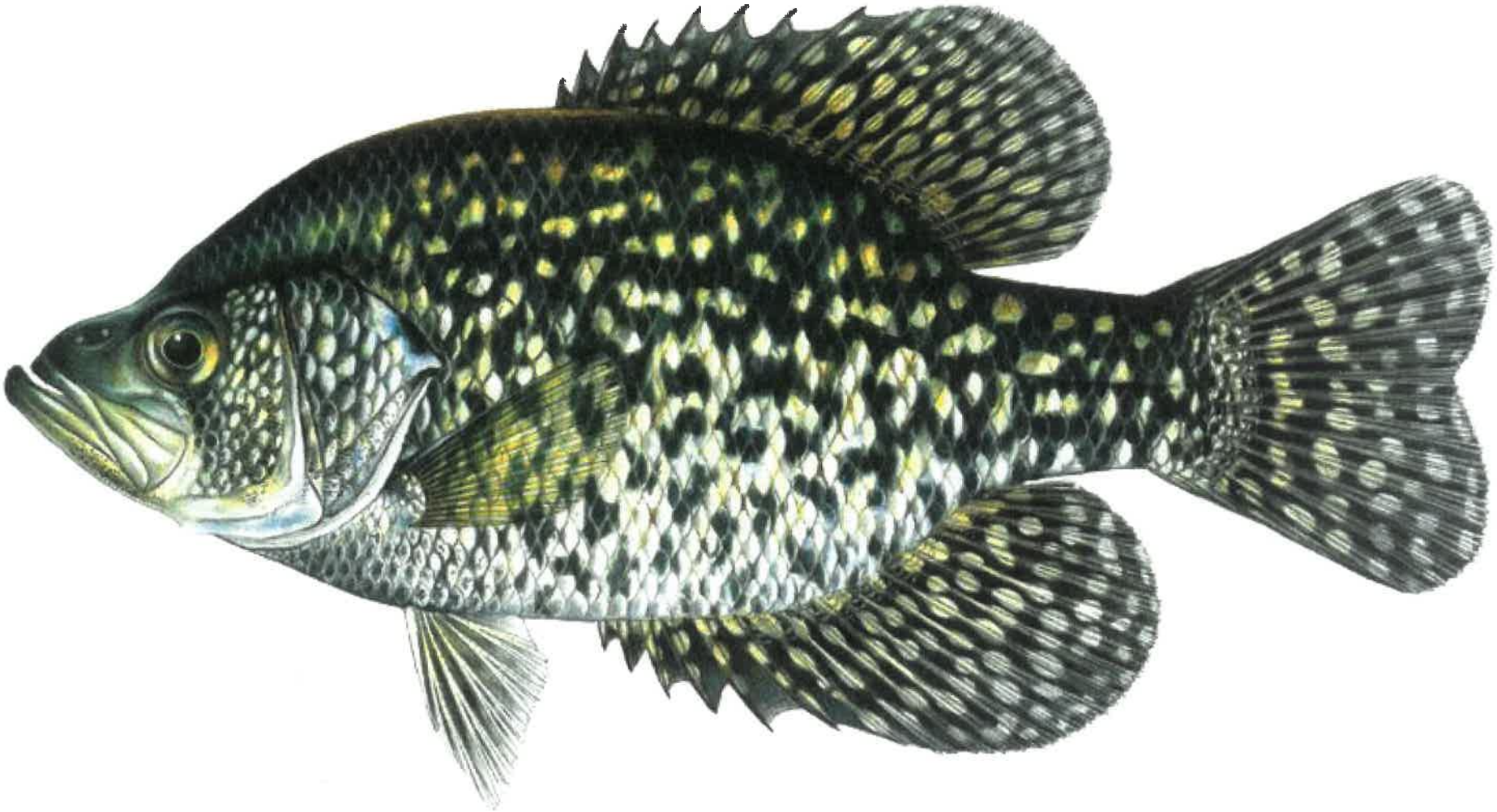
9. a. The fish has a large mouth that reaches back to its eye.....**Smallmouth Bass**
   b. The fish has a small mouth that is in front of its eye.....**Redear Sunfish**

SPECIES # 1

SPECIES # 1 Black Bullhead

A chubby, scaleless fish having an adipose fin, 8 barbels (those under mouth are black in color) that are used to locate food, and a slight notch on the rear margin of the tail. Many anglers have the misconception that the whiskers (barbels) can sting them. What should to be avoided when handling are the hard spines (one in the dorsal fin and one in each pectoral fin) that can inflict a puncture wound if the fish is mishandled. Bullheads will overpopulate and compete with other fish if predators are lacking. When it becomes overpopulated, its bottom feeding activity stirs up bottom sediments - making the water muddy. Primarily feeds on immature aquatic insects, small crustaceans, plant material and an occasional small fish. Often caught by anglers. Tolerant of turbid, low oxygen waters and abundant in many habitats. Parental care of nests – males and females ward off egg predators and fan the nests to aerate the eggs. Fry will school and remain under parental care until about an inch long. Will school through the first summer. Comparatively short-lived catfish species – seldom over 10 years.

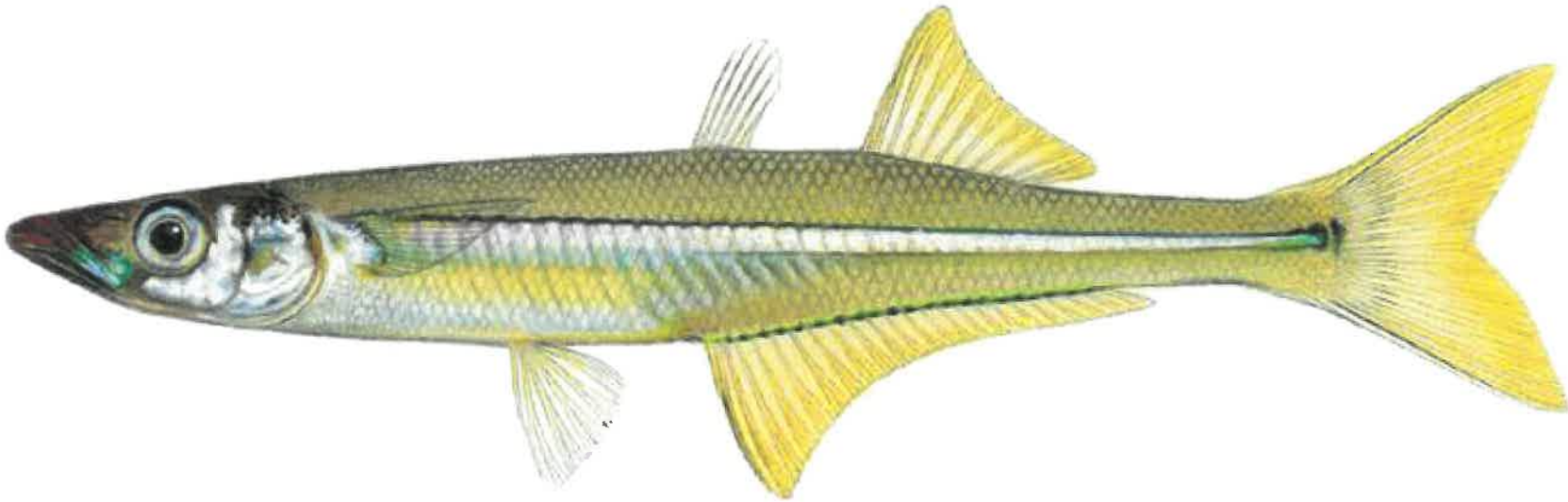
SPECIES # 2



SPECIES # 2 Black Crappie

Silvery fish with irregularly arranged black speckles and blotches on sides and 7 or 8 spines in dorsal fin. Spawning males become almost entirely black. Aquatic insects, large zooplankton and small fish compose their diet. They can become overpopulated if predator populations are low. Like other sunfish, are nest builders. Crappie have high reproductive potential, often leads to overpopulation and stunted populations. Fry remain attached to the nest for several days after hatch. Males aggressively defend nests. Black crappie prefer clear, quiet water. Aggregrate in loose schools.

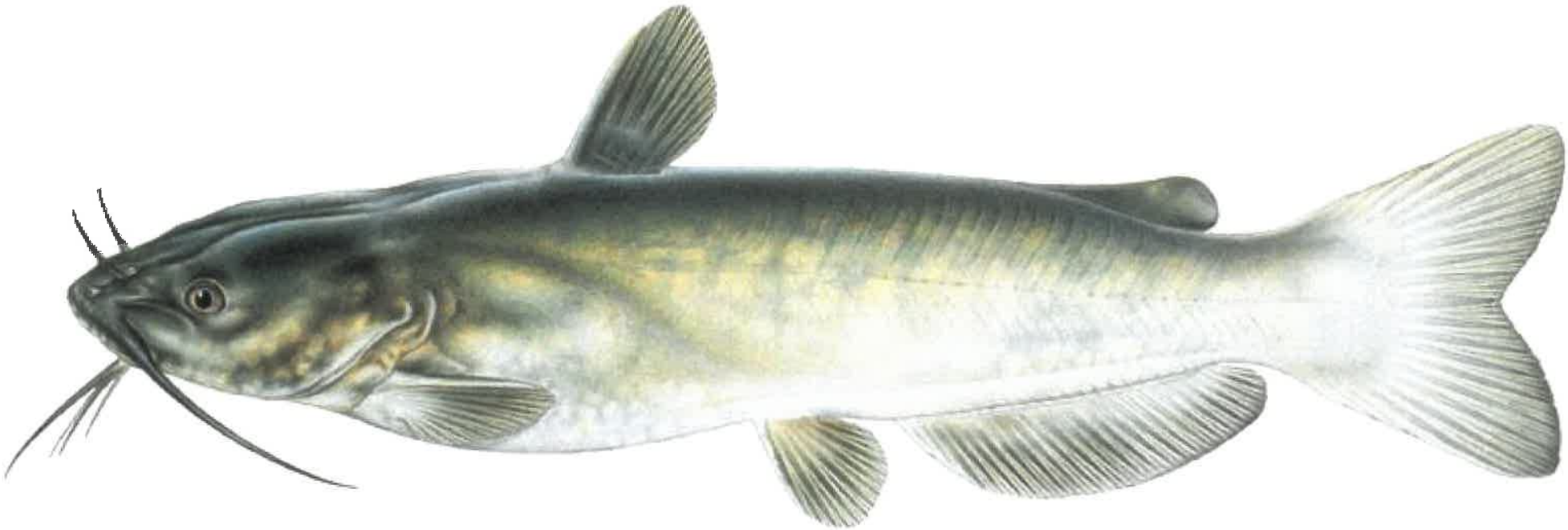
SPECIES # 3



SPECIES # 3 Brook Silverside

A silvery, pencil-thin fish having a pointed, beak-like snout with an oblique, upward turned mouth; a long, sickle-shaped anal fin; 2 widely separated dorsal fins; and a long, bright, silvery stripe lengthwise along each side. It is a non-native species that was inadvertently stocked when shad (another non-native species) were brought into the states for experimental prey stockings for open-water predators during the late 1970's. It is adapted for life near the surface where it feeds primarily on insects (aquatic and terrestrial) and microcrustaceans (small zooplankton).

SPECIES # 4



SPECIES # 4 Channel Catfish

An olive-brown or slate-blue, scaleless fish having dark spots (especially on small fish), an adipose fin, 8 barbels that are used to locate food, and a deeply forked tail. Breeding males become dark blue and are often misidentified as a blue catfish. Many anglers are mistaken by thinking they can be stung by the whiskers (barbels, a sensory organ). What should be avoided when handling are the hard, serrated spines (one in the dorsal fin and one in each pectoral fin) that can inflict a puncture wound if the fish is mishandled. Primarily bottom-feeder, consuming living or dead items. Diet is varied and includes fish, crayfish, insects, mollusks, and plant material. One of the most important commercially cultured species in US. No scales. Had an adipose fin. In natural habitat, moderate to swiftly flowing streams. It is also abundant in reservoirs and ponds and can tolerate turbidity (a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. Flood control reservoirs can have high turbidity due to the large watersheds that drain into them). Primarily detect food with sense of taste, using barbels and sensory organs (like taste buds) that cover their exposed skin. Eyes are comparatively small; channel catfish are not sight feeders. Most movement and feeding occurs after sunset and before sunrise. In daylight, can be found in deep holes, under cover of logs and rocks.

SPECIES # 5

SPECIES # 5 Northern Pike

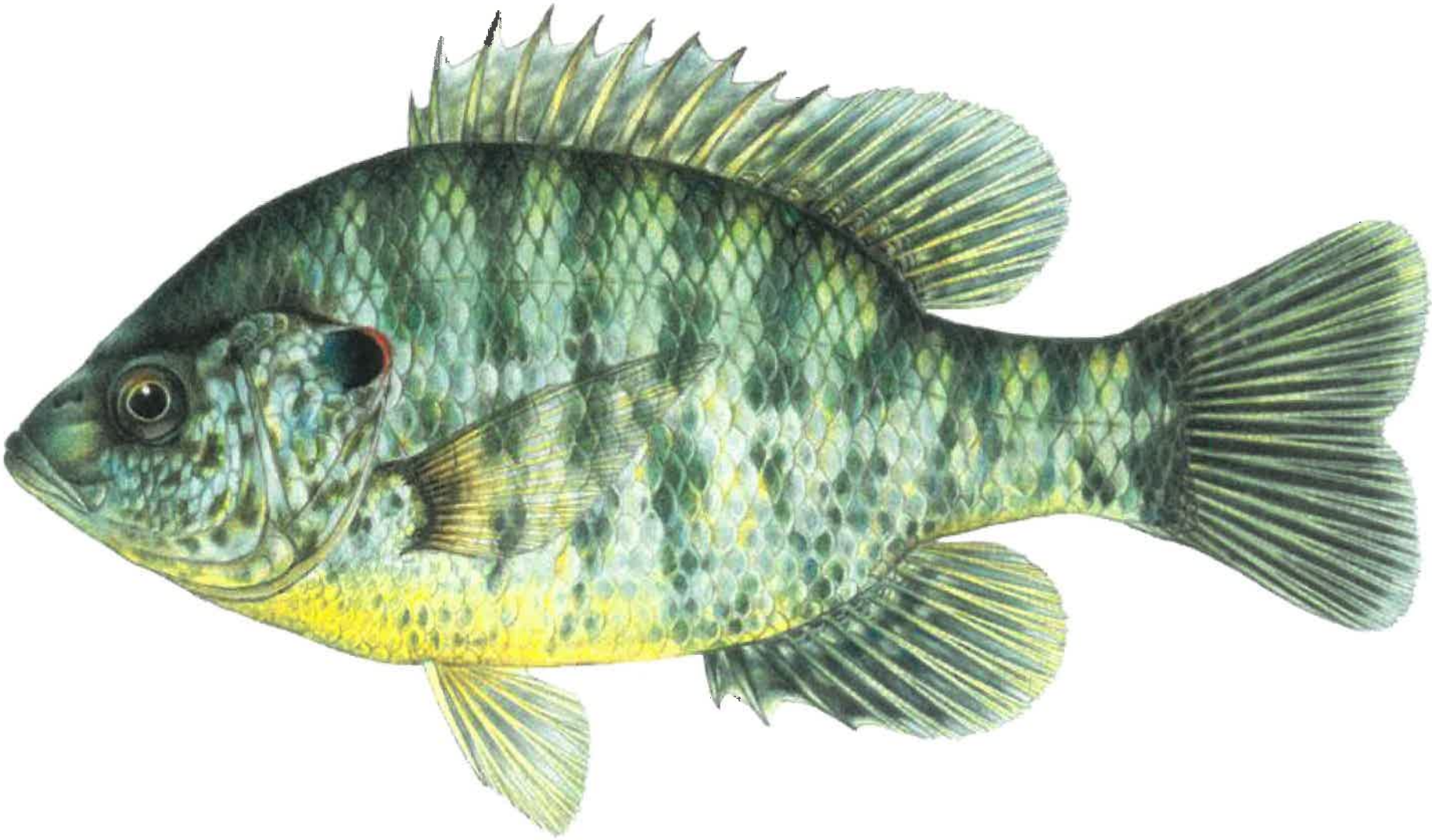
Large, tubular-shaped, native fish having a single dorsal fin near the forked tail, duckbill-shaped snout, large mouth with many sharp teeth, and 5 sensory pores on each side of the lower jaw's underside. Its cheek is fully scaled, while the gill cover is scaled only on the upper half. It prowls vegetated areas in search of food (primarily fish) - providing an important role in regulating and maintaining population balance of various prey fish species. Readily caught by anglers. Early spring spawner. Spawns in shallow water and broadcasts eggs over submerged vegetation. Rapidly growing species. Found in sluggish streams and shallow, weedy places in lakes, as well as in cold, clear, rocky waters. Ambush predators, lie in wait and can make a fast strike at prey. Produce an excess of slime when handled. The ancient Romans wrote about how slimy and stinky pike are. They have free floating Y bones in their flesh that make some people dislike them as a food source.

SPECIES # 6

SPECIES # 6 Rainbow Trout

Non-native fish that requires cold (less than 70 degrees), well-oxygenated water. It tolerates slightly higher temperatures than other trout. It is speckled with small black spots on sides (no orange or reddish spots), back, and tail fin which is slightly forked. Sides also have a broad pinkish or red stripe. It also has small scales, an adipose fin on the midline of the back near the tail, and a small, triangular-shaped axillary process at the upper end of the pelvic fin. The bulk of its diet consists of aquatic and terrestrial insects, amphipods, crayfish, and small fish. It spawns from early winter to late spring, depending on genetic strain and availability of clean, gravelly riffles in streams. Readily caught by anglers.

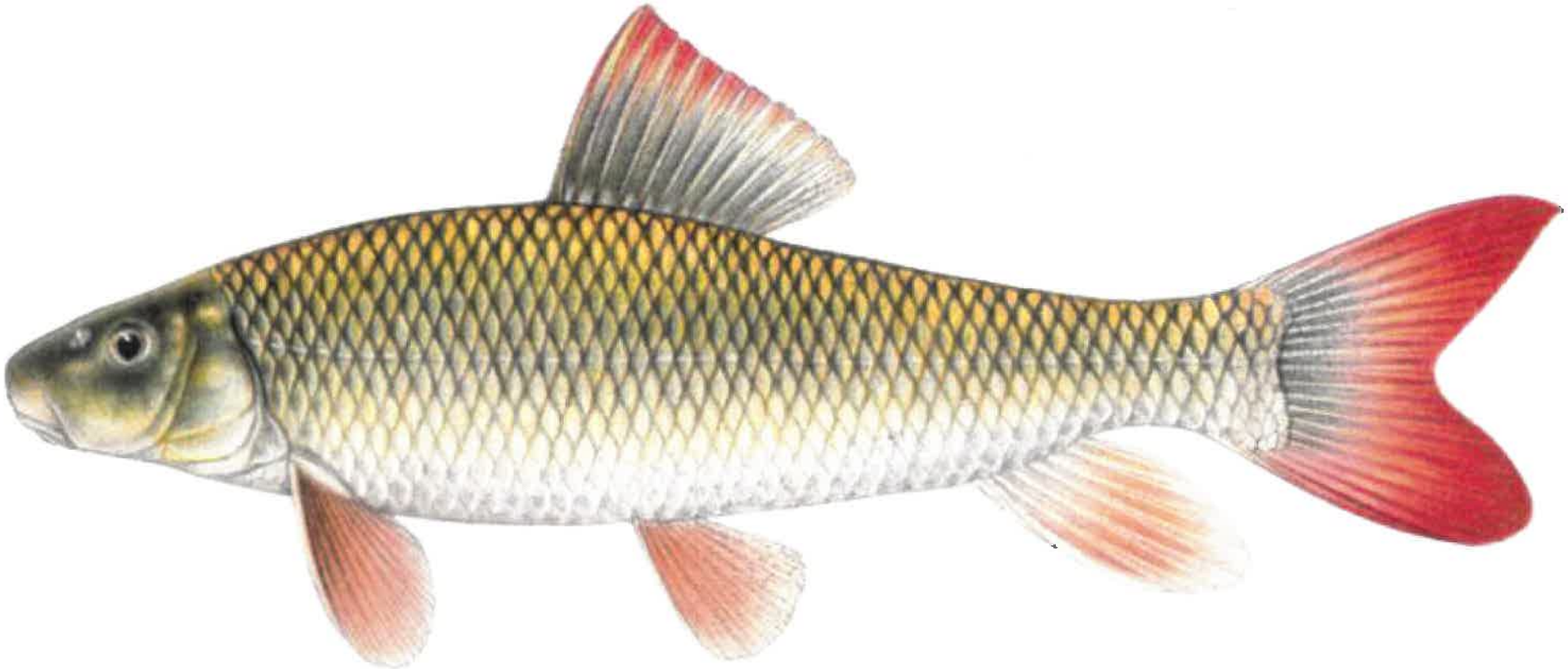
SPECIES # 7



SPECIES # 7 Redear Sunfish

A flat, slab-sided fish with a rather small mouth. Pectoral fin is pointed and relatively long; gill cover tab black with red margin. They are not a native fish and do best in ponds and small reservoirs having warm, clear water with an abundance of aquatic vegetation that harbors numerous small crustaceans and mollusks. Snails are the primary food source for redear, hence the common name (shellcracker). Redear can be used to control snails, which are required hosts in the life cycles of yellow and black grubs - both of which are common fish parasites. Distinguished from bluegill by larger size and by the red trim on the opercular flap. Nicknamed 'shellcracker' for feeding habits. Preferred habitat is in clear, quiet, warm waters with abundant rooted vegetation. Capable of multiple spawns during summer months (65 – 80 F water temp).

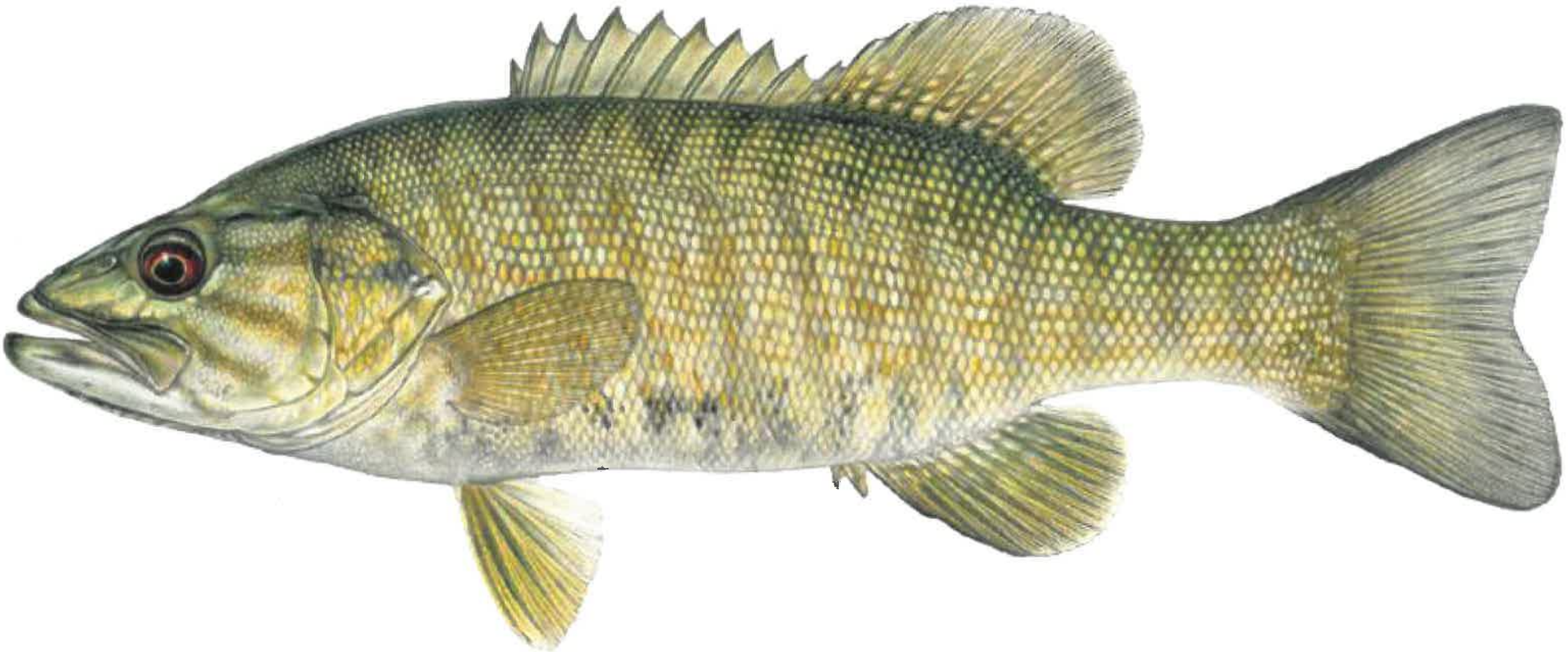
SPECIES # 8



SPECIES # 8 Shorthead Redhorse

A slender fish having a short, triangular-shaped dorsal fin, dark-edged scales giving the appearance of lines, and a lower lip with grooves and a nearly straight rear margin. All fins have definite red color. Bottom-feeder, primarily consuming immature aquatic insects. Rarely caught by anglers.

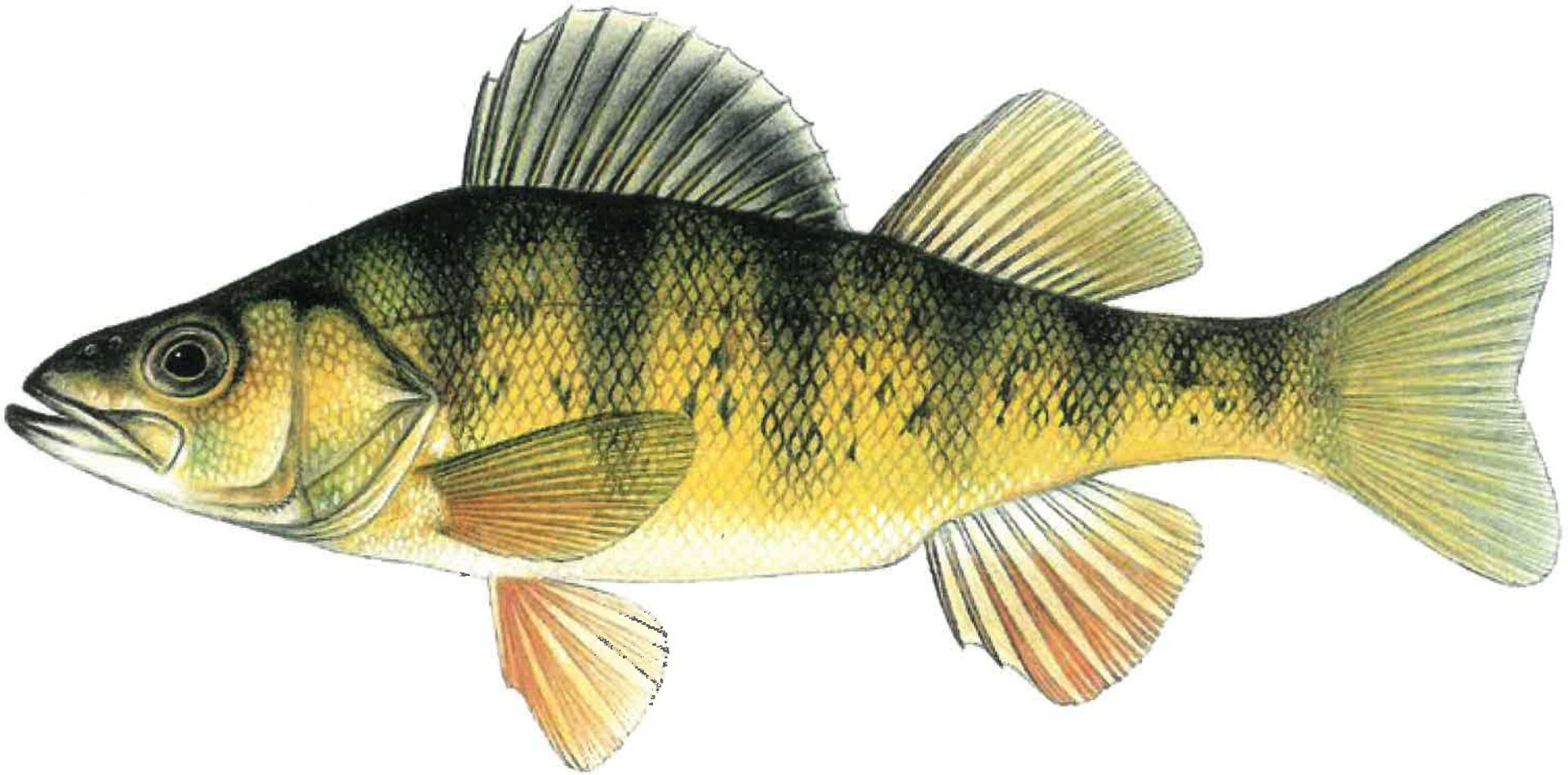
SPECIES # 9



SPECIES # 9 Smallmouth Bass

A torpedo-shaped fish with an upper jaw reaching about to rear margin of eye and dorsal fin is continuous with a shallow notch. Typically bronze-colored and sides plain or with several separate vertical bars with lower sides generally without dark spots. Has little tolerance for siltation and turbidity and thrives in streams with rock or gravel bottoms and riffles. Young primarily eat aquatic insects and their larvae along with small fish. Crayfish are an important food item for adults as well as young fish. Distinguished from largemouth bass by a smaller mouth (does not extend past the back of the eye) and lack of a horizontal stripe (has vertical bars instead). Males will guard nest and fry.

SPECIES #10



SPECIES #10 Yellow Perch

Somewhat tubular, slab-sided fish having 2 separate dorsal fins, regularly spaced vertical bands on body, and no visible teeth. A schooling fish that does best in shallow, well-vegetated lakes, but can become stunted if predation is insufficient. During the spawning process, females release eggs in long gelatinous strings, which are fertilized by several males. Egg masses then become attached to underwater cover (emergent plant stems, blown-in tumbleweeds, etc.). Small crustaceans, insects, and fish make up the bulk of the diet.