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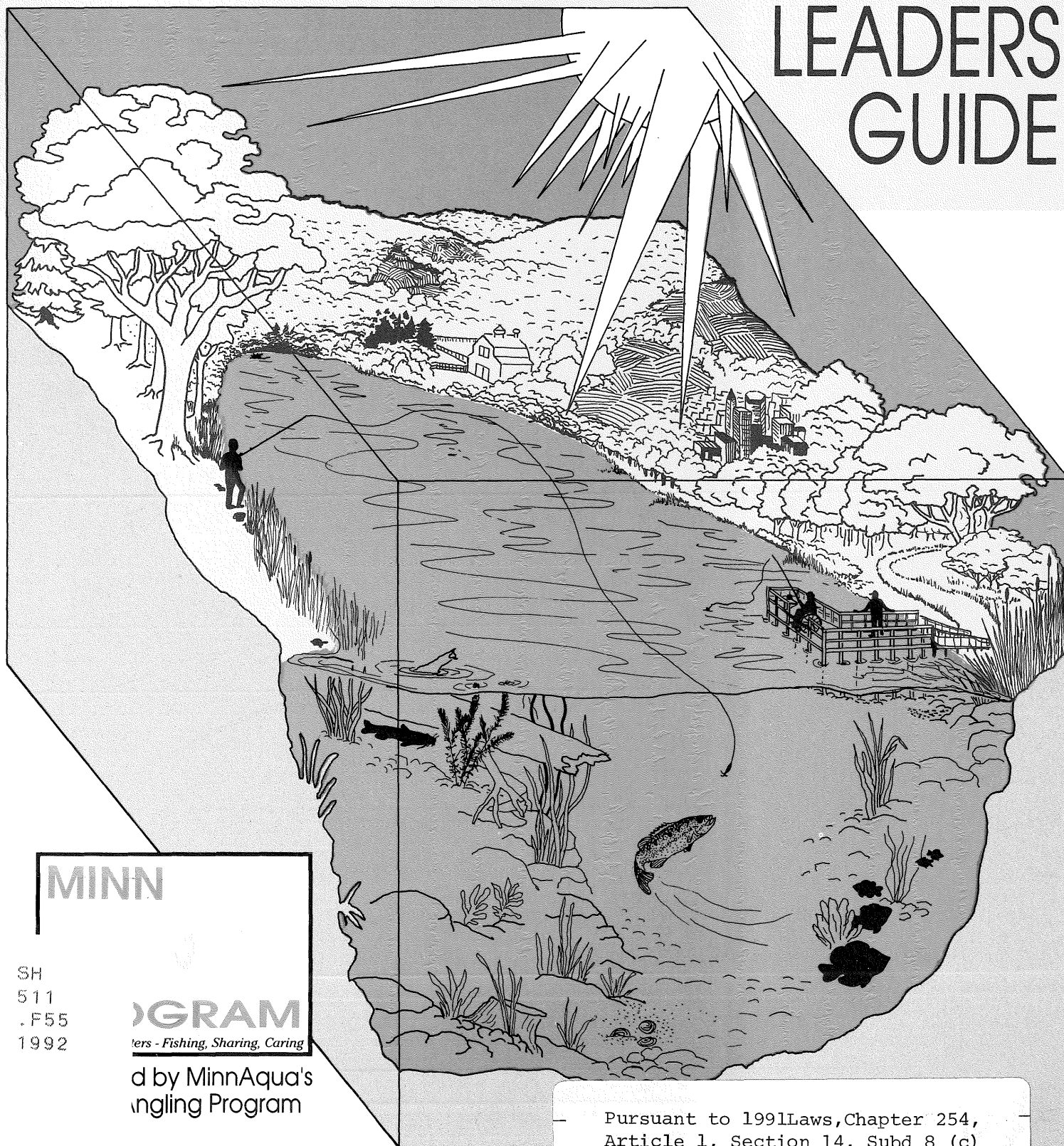


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Fishing...

Get in the Habitat!

LEADERS GUIDE



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Welcome to MinnAqua

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The primary goal of the MinnAqua Program is to assist Minnesotans in understanding the management, conservation, and stewardship of our aquatic resource, and the role that angling plays. The program does this by presenting hands-on activities for you to do. The program starts with learning about the basics – habitats. It then builds upon putting what you have learned into action – the fishing trip.

Fishing is an environmentally and socially acceptable outdoor recreational activity that can become a lifelong sport. The Minnesota Department of Natural Resources and Minnesota Extension Service 4-H Youth Development have provided these materials to give you a better understanding and appreciation of fishing. These materials also provide you with a means to teach others.

The MinnAqua Program includes a variety of subject areas that must be mastered in order to qualify as a successful graduate. To supplement these materials, you may wish to talk to a local resource biologist. To test the group's skills and how much they have learned, lead them in discussions and activities

before you go on to the next chapter. Upon completion, a certificate and "KidsKit" are given out to show that the group or each child has completed the course.

Minnesota has high-quality angling. To ensure that quality remains, emphasis during the event needs to be put on the fishing experience rather than just filling the freezer. We must also encourage the participants to listen to all views and think about the consequences of their actions. The Minnesota DNR needs everybody's help in using our aquatic resources wisely.

We hope you have a fulfilling outdoor experience whenever you go fishing or exploring Minnesota's aquatic resources. The information in these materials provides a good start. The next step is to get out and do it.





Fishing . . . Get in the Habitat! Leaders' Guide

Is sponsored by MinnAqua's Urban Angling Program, a cooperative educational effort between the Minnesota Department of Natural Resources (DNR), Section of Fisheries, and the Minnesota Extension Service (MES), 4-H Youth Development. If you would like more information, call or write:

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This material adheres to the seven goals of environmental education as stated in the 1990 Minnesota Environmental Education Act and meets Model Learner Outcomes for Environmental Education.

Fishing. . . Get in the Habitat

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How to Use This Book

This book is divided into chapters. Each chapter is a part of an aquatic puzzle. Each part contributes to a better understanding of Minnesota's aquatic systems and the basics of fishing. When these chapters are done in the order presented, they build upon each other to form a complete aquatic picture.

Each chapter highlights a variety of activities to choose from that you can do with your group: **Beginner activities** should be used with youth who have little to no experience with aquatic systems and fishing. **Intermediate activities** are for those with limited knowledge and experiences. **Advanced activities** are for those with a lot of experience. **Site studies** are done at the lake or stream where you plan to go fishing. These studies take more time to prepare for, and require additional instructors and people to help supervise. Each activity write-up includes a list of the materials you will need, references for you to

consult, and ideas for modifications or other related activities.

These educational activities can be arranged into programs that require from one hour to six hours to complete: "**MinnAqua Events**" are one to five hours in length and "**MinnAqua Clinics**" are six hours. Programs that are more promotional, such as fair booths and Take a Kid Fishing, are called "**MinnAqua Nibbles**".

With such a variety of activities and programs to choose from, you have the flexibility to tailor the program to meet your group's time constraints, topics, and experience levels. It is also possible to work with the same group many times without repeating the same activities. Here are two examples that you as an instructor might like to use. (For your use, blank program planning outlines are located in the back of this book.)

Example #1

This program can be used for 9 to 10-year old youth who have limited knowledge or background in aquatic systems or fishing. Activities will occur on 3 different days with the program being 2 hours each day. The first two days are scheduled to meet at a community center without water access. On the final day the group will take a bus to a nearby lake with a public fishing pier.

MinnAqua Clinic

Duration: 3 Days; 2 Hours per Day

DAY ONE

<u>Duration</u>	<u>Activity</u>
30 min.	Set up and Prep Volunteers
10 min.	Sign in on Program Roster and Collect Participant Release
5 min.	Welcome and Introductions
15 min.	Chapter 1 – Habitat Lap Sit
25 min.	Fish Identification
5 min.	Break
30 min.	Chapter 2 – Fish Printing

5 min.	Break
30 min.	Chapter 3 – Would You Drink This Water?
5 min.	Clean up and Wrap up

DAY TWO

<u>Duration</u>	<u>Activity</u>
30 min.	Set up and Prep Volunteers
10 min.	Take Attendance (add new names to Program Roster)
5 min.	Welcome & Review Previous Chapters
40 min.	Chapter 4 – Ethics or Regulations
10 min.	Break
50 min.	Chapter 5 – Pop Can Casting
10 min.	Clean up, Hand out Participant Release, and Wrap up

DAY THREE

<u>Duration</u>	<u>Activity</u>
30 min.	Set up, Go Over Safety and Site Evaluation, and Prep Volunteers
10 min.	Take Attendance and Collect Participant Release
5 min.	Welcome & Review Previous Chapters
20 min.	At the Water's Edge
80 min.	Fishing Time
15 min.	Clean up, Hand out "KidsKit", and Closing

Example #2

This program can be used for 9 to 10-year-old youth who have already gone through the first example or 10 to 13-year-old youth who have some knowledge of aquatic systems and fishing. The activities will take place in a six-hour day at a park with lake access.

MinnAqua Clinic

Duration: 1 Day

<u>Duration</u>	<u>Activity</u>
30 min.	Set up, Go Over Safety and Site Evaluation, and Prep Volunteers
10 min.	Sign in on Program Roster and Collect Participant Release
5 min.	Welcome and Introductions
30 min.	Chapter 1 – Food Web Tag

5 min.	Break
15 min.	Fish Identification
25 min.	Chapter 2 – Fish Jeopardy
10 min.	Break
40 min.	Chapter 3 – Water Quality Site Study
5 min.	Break
35 min.	Chapter 4 – Fishing for the "Helo-Waudley Pugfish"
30 min.	Lunch (Participant provides own)
40 min.	Chapter 5 – Rigging a Spin-Cast Combo
10 min.	Break
20 min.	At the Water's Edge
90 min.	Fishing Time
15 min.	Clean up, Hand out "KidsKit", and Closing



Planning Schedule

Getting involved in a MinnAqua program takes time and planning. It is never too early to start. These general guidelines are here to help you. Contact the MinnAqua staff person closest to you if any assistance is needed during this process.

ONE MONTH BEFORE

- Identify your own audience and site or ask a MinnAqua staff person for an assignment.
- Work with a contact from the group to plan your program. Use the appropriate **Program Planning Outline** form¹ as a guide.
- Ask your contact to have the appropriate people sign the **Program Liability Coverage** form. If the group does not have coverage, contact your local MinnAqua staff.
- Order any needed supplies using the **Material Request** form.
- Visit the location and make note of safety and other special needs on the **Safety and Site Evaluation** form.
- Contact others from a **MinnAqua Volunteer List** to help with the event. Rule of thumb: one adult/junior volunteer per five kids while working around water; one per ten kids in classroom. (Note: Volunteers who have attended a MinnAqua training session are covered by MES and DNR volunteer liability when helping at authorized programs.)

TWO WEEKS BEFORE

- Assemble all teaching materials. If you have questions about the concepts to be covered contact your local MinnAqua staff or resource biologist.
- Contact your volunteers and have a short meeting to assign activities and prepare for the program. You may want to have them help you assemble certain teaching materials.
- Finalize all arrangements including transportation, publicity, donations, and refreshments when needed.

- Give your contact the **Participant Release** form. These forms should be filled out by an adult and returned prior to or at the program.

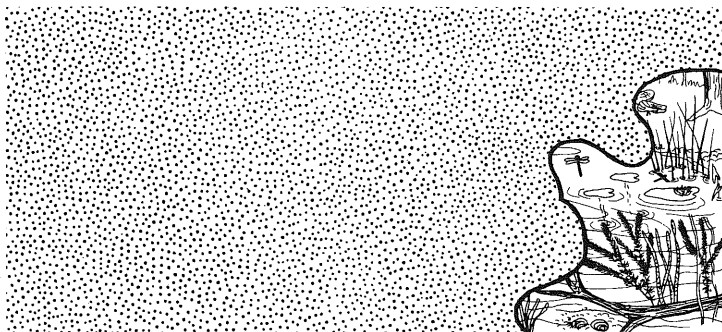
THE EVENT

- Organize your materials and thoughts using your outline.
- Set up a safety and drinking water station.
- Review assignments and safety guidelines with your volunteers.
- Fill out the front of the **Program Roster** form.
- Ask participants and volunteers to sign in on the other side of the roster.
- Check for **Participant Releases** or ask an adult to fill one out.
- Welcome your group and get started. Follow your outline, but add bathroom, drink, and stretch breaks as needed.

THE END

- Collect the equipment.
- Clean up the site with help from the group.
- Hand out appropriate evaluation sheets and collect them before participants leave.
- Hand out a MinnAqua “KidsKit” to participants and remind them of other programs to join or encourage them to form a fishing club.
- **Return borrowed equipment/materials, Program Outlines, Safety and Site Evaluation, Program Liability Coverage, Participant Releases, and Program Roster to MinnAqua.**
- Remember to thank everyone who helped make the program a success.

1. All forms found in the back of the book.



Habitats and Ecosystems

What will the group learn? Individuals will be able to name the four basic habitat needs and describe various habitats used by fish and humans. They will also be able to see plants and animals as part of a food web, and understand that these plants and animals are dependent upon each other and these needs for survival.

Habitat – A Closer Look

Food, water, cover, and space are the four basic habitat needs of all living organisms – from bluegill to songbirds to humans. A bluegill spends its day trying to meet all its needs – feeding, drawing oxygen from water, hiding from predators, and finding enough space to move around in small, loose groups. If all these needs are regularly met, then the bluegill has found a welcomed habitat – a safe and thriving home.

Sometimes, a single area doesn't fill all of an organism's needs: **Food** in a lake, pond, or stream might be limited; too many fish that prey (feed) on smaller fish may be present and limit their food supply; large numbers of bass might eat all of the bluegill in a pond leaving none to reproduce and thus eliminating one of their food supplies. People also may face food shortages. Sometimes these food shortages affect large human populations; more often they affect individual families.

Water, as you might have guessed, is critical to a fish's survival. Quantity alone won't ensure a thriving fish population. The quality of water often decides which species, if any, can live in a given lake, pond, or stream. Water quality also decides where people can swim.

Aquatic plants, rocks, fallen trees, and other items form **cover**. Each type of fish uses cover for different reasons. Small fish stay in cover to avoid being eaten,

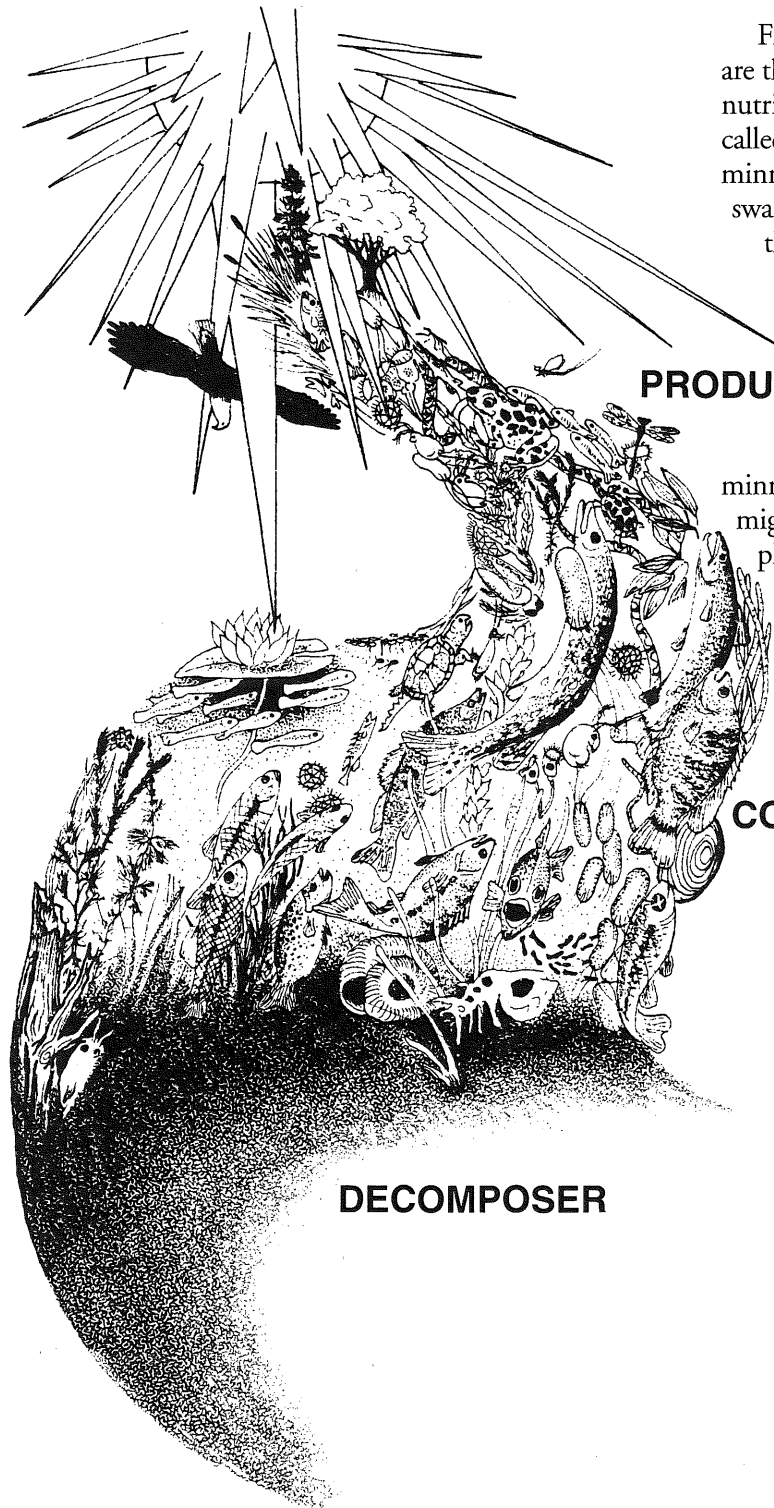
while larger fish may use cover as camouflage to ambush unsuspecting prey. Both may use it for spawning. Humans also need cover to protect them from the rain, snow, and tornadoes!

Space is the final critical need of any animal or plant. The amount of space available directly affects the number of plants and animals in that area. Some fish, like minnows, need very little space and will swim in schools. Others, like catfish, need more space and tend to be loners. Many animals need individual space. Even humans don't do their best in places where their personal needs for space are not met.

Only a limited number and size of fish can be supported in a lake or pond by these habitat needs – this is the water body's **carrying capacity**. Carrying capacity is the total size and amount of an organism that an area can support without damaging the individual organism or the area. When fishing, we should keep this in mind and not expect to catch what the system can't produce.

Food Webs

One of the most limiting habitat needs is food. Organisms need fuel to carry on their activities. To get this fuel, organisms transfer energy by feeding on each other. This process is called a food web. **So, how is a food web spun in a pond, lake, or stream?**



From the arctic to the tropics, the sun and nutrients are the source of energy for food webs. The sun and nutrients help plankton (microscopic plants and animals called food **producers**) grow. The plankton are eaten by minnows and insects (food **consumers**). The minnow is swallowed whole by a perch (food consumer), which is then chased and eaten by a northern pike (food consumer). The pike is dinner for a human family of four (food consumer). Finally, organisms such as bacteria (food **decomposers**) break down dead or waste materials into nutrients. These nutrients then provide future fuel for producers. **But wait!** The pike also eats minnows, and the people also eat perch, and the perch might be hungry enough to feed directly on the plankton. Now we've got a web.

PRODUCER

CONSUMER

DECOMPOSER

Habitat Lap Sit®

Purpose: Everyone should understand the concept of habitat, be able to name the four basic habitat needs of fish, and understand that fish and humans have a lot of needs in common.

Level: Beginner

Group Size: 12 to 30

Site: Outdoors (grassy area) or Indoors (gym or classroom)

Time: 15 to 20 minutes

*Supplies: Habitat Needs Master (page 1-5)
Mounting paper/cardboard/tag board
Scissors
String
Clear contact paper (optional)*

Reference: Sport Fishing and Aquatic Resources Handbook, 69-76 and 82-85; Managing Minnesota's Fish Booklet, all sections pages 2-5; Welcome to the Wetlands poster; and Habits and Habitats of Fishes in the Upper Mississippi River.



This activity demonstrates the four basic habitat needs of fish. Group members become cover, food, water, or space and then form a circle, sitting on each other's lap. The leader will remove one of these needs, and watch the circle crumble. Prior to doing the activity, you will need to make enough Habitat Needs cards for the group.

Habitat Needs cards are made by copying the master and cutting out the four needs. Mount each need to a piece of stiff paper and cover with clear contact paper. Make a hole in each of the top corners and thread the string through them. Adjust the string and cut it so that the card hangs around the neck and can be slipped over the head.



The game begins by asking the group, “What are the four basic needs of fish?” To help them answer, ask them what they need to survive (answers will range from potato chips to video games). You can prompt them to place their needs into the four broad categories – **food, cover, space, and water** – in order to arrive at the correct responses. Some answers (such as video games) are not real needs – they’re wants. You can discuss this difference with the group. Once you get the correct responses, point out that all animals (including humans) share basic habitat needs.

Hand out a *Habitat Needs* card for each person to wear. Try to end up with an equal number of each basic need. Form four groups, one for each need, and let groups discuss briefly why their need is important to fish. Bring the groups back together, and let them share their ideas with the others.

The group now forms one large circle by alternating cover, space, etc. They should stand shoulder to shoulder and face inward. Next, the group should turn to the right and take one large step toward the center. They should be close to one another and be looking at the back of the person in front of them.

Now stand in the middle of the circle. You are a fish in this lake – swim around a bit. (*What do you look like? A perch? A walleye?*) Tell the group members that they’re responsible for keeping you alive! **They need to balance the habitat by keeping the circle intact.**

Participants should place their hands on the hips of the person in front and listen. At the count of three, everyone should sit on the knees of the person behind them, keeping their own knees together to hold the person in front of them up. Your group might be reluctant to sit on each others laps. If so, have them make a two tier pyramid or just hold hands and lean sideways. Remember, this is a beginner activity and may need to be modified to meet your groups needs.



Recite “cover, space, water/oxygen, and food in proper balance are the four basic needs of fish.” At this time, if the circle has been disrupted by someone falling, discuss how the balance of the ecosystem is dependent on all of it’s parts, big or small!

Try the circle again, this time simulating a disruption. For example, you might say “Pollution has affected the amount of oxygen available in the water. The oxygen available can’t support the types of fish present.” Remove the water/oxygens, and watch the circle collapse. Try other variations.

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For Discussion



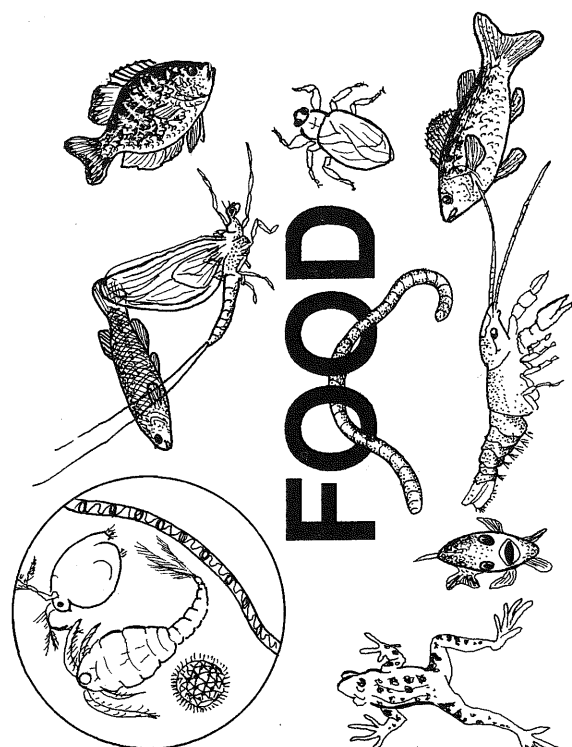
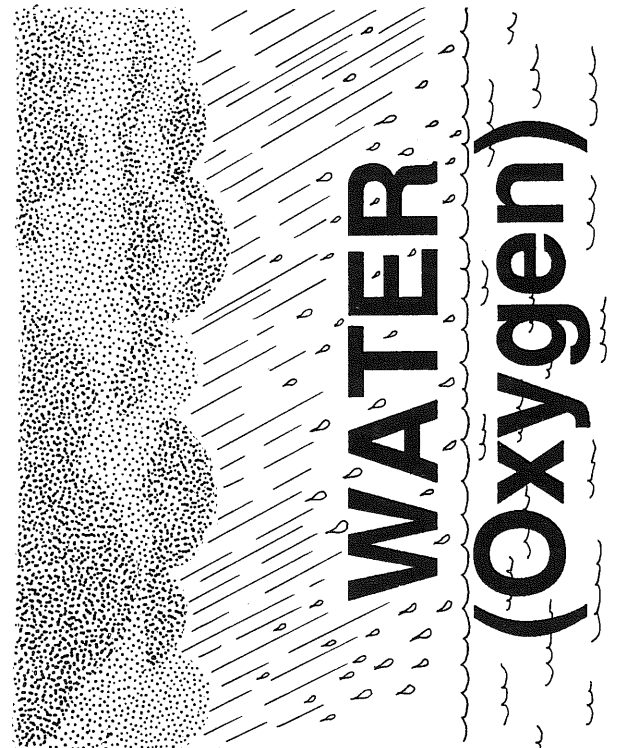

- Q. If we take lily pads away from the pond, which habitat part are we influencing?
 A. *Cover* – hiding places lost; *Water/Oxygen* – plants produce oxygen; *Food* – plants are producers and homes for many insects that fish eat; *Space* – more open areas and fewer hiding places.
- Q. Do you think that a fish’s needs are the same in the winter and summer? Why or why not?
 A. *Yes and no. Food* needs change as the water temperature changes – above 80° F or below 50° F fish eat less and don’t grow as much. *Cover, space, and water (oxygen)* needs stay pretty much the same, although they are met differently during these times. In fact, fish (*like you*) don’t always get all their habitat needs from one area. *Fish often go to different areas to fill their needs, depending on season, time of day, and weather.*
- Q. What are the four basic needs of people? Are any of them ever affected by shortages?
 A. *Food, Water, Cover and Space.* Yes (expand on each basic need – you can use a globe for this. Spin the globe, pick a country, and talk about shortages that the group knows about in that area).

Other Ideas



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 3, 4, and 7.
- Fish strive to meet their needs. So do people! Much of America was settled with habitat needs in mind. Early immigrants and American Indians settled near water or where game (animals) and other food items were abundant. You might want to discuss this “*historical habitat perspective*” with your group. Ask them about their ancestors and how they lived and filled their habitat needs. *Compare this historic environmental philosophy with that of today.* Let them tell stories about their forefathers.

Habitat Needs Master

<p>SPACE SPACE SPACE SPACE SPACE SPACE SPACE SPACE SPACE SPACE</p>	<p>FOOD</p> 
<p>WATER (Oxygen)</p> 	<p>COVER (Shelter)</p> 

Water Habitats Site Study

Purpose: Everyone should observe and identify common aquatic plants, animals, and habitats; identify the four basic needs of fish (and people); construct a food web; and understand the concepts of food webs.

Level: Intermediate

Group Size: 3 to 25

Site: Outdoors (lake, stream, etc.) or Indoors (classroom)

Time: 20 to 35 minutes

Supplies: Water Habitats ID Sheets (pages 1-9 to 1-11)

Paper

Pencils

A hard surface to write on

Study plates (Coffee can lids or the bottom of the gallon jugs)

Pantyhose (one leg for each net)

Coat hangers (one for each net)

Plastic gallon jugs (one for every net)

Waterproof glue

Duct tape

Garden rake

Large shovel

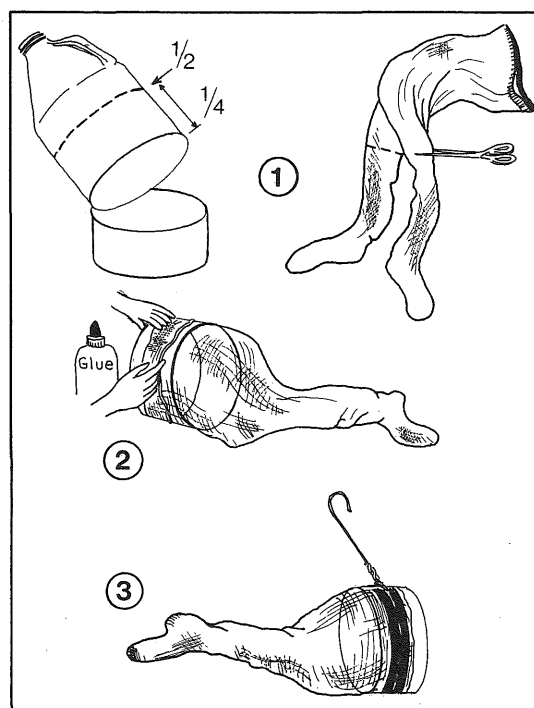
Fishing license and/or DNR permit

Reference: Sport Fishing and Aquatic Resources Handbook, 71-81; Managing Minnesota's Fish Booklet, Section 1 pages 2-9 and all other sections 2-5; and "Who Lives Here" and "Aquatic Roots" Project Wild Supplement.

sketch by sorting through muck (dug by you from the bottom of the lake) and vegetation (harvested by you with a garden rake). Using the identification sheets, the group will try to identify the specimens and make a large food web using their sketches. This activity can be done indoors; however, you will need to collect the specimens a few hours prior to the event. **For transportation, collection, and disposal procedures, check the current regulations.** Your local conservation officer, MinnAqua staff or resource biologist can also provide you with any information you need.



Collect enough materials for the program and to make the dip nets. A simple dip net can be made indoors (before going to the site) or outdoors in a sheltered location by following these instructions.



This activity allows individuals to explore a local water habitat and its inhabitants. Each individual will make a dip net and use it to collect aquatic animals. Participants will also select samples of plants and other animals to

Step 1. Collect enough coat hangers, pantyhose, and plastic bottles for each net you plan to make. Prepare the bottles and pantyhose as shown. The bottoms of the bottles can be saved and used as study plates.

Step 2. Insert the middle section of the plastic bottle into the top of the pantyhose and attach with waterproof glue.

Step 3. Make a handle by bending the wire coat hanger to fit around the bottle. Secure the hanger to the bottle by wrapping duct tape around it a few times.

After your group has constructed the nets, you're ready to go explore. Divide them into three working groups and assign an adult instructor and/or helper to each group. Give the instructors/helpers a copy of the *Water Habitats ID Sheet*. Give each youth a pencil, paper, and a hard surface to write on.

Group number one will use the dip nets to collect three animals on or below the water's surface. This should be done from a gentle sloping bank or off a fishing pier. Have them put their specimens on the available study plates while they study and draw them on their paper.

Group number two will sift (with bare hands) through the mud and muck that you have brought

up with your shovel. There will be lots of "ehhs", but they should be able to find a dragonfly nymph or a worm. They should find three "mucky" insects or invertebrate (organisms without a backbone, like a worm). Have them place their specimens on the available study plates to study and draw.

Group number three will sort through the plant samples you have collected with the rake. Let them select three different plants to draw. Have them place only a small piece of each plant on the available study plates while they draw.

Rotate the groups until everyone has collected and drawn three animals, three plants, and three bottom critters. (Indoors, they will draw and identify the items you collected.)

Work with the group to **minimize your impact on the sample area** by taking small amounts of what you need, and cleaning up the site after the activity. In areas of known exotic plants, be careful not to fragment any of these nuisance plants during harvest or leave them spread along the shore. When transporting and disposing of your samples, **make sure that you follow the current regula-**



tions and obtain **ALL** required permits. Information on which permits you need is available in the fishing synopsis or by contacting your local Conservation Officer, MinnAqua contact, or resource biologist.

Now bring your budding biologists back together to share their discoveries. Using the *Water Habitats ID Sheet*, or through group processing, help them identify the animals and plants. Make sure that all items are correctly identified – if you can't agree on the specific species of plant, insect, or animal, agree on the type – for example, an amphibian or fish, a tree or bush, etc.

Let everyone help create a food web by arranging the drawings in the center of the group's circle so that the various forms of life are connected by touching corners. Explain the food web and discuss the four basic needs that these organisms need to survive.



- Q. What are the four basic needs of aquatic animals? Can you name some examples that you found?
- A. **Food, water, cover, and space** (expand on each need). Examples might include: food – worms; cover – lily pads; water – lake; space – frogs not found in groups together, but spaced apart in their habitat.
- Q. Do any fish use the items you collected for cover? If so, name the item and the fish that uses it for cover.
- A. **Pondweed** (or almost any plant in the water) is used by bluegill and crappie for **cover**. Bass and trout use **trees** for **cover** (no, they don't hide on shore – they use overhanging roots and limbs).
- Q. How could biologists or other people use your findings to help this lake, pond, or stream?
- A. They could **determine the quality of the water** from the type of aquatic life that is present. Some organisms can survive in polluted waters while others can't. Other people, like anglers, can use the data to **better understand where to fish**.

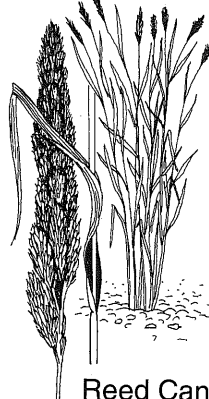
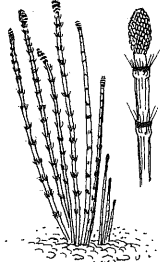


- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 4-7 and 10-11.
- Learn more about your lake by calling and making an appointment to visit your local resource biologist's office or requesting a *Lake Survey Data Printout* from the DNR Section of Fisheries by calling 612-296-3326 (you will need to know the name of the lake, the county it is located in, and the nearest town to the lake).
- To learn more about the plants and other animals of the area, you can request a *Biological Survey Printout* from the DNR Non-Game Section by calling 612-296-8324 (you will need to know the township where your area is located).

SHORELINE PLANTS

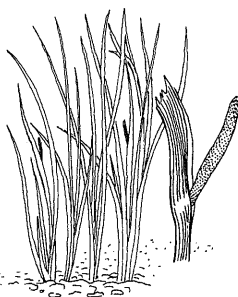
(Plants growing at water's edge)

Horsetail



Sweet Flag

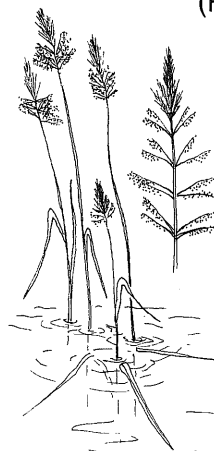
Reed Canary Grass



WATER HABITAT ID SHEET

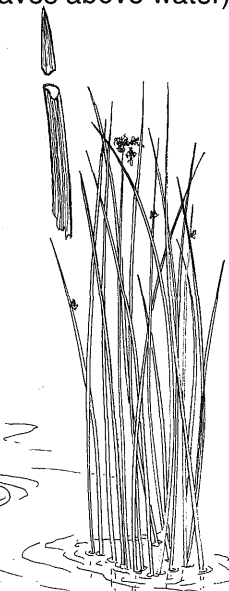
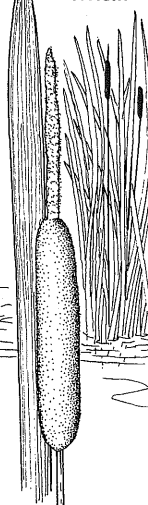
EMERGENT PLANTS

(Plants rooted in water with stems and leaves above water)



Wild Rice

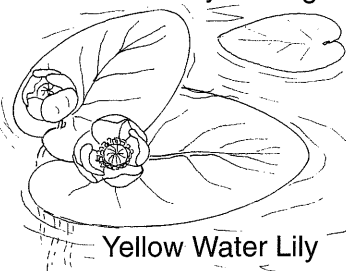
Cattail



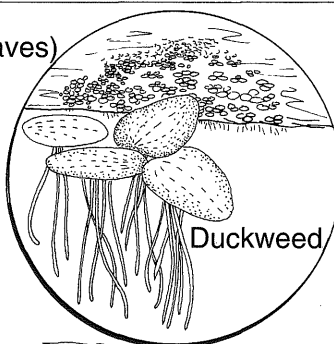
Hardstem Bulrush

FLOATING PLANTS

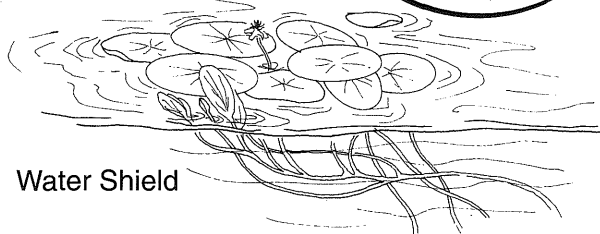
(Plants have many floating leaves)



Yellow Water Lily



Duckweed

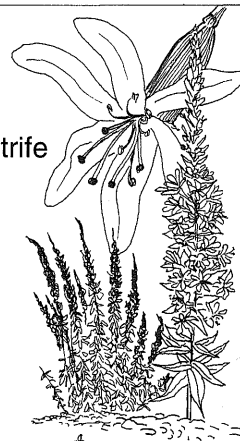


Water Shield

EXOTIC PLANTS

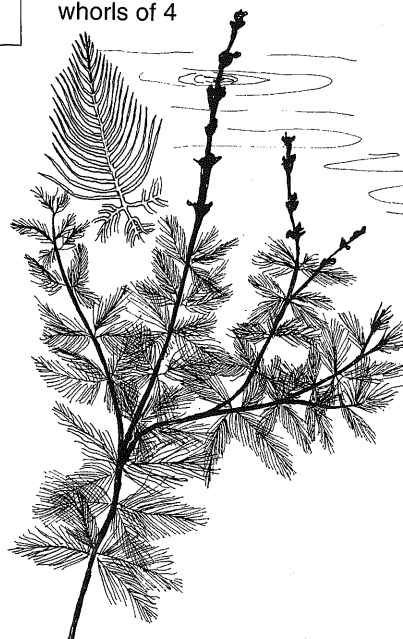
(Plants whose spread should be controlled)

Purple Loosestrife



Eurasian Water Milfoil

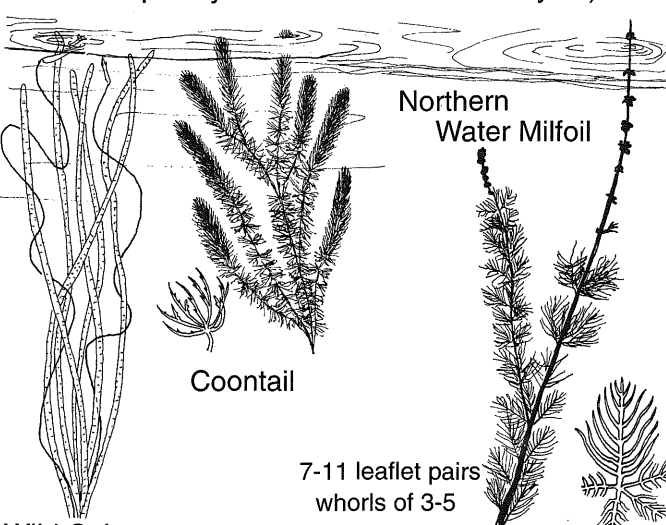
9-21 leaflet pairs
whorls of 4



Curly Leaf Pondweed

SUBMERGED PLANTS

(Plants completely under the water or nearly so)



Northern Water Milfoil

Coontail



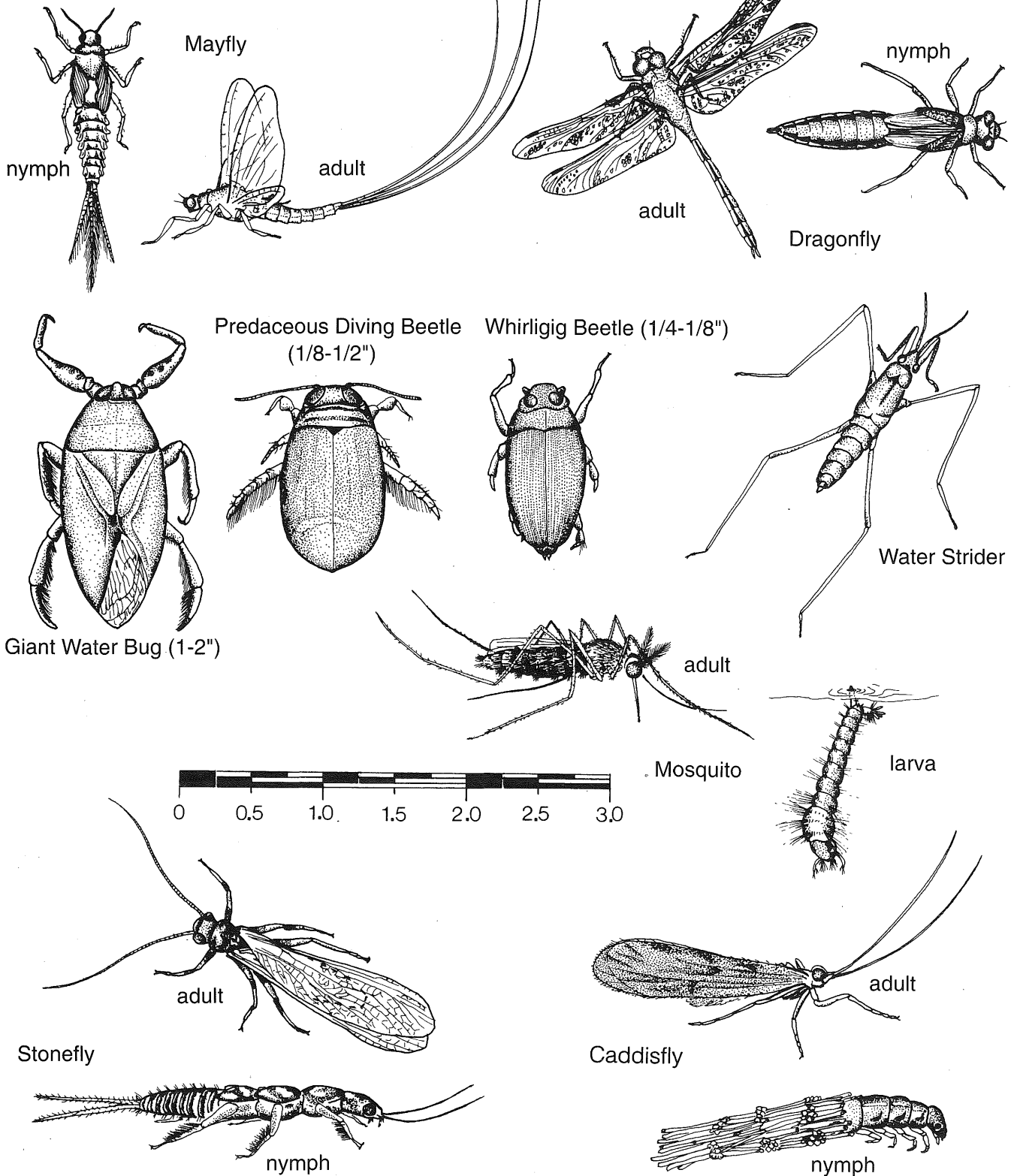
7-11 leaflet pairs
whorls of 3-5



Wild Celery

WATER HABITAT ID SHEET

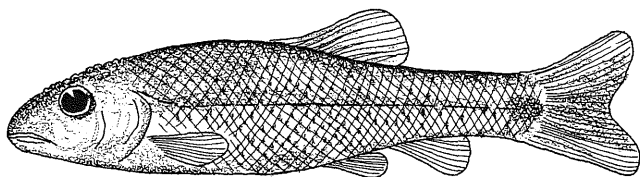
AQUATIC INSECTS



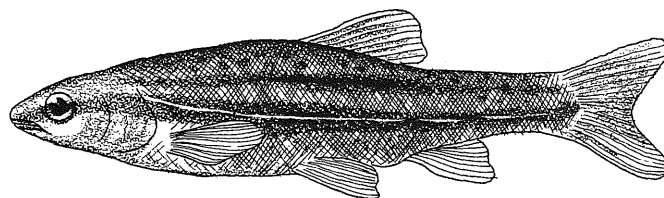
WATER HABITAT ID SHEET

MINNOWS

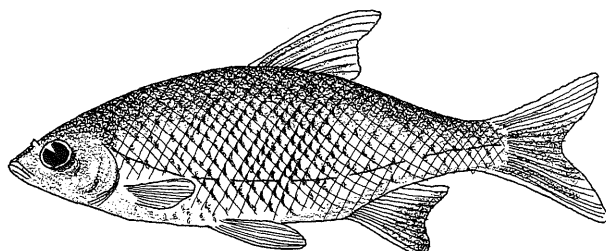
Hornyhead Chub (12")



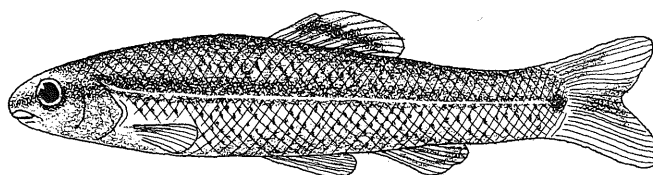
Southern Redbelly Dace (3")



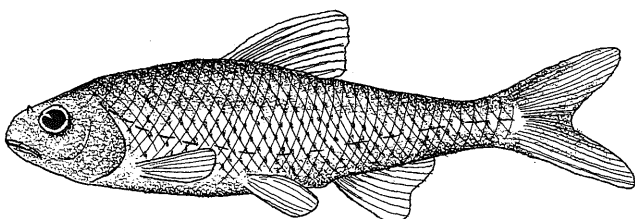
Golden Shiner (8")



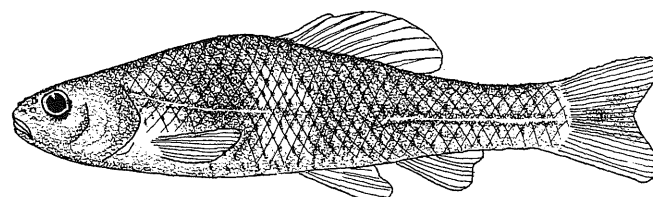
Bluntnose Minnow (3")



Common Shiner (4-12")

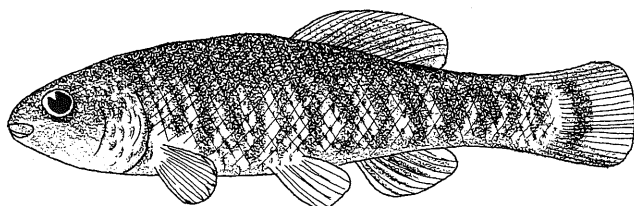


Fathead Minnow (2-3")

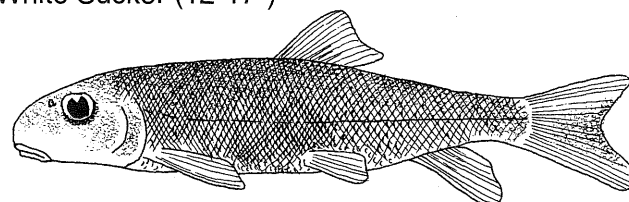


OTHER SMALL FISH

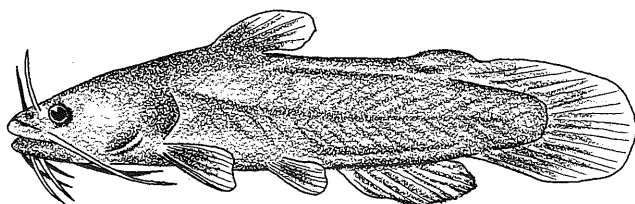
Mudminnow (4-7")



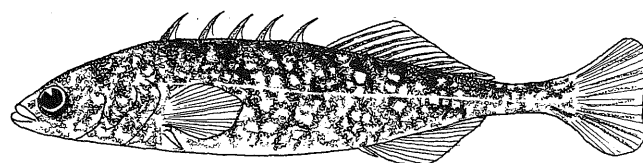
White Sucker (12-17")



Tadpole Madtom (4")



Brook Stickleback (3")



Food Web Tag

Purpose: Everyone should understand the basic habitat needs of fish, the carrying capacity of water bodies, predator/prey relationships, and the concepts of food webs.

Level: Intermediate

Group Size: 8 to 30

Site: Outdoors (lots of open space) or Indoors (gym)

Time: 20 to 30 minutes

Supplies: 3 - 4 gallons of popcorn

Food Web Critters Master (page 1-15)

Sandwich bags

Permanent marker

Masking tape

Hula hoops (2 or more)

Reference: Sport Fishing and Aquatic Resources

Handbook, 77-80; Managing Minnesota's Fish Booklet; Habits and Habitats of Fishes in the Upper Mississippi River; Minnesota Fish Consumption Advisory booklet; and Which Fish Are Safe to Eat? brochure.



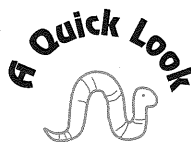
Identify the boundaries of the "lake" where the game will be played (about the size of a basketball court). Spread "plankton" (popcorn) randomly about the surface of the lake.

Mark the sandwich bags (fish stomachs) with a permanent marker to indicate fill levels: the fill level of a minnow will be 1/3 of the bag; the perch will be 2/3; and the northern pike will be a full bag. (Note: Other fish can be substituted to match the common species in your area. Make sure that you have the food web order right – a bluegill won't eat an adult largemouth bass, but that bass will eat the bluegill.)

Explain that **food webs** are the basic building block of all life. The sun and nutrients are the beginning of all food webs. They fuel the production of plant life and plankton, which in turn are food for other animals. This process continues up the food web and eventually reaches humans. All these organisms are interrelated by their habitat needs and their dependence on each other's role in the food web. The maximum number of animals that can be supported by a habitat without causing harm is called the **carrying capacity**. Carrying capacity can vary from season to season or year to year. It is also affected by other things like weather and nutrients.

Throw two hula hoops into the "lake". Tell the youth that these items simulate **cover** and act as safe places for the **prey** (minnows and perch) to hide from **predators** (perch and northern pike). Instruct the youth who are prey that they may stay in the hula hoops for only 5-10 seconds at a time.

Start with a lake containing only minnows. Tape a picture of a minnow on everyone's back. Then, let the minnows "feed" on the "plankton" by filling their bags (stomachs) with popcorn. Let the feeding occur for 1 year (about 5 minutes). *How many of them fill their bags to the necessary line? How long could they feed before they ate all of the food? Are we at the lake's carrying capacity for minnows? Does the lake need something to help balance it – like a predator?*



In this activity, people act out and observe a food web in action by becoming minnows, perch, northern pike, bacteria and anglers. The primary energy source driving the lake is plankton, represented by popcorn! Each species feeds on the popcorn and/or each other to fill their stomachs (sandwich bags) with food. Different population ratios or combinations are tried in an effort to balance this lake.

Copy the *Food Web Critters Master* and make enough of the tags to do each of the fish population scenarios you want to demonstrate.



Introduce predators by letting some people now become perch to feed on the minnows and plankton. Other predators will be northern pike that feed on minnows and perch. Make sure that the youths change the signs on their backs to reflect their new roles. (An approximate ratio of 6 minnows/3 perch/1 northern pike makes a balanced lake.)

Predators need to tag their food source. If tagged, the captured fish must empty their stomach contents into the stomach of the predator. (No one else can tag a fish while transferring food until that process is done.) The tagged fish is now dead and must sit down and wait for the bacteria (**decomposers**) to recycle them back into nutrients.

Select a few participants to become bacteria. They are responsible for removing the dead fish. They must escort the dead fish to the bottom of the lake (north end of your lake) where they recycle the fish into nutrients for fuel to grow new plankton.

For more advanced youth, select a few dead fish to become reborn as anglers (there is a certain justice here, isn't there?). Anglers must first get their bait by tagging a minnow. While holding hands, the minnow and angler can catch a perch or pike, one at a time, by having the minnow tag that fish. (Perch, pike, and minnows can use the hula hoops as safe spots from the anglers.) The angler will then escort this fish to the shore. If your lake is experiencing overfishing, enforce regulations. (For example, make anglers hop on one foot to catch fish.)

Now look at the survivors of the lake. Depending upon how balanced your lake is, you might have a good mix of perch, minnows, and northern pike. *Are the numbers of fish left representative of the lake's carrying capacity for each of these species?* Or is the lake headed for trouble? If you had more northern pike than the carrying capacity would allow, they might be the only fish left. *How long could they last without a food supply?*

If time permits, try different populations of fish and attempt to balance the lake. You can also start with a different combination of the same fish.

For Discussion



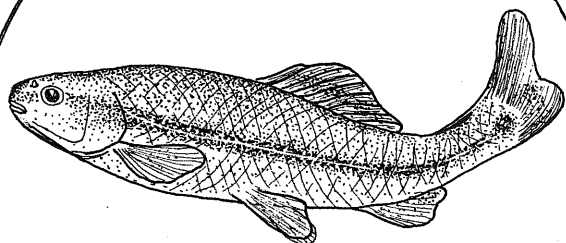
- Q. What would happen if the plankton supply was reduced in a lake or pond?
A. A basic link in the food web would be lost. The web would unravel since there would be no basic source of food (energy) for the fish.
- Q. What would happen if all the northern pike and most of the perch were overfished by anglers from the lake?
A. If the northern pike were overfished, there would be few predators left to eat the perch. The perch population would increase until they depleted the minnows. *If the perch were overfished,* the northern pike would be affected because their food source would diminish. The northern pike population in this case might start to decline, fish could become very skinny, or they might not grow any larger than a hamster's handle.
- Q. Can you name any needs that aren't met in your life? (Think of the four parts of habitat.) Are there any needs in your life that are met every time?
A. Answers will vary greatly. Examples – food might be limited, if the family is large or the economy is tight. Space might be limited, if personal needs for privacy are not met.

Other Ideas



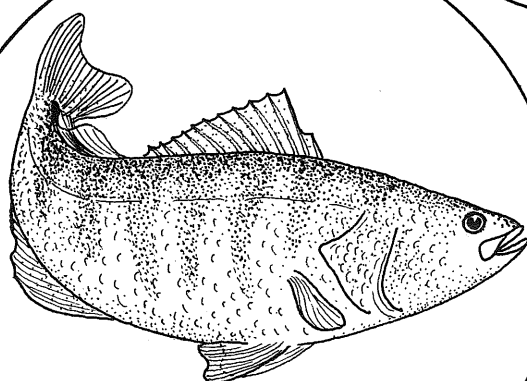
- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 4-7 and 11-14.
- Mix different colored popcorn in with the regular popcorn to simulate pollution in the lake. One color can signify mercury, another PCBs (polychlorinated biphenyls), etc. Let the fish feed on all colors of popcorn. At some point during the game, stop the action and assess the level of contamination in each type of fish. Which type of fish have large amounts of colored popcorn and why? Fish with over 3/4 of their stomachs full of colored popcorn are unhealthy and are now demonstrating unusual behaviors. Assign these youths a different means of movement (skip, walk, crawl) to finish the game. *Point out* that many fish in lakes and streams live with high levels of mercury, PCB, and other contaminants in the fatty portions of their bodies. These fish can be harmful for human consumption, especially if they are eaten on a regular basis. People who eat a lot of fish can reduce their risks of contamination by following the various guidelines outlined in the *Minnesota Fish Consumption Advisory* handout.

Food Web Critters Master

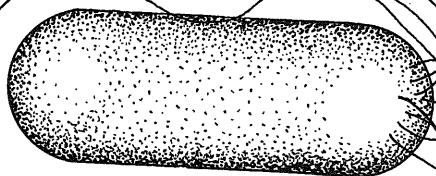


Minnow

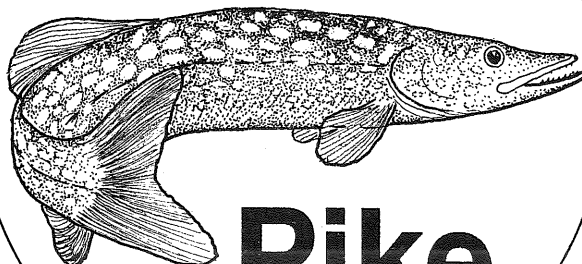
**A
n
g
l
e
r**



Perch



Bacteria



**Northern
Pike**

Mussel Mania®

Purpose: Everyone should describe how carrying capacity can be affected, identify effects of the zebra mussel on other aquatic organisms, and give reasons why zebra mussels are successful nuisance (exotic or non-native) species in Minnesota.

Level: Advanced

Group Size: 10 to 25

Site: Outdoors (lots of open space) or Indoors (gym)

Time: 20 to 30 minutes

*Supplies: Tape, chalk or string
2 hula hoops*

Several sheets of newspaper or scrap paper crumpled into 100+ tight balls

Reference: Sport Fishing and Aquatic Resources Handbook, 53-55 and 77-80; "Who Lives Here" and "Aquatic Roots" Project Wild Supplement; Don't Let These Invaders Hijack Your Boat poster; Zebra mussel card; and Stop the Invaders poster.



This activity demonstrates the effect of a nuisance (exotic or non-native) species on an aquatic ecosystem. Youths become either native clams, zebra mussels (the nuisance), perch, walleye, or plankton movers. The native clams, sitting happily in their habitats (hula hoops), will try to catch plankton (newspaper balls), thrown by the plankton movers. Perch will be introduced to compete for food. Walleye will also be introduced to prey (tag) on the perch. Finally, zebra mussels will find their way to the lake, and will begin to smother the clams and compete for food.



Collect enough materials to do the program. Mark off a circle (20 ft. diameter) with tape, chalk, or string. This area represents a portion of a lake or stream system. In this circle, randomly place two **hula hoops to represent the native clam's habitat (a soft lake bottom)**. The rest of the area is a **hard bottom**. Within these hula hoops, stick a small piece of masking tape.

Review the four components of habitat with the group – **food, water, cover, and space**. A body of water has limits on how much of each of these it can provide. The number of animals and plants that can be supported by a habitat without causing harm is called the carrying capacity. **Carrying capacity** can vary from season to season or year to year. It is also affected by other things like zebra mussels, weather, and nutrients. Everyone in the group will try to meet their needs while being a clam, perch, zebra mussel, or walleye.

Have the group assemble in the circle and mill around. Tell them that they are baby clams trying to find a great place to live (they can't stand still because they are drifting in the current).

Yell "**Stop!**" Anyone not standing in a hula hoop has to leave the circle. Explain that native clams live in muddy or sandy bottoms, which are **ONLY** represented by the hula hoops. If there is more than one person inside the hoops, have them mill again, and stop. The person nearest the small piece of tape has found the very best spot and can sit down. Others must leave.

Have the two surviving baby native clams sit down. Over the course of many years they have grown into adult clams and can no longer drift. **Emphasize that finding the right kind of bottom at just the right time is very important** for the clams, and can limit their numbers.

Identify two youths as plankton movers. They are the currents moving the plankton into the area. They should sit facing away from the circle. They will toss plankton (paper balls) at random over their shoulders into the circle.

The clams must catch the plankton in the air to simulate feeding. Anything missed stays on the ground. (Clams don't have hands to pick things up!) Assign scavengers to pick up the plankton and return it to the movers. (Later in the game, they will also return plankton to the movers after retrieving it from the tagged perch.)

Select three youths to add to the circle as perch. Perch feed on plankton. They will move around the inside of the circle and try to catch plankton in the air. They must catch the plankton without blocking off the clams. They can also feed from the bottom (pick up stray paper balls).

After a few minutes, select two youths to add to the circle as walleye. The walleye eat the perch. They can run around the outside of the circle, reaching in and trying to eat (tag) the perch. Tagged perch must leave the circle and give their plankton to the scavengers to return to the movers. As perch are eaten, add more. Try to maintain at least one perch in the circle at all times.

Begin to add zebra mussels. **Explain that zebra**

mussels compete with native clams for food, and with perch for space. Zebra mussels can't live in the soft bottom like the clams, but must live on hard surfaces (anywhere outside the hula hoops). The zebra mussels will feed the same way as the clams.

Gradually add more zebra mussels. **Explain that unlike the perch, zebra mussels have few predators that feed on them.** This allows the mussels to expand to the limits of their food supply. As it gets crowded, tell the group that since mussels can stick to hard surfaces, they can sit or stand in the hoops as long as they are either touching each other or a clam. Continue until all the clams are smothered with mussels or until everyone has had a chance to get back into the game. At this time, stop the game and discuss what has happened to the animals.

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For Discussion



- Q. From the fishes' and clams' points of view, what happened as more mussels were added? Was the carrying capacity changed for these species?
- A. *Space* became more scarce while food became harder to find. Some of the fish and clams may have even starved because they couldn't get any food. The *carrying capacity* of the lake for fish and clams was decreased as more and more mussels were introduced.
- Q. Were the clams eating at the end, or were they smothered?
- A. This will vary depending on the number of youths playing the game.
- Q. Did the zebra mussels in the activity have to compete with anything else for space?
- A. Zebra mussels compete with each other for space, and may smother each other, but generally they overtake the native clam habitat.
- Q. Do you think zebra mussels would be a problem near water treatment facilities (along water intake pipes – remember the surface)?
- A. *Yes*, since they adhere to hard surfaces, they will often clog intake pipes. It costs thousands of dollars to have them removed, and they just build up again over a period of time.
- Q. What are some ways you can stop the spread of nuisance species like the zebra mussel?
- A. To prevent the spread of certain nuisance species, *drain and dry boats, minnow pails, and livewells* after leaving a body of water. Other invaders, like eurasian milfoil (plant), purple loosestrife (plant), and the ruffe (fish) are also spread by people. (*See the references listed in this activity for specific ways to stop their spread.*)

Other Ideas



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 4, 7, and 20.
- *Identify other nuisance species and discuss their modes of distribution.* Talk about preventative measures that should be followed to slow the spread of nuisance species.
- Invite a local resource person to talk with your group about managing a lake or stream with a nuisance species. Topics might include zeroing in on the zebra mussel, losing loosestrife, sending the sea lamprey packing, foiling eurasian milfoil, etc.



Minnesota Fish

What will the group learn? They will be able to identify common Minnesota fish species, help youth recognize fish habitats, explore some special adaptations that fish have made in order to survive and flourish, recognize fish behaviors, and see similarities between fish and themselves.

From a Perch Eye's View

In the last chapter, you taught your group about habitat, food webs, and carrying capacity. Now you are ready to identify and explore the differing types of fish that inhabit Minnesota's lakes and streams.

What makes a rainbow trout different from a catfish? Why is a pumpkinseed so round with bright spots? The answers are revealed when we explore the relationship between a fish's key traits and their habitat. **Each fish has adapted its body and habits (lifestyle) to coincide with its habitat.** For example, the pumpkinseed lives in quiet waters around thick vegetation. Consequently, its rounded body easily maneuvers through the cover, and its color allows it to hide in areas with light and shadow. For an angler or observer, knowing each fish's adaption adds an additional measure of satisfaction to their hobby. This knowledge is also the key to knowing where and when to fish.

Fish identification is easy if you know which **traits are the "keys" to unlocking each fish's identity.** The absence or presence of certain structures, body shape, the location of body parts (like the mouth), relative size and shape of body parts, and counts of scales, fin rays or

spines are some of the traits that help in identifying each species. In most cases, fish can be identified by external appearances, but sometimes internal structures also need to be examined. Identification keys, illustrations, and descriptions that are based on these traits, are often used to help identify plants and animals. Once you accomplish the skill of using a key, you'll likely be able to identify any fish that you may ever encounter.

One may wonder why color and size is not more widely used. One reason is that they vary among individuals of the same type of fish, depending on age, sex, season, and maturity. Another reason is that color fades rapidly after death, and size can be affected by water quality or population structure.

Youth have a natural curiosity about these special traits of fish and animals. In order to learn about those traits and their relationship to the environment, one needs to touch, smell, see, and explore. Environmental education encourages this "hands on" (experiential) approach to learning. As a leader, you'll conduct this great hunt for knowledge and understanding of these relationships as they relate to Minnesota fish.

Fish Identification

Purpose: Youth should be able to identify common Minnesota fish species, become familiar with fish biology and identification keys, and understand fish behaviors and adaptations.

Level: All

Group Size: 3-25

Site: Outdoors (shaded area) or Indoors (classroom)

Time: 15 - 20 minutes

Supplies: Pictorial Key to Some Common Minnesota Fish Families (page 2-4)

Common Minnesota Fish Cards (pages 2-5 to 2-12)

Fishing . . . Get in the Habitat! youth booklet (page 22)

Whole fish or a mount (optional)

Fishing license and/or DNR permit (needed for whole fish demonstrations)

Reference: Sport Fishing and Aquatic Resources Handbook, 56-65, 71-85; Managing Minnesota's Fish booklet; Habits and Habitats of Fishes in the Upper Mississippi River; Fishing Regulations; and Fish Identification Book List.



Prior to the program, copy enough of the pictorial key and the fish cards without the information on the back to give to each participant. (Note: The common name, family, key traits, habitats, and fishing tips are on the back of the master sheet for your information only.)

Begin by turning to page 22 of Fishing . . . Get in the Habitat! youth booklet. Using a whole fish or a mount, show the different fish traits and explain each of their functions:

- overall shape of fish (pan, torpedo, flat)
- location and shape of mouth
- presence or absence of scales, barbels, and adipose fins
- differences between and counts of fin rays and spines
- shape of tail fin
- location and shape of pelvic and anal fins
- length, structure, and shape of dorsal fin
- features unique to certain fish
- lateral line location
- location of gill cover
- color

Show how to use the pictorial key using a mount, whole fish, or picture. Explain that **keys help unlock the identity of plants and animals by giving you choices, based upon traits.** Each time you make a choice, you move one step closer to learning its identity. (Traits in the pictorial fish key are based upon the characteristics you just reviewed.) Work step-by-step to reach the correct identification – you might want to practice this ahead of time. If the group finds doing the key difficult, try having the group make their own key using the traits of the kids to put themselves into groups. For example, boys/girls, glasses/no glasses, blonde/red/brown hair, etc.

Break everyone into groups of four to five. Give each participant a pictorial key and a fish card. (Select cards which highlight the species most likely to be caught during the fishing time.) They will try to identify the fish on the cards using the pictorial key. Move from group to group helping participants locate fins, determine tail



In this activity, you will review identifying traits (external) of fish with the group, using page 22 of the youth booklet, Match Your Catch. If desired, use a whole fish or a mount to help review these traits. Next, you will demonstrate how to use the pictorial key. Everyone will then use the key to identify fish commonly found in the area using the Common Minnesota Fish Cards.

shapes, etc. Groups will probably make a few wrong choices at first. That's okay – just help them get back on the right stream.

By now you've probably noticed that **fish in the same family** (i.e., northern pike and muskie) will **often have similar traits**, just like members of a human family. Use your fish cards to reinforce these fish family similarities and differences. This is a good time to **explain how these traits relate to the habitat where they live and how they act**.

Is your group key literate yet? If not, continue until group members fully understand how keys work, and can describe the key identifying traits of fish. Let the groups try to identify as many of the fish cards as they can in the time available.

For Discussion

Q. Pick a fish species and describe what it needs for cover, food, space, and water (oxygen).

A. *This will vary*, depending upon the fish chosen. (See back of fish cards for more information.)

Q. Where would you go and what type of bait might you use to catch this fish?

A. *Again, this will vary*. Bait should resemble a natural food source or mimic a prey's movement. The fish's area would include its cover locations, such as an overhanging branch along the riverbank, vegetation bed, etc.

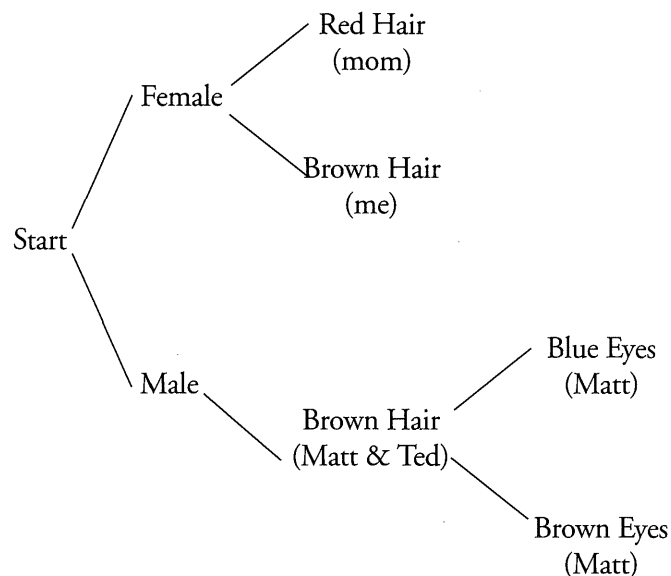
Q. Name some ways that you are especially adapted to your habitat.

A. *This response will also vary*. Be sure to give everyone time to tell their stories about how they adapt to their habitat.

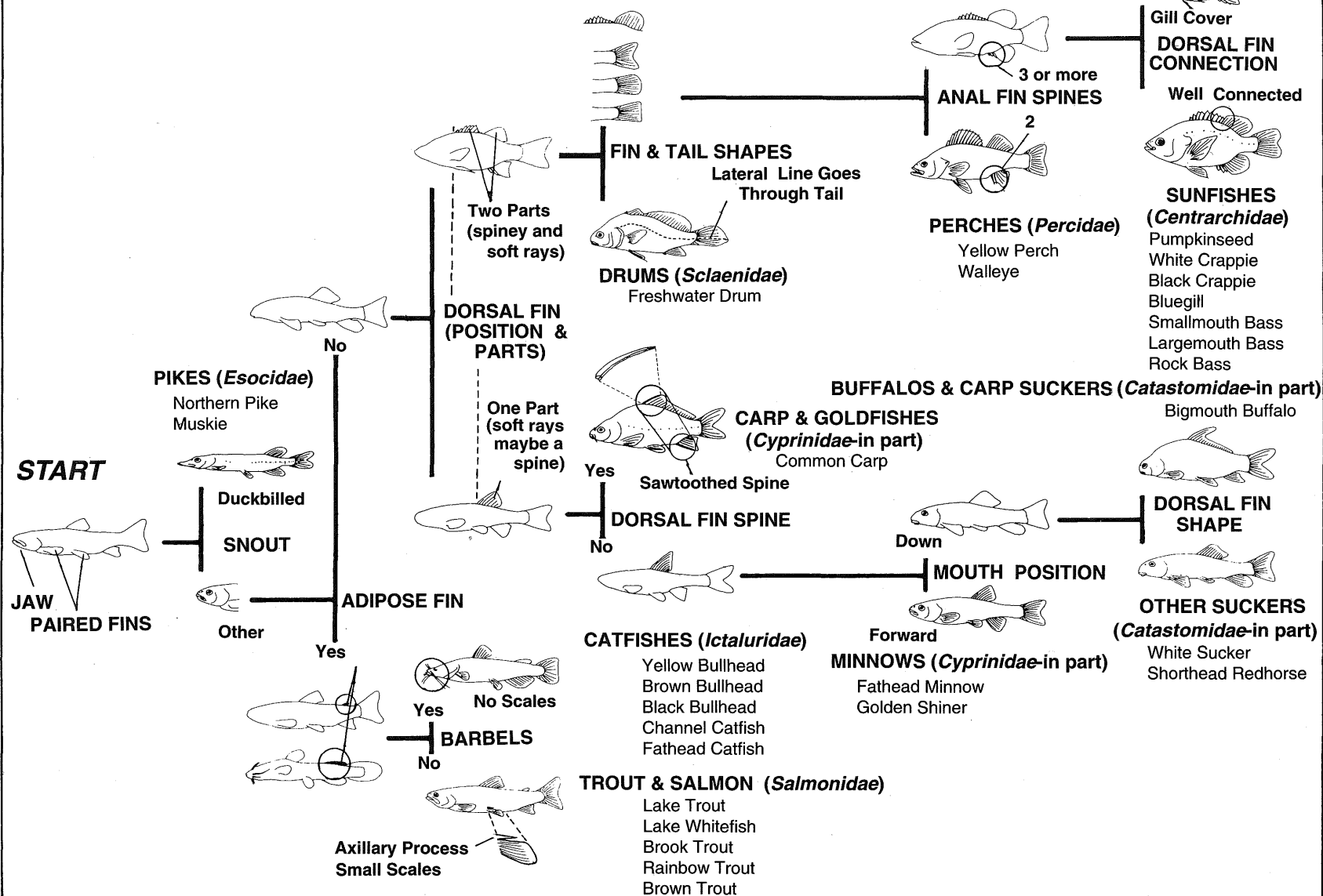
Other Ideas



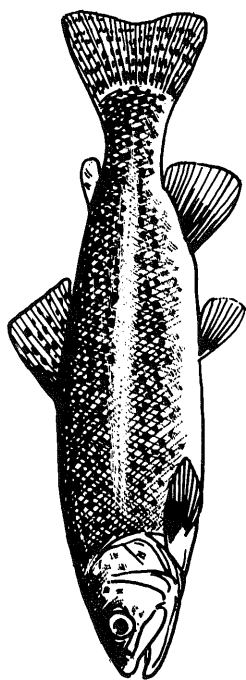
- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 3, 11-14, 22.
- *Participants could make a family key.* It might look like this:



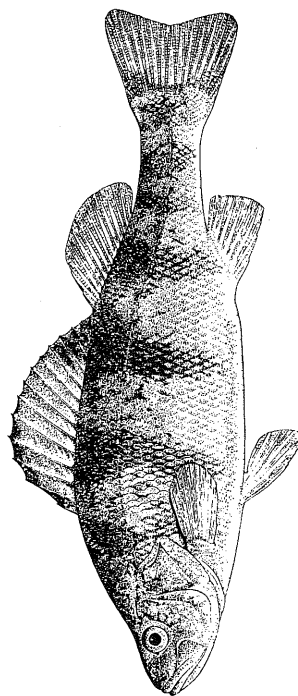
TEMPERATE BASSES (*Percichthyidae*)



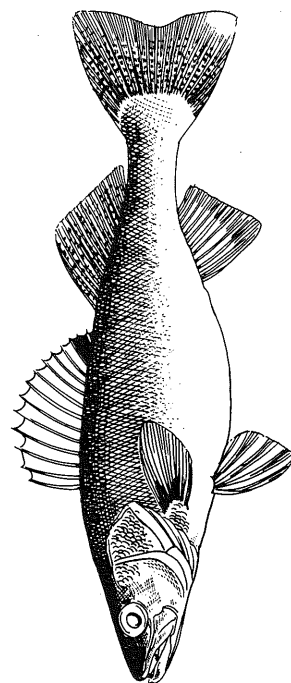
Common Minnesota Fish Cards*



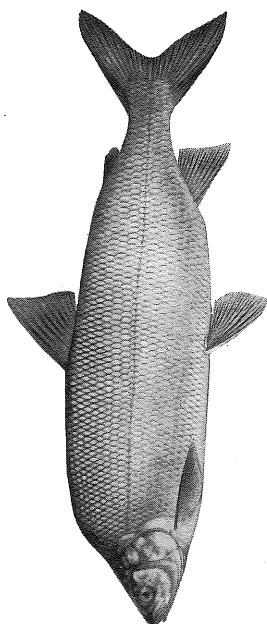
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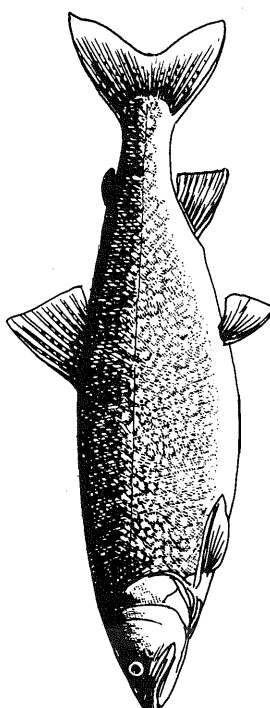
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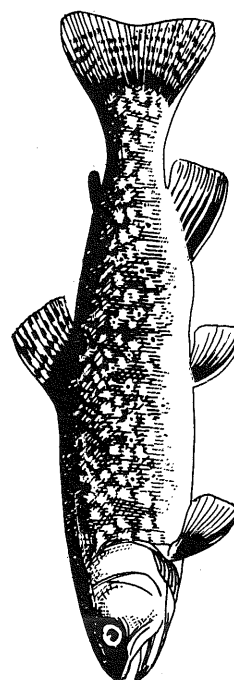
F



A



B



C

D. RAINBOW TROUT (exotic)

Family: Trout and Salmon
 Shape: Stubby torpedo
 Mouth: Medium and forward
 Fins: Adipose fin; Dorsal even with pelvic; Square tail
 Scales: Small
 Color: Bluish/olive above with silvery sides and pink lateral stripe from gill cover to base of tail; Varies depending on habitat
 Habitat: Cool, deep, clear lakes and streams statewide (oligotrophic to mesotrophic)
 Habits: Hardest of the trout; Sight feeder; Very active during insect hatches
 Food: Small fish, insects, fish eggs, and worms
 Tackle: 4-6 lb. line; Flies, spinners, or live bait slightly off the bottom

E. YELLOW PERCH

Family: Perch
 Shape: Stocky torpedo
 Mouth: Small and forward
 Fins: Two part dorsal with spines; Dorsal even with pectorals; Forked tail; Anal spines 2
 Scales: Medium
 Color: Pale yellow to bright orange; 6-7 vertical bars on side
 Habitat: Rocky, vegetated, fairly deep lakes and rivers statewide (oligotrophic to large mesotrophic)
 Habits: Swim in large schools
 Food: Small fish, zooplankton, insects, snails, leeches, and crayfish
 Tackle: 4-6 lb. line; Jig/fly/live bait at night in vegetation off bottom or day in open water

F. WALLEYE

Family: Perch
 Shape: Torpedo
 Mouth: Medium and forward with teeth
 Fins: Two part dorsal; Dorsal even with pectorals; Forked tail; Anal spines 2
 Scales: Medium
 Color: Dark olive brown to black; Black spot at rear base of dorsal; White margin on lower part of tail
 Habitat: Rocky/vegetated lakes and open/deep pools in streams statewide (mesotrophic)
 Habits: Migrate up streams to spawn; Feed at night; Loose schools
 Food: Yellow perch, small fish, insects, snails, leeches, and crayfish
 Tackle: 6-8 lb. line; Spoons, jigs, and live bait fished on bottom; Evening/dusk/dawn best

A. LAKE WHITEFISH

Family: Trout and Salmon
 Shape: Deep-bodied torpedo
 Mouth: Small and forward; Snout overhangs lower jaw
 Fins: Adipose fin; Dorsal even with pelvic; Forked tail
 Scales: Small
 Color: Iridescent sides with dark olive brown back
 Habitat: Cool, deep, clear lakes in northeast (oligotrophic)
 Habits: Sight feeder; Very active during mayfly hatch; Winter at bottom; Spring at surface
 Food: Snails, clams, mayfly, and caddisfly
 Tackle: 4-6 lb. line; Flies, small spinners, and jigs best during hatch

B. LAKE TROUT

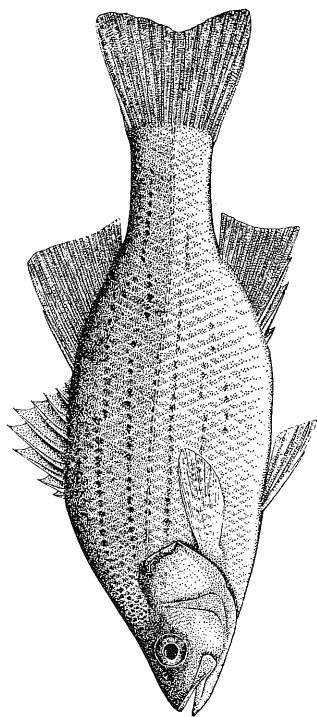
Family: Trout and Salmon
 Shape: Deep-bodied torpedo
 Mouth: Medium and forward
 Fins: Adipose; Dorsal even with pelvic; Deeply forked tail
 Scales: Small
 Color: Grey, green or olive background with white spots extend into the dorsal
 Habitat: Cold, deep, clear lakes with rock/boulder shores in northeast (oligotrophic)
 Habits: Spring/fall shallows; Rest of time deep water; Range over a 30 mile area
 Food: Small fish, insects, and freshwater shrimp
 Tackle: 4-8 lb. line; Spoons/spinners at river mouth; Sunset or stirred-up water best

C. BROOK TROUT

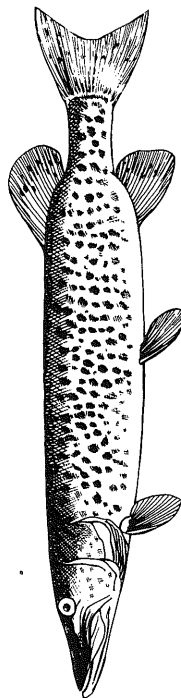
Family: Trout and Salmon
 Shape: Stubby torpedo
 Mouth: Medium and forward
 Fins: Adipose; Dorsal even with pelvic; Square tail
 Scales: Minut
 Color: Dark green to silver with red spots; Back with worm-like pattern; Anal and tail with white margins
 Habitat: Cold, clear, spring-fed streams and brooks statewide (oligotrophic)
 Habits: Wary; Often wait below watercress feeding on items swept downstream
 Food: Small fish, insects, and worms
 Tackle: 4-6 lb. line; Spinners or flies at dusk; Worms off the bottom

* From Fishes of the Minnesota Region by Phillips, Schmid, and Underhill; and Northern Fishes by Eddy and Underhill

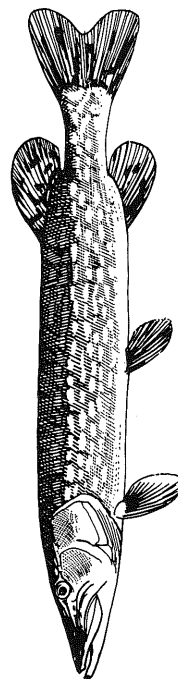
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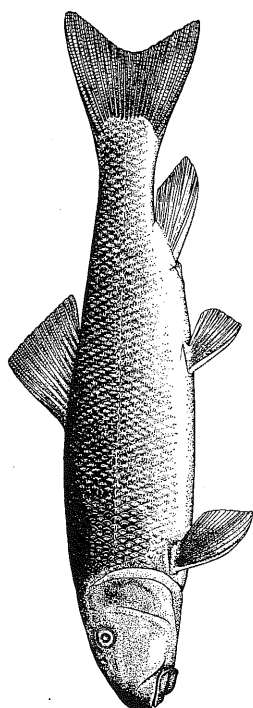
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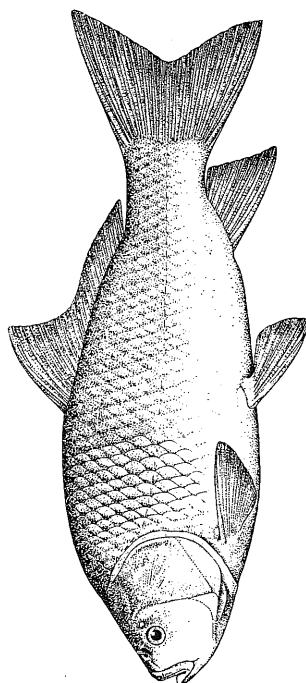
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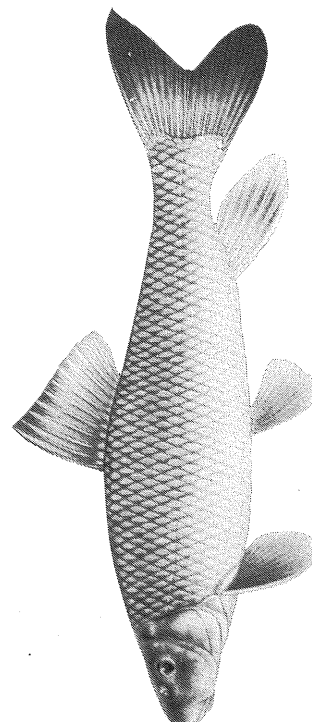
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G



H



I

J. WHITE BASS

Family: Temperate Bass
 Shape: High, flattened plate
 Mouth: Forward; Jaw extends to middle of eye; Lower jaw protrudes slightly
 Fins: Completely divided two part dorsal; Dorsal even with pectorals; Anal 3+ spines
 Scales: Normal
 Color: Silvery; Sides with 7 continuous horizontal olive-gray streaks
 Habitat: Large, sand/rock bottom river systems in south and central (eutrophic)
 Habits: Open water near surface; Active schooling
 Food: Minnows, crustaceans, insects, and gizzard shad
 Tackle: 6-8 lb. line; Minnows and white small plugs/spinners/flyes; Cast to mouths of feeder creeks; Spring or mid-summer best

K. MUSKIE

Family: Pikes
 Shape: Long torpedo
 Mouth: Duckbilled with lots of canine teeth; 6-9 pores on bottom side of each lower jaw
 Fins: One part dorsal; Dorsal even with anal; Forked tail
 Scales: Normal
 Color: Silvery to greenish or brown; Markings variable but when present dark bars or spots on a light background
 Habitat: Clear vegetated lakes and large rivers in north (large oligotrophic to mesotrophic)
 Habits: Sedentary "lone wolf"; Ambush feeder
 Food: Small to medium fish
 Tackle: 10-12 lb. line; Fast retrieve of heavy active plugs/spoons or foot-long white suckers in fall

L. NORTHERN PIKE

Family: Pikes
 Shape: Long torpedo
 Mouth: Duckbilled with lots of canine teeth; 5 pores on bottom of each side of lower jaw
 Fins: One part dorsal; Dorsal even with anal; Tail forked
 Scales: Normal
 Color: Greenish above and white below; Light spots on a dark background
 Habitat: Vegetated quiet or slow-moving lakes, rivers, and streams statewide (oligotrophic to large mesotrophic)
 Habits: Sedentary "lone wolf"; Ambush feeder
 Food: Small and medium fish
 Tackle: 6-10 lb. line; Spoons, plugs, minnows, and foot-long white suckers in spring or fall

G. WHITE SUCKER

Family: Suckers
 Shape: Slender, cylindrical
 Mouth: Downward, sucker shape on blunt snout
 Fins: One part stubby dorsal even with pelvic; No spine
 Scales: Front of body small; Back of body large
 Color: Black with rosy band other times grayish white; Variable during spawning
 Habitat: Clear lakes and small rivers statewide (oligotrophic to large mesotrophic)
 Habits: Bottom schooling
 Food: Bottom insects, plants, algae, and crustaceans
 Tackle: 6-8 lb. line; Worm fished off bottom of pools and riffles during spawn

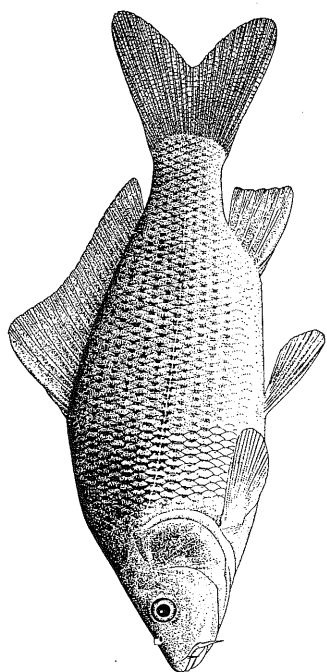
H. BIGMOUTH BUFFALO

Family: Suckers
 Shape: Heavy-bodied elliptical
 Mouth: Forward; Thin-lipped and protractile on rounded snout
 Fins: Long sickle-shaped dorsal even with pelvic
 Scales: Large regular rows
 Color: Greenish to blackish back and sides with a coppery sheen; Belly white or pale yellow
 Habitat: Warm sluggish rivers, lakes and sloughs in central and south (eutrophic)
 Habits: Schools mid-water or near the bottom
 Food: Insects, crustaceans, and vegetation
 Tackle: 6-8 lb. line; Dough balls just off the bottom; April and May during spawning

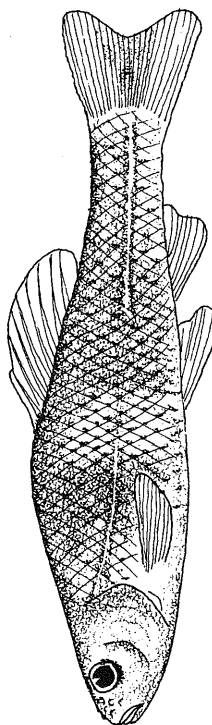
I. SHORthead REDHORSE

Family: Suckers
 Shape: Slender elliptical
 Mouth: Small; Thick lips in parallel folds on bottom
 Fins: Short one part dorsal even with pelvic
 Scales: Course with dark spot at base
 Color: Olive-brown back, golden sides and white belly; Tail bright red
 Habitat: Clean lakes, rivers, and gravelly streams statewide (large mesotrophic to eutrophic)
 Habits: Sensitive to pollution and siltation
 Food: Clams, snails, and insects
 Tackle: 6-8 lb. line; Small plugs/jigs/wet flies or worms in pools or eddies as spawn (May-June)

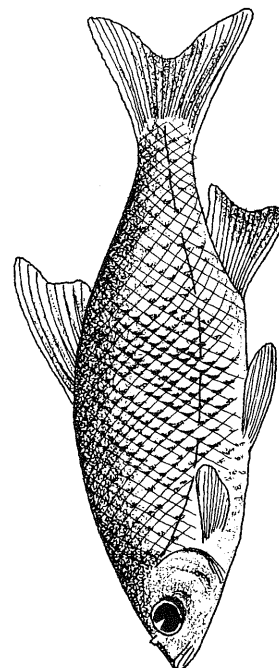
Common Minnesota Fish Cards*



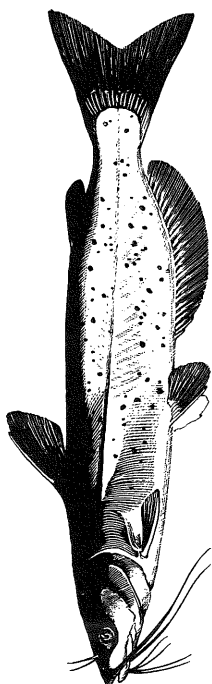
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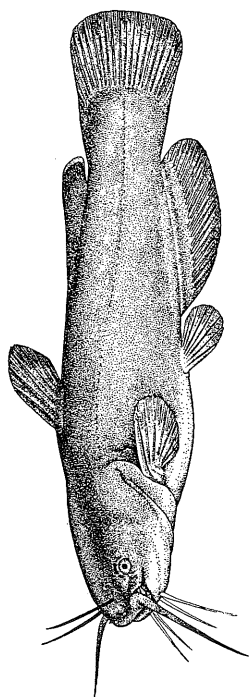
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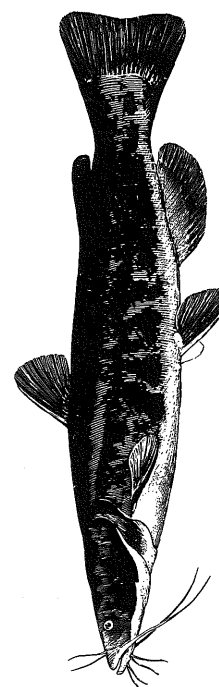
R



M



N



O

P. COMMON CARP (exotic)

Family: Minnow
 Shape: Chubby football
 Mouth: Sucker like with a barbel at each side
 Fins: Dorsal and anal with a sawtoothed spine; Dorsal sickle shaped and even with pelvic
 Scales: Large
 Color: Brassy to olive back with gold sides
 Habitat: Warm, shallow, mud-bottom lakes, streams, and rivers in south (eutrophic)
 Habits: Very adaptable to wide range of conditions
 Food: Insects, crayfish, plant roots/shoots, and seeds
 Tackle: 6-8 lb. line; Canned corn fished off bottom

Q. FATHEAD MINNOW

Family: Minnow
 Shape: Chubby slab-sided football
 Mouth: Small and forward on a blunt rounded snout
 Fins: One part dorsal even with pelvic; Dorsal with black bar across middle; Tail forked with dark spot at base
 Scales: Crowded anteriorly
 Color: Normally drab brown or yellowish-olive; Male during breeding black with two vertical bars and back and snout with bumps
 Habitat: Silty ponds, ditches, and shallow lakes statewide (eutrophic)
 Habits: Survive low oxygen levels; School in mid-water or near bottom
 Food: Algae, plankton, worms, and insects (mosquitos)
 Tackle: Seine or minnow trap; Used as bait for other fish

R. GOLDEN SHINER

Family: Minnow
 Shape: Deep-bodied, compressed; Belly behind pelvic fins keeled
 Mouth: Small upturned
 Fins: One part dorsal even with pelvic
 Scales: Normal with none along keel; Lateral line strongly curved downward
 Color: Greenish-gold tinge that fades rapidly
 Habitat: Vegetated quiet water lakes, ponds, and sloughs statewide (small mesotrophic to eutrophic)
 Habits: Tolerant of low oxygen and nutrient enrichment; Loose aggregated schools
 Food: Plants, snails, and terrestrial insects
 Tackle: 4-6 lb. line; Dry flies; Seine or minnow bucket; Used mainly as bait fish

M. CHANNEL CATFISH

Family: Catfish
 Shape: Slender light bulb
 Mouth: Wide and flat with bristle teeth; Barbels present; Lower jaw protrudes beyond upper
 Fins: Adipose fin; Forked tail with slender base; Spines in dorsal and pectorals; Anal rounded
 Scales: None
 Color: Blue-gray with scattered black spots on back and sides (large fish often lose spots)
 Habitat: Clear, swift, rocky riffles/deep pools streams of the central and south (eutrophic)
 Habits: Locates food by taste/smell
 Food: Small fish, insects, crayfish, snails, and clams
 Tackle: 8-12 lb. line; Fish riffles/shallows off bottom at night with "stink baits", crayfish, worms, or minnows; Fish pools or cover during the day or after a rain

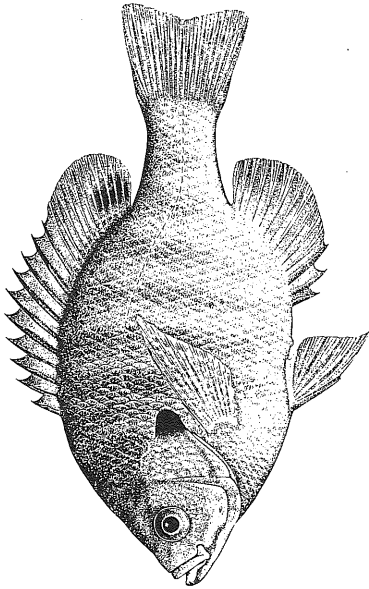
N. YELLOW BULLHEAD

Family: Catfish
 Shape: Short and heavy
 Mouth: Wide on a short broad head; Bristle teeth; White barbels
 Fins: Adipose fin; Dorsal and pectoral fins with spines; Rounded tail
 Scales: None
 Color: Yellowish brown to black with yellow belly
 Habitat: Clear, shallow, vegetated, mud/sand/gravel/rock bottom lakes and slow streams in central and south (small mesotrophic; black and brown eutrophic)
 Habits: Very hardy; Locates food by taste/smell; Indicator of better water quality
 Food: Insects, crayfish, minnows, or almost anything dead or alive
 Tackle: 6-8 lb. line; Still-fishing with worms; Fish on or close to the bottom in June

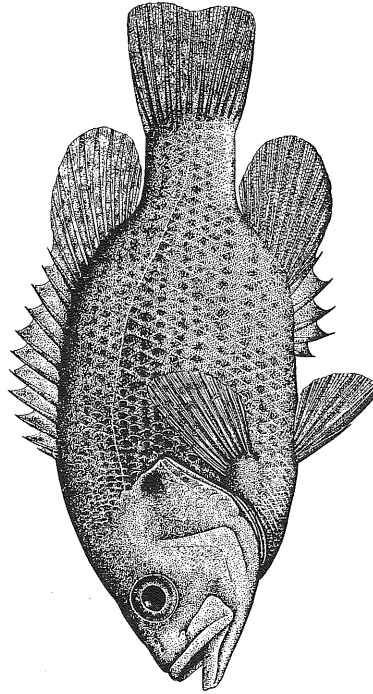
O. FLATHEAD CATFISH

Family: Catfish
 Shape: Slender with depressed anterior (light bulb)
 Mouth: Large and wide on flattened head; Protruding lower jaw; Bristle teeth; Barbels
 Fins: Adipose fin; Dorsal and pectorals with a spine; Squared off tail;
 Scales: None
 Color: Olive to dark brown to sandy yellow mottled
 Habitat: Large, sluggish, turbid rivers with cover and deep pools in central and south (mesotrophic to eutrophic)
 Habits: Day rest on bottom away from current; Feed at night in swift areas
 Food: Small fish
 Tackle: 10-25 lb. line; Live creek chubs/suckers or "stink" bait at night below wing dams or log jams

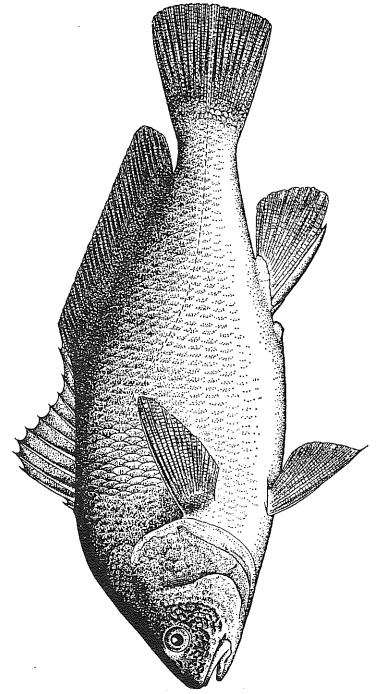
Common Minnesota Fish Cards*



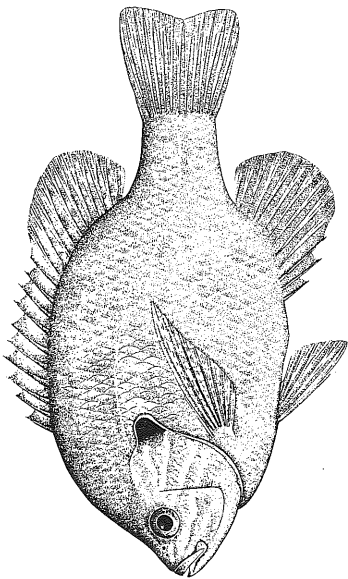
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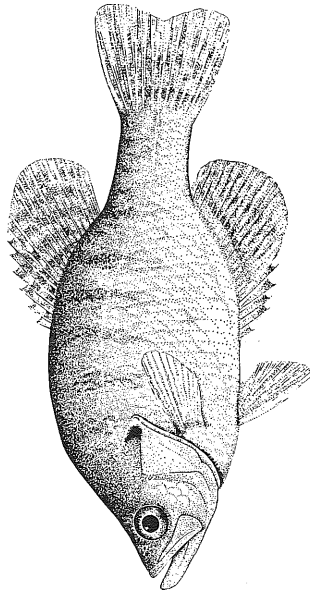
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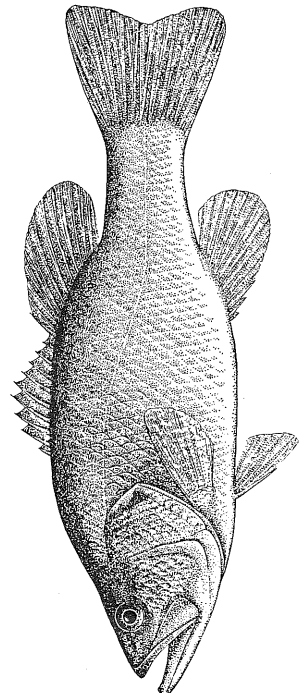
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S



T



U

V. BLUEGILL

Family: Sunfish
 Shape: Flat, round pan
 Mouth: Small "o" shape
 Fins: Well-connected two part dorsal with a spot at base; Dorsal even with pectorals; Long pointed pectorals
 Scales: Normal
 Color: Olive purplish tinge with orange to blue belly; Solid black gill-flap; Vertical bars on sides; Varies with sex, age; and between individuals
 Habitat: Heavily vegetated, clear warm lakes/streams/rivers statewide (small mesotrophic to eutrophic)
 Habits: Travels in loose schools; Day in pool or shade; Dusk/dawn moves into shallows; Suck insects from the surface; Nibble on bait
 Food: Small fish, insects, snails, and zooplankton
 Tackle: 4-6 lb. line; Still-fishing or slow retrieve of a worm/crickets/grasshopper/small jig/fly; June best

W. ROCK BASS

Family: Sunfish
 Shape: Heavy-bodied and stout
 Mouth: Large extending past middle of the eye
 Fins: Well-connected two part dorsal; Dorsal even with pectoral
 Scales: Normal; Each scale with a black spot
 Color: Brassy with distinct black spots; Distinct reddish eye; Change pigmentation to surroundings
 Habitat: Shallow, weedy, slow-moving, soft bottom lakes and streams in central and north (mesotrophic areas)
 Habits: Travels in schools; Daytime feeders; Sedentary and secretive
 Food: Insects, snails, crayfish, and small fish
 Tackle: 4-8 lb. line; Worms/grasshoppers/small plugs/spinners/flies slightly off bottom; Mid-June to -July best

X. FRESHWATER DRUM

Family: Drum
 Shape: Elongated, deep-bodied, hump-back
 Mouth: Medium slightly turned down on blunt rounded snout; Jaws with weak teeth
 Fins: Separated two part dorsal; Very long soft ray portion of dorsal; Diamond shaped tail
 Scales: Rough edged; Lateral line through tail
 Color: Gray back, silver sides, and white belly
 Habitat: Clear to muddy shallow lakes and rivers in central and south (eutrophic areas)
 Habits: Stays near bottom; Make croaking or booming sounds with swim bladder
 Food: Worms, insects, minnows, crayfish, clams, and snails
 Tackle: 6-8 lb. line; Fish live worm/crayfish/small minnows or artificial spinners/flies off bottom; Mid-May to late June and again mid-September to late October

S. PUMPKINSEED

Family: Sunfish
 Shape: Flat, round pan
 Mouth: Small "o" shape
 Fins: Well-connected two part dorsal; Dorsal even with pectorals; Long pointed pectorals
 Scales: Normal with scattered orange spots
 Color: Speckled greenish with yellowish-orange belly; Blood-red edge of gill-tab; Iridescent blue radiating lines on the cheek
 Habitat: Vegetated, clear quiet waters statewide (small mesotrophic to eutrophic)
 Habits: Spawning with bluegill; Congregate beneath cover; Feed on surface
 Food: Aquatic insects, snails, and small fish
 Tackle: 4-8 lb. line; Worms, grasshoppers, small spinners around vegetation; June cast to spawning beds; July-August cast to plant bed edges; Early morning and late afternoon best

T. WHITE CRAPPIE

Family: Sunfish
 Shape: Flat, deep, round pan
 Mouth: Large with paper thin lips
 Fins: Well-connected two part dorsal; Dorsal even with pectorals; 5-6 spines in dorsal (black has 7-8 spines)
 Scales: Normal
 Color: Greenish on top; Silvery-white sides with light black vertical stripes
 Habitat: Turbid warm rivers, backwaters, and lakes in central and south (eutrophic; black crappie mesotrophic to eutrophic)
 Habits: Congregates in loose aggregates around cover
 Food: Small fish and invertebrates
 Tackle: 4-6 lb. line; Still-fishing or deep, slow retrieve of small minnows/worms/plugs/spoons/jigs; Flies only in late evening; Winter and spring fishing best

U. LARGEMOUTH BASS

Family: Sunfish
 Shape: Slender streamlined shoe box
 Mouth: Large; Jaw extending beyond eye
 Fins: Connected two part dorsal with a deep notch
 Scales: Normal
 Color: Dark green with silvery-yellow/green sides with white belly; Black lateral stripe; Varies with habitat
 Habitat: Clear to turbid, weedy, quite, sand/mud bottom lakes and streams in central and south (small mesotrophic to eutrophic; smallmouth bass large mesotrophic)
 Habits: Ambush sight feeder; Most active in morning and evening; Very territorial
 Food: Small fish, bluegill, crayfish, and frogs
 Tackle: 4-8 lb. line; Slow retrieve of plastic worms/frogs/minnows/plugs/spoons in vegetation beds; Let run for awhile before setting hook

* From Fishes of the Minnesota Region by Phillips, Schmid, and Underhill; and Northern Fishes by Eddy and Underhill

Fish Printing

Purpose: Everyone should handle fish and become comfortable with texture, be able to identify fish, understand the function of external fish parts, and notice physical similarities between fish and people.

Level: Beginner

Group Size: 2 to 25

Site: Outdoors (sheltered from wind) or Indoors (classroom with sink)

Time: 25 to 35 minutes

Supplies: Whole fish with big scales (dead not frozen)

Paintbrushes

Tempura paint

Containers for paint and water

Large bucket of water for cleaning paint off fish

Art paper (assorted colors), newsprint, or cloth

Newspapers

Rags

Fishing license and/or DNR permit

Reference: Sport Fishing and Aquatic Resources

Handbook, 56-65, 71-85 and 92-96;

Managing Minnesota's Fish booklet; Habits

and Habitats of Fishes in the Upper Mississippi

River; and Fish Identification Book List.



Collect the fish a few hours before the event or thaw a block of ice containing whole fish that you collected at an earlier time.

Explain to the group that they will be practicing an ancient art form called **gyotaku** (ghio-ta-koo). This art form has been practiced in Japan for over a century. The pictures are used for studying biology and to record catches. It is also a good way to understand and appreciate the beauty and variety of aquatic animals. Consequently, biology is not only a science, it's an art!

Sit the students at tables covered with newspaper – give them enough room to paint freely. Set out the containers of tempura paint, clean water, paintbrushes, paper, and rags.

Give everyone a fish (or let them pick their own). Initially, some youth will be reluctant to handle the fish. Just encourage them to touch the fish, and work slowly with them until they begin to feel comfortable.

Everyone should now **gently dry** their fish with a rag. Using a flat, wide brush, they will apply a thin layer of paint over the fish (spreading fins to paint all parts).

Encourage the youth to identify and explain the functions of the various anatomy parts while painting their fish. Creative types can paint these parts (eyes, tails, mouths) different colors.

Now have participants place a sheet of art or newsprint paper on top of their fish. They should press down on the paper (**blot, don't smooth**). Carefully touch all fish parts without moving the paper. Slowly lift the paper and view the work of art! A second print is sometimes more vivid than the first when done without reapplying paint. To do additional prints, wash the fish in the bucket of water and repeat the above steps.

Once the participant is satisfied with a print, have them paint in the **basic habitat needs** of that fish. Discuss that some needs do overlap and that a small change can impact many different fish. Link the needs to the different types of aquatic systems found in Minnesota. Arrange the pictures into groups of fish that would be found together



This activity allows everyone to touch and hold a fish. It also lets them explore a fish's external anatomy and learn the key traits that will help them identify fish species and their habitats. Once everyone is comfortable handling the fish, they will paint the fish and imprint its image on a piece of paper – an ancient art form known as **gyotaku** (ghio-ta-koo).



in those systems. *Which ones have similar habitat needs? Are any food webs evident from these groupings?* Then have them label the picture with their name and the name of the fish and its family.

Your young biologists may also make fish prints on T-shirts with fabric inks. This is an excellent way to teach youth how to “preserve their catch” before eating the fish as long as water-based inks and paints are used.

For Discussion

- Q. Name the type of fish you are printing and some of its habitat needs.
A. *This will vary widely.*
- Q. Name parts of the fish and their use.
A. *Examples:* The lateral line runs along the side of the fish and senses water vibrations (i.e., predators approaching or a boat moving overhead). Mouths are used for eating. Gill covers help push water through the gills (to get oxygen).
- Q. Name two ways that people are similar to fish.
A. *Examples include:* Two eyes, skin, mouth, etc.

Other Ideas

- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 8, 11-14 and 22.
- *Prints are also made by people.* Each person has unique interests and skills. Find out what types of things they like and dislike. These different interests allow each of us to seek different places to live, different hobbies, and careers. Explain why it is important for each of us to be different. Talk about some of the different options available in the natural resources field.

Fish Fables

Purpose: Everyone should be able to identify several common Minnesota fish, and describe appearance and behavior of fish through storytelling.

Level: Intermediate

Group Size: 3 to 25

Site: Outdoors (shaded area) or Indoors (classroom)

Time: 10 to 15 minutes

Supplies: Common Minnesota Fish Cards (pages 2-5 to 2-12)

Paper and pencils

Reference: Sport Fishing and Aquatic Resources Handbook, 61-65 and 69-85; Habits and Habitats of Fishes in the Upper Mississippi River; Fishing Regulations; and Fish Identification Book List.



In this activity, everyone chooses a fish card and describes its key traits to the group in a “What am I?” story format. They “pass” their knowledge to the group members verbally, while giving the group a chance to guess the fish’s identity.



Prior to the activity, select a set of fish cards that are representative of the fish found in your area. Make sure that you have at least one card for every participant.

Assemble your group in a large circle (sitting). Give each person a piece of paper and a pencil. Pass the set of fish cards around the group having each person select one card. Tell them to keep the card face down after scanning the picture for a few seconds.

Begin the game by describing a fishing trip (or walk along a lake) to the group. Your story might start: “Once I went with my brother to a cold, fast-moving stream,” or “I walked by a person near a fishing pond the other day, and I looked in her catch bucket.” Go on to describe the fish, you had chosen from the cards. Use your imagination to describe this fish, but be accurate. (For a northern pike you might say: “The fish was long like a snake.”)

During the story, encourage the youths to take notes and ask questions of the storyteller. If a storyteller gets stuck, help them by asking questions which get back to the key traits learned earlier. Make sure the storyteller includes where the fish lives, how it feeds, what it eats, and other items it might see in its habitat.

At the end of the story, ask each person to name the fish, based upon the clues given in the story. Remind everyone not to reveal the fish’s identity until someone has made a correct guess. The first person to correctly guess the fish is the next in line to tell their fish fable.

Continue the storytelling as long as it’s interesting! Remember, participants will tell their stories at different paces so give them plenty of time! For more advanced students, you might want to include aquatic insects and plants as items to describe.



Q. Can you identify fish based upon where they are found or what they eat?

A. Yes, describing the habitat can help you figure out what type of fish you’ve caught.

Other Ideas



Q. What key traits described in the story made identifying the fish easier? Which ones not mentioned would have helped?

A. *These will vary* depending on who's telling the story and their knowledge. *Key traits best for identification are body shape, mouth/snout, fin structure/location/shape, and the presence or absence of scales, barbels or adipose fin.*

Q. Do people ever tell "People Fables"?

A. This will vary widely.

- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 11-14 and 22.
- Storytelling has been an important form of teaching in many cultures. Elders passed on traditions and wisdom to youth in verbal form. *Invite an older person into your group from the area to tell stories about his/her life.* The person can also recall how your area has changed over time.

Fish Jeopardy

Purpose: Everyone should know the key identification traits of various fish, understand and recognize fish habits and habitats, and associate a fish's physical traits with a preferred habitat.

Level: Advanced

Group Size: 4 to 25

Site: Outdoors (sheltered from wind and shaded) or Indoors (classroom)

Time: 15 to 25 Minutes

Supplies: Fish Jeopardy Playing Board (page 2-18)

Fish Jeopardy Cards (page 2-19 to 2-20)

Pens

Noise makers (optional)

Reference: Sport Fishing and Aquatic Resources

Handbook, 56-65 and 77-85; Managing

Minnesota's Fish booklet; Habits and Habitats

of Fishes in the Upper Mississippi River; Fishing

Regulations; Fish Identification Book List.

Begin by breaking everyone into two or three teams. Give each team a copy of the Jeopardy Playing Board with the categories and amounts. Explain to everyone that the first team to signal (by raising hands, noise makers, etc.) after you read the card will get a chance to respond to the topic. **Remind them that their responses must be in the form of a question.**

Have a team select a category and amount (i.e., Fish Senses for 10). Using the correct Fish Jeopardy card, read the "Answer" that corresponds with this selection (i.e., "Fish can see in all directions except for these two.")

The first team to signal now tries to provide the "Question" to this answer (i.e., "What is straight down and straight back?"). If the response is incorrect, let the other teams now signal. Repeat until all the teams have had a chance to respond or you are given the correct response. The team with the correct response will choose the next category and amount.

Cross off categories and amounts on your copy as they are used by the group. Let someone keep numerical score to determine a winning team at the end.

Have the group create more answers and questions in categories like: predator and prey, lake classifications, spawning locations, and seasons.



This activity uses the format of the game show "Jeopardy" to reinforce information about fish identification, habitat, and other related topics.



Prior to the activity, select the categories and questions that you plan to ask and set up a master playing board to reflect these choices.



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 3, 11-14, 18, and 22.
- Organize a parade where the youth are dressed as their favorite fish or aquatic animal.

Fish Jeopardy

Fish Parts	Habits and Habitats	Name That Family	Key Traits	Look-A-Likes	Unusual or Under Utilized	Favorite Foods
10	10	10	10	10	10	10
20	20	20	20	20	20	20
30	30	30	30	30	30	30
40	40	40	40	40	40	40
50	50	50	50	50	50	50
60	60	60	60	60	60	60

FISH PARTS

A-10: A fish can't see in this direction.

Q-10: What is directly behind them?

A-20: Special bones (ears) beneath the skin are used to do this sense.

Q-20: What is hearing?

A-30: Parts used to maneuver and balance them in the water.

Q-30: What are fins?

A-40: Fish use these to draw oxygen from the water.

Q-40: What are gills?

A-50: The term used to describe a fish's body temperature.

Q-50: What is cold-blooded?

A-60: The lateral line, nerve endings that run along the side of a fish, senses this in the water.

Q-60: What are vibrations in the water?

NAME THAT FAMILY

A-10: We have duckbilled snouts, sharp teeth, and torpedo shaped bodies.

Q-10: What is the pike family?

A-20: Instead of lifting "barbels," we wear them like whiskers on our scaleless bodies.

Q-20: What is the catfish family?

A-30: We are the largest fish family in Minnesota; anglers pursue us mainly for bait.

Q-30: What are minnows?

A-40: Two of our members have sharp teeth and glassy eyes.

Q-40: What is the perch family?

A-50: Our members have a dorsal fin with two well connected parts – the front full of spines and the back with soft rays.

Q-50: What is the sunfish family?

A-60: Our members are a cold-water species with small scales and adipose fin.

Q-60: What is the trout family?

HABITS AND HABITATS

A-10: The four basic needs of fish.

Q-10: What are food, cover, water (oxygen), and space?

A-20: Rocks, plants, and logs make up this habitat need.

Q-20: What is cover?

A-30: What the animals and plants are called in a food web.

Q-30: What are producers, consumers, and decomposers?

A-40: When a number of the same type of fish "hang-out" with each other.

Q-40: What is schooling?

A-50: Reasons why fish chase lures.

Q-50: What is mimicking real food and attracting fish due to color or noise?

A-60: A bluegill's habits.

Q-60: What is nibbling on a variety of foods and traveling in schools through vegetation?

KEY TRAITS

A-10: All fish use this for eating, but its location and shape tell you what to use as bait.

Q-10: What is a mouth?

A-20: These traits are often used to identify fish but vary depending on water quality, sex, and age.

Q-20: What are color and size?

A-30: Terms that describe the tail (caudal) fin.

Q-30: What are forked, square, and round?

A-40: The presence of these two traits narrows down your choices rather quickly.

Q-40: What are the adipose fin and barbels?

A-50: The two types of structures that can make up the fins.

Q-50: What are soft rays and spines?

A-60: The trait that controls what a fish does, how it moves, and what it eats.

Q-60: What is body shape?

LOOK-A-LIKES

A-10: Sunfish that are separated by studying the jaw.

A-20: An easy way to tell the northern pike from the muskie.

A-30: Crappie are best told apart by counting these structures.

A-40: Non-native stream trout species; one has a forked tail with black spots and the other a square tail.

A-50: These catfish are told apart by counting the anal fin rays and studying the shape of its tail.

A-60: The ear flap shape, length, and color help identify different species of this group.

Q-10: What are largemouth and smallmouth bass?

Q-20: What are the number of pores on the underside of the jaw?

Q-30: What are the number of spines in the dorsal fin?

Q-40: What are rainbow and brown trout?

Q-50: What are bullhead?

Q-60: What are sunfish (bluegill, pumpkinseed, green, orangespotted, etc.)?

FAVORITE FOODS

A-10: An artificial lure that you cast to a trout.

A-20: A soft plastic lure that largemouth bass find very yummy!

A-30: A vegetable that carp and humans are crazy about eating.

A-40: People can't stand it, but catfish come running when they smell it in the water.

A-50: A freshwater drum (sheephead) sometimes crushes this nuisance animal with its powerful molar-like teeth.

A-60: A natural bait that looks like a lobster.

Q-10: What is a fly?

Q-20: What is a plastic worm?

Q-30: What is corn?

Q-40: What is stink bait?

Q-50: What are zebra mussels?

Q-60: What are crayfish?

UNUSUAL OR UNDER UTILIZED

A-10: An ancient fish with a snout that looks like a paddle and is composed entirely of cartilage.

A-20: A fish with the same name as a bison.

A-30: With scales of armor, I am often called a dogfish.

A-40: A nuisance (exotic) fish of the Great Lakes that looks like a snake with a funnel shaped mouth.

A-50: Anglers are repelled by my eel shape, potbelly, and one barbel, but my white firm flesh tastes like lobster.

A-60: A fish whose anal opening moves up into its throat as it matures.

Q-10: What is a paddlefish?

Q-20: What are buffalo?

Q-30: What are bowfin?

Q-40: What is the lamprey?

Q-50: What is eelpout or burbot?

Q-60: What is a pirate perch?



Water Stewardship

What will the group learn? Participants will understand that water is cycled, that people can hurt or help water quality, that the quality of water effects the types and number of fish present, and learn to measure some water quality parameters.

Water, Water, Everywhere

Water is an essential part of habitat for all living organisms. Bluegill, pumpkinseed, northern pike, and crayfish all depend on water. But will all water sustain life? Or does water need to have a certain level of quality to be used by certain fish?

Water moves in a cycle – called the **hydrologic cycle**. Water is a **non-renewable** resource. Humans can't make new water. Our only option is to reuse the existing supply. (A **renewable resource** is one that can be continued – like humans, fish, or snakes.)

We impact the quality of water when we add things that don't belong to the supply. **Point-source pollution** enters water from a single source, such as an outflow pipe or an oil spill. **Non-point source pollution** emerges from numerous sources; it can't be pinpointed to one origin. Chemicals or plant and other organic runoff from feedlots, lawns, urban areas, etc., are all sources of non-point pollution. These pollutants alter water, sometimes making it undrinkable or unusable. This altered water must then be cleaned and filtered to make it fit to use again.

Water quality can also be altered by nature. Erosion

(the wearing away and moving of dirt from a surrounding area) can be caused by rain, ice, wind, or water running overland (called surface runoff). This moving dirt and soil is often deposited in a stream or lake. Too much soil in the water can reduce the clarity (clearness) and increase sedimentation (the buildup of dirt and soil in a body of water). Erosion is a non-point source of pollution, that can be accelerated by human activity in the surrounding area (**watershed**).

Water quality affects where fish live, how they behave, and if they survive. If water clarity decreases, a fish (who feeds by sight) may have trouble finding prey (because it is harder to see). If oxygen levels in a lake drop due to too many nutrients, some fish will die. Also, fish living in polluted waters can contain mercury, PCBs, and other contaminants (pollutants) that are harmful to people if eaten in the wrong amounts (see Fish Consumption Advisory).

We need to maintain and restore high water quality for our lakes, streams, and ponds. **Stewardship of our environment means taking care of our waters. . . and our very future!**

Would You Drink This Water?

Purpose: Everyone should understand how much fresh water is on the earth, be able to define renewable and non-renewable resources, understand that pollutants are often invisible, and know how to use all their senses before labeling a substance polluted.

Level: Beginner

Group Size: 4 to 25

Site: Outdoors (no wind; near drinking water) or Indoors (classroom)

Time: 20 to 30 minutes

Supplies: Ice cream pail with 1 gallon of water
Clear plastic cups (a set of six for each group and one extra)

Eyedropper

Water

Green food color

Powdered coffee creamer

Peppermint extract

Onion extract

Salt

Blindfolds (separate set of two for each group)

Would You Drink This Water? Log (page 3-4)

Fishing . . . Get in the Habitat! youth booklet

Reference: Sport Fishing and Aquatic Resources Handbook, 43-55; Conservation and the Water Cycle poster; and A Citizens' Guide to Lake Protection.



Just prior to the event fill your bucket with 1 gallon of water and mark a cup with a 1/2 cup line. Next prepare your "polluted" water samples for each group. Fill six glasses 3/4 full of water and label them one to six. Pollute five individual glasses with one of these substances: green food coloring, onion extract, coffee creamer, salt, and peppermint extract. One glass should be left as water only. The plain water, onion, salt, and peppermint extract should appear clear. The food coloring and coffee creamer will be cloudy. Place these six glasses out of sight for use later in the activity. (Make sure to use clean, unused blindfolds and sterilized cups for each group.)

Begin by explaining that 75% of the earth is covered with water (or someone can volunteer this figure). This amount is simulated by a one-gallon bucket of water.

Ask everyone how much of the water in the bucket they think is freshwater. Measure 1/2 cup of water from the bucket. This represents all the freshwater on the earth – the rest is salt water in oceans. **Less than 3% of all water on earth is freshwater** – found in lakes, rivers, underground, frozen in ice, etc.

Ask the group how much of the water in the cup they think is available for animal, plants, and human use. Remove one drop of water from the 1/2 cup. **This is ALL the freshwater available for use!** The rest of it is frozen in icebergs and at the poles.

Hand out the *Fishing . . . Get in the Habitat! youth booklet*. Review the water cycle with your group; an illustration is found on page 2. Explain that the water on earth today is the same water that has been here for eons. Dinosaurs slurped the same water that comes out of the kitchen tap! No new water is ever made. Water circles in the hydrologic cycle – precipitation, to transportation, to storage, to evaporation. Discuss ways that water could become polluted in this cycle (runoff, air pollution) and how it is cleaned (infiltration, humans).

Explain to the group that wise conservation (including recycling) of **nonrenewable resources**, such as oil, minerals, and water, needs to be stressed and practiced by



In this activity, you will describe the water cycle, demonstrate how much fresh water is available for use, and define renewable and nonrenewable resources. In the second part, the group(s) will use their senses of sight, smell, and taste to examine six water samples, (five "polluted") and decide which they would drink.

all of us. For once these items are used, they do not regenerate. **Renewable resources**, like fish and humans, can replenish themselves as long as their habitat needs are met. But just because a resource is renewable doesn't mean it will never be used up, or that misuse won't occur – point out some examples of extinct or endangered species. Misuse and natural disasters have often necessitated the need to manage our limited resources. For example, droughts worldwide have caused us to manage the crop supply through rationing. Sometimes it is only through management that we can guarantee that we will have something left for future needs.

Polluting our Waters

Now you're ready to demonstrate pollution. As a large group, or in smaller groups of four to five, assign someone to record responses (one for each group), and give them the “*Would You Drink This Water?*” Log. Next, select two volunteers to be the “samplers” and give each of them a new, clean blindfold (don't reuse blindfolds for additional groups).

From a distance, let the group(s) visually decide which water they would drink and record it on their log. Now, you should blindfold the volunteers. Explain that the water won't make them sick. One will taste (**small sips only!**) and the other will smell the samples. (**If doing this activity with more than one group, use a clean glass each time for tasting the substances.**) Remind the audience and volunteers to keep their reactions secret until each of them has had a chance to try the liquid, and they are asked to respond by the recorder. Change the order of the glasses so that the blindfolded volunteers won't know which one they are sampling.

Bring the groups back together. Have them compare the differences between the sight, smell, and taste preferences, and which ones they thought were fit to drink. Share with them the contents in each of the samples and share how these could represent real situations: For example, green food coloring as algae, onion depicting the smell of an oil spill, coffee creamer as turbid water, and the peppermint representing a substance that can be tasted but not seen or smelled.



- Q. Are all pollutants visible?
A. *No*, for example, the onion and peppermint extract weren't visible. Likewise, pollutants such as mercury and PCB's may not be visible in our water supply.
- Q. Are substances that we see or taste in the water always unhealthy?
A. *No*, some just look bad, like the green food color. Algae tastes bad and can be unsightly, but it is not always unhealthy.
- Q. Name three types of pollution that you have seen in, or near water.
A. *This will vary greatly*, but includes – litter, fertilizer/pesticides, oil from cars, soil from erosion, etc.
- Q. What effects do pollutants have on fish and their habitat?
A. *Pollutants can accumulate in fish* to make them unhealthy to eat. *Pollutants can cause components of habitat to be destroyed*, which causes stress on the fish, which leads to diseased and eventually dead fish.



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 2, 10, and 20.
- Ask group members where in their neighborhood or city have they seen pollution problems. Discuss what might be the source of these pollutants, what effect they have on the habitat, and what effect they have on the fish that we catch and eat.
- Make a list of the “good and bad” sites or facilities and select a few of each to visit. Contact the owner or Public Relations Department to get permission to visit the site or set up a tour of the facility. Have the tour guide explain where they collect the water, what they use it for, if they clean it, how it is disposed, and what other programs they do to help protect our resources. After the tour, ask group members what they, the owner, or the company might do to help make the process less polluting or expand their good efforts to other areas.

Would You Drink This Water? Log

WOULD YOU DRINK THIS WATER?

Which glass of water would you drink based on your senses of sight, smell, and taste? Place an "X" in each column if you would drink this water sample.

	Sight	Smell	Taste
Glass 1	_____	_____	_____
Glass 2	_____	_____	_____
Glass 3	_____	_____	_____
Glass 4	_____	_____	_____
Glass 5	_____	_____	_____
Glass 6	_____	_____	_____

WOULD YOU DRINK THIS WATER?

Which glass of water would you drink based on your senses of sight, smell, and taste? Place an "X" in each column if you would drink this water sample.

	Sight	Smell	Taste
Glass 1	_____	_____	_____
Glass 2	_____	_____	_____
Glass 3	_____	_____	_____
Glass 4	_____	_____	_____
Glass 5	_____	_____	_____
Glass 6	_____	_____	_____

WOULD YOU DRINK THIS WATER?

Which glass of water would you drink based on your senses of sight, smell, and taste? Place an "X" in each column if you would drink this water sample.

	Sight	Smell	Taste
Glass 1	_____	_____	_____
Glass 2	_____	_____	_____
Glass 3	_____	_____	_____
Glass 4	_____	_____	_____
Glass 5	_____	_____	_____
Glass 6	_____	_____	_____

WOULD YOU DRINK THIS WATER?

Which glass of water would you drink based on your senses of sight, smell, and taste? Place an "X" in each column if you would drink this water sample.

	Sight	Smell	Taste
Glass 1	_____	_____	_____
Glass 2	_____	_____	_____
Glass 3	_____	_____	_____
Glass 4	_____	_____	_____
Glass 5	_____	_____	_____
Glass 6	_____	_____	_____

WOULD YOU DRINK THIS WATER?

Which glass of water would you drink based on your senses of sight, smell, and taste? Place an "X" in each column if you would drink this water sample.

	Sight	Smell	Taste
Glass 1	_____	_____	_____
Glass 2	_____	_____	_____
Glass 3	_____	_____	_____
Glass 4	_____	_____	_____
Glass 5	_____	_____	_____
Glass 6	_____	_____	_____

WOULD YOU DRINK THIS WATER?

Which glass of water would you drink based on your senses of sight, smell, and taste? Place an "X" in each column if you would drink this water sample.

	Sight	Smell	Taste
Glass 1	_____	_____	_____
Glass 2	_____	_____	_____
Glass 3	_____	_____	_____
Glass 4	_____	_____	_____
Glass 5	_____	_____	_____
Glass 6	_____	_____	_____

Water Quality Site Study

Purpose: Everyone should be able to measure and monitor water quality, assess the condition of a lake/stream based upon these measurements, and understand water stewardship.

Level: Intermediate

Group Size: 5 to 25

Site: Outdoors (pond, lake, river, or stream)

Time: 30 to 45 minutes

Supplies: Pencils and a hard surface to write on (one per group or individual)

How Healthy is My Water Ecosystem? (page 3-8)

Water Quality Parameters Guide (page 3-9)

*Safety goggles**

Water quality test kit (Dissolved O2 kit, thermometer, Secchi disk, and pH paper)*

Life jackets (optional)*

Reference: *A Citizens' Guide to Lake Protection; A Lake is a Reflection of its Watershed poster; and Sport Fishing and Aquatic Resources Handbook, 43-55.*

* Loaner materials available upon request (limited supply so reserve early)



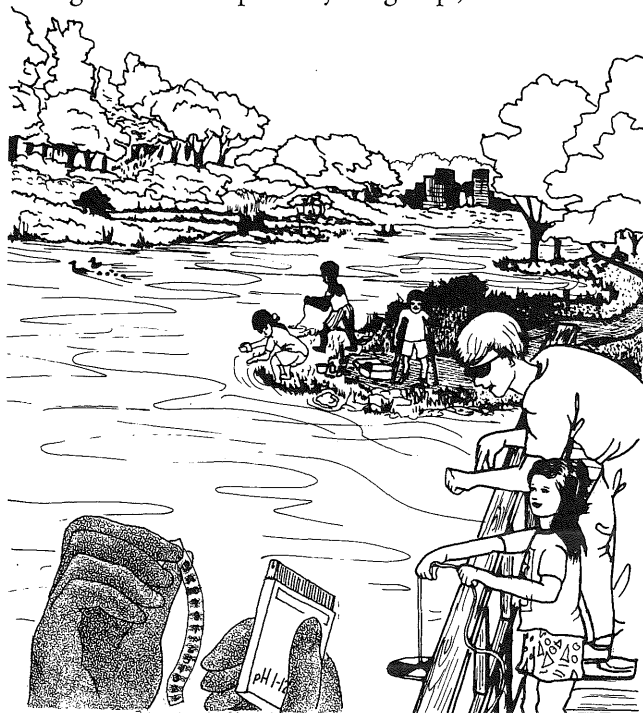
Prior to the program, designate a specific area (gentle sloping bank, pier, foot bridge) for each sampling station. Place the appropriate equipment at each of the sites and assign an adult volunteer to that station. (For safety, you may want to require the wearing of a life jacket when taking the water samples.)

Begin by appointing everyone Resource Managers for the day, and breaking them into groups of five youths per adult. Explain that they are in charge of studying the ecosystem of this water body. From the data collected, they will determine if this ecosystem is healthy. This is how natural resource agencies decide how to manage a lake or stream – through measurement and observation both in, and around the water body.

Hand out the *How Healthy is My Water Ecosystem?* (one per person or group). Rotate the groups through each of the sampling stations. (Remember: It's important to have enough adults to supervise your group!)



In this activity, participants become Resource Managers for the day. They will measure four different water quality parameters, and record positive and negative conditions that are found around the body of water. Finally, they will decide what type of fish might live in the water, and what they could do to improve or protect the site.



Water Temperature Station

Use a thermometer to measure water temperature in various areas, and at different depths, by attaching a string so that it can be easily lowered into the water. Leave the thermometer in the water for about three minutes. Record the temperature, depth at which taken, and shore conditions on the survey. Review how fish species require different temperatures, ranging from warm (75° F) to cold (50° F).

pH (Acidity) Station

Give each group (or individuals) a piece of litmus paper to measure the pH of the lake/pond. Explain that it is important to hold on to and touch only the top edge of the pH paper. Lower the strip into the water at various sites. Interpret the pH by matching the color of the unnumbered section of the strip with the other numbered colors on the strip. A pH of 7.0 is neutral, pH values below 7.0 are acid and above are alkaline. Record this number and the shore conditions on the survey. pH becomes especially important in northern lakes, where the area is susceptible to acid rain.

Water Clarity (Clearness) Station

Using a secchi disk, measure water clarity by lowering the disk into the water until it disappears. Then raise it until it is just visible. (Be careful, this disk is easy to lose and sinks quickly.) Measure the length of rope from the surface of the water to the point underwater where the disk disappears. Record this number, the weather, and shore conditions on the survey. Water clarity is important to fish for finding prey or hiding. (Note: Measurements will vary dramatically depending on the lake type, weather conditions before and on the day of sampling, and shore conditions. For example, lower readings often occur after a rain, and on windy days due to increased turbidity.)

Dissolved Oxygen (DO) Station

Measure the dissolved oxygen of the water by carefully following the instructions included in the kit. Group members wearing safety goggles can help with the different steps by adding the reagent powder or shaking the bottle. Since this test takes some time, the leader may

want to prepare samples ahead of time so that bottles are at the various stages. After making the measurement, record the reading, weather, and shore conditions. Dissolved oxygen (the amount of oxygen (O₂) in the water and available for fish to use) is an important measurement. **Factors that influence the amount of oxygen a lake will have are water temperature** (cold = more; hot = less), **decomposition** (lowers value), and **plant photosyntheses** (production of O₂). Some fish need high amounts of dissolved oxygen, while others can get by with less.

Habitat And Life Forms Station

Have the youths look for various animal life (fish, insects, birds) that can be seen both in the water and on the shore. Observe and explore the habitat needs of these critters. Are there any plants that would serve as food or cover for aquatic animals? Record this information. Using their data, and the *Water Quality Parameters Guide*, let them decide what types of fish might best live in their lake.

Shoreline Condition Station

Is the shoreline or riverbank eroding? Is there cover along the shore (i.e., a fallen log)? Are there plants or trees near or around the water? (Note: Up to 10% of a lake's surface area should have some cover to provide for a good fishing lake.) If no cover is present, why is it missing? Is there any pollution (litter, oil on surface, etc.) in the water or on shore? Are there activities being done around the lake to help protect it from runoff, pollution, etc.? Record these observations.

After rotating the groups through all the stations, bring everyone back together in a big circle (sitting). As Resource Managers, how would they rate the overall health of their ecosystem based on the data they collected today. **Do they agree about the measurements, observations, and overall condition and health of their ecosystem?** Far out values (measurements that don't generally agree with the rest of the groups) might be wrong as a result of improper procedures (letting air into sample bottles of O₂; overhandling the pH paper, etc.).

As a group, let them brainstorm and plan management

activities that will improve or protect their ecosystem. For instance, resource managers might post a “No Littering” sign along the shore. They may prevent plants from being removed (to keep oxygen levels higher). They may want to create a wetland nearby to filter chemical runoff. Let them share their “prescriptions” (ideas and plans for taking care of the water ecosystem).

For Discussion

- Q. What are some ways that you affect the quality of the water in your area?
A. These will vary. They include – illegally pouring paint down the drain and throwing garbage near a stream; taking motor oil to the gas station for disposal is positive.
- Q. Why might group measurements (pH, water clarity, temperature, O₂) differ?
A. The measurement depends on where and when it is taken. A body of water is the sum of many micro (small) habitats. *These micro habitats will give different readings, depending on what is influencing them.* For example, water clarity might be lower near an erosion source. Readings taken in the same spot will also change due to the weather, time of day, month, turnover (mixing of water in the spring and fall due to changes in the water temperature), and stratification (splitting deep water bodies from top to bottom into three layers based on water temperature).
- Q. How do each of the parameters studied affect the fish?
A. Water quality influences *what types of habitats exist* in certain areas. It also will determine which *fish species* are most likely to be able to live in that area, what *behaviors* they will exhibit, and *how healthy they will be* in that lake.
- Q. When you turn the water on in your kitchen, where does that water come from?
A. Urban – municipal water supply. Water is piped to homes from a treatment plant (where water is filtered

and cleaned with chemicals). Before it gets to a treatment plant, however, it comes from a river, lake, or reservoir. In *rural areas*, your home might have a well – literally a hole dug in the ground that pumps water from a groundwater supply.

Other Ideas

- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 2, 10 and 20.
- *Have the same group members monitor this body of water over time.* Set up a schedule so that they are monitoring the water at the same time of day and at the same exact location. They should record their data, and note any major physical changes to the area. Graphing this data would be helpful in showing trends. You may wish to work with a local resource staff prior to collecting your data. By doing so, they will be able to help the class interpret the data and any trends.
- *Participants can organize an environmental fair* to make the community aware of any special problems or needs facing a lake, stream, or pond. They can write stories, poems, and articles that highlight the positive actions being taken or that could be done to help protect the resource.

HOW HEALTHY IS MY WATER ECOSYSTEM?

Name of Water Body: _____ County: _____

Nearest Town: _____ Date: _____ Time: _____

Resource Manager Conducting Survey: (your name here) _____

Weather: Today _____ Yesterday _____

Lake Type: (circle one) Oligotrophic Mesotrophic Eutrophic Lake Conditions: (circle one) Rough White Caps Smooth

	Water Temperature Reading/Depth			pH	Clarity	DO Reading/Depth	Habitat and Life Forms	Shoreline Condition	
								Positive	Negative
Site 1									
Site 2									
Site 3									
Site 4									

How the land surrounding the lake is used: (Circle all that apply) Forest Cropland Parks City Yard Pastures Houses Industry
Feedlot Others _____

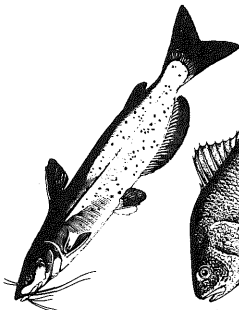
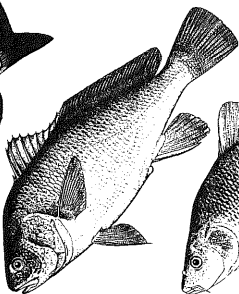
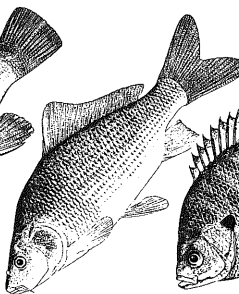
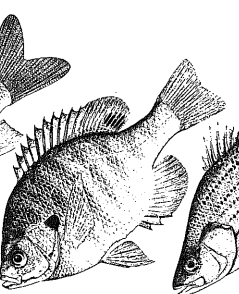
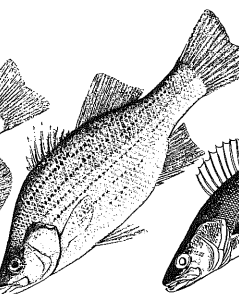
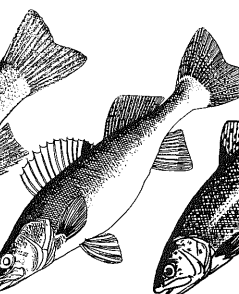
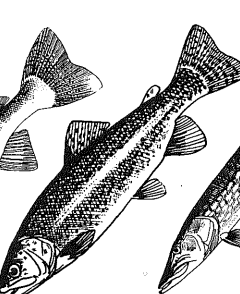
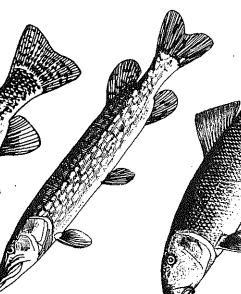
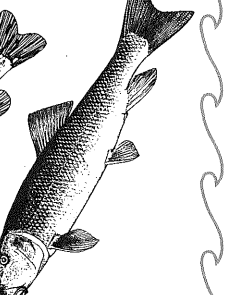
Overall Health of Your Water Ecosystem (circle one):

- 1 Warning! Don't come near this place.
- 2 There's hope! A silver lining lies under all this muck.
- 3 Looks healthy, smells healthy, but is it healthy?
- 4 Needs some work, but it will do.
- 5 This place is thriving and really great!

What would you do to improve this ecosystem?

What types of fish would you expect to catch?

Water Quality Parameters for Selected Fish*

									
	Channel Catfish	Freshwater Drum	Common Carp	Bluegill	White Bass	Walleye	Rainbow Trout	Northern Pike	White Sucker
Water Temperatures	75-85° F	55-75° F	55-80° F	65-80° F	55-78° F	35-80° F	40-60° F	45-75° F	40-65° F
Water Type	Eutrophic; Warmwater streams, rivers, and ponds	Eutrophic; Warmwater rivers	Eutrophic; Warmwater streams, rivers, and ponds	Eutrophic to Mesotrophic; Warmwater streams, rivers and ponds	Eutrophic to Mesotrophic; Warmwater rivers, and lakes	Mesotrophic; Coolwater large lakes and streams	Mesotrophic to Oligotrophic; Coldwater streams, rivers, and deep lakes	Mesotrophic to Oligotrophic; Coolwater lakes, large rivers, and reservoirs	Oligotrophic; Coolwater lakes and streams
Clarity	Clear to turbid; can adapt to waters most fish can't tolerate	Clear to turbid	Clear to turbid; can adapt to waters most fish can't tolerate	Less turbid waters than previous fish	Clear sometimes turbid waters	Clear sometimes turbid waters with good fertility	Clear with some to very little fertility and moderate vegetation	Clear with moderate amounts of aquatic vegetation	Clear with scant fertility and aquatic vegetation
Oxygen (Min.)	3 ppm	3-5 ppm	.8 ppm	3-5 ppm	5 ppm	5 ppm	6 ppm	4 ppm	4 ppm
pH	4.5-9.0	4.5-9.0	4.0-9.5	5.5-9.0	5.5-9.0	6.0-9.0	6.5-8.5	6.0-9.0	6.5-8.5

* Values taken from Fish Health by Dr. George W. Post and Fish Physiology by Hoar and Randall.

The Lake Game

Purpose: *Everyone should understand that we depend on lakes for our water supply, enjoyment, and livelihood; understand the economics behind decisions facing lake polluters; and understand how people can become better water stewards.*

Level: *Intermediate to Advanced*

Group Size: *10 to 30*

Site: *Outdoors (near lake) or Indoors (classroom)*

Time: *25 to 35 minutes*

Supplies: *Role-Playing Cards (pages 3-12 to 3-20)
Clear rectangular container (represents the lake)*

Plastic cup

Two buckets (one for dirty water the other for clean)

Red and yellow food coloring with droppers (red = pollution; yellow = fish guts and organic substances)

A small shaker or can with a scoop (fill with dirt)

Roll of toilet paper

Small box labeled "Clean Up Fund"

Fish silhouettes (plastic coffee can lids cut as fish)

Fishing rod (wood dowel with string and a magnet or paper clip hook)

Tangle of yarn

A die to roll

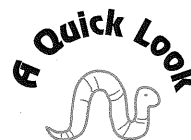
Scissors

Note cards

Clear contact paper (optional)

Rags

Reference: *Sport Fishing and Aquatic Resources Handbook, 48-55; A Lake is a Reflection of its Watershed poster; Fishing Regulations; and Minnesota Fish Consumption Advisory.*



In this activity, everyone is asked to become a lake user. Everyone will make and hear decisions relating to pollution, recreation, industrial values, and economics in a dynamic setting. A container of water representing the lake will be influenced both positively and negatively as individuals make real-life choices. Role Playing Cards are used to assign different characters and situations to each participant.



Prior to the program, make two sets of role-playing cards and some fish silhouettes. The silhouettes are made by cutting fish shapes out of a plastic lid. When using a paper clip hook, you need to make a hole for the mouth; for a magnet hook attach a paper clip to this area. Next attach the cutout to a weighted base so that they stand on the bottom of the lake.

The leader's role-playing cards are made by pasting the role and the discussion on a note card; the participant's cards are made by pasting just the role on a note card. (You can cover the cards with clear contact paper to make them waterproof.) You may wish to write some new situation cards that include local community situations.

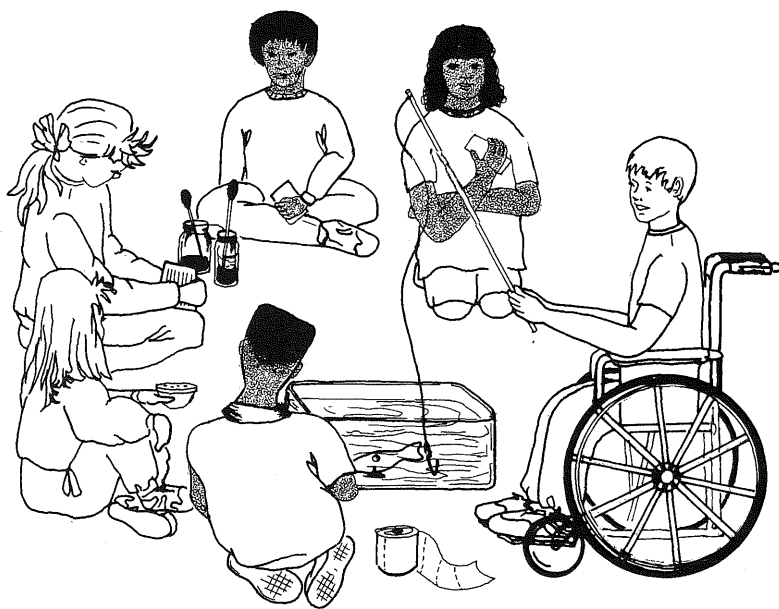
Begin the activity by forming a circle with the group. Place your "lake" in the center of the circle. Stand the fish on the bottom. Arrange the pollution solutions, eye dropper, turbidity (dirt/particle) shaker, and the container for removing water near the bucket. Retain the fishing pole, die, toilet paper, yarn, etc. until that particular role is read.

Distribute the role cards and assign playing order.

Encourage everyone to act as they think the person described on their card would act.

You're ready to begin the Lake Game. Let the first person read their role and make a choice aloud (if a choice is indicated). Each role should involve an action of some sort. You may or may not want to allow people to verbally influence others' decisions.

Have each person perform the appropriate actions – polluting the lake, paying money, withdrawing water, catching fish. After the action is done, read (or discuss) the text on the leader's lake game cards.



Discuss individual decisions and real-life outcomes as you play. **Balance economic realities against idealism.** If no one opts to pollute, ask how realistic that situation is. Compare the multi-million dollar decisions that they may not feel they can influence with what they can do as individuals to reduce or prevent pollution and the loss of important habitats. For example, they may choose to “save” a local wetland, but in reality it may now be a

shopping mall. Who decided to make it a mall – city planners, zoning board, or the business community? Are the citizens of the area asked their opinions? Should they be? Discuss how they really can have an impact on corporate decisions through letter-writing campaigns, boycotts, etc.

Review that the container is a simple model of your lake. In reality, **water is constantly being added through precipitation (rain) and runoff.** Pollution is diluted or flushed out at the outflow. The water in your lake is a limited resource – it isn't infinite.

Finish up with a review of the choices that polluted or depleted the lake water. **Encourage each of them to share what they have learned with their families and friends.**

Other Ideas

- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 2, 6, 9, 10, 20, and 23.
- Fish often accumulate the toxins found in our water systems; pollutants such as PCBs and mercury build up in the fatty tissues of bottom feeding species such as carp and catfish. Other fish can store these toxins, too. *Show your group how to remove these contaminated parts when preparing fish for eating.* See page 2 of the *Minnesota Fish Consumption Advisory* for an illustration of this process. You can share other nutrition and pollutant information from this book with your group.
- Encourage participants to go home and identify family practices that are both positive and negative for the environment. Have them list ideas of how they could alter the negative behaviors to better protect their environment.

Role-Playing Cards

SITUATION 1:

My family owns a car. When we drain the oil, I have observed my family dumping it into the storm sewer. I didn't realize this could pollute the lake. I have to choose whether to let them continue to illegally dump the oil or let them know of how to dispose of it properly. (If you choose to dump it in the storm sewer, add two units of red color.)

DISCUSSION 1:

In Minnesota it is illegal to dump used motor oil. If it is dumped into the storm sewers it will be drained into ponds and rivers where the oil can be harmful to plants and animals (including humans). Used oil also contains heavy metals (from engine wear) that pose a health risk. By law, the place where you bought the new oil must accept used oil or post a notice of where you can recycle it.

SITUATION 2:

I run an industry on the lake. None of the company bosses live near the lake, so they don't see the pollution that it is producing. It often seems that they don't care if the plant pollutes the lake. (Add three units of red color.)

DISCUSSION 2:

How could we convince the company that we don't want the plant polluting our lake? Your voice counts! Recently in Utah, a group of 6th graders began talking to neighbors about cleaning up a nearby hazardous waste dump. They wrote letters that got state laws changed and raised money for cleanup. Kory Hansen, one of the 12-year-old "pollution busters" summed it up, "Kids can make a difference."

SITUATION 3:

I live in the cities and can choose to spend five minutes a day making sure that my family recycles our aluminum cans, newspapers, and glass. Do I choose to recycle? (If you choose not to recycle, add one unit of red color. If you recycle, stand up for a round of applause.)

DISCUSSION 3:

Each person in Minnesota throws away 600 pounds of paper, 60 pounds of aluminum cans, and 200 glass containers each year. Recycling would not only save space in our landfills, or prevent air pollution (from incineration), but it would also reduce the amount of natural resources that are used up making new products. People in Minnesota are getting better about recycling. How many of you recycle?

SITUATION 4:

I live in the city and I know I should take my garbage to the landfill, but it's cheaper and easier to dump the garbage in my backyard. I have to choose whether to continue to use my backyard as a dumping ground for my household garbage or to pay \$5 a month and haul my garbage to the landfill. (Add one unit of red color or pay your card to the Clean-Up Fund box.)

DISCUSSION 4:

Is it okay for him to use his backyard in whatever way he wants? Why not? If you lived next to him, how could you convince him not to dump there?

Role-Playing Cards

SITUATION 5:

I go fishing with my friend. When we clean our fish we dump the guts in the lake instead of wrapping them up and throwing them away. We also like to throw all our unwanted fish like carp up on the bank. We think this is okay because they are biodegradable or birds will eat them. (Add one unit of yellow color.)

DISCUSSION 5:

In Minnesota it is illegal to dump fish guts into the water. Although they are degradable, they stink and attract pests (flies, gulls). Dumping the guts makes using the area unpleasant for others and can pass along disease to other fish. You should take the guts home - to either compost or dispose of them with your garbage. If you're out camping, bury them in a hole at least a foot deep, 100 feet away from the water's edge. Disposing of unwanted fish on the banks is a waste of the resource and can be considered littering. Any fish that

DISCUSSION 5 CONT.:

you do not plan to eat can legally be released back into the lake. Only with certain fish populations (stunted, over-populated, nuisance) exist may it be beneficial not to put the fish back, but to use it instead for fertilizer. Check with the local fisheries biologist to find out if this is the case for your lake.

SITUATION 6:

I am the logger who cut down all of the trees too close to the lake. Without the trees, the soil washes into the lake. This causes damage to fish spawning grounds, and pollutes the lake. (Add 5 big scoops of dirt.)

DISCUSSION 6:

Many fish lay their eggs on clean gravel beds in streams and lakes. Fish eggs that are covered with dirt may never hatch. We have to be able to harvest our forest products, but there are ways to do so without damaging our lakes and streams. Loggers should leave a buffer strip of uncut vegetation near water bodies.

SITUATION 7:

I own an industry near the lake. It would cost us \$1 million to clean up our pollution. If we have to pay that much we will go out of business and 300 people will lose their jobs. I have to choose whether to clean up or to continue to pollute the lake. (Pay your card to the Clean-Up Fund box or add four units of red color.)

DISCUSSION 7:

This game is like real life. Often the choices aren't this dramatic, but there are hard economic choices that have to be made when we want to reduce pollution. What kind of compromise could be worked out to avoid losing 300 jobs, and still stop pollution of the lake?

Role-Playing Cards

SITUATION 8:

My friends and I ride our bikes to the ice cream store for malts. While riding home, one of my friends throws her garbage on the ground. I tell her she shouldn't litter, but she doesn't care. I can choose to pick up her garbage or leave it on the ground. (If you pick up the litter, stand up for a round of applause. If you leave the litter, add one unit of red color.)

DISCUSSION 8:

Each American throws away 4 pounds of solid waste a day. That equals 1460 pounds a year. Minnesota's garbage would fill the Metrodome to the roof, twice a week! How many of you avoid littering? How many would tell a friend not to litter? How many of you would actually stop your bike and pick up the litter?

SITUATION 9:

I own a home with a well. My septic system is old and needs repair, but it will cost me \$300. I'd rather use the money for a vacation. I have to choose whether to pay to fix it, or let my leaky septic system pollute the lake and kill the fish. (Pay your card to the fund or add one unit of yellow pollution and 1 torn up sheet of toilet paper.)

DISCUSSION 9:

Most cities have sewage treatment plants that take your household water and clean it before returning it to the environment. Country homes rely on septic systems and drainfields filled with bacteria that break down wastes before they get into lakes or wells. These work okay, if they are constructed properly and maintained, and if people are careful about how much water they use at home. How many of you have septic systems at home?

SITUATION 10:

I represent the Highway Department. We salt the highway during the winter. This makes the road safer, but when the salt runs off in the spring it pollutes the lake. (Add two units of red color.)

DISCUSSION 10:

Although salting our highways does make them safer for winter travel, the salt can run off and enter our lakes and rivers where it can be harmful to plants and animals. We don't want to have more accidents, but we need to consider our environment. There are alternatives to salt. What are some of them? Minnesota is experimenting with an environmentally safer road deicer called urea. It is expensive but pollutes less than salt.

SITUATION 11:

I am in charge of a company that uses water to make paper. Most of the water is supposed to be returned to the lake clean, but I know there is a problem with the equipment. If I report the problem, I will lose my job. If I don't report it, pollution of the lake will continue. (Give up job or add two units of red color.)

DISCUSSION 11:

Most people can't really afford to give up their jobs - even if they really believe in protecting the lake. How could she solve the pollution problem, without losing her job?

Role-Playing Cards

SITUATION 12:

I don't live by the lake, but I know that when I waste electricity it increases air pollution that affects the lake. I have to decide whether to conserve electricity at home. (If you decide to conserve, stand up for a round of applause. If you waste electricity, add one unit of yellow color.)

DISCUSSION 12:

Many electrical generating plants in Minnesota burn coal. Coal contains an impurity called sulfur. Sulfur dioxide and nitrous oxides (from automobile exhaust) combine with moisture in the atmosphere to form acid rain. Acid rain is a problem for our aquatic, forest and man-made resources. "Scrubbers" can be installed on power plants to reduce sulfur emissions, but they are expensive. What can you do to reduce acid rain? (Turn off lights, etc.) How much would your parents pay for improvements to the plant?

SITUATION 13:

I am 15 years old. I am young enough to fish without a license and I believe that fishing laws don't apply to me. I take more fish than the legal limit every time I go fishing. (Use the fishing rod to remove one fish from the lake.)

DISCUSSION 13:

Just because you don't need a license doesn't mean you don't have to follow the rules. If everyone took over their limit, it wouldn't be long before there wouldn't be any fish left in the lake. DNR Fisheries Managers work with lake data and the public to determine the appropriate limits for the different species and sizes to keep so that a viable (successful) fish population is maintained in our lakes. These regulations are summarized in the fishing regulations booklet.

SITUATION 14:

I am a property owner who has to choose whether to use colored decorator toilet tissue, even though I know they contain dyes that aren't biodegradable and can pollute the lake. (If you choose to be color-coordinated, add one unit of yellow color.)

DISCUSSION 14:

Certain dye colors won't break down in septic systems or municipal treatment facilities. If not broken down, it can be carried with drain water into the lake if the systems aren't kept up to code or working properly.

SITUATION 15:

We have a fishing boat and often spill gasoline into the lake when we are filling the tank. I don't think it matters because the lake is so big that a little gasoline won't hurt it. (Add two units of red color.)

DISCUSSION 15:

That little bit spilled into the lake shouldn't hurt, right? What if everybody spilled "just a little bit?" Gasoline is easily dispersed through the lake and affects many plants and animals. Some components of gasoline (benzene, for example) cause cancer in humans and other animals. Another source of gasoline contamination in the environment are the "last few drops" that fall out of the handle when people fill the tank on their car. Filling gas tanks carefully takes using a funnel and pouring slowly.

Role-Playing Cards

SITUATION 16:

I live by the lake and want to have a nice green lawn. I can choose to use chemicals, pull the weeds by hand, or get a permit to use the lake water to fertilize and water my lawn. Chemicals could pollute the lake if not used according to the label instructions, but would save me work. (If you choose to use chemicals, add one unit of red color.)

DISCUSSION 16:

The best kind of lakeshore environment - for water quality, for animals, and also for people - is one that includes vegetation other than mowed grass. Buffer strips of weeds, aquatic plants, shrubs, or trees help protect the lake by preventing runoff of excess soil, nutrients or chemicals. This buffer also provides habitat for the fish and animals. One of the worst things lakeshore owners can do to their lake is improperly use fertilizers or herbicides (chemicals to kill weeds) on mowed lawns next to the lake.

SITUATION 17:

I am going to build a fishing dock for youth. I know that creosote treated lumber will last longer and save me money and time in the future, but the chemicals used to treat the wood are bad for the lake. I have to choose whether to build a long-lasting, treated dock, or to protect the lake. (If you choose the treated lumber, add one unit of red color.)

DISCUSSION 17:

The chemicals used to treat lumber to make it resist rotting can be harmful for plants and animals in our lakes. What would be some options instead of using treated wood? Using non-treated wood like cedar or redwood, metal, or plastic materials are more expensive, but better for the lake.

SITUATION 18:

I am a builder. I choose to drain a wetland and build a shopping mall in its place. The wetland used to hold rain water from running down to the lake. Now this water pours down a hill and carries mud into the lake. (Add 5 big scoops of dirt.)

DISCUSSION 18:

Wetlands provide several services for us in Minnesota. They serve for flood protection, soaking up and retaining extra water during peak flow periods. They also serve as recharge areas by releasing that water slowly over time. They offer unique plant and wildlife habitat - there are many species you'll never see anywhere else. Importantly, wetlands also improve water quality by trapping or filtering out nutrients and other pollutants. We lose about 500,000 acres of wetlands every year in the U.S. and it's time we start recognizing that they are important.

SITUATION 19:

I represent a city on the lake. We need 400,000 gallons of clean water from the lake each day for our city water supply. (Remove four cups of water, show everyone how polluted the water is.)

DISCUSSION 19:

How many of you would want to drink that water? Many communities in Minnesota use surface water for their municipal water supply. Before the city could send that water out to homes, what will they have to do to it? What will that mean in terms of the cost of using water?

Role-Playing Cards

SITUATION 20:

I am a very good lawyer who wins all my cases. I have been asked to defend a company that pollutes the lake. If I decide to take this case and am able to win, I will make lots of money. However, the pollution of the lake will continue. (If you take the case, add three of red color.)

DISCUSSION 20:

Would earning \$10,000 be worth continued pollution? Would \$5,000 be worth the damage? Remember, all people and companies have a right to legal counsel no matter what they have done. It is also a judge or jury that decides the outcome of the cases not the lawyer. Another option that the lawyer has is to work out a settlement which would benefit both the company and the environment. We all need to consider the ethical effects of what we want, and to understand the impact our actions have on our environment.

SITUATION 21:

I am the weather. I supply water to the lake by rain. (Roll the die. Add water to the lake according to the following:

- 1 = "slightly dry year," add one cup
- 2 = "normal year," add two cups
- 3 = "slightly wet year," add three cups
- 4 = "drought year," add no water
- 5 = "second drought year in a row," remove one cup
- 6 = "very wet year - FLOOD," add six cups

DISCUSSION 21:

We can't expect the recharge (water put back) to our lake to be the same every year. Recharge occurs through precipitation directly onto the lake surface and through runoff from precipitation over the land around the lake. That runoff can be by rivers, or streams, or right over the land surface. The land area that drains into a lake is called its "watershed" or drainage basin. Recharge can also occur from groundwater seeping into the bottom of the lake.

DISCUSSION 21 CONT.:

Water leaves the lake through evaporation, river drainage, groundwater seepage, and human diversion. Much of the water that we divert is returned to the lakes after our use - that's called non-consumptive use. If the water doesn't get back to the lake, it is called consumption use.

SITUATION 22:

I am a great water skier. I like to ski near the shore so people can see how good I am. This causes erosion of the shoreline. I have to choose whether to quit skiing near the shore to protect the lake or to keep showing off. (If you continue to ski near the shore, add 3 big shakes of turbidity. If not, stand up and take a bow.)

DISCUSSION 22:

Sometimes little things make a big difference in a lake. The addition of turbidity not only makes the lake less pleasant for us, but it also damages the plant and animal habitat. It decreases the amount of light that reaches deep into the lake, which can affect plant growth (plants need sunlight) and the ability of predators to see prey. It can also cover spawning grounds and limit reproduction.

Role-Playing Cards

SITUATION 23:

I am in charge of the sewage treatment plant for a city on the lake, but we don't think that people who live in the city will agree to pay higher rates for wastewater treatment. A \$3.00 a month increase in rates would help prevent pollution of the lake. (Take a vote. If the majority say they would pay more, add no color and pay your card to the fund. If they vote no, add three units of yellow color and 2 sheets of torn up toilet paper.)

DISCUSSION 23:

Citizens need to be informed and aware of the trade-offs so that the best decisions are made. Most treatment systems use (at the least) what is called secondary treatment of sewage before it is returned to the lake. Tertiary treatment produces even cleaner water, with fewer nutrients to affect the lake, but it is more expensive and many small communities have a difficult time financing improvements. How much would you be willing to pay? \$5 per month? \$10 a month? \$20 per month? How much would your parents be willing to pay?

SITUATION 24:

I have a motor boat. I went to Lake Minnetonka, near Minneapolis, and then came to boat here. I didn't wash off my trailer or clean out my boat; consequently, I brought Eurasian water milfoil to this lake. (Add a tangle of yarn to the lake.)

DISCUSSION 24:

Eurasian water milfoil was first discovered in Minnesota (in Lake Minnetonka) in 1987. By 1991, it had spread to 31 lakes in the state. It is a nuisance weed that is spread by people and animals carrying it from one lake to another: inside their boats, on their trailers, in their livewells or bait buckets, and on animal feet or bills. It grows rapidly and crowds out beneficial native plants. It is a nuisance for boating, swimming, water-skiing, and fishing.

DISCUSSION 24 CONT.:

Its spread can be controlled if people take a few extra minutes to make sure they are not transporting it to another lake. Be careful - this is a serious threat to Minnesota's lakes and tourism industry.

SITUATION 25:

I am an angler who wants to catch some fish for supper tonight. I can eat the fish if there isn't too much pollution. (Try to catch fish. 15 seconds will be allowed for fishing.)

DISCUSSION 25:

Would you want to eat a fish that came out of water polluted like our lake? When pollutants get into our lakes they can build up in sediments, in insects, and in small fish. When bigger fish eat them, pollutants accumulate in their flesh (particularly fatty tissue). This is called "bioaccumulation" and is a problem in large, fatty fish. If the water quality becomes too bad, the fish may even die. The Minnesota Department of Health has issued guidelines for eating fish from 260 lakes in Minnesota. They have found that there

Role-Playing Cards

DISCUSSION 25 CONT.:

are health risks for young children and pregnant women from mercury and PCBs that have bioaccumulated in fish. The Department of Health recommends that the public limit the number and size of fish that they eat from lakes with harmful pollutants. Other lakes not mentioned in this booklet may also contain “tainted” fish. To reduce your risk, practice these guidelines when eating fish.

SITUATION 26:

I am a newspaper reporter. I have information about a company that is polluting the lake. Company officials have offered me \$10,000 not to tell. I have to choose whether to take the bribe or write the story. (If you take the money, add two units of red color.)

DISCUSSION 26:

Is the pollution of the lake worth only \$10,000? How much would it have to be to get you to clam up about the story? \$20,000? Only \$500? Is your personal gain worth the damage to the lake?

SITUATION 27:

I want to get rid of the plants in the water in front of my lakeshore cabin. I can get rid of just a few plants to create a swimming area or remove all of them. Chemicals would be easier and take a lot less time, but be more expensive. I have to choose whether to get rid of all the plants with chemicals or leave a few. (If you choose to get rid of all of them, add two shakes of dirt and two units of red color.)

DISCUSSION 27:

Chemicals approved for controlling aquatic plants are safe if applied correctly. Using chemicals in the lake to kill plants, however, is not as easy as it seems. You must have a permit from the DNR to use chemical herbicides. When chemicals are applied at the wrong rate or at the wrong time they can have a serious impact on fish and other animals. Wind or current can cause chemicals to travel away from where you want them to work.

DISCUSSION 27 CONT.:

If there are plants in the rest of the lake, they'll continue to come back to your area. Besides, vegetation can help reduce bank erosion, improve water quality, and provides spawning and nursery areas for fish and other aquatic animals.

Role-Playing Cards

SITUATION 28:

I feed the ducks and geese that live on the lake. The feces that the geese leave pollute the lake. I have to choose whether to keep feeding so many birds. (If you keep feeding, add two units of yellow color.)

DISCUSSION 28:

Ducks and geese add nutrients that can increase the growth of nuisance weeds or algae. It may take many years to reduce the levels of nutrients that have been added by large numbers of birds or by cattle and other animals that are allowed to stand in the lake. Enrichment of a lake with too many nutrients is called eutrophication.

SITUATION 29:

I am in charge of mosquito control for the city. Every year we spray near the lake. I have been asked to increase the area we spray to kill more mosquitoes. Some people don't want any spraying. I have to choose whether to spray more, less, or the same as in past years. (If more, add two units of red color; if less, add no color; if the same, add one unit of red color.)

DISCUSSION 29:

Citizens need to be informed and aware of the trade-offs so that the best decisions are made. Chemicals approved for mosquito control are safe if applied correctly. But some may have long-term effects on birds and other animals. Do we really need to get rid of all the mosquitos? Is tourism affected by having lots of bugs? Is that important, too? Are there things that the community can do to change attitudes or practices?



Managing Our Resources

What will the group learn? Participants will be able to understand the terms renewable and non-renewable; understand how to control, enhance, or degrade resources; how to apply and understand Minnesota Fishing Regulations; and understand catch and release and other ethical behaviors.

Pondering Our Ponds

In the previous chapters, you've taught concepts that dealt with the needs of the animals (including humans) who live in the environment. You've shown how these organisms depend upon each other. You've shown how to care for our lakes, streams, and ponds. Your group has also learned how to protect our water supply. In this chapter, you'll show and teach ways that Minnesota's water resources are managed.

Why manage our environment? Isn't it enough to just let our ponds, streams, or lakes take care of themselves? After all, government regulations and conservation groups weren't in existence hundreds of years ago, and our waters didn't dry up. Our bass and trout did not die. The environment seemed to get along just fine without us.

People pressures and demands on the environment have created a need to manage our resources. Imagine a lake without fish for eager anglers, an urban area without a wetland, or land so overpaved that it can no longer soak up the rains.

There are a lot of players involved in managing our waters – the public, natural resource agencies, conservation groups, legislators, and others. **Sometimes uses or needs conflict.** True management uses a multiple-use approach to maximize uses and needs, not only for the people, but also for the plants and animals that live in that ecosystem. Through surveys and data collection biologists determine which management tools to exercise. Fish population manipulations, habitat protections and enhancement, research, education, and regulation are just a sampling of the tools used by biologists. These tools are most often used to assist the resource in meeting the demands placed upon it by recreational, commercial, and domestic fishing.

The payoff is resources that are truly renewable. As our population continues to grow (estimated population of over 10 billion by the end of the next century), it will become more and more important for us to practice and live by principles of stewardship, wise use, and multiple management. Our waters are counting on us.

Wonderful Watersheds

Site Study

Purpose: Everyone should understand what a watershed is and how humans impact it.

Level: Beginner to Intermediate

Group Size: 3-25

Site: Outdoors (lake, stream, etc.) or Indoors (classroom)

Time: 45 minutes

Supplies: State of Minnesota map

Local map

Crayons or colored pencils

What A Watershed! (page 4-4 to 4-5)

Twin Cities Watersheds (optional, page 4-6)

Graph paper

Pencils

Something hard to write on

Reference: Sport Fishing and Aquatic Resources

Handbook, 43-55; Managing Minnesota's

Fish booklet; A Lake is a Reflection of It's

Watershed poster; Conservation and the

Water Cycle poster; and A Citizen's Guide to Lake Protection.



Begin by explaining to your group that a stream or lake is not isolated. It's part of a system – a **watershed**. A watershed includes all the land that drains into a body of water. You might compare a watershed to a large bowl or show older youth how to find watershed boundaries on a topographic map. Watersheds include your backyard, parking lots, and fields. They can be as small as a puddle or stretch over the entire state.

Explain that the water moves over and through this area, eventually ending up in a major stream or body of water. Therefore, it's important to understand the scope and size of a watershed, because some land use practices can produce pollution which can be carried many miles before ending up in a lake, pond, or stream. The most common ways that these pollutants are moved is via surface runoff or infiltration into groundwater supplies. In some cases, land use practices can actually improve the health of our aquatic resources.

Hand out the *What A Watershed!* map and describe the major watersheds in Minnesota. Color each watershed a different color.

Give everyone a sheet of graph paper and a local map. Help them locate the lake you are studying (where you will be fishing). Everyone should draw the lake on their graph paper using an appropriate scale.

Visit the lake (or study the map closely) to pick out things that might harm or benefit the water quality or fish habitat. *Do people fertilize their lawns in this area?* If so, that mixture might wind up, via surface runoff, in the wetland two blocks down the street. The fertilizer mix may make algae bloom (grow excessively), which can limit fish survival. **Every activity within a watershed affects the lake.** Encourage everyone to name other effects both good and bad that are happening in the watershed. They will draw these on their graph paper map.

Now that they have this local map drawn, help them place it into the correct watershed on their *What A Watershed!* map. *Do the same activities that effect smaller watersheds effect these major ones?* When everyone is finished, they should have a local and state watershed map.



In this activity, you will define a watershed. The group will then learn about the major watersheds by coloring the *What A Watershed!* map. Using a local map, graph the water body being studied onto a piece of graph paper. By exploring the area and studying a local map, the group will draw (on their papers) the land uses that are occurring around the lake. They will then place their lakes in the proper watershed on the *What A Watershed!* map and discuss what land uses in the watershed are effecting the lake. When everyone is done they should have a local and state watershed map for the water body.

For Discussion



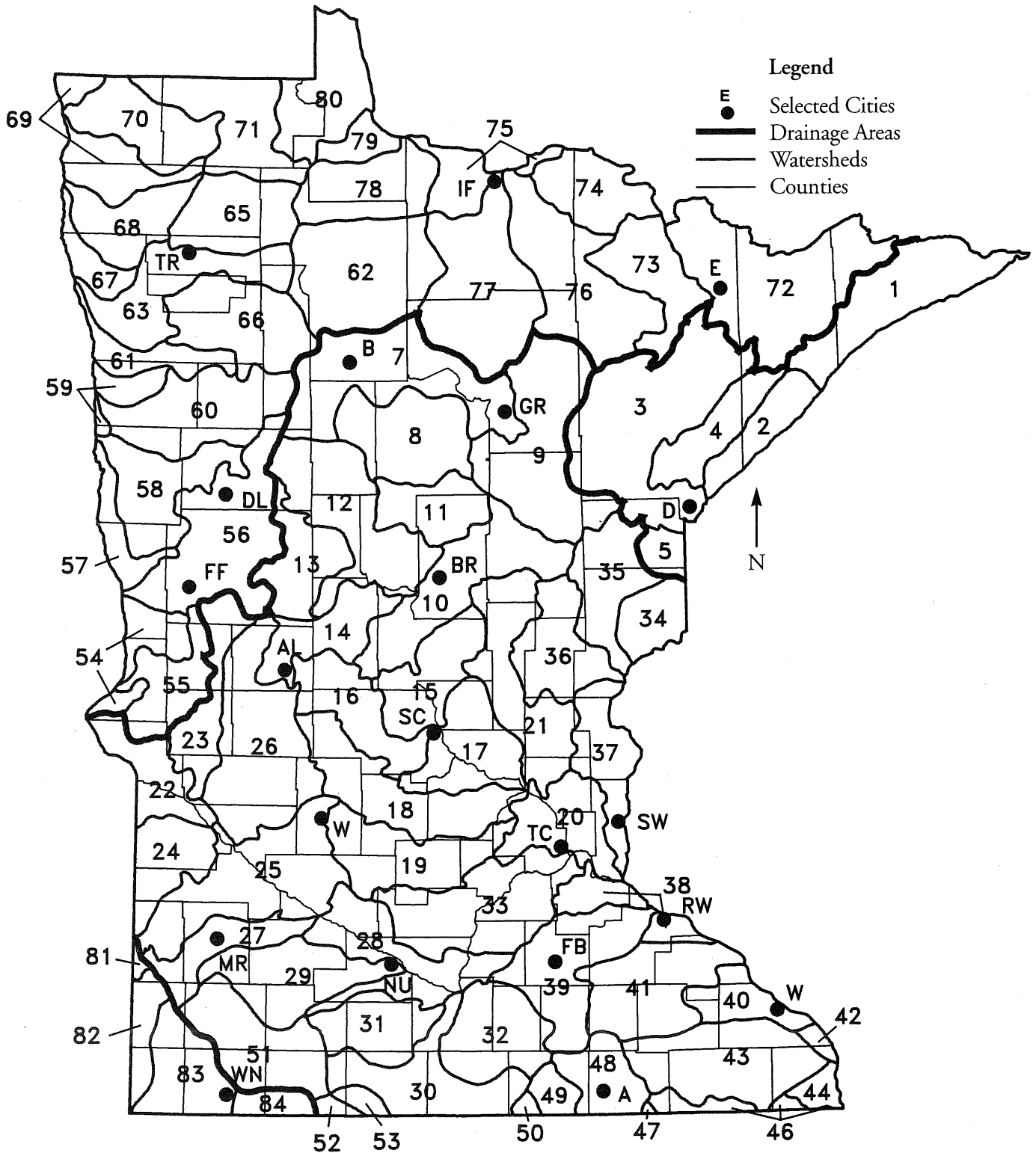
- Q. How would you describe a watershed?
- A. *Answers will vary*, but the bowl analogy is good to use. Basically, a *watershed is the area surrounding a body of water that drains into that water resource* (via infiltration, groundwater, and surface runoff).
- Q. Is this site's watershed suitable for good fish production?
- A. This will vary depending upon the site. Some *negative factors* include excessive nutrient runoff (i.e., feedlots and lawns), overapplication of chemicals, discharge into rivers/lakes from manufacturing plants, excessive erosion (causing decreased water clarity), etc. A few *positive factors* include vegetation left along the shore, settling ponds in highly erosive areas, livestock fenced off from streams and lakes, etc.
- Q. What factors could be changed to make this site better? What factors are negative or positive? Are all of them visible as you look around you?
- A. Answers will vary. It is important to remember that *not all negative or positive impacts on a watershed can be seen*.

Other Ideas

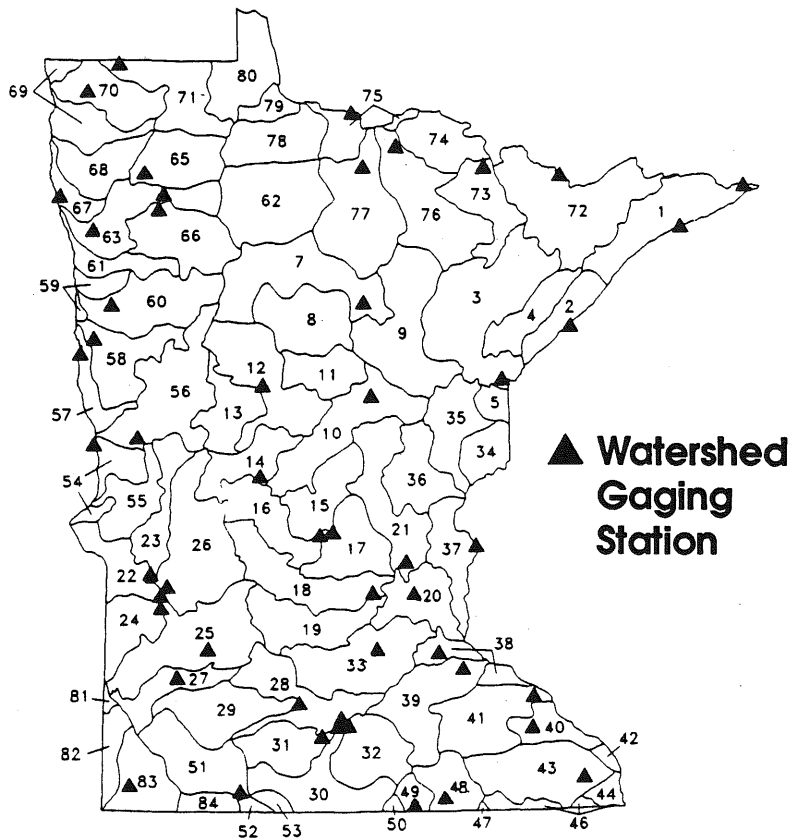


- Do *Fishing . . . Get in the Habitat!* youth booklet activities 2 and 9-10.
- Let your group make a *three-dimensional model of their watershed*. They can use plaster of paris, clay, twigs, leaves, bits of brush, paint, a base, and other materials. Be creative to make this model. Group members should mound clay and use twigs to simulate hills, valleys, and forests. After they have finished, let them become clouds and rain on their watershed (use a sprinkling can). Note where the rain falls, where it travels, where it collects, etc. Use colored water to reflect a chemical spill or other pollutant entering the watershed.

What a Watershed! Map



81 Major Watersheds



- 1 Lake Superior (north)▲
- 2 Lake Superior (south)▲
- 3 St. Louis River▲
- 4 Cloquet River
- 5 Nemadji River
- *
- 7 Mississippi River (Headwaters, Lake Winnibigoshish)▲
- 8 Leech Lake River
- 9 Mississippi River (Grand Rapids)
- 10 Mississippi River (Brainerd)▲
- 11 Pine River
- 12 Crow Wing River▲
- 13 Redeye River (Leaf River)
- 14 Long Prairie River▲
- 15 Mississippi River (Sartell)▲
- 16 Sauk River▲
- 17 Mississippi River (St. Cloud)

- 18 North Fork Crow River▲
- 19 South Fork Crow River
- 20 Mississippi River (Metro)▲
- 21 Rum River▲
- 22 Minnesota River (Headwaters)▲
- 23 Pomme de Terre River▲
- 24 Lac qui Parle River▲
- 25 Minnesota River (Granite Falls)▲
- 26 Chippewa River▲
- 27 Redwood River▲
- 28 Minnesota River (Mankato)▲
- 29 Cottonwood River▲
- 30 Blue Earth River▲
- 31 Watonwan River▲
- 32 Le Sueur River▲
- 33 Minnesota River (Shakopee)▲
- 34 St. Croix River (Upper)
- 35 Kettle River
- 36 Snake River

- 37 St. Croix River (Stillwater)▲
- 38 Mississippi River (Red Wing) and Lake Pepin▲
- 39 Cannon River▲
- 40 Mississippi River (Winona)▲
- 41 Zumbro River▲
- 42 Mississippi River (La Crescent)
- 43 Root River▲
- 44 Mississippi River (Nevo)
- *
- 46 Upper Iowa River
- 47 Wapsipinican River (Headwaters)
- 48 Cedar River▲
- 49 Shell Rock River▲
- 50 Winnebago River (Lime Creek)
- 51 West Fork Des Moines River (Headwaters)▲
- 52 West Fork Des Moines River (Lower)
- 53 East Fork Des Moines River
- 54 Bois de Sioux River▲
- 55 Mustinka River
- 56 Otter Tail River▲
- 57 Red River of the North (Headwaters)▲
- 58 Buffalo River▲
- 59 Marsh River
- 60 Wild Rice River▲
- 61 Sandhill River
- 62 Upper and Lower Red Lake
- 63 Red Lake River▲
- *
- 65 Thief River▲
- 66 Clearwater River▲
- 67 Grand Marais Creek (Red River of the North)▲
- 68 Snake River
- 69 Tamarack River (Red River of the North)
- 70 Two River▲
- 71 Roseau River▲
- 72 Rainy River (Headwaters)▲
- 73 Vermillion River▲
- 74 Rainy River (Rainy Lake)
- 75 Rainy River (Manitou)▲
- 76 Little Fork River▲
- 77 Big Fork River▲
- 78 Rapid River
- 79 Rainy River (Baudette)
- 80 Lake of the Woods
- 81 Big Sioux River (Medary Creek)
- 82 Big Sioux River (Pipestone)
- 83 Rock River▲
- 84 Little Sioux River

Ethics or Regulations?

Purpose: Everyone should be able to understand current Minnesota fishing regulations, reinforce concepts of stewardship, and develop and apply personal ethics to a variety of situations.

Level: Intermediate

Group Size: 3 to 30

Site: Outdoors (out of wind and shaded) or Indoors (classroom)

Time: 20 to 30 minutes

*Supplies: Angler Situation Cards (pages 4-9 to 4-11)
Note cards*

*Current Minnesota Fishing Regulations
Clear contact paper (optional)*

Reference: Sport Fishing and Aquatic Resources Handbook, 38-42 and 87-91; Current Minnesota Fishing Regulations; An Angler's Guide to Catch-and-Release brochure; and Turn In Poachers brochure.



Prior to the program, make two sets of situation cards: the leader's paste the situation and the answer on a note card; participants paste only the situation on the cards. You can cover the cards with clear contact paper to make them waterproof.

Hand out copies of the current *Minnesota Fishing Regulations*. Define some of the regulations, such as limit and seasons. Show everyone how to locate the different regulations using the book; quizzing your group about different regulations (for example, how many bluegill can you keep?) and having them use the book to look up the answer makes this activity much more fun. Keep this part of the activity short by covering only the rules they will need to know when fishing.

Explain to the group that it is the **responsibility of every person to know the rules and regulations** that apply to fishing and protecting our resources. The DNR publishes a synopsis of the fishing regulations annually. In order to manage the fish populations and food webs of our waters, biologists need all of us to follow and support these rules. Fishing regulations are not just made up. They are the product of research (like you've collected in previous activities). As well as paying close attention and following the regulations, it is also our responsibility to encourage others to do so too.

Ethics, on the other hand, are "**unwritten laws**" that **govern ones behavior**. Good ethical conduct results in respect for oneself and others. Some ethics to consider include: obtaining permission to fish on any private land in advance, avoiding behavior that interferes with the enjoyment of others, releasing a portion of the allowable catch, harvesting only enough fish for immediate needs, not littering, and treating the area with respect. An ethical person realizes that the future of our resources depends on the respect we have for ourselves, others, and the environment.



In this activity, participants will role-play situations relating to fishing and environmental regulations and/or ethics. They will need to make decisions about their behaviors. Some of their decisions are regulated by state laws which they need to understand, know where they apply, and how they work.

Break into smaller groups of two to three members. Give each group an *Angler Situation Card*. A person within each group should read the situation aloud. The group should discuss the responses; record which ones, if any, are illegal; and select the most ethical response. Participants should use the regulations book as needed. Once they agree on an answer, have them prepare a skit based on their situation to act out to the entire group.

After a period of time, bring the small groups back together. Each group should take turns role-playing their situation. After each skit, let the group vote on the correct response. Did they come up with the same response as the small group. If yes, why was this the best response. If no, have them explain why they chose the answer they did to that situation.

Continue doing this activity with other situations as time permits.

Other Ideas



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 20-21.
- *Demonstrate catch and release.* Using felt squares and scissors, let participants cut out a fish. They can use their imagination, as long as their fish has a mouth, gill cover, and stomach area. Show them how to correctly hold their felt fish and how to release it unharmed. You can also show how to treat a fish that's swallowed a hook (cut the line).

For Discussion



- Q. Do you think all anglers are ethical? Why or why not?
A. This question will have a variety of responses.
- Q. Why don't we just let everyone fish the way they want to fish? Why do they need to obey regulations?
A. Fishing regulations protect fish populations and lake/stream ecologies.
- Q. Do you think that most people are ethical about their use of the environment? Why or why not?
A. This question will have a variety of responses.

Angler Situation Cards

SITUATION 1:

You are at a lake roller skating and you see a group leaving pop cans, drink boxes, fishing line, bait packages, and other trash behind. Would you:

- Ask them nicely to pick up their litter and offer to help
- Wait for them to leave and pick up the litter for them
- Remember what they look like and report them to a police officer
- Pick up the trash in front of them, while they are still there

ANSWER TO S1:

Answers will vary. You might like to point out that littering is illegal and isn't very respectful.

SITUATION 2:

You are fishing at an isolated lake and you've caught and kept four walleye during your first day at the lake. On the second day, the fishing is so great that you catch two walleye in the first hour. Both of these fish are bigger than the previous day's fish. Minnesota law allows you to possess six walleye, so you:

- keep fishing, but look around a lot for Conservation Officers

- throw away the small fish from yesterday, and keep fishing
- eat the fish you caught today for lunch
- try to catch other types of fish (not walleye)
- quit fishing and go rock climbing

ANSWER TO S2:

Once you have caught your limit of fish you must stop fishing for that type of fish. It is also illegal to stringer sort (release a fish already on a stringer or in a live well and replace it with another fish).

SITUATION 3:

Your friend's dad has a freezer full of fish from last summer. His dad caught a daily limit on many different days and froze them to eat throughout the winter. Would you:

- ask him for some fish to take home
- tell him that Minnesota law says he can only have one limit of each type of fish in his possession (freezer)
- say nothing and change the subject
- ask him where his dad goes fishing and how he catches so many fish

ANSWER TO S3:

The possession limit means you can only keep one limit of fish at a time. You can report a violator to the Turn In Poachers (TIP) program anonymously.

Angler Situation Cards

SITUATION 4:

Your mom is changing the motor oil in her car. She usually throws the old oil from the car away at the gas station, but today she is in a hurry. She asks you to run across the street to the park and dump the oil onto the ground near a pond. Would you:

- do what your mom asks, because she still owes you this week's allowance
- tell her that the oil is pollution, and will eventually wind up in the pond

- tell her to empty the oil herself – you're not willing to break the law
- offer to take the oil to the gas station yourself

ANSWER TO S4:

Oil must be dumped at oil recycling centers. All businesses that sell oil will know where the centers are located.

SITUATION 5:

You and a friend are steelhead fishing along Lake Superior's North Shore. The fishing has been quiet, and neither one of you has caught a fish all morning. Just before lunch your friend lands a six-pound steelhead that she accidentally hooked by the belly. Would you:

- tell your friend to release the fish
- look around for other people watching, and then put the fish in your ice chest
- eat the fish for lunch

ANSWER TO S5:

This fish was foul hooked (fish hooked/snagged in any location other than the mouth). It would be illegal to keep. This law protects fish from intentional snagging.

SITUATION 6:

It's June and you are fishing with your uncle and your friend at Lake Nokomis. While fishing, your uncle puts two lines in the water, saying "You'll catch more fish faster this way." You and your friend each have just one line in the water. Would you:

- add another line of your own to the water
- tell your uncle it's against the law to have more than one line in the water

- take your line out of the water and announce you're leaving
- look around for other people, put another line in the water, and move several feet away, pretending it's not your line

ANSWER TO S6:

During the summer on Inland Lakes of Minnesota you can only fish with one line. During winter ice fishing, a person can use two lines unless it is designated a trout lake.

Angler Situation Cards

SITUATION 7:

You are fishing for largemouth bass on Lake Phalen. Your luck is tremendous, and the first fish you land is a three-pound largemouth bass. You decide to keep this fish. Within ten minutes, you have caught another three-pound largemouth bass. Do you:

- keep the fish and mount it – after all, how many good days do you get
- keep it and continue angling, but release it if you catch a bigger fish

- put this and other “trophy” fish of the day back, in order not to over-harvest the lake
- use the lake data information to determine which size of fish to keep

ANSWER TO S7:

Legally, you can keep this fish, unless there are special regulations prohibiting this on the particular lake. However, you may wish to return the fish so that it grows larger. The lake data information can give you clues on which fish to keep. For instance, if the entire bass population is composed of three-pound fish, it's probably not going to hurt the population to harvest a few.

SITUATION 8:

You are fishing and catch a carp (an under-utilized or rough fish species). This is not one of the fish that you were fishing for that day (a non-target species). What should you do?

- throw it up on the shore
- release it back into the lake
- decide to take it home
- throw it in the garbage

ANSWER TO S8:

As long as it is a legal species of fish to harvest, you may take it home. However, if the fish is not going to be eaten or you plan to just throw it away, you should release it back into the lake. Good angler ethics include catch and release of all fish. To dispose of this fish in other ways, such as throwing them up on the bank or leaving them on the ice, is considered littering and is a terrible waste of the resource. Only in certain management situations does a fish population need to

be “thinned” (overpopulation, stunting, etc.). When this occurs it is beneficial not to return a fish to the lake but use it instead for other purposes.

Fishing for the "Helo-Waudley Pugfish"

Purpose: Everyone should understand that renewable resources can be managed to meet multiple uses and needs; be aware that the amount of fishing pressure, the time of the fishing season, and fishing techniques all have an impact on fish populations; and associate economics to each of these activities.

Level: Advanced

Group Size: 3 to 25

Site: Outdoors (out of wind) or Indoors (gym)

Time: 30 minutes

Supplies: Fishing poles (dowels with string and round magnet attached)*

*Paper money**

Paper clips

String or chalk

Good Angler Permits (page 4-18)

Helo-Waudley Pugfish Fishing Cutouts (page 4-15)

Recruitment Curve and Cost Estimate Guide (page 4-16)

Helo-Waudley Pugfish Data Sheet (page 4-17)

Paper plates (one for each youth)

Small box labeled "Management Funds"

Paper cutouts that represent cover types

Clock (with second hand)

Other items to represent other fishing gear (i.e., plastic cup for boat, etc.)

Hand calculator (optional)

References: Sport Fishing and Aquatic Resources Handbook, 3-13, 38-47, and 87-96; Managing Minnesota's Fish booklet; Current Minnesota Fishing Regulations; and A Citizens Guide to Lake Protection.

** Loaner materials available upon request (limited supply so reserve early)*



In this activity, the group lives in a pretend world that you create and describe. In this world they will help create a fishing lake. Once the lake is created, they will become anglers who must purchase equipment and permits from a local vendor. In cooperation with the local Fisheries Manager and Conservation Officer, they will role-play different fishing techniques and regulations.



Prior to event make poles, animals, fishing tackle props, and other props. Use paper clips on fish, non-target species, and trash, so that the magnet will stick to them.

Begin the game by describing your new world to the participants. Assign everyone to be anglers. Introduce them to Ms/Mr. Wego Cheap, the owner of the local tackle shop; Ms/Mr. Fish Fever, the Lake Biologist; and Ms/Mr. Wats Lawful, the Conservation Officer. Give everyone \$100; this can be a yearly salary or a one time lump sum – you decide.

As a group, create a lake which will support the Helo-Waudley Pugfish. Show the group a picture of the fish and go through its key physical traits. From these traits let the group decide what the habits and habitat would be for this fish.

The group now needs to decide what size to make the lake and the type of habitat quality they plan to maintain. Use the *Cost Estimate Guide* to determine what to charge the group for their lake construction. Collect this amount and place it in the "Management Fund" box. Construct the lake by using the string to mark its boundaries. Next have the group help you place the paper habitat cutouts.

Now, stock the correct number of fish (*place the picture face down*) in the lake. (Remember to place the fish in or next to their proper habitat.)

Now it is time to purchase permits and fishing equipment. Each participant should visit the vendor and use their money to get needed items. Allow the vendor to sell items that either can't be used on the lake (like boats), or are ineffective at catching the Helo-Waudley Pugfish (fishing rods with paper clips instead of magnets). After everyone has purchased their supplies, *collect 1% of the vendors sale money* and put it in the "Management Fund" box. Explain to the group that this money will be used to manage the lake.

Now you're ready to fish! Let each person select a fishing site. Once at that site, set a few safety and general

fishing rules: no rod flinging, fish only from the site you selected, no boats allowed, etc. Discuss with the group whether or not it was fair for the vendor to sell them items that they couldn't use. Should they have checked the regulations prior to getting to the lake?

The first year let everyone fish for 30 seconds using only one pole. Start the clock. Each angler should try to "catch" as many fish as possible and put them in their creel (a paper plate). Any dropped fish are those that got away! The biologist should record the number of anglers, fishing time, and method above the first year's block on the data sheet. Have the officer check for permits and if obeying the regulations set.

After 30 seconds, stop fishing. Have the biologist count the number of fish caught and report this number



on the data sheet. The biologist should then subtract the total from the original fish population. For instance, if 50 fish were stocked and 30 were caught, there would be 20 left. Find the number 20 on the "x" axis of the *Recruitment Curve* and the corresponding number on the "y" axis – that number is 20. This number will be the number of recruits 3 years later. Add the number of remaining fish (20), to the number of new recruits (20), to get the population for year 3 (40). Enter 40 in the data sheet under year 3 population. Make sure 40 fish are in the lake and continue as before; 30 seconds one pole. Continue until you run out of fish or reach year 9.

Now try under different

conditions, starting in year 2. This year the length of the fishing season has been changed to 60 seconds. Repeat the process, starting with the original number of fish stocked. Continue through year 10, recording the number of spawners, recruits, and new population sizes as before.

You may play the game using different harvest regulations, such as “size limits” or “creel limits.” Also try changing the angling methods or equipment allowed. Let the youths use more than one pole or use “nets” (one hand scooping the fish into a cup) to catch fish.

When the number of Helo-Waudley Pugfish falls within the shaded area of the graph, enter 0 for the number of recruits. This means that the population is very unstable. Even though the curve shows some recruits, remind the youths that the curve doesn’t make allowances for natural mortality such as predation, low water levels, etc. So in fact, there may not be any recruits at all. If there is enough money, the group can decide to stock fish or do habitat improvement to help bring the population back.

To simulate what happens when you do habitat improvement or when natural mortality enters the picture, follow the same procedures but prior to entering the population information, subtract or add fish as shown on the *Cost Estimate Guide*. For habitat improvement, you will need to check if there is enough money in the “Management Fund” to do the improvement. If not, poll the anglers to find out if they are willing to donate some money. If you get the money, add the number of fish to your total.

By mixing in the non-target (frogs and crayfish) cutouts, you can simulate what to do when you catch other types of animals. The litter can also be put into the lake to show what happens when we aren’t good stewards.

For Discussion



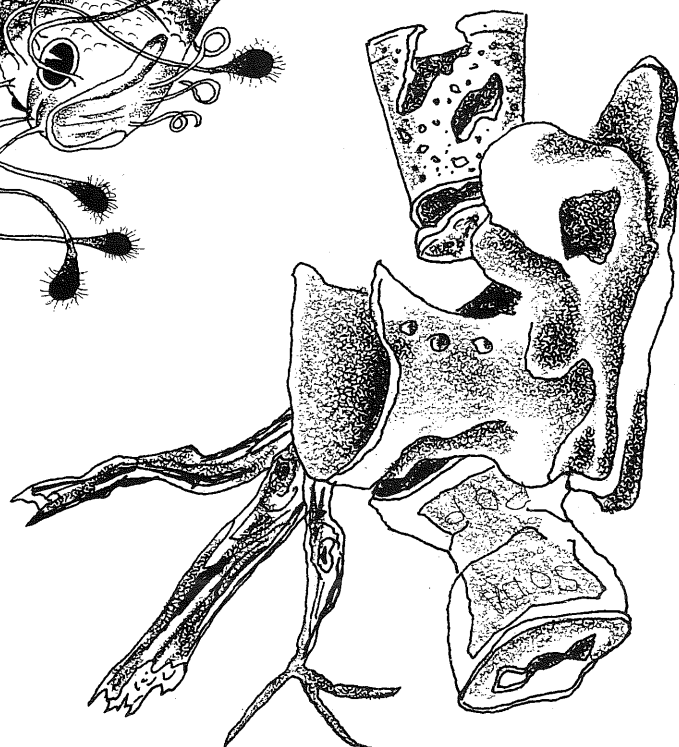
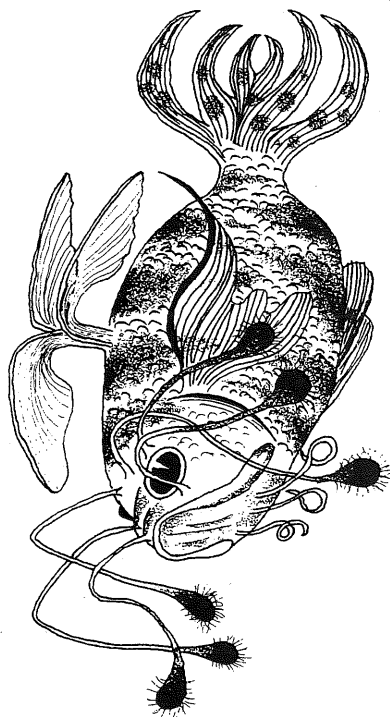
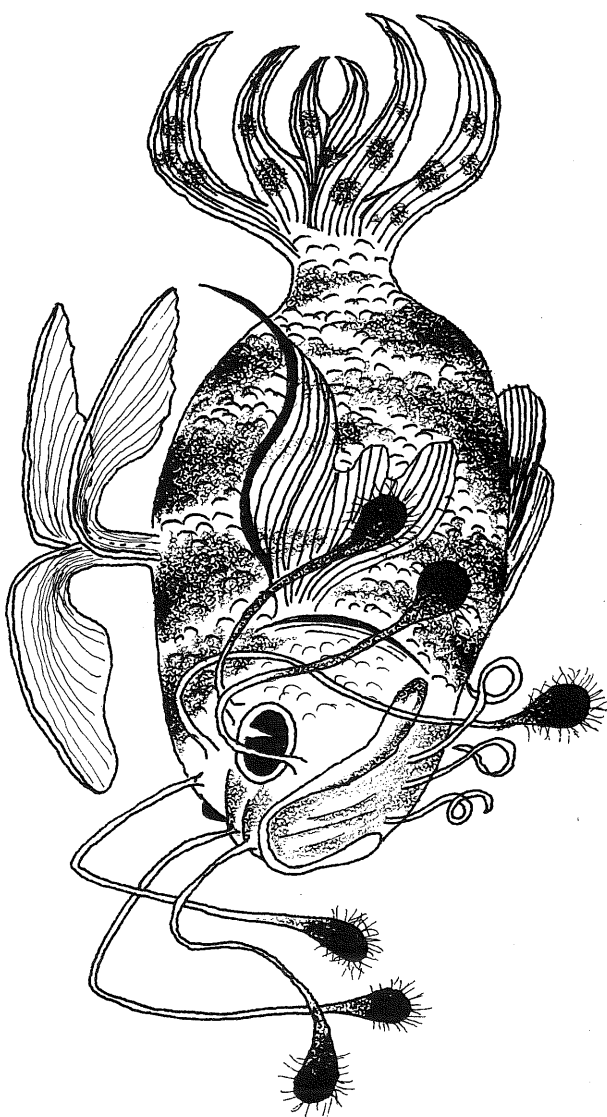
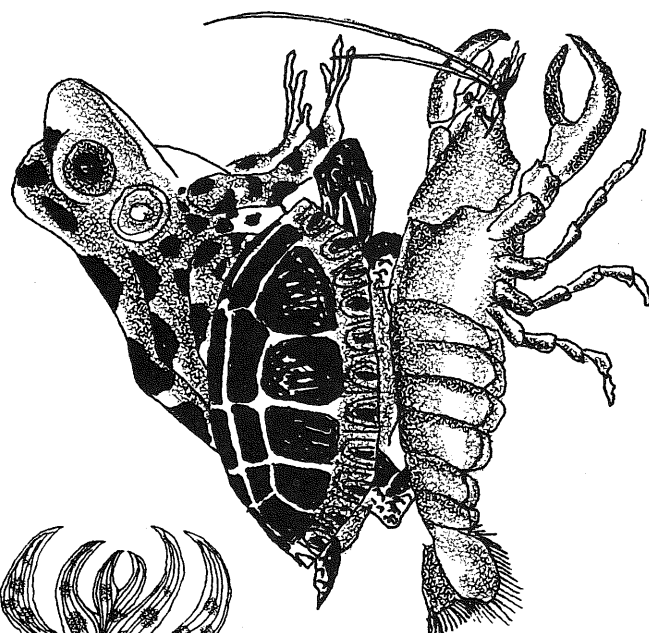
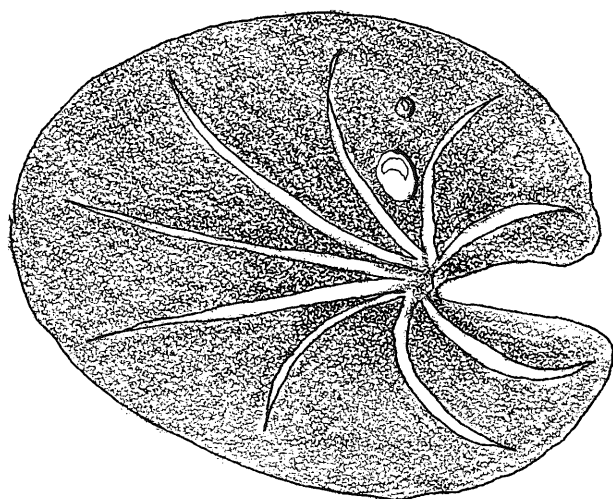
- Q. If they had their choice of fishing unrestricted for a few years, or with restrictions, which would they choose?
A. *Answers will vary.* This is an ethical response.
- Q. How did changes in the ecosystem/watershed effect the fishing?
A. *Fish replenish themselves under the correct habitat and water quality conditions.*
- Q. What happens when different regulations and harvest methods are used?
A. *Fish can be harvested* (caught), under the proper conditions, without hurting the population as a whole. *Too much fishing pressure* can strip a lake of large fish, leaving only a pool of smaller ones to catch. *An overfished lake or stream* may result from too many anglers, an over-extended season, or from unrestricted fishing techniques. *Too little fishing pressure* can allow the population to become too crowded resulting in stunted fish.
- Q. Did human impact help or hinder this situation?
A. *Answers will vary.*

Other Ideas

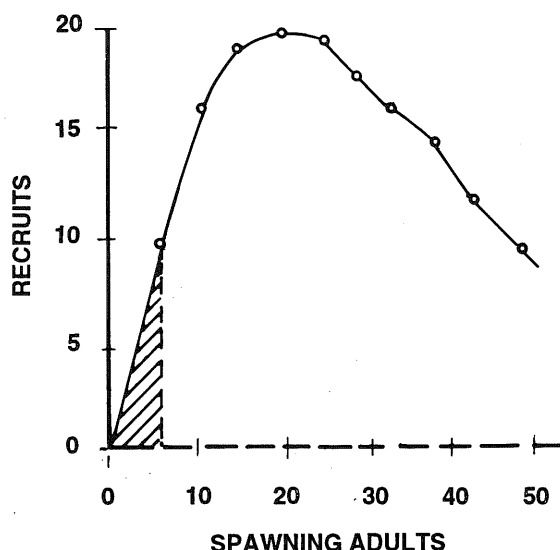


- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 7 and 8.
- *Make a room an aquatic ecosystem* by hanging various aquatic animals from the ceiling. On each animal give a tip on how to best protect and manage the system.
- Or make a series of nature cards with various management or habitat messages and give them to family and friends.

Helo-Waudley Pugfish Fishing Cutouts



Helo-Waudley Pugfish Recruitment Curve



The recruitment curve shown here depicts hypothetical population of fish. Actual models for population dynamics are very complex. This curve shows the number of fish (under ideal conditions) that will be recruited into the population (Y axis), given a certain number of fish who are left to spawn (X axis). It doesn't reflect effects of natural threats or pollution. Therefore, when the number of remaining fish is within the shaded area, no recruits are added to the population. Scientist call this area "random walk". It is where the population may swing up or down. At this point, the population is in serious trouble. In addition, at high levels of parent stock, recruitment again declines due to cannibalism, competition between recruits and parents, or lack of parental care. It is important to note that the number of recruits entering the population is based on biomass and doesn't necessarily reflect the desired size.

Helo-Waudley Pugfish Cost Estimate Guide (per person)

<u>Size Costs</u>	
Small (< 10 acres)	\$ 5
Medium (10-100 acres)	\$15
Large (>100 acres)	\$35

<u>Habitat Quality</u>	
Poor (<5% or >10% cover; <3 ppm oxygen; 85° F; high pollution)	\$ 5
Good (5-10% cover; 5 ppm oxygen; 70° F; low pollution)	\$15
Excellent (10% cover; 6 ppm oxygen; 65° F; no pollution)	\$20

<u>Initial Stocking</u>			
	Poor	Good	Excellent
Small	1 fish/4 people	1 fish/2 people	1 fish/person
Medium	1 fish/3 people	1 fish/person	2 fish/person
Large	1 fish/2 people	2 fish/person	3 fish/person

<u>Carrying Capacity (optional)</u>			
	Poor	Good	Excellent
Small	30	40	50
Medium	40	55	75
Large	50	75	100

<u>Additional Fish Stocking (per fish)</u>	
Fry (small baby fish)	\$0.10
Fingerlings (fish as long as your index finger)	\$0.50
Year old fish	\$1.50
Trophy fish	\$5.00

<u>Equipment (per item)</u>	
Permit	\$ 3
Creel	\$ 1

Fishing rod (magnet)	\$ 3
Fishing rod (paper clip)	\$ 2
Boat with life jacket	\$10
Artificial lures	\$.75
Live bait	\$1.00/doz.
Other types of tackle	

<u>Negative Threat Factors (natural/human)</u>	
Eggs don't hatch	-2% of recruits
Young eaten by predators	-1% of recruits
Low water levels (drought)	-15 recruits
Partial winter/summer kill due to natural activities	no recruits
Litter	-10 recruits
Aquatic plants harvested	-10 recruits
Low water level due to human use	-15 recruits
Construction caused erosion	-15 recruits
Spawning area destroyed/drained	no recruits
Partial winter/summer kill due to human activities	no recruits

<u>Positive Threat Factors (natural/human)</u>	
Natural revegetation of bank	+5 recruits after next two years
Strong egg hatch	+5 recruits
Lots of food for young	+10 recruits
Aquatic vegetation at 10%	+15 recruits
\$ 20 planting along bank	+5 recruits
\$ 25 fencing project	+5 recruits
\$ 55 litter clean-up project	+10 recruits
\$ 65 sedimentation ponds (construction sites, agricultural lands, etc.)	+15 recruits
\$100 habitat improvement project	+15 recruits

Helo-Waudley Pugfish Data Sheet

Number of Anglers _____ Fishing Season _____ Fishing Method _____

	Year 1	Year 3	Year 5	Year 7
Population				
Harvest				
Spawners				
Recruits				
Threat Factor				

Number of Anglers _____ Fishing Season _____ Fishing Method _____

	Year 1	Year 3	Year 5	Year 7
Population				
Harvest				
Spawners				
Recruits				
Threat Factor				

Number of Anglers _____ Fishing Season _____ Fishing Method _____

	Year 1	Year 3	Year 5	Year 7
Population				
Harvest				
Spawners				
Recruits				
Threat Factor				

Number of Anglers _____ Fishing Season _____ Fishing Method _____

	Year 1	Year 3	Year 5	Year 7
Population				
Harvest				
Spawners				
Recruits				
Threat Factor				

Good Angler Permits

I am a good angler
Permit

Name: _____

thumb print

I am a good angler
Permit

Name: _____

thumb print

I am a good angler
Permit

Name: _____

thumb print

I am a good angler
Permit

Name: _____

thumb print

I am a good angler
Permit

Name: _____

thumb print

I am a good angler
Permit

Name: _____

thumb print



Fishing Equipment and Techniques

What will the group learn? The participants will be able to tie knots, make fishing rigs from pop cans, rig and cast a closed face (spin-casting) rod and reel, and be able to select fishing locations and live or artificial baits based on habitat and fish species.

Fishing Fundamentals

Fishing is a way to bring people into their natural environment. Youth who are exposed to fishing can learn patience, build self-esteem, gain time for reflection, and problem-solving. Fishing is also a way to build family bonds and friendships. To be a good angler, one must utilize the concepts taught in the previous chapters.

Many people have never learned how to fish. In Minnesota, there are over 5,400 fishing lakes, 15,000 miles of fishing streams, and 153 fish species. There is abundant opportunity to explore fishing. Angling doesn't have to be expensive and sophisticated to be enjoyable. Equipment can be made from pop cans, and

bait can be found in your own backyards. Part of the adventure of fishing is understanding how truly simple it can be. This chapter teaches people basic skills to enhance their enjoyment of ponds, lakes, and streams for adventure or fishing.

While fishing, you can use the time to teach how artificial lures mimic parts of the food web. Why would a largemouth bass chase a fluorescent, dancing, spider jig? Why is a rainbow trout lured into eating cheese? Above all, you can leave those you teach with greater enthusiasm for the sport of fishing or out-of-doors activities. It will leave a lasting impression.

Pop Can Casting

Purpose: Everyone should be able to tie a clinch knot, make a fishing rig from a pop can, accurately cast a line, associate these techniques to a fish's habits and habitats, and fish independently in the future.

Level: Beginner

Group Size: 2 to 25

Site: Outdoors (large open space) or Indoors (gym)

Time: 25 to 35 minutes

Supplies: Fishing . . . Get in the Habitat! youth booklet
1/4" nylon cord or rope (24" lengths; 5 per hula hoop)*

4-6 hula hoops

Sinkers

Bobbers

#6 or #8 hooks

Empty pop cans

Casting plugs

Needlenose pliers

1-2 fingernail clippers

1-2 roles of masking tape

Clear container (plastic pail or aquarium) with water

2-3 spools of monofilament fishing line (6- to 8-lb test)

Construction paper (to make cover props such as lily pads, stumps, docks, rocks)

Reference: Sport Fishing and Aquatic Resources Handbook, 3-13 and 26-31; Getting Started in Fishing brochure; and An Angler's Guide to Catch-and-Release brochure.

** Loaner materials available upon request (limited supply so reserve early)*



In this activity, the group will learn how to tie a clinch knot and how to make a pop can rig. They will practice casting using hula hoops with simulated cover. Once they have mastered casting, they will learn the basics of handling and releasing fish. The final step is rigging the pop can with hooks, bobbers, and sinkers in preparation for the fishing trip and learning the "signs" that tell you that you're about to catch a fish.



Begin by teaching the group how to tie a clinch knot. This knot is important because it links your hook to the line. Without a sturdy set up, you're likely to lose your fish!

Handout *Fishing . . . Get in the Habitat! youth booklets* and turn to page 16. Using a hula hoop and nylon cord, show your group how to make a clinch knot as shown in the booklet. Now break the youth into groups of 5 per hula hoop. Each person should tie a knot to the hula hoop. Encourage those youths who can tie the knot to help others learn while they are waiting for the next step. (Note: Fishing tackle manufacturers have found that 5 wraps of the line works best. With less than 5 wraps, the fish may pull the knot out, and with more than 5, the line may break.) Make sure everyone has mastered this knot before going on to make a pop can rig.

Rigging

Your group is now ready to construct a pop can rig as shown in the youth booklet (page 17). These pop can rigs take the place of a rod and reel. Yes, you CAN and WILL catch fish with these reels! Set up the empty pop cans, masking tape, fishing line, clippers, and casting plugs at tables that give everyone enough room to work. Have

everyone follow the steps in the youth booklet. At this time, change step four to attaching only a casting plug so they can use the pop can rigs for casting practice.

Casting for Cover

Discuss the importance of casting close to cover. For instance, largemouth bass will wait in the shade of a lily pad for its prey. Our lure imitates prey when we go fishing. If we can fool the bass, then we'll have a bite!

Demonstrate to the group the proper technique for casting a pop can rig (*page 17 of youth booklet*). Make sure your hand or thumb isn't over the line wrapped around the can! With any group, it's important to emphasize safety when casting. Make sure that everyone is several feet apart. Remind everyone to look around them for people, obstacles, overhead wires, and branches, etc., before casting.

To practice casting and to reinforce picking a fishing spot based on habitat, set up a pop can casting course.

Place hula hoops on the ground for targets. Set up a series of stations in a golf-course form with each station representing the habitat of a different fish. For example, put paper "lily pads" around one hula hoop to represent good largemouth bass habitat. Then let the group "cast for

cover" from about 15 to 20 feet away from the hula hoop. Allow everyone at least three tries at each station before having to move on to the next station. Once a person casts inside the hula hoop they should identify the type of fish they would have caught, and move on to the next station of their choice. Watch the group and help as needed.

Landing and Handling a Fish

Demonstrate landing a fish by using volunteers as bass, bluegill, and anglers. Let the fish "swim" near cover (hula hoops). Using a casting plug, the angler gently casts the plug into the cover. The appropriate fish takes the bait (by holding with their hands). Talk the angler through the landing of this fish. For example, is the fish diving for the bottom? Keep tension on the line, and slowly feed some line to the fish to avoid breaking the line. Is the fish swimming towards you? Reel your line in quickly! Demonstrate this a few times. Remind the group not to drag the fish across the ground to get it landed.

Using a replica (felt cutout, mount, etc.) or a real fish show the proper way to hold the fish to remove the hook. When handled gently, quickly, and with a few precautions, fish have an excellent chance of surviving if released. Some handling tips can be found both in the

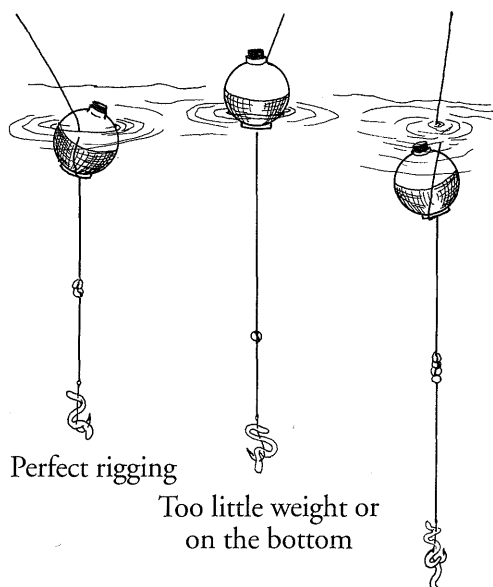


Catch-and-Release brochure and on page 19 and 23 of the youth booklet. Emphasize that if the fish caught is not going to be used for a meal or as a mount it should be released immediately and unharmed back into the lake. This voluntary recycling of fish helps maintain Minnesota's quality fishing and gives you or someone else the opportunity to catch it again.

Rigging for Fishing

Now that everyone is an expert at casting and handling fish, have them return to their work station to rig the pop can for fishing. Remove the casting plug and give everyone a hook, sinker, and bobber. Remind everyone of the safe way to handle a hook so they don't get it caught on their clothes or themselves.

Have them *follow the directions on page 15 (steps 3-5) of their youth booklet.* (Note: If you plan to practice catch-and-release, the barbs can be bent down. This will make the fishing more challenging and further reduce fish mortality.) Help everyone rig their pop cans. As individuals finish rigging, let them test their rig in a plastic or glass container to see if it floats at the correct level. Review or show the group at this time the "signs" the bobber gives when you're about to catch a fish.



Too much weight or you got a fish



- Q. What is the most important step when rigging your fishing rod?
 A. *The knot.*
- Q. Where would you cast your line to catch bluegill or crappie?
 A. *Near shaded cover*, such as docks or vegetation.
- Q. What does it mean when your bobber is laying on its side in the water?
 A. It can mean either you *don't have enough weight* on your line, that your *bait is sitting on the bottom* of the lake, or that *you have a fish on the line!* A perch or crappie will not necessarily take the bait down with them. Instead, they may stay right where they are and feed, or swim horizontally for awhile.
- Q. How should one handle a fish?
 A. *Quickly, gently and by keeping them in the water.* If the hook is swallowed, don't try to remove it, just cut the line.



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 3, 18, and 20-21.
- *Introduce live-bait* (see Live-bait Hunt) and test it in the clear containers. Have your group experiment with putting bait on a hook and observing how different bobber and sinker sizes affect the bait. For example, try four split-shot sinkers and a worm versus a bobber, one-split shot sinker, and a worm. Which might be better suited for a catfish lying on the bottom of a swift moving river? Which is better for a bluegill only a few feet under the surface of a lake?

Rigging a Spin-Cast Combo

Purpose: Everyone should be able to tie a clinch knot, cast and rig a spin-cast rod and reel, accurately cast a line, associate these techniques to a fish's habits and habitats, and fish independently in the future.

Level: Beginner

Group Size: 2 to 25

Site: Outdoors (large open space) or Indoors (gym)

Time: 15 to 25 minutes

Supplies: Fishing . . . Get in the Habitat! youth booklet
1/4" nylon cord or rope (24" lengths; 5 per hula hoop)*

4-6 hula hoops

Sinkers

Bobbers

Casting plugs

#6 or #8 hooks

Needlenose pliers

1-2 fingernail clippers

Spin-cast rods with reels and monofilament line

Clear container (plastic pail, aquarium) with water

Construction paper (to make cover props such as lily pads, stumps, docks, rocks)

Reference: Sport Fishing and Aquatic Resources Handbook, 3-13; Getting Started in Fishing brochure; and An Angler's Guide to Catch-and-Release brochure.

** Loaner materials available upon request (limited supply so reserve early)*



In this activity, the group will learn how to tie a clinch knot and rig a spin-cast rod and reel. Participants will practice casting using hula hoops and simulated cover. Once they have mastered casting, they will learn the basics of handling and releasing fish. The final step is rigging the rod with hooks, bobbers, and sinkers in preparation for the fishing trip, and learning the "signs" that tell you that you're about to catch a fish.



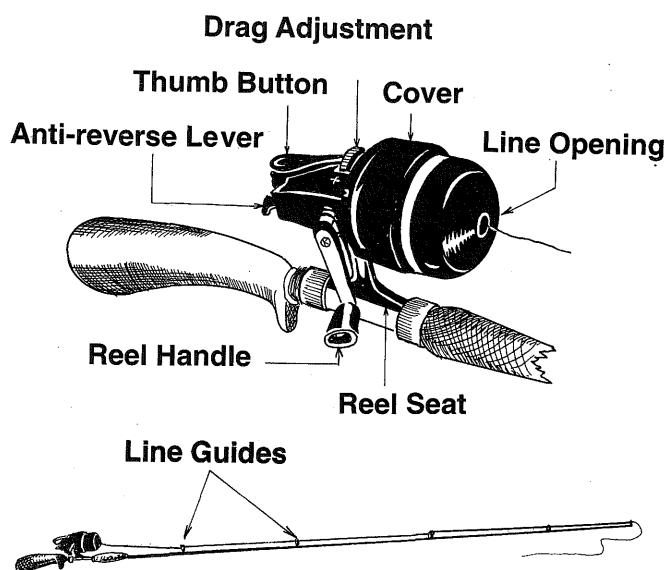
Begin by teaching the group how to tie a clinch knot. This knot is important because it links your hook to the line. Without a sturdy set up, you're likely to lose your fish!

Handout *Fishing . . . Get in the Habitat! youth booklets* and turn to page 16. Using a hula hoop and nylon cord, show your group how to make a clinch knot as shown in the booklet. Now break the youth into groups of 5 per hula hoop. Help each person tie a knot to the hula hoop. Encourage those youth who can tie the knot to help others learn while they are waiting for the next step. (Note: Fishing tackle manufacturers have found that 5 wraps, of the line works best. With less than 5 wraps, the fish may pull the knot out, and with more than 5, the line may break.) Make sure everyone has mastered this knot before going on to rigging a spin-cast rod.

Rigging

Now show everyone how to rig their rod.

Start by locating the line on the reel (if necessary, take the cover off). The line should come out of the cover at



the line opening. Push the thumb button to release the line. Gently pull the line from the reel, threading it through the line guides. Turn the reel handle once to secure the line. Check the drag adjustment on the reel: Tie the line to something sturdy. Move the drag adjustment lever so the line comes out easily. Gradually lift the rod until it bends, tightening the drag adjustment as you increase the tension on the line. Now jerk the rod as if setting the hook. The drag should slip slightly. If it doesn't, loosen the drag until it does. At this time, attach only a casting plug so they can use the rigs for the following casting practice.

Casting for Cover

Discuss the importance of casting close to cover. For instance, largemouth bass will wait in the shade of a lily pad for its prey. Our lure imitates prey when we go fishing. If we can fool the bass, then we'll have a bite!

Demonstrate to the group the proper technique for casting their spin-cast combo (*page 19 of youth booklet*). Make sure the line isn't wrapped around the top of the rod! With any group, it's important to emphasize safety

when casting. Make sure that everyone is several feet apart from each other. Remind everyone to look around them for people, obstacles, and overhead wires, branches, etc., before casting.

To practice casting and to reinforce picking a fishing spot based on habitat, set up a pop can casting course as described on *page 5-3*. Watch the group and help as needed.

Landing and Handling a Fish

Demonstrate landing a fish as described on *page 5-3*. Remind the group not to drag the fish across the ground to get it landed.

Using a replica (felt cutout, mount, etc.) or a real fish, show the proper way to hold the fish to remove the hook. When handled gently, quickly, and with a few precautions, fish have an excellent chance of surviving if released. Some tips can be found both in the *Catch-and-Release brochure* and on *page 19 and 23 of the youth booklet*.

Emphasize that if the fish caught is not going to be used for a meal, or as a trophy mount, it should be released immediately and unharmed back into the lake. This voluntary recycling of fish helps to maintain Minnesota's quality fishing and gives you or someone else the opportunity to catch it again.

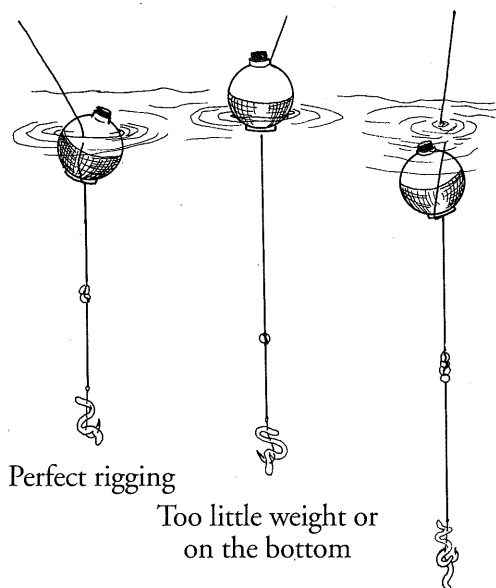
Rigging for Fishing

Now that everyone is an expert at casting and handling fish, have them return to their work station to rig the spin-cast combo for fishing. Remove the casting plug and give everyone a hook, sinker, and bobber. Remind everyone of the safe way to handle a hook so they don't get it caught on their clothes or themselves.

Have them follow the directions on *page 15 (steps 3-5) of their youth booklet*. (Note: If you plan to practice catch-and-release, the barbs can be bent down. This will make the fishing more challenging and further reduce fish mortality.) Help everyone rig their spin-cast combo.

Once everyone is rigged, test their rigs by using a

plastic or glass container to see if the bobber floats at the correct level as shown in the illustration below. Review or show the group at this time the “signs” the bobber gives when you’re about to catch a fish.



For Discussion

- Q. What is the most important step when rigging your fishing rod?
A. *The knot.*

- Q. Where would you cast in a stream to catch rainbow or brook trout?
A. *Near shaded cover*, such as tree roots, under bank side bushes, or in fast-moving, shallow water.
- Q. What does it mean when your bobber goes under the water?
A. It means either that *you have a fish*, or your *split-shot sinkers are too heavy* for the bobber you have chosen.
- Q. What’s the best type of bait to use in order to release (let my fish go back into the water alive) my fish?
A. *Live-bait* will be the poorest choice, since many fish will swallow live-bait and the hook will lodge in their stomach. *Artificial lures* (such as stick baits) are better.

Other Ideas

- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 9, 18, and 20-21.
- *Discuss what to look for when selecting fishing equipment.* Remember to include cost, quality, styles, and matching it to the fish they are seeking. Emphasize that one doesn’t have to have a lot of expensive gear to catch a fish; simple and inexpensive can be just as effective as long as you practice the concepts learned about habitat, fish identification, stewardship, and ethics.

Live-Bait Hunt Site Study

Purpose: Everyone should be able to identify several common insects, invertebrates, and small aquatic/amphibians; identify their habitats; and further understand food web relationships.

Level: Intermediate

Group Size: 2 to 25

Site: Outdoors (Spring, Summer, or Fall before snow)

Time: 20 to 25 minutes

Supplies: Dip nets (page)

Storage containers for specimens

Bait Storage Instructions (page 5-10)

Water Habitat ID Sheets (pages 1-9 to 1-11)

Current Minnesota Fishing Regulations

Fishing license or special DNR permit

Leech trap (optional)

Crimper or pliers (optional)

Minnow trap (optional)

Beef kidneys, fish heads, dog food, bread (optional)

Reference: Sport Fishing Resource Handbook; and Current Minnesota Fishing Regulations.

the water to your trap, or leeches will abandon it. For best results place it out the night before the event. A minnow trap is made of wire mesh (*Making Bait Traps*, page 5-10). Labeled minnow traps can be set out a few hours before the program.



Select a nearby area where your group will be able to hunt for insects, invertebrates, frogs, etc. Take time to review the *Minnesota Fishing Regulations* for bait collecting, transportation, and disposal laws. If you have any questions, contact your local Conservation Officer, resource biologist, or MinnAqua contact.

Assign 4-5 youth to an adult instructor/helper. Work with your group to **minimize impact on the area by taking only a small amount of what you need**, and cleaning up the site after the activity. Under the supervision of the adults, let the youth collect as many of the different types of bait as time will allow:

Earthworms

Earthworms are usually found from ground level to two feet below the surface. In winter or during hot weather, they will burrow deeper. Search for earthworms in areas moist and rich in organic material. Turning over logs and rocks in wooded areas that feel bumpy underneath (the bumps are hardened castings of worms) should yield these squiggly treasures. Worms also will leave their burrows during heavy rains. During this time, they can be easily collected from sidewalks or roads.

Insects

Aquatic insects in their larval or nymph forms generally make excellent bait. Turn over rocks in shallow water to collect caddisfly cases, stonefly nymphs, and other insect larvae. Near shore, gather mud, leaves, and



In this activity, everyone will explore the habitats where one can find potential live-bait used for fishing (frogs, worms, crickets, etc). They will then get a chance to catch their own bait for use later during fishing.

Prior to the program, construct the leech and minnow traps. You can construct a leech trap from a coffee can (*Bait Storage*, page 5-10). Crimp the top shut so that the bait doesn't float away. Place the labeled trap in water where currents move gently, so that the smell of the bait can be dispersed. Be sure that sunlight doesn't penetrate

sticks, and sort through the materials to find insects such as dragonfly nymphs. Look for water worms in mud and leaves downstream from fallen trees. Adult crickets and grasshoppers are also excellent baits.

Frogs

Frogs prefer marshy areas and edges of streams or creeks. Certain species of frogs prefer to live near plants in deep water. During warm summer days, frogs can be chased and caught by hand or with nets.

Leeches

Ribbon leeches live in lakes and ponds without fish except for a few minnows. They are flat, black to brown invertebrates that have sucking disks at both ends of their bodies. The smaller disk is the mouth and the large disk at the tail is used to cling to objects. Most leeches eat dead material. Leeches can be collected from spring through early summer. They prefer ponds with an abundance of shoreline vegetation, such as cattails. You are less likely to catch leeches in a pond with game fish.

Minnows

Minnows are easily trapped in most areas throughout the year. Have your group examine the trap you set earlier to see what types have been caught. You might want to let them try collecting their own minnows using dip nets (*Water Habitats Site Study*, page 1-6).

After collecting, reassemble the group and have them share the types of bait they caught, and describe the habitats where they found them.

Use the *Bait Storage* page to discuss ways to store the various bait. All bait needs to be kept cool and moist in a place like a refrigerator, cooler, or shade. Minnows and leeches also need clean, fresh water (do not use chlorinated water) to survive over long periods of time. While fishing, many anglers store their minnows and leeches in a flow-through container in a shaded part of the lake or stream. For best survival, it is important to change the water or check the bedding at least once a day.



- Q. Why do you find so many insects under rocks?
*A. Because **dark, moist areas** are where many insects prefer **cover** and can be their habitat.*
- Q. Lures have several advantages and disadvantages over live-bait. What are they?
*A. **Lures aren't swallowed** like live-bait by fish, so it may be easier to practice catch and release. However, **lures cannot completely mimic** the smell, action, and texture of a worm or minnow.*
- Q. Could you live in a pond? Would there be enough things to keep you alive?
*A. **Responses will vary, but probably not.** The winter would be too cold, and food sources would be limited.*



- Do *Fishing . . . Get in the Habitat!* youth booklet activity page 18.
- *Research and discuss raising bait at home.* Show samples of equipment needed. Items like worm food and bedding can be purchased at bait and tackle shops. Raising worms is a positive way to recycle selected food items into compost for your lawns and gardens.

BAIT STORAGE



STYROFOAM PAIL

MINNOW PAIL

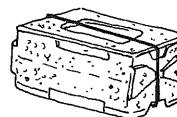


Use fresh (non-chlorinated) water and keep in a cool, shaded spot.
(Letting water sit overnight will dechlorinate it.)



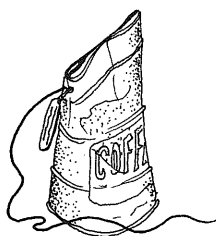
WORM PAIL

**WORM
BAIT BOX**

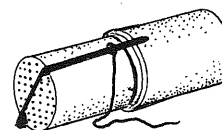


Use moist soil or worm bedding and keep in a cool, shaded spot.

**LEECH
TRAP**



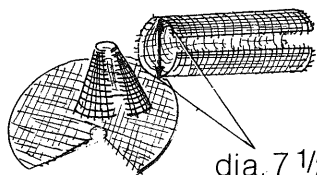
**FLOW-THROUGH
LEECH CONTAINER**



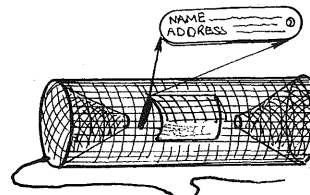
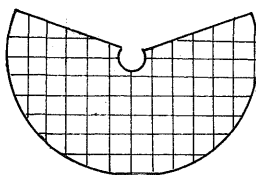
1. Squeeze can shut by bending in the top rim.
2. Bait with fish heads, red meat, or liver.
3. Place in shallow water and tie to a spot on shore or use a marker float.

Place in water and tie to a spot on shore.

MAKING BAIT TRAPS



dia. 7 1/2"



1. Use a piece of 1/4" inch mesh 25" x 16" to make a cylinder.
2. Fasten ends together by bending cut ends around other edge.
3. Cut a door. Use a piece of wire to hook door shut.
4. Cut out and make two cones using scaled drawing as a guide (1 square = 1 inch).
5. Insert a cone into each end of cylinder and fasten as above.
6. Place a metal tag showing your name and address on the trap.
7. Bait with bread or dog food.
8. Place in shallow water and tie to a spot on shore or use a marker float.

Tackling Your Tackle Box

Purpose: Everyone should be able to apply knowledge of fish habits to select fishing tackle and determine basic equipment needs.

Level: Advanced

Group Size: 3 to 25

Site: Outdoors (shaded area) or Indoors (classroom)

Time: 15 to 20 minutes

Supplies: Ruler*

Map

Whistle

Tackle box

Stringer

First aid kit

Hook sharpener

Needlenose pliers

Fish Identification Key (page 2-4)

Sunscreen and hat

Current Minnesota Fishing License

Guide to Simple Rigging (pages 5-13 to 5-17)

Current Minnesota Fishing Regulations

Natural baits (worms, leeches, minnows)

Clear container with water (plastic pail or aquarium)

3 different weights of fishing line (6-, 10-, 17-lb. test)

Assortment of hooks, sinkers, and bobbers (different styles and sizes)

Assortment of common artificial lures (jigs, spinner baits, crank baits, and stick baits)

Reference: Sport Fishing and Aquatic Resources Handbook, 3-13; Getting Started In Fishing; and How To Select Lure Colors For Successful Fishing sheet.

** Loaner materials available upon request (limited supply so reserve early)*



In this activity, the youths learn how to use the right gear for the right fish. You will introduce them to a basic tackle box set up. You will then assign each person a type of fish to catch. Participants will live-bait rig their poles or pop cans for this type of fish. They can test their set up in a container of water and practice presenting this delight to their fish.



Prior to the program, fill the tackle box with the required supplies. In front of the group, open the tackle box. Describe all or some of the items, their uses, and proper handling. For example:

Needlenose pliers: Used to gently remove a hook from a fish's mouth and cut the line if the fish has swallowed the hook. You will need needlenose pliers to effectively practice catch-and-release. Safety in removing the hook can be practiced by making sure that you pull the hook at an angle that is away from your body.

Minnesota Fishing Regulations: You will need to check for special regulations and limits posted for the lake or pond area you will be fishing.

Once your group is familiar with the items in the tackle box, discuss how an angler matches the gear to the size, and types of fish they hope to catch. For example, you would use a number 10 hook for a rainbow trout, but a number 6 hook (it's bigger) for a largemouth bass. Other items to consider when rigging your pole are the bobber, line weight (or test), sinker weights and sizes, etc. Use the *Guide to Simple Rigging* to work through a few examples.

Now assign each youth, or pair of youth a different type of fish (i.e., bluegill, bass, etc.) that they must prepare to catch with live-bait. Remind everyone to practice safety when handling the items. Let each person or group select their own equipment for rigging from your tackle box. Make sure to help them with the correct hook, bobber, and sinker selections, if they need it.

With the correct live-bait rigging, have them each practice placing the appropriate live-bait on their hook. Provide the live-bait in clear containers. In a container of water, let each person test their rigs and practice the correct presentation. For example, for bluegill let the bait drop to the bottom and slowly bring it to the surface, for bass skip it along at a certain depth, and for catfish just let it sit on the bottom.

Other Ideas



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 18 and 20-21.
- *Research the history of making lures.* Discuss details of the ways designers over time have made their lures mimic the natural food of the fish. Why do designers use so many colors? Look at habitat and water quality as factors that determine which colors are used.

For Discussion



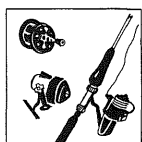
- Q. The basic fishing equipment list would include what?
A. See supply list.
- Q. Which habitat components must be considered when selecting the types of equipment to use?
A. Cover – the heavier the vegetation the greater the weight and larger the line you will need. *Water* – determines which color of line or lures to use. *Food* – the lures to use to imitate the natural food or the live-bait to buy.
- Q. What do you need to catch a northern pike?
A. Medium to large hook – #1 or #2, 12 to 17-lb-test line, large bobber, few large sinkers, and a medium to large sucker minnow. You need to use the bigger, stronger equipment because northern pike like to eat medium-sized fish, and they have sharp teeth.

"Guide to Simple Rigging" Key

Rods/Reels – The key to choosing the right equipment lies in carefully deciding on your needs. You should consider your own skill as an angler, the fish you plan to catch, and the habitat conditions that you will be facing. Then talk to as many people as you can prior to purchasing.



Use a small to medium-sized spin-casting or spinning reel with a 6 to 6 1/2 foot long, light to medium action rod. Another option is a cane pole or pop can rig.

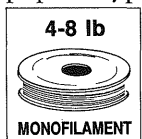


Use a medium-sized spin-casting, spinning, or bait casting reel with a 5 1/2 to 6 foot long medium action rod.

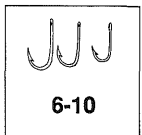


Use medium-to large-sized spinning or bait casting reel with a 5 1/2 to 7 foot long medium to heavy action rod.

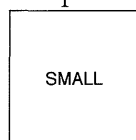
Line Weight – Monofilament is by far the most popular type in use. Match the strength of the line with the size and strength of the fish you want to catch. Lines are rated by breaking strength measured in pounds. The smaller the line, the more natural it will make a bait or lure appear to the fish. For heavy vegetation and large fish use larger line. Use clear line in clear water, and colored line in stained or cloudy water.



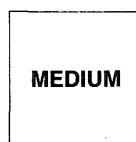
Hooks – Come in hundreds of styles and sizes. Each has been designed for a specific purpose, so make sure you pick the correct style for the fishing you will be doing. Sizes range from 10-6/0. The smaller the number, the bigger the hook. Match hook size to the size of the fish's mouth and the type of bait you're going to use. The barbs on the hooks can be bent down if you intend to release your catch. This will make your fishing more challenging and reduce fish mortality.



Size – The fish's physical characteristics and habitat preferences need to be considered when deciding which size gear and bait to use when you go fishing. As you spend more time fishing, refine these guidelines to fit your own fishing style and situations. **Note:** Not all components listed are required for every set-up.



Bobbers: 1/2"-3/4"
Split-shot sinkers: B, BB, 3/0
Egg, bullet, or walking sinkers: 1/4 oz.
Swivels: small Jigs: 1/32-1/8 oz.
Live-bait: 2"

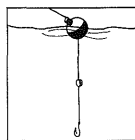


Bobbers: 3/4"-1 1/4"
Split-shot sinkers: 3/0, 7, 5
Egg, bullet, or walking sinkers: 3/8-3/4 oz.
Swivels: medium Jigs: 1/4-3/8 oz.
Live-Bait: 2"-4"

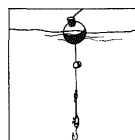


Bobbers: 1 1/2"-2"
Split-shot sinkers: 5, 3, 2
Egg, bullet, or walking sinkers: 1-2 oz.
Swivels: large
Steel leader: 6-9", 20-30 lb. test
Jig: 1/2-1 oz. Live-bait: 4"+

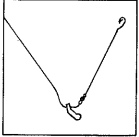
Rigging – Live-bait rigs are the simplest, and often the most productive at catching fish. Below are the most often used set-ups.



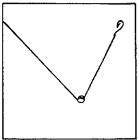
This basic bobber set-up consists of a split-shot sinker attached about 9 inches above a single-shank hook. Place the bobber at a distance from the hook equal to the depth you will be fishing. Start with the hook about 6 inches from the bottom. Change depths until you catch a fish.



This basic bobber set-up consists of steel leader, attached to a single-shank hook with the split-shot sinker attached above the leader. The leader prevents toothy fish (like Northern pike) from cutting the line. Leaders may scare other types of fish away, so use them only when necessary.



This live-bait set-up includes a sliding sinker placed on the line above a swivel. Attached to the swivel is 1-4 ft. of line (called a snell) and then a single-shank hook. Use a sliding walking sinker over sand, rock or muck; use an egg or bullet sinker over submerged aquatic plants. Small spinner blades and beads are often added to the snell to help attract fish.

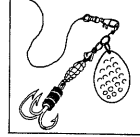


This live-bait set-up includes a split-shot sinker attached about 1-2 feet away from a single-shank hook. This rig is used for still fishing or tumbling baits down a stream.

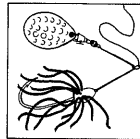
— Artificial bait used to catch a wide variety of fish. The color of lure to use will vary depending on the body of water: natural colors and patterns are best for clear water, while brighter colors are often better in dark waters.



Jigs come in a variety of colors and sizes. They are made with a weighted metal head, and a “tail” of animal hair, soft plastic, feathers, or rubber. They can be used with or without a bobber and/or bait. They can be casted and retrieved at slow to medium speeds, and are used to catch nearly every kind of freshwater fish.



In-line spinners are best to cast. They are made of metal, and have plain or hair dressed hooks. In-line spinners usually have a blade that creates a “flash” underwater that looks like a baitfish. You will need to attach it to the line with a swivel to avoid twisting your line.


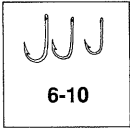
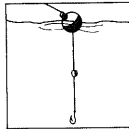
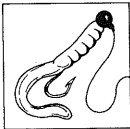


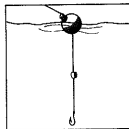
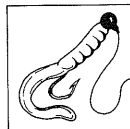


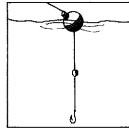

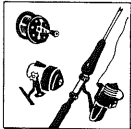

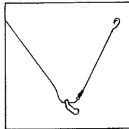
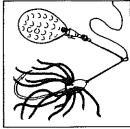
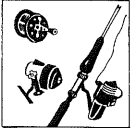
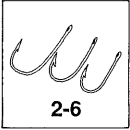
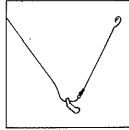
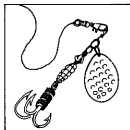

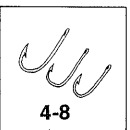
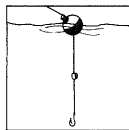
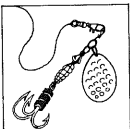

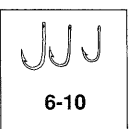
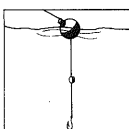
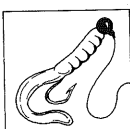


Spinnerbaits are great multi-species, large fish catchers. They are made from metal, and either wobble or flutter as they move through the water. Spinnerbaits usually have blades that spin to create a “flash” underwater that looks like a baitfish darting from one place to another. Try retrieving the bait at a variety of speeds until you get a bite.

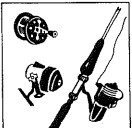





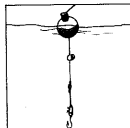


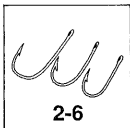
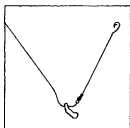


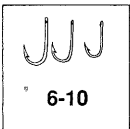
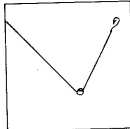


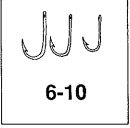
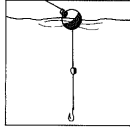
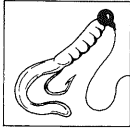

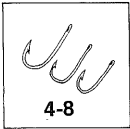
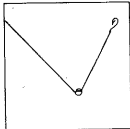



Spoons are big fish attractors. They are made from metal, and wobble or flutter as they move through the water. This action creates a “flash” that looks like a baitfish darting from one place to another. Attach the spoon to the line with a swivel for the best action and to keep your line from twisting.

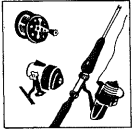


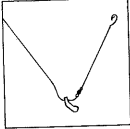
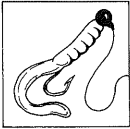

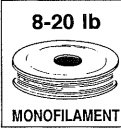
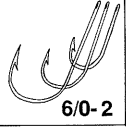
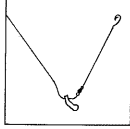
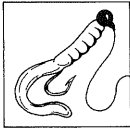
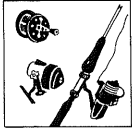

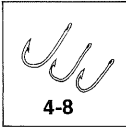
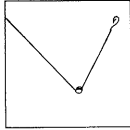
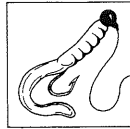
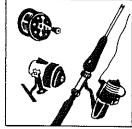

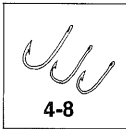
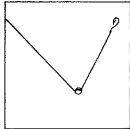
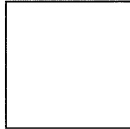
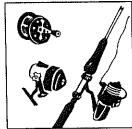
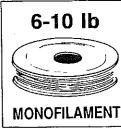
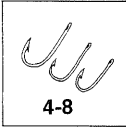
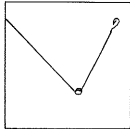
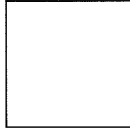
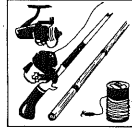

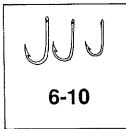
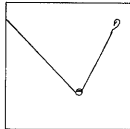
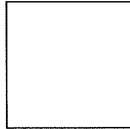

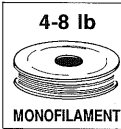
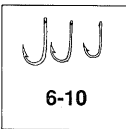
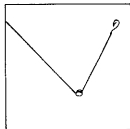
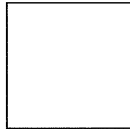
Guide to Simple Rigging

Family/Species	Rod & Reel	Line Wt.	Basic Equipment Hook	Sizes	Live-Bait Rigging	Live-Bait	Artificial Lures
Sunfish Panfish (others)		4-8 lb MONOFILAMENT	 6-10	SMALL		Worm/Leech/ Waxworm	
Crappie		4-8 lb MONOFILAMENT	 4-8	SMALL		Minnow/ Waxworm	
Rock Bass		4-8 lb MONOFILAMENT	 4-8	SMALL		Minnow/Worm/ Leech/Waxworm	
Largemouth Bass		8-20 lb MONOFILAMENT	 2/0-4	MEDIUM		Minnow/Leech/ Frog/Worm	
Smallmouth Bass		6-10 lb MONOFILAMENT	 2-6	MEDIUM		Minnow/Leech/ Frog/Worm/Crayfish	
Temperate Bass White Bass		6-10 lb MONOFILAMENT	 4-8	MEDIUM		Minnow	
Perch Yellow Perch		4-8 lb MONOFILAMENT	 6-10	SMALL		Minnow/Worm Leech/Waxworm	

Guide to Simple Rigging

Family/Species	Rod & Reel	Line Wt.	Basic Equipment Hook	Sizes	Live-Bait Rigging	Bait	Artificial Lures
Perch (cont.) Walleye		6-10 lb MONOFILAMENT	 4-8	MEDIUM		Minnow/Leech/ Worm/Frog	
Pike Northern Pike		8-20 lb MONOFILAMENT	 2/0-4	LARGE		Minnow	
Trout/Salmon Lake Trout		8-20 lb MONOFILAMENT	 2-6	MEDIUM		Minnow	
Stream Trout		4-8 lb MONOFILAMENT	 6-10	SMALL		Worm/Fish Eggs	
Lake Whitefish		4-8 lb MONOFILAMENT	 6-10	SMALL		Waxworm/Minnow	
Catfish Bullhead		6-10 lb MONOFILAMENT	 4-8	MEDIUM		Waxworm/Leech/ Worm/Liver	

Guide to Simple Rigging

Family/Species	Rod & Reel	Line Wt.	Basic Equipment Hook	Sizes	Live-Bait Rigging	Bait	Artificial Lures
Catfish (cont.) Channel Catfish		8-20 lb  MONOFILAMENT	 2/0-4	LARGE		Liver/Dead Sucker/ Worm/Doughball	
Flathead Catfish		8-20 lb  MONOFILAMENT	 6/0-2	LARGE		Minnow	
Drum Freshwater Drum		6-10 lb  MONOFILAMENT	 4-8	MEDIUM		Worm/Minnow/Leech/Frog	
Minnow Common Carp		6-10 lb  MONOFILAMENT	 4-8	MEDIUM		Worm/Kernel Corn/Doughball	
Suckers/Buffalos Bigmouth Buffalo		6-10 lb  MONOFILAMENT	 4-8	MEDIUM		Worm/Kernel Corn/Doughball	
Shorthead Redhorse		4-8 lb  MONOFILAMENT	 6-10	SMALL		Worm/Kernel Corn/Doughball	
White Sucker		4-8 lb  MONOFILAMENT	 6-10	SMALL		Worm	



The Fishing Trip

What will the group learn? Participants should demonstrate ethical fishing practices, care in handling fish, and competence in fishing techniques in order to pursue fishing as a recreational, educational, and life-skill activity.

Fishing . . . Starting A New Habit

After working through an event or clinic, you should have before you dozens of eager learners just waiting to put their new knowledge into practice! These learners now know about habitats, food webs, fish identification, water quality, stewardship, and resource management. They've rigged a pole and searched for bait. They're ready to go fishing.

Now is the time for participants to apply the skills and knowledge they've gained to a fishing experience. Before the first cast can be made, however, there are a few final items to discuss and reinforce, including safety and fishing regulations. During the actual fishing time, activities will include ethical fishing, care in handling fish, and good stewardship.

Look around your fishing area. A fishing trip can be a lot more than just catching fish. It is an opportunity to explore, observe, and identify plants and animals. It's also a good time to watch people, and observe how they interact with their environment.



At the Water's Edge

Purpose: Everyone should be able to identify safety items that will be at the program site, select appropriate safety rules to follow while casting and fishing, understand how to pick a safe location to fish, be familiar with fish consumption advisories and how to reduce their health risk, and know the relevant fishing regulations.

Level: All

Group Size: 3-25

Site: Outdoors (fishing site) or Indoors (classroom)

Time: 10-15 minutes

Supplies: Local map*

First aid kit

Rigged spin-cast combo or pop can

Fishing. . . Get In The Habitat! youth booklet

Throwable life cushion with 50' of rope

Life jacket

Current Minnesota Fishing Regulations

Current Minnesota Fishing License (ages 16+)

Reference: Sport Fishing and Aquatic Resources Handbook, 14-31 and 38-42; Current Minnesota Fishing Regulations; An Angler's Guide to Catch-and-Release; MN. Fishing Piers map; Hypothermia. . . The Cold Facts pamphlet; Think Safe – Choose the Right Personal Flotation Device (PFD); MN. Fish Health Advisory booklet; and Which Fish Are Safe To Eat? brochure.

** Loaner materials available upon request (limited supply so reserve early)*



This activity begins by covering the basics of safety and fishing regulations. It is essential that your group understand both of these topics before they try to fish at a MinnAqua event or clinic. The activity then provides a brief review of selecting a site, landing and handling the fish for either release or harvest, and fish consumption health risks.



In order to encourage participants to go fishing in the future, review with them how you selected this fishing site. Bring along a local map, and show how to get to the area by bike, bus, or on foot. Stress the buddy system when going fishing by having them name one or two people to invite to go fishing with them. For the fishing trip, let everyone pick their own fishing buddy for the day. Discuss and show them other lakes that they might like to visit in the future.

Talk about the types of fish that can be caught at the site, and mention the regulations that apply. Discuss how to pick a safe and productive area to fish from along the shoreline. This is the time to reinforce concepts of habitat, fish identification, stewardship, how to handle fish and remove hooks. (If someone gets a hook imbedded in their hand past the barb, a doctor, not the leader, should remove the hook.)

Discuss whether or not the group will be harvesting or releasing the fish. MinnAqua encourages the practice of catch-and-release; however, instructors can choose to allow harvest as long as the proper handling (transportation, preparation, etc.), and good use (enough for a meal

and not tossed in the garbage) of the resource is practiced.

Spend a few minutes talking about any health risks associated with eating the fish that they may catch. Review the ways that they can reduce their risk by using the guidelines in the *Minnesota Health Advisory* booklet and *Which Fish Are Safe To Eat?* brochure.

Next discuss fishing etiquette and safety. Identify the safety equipment (water station, shade, throwable life cushion, and first aid kit) and adult in charge for the group. Show where these adults will be located during the fishing time. Talk about how a person that is in danger would be helped, and what the youth should do to make the rescue go smoothly. Your group should be taught to yell or scream the word “DANGER” to attract the attention of an adult during an emergency. The adults will then put their emergency action plan into progress, which includes calling 911 IMMEDIATELY. The life cushion and rope should be used for rescue by adults only.

Demonstrate to your group how to wear the various types of life jackets and how to check for proper fit. Point out that it’s important to use the right size life jacket for each person’s weight and size. You can use a volunteer to show how to fasten snaps and zippers, and to make sure they are pulled snug. You may wish to have a relay race to give the youths a chance to learn how to wear these items.

Let the group set safety and etiquette rules to follow during fishing. Be sure they suggest and agree to the rules as a group. Use *page 21 of the youth booklet* to help guide this discussion. Some of the rules should reinforce casting safety: staying a safe distance apart and looking all around you for other people, or avoiding overhanging trees and power lines when choosing a casting site.



- Q. Where are the First Aid Kit and the throwable cushion located?
A. *The location you have chosen.*
- Q. Name the types of fish you may expect to catch with specific baits, and the regulations that apply to those fish. (You can break this down to many short questions.)
A. Will vary with species (*see Minnesota Fishing Regulations*).
- Q. Name some things you should do before you go fishing.
A. *Tell someone where I’m going;* see if an adult or older person will go with me; practice safe bicycling or bus skills; pick an area where there are lots of people during the day; get all my equipment together.



- Do *Fishing. . . Get in the Habitat!* youth booklet activities pages 20 and 23.
- *Water safety classes* are offered for both youth and adults from a variety of agencies (DNR, American Red Cross, etc.) Encourage your participants to sign up for these classes and to bring a family member. You might also want to take this class as a group activity.

Fishing Time



Purpose: Everyone should demonstrate angler ethics and stewardship to the aquatic resource and its surroundings, and have a rewarding experience.

Level: All

Group Size: 3-25

Site: Outdoors at the shoreline fishing site

Time: 45-120 minutes

Supplies*: Measuring tape

First aid kit

5 gallon water jug with water and cups

Throwable life cushion with 50' of rope

Rigged spin-cast combos or pop cans

Bait containers with bait

Basic tackle box with hooks, sinkers, bobbers, pliers, and line cutters

Current Minnesota Fishing Regulations

Current Minnesota Fishing License (ages 16+)

Life jackets (optional)

Landing net (optional)

Stringers or pails with ice for keeping fish (optional)

Reference: Sport Fishing and Aquatic Resources Handbook, 14-30; Current Minnesota Fishing Regulations; and An Angler's Guide to Catch-and-Release brochure.

* Loaner materials available upon request (limited supply so reserve early)

Prior to the event, set up the first aid, drinking water, gear, bait, and other activities stations. (If you plan to harvest fish, set up a station to handle this process.)

Mark the fishing area boundaries, and direct groups to assigned areas. **Appoint one adult/junior volunteer to each group of five youth.** Hand out rods and reels. Every participant should practice the fishing safety and etiquette rules established earlier.

Give each adult/junior volunteer a bait container and small tackle box to take with them. Encourage children old enough to handle hooks to bait their own lines. Throughout the activity, reinforce fishing ethics, fish identification, and habitat/ecological concepts. Be sure to watch for youth who appear to be having difficulty. Have the group or yourself help these youth.

Not everyone will stay fascinated with fishing for the entire allotted time. **Consider setting up another area for alternate activities** (such as fish printing, pop can casting, etc.) and assigning an adult to staff this area. *Fishing... Get in the Habitat!* youth booklets can also be available at this station, along with a supply of crayons.

When participants catch a fish, let them talk about how they were successful, what type of bait worked, where they were fishing, etc. As a group, you can identify the fish. Handle the fish properly so it can be released and have a good chance at surviving. If you are planning to harvest fish, make sure you handle them appropriately to prevent spoilage, and prepare them in the proper manner for transportation.

Remember, however, that fishing (as with other youth activities) should be a win-win situation. The people who don't catch any fish should still have fun and learn. You can reinforce their success at casting, baiting a worm securely, identifying plants in the area, etc. Participants should be able to volunteer the one or two things that they think they do exceptionally well – you just need to agree and show support.



We're going fishing. The shore fishing experience will be a major highlight of the summer. For some, it also might be their first time fishing. Keep this in mind. Some people may find things difficult that you think are simple – for instance, baiting a hook with a worm.

At the end of the activity, the rods and reels should be returned. Remove the bobber and fasten the hook around the lowest guide before reeling in the line and putting them away. And remember stewardship – leave the shoreline in better condition than when you came. Youths should pick up the litter in their area.

Reassemble the group. If you haven't already done so, hand out *Fishing . . . Get in the Habitat!* youth booklets to everyone. Participants also receive a *MinnAqua KidsKits*. Talk to them about other upcoming events that they might want to attend. Answer any questions (there must be a few by now). **Thank your group for coming.**

For Discussion

- Q. What are the specific forms of habitat for the fish you are trying to catch in this body of water?
 A. Will vary depending on location. *Examples:* Pumpkinseed eat worms, hide in vegetation, swim in schools, and need clear water.
- Q. Where was the best place for fishing (or appears to be the best place for fishing).
 A. Many times this place will be *near a dock or where there is visible vegetation* in the water.
- Q. Do you think you'll go fishing again? Why or why not?
 A. *Answers will vary widely.*

Other Ideas



- Do *Fishing . . . Get in the Habitat!* youth booklet activities pages 18-24.
- Talk to your group about setting up another event or starting a club. This time try fishing using only barbless hooks and include a fish cleaning and cooking station.
- You could also include a picture contest dramatizing the best (beauty) and worst (pollution) of fishing experiences. Encourage local businesses to put these pictures up in their windows.





Forms

Program Guidelines

Reference Material Sources

MINNAQUA



PROGRAM

MATERIAL REQUEST FORM

Fill out a **separate request form for each program**. Allow at least **four weeks for delivery** and processing. Supplies are limited so reserve early or call to confirm availability. **Materials and completed forms to be returned to the MinnAqua Program within a week after the event.** Not reporting or returning materials with unusual wear and tear are grounds for denial of future requests.

Name: _____

Address: _____

City/State/Zip: _____

Phone number: _____

Program Information

- ☐ Clinic (6 hrs/education) ☐ Event (1-5 hrs/education) ☐ Nibble (booths/fairs)
☐ Instructor Training

Date(s): _____ Time(s): _____

County: _____ Site: _____

Group/Agency Name: _____ Group Size: _____

Materials Ordered

- ☐ Life Vests (identify: _____)
☐ Empty MinnAqua Bags (# _____)
☐ MinnAqua Stickers (# _____)
☐ Fish Printing Kit
☐ Fishing for the "Helo-Waudley Pugfish" Kit
☐ Fishing Time Kit
☐ Form Return Kit
☐ KidsKit (# _____)
☐ Lake Game Kit
☐ MinnAqua Fishing Vests (# _____)

- ☐ Pop Can Casting Kit
☐ Rigging Spin-cast Kit
☐ Shoreline Safety Kit
☐ Tackling Your Tackle Box Kit
☐ Training Packets
☐ Water Habitats Kit
☐ Water Quality Kit
☐ Other Materials (identify): _____

Office Use Only

Date request received _____

Order filled by _____

Date sent/delivered _____

Order sent via ☐ mail ☐ UPS ☐ delivery

Person materials delivered/sent to _____

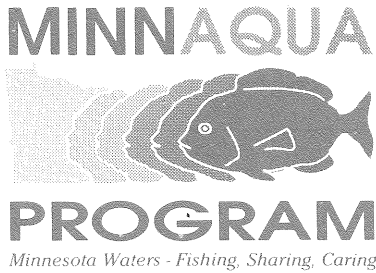
Date materials returned _____

Condition of materials when returned:

- ☐ need repairs (list) _____
☐ good ☐ needs replaced (list) _____

PROGRAM LIABILITY COVERAGE FORM

Have the organization (Boy Scout, YMCA, etc.) you are working with sign the following form. If you are not working with an agency or they do not have their own participant coverage for the program, contact a MinnAqua representative. Return this form to MinnAqua one week prior to the program.



Program Liability Release

Return to:
(Return Address)

(Group/Agency Name)

In consideration for participation in the MinnAqua Program to be held on _____, 19____, at _____ from _____ to _____ the undersigned authorized representative hereby states that liability coverage for participants will be provided by the undersigned organization's insurance.

In addition, the undersigned hereby agrees to indemnify and hold harmless the Minnesota Department of Natural Resources, Minnesota Extension Service, 4-H Youth Development; and all MinnAqua employees and volunteers from any and all losses, claims, liabilities, damages, or right of action arising directly or indirectly out of MinnAqua programming or the possession display, or use of MinnAqua equipment while facilitating an authorized MinnAqua Program for this agency or group.

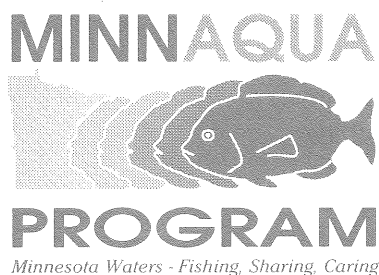
Signed: _____ Date: _____
Authorized Representative

Address: _____

Phone: _____

PARTICIPANT RELEASE FORM

In addition to Program Liability, this form must also be filled out prior to participation in an authorized MinnAqua Program. Participants who don't have a signed form should be restricted from participating in any site studies or fishing activities. **Return to MinnAqua immediately after program.**



Participant Release

Return to:
(Return Address)

Participant's Name: _____

As parent or legal guardian of the above named, I certify that said person has my permission to attend and participate in this MinnAqua Program on _____, 19____, at _____.
The event will run from approximately _____ to _____.

As a participant at this event, they agree to not willingly enter the water, balance on items in the water or hang on items overhanging the water. Fishing lures or line snagged in overhanging or submerged items that can not be easily freed by standing on the bank will be cut.

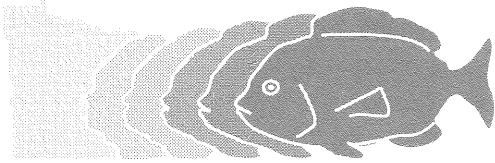
I voluntarily assume the risk of any injury regardless of severity, including death, and all risk of damage to or loss of property, which may be incurred due to negligence or accidental occurrences while said person participates in this MinnAqua Program.

In consideration of the opportunity to participate, I on behalf of myself, my agents, heirs and next-of-kin hereby release the University of Minnesota, Minnesota Extension Service 4-H, the State of Minnesota, Department of Natural Resources, other participants, hosts, sponsors, and all other official parties involved in the event (the "Group") from any responsibility or liability for personal injury, including death, and damage to or loss of property, that I or said person may incur due to negligence of the Group, myself, said person or others, or due to accidental occurrences while participating in this program.

I also hereby grant the sponsor and co-sponsors the unconditional right to use the name, voice, and photographic likeness of said person in connection with any of their audio/video productions, articles, or press releases, but not as an endorsement.

Signed: _____ Date: _____
(Signature of parent, guardian or participant of legal age)

MINNAQUA



PROGRAM

Minnesota Waters - Fishing, Sharing, Caring

Date:

Dear Parents or Guardians:

Greetings. You or your child has expressed an interest in attending a MinnAqua Program. The goal of this program is to get people excited about the aquatic environment by giving them a "hands-on" fishing experience. Trained volunteers or staff will be teaching the group about fishing gear, rules, stewardship, management, aquatic ecology, ethics, and safety.

This program has opportunities to go fishing, practice casting, and do other outdoor activities. Therefore, it is important that everyone come dressed for the weather, including a hat and sun screen. MinnAqua will provide any other needed equipment or materials.

Please fill out the form on the back side of this sheet to grant permission to participate in this MinnAqua Program. Bring the signed form to the event or mail it to the address below. A photo release is included so that we may use pictures from the event to promote the program.

If you or your child has any special needs (medical, life jacket request, etc.) that we should be aware of, we would appreciate a call or a note prior to the program.

We look forward to an exciting time. Those interested in joining us are also welcome. If you have any questions, please contact me.

Sincerely,

MINNAQUA



PROGRAM

PROGRAM PLANNING OUTLINE

MinnAqua Event
Duration: 1 Hour; No fishing

Date/Location: _____

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and Collect Participant Releases	_____
_____	5 min.	Welcome and Introductions	_____
_____	20 min.	An Activity from Chapters 1-4	_____
_____	_____	_____	_____
_____	10 min.	Fish Identification	_____
_____	20 min.	An Activity from Chapter 5	_____
_____	_____	_____	_____
_____	5 min.	At The Water's Edge	_____
_____	5 min.	Clean up, Hand out " KidsKit ", and Closing	_____

MINNAQUA



PROGRAM

MinnAqua Event
Duration: 2 Hours

Date/Location: _____

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up, Go Over Safety Plan and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and Collect Participant Releases	_____
_____	5 min.	Welcome and Introductions	_____
_____	20 min.	An Activity from Chapters 1-4	_____
_____	_____	_____	_____
_____	5 min.	Break	_____
_____	15 min.	Fish Identification	_____
_____	20 min.	An Activity from Chapter 5	_____
_____	_____	_____	_____
_____	5 min.	Break	_____
_____	10 min.	At The Water's Edge	_____
_____	45 min.	Fishing Time	_____
_____	5 min.	Clean up, Hand out " KidsKit ", and Closing	_____



PROGRAM PLANNING OUTLINE

MinnAqua Event
Duration: 3 Hours

Date/Location: _____

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up, Go Over Safety Plan and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and Collect Participant Releases	_____
_____	5 min.	Welcome and Introductions	_____
_____	20 min.	An Activity from Chapters 1-2	_____
_____		_____	_____
_____	5 min.	Break	_____
_____	15 min.	Fish Identification	_____
_____	20 min.	An Activity from Chapters 3-4	_____
_____		_____	_____
_____	5 min.	Break	_____
_____	35 min.	An Activity from Chapter 5	_____
_____		_____	_____
_____	10 min.	At The Water's Edge	_____
_____	60 min.	Fishing Time	_____
_____	10 min.	Clean up, Hand out " KidsKit ", and Closing	_____

Notes: _____

MINNAQUA



PROGRAM

PROGRAM PLANNING OUTLINE

MinnAqua Event

Duration: 4 Hours

Date/Location: _____

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up, Go Over Safety Plan and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and Collect Participant Releases	_____
_____	5 min.	Welcome and Introductions	_____
_____	20 min.	An Activity from Chapters 1-2	_____
_____		_____	_____
_____	5 min.	Break	_____
_____	15 min.	Fish Identification	_____
_____	25 min.	An Activity from Chapter 3	_____
_____		_____	_____
_____	10 min.	Break	_____
_____	25 min.	An Activity from Chapter 4	_____
_____		_____	_____
_____	5 min.	Break	_____
_____	30 min.	An Activity from Chapter 5	_____
_____		_____	_____
_____	15 min.	At the Water's Edge	_____
_____	80 min.	Fishing Time	_____
_____	10 min.	Clean up, Hand out " KidsKit ", and Closing	_____

Notes: _____

MINNAQUA



PROGRAM

PROGRAM PLANNING OUTLINE

MinnAqua Event

Duration: 1 Day

Date/Location: _____

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up, Go Over Safety Plan and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and Collect Participant Release	_____
_____	5 min.	Welcome and Introductions	_____
_____	30 min.	An Activity from Chapter 1	_____
_____		_____	_____
_____	5 min.	Break	_____
_____	15 min.	Fish Identification	_____
_____		_____	_____
_____	25 min.	An Activity from Chapter 2	_____
_____		_____	_____
_____	10 min.	Break	_____
_____	40 min.	An Activity from Chapter 3	_____
_____		_____	_____
_____	5 min.	Break	_____
_____	35 min.	An Activity from Chapter 4	_____
_____		_____	_____
_____	30 min.	Lunch (Participant provides own)	_____
_____	40 min.	An Activity from Chapter 5	_____
_____		_____	_____
_____	10 min.	Break	_____
_____	20 min.	At The Water's Edge	_____
_____	90 min.	Fishing Time	_____
_____	15 min.	Clean up, Hand out " KidsKit ", and Closing	_____

Notes: _____

MINNAQUA



PROGRAM

PROGRAM PLANNING OUTLINE

MinnAqua Event

Duration: 2 Days; 3 Hours per Day

Date/Location: _____

DAY ONE

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and Collect Participant Release	_____
_____	5 min.	Welcome and Introductions	_____
_____	30 min.	An Activity from Chapter 1	_____
_____	_____	_____	_____
_____	5 min.	Break	_____
_____	15 min.	Fish Identification	_____
_____	25 min.	An Activity from Chapter 2	_____
_____	_____	_____	_____
_____	5 min.	Break	_____
_____	40 min.	An Activity from Chapter 3	_____
_____	_____	_____	_____
_____	5 min.	Break	_____
_____	35 min.	An Activity from Chapter 4	_____
_____	_____	_____	_____
_____	10 min.	Clean up, Hand out Participant Releases, Wrap up	_____

DAY TWO

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up, Go Over Safety Plan and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and collect Participant Release	_____
_____	10 min.	Welcome & Review Previous Chapters	_____
_____	40 min.	An Activity from Chapter 5	_____
_____	_____	_____	_____
_____	15 min.	At the Water's Edge	_____
_____	90 min.	Fishing Time	_____
_____	20 min.	Clean up, Hand out " KidsKit ", and Closing	_____

MINNAQUA



PROGRAM

PROGRAM PLANNING OUTLINE

MinnAqua Event

Duration: 3 Days; 2 Hours per Day

Date/Location: _____

DAY ONE

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up and Prep Adult/Junior Volunteers	_____
_____	10 min.	Sign in on Roster and Collect Participant Release	_____
_____	5 min.	Welcome and Introductions	_____
_____	30 min.	An Activity from Chapter 1	_____
_____	_____	_____	_____
_____	5 min.	Break	_____
_____	15 min.	Fish Identification	_____
_____	25 min.	An Activity from Chapter 2	_____
_____	_____	_____	_____
_____	5 min.	Break	_____
_____	30 min.	An Activity from Chapter 3	_____
_____	_____	_____	_____
_____	5 min.	Clean up and Wrap up	_____

DAY TWO

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up and Prep Adult/Junior Volunteers	_____
_____	10 min.	Take Attendance (add new names to Roster)	_____
_____	5 min.	Welcome & Review Previous Chapters	_____
_____	40 min.	An Activity from Chapter 4	_____
_____	_____	_____	_____
_____	10 min.	Break	_____
_____	50 min.	An Activity from Chapter 5	_____
_____	_____	_____	_____
_____	10 min.	Clean up, Hand out Participant Releases , and Wrap up	_____

DAY THREE

<u>Time</u>	<u>Duration</u>	<u>Activity</u>	<u>Materials/Cues</u>
_____	30 min.	Set up, Go Over Safety Plan and Prep Adult/Junior Volunteers	_____
_____	10 min.	Take Attendance and Collect Participant Release	_____
_____	5 min.	Welcome & Review Previous Chapters	_____
_____	20 min.	At the Water's Edge	_____
_____	80 min.	Fishing Time	_____
_____	15 min.	Clean up, Hand out " KidsKit ", and Closing	_____

SAFETY AND SITE EVALUATION FORM

Site information may already be available from your MinnAqua contact. **Return form to MinnAqua immediately after event.**

Date: _____ Site: _____

County: _____ Time: _____ Nearest Town: _____

Instructor: _____

Safety Plan

Closest Telephone: ☐ Pay ☐ Private ☐ Directions: _____

Emergency #: _____ Hospital #: _____

Safety Equipment Check List:

- | | |
|--|---|
| <input type="checkbox"/> First Aid Kit | <input type="checkbox"/> Fire Extinguisher (if cooking) |
| <input type="checkbox"/> Throwable PFD with Rope | <input type="checkbox"/> Drinking Water |

Volunteer Roles During Emergency:

Stays with hurt youth: _____

Calls for help: _____

Stays with group: _____

If anyone is hurt at an authorized MinnAqua Program the Instructor must call their MinnAqua contact within 24 hrs. to fill out appropriate forms. Certified volunteers are covered under workman's compensation; all others depend on who is covering the program liability.

Site Information (check all those that apply)

Access: ☐ Shoreline ☐ Pier ☐ Ramp ☐ Private ☐ Public

- | | |
|---|-----------------------------------|
| <input type="checkbox"/> Electricity | |
| <input type="checkbox"/> Indoor Facilities | <input type="checkbox"/> Shelters |
| <input type="checkbox"/> Bathrooms | <input type="checkbox"/> Parking |
| <input type="checkbox"/> Drinking Water Available | <input type="checkbox"/> Tables |

☐ Handicapped Accessible (identify): _____

☐ On Bus Route (identify): _____

☐ Safety Hazards to Avoid: _____

☐ Fees (identify): _____

Best Fishing For: _____

Seasonal Changes (plant growth, special regulations): _____

Comments: _____

Return to:
(Return Address)

PROGRAM ROSTER

Return form to MinnAqua immediately after program.

Date(s): _____ Time(s): _____ Site: _____ County: _____
 Agency/Group: _____ Address: _____
 Group Contact: _____ Phone: _____
 Program Leader: _____ Address/Phone: _____ Hours Donated: _____

Event Information

☐ Instructor Training ☐ Helper Training ☐ Clinic ☐ Sponsor Activity ☐ Event ☐ Nibble
 Program Length (Hrs.): _____ Certification Date (Trainings only): _____
 Group Interested in Another Program (when): _____

Participant Summary Log

Total #: _____ Gender Breakdown [% or #]: _____ F _____ M
 Age Range [% or #]: _____ 0-8 _____ 9-15 _____ 16-20 _____ 21-64 _____ Over 65
 Race Breakdown [% or #]: _____ AA _____ BL _____ C _____ H _____ NA _____ Unknown
 Disability Breakdown [% or #]: _____ E _____ H _____ M _____ MU _____ S

Donations

Company/person	Item Description	Number Received	Retail Price
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

Comments:



Return to:
 (Return Address)

CODES Gender: F=Female M=Male Age: A=(0-8) B=(9-15) C=(16-20) D=(21-64) E=(Over 64) Ethnic: AA=Asian American BL=African American C=Caucasian H=Hispanic NA=Native American O=Other
 Disability: E=Emotional H=Hearing M=Motor MU=Multiple S=Sight

Date _____

Site _____

County _____

PROGRAM ROSTER CHECK-IN

Volunteers	Name/address	Time Donated
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____

FILL IN FOR TRAININGS AND CLINICS (also Events with less than 30 participants)

Participant Parent/Guardian	Address/Phone #	Answers Optional				Class			Got Cert.
		Gender	Age	Ethnic	Disability	#1	#2	#3	
<i>EXAMPLE:</i> Sally Jones Tim Smith (Grandpa)	1400 E. Fish Lane, St. Paul, 55108, 646-3300	F	B	NA	—	√	√	√	Yes 8-6-92
1. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____

CODES Gender: F=Female M=Male Age: A=(0-8) B=(9-15) C=(16-20) D=(21-64) E=(Over 64) Ethnic: AA=Asian American BL=African American C=Caucasian H=Hispanic NA=Native American O=Other
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Return to MinnAqua Program

Date _____

Site _____

County _____

PROGRAM ROSTER CHECK-IN

	Participant Parent/Guardian	Address/Phone #	Gender	Answers Optional				Class			Got Cert.
				Age	Ethnic	Disability	#1	#2	#3		
EXAMPLE:	Sally Jones Tim Smith (Grandpa)	1400 E. Fish Lane, St. Paul, 55108, 646-3300	F	B	NA	-	√	√	√	Yes 8-6-92	
1.											
2.											
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7.											
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11.											
12.											
13.											
14.											
15.											

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Return to MinnAqua Program

PROGRAM GUIDELINES

Volunteer Requirements and Expectations

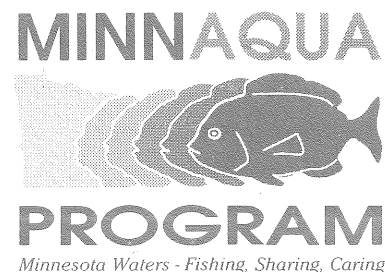
1. Volunteer Instructors and Helpers are required to go through and pass a screening process and training.
2. Volunteers are required to sign a job description that outlines duties and commitment of hours to be donated to the program.
3. Volunteers must have a current fishing license (16 years of age and over) when participating in any activity defined as fishing in the Minnesota fishing regulations.
4. Volunteers must have no conservation convictions in the past two years.
5. Volunteers must be willing to take responsibility for projects (assignments based on interest and/or expertise) under the direction of program personnel.
6. Volunteers must be committed to the programs goals and objectives.
7. Volunteers will be punctual and dependable and carry out duties courteously.
8. Volunteers will notify appropriate personnel if unable to fulfill commitments.
9. Volunteers will use equipment only for authorized activities.
10. Volunteers will maintain a professional attitude before, during, and after all activities and be available to assist or evaluate other volunteers.
11. Volunteers will refrain from smoking or chewing tobacco; use of profanities, obscenities, and other unbecoming language; and the use of alcoholic beverages and non-prescribed drugs during scheduled activities.
12. Volunteers must maintain and submit accurate records in a timely manner
13. Volunteers must return equipment and materials promptly and in good condition.

Program

1. Programs are to consist of group activities that are conducted from shore.
2. Water safety will be taught and practiced at every program; this includes having a safety plan, first aid kit, drinking water, and PFD on site and ready for use.
3. When working with food items use common sense and follow all food protection principles (refrigeration, wash hands, dean cups, etc.).
4. Loaner materials are available only to certified Volunteer Instructors.
5. Any accidents should be reported within 24 hours to your MinnAqua contact.
6. Program and Participant Releases are needed for all MinnAqua events, especially water related activities.

Record Keeping

1. Track all time put into a program. Examples include: travel time to and from trainings and programs; time spent (before, during, and after) on any activities associated with the program.
2. Fill out and return all appropriate forms to your local MinnAqua contact or the main offices within a week after each event.
3. Provide any local news coverage or articles to your MinnAqua contact for inclusion in the program file.





REFERENCE MATERIAL SOURCES

A Citizens' Guide to Lake Protection booklet – MN Pollution Control Agency and Freshwater Foundation (2500 Shadywood Road, Box 90, Navarre, MN 55392).

A Lake is a Reflection of Its Watershed poster – U of M Agricultural Extension Service and MN Pollution Control Agency (520 Lafayette Road, St. Paul, MN 55155).

An Angler's Guide to Catch-and-Release brochure – MN Department of Natural Resources Section of Fisheries (500 Lafayette Road, Box 12, St. Paul, MN 55155).

Conservation and the Water Cycle poster – Soil Conservation Service and U.S. Department of Agriculture.

Don't Let These Invaders Hijack Your Boat! poster – MinnAqua Program.

Fish Identification Reference List – MinnAqua Program.

Fishing . . . Get in the Habitat! youth booklet – MinnAqua Program.

Fishing Piers Statewide map – MN Department of Natural Resources Trails and Waterways (500 Lafayette Rd., St. Paul, MN 55155).

Getting Started In Fishing sheet – AFTMA (2625 Clearbrook Drive, Arlington Heights, IL 60005).

Habits and Habitats of Fishes in the Upper Mississippi River booklet – U.S. Fish and Wildlife Service (National Fishery Research Laboratory, P.O. Box 818, La Crosse, WI 54602).

How to Select Lure Colors for Successful Fishing sheet – MN Extension Service (1420 Eckles Avenue, St. Paul, MN 55108).

Hypothermia . . . The Cold Facts brochure – MN Department of Natural Resources Boat and Water Safety (500 Lafayette Road, St. Paul, MN 55155).

Managing Minnesota's Fish booklet – MN Department of Natural Resources Section of Fisheries (500 Lafayette Road, Box 12, St. Paul, MN 55155).

Minnesota Fish Consumption Advisory booklet – MN Department of Health phone: 612/627-5046.

Minnesota Fishing Regulations – MN Department of Natural Resources or most stores that sell fishing tackle.

Recommended Minimum Ice Thickness card MN Department of Natural Resources Boat and Water Safety (500 Lafayette Road, St. Paul, MN 55155).

Think Safe Choose the Right Personal Flotation Device brochure – Stearns Manufacturing Company (P.O. Box 1498, St. Cloud, MN 56302).

Turn In Poachers brochure – MN Department of Natural Resources Division of Enforcement (500 Lafayette Road, St. Paul, MN 55155).

Sport Fishing and Aquatic Resources Handbook – MinnAqua Program.

Stop The Invaders poster – Bureau of Indian Affairs, Great Lakes Indian Fish and Wildlife Commission and 1854 Treaty Authority, and U.S. Fish & Wildlife Service (Ft. Snelling Federal Bldg., Twin Cities, MN 55111).

Welcome to the Wetlands poster U.S. Environmental Protection Agency (Region 5, 230 South Dearborn Street, Chicago, IL 60604).

Which Fish Are Safe To Eat brochure – MN Department of Health phone: 612/627-5046.

"Who Lives Here" and "Aquatic Roots" Project Wild Supplement – MN Department of Natural Resources Project Wild Program (500 Lafayette Road, Box 7, St. Paul, MN 55155).

Zebra Mussel WATCH card – The Great Lakes Sea Grant Network and MN Department of Natural Resources Ecological Services (500 Lafayette Road, St. Paul, MN 55155).

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