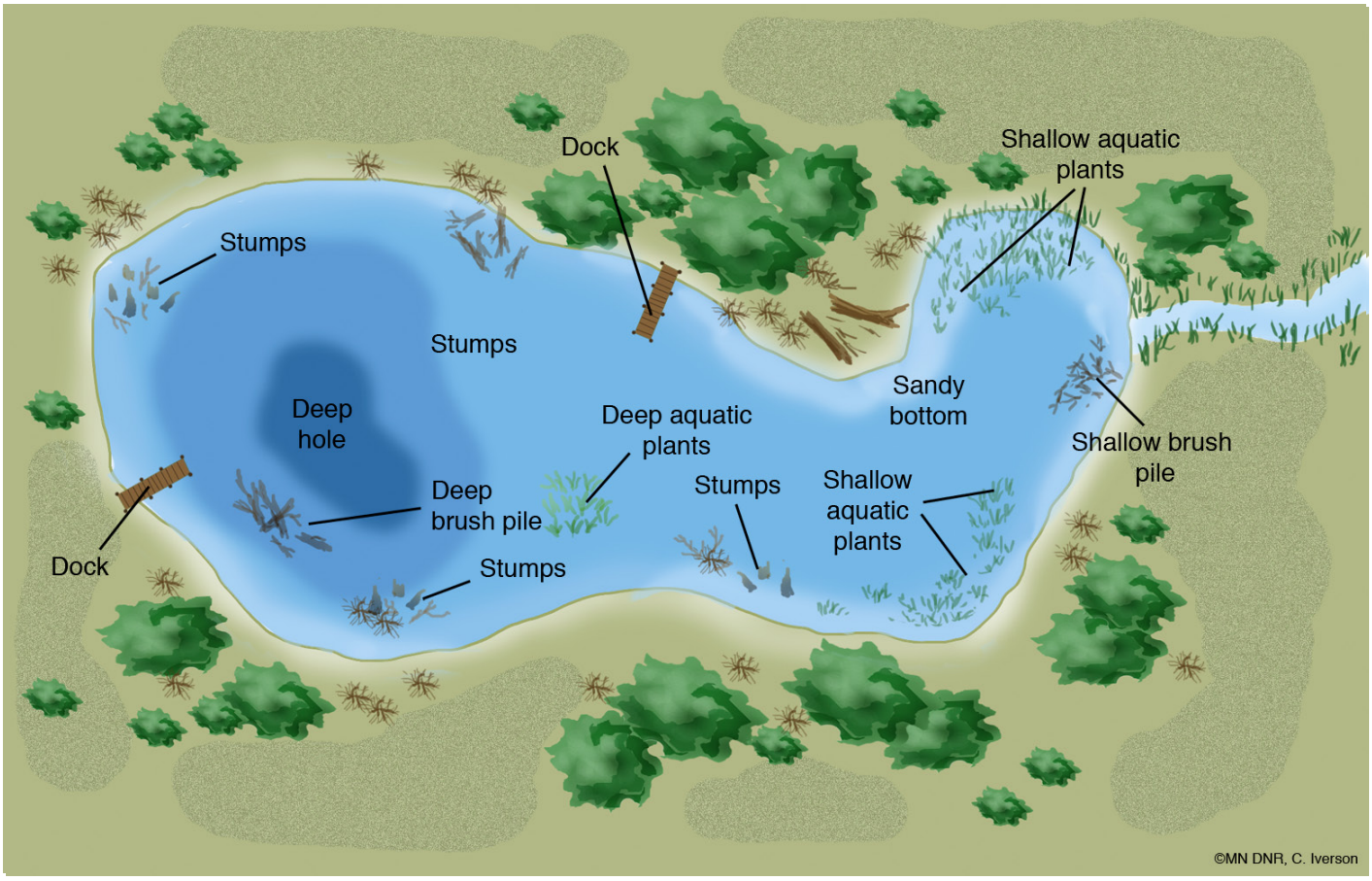
Habitat Hideout

Living in the fast lane can be exciting, but it takes a lot of energy. Fish seek places where they can rest, find food, and evade predators.



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Please note: Academic Standards are updated regularly and our alignments will be updated on the DNR Academic Standards Website at: www.mndnr.gov/education/teachers/edstandards_intro.html

Habitat Hideout

Minnesota Academic Standards

◒ Lesson *introduces* this Benchmark.
◒ Lesson *partially* addresses this Benchmark.
● Lesson *fully* addresses this Benchmark.

Language Arts

Grades 3, 4, 5
I. Reading and Literature
B. Vocabulary Expansion:
Benchmark 1—Students will acquire, understand and use new vocabulary through explicit instruction and independent reading. ◒
C. Comprehension:
Benchmark 1—Students will read aloud grade-appropriate text (that has not been previewed) with accuracy and comprehension. ◒
III. Speaking, Listening and Viewing
A. Speaking and Listening:
Benchmark 1—Students will participate in and follow agreed-upon rules for conversation and formal discussions in large and small groups. ●
Benchmark 2—Demonstrate active listening and comprehension. ●

Grade 3
III. Speaking, Listening and Viewing
A. Speaking and Listening:
Benchmark 3—Students will follow multi-step oral directions. ●

History and Social Studies

Grades K—3
V. Geography
A. Concepts of Locations:
Benchmark 2—Students will use maps and globes to locate places referenced in stories and real-life situations. ◒
Benchmark 4—Students will name and use directional words to describe locations of places in the community. Students will locate places by using simple maps, and understand that maps are drawings of locations and places as viewed from above. ◒
V. Geography
B. Maps and Globes:
Benchmark 1—Students will locate places by using simple maps, and understand that maps are drawings of locations and places as viewed from above. ◒

Science

Grade 3
IV. Life Science
C. Interdependence of Life:
Benchmark 1—Students will know that organisms interact with one another in various ways besides providing food. ●
Benchmark 2—Students will know that changes in a habitat can be beneficial or harmful to an organism. ●

Grade 4
III. Earth and Space Science
A. Earth Structure and Processes:
Benchmark 1—Students will identify and investigate environmental issues and potential solutions. ●

Grade 5
III. Earth and Space Science
A. Earth Structure and Processes:
Benchmark 3—Students will describe how waves, wind, water and ice shape and reshape the earth's surface. ●
Benchmark 5—Students will explore the interaction of lithosphere, atmosphere, hydrosphere and space. ●

Environmental Literacy Scope and Sequence

Benchmarks

- Social and natural systems are made of parts. (PreK-2)
- Social and natural systems may not continue to function if some of their parts are missing. (PreK-2)
- When the parts of social and natural systems are put together, they can do things they couldn't do by themselves. (PreK-2)
- In social and natural systems that consist of many parts, the parts usually influence one another. (3-5)
- Social and natural systems may not function as well if parts are missing, damaged, mismatched or misconnected. (3-5)

For the full Environmental Literacy Scope and Sequence, see:
www.seek.state.mn.us/eemn_c.cfm

Chapter 1 • Lesson 5

Habitat Hideout

Grade Level: 3-5
Activity Duration: Part 1: 45 minutes
Part 2: two class periods
Part 3: 30 minutes
Group Size: any
Subject Areas: Language Arts, Physical Education, Science
Academic Skills: construction, recognition, writing
Setting: Part 1 and Part 2: indoor or outdoor gathering space with tables
Part 3: large indoor or outdoor open area
Vocabulary: current, cut-bank, eddy, limnetic zone, littoral zone, meander, pool, riffle, structure, undercut
Internet Search Words: fish habitat, fish structure, lake structure, stream structure

Instructor's Background Information

If you fish from shore, a pier, a boat, or a bridge, do you see the fish in the water? Probably not. It can be difficult to see underwater because the sunlight reflecting from the surface of the water produces glare. And the water might be deep, dark, or murky. But even if you can't actually *see* the fish, you can often find clues to where they might be hidden by noticing things protruding from the water, or the way that the water swirls and flows as it moves downstream. The features of the bottom of a lake or stream can also help an informed observer pinpoint the location of elusive fish.

When anglers know what to look for in and around the water, and know something about the types of habitat in a water body, they significantly increase their chances of finding the fish they're trying to catch. There's nothing like knowing just where to cast your line for the best chance of success!

Structure
Although fish may move to different locations at different times of the day, or during different seasons, most fish seek structure. **Structure** can be any lump, bump, hole, drop-off or other hideaway in a lake or streambed. Submerged stumps, rocks, trees, plants, brush piles, boat docks, and fishing piers are examples of structure, too. Learning about the behaviors of fish species reveals clues about the types of habitats or structures that they prefer.

Summary

Different kinds of fish prefer different types of habitat. In this lesson, students learn to identify preferred fish habitats to help them locate fish "hideouts" when they go fishing. In groups, students create lake and stream habitat murals showing areas of structure and, on habitat maps, show where various fish species might prefer to live. A relay game helps reinforce the concepts they've learned.

Student Objectives

The students will:

1. Identify three types of habitat structure in a lake or stream.
2. For each habitat structure identified in objective one, list three different fish species that would use each habitat.
3. Compare the littoral and limnetic zones in the habitat preferences of the fish listed in objective two.
4. Define meander, pool, riffle, and undercut in reference to a stream, and state what each means in terms of fish habitat.
5. Discuss how changes in a habitat can benefit or harm fish.

Materials

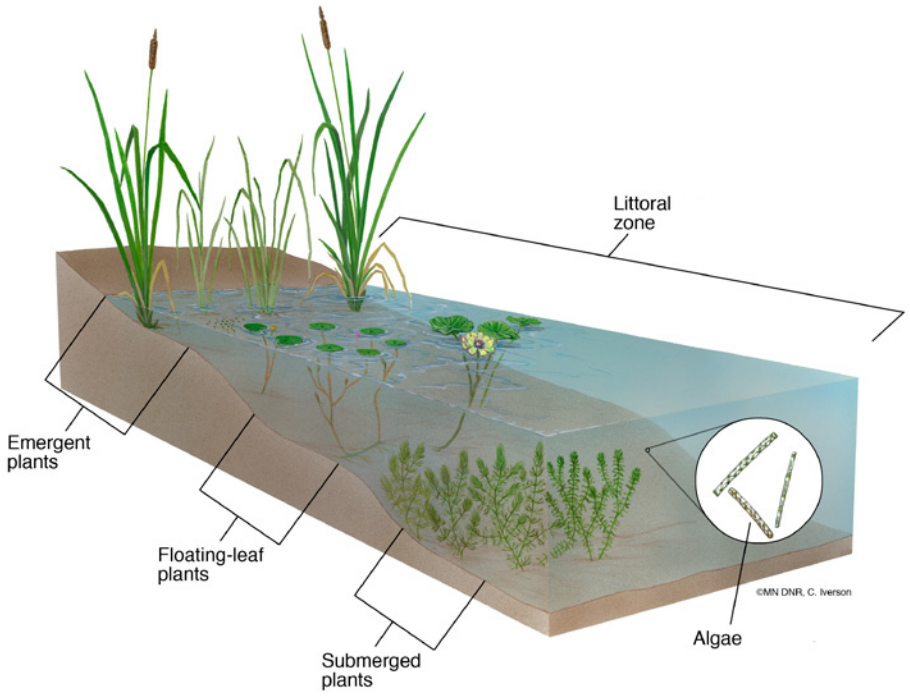
- **Lake Habitat Sheet**, one per student
- **River or Stream Habitat Sheet**, one per student
- **Fish Habitat Chart**, one per student
- Two sets of **Habitat Hideout Fish Identification Cards** for the relay game
- Paper clips
- Card stock and paper, 8.5" x 11"
- Laminating materials
- Markers, one orange and one blue
- Scissors
- Glue
- Hula-hoops, three
- Roll of butcher paper or newsprint
- Markers or crayons
- Clipboards
- Pencils
- Double-sided tape, self-stick Velcro, or self-stick magnets
- Wooden dowels, three feet long, or pop can casters rigged with lines and casting plugs (See **Lesson 5:3—Pop Can Casting** for instructions for making pop can casters)
- 8.5" x 11" print-outs of images of Minnesota fish

Fish are attracted to structure for many reasons. Structure provides a place for prey to hide from predators—it also gives predators a covert place from which to strike. On sunny days, structure provides shade for fish with light-sensitive eyes. River and stream fish find resting places where structure shelters them from strong currents. Structure sometimes serves as a landmark or place marker, just as a street sign tells us that we're home.

If there are no smallmouth bass in the spot where you're fishing, of course you won't catch any smallmouth bass. But if you know how to identify and locate the structure preferred by the species you seek, you'll be more likely to catch those fish consistently. Structure can be viewed as a target for your carefully aimed cast.

Lakes

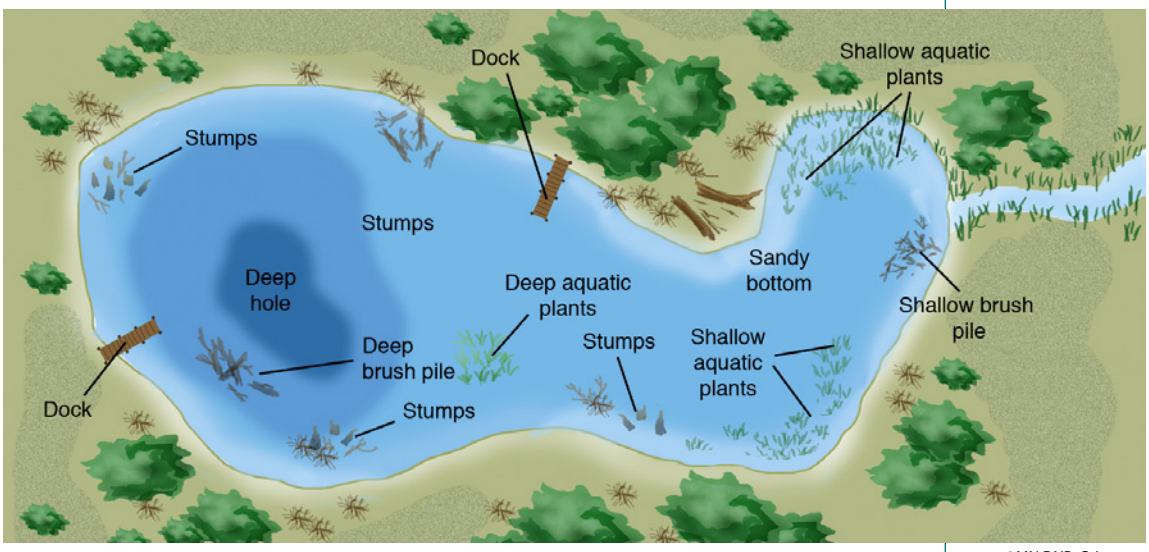
Lakes consist of two zones, shallow water and deep water. The shallower portion of the lake, where sunlight penetrates the surface and reaches the bottom with enough intensity to allow the growth of rooted aquatic plants, is called the **littoral zone**. Prey fish, such as sunfish (pumpkinseeds and bluegills) and minnows, may hide and feed in vegetation, such as lily pads and cattails, in the littoral zone. Many prey fish feed on the invertebrates that live among the plants. Predator fish, such as northern pike and largemouth bass, may also hide among plants in the littoral zone as they wait to ambush an unsuspecting sunfish.



The zone in which emergent, floating-leaf, and submerged plants grow is referred to as the littoral zone. In many Minnesota lakes, the littoral zone is approximately zero to fifteen feet deep. Free-floating plants grow anywhere on the surface of a water body.

Largemouth bass, crappies, and bullheads often hide in areas with submerged logs or brush piles. Fallen trees and brush attract minnows and insects. These areas may be in or just outside the littoral zone, where the water is slightly deeper.

The open, surface water above the deep area of a lake (surrounded by the littoral zone), where rooted plants can't grow is the limnetic zone. Walleyes are often found near rocky drop-offs in limnetic zones. Deeper water and drop-offs provide shade from bright sunlight. Walleye and northern pike can move through deep water on their way to other parts of the lake to search for prey.



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Lake structure types preferred by fish.

Streams and Rivers

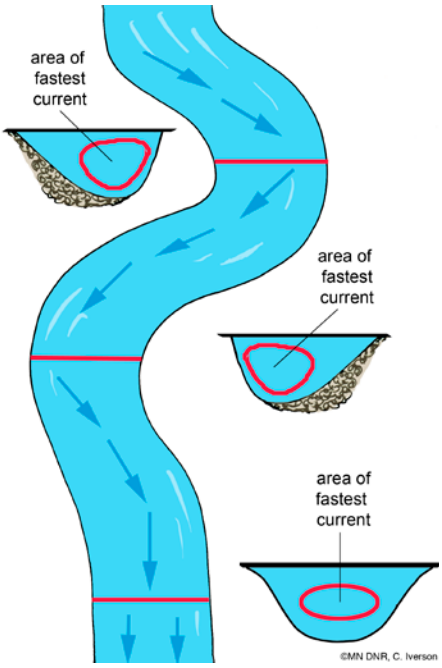
Streams and rivers have shallow and deep-water areas, too. Flowing water cuts into the banks on the outside bend of a **meander**, or curve in the course of a stream or river.

When the water hits the outside bend, the water causes some of the bank to erode as it changes direction. This outside bend where soil is hollowed away is called the **cut-bank**.

The water sometimes carves deeply enough into the outer bank to form small caves that protect fish (such as trout or smallmouth bass) from the sun and from predatory birds. These small caves are referred to as **undercuts**. The current carries eroded silt and sand downstream.

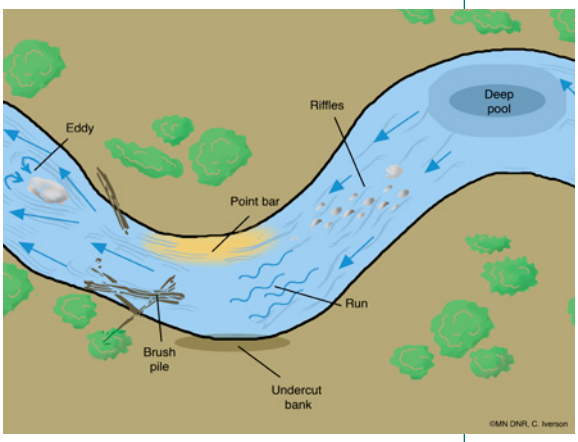
On the inside bend, the current velocity slows and sediment is deposited. This shallow inside bend is called a **point-bar**.

Rivers are dynamic—they're always changing. As time passes, the cut banks and point bars migrate downstream so, several years later, they may be in different locations. The proportions (number of meanders, pools, riffles, and so forth) will remain the same.



Areas of fastest current in a river or stream.

When flowing water hits an obstruction, such as a rock, brush pile, or log, it goes around it or over the top of the structure. The water curls and swirls around the structure, forming an **eddy** and often scouring a hole on the downstream side of the object. These spots make good places for fish to rest. Because it takes less energy to swim in these pocket areas, fish use less energy and need less food than they would if they spent all of their time swimming in the currents. From these resting spots, fish can dart out and capture passing prey from the currents. Carp, smallmouth bass, and trout can be found in eddies.



Structure types in a river or stream.

Shallow areas where the water moves quickly over rocks spread across the width of the stream are called **riffles**. (In larger rivers with greater water flow, these areas are called rapids.) The turbulence of the flowing water hitting the rocks mixes oxygen from the air into the water, and frothy air bubbles can make the water appear white. Insects that require high levels of oxygen live on the rocks in riffles. Fish, such as trout, swim just below the riffle areas to catch the insects, such as stonefly larvae and mayfly larvae, that get knocked off or let go of the rocks to be carried downstream by currents. The areas of quieter water downstream of the riffles are referred to as runs. Quiet deeper areas where fish rest are called pools.

Examples of fish that live in streams include brook trout and smallmouth bass. Streams provide conditions that suit the needs of these fish, including higher dissolved oxygen levels, cooler water, abundant invertebrates, and adequate cover. The types of fish species that live in a stream can vary, depending on stream temperature. Trout need cooler streams, and smallmouth bass can be found in warmer water. (Although brook trout are typically found in cold water streams, some other species of fish, such as smallmouth bass, can be found in streams, rivers, or lakes.) Stream fish can be found in or behind structure such as pools, below riffles, in undercut banks, and behind rocks and brush piles.

Rivers can support a great diversity of fish species. Larger fish species that aren't found in small streams (such as sturgeon, paddlefish, catfish, and gar) live in Minnesota rivers. Rivers also contain some fish species usually found in lakes, including walleye, northern pike, and bass. As in streams, areas of slow-moving water or structure provide good habitat for fish in rivers. Gar find respite from stronger currents behind logs, in brush piles, or in aquatic plants growing in the slow-moving backwaters. Catfish particularly like to sit in deep pools where they can rest from river currents. When they're hungry, the fish move to the front of the pool and wait for food to flow downstream to them.

Altering Aquatic Habitat

Efforts to remove structure from lakes, rivers, and streams can damage or eliminate habitat, negatively impacting fish populations. In lakes, a major concern is the removal of aquatic plants and shoreline

vegetation. This is often done when a new owner decides to put in a swimming area on their lake front property. The removal of plants eliminates hiding and resting places, protected spawning areas, and important food sources (invertebrates and small fish living in the plants) for fish. The removal of plants can also increase erosion and decrease water quality. Because aquatic plants provide habitat for a diversity of aquatic species, including fish, property owners may need approval from the Minnesota DNR to remove aquatic plants.

In rivers and streams, one major concern is channelization. When the meanders are removed from a river or stream, so is structure. Cut-banks, undercut banks, and point-bars are eliminated. With the new straightened channel, water speeds are uniform from bank to bank, so there is no slack water or and little or no vegetation. Without meanders to catch them, the current flushes logs and brush piles downstream.

For these reasons, people who plan to purchase land bordering lakes, rivers, and streams should look for shoreline and lake or stream bottoms that already match their intended activities such as fishing, boating, or swimming. If you would like to improve your site for fishing, contact the Shoreland Habitat Program at the Minnesota DNR.

For more information on laws governing the removal of aquatic vegetation and the benefits of various water plants, contact the Minnesota DNR for the free brochure, *Aquatic Plant Management.*

To learn more about how you can improve fish and wildlife habitat and keep water clean, look on the Minnesota DNR web site or on these CD-ROMs published by the Minnesota DNR: *Restore Your Shore: A Guide to Protecting and Restoring the Natural Beauty of Your Shoreland* and *Healthy Rivers, a Watercourse: An Interactive Tool to Understand the Management of River Systems.*

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Procedure

Preparation

1. Draw an outline of a lake (an irregular circle) and a stream (two parallel lines meandering like a ribbon) on the whiteboard or prepare overhead transparencies. Do not add structures to these water bodies at this point.
2. Make two sets of **Habitat Hideout Fish Identification Cards** for the activities. Copy each page twice and cut out each set of three pieces. Group each set of three pieces and paper clip them with the fish picture and the text back to back with the structure picture (deep pool, brush pile, or aquatic plant) in the middle. Using markers, put an orange dot on one set of cards and a blue dot on the other to differentiate teams, or copy the cards on two different colors of paper. You may wish to laminate the cards for future use.

3 Cut six 8.5" x 11.5" sheets of paper into three 8.5" x 3.5" pieces. Label each piece with the name of one of these three habitat types: aquatic plants, brush pile, pool (for a river or stream) or drop-off (for a lake). Make several of these labels for each habitat type. Place double-sided tape, self-stick Velcro, or self-stick magnets on the back of each label—these labels identify the different types of habitat for the murals and the relay game.

4 Laminate the **Habitat Hideout Fish Identification Cards, Lake Habitat Sheet, River or Stream Habitat Sheet**, and the **Fish Habitat Chart**, if you wish to preserve them for future use.

5 Copy one **Lake Habitat Sheet**, one **River or Stream Habitat Sheet**, and one **Fish Habitat Chart** for each student.

Activity

Warm-up

1 Ask the students where they catch fish when they go fishing. Ask them what leads them to think that they might catch fish in those spots. Tell the students that different fish species prefer to live in different locations within a lake or stream. Make a list of locations where the students have found fish in the past. Ask the students why they think the fish like those particular "hideouts." What do they know about certain species of fish that might give them some clues as to where those fish can be found? You can ask these questions as an informal discussion, or have the kids brainstorm ideas and record them in a graphic organizer.

2 Ask students how changes in the habitat might benefit or harm fish.

3 Ask students to think about these questions throughout the rest of the lesson.

4 Define structure for the students. Write the definition on the whiteboard.

5 Direct the students' attention to the lake and stream outlines on the whiteboard. Add the various types of structure to these lake and stream drawings. Label and define each type of structure as you draw them:
- structure types for a lake: aquatic plants, fallen logs and brush piles, drop-offs, deep holes or pools, and docks
- structure types for the stream or river: aquatic plants, fallen logs and brush piles, riffles, runs, deep holes or pools, cut-banks, undercuts, point-bar, rocks, and eddies

6 Explain that the drawings of the lake and stream or river are habitat maps that illustrate a birds-eye view of structure and characteristics. These maps can help anglers locate likely fish habitat hideouts!

7 If you have photos from magazines or books that show stream, river, or lake habitat or photos of a local lake or stream, show them to the students and ask them to compare the drawings on the board with the photos. Can they identify stream or river and lake habitat structure in these photos?

Graphic organizers can take the form of a concept map, tree, star or web showing definitions, attributes, examples, classifications, structures, examples, relationships, and brainstorming. Charts and tables show attributes, characteristics, comparison, and organization. A chain or timeline illustrates processes, sequences, cause and effect, and chronology. Diagrams, charts, and drawings show physical structures, spatial relationships, and concrete objects. Cut and folded paper can be fashioned into flaps that, when lifted, reveal details, definitions, descriptions, or explanations. (Research graphic organizers on the Internet for more ideas on how to make them.)

Lesson

Part 1: Identifying Habitat Hideouts

1. Pass out a **Lake Habitat Sheet**, a **River or Stream Habitat Sheet**, and a **Fish Habitat Chart** to each student. The drawings on the whiteboard should resemble those on the **Lake Habitat Sheet** and the **River or Stream Habitat Sheet.** Later in the lesson, the students will use these sheets as guides for creating their own large lake and river or stream habitat map murals.
2. Ask a volunteer to choose a **Habitat Hideout Fish Identification Card** from your stack. Ask the volunteer to read the name of the fish species to the class. Describe the fish and refer to the illustration on the **Fish Habitat Chart**. You may also wish to hold up, or point to, a large picture or replica of the fish if you have large pictures or mounts available. Print fish illustrations from the *MinnAqua Leader's Guide* image CD on 8.5" x 11" sheets, or find fish photos in magazines or on the Internet.
3. Have your volunteer read the back of the card to the class and decide where in the lake or river or stream this fish might live. Would you find that type of fish in a lake or stream? Is this fish most likely to be found in aquatic plants, in a brush pile, or in a pool?
4. Discuss why the fish might prefer that location and habitat. What kind of food does it eat? Where does it find its food? Are its eyes sensitive to light?
5. If the fish can be found in more than one place, have the student choose one likely location and, using the drawings on the whiteboard, point to this habitat or structure.
6. On their **Fish Habitat Charts** have students list the characteristics and preferred habitat for that fish.
7. Complete Steps 5-7 for all sixteen cards in the deck. Ask the students to complete the **Fish Habitat Charts**.

Part 2: Making Habitat Map Murals and Practice Casting

1. Divide the class into two groups. Using paper from the roll of butcher paper or newsprint (a canvas tarp or white sheet can be used to make the mural more durable for display), have one group of students work together to design a large river or stream habitat map mural. The other group should create a large lake system habitat map mural. You may wish to divide the students into smaller groups and have half of the groups make river or stream habitat maps, and the others make lake habitat maps. Be sure that the students show the various eddies, pools, and aquatic plants, but ask them not to label them at this point.
2. Have the students place the self-sticking labels noting the types of structure (eddy, pool, brush pile, aquatic plants, and so forth) in the appropriate areas on the river or stream and lake maps.
3. Flip the text part on each set of the **Habitat Hideout Fish Identification Cards** so the blank side faces out.
4. Separate the students into pairs. Hand out a **Habitat Hideout Fish**

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You may wish to have the students make their large habitat maps of a local lake and river or stream. Visit these locations and ask the students to make preliminary observations and drawings. Note the locations of various types of structure. When you return to the classroom, have the students refer to the field drawings as they draw their habitat map murals.

Identification Card to each pair of students. Have students place their fish into the appropriate area on the lake and river banner without using their **Fish Habitat Charts**. When the students are finished, go through all of the fish and their characteristics and discuss why each might prefer to live in a specific location. Ask students where they would go to fish for each of the species. Where would they cast?

5 Gather the pop can casters with casting plugs tied to the lines. (See **Lesson 5:3—Pop Can Casting**.) The casting plugs and **Fish Identification Cards** can be fitted with self-stick Velcro so that the students can try to cast and catch fish. Place the hooked pieces on the casting plugs, and the looped pieces on the fish cards. Place each fish card in the appropriate structure area on the habitat map murals. Have students form lines to take turns casting for fish on the large lake and river or stream murals. Before casting, ask each student to identify the type of fish they'd like to catch and to name the habitat type that would be the best place to aim their cast.

6 Have students compare their ideas or concept maps from the Warm-up discussion with what they've learned about fish habitat, structure, and fish characteristics. Ask the students to explain how the things they've learned about fish habitat and structure could make them more successful anglers.

Part 3: Relay Game

1 To reinforce what the students have learned, play a relay game.

2 Divide the class into two teams.

3 Line up the teams single file on one end of the field.

4 Place three hula-hoops with their representative habitat labels (aquatic plants, brush pile, and pool) on the far end of the field, approximately 50-75 feet from where the teams are lined up. (See **Habitat Hideout Playing Field Diagram**.)

5 Flip the text part of each set of **Habitat Hideout Fish Identification Cards** so the blank side faces out and set one set of each picture side up in front of each team.

6 When signaled to begin the relay, the first person in line on each team picks up a fish card and races to put it in the appropriate hula-hoop (structure type). This student then returns to their team and goes to the end of the line. The student in the front of the line then repeats this process.

7 It might be difficult, sometimes, to decide where a fish belongs. Each student should choose a location—and be able to explain their choice.

8 At the end of the game, go through each card with the class and review where it belongs. Lift up the fish picture to see the structure symbol underneath to see if the card is placed in the correct habitat structure.

9 If cards have been placed in the wrong habitat locations, discuss why. The team placing the most cards in the correct habitats wins the game. In case of a tie, the team that finishes first wins.

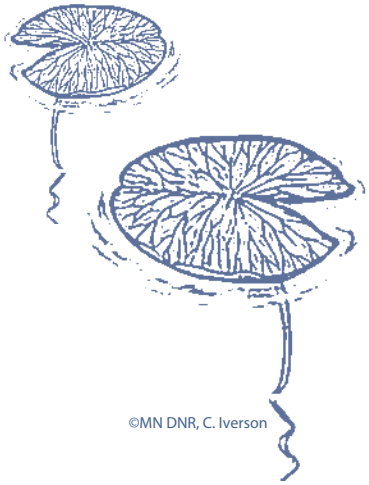
Wrap-up

1. Ask students to describe actions that might result in habitat loss. (Removal of vegetation to create a beach or to build a dock, removal of brush piles or fallen logs to clear paths for boats.) Ask students to describe some ways aquatic habitat might be improved. (Adding structure such as brush piles, fallen logs and submerged rocks, planting native aquatic vegetation, restoring meanders in a stream.) For each type of habitat change resulting in habitat loss or in habitat improvement, have students decide if the action impacts fish positively or negatively.

   Discuss how people who are purchasing shoreline property should consider an area that matches their desired activities (such as fishing, boating, or swimming). For more information, see the presentations *Restore Your Shore: A Guide to Protecting and Restoring the Natural Beauty of Your Shoreland* and *Save Our Shorelines: A Strategy for Helping Shoreline Owners Preserve Wildlife and Water Quality*. These programs are available in CD format from the Minnesota DNR Information Center at 651-296-5481 or 1-888-MINNDNR (646-6367).
2. Why do fish need habitat hideouts? Review where to fish for different species of fish.

Assessment Options

1. Have students complete the **Lake Habitat Sheet** and **River or Stream Habitat Sheet**, including:
   - Labels for three different types of structure in the lake and three types of structure in the river or stream, or have students create a color-coded key to identify the types of structure shown in their habitat map murals.
   - Draw and label the different fish species likely to use each of these structure types as a preferred habitat.
   - Choose one of the fish from the river or stream and one from the lake and write a paragraph describing the reasons each species would prefer a particular structure type in the river or stream or lake.
2. Assess student participation in Wrap-up discussion for understanding how habitat changes can impact fish populations positively or negatively. Ask the students to identify how particular habitat alterations could impact a specific type of fish.
3. Have students write their own angling column on what to look for in a good fishing spot when angling for several different species of fish. The title of this article could be "Fishy Habitat Hideouts."
4. Assessment options include the Checklist and Rubric on the following pages.



Checklists are tools for students and instructors. Checklists involve students in managing their own learning. They help students understand and set learning goals before the lesson begins, and help them monitor their progress during the lesson, ensuring that they meet learning goals and objectives by the end of the lesson. Students can also use checklists to discover areas that may need improvement. Checklists help instructors monitor each student's progress throughout the lesson, facilitating appropriate adjustment of instruction to ensure learning by the end of the lesson. The instructor may wish to have students add several of their own learning goals to the checklist to personalize it, and to accommodate varied learning needs and styles.

Grade

26-28 points = A
Excellent. Work is above expectations.

23-25 points = B
Good. Work meets expectations.

19-22 points = C
Work is generally good. Some areas are better developed than others.

14-18 points = D
Work does not meet expectations; it's not clear that student understands objectives.

0-13 points = F
Work is unacceptable.

Habitat Hideout Checklist

Possible Points	Points Earned Student	Points Earned Instructor	
6	_____	_____	Student identifies three different fish habitat structure types on a lake, river, or stream habitat map.
6	_____	_____	Student lists at least two types of fish that live in each of the three habitat types.
3	_____	_____	Student describes how three different types of structure provide beneficial habitat for fish.
3	_____	_____	Student describes appropriate adaptations or characteristics of fish species that are suited to each of the three habitat structures.
2	_____	_____	Student defines *structure*.
4	_____	_____	Student defines *meander, pool, riffle,* and *undercut*.
4	_____	_____	Student explains why learning about lake and river or stream structure—and the types of structure fish need—can help anglers catch fish.
Total Points			
28	_____	_____	**Score** _____

Habitat Hideout Scoring Rubric

Fish and Structure Criteria	4 Excellent	3 Good	2 Fair	1 Unacceptable	0 Unacceptable
Structure	Identifies three different types of fish habitat structure on a lake, river, or stream map..	Identifies two different types of fish habitat structure on a lake, river, or stream map.	Identifies one type of fish habitat structure on a lake, river, or stream map.	Can't identify a type of habitat structure on a lake, river, or stream map.	Makes no effort to identify structures.
Fish species	Lists at least two types of fish that live in each of the three habitat structures.	Lists at least one type of fish that live in each of the three habitat structures.	Lists at least one fish that lives in at least two different habitat structures.	Lists at least one fish that lives in one habitat structure.	Makes no effort to identify fish.
Habitat characteristics	Describes two types of structures in a lake and two types in a river or stream that are good habitat for fish. Describes appropriate characteristics of one fish species that prefers each of the four habitat structures. .	Describes two types of structures in a lake and in a river or stream that are good habitat for fish. Describes appropriate characteristics of one fish species that prefers each of the three habitat structures.	Describes one type of structure in a lake and one type in a river or stream that are good habitat for fish. Correctly identifies characteristics of a fish species that prefers each of the two habitat structures.	Describes one type of structure in a lake or in a river or stream that is good habitat for fish. Describes appropriate characteristics of a fish species that prefers that habitat structure.	Makes no effort to describe structures or fish characteristics.

Score _____ (Calculate score by dividing total points by number of criteria.)

Diving Deeper

Extensions

1. Have students draw a map of their local lake (or print maps available online on the DNR Lake Finder at **www.mndnr.gov**) and chart the fish hideouts. If the student has caught fish or observed fish at a certain spot, make sure that spot is indicated on the map.
2. Ask the students to write a hypothetical letter to a lakeshore owner who intends to remove all the aquatic vegetation from their lakeshore to create a sandy beach. What would they want to say to the person about vegetation and fish habitat? You could also ask them to write a letter to the editor of a lake association newsletter concerning the importance of aquatic vegetation in the lake.
3. Fill a large white pan or children's pool with water. If the water isn't dechlorinated, let it sit uncovered overnight. Add minnows to the water and observe where they rest. One at a time, add types of structure such as large rocks, weighted sticks, or plants and observe where the minnows rest. Be sure to return minnows only to the water body where you collected them, or use them for fishing.
4. Do **Lesson 2:6—Adapted for Habitat** with your class.

For the Small Fry

K-2 Option

1. Use the **Habitat Hideout Fish Identification Cards** with only the fish and structure pictures (aquatic plant, brush pile, and pool). Have students play the relay game using two sets of the two-sided cards. Players should try to match the habitat on the back of the card with the correct hula-hoop habitat. Matching helps students discover that fish live in varied habitats. (Use three hula-hoop habitats labeled aquatic plants, brush pile, or pool). After the game, ask the students if they can guess why each type of fish prefers its habitat. Discuss characteristics of the fish and how they're related to their preferred habitat. (The bluegill has a small mouth and eats insects—and insects live among the plants in the water.)
2. Flip the structure picture of the **Habitat Hideout Fish Identification Cards** so the blank side faces out. Place the cards with the fish illustration side down in the appropriate habitat and structure on a lake or river mural. Have the students "go fish" with dowel poles or pop can casters to discover the kinds of fish that can be found in different types of habitat in the lake or river or stream. Have the students place the fish cards face-up in the appropriate structure in the lake or river or stream. They can then take turns to decide what type of fish they want to catch and aim for the appropriate structure when they cast.

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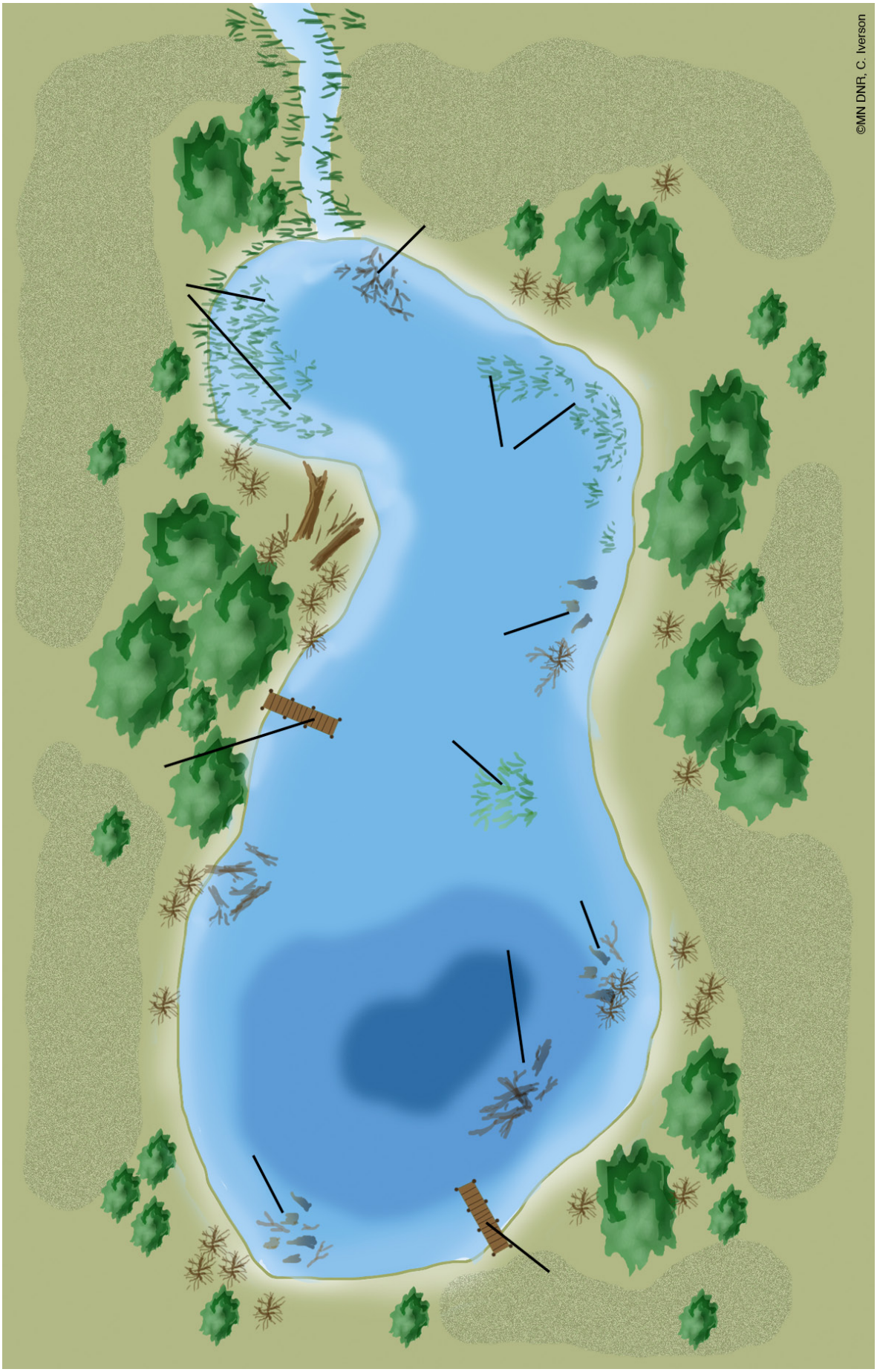
Lake Habitat Sheet



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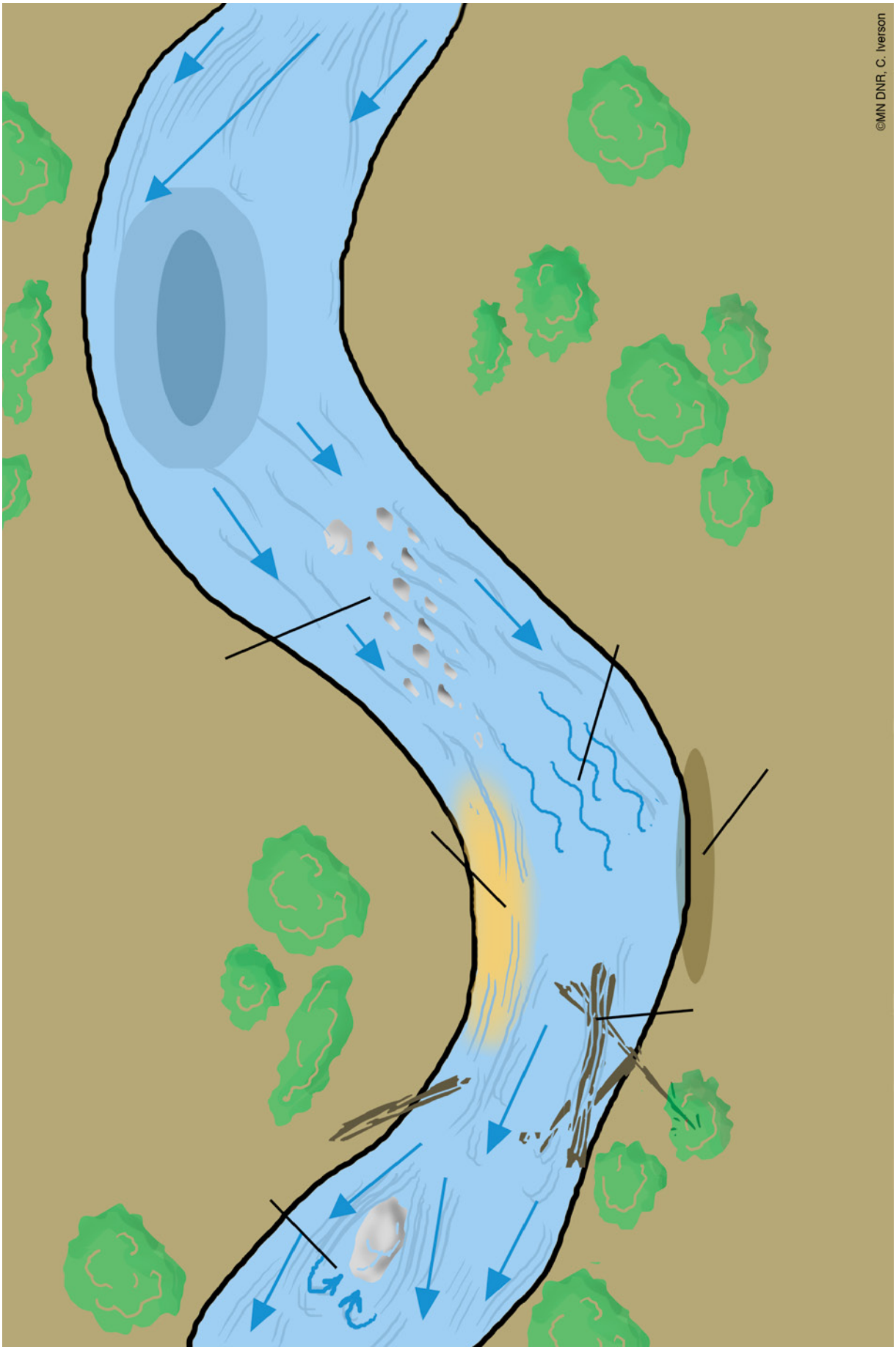
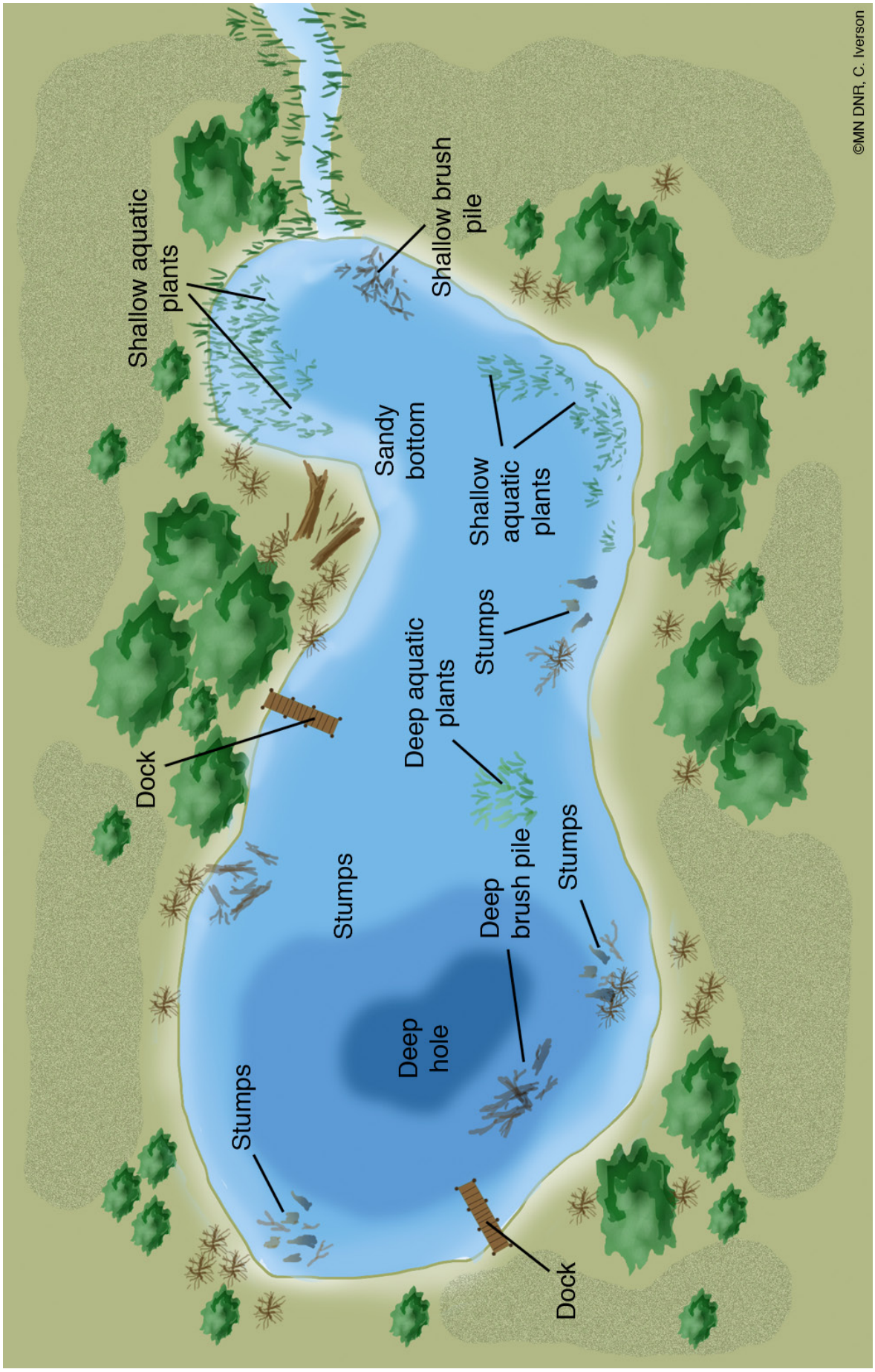
River or Stream Habitat Sheet



INSTRUCTOR COPY

Lake Habitat Answer Sheet



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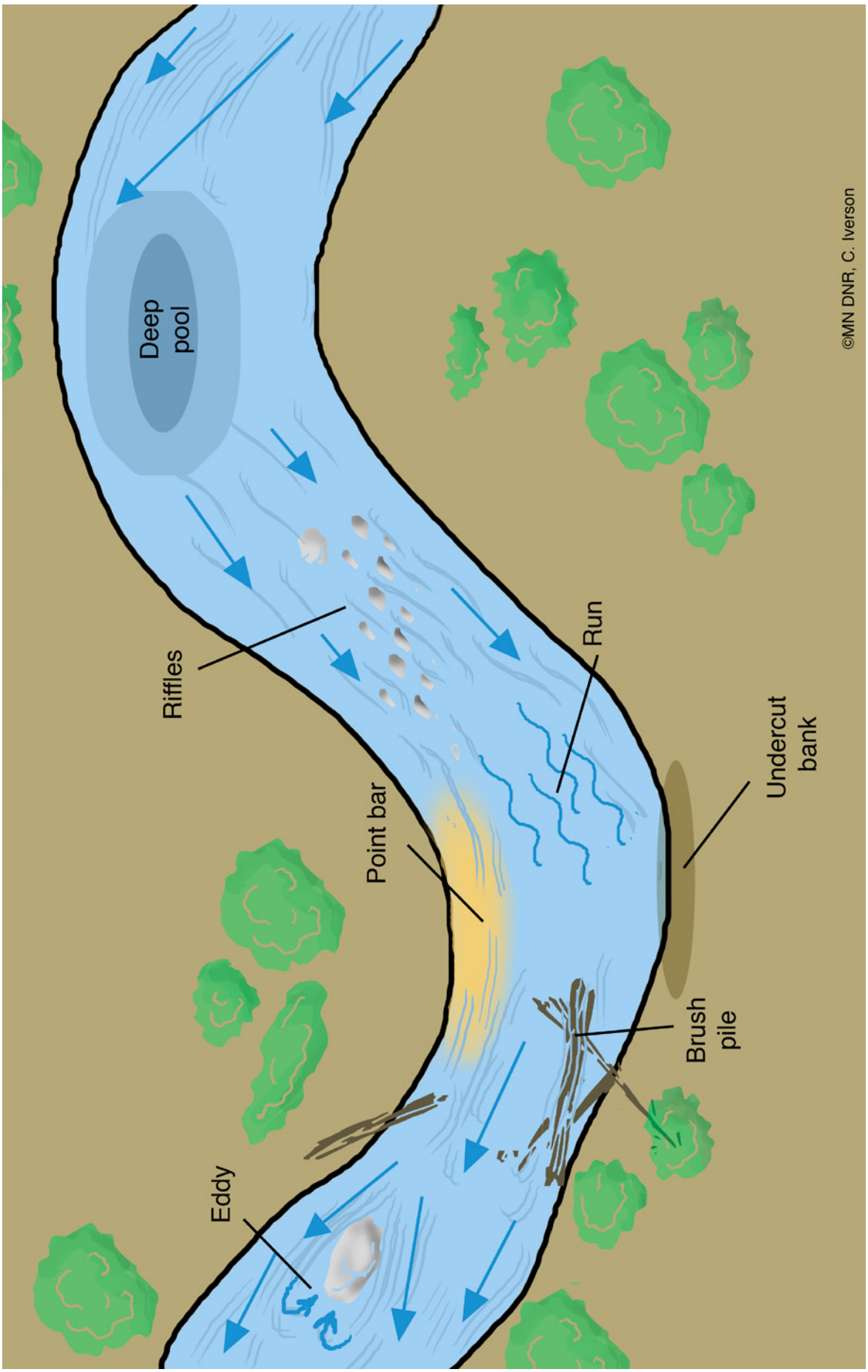
River or Stream Habitat Answer Sheet



INSTRUCTOR COPY

Habitat Hideout Playing Field Diagram

STUDENT COPY

Name _____ Date _____

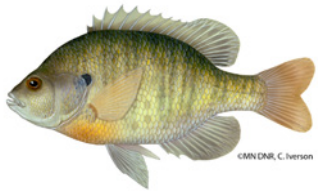
Fish Habitat Chart

Fish Species	Characteristics	Preferred Habitat
 1. Largemouth Bass *Micropterus salmoides*		
 2. Black Bullhead *Ameiurus melas*		
 3. Freshwater Drum *Aplodinotus grunniens*		
 4. Burbot *Lota lota*		
 5. Lake Sturgeon *Acipenser fulvescens*		
 6. Brook Trout *Salvelinus fontinalis*		

STUDENT COPY

Name _____ Date _____

Fish Habitat Chart

Fish Species	Characteristics	Preferred Habitat
 7. Northern Pike *Esox lucius*		
 8. Black Crappie *Pomoxis nigromaculatus*		
 9. Rainbow Trout *Oncorhynchus mykiss*		
 10. Bluegill *Lepomis macrochirus*		
 11. Channel Catfish *Ictalurus punctatus*		

STUDENT COPY

Name _____ Date _____

Fish Habitat Chart

Fish Species	Characteristics	Preferred Habitat
 12. Walleye *Sander vitreum*		
 13. Longnose Gar *Lepisosteus osseus*		
 14. Yellow Perch *Perca flavescens*		
 15. Smallmouth Bass *Micropterus dolomieu*		
 16. Common Carp *Cyprinus carpio*		

Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Bluegill
Lepomis macrochirus

Habitat: Lakes and rivers in shallow water among aquatic plants

Behavior: Travels in schools; stays in shade during daytime

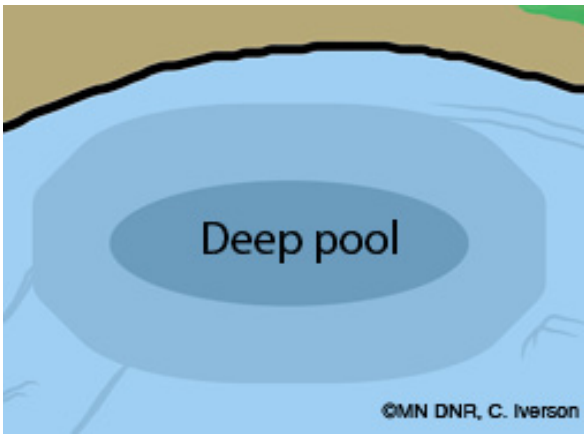
Food: Insects, snails, and zooplankton

Walleye
Sander vitreum

Habitat: Lakes and rivers in deep water such as pools and near drop-offs

Behavior: Moves to shallower water on cloudy days or at night; travels in loose schools

Food: Small fish, insects, crayfish, and leeches



Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Black Crappie
Pomoxis nigromaculatus

Northern Pike
Esox lucius

Habitat: Lakes and rivers along aquatic plants and in the branches of fallen trees in weed lines and submerged woody debris

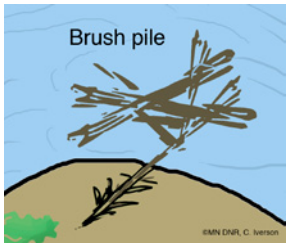
Behavior: Gathers in loose groups around cover

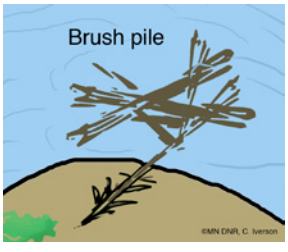
Food: Small fish, invertebrates, and zooplankton

Habitat: Lakes and rivers near aquatic plants

Behavior: Hides from prey in brush or aquatic plants; very fast and aggressive when chasing prey fish

Food: Small and medium fish





Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Common Carp
Cyprinus carpio

Black Bullhead
Ameiurus melas

Habitat: Lakes and rivers

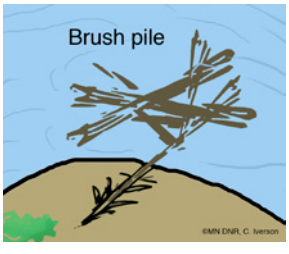
Behavior: Feeds on bottom among aquatic plants

Food: Insects, crayfish, plant roots, shoots, and seeds

Habitat: Lakes or rivers among aquatic plants or brush

Behavior: Locates food using taste and smell; has taste buds on barbels (whiskers) and on entire body

Food: Aquatic plants, insects, crayfish, frogs, and small fish



Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Smallmouth Bass
Micropterus dolomieu

Largemouth Bass
Micropterus salmoides

Habitat: Lakes and rivers near rocks, brush and drop-offs

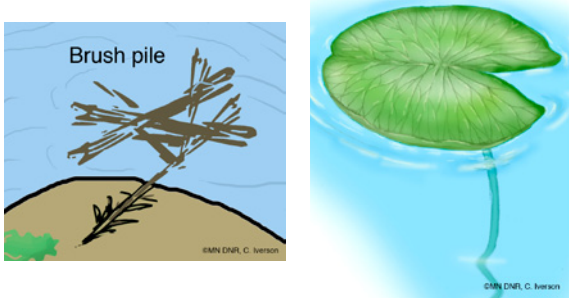
Behavior: Ambush feeder; most active in morning and evening; highly territorial

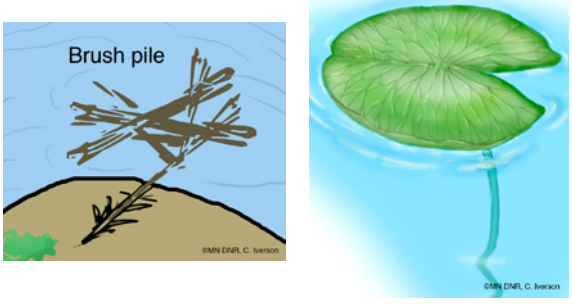
Food: Small fish, crayfish, and leeches

Habitat: Lakes and rivers in brush and aquatic plants

Behavior: Ambushes prey from hiding spot in brush or aquatic plants; highly territorial

Food: Small fish, crayfish, and frogs





Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Brook Trout
Salvelinus fontinalis

Yellow Perch
Perca flavescens

Habitat: Cold water streams with deep pools and undercut banks

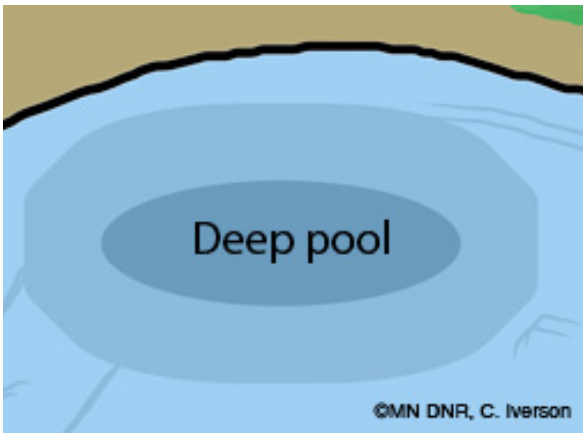
Behavior: Rests in pools and undercut banks; feeds on organisms swept downstream

Food: Small fish, insects, and scuds

Habitat: Lakes and rivers near rocks and aquatic plants

Behavior: Swims in large schools

Food: Small fish, zooplankton, insects, snails, and crayfish



Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Rainbow Trout
Oncorhynchus mykiss

Burbot
Lota lota

Habitat: Cold water streams with deep pools and undercut banks

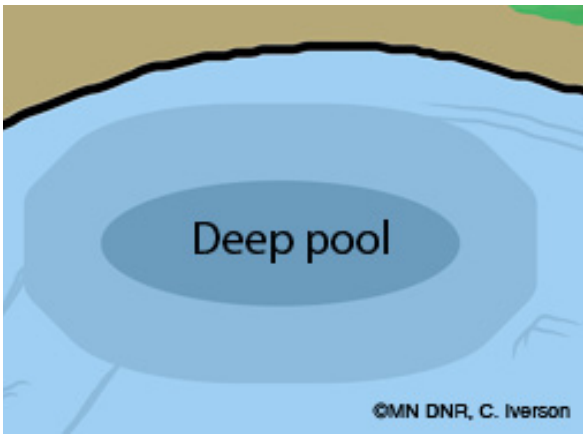
Behavior: Rests in pools and undercut banks; feeds on organisms swept downstream

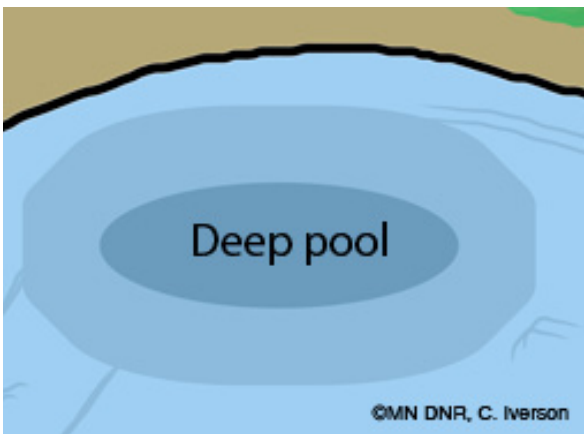
Food: Small fish, insects, and scuds

Habitat: Cool water lakes in deep water and in pools or holes

Behavior: Spawning takes place very early in the year, often before ice melt; known to gorge on food, which expands their stomachs

Food: Yellow perch, whitefish, and ciscoes





Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Channel Catfish
Ictalurus punctatus

Lake Sturgeon
Acipenser fulvescens

Habitat: Rivers in undercut banks and pools

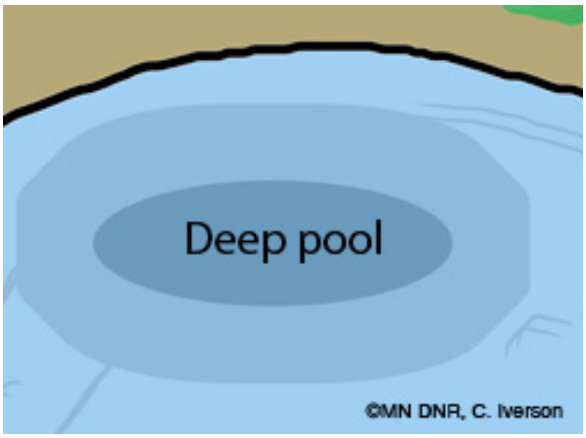
Behavior: Locates food using taste and smell; has taste buds on barbels (whiskers) and on entire body

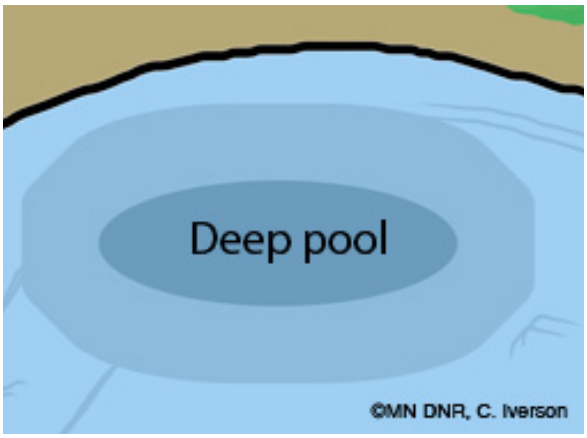
Food: Aquatic plants, insects, crayfish, frogs, small fish

Habitat: Large rivers and lakes in deep pools and near drop-offs

Behavior: Sucks food off bottom with tube-shaped mouth

Food: Snails, clams, crayfish, and insects





Habitat Hideout Fish Identification Cards

Prepare cards as indicated in Step 2 of the lesson Preparation.

Freshwater Drum
Aplodinotus grunniens

Longnose Gar
Lepisosteus osseus

Habitat: Lakes and rivers in central, western, and southern Minnesota

Behavior: Stays near bottom and in pools; makes croaking or booming sound using its swim bladder

Food: Insects, crayfish, clams, snails, and, occasionally, zebra mussels

Habitat: Large river systems, in backwater bays and side channels, and in aquatic plants

Behavior: Hunts lie-in-wait-style by quietly floating like a log until a small fish comes within snapping distance

Food: Other fish such as minnows and gizzard shad