Martin O. Weddington Papers.

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Version 3
August 20, 2018

MinnAqua Leader's Guide Review Meeting

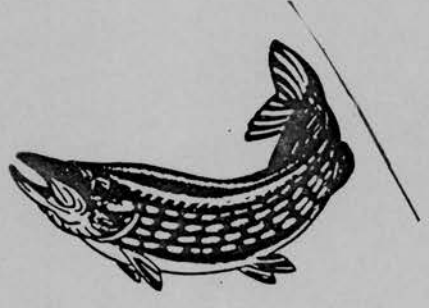
December 16, 1991

9:00	Welcome and Introductions
9:10	Leader's Guide Goal and Today's Strategies
9:20	Break into Chapter Groups

A. Chapter 1 & 2
B. Chapter 3 & 4
C. Chapter 5 & 6

(Break as needed)

12:00	Box Lunches
12:45	Return to Chapter Groups and Prepare a **MinnAqua** Clinic
2:15	Break & Layout Review
2:30	Large Group Processing with Chapter Groups' Reports
3:45	Individual Overall Evaluations
4:00	Adjournment



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MINNAQUA URBAN ANGLING PROGRAM
LEADERS' GUIDE

is sponsored by MinnAqua's Urban Angling Program, a cooperative educational effort between the Minnesota Department of Natural Resources, Section of Fisheries, and the Minnesota Extension Service, 4-H Youth Development.

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This material adheres to the seven goals of environmental education as stated in the 1990 Minnesota Environmental Education Act.

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MINNAQUA URBAN ANGLING PROGRAM
LEADERS' GUIDE

Materials adapted with permission of Missouri Department of Conservation, Minnesota 4-H Youth Development, Minnesota Extension Service, Project Wild/Project Aquatic, Sea Grant, and Ontario.

Funding for this project approved by the Minnesota Legislature (ML 1991, Chapter 254, Art. 1, Sec. 14, Subd.8C) as recommended by the Legislative Commission on Minnesota Resources from the Minnesota Environment and Natural Resources Trust Fund. Additional funding was provided by the Reinvest in Minnesota Program and federal Sportfishing Restoration funds.

Preparing For Your MinnAqua Clinic or Event

One Month Before
Identify your audience and site group of youths you'll be working with. It may be 4-H'ers, Neighborhood Houses, Girl Scouts, or other groups. Or you may hold an event with participants from a non-structured group, such as kids from the area or friends of your children.

Identify and evaluate the location of the clinic, site study, or event. Lakes, streams, and ponds with fish work the best. See Appendix B for more information.

Plan your event or clinic using the Program Planning Sheets (see Appendix C and D) and Chapters 1 through 7.

Order your materials and secure liability releases for your group (See Appendix A).

Two Weeks Before
Assemble the teaching materials you'll need (see "Materials You'll Need", chapters 1 through 7).

Identify other volunteers and helpers that you'll need to run the clinic or event (a good rule of thumb is one adult/junior volunteer per five kids at a water site; per ten kids in classroom).

Arrange for transportation for your group to and from the lake, stream, or pond. You can also arrange to meet everyone at the site, if you feel that the participants can get there on their own.

Solicit treats (juice, cookies, etc.) for your group from parents/volunteers. In events exceeding two hours, providing some form of energy to the participants is recommended. Kids get hungry and learn more on a full stomach!

At the Event
Organize your teaching materials and thoughts. Keep your Program Planning Sheet handy to use as your schedule.

Have participants sign-in (see Appendix E).

Welcome your group!

Go! Follow your Program Planning Sheet, but insert additional bathroom/get moving breaks as needed.

At the End
Collect equipment and clean up the site with help from the group.

Hand out MinnAqua KidsKits to participants.

Table of Contents

Program Planning Sheet Sample

Urban Angling Special Event
Duration: 3 Hours

TimeActivityMaterials Needed

5 minWelcome and Introductions
20 minPick one activity from Chapter 1
10 minFish Identification Chapter 2
20 minPick one activity from Chapter 3
15 minRegulation Review Chapter 4
10 minBREAK
20 minActivity from Chapter 5
10 minSafety and fishing regulation review
60 minFishing Time
10 minClosing and Cleanup

HABITATS AND ECOSYSTEMS - CHAPTER 1

Learner Outcomes:To define the four basic needs of habitat; to understand food webs; to show similarities between humans and other organisms; to understand that organisms are interdependent; and to comprehend that limited availability of these needs can impact survival.

Introduction

To understand some of the complex workings of our aquatic environments, we need to start with a sound base; an environmental literacy for our youth. This base of knowledge includes food webs and habitats. In this chapter you will teach participants about habitats that fish occupy and relate these basic needs back to their own environments.

Habitat Is Where You Find It

Food, water, cover, and space are the four basic needs of all living organisms--from bluegills to songbirds to humans. Each of these needs must be met to provide an organism with a flourishing habitat.

Food in a lake, pond, or stream can be limiting in many instances. For example, too may large fish which prey heavily on smaller fish may exist in a pond. Overfeeding can reduce the small fish food source to a critical level. Humans, also, are subject to limited food sources in some areas. In these areas, famine may result, and the population may move long distances in search of food.

Water, as you might have guessed, is critical to the survival of fish. Quantity alone won't ensure a thriving fish population. The quality of the water will determine what species can live in a given lake, pond, or stream. Water of a drinkable quality is also critical to the survival of human populations.

Cover occurs in the form of aquatic plants, rocks, fallen trees, and docks. Cover is important to all sizes of fish and each type of fish uses cover for different reasons. Small fish stay in cover to avoid being eaten while larger fish use cover as camouflage to ambush unexpecting prey. Cover is often limiting among human homeless groups. It is essential to all species.

Space is the last of the critical needs. The amount of space directly effects the amount of anything that can be contained. In a lake or stream that is small, only a limited number and limited size of fish can

be supported. Even large bodies of water have a carrying capacity. Carrying capacity is the amount of an organism that an area can support, based upon availability of habitat, without incurring damage to the organism or the area. Additionally, many animals have specific individual space needs. Humans don't thrive in places where their personal needs for space are not met.

FOOD WEBS

The sun is the source of energy for food webs. In an aquatic ecosystem, the sun provides energy for phytoplankton (a producer) to grow. In turn, small fish and insects (consumers) feed on this food source. These small fish and insects become food for larger fish (also consumers). Finally, organisms such as bacteria (decomposers) break down dead material into nutrients. These nutrients become part of the food web, and help fuel the producers.

SUGGESTED ILLUSTRATION OF A POND ECOSYSTEM WITH PARTS LABELED AS PRODUCER, CONSUMERS, DECOMPOSERS, ETC.

How does this food web spin away in a pond, or lake, or stream? The sun helps the phytoplankton grow, which is eaten by a minnow. The minnow is swallowed whole by the bluegill, which is then chased and eaten by a northern pike. The pike is dinner for a family of four. But wait! The pike also eats minnows, and the people also eat bluegill, and the bluegill might be hungry enough to eat the phytoplankton directly. Now we've got a web.

FISH HABITAT LAP SIT

Purpose:To be able to define habitat; to identify four basic needs of fish and other organisms; to be able to understand causes and effects within nature.

Level:Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 77-80. Fishing... Get in the Habitat!, pages 3,4,5. Wetland Poster, EPA.

Site:Indoors or outdoors

Time:15 to 20 minutes

Supplies:Basic Needs Cards (see master #1 on next page). Prior to the event, copy the master and cut out the Needs. You will also need tape or string to attach the card to the youth.

Group Size:4 to 30

Activity: All animals (and humans) share basic needs of habitat. These needs include food, cover, space, and water. To start this activity, ask 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 into placing their needs into the four broad categories, to arrive at the correct responses.

After answering food, cover, water, and space, hand out a Basic Needs Card to each participant. Try to end up with an equal number of each need. Form four groups, one for each need, and let them discuss briefly why their need is important to fish. Next, assemble the groups, and have each need share their importance. Point out any interrelationships between needs and the change of needs during the different seasons of the year.

To reinforce the information have the group form a circle, alternating youth who represent cover, space, etc. All should be standing shoulder to shoulder facing inward. The group should next turn to the right and take one large step toward the center. They should be close to one another, and each should be looking at the back of the person in front of them.

Tell them that you are a fish in a lake (in the middle of the circle) and they, as the four basic needs, must work together to keep you alive. To do that they must be successful on the next part of the activity.

Ask the youth to 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. Recite "shelter, space, water/oxygen, and food in proper balance are the four basic needs of fish."

If by this time the circle has been disrupted with someone falling, discuss how the balance of the ecosystem is dependent on all of it's parts.

Try the circle again, this time simulating a disruption of the needs.

For example, you might say "Pollution has affected the amount of oxygen available in the water. This need is no longer sufficient to support the types of fish present." Remove the water/oxygens, and watch the circle collapse. Try other variations.

Helpful Tips: Much of America was settled with habitat needs in mind. Early pioneers settled near water or where game (animals) were abundant for food. You might want to discuss the "historical habitat perspective" with your group. Ask them about their ancestors, and how they lived and filled their habitat needs.

Questions for Discussion:
If we take away plants from the environment, which habitat need are we influencing?
Answer: Cover--hiding places lost; Water/Oxygen--plants produce oxygen; Food-- plants are producers.

What are the four basic needs of people? Are any of them every affected by shortages?
Answer: Food, Water, Cover and Space. Yes (expand on each basic need).

Can you think of an example of a disrupted water habitat?
Answer: Try to select a local disrupted water habitat; an example may be a lake effected by the drought.

WATER HABITATS, A SITE STUDY

Purpose:To observe and identify common aquatic plants and animals and the type of habitat where they are found. To identify the four basic needs of fish.

Level:Intermediate

Reference:Pond Life, Golden Book Series. Sport Fishing and Aquatic Resources Handbook pages 77-79. Fishing...Get in the Habitat!, pages 4,5,10.

Site:Outdoors or Indoors (If indoors, leader will need to collect aquatic samples in an aquarium or bucket for the group beforehand)

Time:20 to 35 minutes

Supplies:ID book or ID Fact Sheet (see page); paper; pencils; clip

boards (or hard surface to write on); coffee can lids to use as study plates. Also, to make dip net, you will need: pantyhose (one leg for each person); plastic one or one-half gallon jug; waterproof glue, and a coat hanger. To make a bottom sampler, you will need a coffee can; a metal clippers (to cut a hole in the coffee can), and a small rope. To make a plant grapple, you will need .

Group size:3 to 25

Activity: Discovering and observing aquatic life can help participants understand the complexity of an aquatic environment. In this activity youth will discover aquatic life with the aid of basic sampling equipment.

When collecting plants and organisms, remember to practice stewardship of the environment. Don't let the group harvest fistfuls of plants; a single stem is enough. Frogs, fish, or other live organisms that are collected should be returned alive to the ecosystem.

This is a site study, which means it will take place at a body of water that you have identified, such as a river, lake, or pond. For this site study, you have the option of adapting the activity to an indoor setting; however, you will have to collect aquatic animal and plant samples before you can proceed.

Identify the following goals of the activity to the participants: to make a dip net, plant grapple, and bottom sampler; to collect aquatic life with a limited impact on the ecosystem; to draw these samples; to identify these samples; and finally to identify the habitat and where the collected item fits into the food web.

Your group can make a simple dip net, plant grapple, and bottom sampler indoors before going to the water or outdoors in a sheltered location. See the instructions below. This activity can be done individually by the participants or in groups of two to three who will share the nets.

ILLUSTRATION HOW TO MAKE AND USE THE DIP NET
ILLUSTRATION HOW TO MAKE AND USE THE PLANT GRAPPLE
ILLUSTRATION HOW TO MAKE AND USE THE BOTTOM SAMPLER

After your group has constructed their dip nets, plant grapples, and bottom samplers, divide them into groups of four to five to work together. Give them pencils, paper, and clip boards (or other hard surface to write on). Each group will then use their dip nets and bottom samplers to secure samples of three aquatic animals. Let them sift through the mud and muck that they bring up with the bottom sampler to find insects, larvae, and crayfish. The groups will then use the plant grapple to secure samples of two aquatic plants.

After they have collected their samples, they will then draw these items as accurately as they can with their pencils/paper. Using the ID Fact Sheet, or through group processing, let them identify the animals and plants they have found from their drawings. (In an indoor setting, they will draw and identify the items you have collected.)

To conclude, reassemble the large group and have them share their discoveries. Make sure that all items are correctly identified--if you can't agree to the specific specie of plant, insect, or animal, agree to the type--for example, an amphibian or fish; a tree or bush, etc.

As a group, try to create a food web with the drawings by arranging the pictures in the center of the group. Discuss the four basic needs that these organisms have.

Helpful Tips: Visit the site ahead of time and check for a safe study area. Get a lake survey for the lake you are on and compare the results of the participants findings with those of the Department of Natural Resources, Section of Fisheries.

Questions for Discussion:

What are the four basic needs of aquatic animals? Can you name some examples that you found?
Answer: Food, water, cover, and space (expand on each need); examples might include: food--worms; cover--lilypads; water--lake; space--frogs not found in groups together, they are spaced apart in their habitat.

Can you describe some needs you found that related to each other?
Answer: Example: plankton was food for small fish, but also provided an oxygen supply for the fish, and decomposing fish provided nutrients in the water for the plankton to grow.

How could scientists or other people use this collected data (information) to assist this lake, pond, or stream?
Answer: 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.

FOOD WEB TAG GAME

Purpose:To be able to understand the basic habitat needs of fish; to understand carrying capacity and predator/prey relationships; to understand concepts of food webs.

Level:Intermediate

Reference:Sport Fishing and Aquatic Resources Handbook, pages 77-80. Fishing... Get in the Habitat!, pages 4,5,7,11-14. Managing Minnesota's Fish: Brochure Series by MN DNR.

Site:Indoors or outdoors - outdoors preferred

Time:20 to 30 minutes

Supplies:3 - 4 gallons popcorn
pictures, as follows: 3 or more pictures of minnows; 3 or more pictures of "perch"; 3 or more pictures of "walleye", see master #2 (note: other fish can be substituted for perch and walleye to match the common species in your area)
sandwich bags
permanent marker
masking tape
hula hoops (2 or more)

Group Size:6 to 30

Activity: Food webs are the basic building blocks of life. All organisms are interrelated by their habitat needs and their dependence on each other's role in the food web.

By simulating a lake ecosystem, youth will be able to act out and observe a food web in action. Start by identifying 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 bags with permanent marker to indicate fill levels of the fish stomachs; the fill level of a minnow will be 1/3 of the bag, the level of the perch will be 2/3; and the level of the northern pike will be a full bag. Hula hoops thrown into the "lake" simulate cover and act as safe

bases for minnows and perch (5-10 second limit in the hoops).

Different distributions of lake species can be acted out. Start with a lake of all "minnows". On each participant's back, tape a picture of a minnow that identifies the person as a minnow. Then, have these minnows "feed" on the "plankton" by filling their bags (stomachs) with popcorn. Let the feeding occur for 1 year (about 3 minutes).

How many of them fill their bags to the necessary line? Now ask the youth how long they could continue to feed before they exhausted their supply of food. Do they need some sort of balance to the lake?

Introduce predators. Let some of the participants now become perch (feed on minnows and plankton). Be sure to put the sign on their backs. Some of the other youth will be northern pike (feed on minnows and perch). The predators need to "tag" their food source. If tagged, the captured fish empties their "stomach" contents into the "stomach" of the predator.

The tagged fish must leave the lake--they're dead. Have a few participants become decomposers (bacteria), they are responsible to remove the dead fish - decompose them. With small groups, you may want the dead fish to return to the water as a new fish of the same species.

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. If you had too many northern pike, you might have only these fish left. How long could they last without a food supply?

Play this game as many times as you like, with whatever mix you desire. For advanced youth, you may want to add an angler to the lake.

Helpful Tips: A large area for the lake is important to make this activity work correctly. An approximate ratio of 6 minnows/3 perch/1 northern pike will be balanced.

Questions For Discussion:

What would happen if the supply of plankton was reduced in a lake or pond?
Answer: A basic link in the food web would be lost, and the web would come apart, since there would be no source of food (energy) for the fish. Also, oxygen production would be decreased if there is a low percentage of plants in the lake.

What would happen if all the northern pike and most of the perch were fished out of the lake?
Answer: If the northern pike were fished out of the lake there would be no large predator in our lake for perch and then they would increase in numbers and deplete the minnows. If the perch were over fished, then the northern pike would be impacted because their major food source is gone. Their numbers would decrease or growth would be limited.

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?
Answer: (This will vary greatly) Examples--food might be limited, if the family is large or economies are tight and space might be limited, if personal needs for privacy are not met. Maybe our water supply is (or seems!) endless--just turn on the faucet.

Mussel Mania

Purpose:To describe factors that contribute to the carrying capacity of a habitat; to identify effects of zebra mussel invasion on an established community; and to provide reasons why zebra mussels are successful invaders.

Level:Advanced

Reference:Zebra Mussel Card, Department of Natural Resources. Fishing... Get in the Habitat!, pages 4,7,20. Sport Fishing and Aquatic Resources Handbook, pages 53,54,77-80. Stop the Invaders, poster.

Site:Outdoors or Indoors

Time:20 to 30 minutes

Supplies:Tape or chalk to mark circles; two hula hoops; several sheets of newspaper; pictures of: unionid clam, zebra mussel, perch, and algae

Group Size:10 to 25

Activity: To set the stage for the activity, discuss with the group the following information. All living things have basic needs for food, water, shelter, and space. A body of water has limits on how much of each of these items it can provide. The number of animals and plants

that can be supported in the habitat without causing harm is called the carrying capacity. Carrying capacity can vary from season to season or year to year, and can be affected by other variants.

In this activity, the carrying capacity of a lake community for native clams and perch is affected by the arrival of zebra mussels, a non-native organism. Native clams are called unionid clams. They live in muddy or sandy bottoms and feed upon small floating plants (plankton). Zebra mussels compete with clams for food and space. Although mussels can't live in the soft bottom like a clam, they attach directly to the hard surface of the clam, eventually smothering it.

Perch are an important fish that feed on plankton, so the zebra mussel competes directly for food. However, perch have many predators (larger fish) that feed on them, while the zebra mussel has no such predator, and can expand to the limit of its food supply.

To play mussel mania, mark off one or more (10 foot diameter) circles on the floor (can accommodate 20 to 25 players). In each circle, randomly place two hula hoops. Within these hula hoops, stick a small piece of masking tape to the floor. Crumble the newspaper into 100 tight balls.

Review or establish the four needs of habitat with the group. Indicate that students will try to meet their needs while being either a clam, perch, or zebra mussel.

Have the group assemble at 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 baby clams drift in the currents). Yell "Stop!". Everyone not standing in a hula hoop has to leave the circle. Explain that the clams' shelter needs is a muddy or sandy bottom, which is 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 stay. Others must leave.

Have the two surviving clams sit down on the piece of tape. They are now adult clams that can't swim. 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 youth as plankton movers--they are the currents moving the plankton into the area near the clams. Have them sit with their backs to the circle, and toss plankton (paper balls) at random over their shoulders into the circle to simulate plankton floating freely.

The clams must catch the plankton in the air to simulate feeding. Anything missed stays on the ground, since clams do not have hands to pick things up. (You could assign scavengers to pick up the plankton and return them to the movers).

Identify three perch and add them to the circle. Indicate that they are very young perch and eat plankton. They can move around the circle and try to catch plankton in the air, but they can't block off the clam. They can also feed from the bottom.

After a few minutes, add two walleye, which will eat the perch. The walleye run around the outside of the circle, reaching in and trying to tag (eat) the perch. Tagged perch must leave the circle. Perch must then avoid the walleye and catch food. As perch are eaten, add more at your discretion. Try to maintain at least one perch until the circle starts to get crowded and food to the perch is severely reduced.

Begin to add zebra mussels. Indicate that they can live on any hard surface, i.e., anywhere outside the hoops or loops, and feed the same way the clams do. Gradually add more mussels. As it gets crowded, indicate that since mussels can stick to each other, they can sit in the hoops or loops as long as they are touching another mussel outside the hoops. Be sure to remind students that clams are hard surfaces. Continue until all the clams are sat on, as well as some of the mussels.

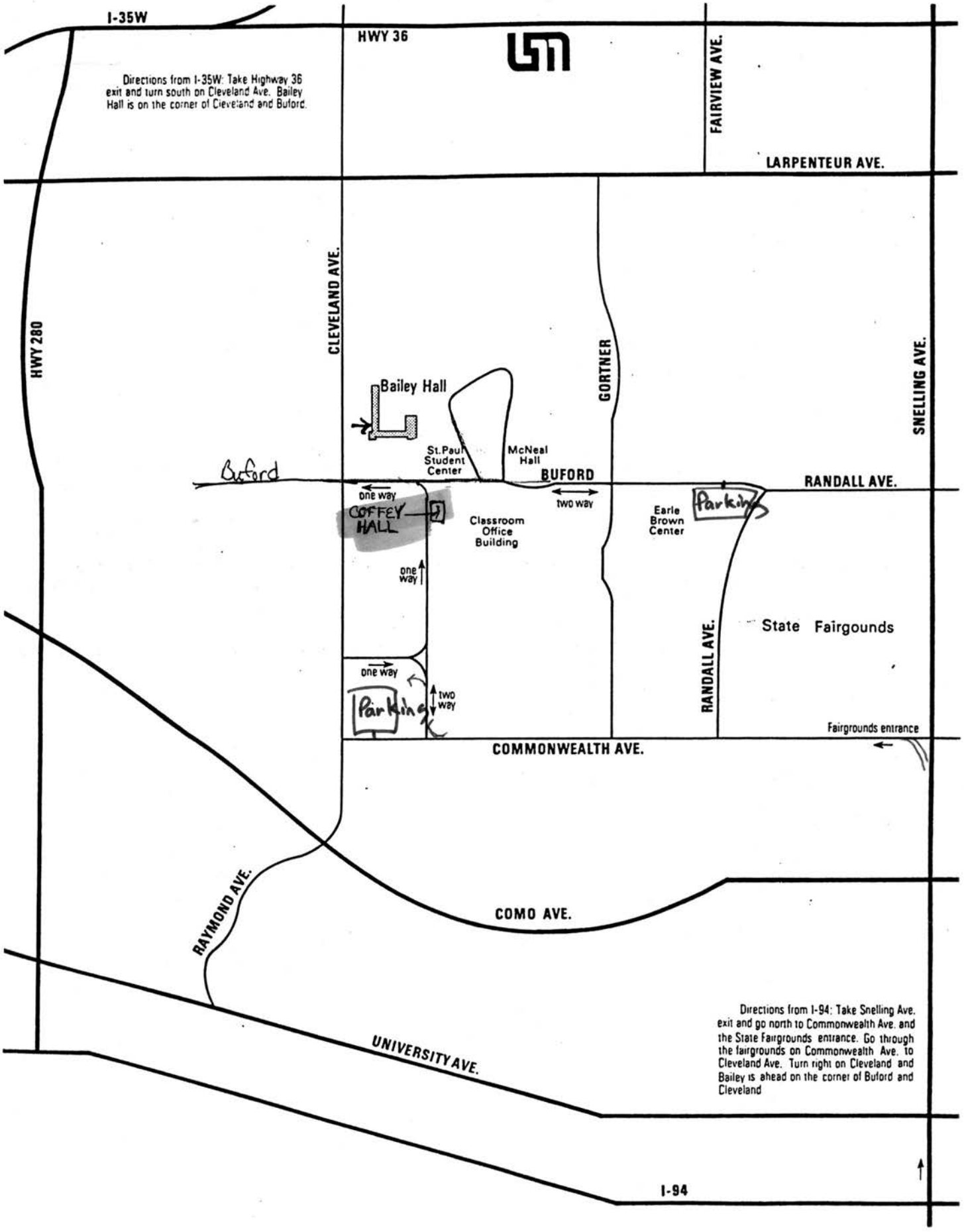
Discuss, from the fish and clams' points of view, what happened as more mussels were added. Did they continue to get as much food? Was it harder to get food? What did the perch have to put up with that the zebra mussels didn't? Were the clams getting anything at the end, or were they smothered? Did the mussels have to compete with anything else for space? Were any zebra mussels smothered? Did that mean there were fewer zebra mussels?

Helpful Tips:You might want to extent this activity by adding a decomposer, i.e., assign a person to "decompose" those perch that have been caught by walleye (not all of the perch would be eaten--some discard would need to be broken down by decomposers).

Questions for Discussion:

How could we have controlled the zebra mussels?
Answer: By not transporting them from other locations.

Do you think zebra mussels would be a problem near water treatment facilities (along water intake pipes--remember the surface)?
Answer: Yes, since they adhere to hard surfaces, they often will clog intake pipes. It costs thousands of dollars to have them removed, and they just build up again over a period of time.


I-35W
HWY 36
FAIRVIEW AVE.
LARPENTEUR AVE.
Directions from I-35W: Take Highway 36 exit and turn south on Cleveland Ave. Bailey Hall is on the corner of Cleveland and Buford.
HWY 280
CLEVELAND AVE.
GORTNER
SNELLING AVE.
Bailey Hall
St.Paul Student Center
McNeal Hall
Buford
BUFORD
RANDALL AVE.
one way
two way
COFFEY HALL
Classroom Office Building
Earle Brown Center
Parking
one way
State Fairgounds
RANDALL AVE.
one way
two way
Parking
Fairgrounds entrance
COMMONWEALTH AVE.
RAYMOND AVE.
COMO AVE.
Directions from I-94: Take Snelling Ave. exit and go north to Commonwealth Ave. and the State Fairgrounds entrance. Go through the fairgrounds on Commonwealth Ave. to Cleveland Ave. Turn right on Cleveland and Bailey is ahead on the corner of Buford and Cleveland
UNIVERSITY AVE.
I-94

MINNAQUA PROGRAM

Minnesota Waters - Fishing, Sharing, Caring

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4-H Youth Development
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December 6, 1991

Martin Weddington
714 West Central Avenue
St. Paul, Minnesota 55104

Dear Martin:

Thank you for setting aside the time to attend the review meeting on the **MinnAqua** Leader's Guide: **Fishing...Get in the Habitat!** The meeting will be on Monday, December 16, 1991, 9:00 a.m. to 4:00 p.m., Room 125, Coffey Hall, University of Minnesota St. Paul campus. Lunches will be provided. (See the enclosed map for directions.)

Also enclosed is a copy of the book. Please read it and bring your copy to the meeting. Note that the text is printed on both sides of the pages.

Some things that you might want to think about as you review this material:

- Are the activities clear and concise?
- Can you arrange activities using this format to create a clinic?
- Can you suggest types of illustrations and locations within the text?

We will be reviewing the text in small groups at the meeting.

Thanks again for participating in this review process. With your cooperative input, I feel confident that we will be able to provide a fun and educational aquatic environmental and recreational angling curriculum for the youth of Minnesota. Call me if you have any questions or comments. My phone number is 612-625-1291.

Sincerely,

Peter Jacobson
Aquatic Education Specialist

PJ:mte
Enclosures

revmtg

MINNESOTA FISH-CHAPTER 2

Learner Outcomes: To identify common Minnesota fish species; to understand individual fish species behaviors, habitat needs, and adaptations; and to find similarities between aquatic animals and humans.

Introduction

With the activities in the last chapter, you were able to introduce the concepts of habitat and food webs. Now you are ready to introduce directly some of the freshwater inhabitants of Minnesota's lakes, streams, rivers, and ponds. In this chapter, you will help youth identify and become familiar with fish species. You will also help them identify the habitat that a particular fish occupies, as well as some special adaptations that fish species have made to survive successfully and flourish.

From a Perch Eye's View

Why does a channel catfish have long "whiskers"? (Actually called barbels). Why does a walleye have "glassy" eyes? Why is a pumpkinseed so bright? How does a fish know that there are other fish in the area?

Youth have a natural curiosity about these special traits of fish and of other animals. Environmental education encourages this exploration of an environment--a "hands on" approach to learning deemed "experiential learning". Quite literally, youth need to meet their aquatic neighbors head-on. We are part of one world.

FISH IDENTIFICATION

Purpose:To be able to identify common Minnesota fish species; to become familiar with fish biology; and to understand individual species behaviors and adaptations.

Level:Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 61-65, 77-85. Managing Minnesota's Fish: Brochure Series by MN DNR. Fishing... Get in the Habitat!, pages 11-14, 22.

Site:Indoor or Outdoors

Time:10 to 15 minutes

Supplies:Pictures of fish species including: pumpkinseed, walleye, bluegill, rainbow trout, lake trout, muskie, smallmouth bass, largemouth bass, channel catfish, black and white crappie, and perch (or Fish Identification Cards--see Appendix)

Group Size:3-25

Activity:How does a black crappie differ from a white crappie? How can you tell the difference between a rainbow and a brook trout? Being able to identify and distinguish fish species is key to understanding fishing regulations and fish habitat preferences.

In this activity you will need photos of fish found in Minnesota. You will also use the fish key found on page to identify these fish.

Begin by handing out a fish key to all those present. Keys help unlock the identify of a fish species by giving you choices based on traits of the fish. Each time you make a choice, you advance one step closer to learning a fish's identify. Traits to identify on a fish include: shape, mouth type and locations, and color patterns. Learning to identify animal (or plant) species through keys helps youth examine and process information more expertly than by rote memorization.

Begin with your first photo of a fish. Demonstrate how to use the key with this photo, working step by step to reach the correct identification. Working individually or in small groups, the participants should then key the next photo. They should identify all the available photos using the key.

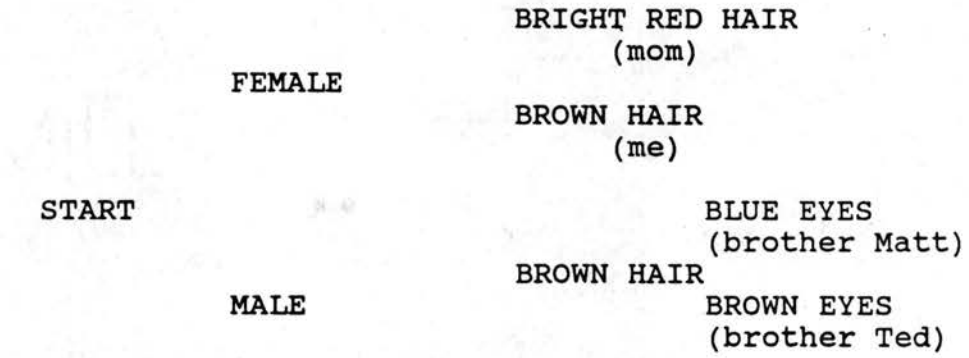
Reinforce any similarities or differences in the physical characteristics of fish. Fish in the same family (i.e., northern pike and muskie) will often have similar traits, just like members of a human family. Use the information cards to supplement and further describe each fish. Try to describe habitat and any adaptations that each particular species has to its' surroundings--the information cards will provide some insight here as well. Examples include:

Lake Trout:The lake trout is a grey/green fish with pale spots. It has a torpedo shape that helps it move swiftly through lakes, chasing prey.

Pumpkinseed:The pumpkinseed is a brightly-colored fish, primarily orange and yellow. The gill cover is black with a edging of bright red. The mouths of the bluegill and pumpkinseed are the shape and size of an "o", since they feed mainly on small aquatic insects and invertebrates. These fish live among or close to heavy beds of aquatic plants. These small young panfish are prey for many predators, primarily the largemouth bass.

Continue until you have shown, described, and reinforced this introduction to fish identification and keys.

Helpful Tips:Participants could also make a family key. It might look like this:



Questions for Discussion:

Pick a fish species and tell what it needs for cover, food, space, and water (oxygen).
Answer:This will vary, depending upon the fish species chosen.

What type of bait might you use to catch the fish you choose in the above question? Where might you catch this fish?
Answer:Again, this will vary. Bait should resemble a natural food source or mimic a prey's movement. The area to catch this fish would include its cover locations, such as near an overhanging branch along the bank of a river, weedbed, etc.

Name some ways that you are especially adapted to your environment.
Answer:This response will also vary. Be sure to let the participants have time to tell their own stories about how they adapt to the demands of their environment.

Identifying Characteristics and Habitats of Common

Minnesota Fish Information Cards

LAKE TROUT
SHAPE:Torpedo
SIZE:20" - Forked tail
COLOR:Grey, green, or olive background with pale spots
MOUTH:Medium size
FOOD:Small fish, insects, freshwater shrimp
HABITAT:Cold, deep, clear water

RAINBOW TROUT
SHAPE:Torpedo
SIZE:16" - Lake, 10" - Stream
COLOR:Silver background, small black spots, light rainbow strip along the sides
MOUTH:Medium size
FOOD:Small fish, insects
HABITAT:Cold, deep, clear water; cold streams

BROWN TROUT
SHAPE:Torpedo
SIZE:16" - Lake, 10" - Stream
COLOR:Olive, brown background, small x-shape dark spots with a few red spots
MOUTH:Medium size
FOOD:Small fish, insects
HABITAT:Cold, deep, clear waters

BROOK TROUT
SHAPE:Torpedo
SIZE:12" - Lake, 9" - Stream
COLOR:Dark green background, leading edge of low fin is white, back has worm-like marks, pale spots on the side
MOUTH:Medium size
FOOD:Small fish, insects
HABITAT:Cold, deep, clear waters

WALLEYE
SHAPE:Torpedo
SIZE:15"
COLOR:Dark green or black back, golden or olive side, black mark on rear of dorsal fin, white mark on lower lobe of tail
MOUTH:Medium size, medium canine teeth
FOOD:Yellow perch and small fish, minnows
HABITAT:Lakes and rivers, rock, gravel, mud, aquatic plant beds

YELLOW PERCH
SHAPE:Stocky, torpedo
SIZE:8"
COLOR:Golden or brassy yellow with 6-9 black

vertical bars on the side
MOUTH:Small
FOOD:Small fish, minnows, and invertebrates
HABITAT:Lakes and rivers; rock, gravel, mud, aquatic plant beds

WHITE CRAPPIE
SHAPE:Plate shape
SIZE:9"
COLOR:White background, with light black and vertical stripes, 5-6 spiny dorsal fins
MOUTH:Small/medium, "paper like" skin around mouth
FOOD:Small invertebrates and minnows
HABITAT:Open water in schools, fallen trees

BLACK CRAPPIE
SHAPE:Plate shape
SIZE:9"
COLOR:White background, black spots overall, 7-8 spiny dorsal fins
MOUTH:Small/medium, "paper like" skin around mouth
FOOD:Small invertebrates and minnows
HABITAT:Open water in schools, fallen trees

BLUEGILL
SHAPE:Plate shape
SIZE:6"
COLOR:Light to dark olive, purplish tinge; orange to blue belly, ear flap is black
MOUTH:Small "O" shape
FOOD:Small invertebrates and insects
HABITAT:Heavy aquatic plant beds to open water

PUMPKIN SEED
SHAPE:Plate shape
SIZE:6"
COLOR:Golden to orange with some blue barring, ear flap is a bright orange
MOUTH:Small "O" shape
FOOD:Small invertebrates and insects, feeds heavily on snails
HABITAT:Heavy aquatic plant beds to open water

WHITE BASS
SHAPE:Plate shape with separated dorsal fin, forked tail
SIZE:10"
COLOR:White to silver with 7 horizontal stripes
MOUTH:Small/medium
FOOD:Aquatic insects, small fish, gizzard shad
HABITAT:Open water, often near the surface

LARGEMOUTH BASS

SHAPE:Shoe box-shape with separated dorsal fin
SIZE:12"
COLOR:Dark green on top with silvery/yellow green side and a white belly, dark stripe along side
MOUTH:Upper jaw extends rearward beyond the eye when mouth is closed
FOOD:Small fish, yellow perch, bluegills, minnow, invertebrates like crayfish
HABITAT:Shallow to intermediate waters in or along aquatic plants

SMALLMOUTH BASS
SHAPE:Shoe box-shape with separated dorsal fin
SIZE:14"
COLOR:Brassy brown,vertical bars, grey cream belly
MOUTH:Upper jaw extends rearward even with the eye when mouth is closed
FOOD:Crayfish, small fish, invertebrates
HABITAT:Near rocks in rivers and lakes

NORTHERN PIKE
SHAPE:Long, torpedo shape
SIZE:18"
COLOR:Dark green back, lighter green side with many white spots, white belly
MOUTH:Duck bill type with many canine teeth
FOOD:Small to medium size fish
HABITAT:In or along aquatic plant beds

MUSKIES
SHAPE:Long, torpedo shape
SIZE:30" average
COLOR:Bronze to green back, light background with dark spots
MOUTH:Duck bill type with many canine teeth
FOOD:Small to medium fish
HABITAT:Aquatic plant beds

BULLHEAD (ALL)
SHAPE:No scales, a fin
SIZE:9"
COLOR:Dark brown/black back with lighter sides, yellow to white belly
MOUTH:Wide, flat
FOOD:Invertebrates, vegetation, small fish
HABITAT:Bottom, aquatic vegetation or mud

FLATHEAD CATFISH
SHAPE:No scales, barbels, squared off tail
SIZE:20"
COLOR:Dark brown/grey back, brownish mottled sides
MOUTH:Wide, flat
FOOD:Fish
HABITAT:Deep river poles, deep cover (i.e., log

jams)

CHANNEL CATFISH
SHAPE:No scales, barbels, forked tail
SIZE:14"
COLOR:Steel grey and peppered dark spots
MOUTH:Wide, flat
FOOD:Small fish, crayfish, insects, snails
HABITAT:Deep river poles, deep cover (i.e., log jams)

FISH PRINTING

Purpose:To handle fish and become comfortable with texture; to reinforce fish identification and function of external parts; and to demonstrate physical similarities between fish and humans.

Level:Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 61-65, 77-85. Managing Minnesota's Fish: Brochure Series by MN DNR. Fishing... Get in the Habitat!, pages 11-14, 22.

Site:Outdoors or indoors (sheltered from wind)

Time:25 to 35 minutes

Supplies:Whole cold fish (not frozen, not live), paintbrushes for all participants, tempura paint, assorted colors of art paper, newspaper, cloth or other material to imprint, fish identification posters/pictures (for reinforcement of identification concepts)

Group Size:2 to 25

Activity:Some youth (and adults) have not had a great deal of exposure to the natural world. When they close their eyes and imagine water worlds, they might conjure up cold, slithery creatures in dark depths. Youth (and adults!) can benefit from seeing, touching, and exploring fish and environments. In this activity, they'll have a chance to use their creative abilities to make fish paintings (without having to teach the fish to paint!).

The outcomes of this activity require handling fish and exploring fish anatomy, similar to a biology

class's use of frogs to explore animal structure. This activity will not work with live fish. Part of environmental education includes assigning values to natural resources, such as fish. This activity has assigned an educational value to the fish used here.

In this activity, participants will handle fish. To begin, set students at tables covered with newspaper, giving them enough room to paint freely. Set out materials, including tempura, paintbrushes, etc. Next, give each student a cold fish (or let them pick their own). Initially, many participants 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.

Each person should now dry their fish gently with paper towels. Using a flat, wide brush, they should evenly stroke paint over the fish (spreading fins to paint all parts). Next, have the group place a sheet of art paper on top of their fish. They should press down on the paper, being careful to touch all fish parts while keeping the paper from slipping. Everyone is now ready to slowly lift their paper and view their work of art! The fish can be used again for more fish printing.

As the group is fish printing, be sure to reinforce the fish identification and external parts of the fish.

Helpful Tips:The second print of a fish is sometimes more artistic than the first--don't reapply paint in between prints. To reinforce external parts have the participants paint each part a different color.

Questions for Discussion:

Name two ways that people are similar to fish.
Answer:Examples include both have two eyes, both have skin, etc.

Name the type of fish you are printing and some of it's habitat needs.
Answer:This will vary widely.

Name parts of the fish and their use.
Answer:Examples include--the lateral line is a sensing organ in fish. It senses water vibrations (i.e., predators approaching or a boat moving overhead).

FISH FABLES

Purpose:To be able to identify several common Minnesota fish species; to be able to describe appearance and behavior of fish through storytelling.

Level:Beginners

Reference:Sport Fishing and Aquatic Resources Handbook, pages 61 - 65, 69 - 81. Fishing... Get in the Habitat!, pages 11-14, 22.

Site:Indoors or outdoors

Time:10 to 15 minutes

Supplies:Fish Identification Cards, order from DNR (see Appendix A)

Group Size:3 to 25

Activity: Passing stories or creating a verbal history about experiences is common to many cultures. In this activity, each person will be handed a Fish Identification card (face down), and will share it's key appearance characteristics with the group in a "What am I?" format. They will "pass" their knowledge to other group members verbally.

Start out by describing an angling or observation experience to the group, using a fish from the Fish Identification card. For instance, 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." Then, describe the fish, embellishing the story to include elements of surprise or special interest (for example, in describing a northern pike, you might say "the fish was longer than it was wide"). Don't tell the group the name of the fish you are describing, however. At the end of the story, ask your group to name the fish, based upon your description of appearance, habitat, and behavior. The first youth to correctly guess the fish is the next in line to tell a fish fable.

Be sure that the person doesn't reveal the fish identity until someone has correctly guessed what fish is being described. Continue the storytelling as long as it holds the groups' interest.

Helpful Tips:Everyone tells a story at their own rate. Give them time to tell the story. Make sure that all participants can individually identify the fish you've introduced through storytelling.

Questions for discussion:

Can you identify fish from their location or from the food that they eat?
Answer:Yes, describing the habitat can help you determine what type of fish is located in an area.

How do you think people from ages ago communicated before alphabets and writing were commonly used?
Answer:They passed along stories, much like what the group is doing in this activity.

Do you ever tell "People Fables"?
Answer:This will vary widely.

FISH JEOPARDY

Purpose:To reinforce understanding of individual fish specie characteristics; to understand fish habits and habitats; to associate physical characteristics with preferred habitat.

Level:Intermediate

Reference:Sport Fishing and Aquatic Resources Handbook, pages 61-65, 77-85. Managing Minnesota's Fish: Book by MN DNR. Fishing... Get in the Habitat!, pages 11-14, 22.

Site:Indoor or Outdoor

Time:15 to 25 Minutes

Supplies:Fish Definitions and Habitats (see page for examples), blackboard or tagboard to keep track of scores

Group Size:4 to 25

Activity:Understanding fish habits and preferred habitats is important in helping to catch and to manage fish. This activity will reinforce identification information and further enhance concepts of species adaptations to cover and food.

Before the activity, assign point values for each correct "question". You also need to decide on the

number of rounds you want to conduct.

To begin the activity, divide the participants into two or three teams. Next, read an "answer" from the Fish Definitions and Habitats; for example, "It has a black flap of skin extending from it's gill cover and it's body is plate shaped." Have the teams signal by raising their hands when they have a "question" for the answer; for example, "What is a bluegill?" The teams must answer in the form of a question.

The team with the first correct "question" will receive a point. The team with the most points at the end of a round wins the round. Remember and remind the participants that the object of this activity is to learn, not to find out who's the best.

Fish Jeopardy Categories and Questions

Fish Senses
A:Fish can see in all directions except for these two. Q: What is straight down and straight back.

A:Fish use the bones of their head, not ears, to do this. Q: What is hear?

A:The lateral line, nerve endings that run along the side of a fish, help the fish do this. Q:What is sense vibrations in the water?

A:Are fish cold-blooded or warm-blooded? Q:What is cold-blooded?

A:My glassy eyes actually help me see the fish I chase and eat at night. Q:What is a walleyed pike?

Habits and Habitats of Fish

A:The four basic needs of fish. A:What are food, cover, water (oxygen), and space.

A:When fish have needs that require they spend time closely with other fish, it is called this. A:What is schooling?

A:This is a producer in the aquatic food web that is eaten by some small fish. A:What is phytoplankton?

A:Fish use gills to draw this from the water. Q:What is oxygen?

A:Fish chase lures for these two main reasons. Q:What is lures mimic real food and lures attract fish because they are colorful or noisy.

Name That Fish!
A:I give rapid chase to other fish, am gray and spotted, and am longer than I am wide. Q:What is a northern pike?

A:Instead of lifting "barbels", I wear them like whiskers and use them to find food. Q:What is a catfish (channel or flathead)?

A:Many people think I taste like lobster, but I look like an eel. Q:What is an eelpout or burbot?

A:My bright orange color gives me away every time (especially at Halloween). Q:What is a pumpkinseed?
A:I am the littlest fish of all. Everyone always eats me. Q:What is a minnow?

My Favorite Food
A:If you fly a fly at me in a cold, racing stream, you'll probably get a bite! Q:What is a rainbow trout?

A:I like to nibble nibble nibble at your worm, so be sure to thread the worm tightly. Q:What is a bluegill?

A:Zebra mussels are great to eat--I crack their hard shell with my powerful mouth. Q:What is a freshwater drum (sheephead)?

A:There's nothing better than a purple, plastic worm. Yummy! Q:What is a largemouth bass?

A:My smallmouth makes crayfish a perfect meal for me. Q:What is a smallmouth bass?

WATER STEWARDSHIP - Chapter 3

Learner Outcomes:To understand that water is cycled; to understand humans impact the quality of water supplies; to show water quality effects species diversity and survival; and to understand how water quality is measured.

Introduction

In the first chapter, you taught your group that water is a basic habitat need for all living organisms. Bluegills, pumpkinseeds, northern pike and crayfish all depend on water. But will any old water sustain life? Or does water need to have a measurable quality to be used by fish and other organisms?

Water, Water, Everywhere

Water moves in cycles. Humans can't make new water. Our only option is to reuse the existing supply. We impact the quality of this water when we add elements to the supply. Phosphates, solid wastes, and other pollutants alter water, often rendering it undrinkable or unusable. This altered water must then be cleaned and filtered to make it fit for usage.

Water quality can also be altered by nature. For example, erosion can be caused by rain or water running overland to a stream or lake. Too much soil in a body of water can reduce the clarity of water or increase sedimentation. Humans can accelerate erosion.

Water quality effects fish distribution, behavior, and survival. For example, if water clarity diminishes, a fish may have trouble locating prey. If oxygen levels in a lake drop due to excessive nutrient loading, some fish species will die. Additionally, fish living in degraded waters can contain mercury, PCBs, and other contaminants that are harmful if consumed in certain quantities.

Maintaining the quality of our waters is critical to securing the survival of many species (including us!). Stewards are caretakers. We all have an obligation to become stewards of our waters, our environment . . . and our very future.

WOULD YOU DRINK THIS WATER?

Purpose:To show limitations of our freshwater supply; to introduce concepts of limiting resources; to demonstrate that pollutants are not

always visible; to show that not all pollutants pose health risks--rather, some are visually unappealing.

Level:Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 43 - 55. Fishing. . . Get In the Habitat! page 2.

Site:Indoors or outdoors

Time:20 to 30 minutes

Supplies:Ice cream pail or other container with 1 gallon of water; clear cup measure (1/2 cup); eyedropper; 6 clear plastic glasses; green food color; powdered coffee creamer; water; peppermint extract; onion extract; salt; blindfolds; Would You Drink This Water sheets--photocopy enough for one sheet for each group of 4 to 5

Group Size:2 to 25

Activity:Understanding concepts of limiting resources is critical when talking about any aspect of the environment and human use. Water can be a limiting resource--droughts worldwide cause rationing, and, in extreme situations, crop failures and even death. Your group should have a thorough understanding of how much water is on the earth, how it is cycled, and how it is polluted.

Start by explaining that 75% of the earth is covered with water (or youth can volunteer this figure). This amount is simulated by a one-gallon bucket of water. Ask everyone how much of this total is freshwater.

Measure 1/2 cup of water. 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 this total is available for use.

Remove one drop of water from the 1/2 cup. This is ALL the freshwater available for our use! The rest of it is frozen in icebergs and at the poles.

Explain that the water on earth now 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--evaporation to transport to precipitation. Some water also remains in storage for differing periods of time.

SUGGESTED ILLUSTRATION OF THE WATER CYCLE

Polluting our Waters

To demonstrate pollution, fill six glasses 3/4 full of water and label them one to six. Pollute five of the glasses by adding drops of green food coloring, onion extract, coffee creamer, salt, and peppermint extract. One glass of water should be left clean. Four of the glasses should look clear, one should be green, and the other should be cloudy.

Break the participants into groups of four to five. From a distance, have each group make a visual determination of which water they would drink. Each group will blindfold two volunteers to sample the water (explain the water won't make them sick); one will taste and the other will smell the samples. Each group will record their results on the Which Water Would You Drink sheet.

Bring the groups back together. Have them compare the differences between the sight, smell, and taste preferences and share which sample they decided was fit to drink.

Helpful Tips:Relate the materials added to the water to real events that occur in lakes; for example, the green food coloring might be too much algae caused by excessive nitrogen/fertilization of the lake. The onion extract smells and tastes bad . . . just like oil spills. The coffee creamer could represent turbidity (lots of dirt in the water) or a visible pollutant; the salt--salt!; and the peppermint extract might be an invisible pollutant that can not be seen.

Questions for Discussion:

Are all pollutants visible?
Answer: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.

Are all pollutants unhealthy?
Answer: No, some are just visibly unappealing, like the green food color in the demonstration.

Name three types of pollution that you have seen near water.
Answer: This will vary greatly, but includes--litter, fertilizer/pesticides; oil from cars; soil from erosion, etc.

WOULD YOU DRINK THIS WATER?

Mark "Yes" in the column if you would drink this water, and "No" if you would not.

SightSmellTaste

Glass 1

Glass 2

Glass 3

Glass 4

Glass 5

Glass 6

Which glass of water would you drink, based on your sense of sight, smell, and taste?

MEASURING WATER QUALITY - A SITE STUDY

Purpose:To be able to perform water quality measurements and monitoring; to be able to assess the condition of a body of water based upon these measurements; to understand principles of water stewardship.

Level:Beginner

Reference:A Citizens' Guide to Lake Protection, Freshwater Foundation and Minnesota Pollution Control Agency. Fishing. . .Get in the Habitat! page 2.

Site:Outdoors at a pond, lake, river, or stream

Time:30 to 45 minutes

Supplies:Dissolved O2 Test Kit; thermometer; secchi disk; ph paper; (See Appendix A for ordering these materials) handouts, page

Group Size:5 to 25

Activity:Our base of knowledge about the environment is based upon measurement and observation. To determine if a lake or stream is healthy, we can make measurements and observe other conditions around the water. This is basically how natural resource agencies decide what type of management a lake or stream might need--through measurements and observation.

In this activity, you will help your group become resource managers. They will measure water quality and observe conditions around the lake or other body of water.

At the lake, pond, or stream, hand out the water quality assessment sheets found on page . Break into groups of five youth per adult or volunteer. Let each group perform one of the water measurements, rotating stations so that everyone gets a chance to make different measurements.

Water Temperature:Measure water temperature with a thermometer, leaving it in the water for two or three minutes (attach a string so that it can be easily lowered into the water from a dock). The group should mark the temperature on their site sheets, along with the depth (approximate) of the reading.

Ph:Pass out litmus paper to your group. They will measure the Ph of the lake/pond by dipping the strips into the water. Interpret the Ph by using the color chart found with the kit. They will record this reading on their site sheets.

Water Clarity:Using the secchi disk, measure water clarity by lowering the disk (from a dock, low bridge, or secured bank site) into the water until it disappears, then raise it until it is just visible. Measure the length of rope between these two points. This measurement is the water clarity. This measurement should be recorded on the site sheets.

Dissolved O2:Measure the dissolved oxygen of the water by following the instructions of the kit carefully. Group members can help with the different steps, such as adding the reagent powder or shaking the can to mix. After making the measurement, they'll record the reading (in parts per million).

Type of Forage (Food):Is there any fish, minnows, or insects swimming near shore? Are there any plants that would make good food for aquatic animals in the water? The group can make these visual observations, and record their findings on the site sheets.

Overall Condition of Shoreline:Is there cover along the shore (i.e., a fallen log)? Is the shoreline or riverbank eroding? Are there plants near or around the water? Record these observations also.

When groups complete their data collection let them decide what types of fish might live in their lake (use the fish chart handout on page and the information they learned in Chapters 2 and 3). Then, let the "biologists" present their findings and recommendations for improving or preserving the lake or stream.

Helpful Tips:You can extend this activity by visiting a lake that has water quality problems such as excessive nutrient loading from surrounding farmland or urban areas. Such a lake is undergoing an accelerated aging process called cultural eutrophication, where nutrients are fertilizing the lake, allowing algae and other aquatic plants to grow and "fill in" the area. Your water quality measurements in such a lake will show, higher temperatures, and lower water clarity readings. Dissolved oxygen readings might also be decreased.

Questions for Discussion:

What are some ways that you affect the quality of the water in your area?
Answers:These will vary. They include--pouring paint down the drain affects water quality negatively, throwing garbage near a stream affects water quality negatively, taking motor oil to the gas station affects water quality positively because the oil is properly disposed of.

Some lakes, especially in northern Minnesota, are more acidic than others (their ph is lower on the ph scale). Why?
Answer:Some lakes are susceptible to acid rain--rain mixed with gaseous pollution. The northern lakes of Minnesota don't have a natural buffer.

How does the clarity of the water affect a fish's ability to find food?
Answer:If the water is murky, little light can filter through to help the fish locate prey. Fish specially adapted to these conditions--such as channel catfish that have barbels to help them sense prey--have an increased chance of survival.

INSERT ILLUSTRATION/LAYOUT OF SITE STUDY SHEET

Name of Lake/Stream/Pond/River: Date of Survey:
Name of Biologist Conducting Survey (your name here)

Water Temperature

Water Ph

Water Clarity

Amount of Dissolved Oxygen (parts per million)

Observable Conditions:

Condition of Shoreline:

URBAN LAKE GAME

Purpose:To develop a better awareness of how many people in a community depend on lakes for their water supply, enjoyment, or livelihood. To better understand the economics of decisions facing polluters of lakes; and to understand how individuals can minimize the adverse effects of their actions on our water resources.

Level:Intermediate

Reference:Sport Fishing and Aquatic Resources Handbook, pages 77-80. Fishing... Get in the Habitat!, pages 3,4,5.

Site:Outdoors near lake, indoors.

Time:25 to 35 minutes

Supplies:A lake--can be made from:
a large container nearly filled with clean water
an aquarium
a large bucket
a wading pools, etc.

Also need:
an extra bucket or sink for dumping water removed from the lake;
an extra bucket of clean water for rain;
3 drops of red food-color in a cup of water to produce a colorful solution to represent pollution;
a similar solution of yellow food color;
a plastic container with a perforated lid, filled with muddy water for the students to add "shakes" of turbidity to the lake; or a few small vials or envelopes filled with mud or dust;
a roll of toilet paper;
a clear container for withdrawing municipal supplies;
play money, or a substitute, for the roles that involve paying instead of polluting;
at least 3 fish silhouettes made from a plastic coffee can lid weighted to stand on the bottom of the lake. Punch a hole in these silhouettes (for hooking);
a fishing pole to catch the fish;
a simple secchi disk for estimating clarity;
a tangle of yarn to represent Eurasian Water Milfoil;
a die for the weather to roll;
Roll Playing Cards (see pages). To make, paste the student role on one side and the leader discussion text on the back of a tagboard card. Cards should be flexible and durable, with large text. Cover the

cards with clear contact paper to make them waterproof. You can number the cards with indelible pen in the order in which they are listed below. This playing order ensures some pollution of the lake before students remove drinking water and go fishing.

Group Size:10 to 30

Activity:Everyone will be asked to assume the role of a lake user and make action choices appropriate to that role. A bucket of water representing the lake will become polluted and depleted as the game progresses. Participants will make and hear decisions related to pollution, recreation and industrial values, and economics in a dynamic setting.

Form 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 shaker, and the container for withdrawing 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 role play and to act as they think the person described on their card would act.

You're ready to begin the game. Let the first person read their role and make a choice they have made 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 decision is make, you will read (or discuss) the text on the back of the lake game cards.

Also, discuss their decisions as you play - balance economic considerations against idealism. If none opt 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. 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 and runoff and pollution is diluted or flushed out at the outflow. Stress, however, that water in your lake is a limited resource - it isn't infinite.

Finish up with a review of which activities and choices polluted or depleted the lake water. Let participants discuss which were acceptable and how they could alter their own or others' behavior patterns to better protect their lake.

ROLE PLAYING CARDS

I am driving a car. I throw a burning cigarette out my window and start a fire. Many trees and grasslands are destroyed. All that is left is dirt and it is washed into the lake by rain.
(Add 5 big shakes of soil.)

DISCUSSION:
Not only do fires destroy wildlife habitat, but they also destroy the trees and shrubs whose roots prevent erosion. Without roots to hold it back, soil is carried by runoff down slopes and into lakes and rivers. Besides the loss of valuable topsoil, erosion carries nutrients that are added to our lakes. This can cause algae blooms or excessive weed growth that make our lakes unattractive and unhealthy.

I am a car owner. When I drain oil in my car, I like to dump the oil into the storm sewer. This can pollute the lake. I have to choose whether to dump the oil or dispose of it properly.
(If you choose to dump it along the road, add two units of red color.)

DISCUSSION:
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.

I run an industry on the lake, but none of the company bosses live near it. They don't care if they pollute the lake.
(Add three units of red color.)

DISCUSSION:
How could we convince the company that we don't want them 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."

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:
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?

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 think this is okay because they are biodegradable or birds will eat them.
(Add one unit of yellow color.)

DISCUSSION:
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.

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:
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?

In am a 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 shakes of turbidity.)

DISCUSSION:
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.

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 continue to pollute
the lake.
(Pay your card to the Clean-Up Fund box or add four units of red color.)

DISCUSSION:
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?

My friends and I just rode our bikes to the ice cream store for malts. While riding home, one of my friends threw 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:
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

would actually stop your bike and pick up the litter?

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 up, or let my leaky septic system pollute the lake.
(Pay or add one unit of yellow pollution and 1 torn up sheet of toilet paper.)

DISCUSSION:
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 soil bacteria that eat up 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?

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:
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.

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:
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 and forest

resources as well as for man-made materials. "Scrubbers" can be installed on power plants to reduce sulfur emissions, but they are expensive. How much would you pay to reduce acid rain? How much could you convince your parents to pay on their electric bill?

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:
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?

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:
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 pump handle when people fill the tank on their car. Filling gas tanks carefully only takes a little thought.

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.
(Remove one fish from the lake.)

DISCUSSION:
Just because you don't need a license doesn't mean you don't have to follow the rules. DNR wildlife management officials have determined the appropriate limits for different species and different sizes to keep

a viable (successful) fish population in our lakes.

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 shakes of turbidity.)

DISCUSSION:
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.

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:
We can't expect the recharge 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. Water leaves the lake through evaporation, rivers draining out, groundwater seepage, and diversions by humans. 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.

I live by the lake and want to have a nice green lawn. I can choose to use chemicals on my lawn or pull the weeds by hand. Chemicals could pollute the lake, but would save me work.
(If you choose to use chemicals, add one unit of red color.)

DISCUSSION:
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 soil and nutrients or chemicals, and by providing habitat for animals. One of the worst things lakeshore owners can do to their lake is use fertilizer or herbicides (chemicals to kill weeds) on mowed lawns next to the lake.

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 boat and I brought Eurasian water milfoil to this lake.
(Add a tangle of yarn to the lake.)

DISCUSSION:
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 carrying it from one lake to another on their boats or trailers or in their live wells or minnows buckets. It grows rapidly and crowds out beneficial native plants. It doesn't provide good habitat and is a nuisance for boating, swimming, water-skiing, or fishing. 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.

I am going to build a fishing dock for kids. I know that treated lumber will last longer and save me money and time in the future, but the chemicals used to treat the wood may be 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:
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.

I am a fisherman who just spent $300 on equipment. I can catch a fish if there isn't too much pollution.
(Try to catch fish. 15 seconds will be allowed for fishing.)

DISCUSSION:
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 larger fish. The Minnesota Department of Health has issued guidelines for eating fish from 260 lakes in Minnesota. They have found that there are health risks for young children and pregnant women from mercury and PCBs that have bioaccumulated in fish and recommend that they limit the number and size of fish they eat from certain lakes.

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:
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?

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, I will make lots of money, but pollution of the lake will continue.
(If you take the case, add three of red color.)

DISCUSSION:
Would earning $10,000 from the case be worth continued pollution? Would $5,000 be worth it? Would $500 be worth the pollution? Is earning this huge fee worth the damage to the lake? We all need to start considering the ethical effects of what we want, related to the impact our actions have on our environment.

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:
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 that ruins everyone else's use?

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:
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? What about how tourism is affected by having lots of bugs? Is that important, too?

I am a great water skier. I like to ski near shore so people can see how good I am. This causes erosion of the shoreline. I have to choose whether to quit skiing near 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:
Sometimes little things make a big difference in a lake. The addition of turbidity not only makes the lake less pleasant for us as humans, but it also damages plant and animal habitat. If decreases the amount of light that reaches deep into the lake which can affect the temperature and ability of predators to see prey. It can also cover spawning grounds and limit reproduction.

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. Rates only $3.00 a month higher would help prevent pollution of the lake.
(Take a vote. If the majority say they would pay more, add no color.

If they vote no, add three units of yellow color and 2 sheets of torn up toilet paper.)

DISCUSSION:
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 less 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?

I want to get rid of the weeds in the water at the kids swimming beach. I could cut the weeds or use a chemical weed killer. Chemicals would be easier and would take a lot less time, but could cause problems in the lake. I have to choose whether to cut the weeds or use chemicals. (If you choose chemicals, add two units of red color.)

DISCUSSION:
Using chemicals in the lake to kill weeds is not as easy as it seems. You must have a permit form the DNR to use chemical herbicides. When chemicals are applied at the wrong rate or at the wrong time of day 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. If there are weeds in the rest of the lake, they'll continue to come back to your beach area. Besides, emergent vegetation (the weeds that stick out of the water) can help reduce bank erosion and can actually help improve water quality.

hire a kid. pull up weed.

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

DISCUSSION:
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.

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:
Certain dye colors won't break down in septic systems and can be carried with drain water into the lake if the septic systems isn't kept up to code.

MANAGING OUR RESOURCES-CHAPTER 4

Learner Outcomes: Participants should be able to understand principles of renewable versus non-renewable resources and how management actions can control, enhance or degrade these resources. Individuals should know and be able to apply Minnesota Fishing Regulations. Participants should demonstrate and understand catch and release principles.

Introduction

In the previous chapters you've introduced and reinforced concepts that deal with the needs of the animals (and humans) who live in an environment, and how organisms are interdependent. You've taught others by example principles of stewardship. In this chapter, you'll extend these concepts to include how and why 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, governmental regulatory 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 manipulate our resources. Imagine a lake without fish, for eager anglers; an urban area without a wetland for a hush in the rush; a watershed so overpaved that it can no longer guarantee quality surface water runoff.

Natural resource agencies and groups work to ensure that our resources are perpetuated for future generations. They also work to meet as many demands as possible for a particular lake or stream. They use regulations, education, and legislation as their tools.

The payoff are resources that are truly renewable and non-limiting. As our people population continues to grow (estimated population of over 10 billion by the end of the next century), it will become increasingly important for us to practice and live by principles of stewardship.

WATERSHEDS--A SITE STUDY

Purpose:To collect and assess data to determine the overall quality of a watershed; to understand how humans have impacted the watershed; and to utilize data collect from other site studies to support or negate conclusions.

Level:Intermediate to advanced

Reference:

Time:45 minutes

Supplies:Platt book with your township OR a good quality city map showing the lake you are studying; crayons/colored pencils; copies of handout on page; graph paper, pencils.

Group size: 3 - 25

Activity:A stream or lake is Part of a watershed. ~~not~~ an isolated vacuum. It is part of a system--a watershed. A watershed includes all the land that drains into a body of water. Watersheds can be as small as your backyard or as big as millions of acres. It is important to know the scope and size of the watershed because land use in this area can produce pollution. This pollution can be carried into the water even though its source may be miles away.

Land use practices can be managed to minimize negative impact on our resources. Sometimes, land use practices can actually improve the quality of our resources. In some cases, however, the land manager is limited with solutions to problems within the watershed; this might translate into a marginal fish population in the watershed lakes and rivers.

On the following page, Minnesota's major watersheds are outlined. Give each participant a copy of the map, and have them color the different watersheds. Discuss how each activities in those broad areas impact the major tributary of that area. For example, wastewater treatment plant discharge, pesticide use, and other pollutants have combined to render the Minnesota River unable to meet water quality limitations in it's lower 25 miles during low-flow conditions. This stretch can no longer support fishing and swimming.

Also point out to your group that their individual activities may affect more localized lakes, ponds, streams, or rivers within the large watershed. For example, if you fertilize your lawn, that

nitrogen/phosphorus/potassium mixture is likely to wind up, via surface runoff, in the wetland two blocks down the street. Every activity within a watershed affects the water resource.

After the discussion, split the youth into groups of five. Give each group graph paper and a map and assist them in locating the lake you are studying on the (platt or city) map. Have each group begin by calculating the area of the lake. Do this by:

.in a Platt book, each township is marked with horizontal and vertical lines to form 36 sections. Each section is 640 acres. You can estimate the area of the lake you are studying by calculating what percentage of a section area is the lake. For example, if your lake takes up approximately 1/3 of the total section, than your lake is approximately .33 x 640 acres = 218 acres.

.many city/county maps are also marked with sections--look closely at the map to find your lake and the section. Then, estimate your acreage as above.

Bring the group back and talk about the surrounding watershed. You can describe this watershed by comparing it to a large bowl. If you look around, you might see some ridges or hills that may define the limits of this small watershed. (They also might be small ridges within your small watershed). Management, human, and natural activities taking place within these areas will effect your body of water. A good watershed ratio is 1 acre of pond to every 10 acres of watershed.

Direct the individuals to draw the lake on their graph paper using an appropriate scale. Then look for factors in the watershed that might lower the water quality or damage habitat for the fish life and humans in the study site. While they are doing this also have them draw the types of surrounding land use on the map and any factors affecting the site. Also have them look back at their maps to locate communities, factories, etc. located in the watershed. Once completed compare this information with that collected earlier in the other site study activities.

Tips:Incorporate assessments from the site studies in chapter 1 and chapter 3 to extend and enhance this activity.

Questions:

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 groundwater and surface runoff).

Q:Is this site's watershed suitable for good fish production?
A:This will vary depending upon the site studied. Some negative factors for fishery production in a watershed include excessive nutrient application (i.e., farm use, urban areas with over-application of chemical lawn nutrients, discharge into rivers/lakes from manufacturing plants); excessive erosion (causing decreased water clarity); etc.

Q:What factors could be changed to make this site better? What factors would negatively impact this site? Are all of them evident as you look around you?
A:Answers will vary. It is important to remember that not all negative impacts on a watershed are readily observable.

ANGLER ETHICS CARDS

Purpose:To reinforce current Minnesota fishing regulations; to reinforce concepts of stewardship; to apply personal ethics to varieties of situations.

Level:Intermediate

Reference:Sport Fishing and Aquatic Resources Handbook, pages 38 to 42, pages 87 to 91. Fishing... Get in the Habitat!, pages 20 to 21. Minnesota Fishing Regulations, DNR.

Site:Indoors or outdoors

Time:20 to 30 minutes

Supplies:Angler Ethics cards (see master, page -- you will need to xerox and cut out the cards). Current year Minnesota Fishing Regulations book for everyone (see appendix).

Group Size:3 to 30

Activity:In order to manage the fish populations and food webs of our waters, we need to follow and support the rules and regulations protecting these

resources. These regulations are not arbitrarily assigned; they are the product of research and knowledge about ecosystem management. Youth need to develop respect for these rules and understand that they exist for a certain purpose--to conserve and best use our resources.

In this activity, everyone will be given a copy of the Minnesota Fishing Regulations Book. Give a brief introduction to the book, include showing where to find all the different regulations. Talk about limit and season definitions. Quiz them about the different regulations, for example, how many bluegills can you keep? This part of the activity should be kept under 10 minutes, since it is used to prepare them for the role playing.

Next, participants will role-play ethical behavior using cards that assign parts. Start out by dividing the group into smaller groups of 2-3 members and give each group a stack of Angler Ethics Cards. Each member of these mini-groups will draw a card from their stack, and read it out loud. The group should then discuss the responses and come to some agreement, as a group, on the ethical response.

After a period of time, bring the small groups back together, and have them discuss their decisions.

Helpful Tips:You can extend this activity into an actual role-play. Pick a situation and have some of the participants act out the different choices.

Discussion Questions:

Do you think that all anglers are ethical? Why or why not?
Answer:This question will have a variety of responses.

Why don't we just let everyone fish the way they want to fish? Why do they need to obey regulations?
Answer:Fishing regulations protect fish populations and lake/stream ecologies.

Do you think that most people are ethical about their use of the environment? Why or why not?
Answer:This question will have a variety of responses.

Angler Ethics Cards

Situation 1:You are at a lake roller-skating and you see a bunch of kids leaving pop cans, drink-boxes, and other trash behind. Would you:

ask them nicely to pick up their litter
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

Situation 2:You are fishing at an isolated lake and you've caught and kept four walleyes during your first day at the lake. On the second day, the fishing is so great that you catch two walleyes in the first hour. Both of these fish are bigger than the previous day's fish. Minnesota law allows you to possess six walleyes, so you:

keep fishing, but look around alot 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 walleyes)
quit fishing and go rock climbing
keep fishing and let one of the fish go if you catch a bigger one

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 all through 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

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 into 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--that you're not willing to break the law
offer to take the oil to the gas station yourself

Situation 5:You and a friend are steelhead trout fishing along Lake Superior's North Shore. The fishing has been quiet, and neither one of you have caught a fish all morning. Just before lunch your friend lands a six pound steelhead that she had 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

Situation 6: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

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 this fish and keep angling--after all, how many good luck days do you get?
put this and other "trophy" fish of the day back, in order not to over-harvest the lake

Situation answers:
#1 Answers will vary.
#2 Once you have caught your limit of fish you must stop fishing for that type of fish. You can not string sort (it is illegal to release a fish that you put on your string or in your live well and replace it with another fish).
#3 The possession limit means you can only keep one limit of fish at a time. You can report that person to the Turn IN Poachers (TIP) program

anonymously.
#4 Oil must be dumped at oil recycling centers. All businesses that sell oil will know where the centers are located.
#5 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.
#6 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.
#7 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.

To Fish or Not To Fish

Purpose:To demonstrate management of renewable resources and to show how fish are managed to meet multiple uses and needs.

Level:Intermediate

Reference:

Site:Indoors or out

Time:30 minutes

Supplies: Population curve (page), natural mortality and fish population cards (page), fishing poles (pencils with string and paper clip-opened attached), fish (page --you will photocopy, cut, fold, and punch holes in these fish), good angler permit from page , paper money.

Group size:3 to 25

Activity: Wise conservation (to include recycling) of nonrenewable resources, such as oil and minerals, should always be stressed. Once used, these resources do not regenerate. Renewable resources, like fish, replenish themselves continuously. But just because a resource is renewable doesn't mean it will never be used up or that human misuse won't occur. Our animal resources are often taken for granted. Only when a species no longer exists, or becomes a nuisance, does it become evident that management of this resource is important.

Fish are capable of replenishing themselves under the correct habitat and water quality conditions. Under the proper conditions and regulations a portion of a fish population can be removed through angling without detriment to 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. Over-fishing may result from too many anglers or from an over-extended season. Fishing techniques also have an impact.

The spawner/recruitment curve shown here is for a hypothetical population of fish. Actual models used by biologists are very complex. The curve shows the number of fish that will increase (y axis) given a certain number of spawning fish (x axis). This curve doesn't take into effect natural mortality. For the purpose of this game, this will be done through mortality cards. Once the total spawners number less than ___ , you should consider the game over.

To start the activity: designate the participants as anglers. You will be the biologist. Using the bucket, create through discussion a hypothetical lake. Decide the overall fish species type, water quality, etc. of the lake.

Now give each participant and equal amount of play money. This is the money that they have to work with for a full year of fishing. They should first purchase their good angler permit (see) for a set amount of dollars (you could explain that a certain percentage of this money is used to manage the lake). Take this amount and set it aside for later in the game. Next have them buy their gear (rod and cup). Set these dollars aside for later in the game.

Split the kids into small groups (2-4). Now spread out 200 of the fish around the "lake". You're ready to fish!

Begin by fishing with only one angler from each group for 30 seconds. Don't introduce any type of regulation. Each angler should try to "catch" (with pencil poles) as many fish as possible (within 30 seconds) and put them into the paper cup. Any dropped fish are those that got away!

After 30 seconds, count the number of fish caught and subtract that number from 200. Find this

number on curve's x axis, find the corresponding number on the y axis. This will be the number of fish entering the established population _____ if all survived. To bring in natural mortality, draw a mortality card and subtract that number from this total.

Enter this number on the chart under the corresponding year. Now start with that many fish and repeat the activity with a member from each group until you have filled in data for _____ years. This represents the angling pressure from one years worth of fishing.

Now try changing the length of the fishing season to 60 seconds. Give different members a chance to "fish". You can also make random regulations, such as "no fish over one inch", or "only keep ten fish".

You can also try changing the angling methods allowed. Let the youth use more than one pole or use "nets" (scooped hands) to catch fish.

Next try adding some habitat improvement--select one habitat improvement card. Do you have enough money from the sale of licenses to do this 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.

When the spawning fish goes below ____. Remind the kids that the population is very unstable. As a closure, discuss the results of the graph and the data that the participants have recorded.

Questions 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.

Helpful Tips:

Q:How did natural mortality and changes in the ecosystem/watershed effect the fishing?
A:Answers will vary.

Q:Did human impact help or hinder this situation?
A:Answers will vary.

Regulations--suggested location, back cover:

It is the responsibility of every angler in Minnesota to know the rules and regulations that apply to fishing in Minnesota. DNR publishes these regulations annually. As well as following the regulations, it is also your responsibility to encourage others to do the same.

Ethics are "unwritten laws" governing behavior that result in respect for oneself and others. The ethical angler realizes that the future of fishing in Minnesota depends on the respect we have for ourselves, others, and the environment.

FISHING EQUIPMENT AND TECHNIQUES-CHAPTER 5

Learner Outcomes:To successfully demonstrate the basics of angling including knot tying, rigging and casting a closed face (spin casting) rod and reel, and utilizing live bait.

Introduction

Youth who are exposed to fishing as a skill will build patience, self-esteem, and will have opportunities for reflection and problem-solving. All of these traits are important indicators of healthy development. Fishing is also a way to build family participation and bond with others.

Fishing is also a way to entice youngsters into their natural environment. They can utilize concepts of habitat, observation, measurement, water quality, and fish identification to watch and learn about their backyard ponds.

Fishing Fundamentals

Many youth and adults are not aware of the basics of angling. Increasingly, both groups are searching for activities in the out-of-doors, in the natural environment. They need skills and tools to hurdle the barriers to exploring their aquatic resources.

Angling doesn't have to be expensive and sophisticated to be enjoyable. Equipment can be made from pop cans, and bait can be found outside. Part of the adventure of fishing is understanding how truly simple the experience can be.

Angling is also an excellent opportunity to teach about lures and how they mimic parts of the food web. Why would a largemouth bass chase a fluorescent, dancing, spider jig? Why would a rainbow trout eat cheese? The table below provides some interesting insight into these food web relationships.

SUGGESTED ILLUSTRATION--BAITS AND HOW THEY MIMIC LURES TABLE

It will be important to build upon skills in the chapter as they appear in the sample activity

planning sheets. For example, knot tying skills will be essential for completing following activities as well as for helping your group to fish on their own after your program.

KNOT TO KNOT

Purpose:To be able to make a correct knot for use in attaching hooks and other items to fishing line.

Level:Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 3 to 13. Fishing... Get in the Habitat!, page 16.

Site:Indoors or outdoors

Time:10 to 15 minutes

Supplies:spool of fishing line (6- to 8-lb test), fingernail clippers to cut line, enough hooks (size 6 or 8) for the group, hula hoops, 1/4" nylon cord in 24" lengths. (Enough for each person.)

Group Size:2 to 25

Activity:In order to successfully land a fish, certain things need to follow a logical order. The first major step is having a secured fishing hook on your line. Loose knots lead to lost fish. Everyone fails to land a fish on occasion, but failing to reel in EVERY fish can be disheartening!

In order to ensure that the group assembles their equipment correctly, you will need to teach them to tie a clinch knot. To demonstrate this technique, use a hula hoop and a nylon cord. Demonstrate as below:

ILLUSTRATION OF TYING KNOT WITH A HULA HOOP

Once you have demonstrated how to tie the knot, give each group member a length of nylon cord and watch as they attach a hula hoop to the line. Make

sure they are tying their clinch knot correctly. If they are having trouble, repeat it step-by-step with them.

Once everyone is successful, have practices with lighter line or move onto the rigging activities where they will be using the knot.

Helpful Tips:When tightening the clinch knot on a fishing pole, pull only the end attached to the fishing pole. Wet the line (like you wet a stamp!) before tightening, since this will help it slide.

Questions for Discussion:

What would happen if you didn't tie your knot securely?
Answer:A fish would be able to pull the knot apart so that you couldn't catch the fish.

Why don't you just tie a big, strong, chunky knot?
Answer:A chunky knot isn't necessarily better than a small knot. It can still come unraveled if not tied properly. It may be more visible to the fish.

POP CAN CASTING

Purpose:To be able to make and cast a fishing rig from a pop can, in order to experience fishing regardless of ability to purchase equipment.

Level:Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 3 to 13. Fishing... Get in the Habitat!, page 17.

Site:Indoors or outdoors

Time:15 to 25 minutes

Supplies:empty pop cans, masking tape, spool of fishing line (6- to 8-lb test), and fingernail clippers to cut line. Optional: casting plug, sinkers, and bobbers. (one for each student.)

Group Size:2 to 25

Activity:Fishing is an activity that should be enjoyed by everyone. Barriers to fishing in the past have included the expense of the activity.

You can teach participants how to make pop can rigs

to use fishing. These pop can rigs take the place of a rod and reel, and can be very successful at catching fish!

Set up the materials at tables and give each participant some room to work. To build the pop can rig, have the group each:

Tie the end of the fishing line to the tab on the top of the can with a clinch knot (see KNOT TO KNOT, page). Tape the fishing line near the top of the pop can. Each youth should wrap the fishing line around their pop can about 50 times. Cut the line. Attach a practice casting plug to the line using the clinch knot.

You are now ready to cast. To cast, just unwind the line about two feet beyond the casting plug. Hold the top end of the pop can in one hand and the casting plug in the other hand. Point the bottom of the pop can where you want the casting plug to fall. Toss the bobber underhanded toward the water. The rest of the line should unwind and follow.

To practice casting and to enforce past activities on habitat, hold a pop can casting-for-cover skill quest. Use hula hoops for ground targets. They are in a location where a fish will most likely hide. Place paper "lily pads," or other forms of cover, around the targets and let the group "cast for cover" from about 15 to 20 feet. Those hitting the inside of the hula hoops, nearest the lily pads, are the most accurate. Set up a series of stations in a golf course form for the casting. Once you make a good cast you move on to the next stations.

After the casting practice is completed, have the youth return to their work space to rig up for fishing. To prepare the pop can reel for fishing, remove the practice casting plug and attach a hook to the line. Then squeeze on a split-shot sinker about 8" above the hook, and secure a bobber on the line about 18" above the hook. This distance will vary with fish locations.

Helpful Tips: Point the bottom of the can straight at the target when casting.

Questions for Discussion:

Where would you cast your line to catch bluegill and crappies?

Answer:Near shaded cover, such as docks.

Where would you cast in a stream to catch rainbow or brook trout?
Answer:Near shaded cover, such as tree roots or under bankside bushes, or sometimes in fast-moving, shallow water.

Why would a fish hide in the cover where you have been casting near?
Answer:To avoid being seen by predators or prey.

RIGGING A SPINCAST ROD & REEL

Purpose:To be able to rig and cast a spincast rod and reel in order to be able to fish independently.

Level:Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 3 to 13. Fishing... Get in the Habitat!, page 15.

Site:Indoors or outdoors

Time:15 to 25 minutes

Supplies:rod and reel, monofilament line, split-shot sinkers, hooks (size 8 to 10), bobbers, pliers

Group Size:2 to 25

Activity:Use a spin cast rod and reel to demonstrate this activity. Make sure that all the participants have one of these in order to follow along with your demonstration.

Start by finding the line on the reel (you may have to pull the front cover off the reel). The line should come out of the reel cover. Push the line release bottom and gently pull the fishing line from the reel, threading it through the guides. Check the drag on the reel by engaging the reel and then pulling on the line. If it comes out of the reel very easy or drag considerably adjust the drag. Now you can attach a practice casting plug (use the clinch knot) and practice casting.

To practice casting and to enforce past activities on habitat, hold a casting-for-cover skill quest. Use hula hoops for ground targets. Place paper "lily pads," or other forms of cover, around the

targets and let the group "cast for cover" from about 15 to 20 feet. Those hitting the inside of the hula hoops, nearest the lily pads, are the most accurate.

Next, attach a hook with a clinch knot.

Then attach a split-shot sinker to the line about 8" above the hook. Thread the line through the "open jaws" of the split-shot, and squeeze it shut with a pliers (never ever ever use your teeth!).

Next, attach a small bobber to the line above the split-shot sinker (the distance between the bobber and hook will depend on how deep you want to fish). Push down on the button of the bobber and clamp it's tiny hook to the line (like opening its mouth and shutting it). Wrap the line around the hook on the bobber.

Now, let all the participants try this activity for themselves. You will have to help most youth individually.

Helpful Tips:Master tying the clinch knot first, in order to be able to successfully complete this activity.

Questions for Discussion:
What does it mean when your bobber is under the water?
Answer:It means either that you have a fish on the line or your split-shot sinkers are too heavy for the bobber you have chosen.

What does it mean when your bobber is laying on its side in the water?
Answer:It can mean 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 feeding, or swim horizontally for awhile.

What's the best type of bait to use to be able to release my fish?
Answer:Live bait will be the poorest choice, since many fish will swallow live bait and the hook will lodge in their stomach. Lures are better.

TACKLING YOUR TACKLE BOX

Purpose: To apply knowledge of fish habits and water quality to selecting fishing tackle; to determine the basic equipment needs.

Level: Beginner

Reference:Sport Fishing and Aquatic Resources Handbook, pages 3 to 13. Fishing... Get in the Habitat!, page 15.

Site: Indoors or outdoors

Time: 10 to 15 minutes

Supplies: Three different test weights of fishing line (approx. 6, 10, 17 lb. test), assortment of hooks, weights, and bobbers in different styles and sizes; examples of natural baits (worms, leeches, minnows; examples of common artificial lures (jigs, spinner baits, crank baits and stick baits); simple tackle box, pliers, stringer, line cutter and a hook sharpener, clear containers with water (clear plastic pail or an aquarium.

Group Size: 3 to 25

Activity: Fishing equipment needs to be balanced or matched with the type of fish being pursued. This includes using the appropriate size and style of equipment. In this activity participants will explore basic fishing equipment.

To start the activity introduce the concepts of matching the size of fishing equipment with the size of the fish. Then discuss hook sizes in relationship with fish mouth size and the type of bait.

Next, introduce fishing line; including, line strength in pounds of test, color and material. Relate the type of line needed to catch local fish. Show bobbers and weights (sinkers) and the style and size that the group will be using.

Encourage the participants to apply this method by having them practice tying a rig on a piece of line, including a hook, bobber, and weight. Ask them to rig up for a bigger fish such as a northern pike and a small fish such as a bluegill. Provide live bait in clear containers.

Follow up with a short discussion on the basic tools to include in a tackle box. Ask the participants to list all of the things they used to make their rigs (remember the pliers and the string for the fish!). Conclude by showing a basic tackle box with a few artificial baits. Question the participants on what type of fish they would catch

and why.

Helpful tips: Have enough equipment for each person to make two rigs. Keep the tackle box and contents simple, basic, and low-priced.

Questions: What do you need to catch a northern pike?
Medium to large hook-#1 or #2, 12-17 lb test line, large bobber, few large sinkers and a medium to large sucker minnow. You need to use the bigger strong equipment because they like to eat medium size fish and they have sharp teeth.

LIVE BAIT HUNT-A SITE STUDY

Purpose:To be able to identify several common insects, invertebrates, and small aquatic amphibians; to be able to identify their habitats; to be able to capture and utilize and natural bait; to be able to understand food chain relationships.

Level:Beginner

Reference:Sport Fishing Resource Handbook

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

Time:15 to 25 minutes

Supplies:Containers with tops to collect species; coffee cans; beef kidneys or fish heads to use to lure bait; crimper or pliers

Group Size:2 to 25

Activity:Food web relationships and habitats can be explored by searching for and collecting small insects, invertebrates, and other aquatic animals. These collected species can then be used for bait during an angling outing. Live bait has several advantages over lures, since lures cannot completely mimic the smell, action, and texture of a worm or minnow.

Near a lake, stream, or pond, your group can hunt for these insects and invertebrate in their natural habitat. Have students collect three types of bait and then meet in a group and share their findings and what they might catch with the bait. They can collect the following:

Earthworms:Earthworms are usually found between ground level and two feet below. In winter, or during hot weather, they will burrow deeper. Search for earthworms in grounds that are rich in organic material. Turning over logs and rocks in wooded areas, or digging in lawns that feel bumpy underneath (the bumps are hardened castings of worms) are excellent ways of finding worms. Also, worms will leave their burrows during heavy rains. They can be collected from sidewalks or roads.

Leeches:Ribbon leeches live in lakes and ponds. They are flat, black to brown invertebrates that have sucking disks at both ends of their bodies. Most leeches eat dead material. Leeches can be successfully collected from spring through early summer. They prefer ponds with an abundance of shoreline vegetation, such as cattails. To collect leeches, your group will construct a trap. Drop fish heads, beef kidneys, bones, or other bait into a coffee can, and crimp the top so that it closes somewhat. Place the coffee can in water where winds move currents gently, so that the smell of the bait can be dispersed. Be sure that sunlight cannot penetrate to your trap, or leeches will abandon it.

Insects:Aquatic insects in their larvae form generally make excellent bait. Turn over rocks in shallow water to collect caddis cases, stonefly nymphs, and other insect larvae. Near shore, gather mud, leaves and sticks and sort through the materials to find insects such as dragonfly nymphs. Look for stream waterworms in mud and leaves in silty deposits downstream from fallen trees.

Frogs:Frogs prefer marshy areas and edges of streams of creeks. Certain species of frogs prefer to live near aquatic vegetation in deep water. During warm summer days, frogs can be chased and caught by hand or with nets. Your hunt will be most successful if you have chosen the right marshy habitat.

Helpful Tips:Be sure to minimize your impact on the pond or lake area you are studying. Do not release unused bait into the lake! (This is how we get invaders into lakes!)

Questions for Discussion:

Why do you find so many insects under rocks?
Answer:Because dark, moist areas are many insects preferred cover.

Why do earthworms burrow deeper in the winter or during rain?
Answer:To keep warm or dry.

Could you live in a pond? Would there be enough things to keep you alive?
Answer:Responses will vary, but probably not. The winter would be too cold, and food sources would be limited.

THE FISHING TRIP-CHAPTER 6

Learner Outcome:To demonstrate ethical fishing and care in handling fish; to be able to demonstrate competence in fishing techniques in order to pursue fishing as a recreational, educational, and self-protecting activity.

Introduction

Many factors--from fish populations to water quality to anglers themselves--affect a lake, pond, or stream. These components--some simple, some complex, but all interrelated--have positive and, sometimes, negative effects on our water resources. It is important that future users and consumers respect and understand their environment.

In this chapter you'll help participants combine the information and skills gained from the pervious activities and apply them 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, youth activities will include ethical fishing, care in handling fish, and practicing stewardship.

A fishing trip can be an exciting opportunity for exploring the shoreline, observing and identifying plants and animals, and for watching people interact with their environment. Fishing is also a good time for introspection and renewal.

SAFETY, FISHING REGULATIONS REVIEW AND SELECTING A FISHING SITE

Purpose:To identify safety items that will be at the program sight; to demonstrate the safety rules followed while casting and fishing; and to understand fishing regulations that apply to the fishing location.

Level:All

Reference:Sport Fishing and Aquatic Resources Handbook, pages 14-19,26-30. Minnesota Fishing Regulations (Current Year Copy).

Site:At the shoreline site, or Indoors

Time:15 minutes

Supplies:First Aid Kit, throwable life cushion (PFD--Personal Flotation Device) with 50 feet of rope attached to it, rod and reel with hook, sinker and bobber rigged, Minnesota Fishing Regulations (Current Year Copy) for each participant to keep.

Group Size:3-25

Activity:This activity will include a discussion about fishing safety and fishing regulations relevant to the lake or stream you are visiting. You will lead this discussion and then follow up with simple questions to reinforce the learning.

Safety

Begin with the safety equipment that you will have at the shore. Identify the First Aid Kit and the throwable life cushion and indicate where they will be located at the water's edge.

Talk about how to assist a person in the water that is in danger. At the program, your group should be taught to locate an adult or call 911 IMMEDIATELY if someone is in danger. The life cushion and poles are available for adults only. Participants should yell, scream, and attract attention at MinnAqua clinics if someone is in danger, but liability does not cover the youth aiding the person in the water themselves.

Show your group how to wear a life jacket. Put a life jacket on a volunteer, and show the correct way to fasten all of the snaps and zippers. Discuss how to match the user's weight and size with the jacket.

Another important topic is casting safety. Discuss safe casting techniques including: looking behind for other people before casting and looking for overhanging trees and power lines in the area. Review hook safety and what to do if a hook gets imbedded in someone's hand (the MinnAqua program requires that a doctor, not the leader, remove the hook).

At this time have the participants set rules that they will follow at the site.

Regulations

Discuss the types of fish that may be caught at the lake/stream that you are visiting and safe ways to handle those fish. Along with the review, include regulations that may apply to those fish. Finally share with the participants the details on how you selected this fishing site. Discuss where they might fish in the future. Bring along a local map and show other lakes in the area. Encourage them to bring a friend or a parent fishing for safety and to share the experience.

Helpful Tips:Make sure there is enough space (ceiling height) to demonstrate casting safely.

Questions for Discussion

Where are the First Aid Kit and the throwable cushion located?
Answer:(The location you have chosen)

Name the types fish you may catch and the regulation that apply to those fish.(As the leader you can break this down in to many short questions)
Answer:Will vary with species, use Minnesota Fishing Regulations.

FISHING TIME

Purpose:To apply the knowledge gained at the program to a fishing situation; to demonstrate actions of good angler ethics and stewardship to the aquatic resource and its surroundings;

Level:All

Reference:Sport Fishing and Aquatic Resources Handbook, pages 26-30. Minnesota Fishing Regulations (Current Year Copy). An Angler's Guide to Catch and Release, Minnesota Department of Natural Resources.

Site:At the shoreline fishing site(see site evaluation form)

Time:45-120 minutes

Supplies:First Aid Kit, throwable life cushion (Personal Flotation Device) with 50 feet of rope attached to it, rods and reels with hook, sinker and bobber rigged (one for each participant,popcan reels can be used here),bait (worm, minnows, leeches, or wax worms),bait containers, strings or pails for fish if keeping them, basic tackle box with extra hooks sinkers bobbers pliers and line cutters, landing net (optional).

Group Size:3-25

Activity:The shore fishing experience may be a major highlight of the summer for many participants. It also might be their first time ever fishing. Keep this in mind, as some participants may encounter difficulties with things that you think are simple; for instance, baiting a hook with a worm.

Prior to starting this activity you will need to determine if you want the participants to keep or release the fish they catch. If you plan on releasing the fish, you will need to demonstrate the techniques used to release a fish unharmed.

To begin the activity describe the fishing area to the participants and set boundaries if necessary. Then hand out rods and reels. You will need to set up a bait location or have few bait containers spread out along the shore line for participants. Through out the activity promote good fishing ethics and use situations that many occur as teachable moments. Remember, fishing (as with other youth activities) should be a win-win situation. The participants who don't catch any fish should still have a positive experience!

At the end of the activity have the rods and reels turned in and have a clean up time. And remember stewardship: leave the shoreline in better condition then when you to came!

Appendix A

MinnAqua Material Request Form

Name

Address

City/State/Zip

Phone number

I am conducting a MinnAqua Urban Angling Program:

Date:

Time:

Location:

Organization:

Group size:

The program liability will be covered by:

Organization (enclose "Release from Liability Coverage and Hold Harmless Agreement" signed by organization representative)

Parents/guardians (enclose "Fishing Clinic Event Liability/Photo Release" for each participant signed by parent or guardian)

MinnAqua

Materials requested from MinnAqua

Printed

Youth Booklet
Managing MN Fish Series
- Managing MN Fish
- Bass
- Panfish
- Pike & Musky

Stream Trout
Catfish
Lake Superior

Catch & Release Booklet
Catch & Release Rule
MN Fishing Regulation

Goodie bag (1 - 5 hours program)

Goodie bag with tacklebox (6 hour program)

Equipment

Fish Pictures
Fish Printing Kit (Paint, brushes, paper)
Water Quality Testing Kit
Urban Lake Game Kit (Clear tube, food colorings, silt shaker, fish, etc.)
Pop can Kit (line, line cutters, tape, casting plugs)
Rods & Reels
Basic Tacklebox for leader
Shoreline Safety Kit (Throwable cushion with rope & First Aid Kit)

Appendix B

MinnAqua Program
Release from Liability Coverage and
Hold Harmless Agreement

In consideration for participating in the MinnAqua Program to be held on
at
from
to
, the undersigned

authorized representative hereby states that liability coverage is 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.

Signed:

Group Name:

Authorized Representative

Address:

Date:

Phone: ( )

DNR - Section of Fisheries
Box 12
500 Lafayette Road
St. Paul, MN 55155
(612) 296-3325

MN Extension Service, 4-H
340 Coffey Hall
1420 Eckles Avenue
St. Paul, MN 55108
(612) 625-4774

4-H

DNR - Section of Fisheries

Box 12

Hall

500 Lafayette Road
St. Paul, MN 55155

55108

(612) 296-3325

MN Extension Service

340 Coffey

1420 Eckles Avenue
St. Paul, MN

(612) 625-4774

MinnAqua Volunteers Are Expected To:

1. Be committed to the programs goals and objectives.

2. Be punctual and dependable.

3. Carry out duties promptly.

4. Notify appropriate personnel if unable to fulfill commitments.

5. Be available to assist other program volunteers.

6. Use equipment only for program activities, and only at authorized times.

7. Be friendly and courteous to all students, visitors, and other program participants.

8. Maintain a professional attitude before, during, and after all activities.

9. Refrain from smoking or chewing tobacco during scheduled activities.

10. Refrain from the use of profanities, obscenities, and other unbecoming language.

11. Refrain from the use of alcoholic beverages and non-prescribed drugs during scheduled activities.

12. Maintain accurate records as required.

Specific Requirements for MinnAqua Program Volunteers

1. A current fishing license is required for any volunteer, over 16 years of age, participating in any activity defined as fishing in the Minnesota fishing regulations.

2. No conservation convictions in the past two years.

3. Willingness to take responsibility for specific projects under the direction of program personnel. Assignments will be based on volunteer's interest and/or expertise.

Duties:

1. Provides support services based on areas of interest and expertise.

2. Assists program personnel and volunteers in instructional and/or non-instructional activities.
-Volunteer Time Sheets, Expectations and Logistic Evaluation

Appendex C

MinnAqua Fishing Clinic Event
Liability/Photo Release

Name:

Address:

City: State: Zip:

Phone Number: Age of Participant:

As parent or legal guardian of the above named, I certify that said person has my permission to attend and participate in this MinnAqua Fishing Clinic Event sponsored by (list agencies involved) on (day of week), (date), 19(year), at (location). The event will run from approximately (time) to (time).

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.

In signing this form, I hereby waive and release all other participants, the host, sponsors, and all other officials or parties involved in the event from all claims and/or damage incurred in connection with this event.

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.

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

DNR - Section of Fisheries
Box 12
500 Lafayette Road
St. Paul, Minnesota 55155
(612) 296-3325

MN Extension Service, 4-H
340 Coffey Hall
1420 Eckles Avenue
St. Paul, Minnesota 55108
(612) 625-4774

Dear Parents or Guardians:

Greetings from the MinnAqua Program. Your child has expressed an interest in

attending a MinnAqua event/clinic. Trained Urban Angling volunteers or staff will be teaching him/her about fishing gear, rules, fish management, ethics and safety. During this event, there will be opportunities to go fishing, practice casting, identify fish, as well as, receive sportsmanship tips, safety and aquatic ecology. MinnAqua will provide fishing gear and bait.

The goal of this program is to get kids excited about fishing by giving them a "hands-on" experience; therefore, your child needs to come dressed for the weather and to bring a hat and sun screen lotion.

Please fill out the form on the back side of this sheet to grant your child permission to participate in this MinnAqua Program. Then return the form to the office address below or bring it to the event. A photo release is included so that we may use pictures from the event, which might include your child, to promote the MinnAqua Program.

If you have any questions, please contact:

Staff Person Address Phone

We look forward to having your child join us for an exciting time. If you would like to accompany him/her, you are more than welcome to do so.

Sincerely,

The MinnAqua Program

Appendex D

MinnAqua Shorefishing Site Information/Safety Plan

Date:

Body of Water:

Town:

County:

Shoreline Access: [ ]None [ ]Town [ ]City [ ]County
[ ]State [ ]Private

Owner's name/phone/fees, etc.

Parking/Fee/Handicapped:

Describe Wheelchair Access: (Relatively flat, steephill, etc.)

Bus Route/Identify:

Shoreland Access:

From Shore:	From Pier:
[ ] Good	[ ] Good
[ ] Fair	[ ] Fair
[ ] Poor	[ ] Poor
[ ] Spring	[ ] Spring
[ ] Summer	[ ] Summer
[ ] Fall	[ ] Fall

Fish Species:

Attach Commericial or Drawn Map: (If drawn,use back of form) Indicate; access(es), fishing areas, piers and wading spots. Name roads and locate North. Note obstacles; weeds, sunken log locations, soft or marshy areas. Also indicate heavy seasonal use and important services available nearby.

Comments:

Contact: (My name/address+zip/area code+phone)

MinnAqua Program
DNR, Section of Fisheries
Box 12, 500 Lafayette Road
St. Paul, Minnesota 55155-

(612) 297-4918

4012

A Fishing Trip (Check List/Safety Plan)

Site:

Date:

Time:

Instructor:

Helpers: (1 Helper per 5 youth)

Closest Telephone: Pay Private (Circle One)

Location:

Emergency #:

Hospital #:

Emergency Plan:

Adult Roles:

Stays with hurt youth:

Goes to telephone:

Stays with group:

Safety Equipment Check List:

- First Aid Kit
- Throwable PFD with rope (Keep at water's edge)
- Fire extinguisher (if cooking)

Fishing Equipment Check List:

- Rods & Reels (#)

Tackle Box

Bait (Types:

Bait coolers

Strings/5 gal. pails

Hand towels (if paper, bring garbage bags)

Other Activity materials:

Appendex E-Program Planning Sheets

Urban Angling Special Event
(1 Hour Special Event)

Materials:

5 minutes - Welcome and Introductions

20 minutes - 1 Activity from Chapters 1 - 4:

20 minutes - Soda can or rod-reel rigging/casting for cover

10 minutes - 1 Activity from Chapter 5

5 minutes - Review and Closing

Note: No fishing involved in 1 hour special event.

Urban Angling Special Event
(2 Hour Special Event)

Materials:

5 minutes - Welcome and Introductions

25 minutes - Activity from Chapters 1 - 4:

25 minutes - Activities from Chapter 5:

10 minutes - Discussion on Safety, Ethics & Regs

45 minutes - Fishing Time

10 minutes - Review and Closing

Urban Angling Special Event
(3 Hour Special Event)

Materials:

5 minutes - Welcome and Introductions

25 minutes - Activity from Chapters 1 or 2:

25 minutes - Activity from Chapters 3 or 4:

10 minutes - BREAK

35 minutes - Activities from Chapter 5:

10 minutes - Discussion on Safety and Regs from Chapter 6

60 minutes - Fishing Time

10 minutes - Review and Closing

Urban Angling Special Event
(4 Hour Special Event)

Materials:

10 minutes - Welcome and Introductions

20 minutes - Activity from Chapter 1:

10 minutes - Fish ID

25 minutes - Activity from Chapter 3:

25 minutes - Activity fromChapter 4:

10 minutes - BREAK

30 minutes - Activities from Chapter 5:

10 minutes - Discussion on Safety & Regs

90 minutes - Fishing Time

10 minutes - Review and Closing

Urban Angling Clinic
(6 Hour Clinic)
1 Day

Materials:

10 minutes - Welcome and Introductions

35 minutes - Activity from Chapter 1:

15 minutes - Fish ID

25 minutes - Activity from Chapter 2:

10 minutes - BREAK
35 minutes - Activity from Chapter 3:

35 minutes - Activity from Chapter 4:

35 minutes - Activity from Chapter 5:

10 minutes - BREAK

15 minutes - Activity from Chapter 5:

15 minutes - Safety & Regs

100 minutes - Fishing Time

20 minutes - Review, Awards, and Closing

Urban Angling Clinic
(6 Hour Clinic)
2 Days (3 Hours/Day)

Materials:

(Day One)
Date/Location

10 minutes - Welcome and Introductions

35 minutes - Activity from Chapter 1:

15 minutes - Fish ID

25 minutes - Activity from Chapter 2:

10 minutes - BREAK

35 minutes - Activity from Chapter 3:

35 minutes - Activity from Chapter 4:

15 minutes - Activity from Chapter 5:

(Day Two)

Date/Location

10 minutes - Welcome & Review Activities from Chapters 1, 2, 3, 4 & 5

40 minutes - Activities from Chapter 5:

10 minutes - Review Safety & Regs

100 minutes - Fishing Time

20 minutes - Review, Awards, and Closing

Urban Angling Clinic
(6 Hour Clinic)

Materials:

3 Days (2 Hours/Day)

(Day One)

Date/Location

10 minutes - Welcome and Introductions

35 minutes - Activity from Chapter 1:

15 minutes - Fish ID

25 minutes - Activity from Chapter 2:

35 minutes - Activity from Chapter 3:

(Day Two)

Date/Location

10 minutes - Welcome & Review Activities from Chapters 1, 2, & 3

40 minutes - Activity from Chapter 4:

10 minutes - BREAK

60 minutes - Activities from Chapter 5:

(Day Three)

Date/Location

5 minutes - Welcome & Review Activities Chapters 1 - 5

10 minutes - Safety & Regs

100 minutes - Fishing Time

10 minutes - Review, Awards, and Closing

Appendex G-Event Statistics and Roster

SPECIAL EVENTS OR NIBBLES

Date: Site: County:

Leader: Phone Number

Helper(s):

Co-sponsor(s):

Liability Coverage: (Cir.) MinnAqua Sponsor Student

Program Length:(Hrs.) Number of Participants: Gender: F M

Age Range: 0-8 9-15 16-20 21-64 Over 65

Race: AA BL C H NA Unknown

Disability: E H M MU S

Program Cost:

Donations:

Event Comments:

Return to:

MinnAqua Program Class Roster (Use for six hour clinics)

EVENT:(Circle): Training Clinic LEADER: PHONE:

KEY TO OPTIONAL QUESTIONS

SPONSOR: SITE: COUNTY: Gender: F-Female M-Male

Age: A-0-8 B-9-15 C-16-20 D-21-64 E-Over 64

HELPERS: Ethnic: AA-Asian American BL-African American C-Caucasian

H-Hispanic NA-Native American Other

CERTIFICATION DATE: MINNAQUA CONTACT:

Disability: E-Emotional H-Hearing M-Motor MU-Multiple S-Sight

Name/Address/Phone # Parent/Guardian	Answers Optional Gender	Age	Ethnic	Disability	Class #1	#2	#3	#4	#5	Got Cert
EXAMPLE: Sally Jones, 1400 E. Fish Lane, St. Paul, 55108, 646-3300 Tim Smith (Grandpa)										
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										

Appendex H-Volunteer Time Sheets, Expectations and Logistic Evaluation

VOLUNTEER TIME SHEET - INSTRUCTIONS

Please fill out the attached form for all volunteer activities in which you are involved. If you take on the project of setting up and conducting a clinic in your area, be sure to keep track of all your time and mileage traveled for that project. Then submit the form at least one week after the event.

TYPES OF ITEMS TO INCLUDE IN YOUR RECORD KEEPING:

1. Travel time and mileage to and from training sessions, clinics, and any work involved in assisting the program.

2. Preparation time - before, during or after conducting clinics, special events, and/or school talks.

3. Developing educational aids for use by instructors, students, and the general public.

4. Publicity.

5. Art work, photography.

6. Typing and other clerical functions.

7. Phone calls - time and costs.

8. Donations - fair market value (submit itemized list)

9. Surveys - water access, questionnaires, shore fishing areas.

VOLUNTEER TIME SHEET

Name Phone

Address Zip

Event Date
Co.

DATE	DESCRIPTION OF WORK	MILES TRAVELED	TIME INVOLVED	DONATIONS

MinnAqua ADVISORY COMMITTEE MEETING
June 20, 1990

Present: Sue Anderson, Steve Bilitz, Dick Byrne, Bob De Vries, Linda Erickson-Eastwood, Jeri Ezaki, Bud Fuchs, Bob Gibson, Roger Grosslein, Ilo Howard, Mary Kroll, Jane Lampland, Steve Laursen, Judy Melander, John Miller, Karen Van Norman and Martin Weddington.

Introduction:

Linda Erickson-Eastwood, Aquatic Resource Coordinator, gave a brief synopsis of her background. She then gave a clarification of LCMR's Project, known as the **MinnAqua** Urban Angler Program. The Urban Angler Project is only one piece of the **MinnAqua** pie. DNR is committed to "Aquatic Education" and is working on a statewide program that will include a variety of topics:

(1) Urban angler
(2) Mobile displays for nature centers
(3) Specialty programming, i.e. water quality, catch and release, and acid rain
(4) Volunteer and teacher training
(5) School classroom

Goal: To make all these pieces work together forming the whole pie--which will be called the **MinnAqua Program. MinnAqua** will eventually become the umbrella program with LCMR funding the urban angler portion only.

Linda E. encouraged all members of the advisory committee to not limit their expertise solely to LCMR's **MinnAqua Program** but to be open and available to help provide information to the DNR for the statewide program.

Personnel Update & Training:

Three Program Assistants were hired: Dale Eggert working at Ramsey County; Michelle Kvale working in the St. Louis County; and Anthony Rhines working in Hennepin County in cooperation with Hennepin County Parks. Formal training of these PA's has been completed and they are beginning to conduct trainings and clinics.

Ilo Howard is leaving the **MinnAqua Program** to finish her bachelor's degree. She has been very supportive and active in our program. Even though we will be filling her position, we will not be getting another "Ilo." We wish her the best. Interviews will begin July 11. Four of eight applicants will be interviewed by a panel of five people.

Ilo Howard, on behalf of Steve Bilitz and herself, gave a special welcome to Linda for bringing such exciting components to the program and being so great to work with.

Introductions of all **MinnAqua** Advisory Committee members:

Dick Byrne, Assistant Director of Extension Service and as the Director of the Minnesota 4-H Program, who is temporarily filling in for Larry Karels who recently resigned. Jeri Ezaki, Hennepin County Extension Office. Jane Lampland, Minnesota Community Education Association. Martin Wettington of St. Paul, Twin City Reel and Trigger Club and Minnesota Conservation Federation Council representative. Judy Melander, DNR, Bureau of Information and Education. Bob De Vries, past President (project leader) of MSC. Steve Bilitz, **MinnAqua Program** leader. Roger Grosslein, DNR and coordinator of the Hunter Education program in Minnesota. Mary Kroll, new to MN 4-H from doing some curriculum development in Natural Resources, providing some problematic support. Sue Anderson, working at the Science Museum of Minnesota. Bob Gibson, Program Supervisor for Hennepin County Parks and who works with Jeri Ezaki and Anthony Rhines. John Miller, Environmental Education Specialist for the Department of Education. Steve Laursen, Program Leader for Natural Resources Programs at the University of Minnesota and Extension Service. Karen Van Norman, Coordinator of Project and Aquatic Wild at the DNR. Ilo Howard, **MinnAqua** Program coordinator. Bud Fuchs, U.S. Fish and Wildlife who works to help secure federal funding for the statewide **MinnAqua Program.**

Volunteer Training and Student Clinics:

Steve Bilitz and Ilo Howard reported on the projects done at Hallie Q. Brown, Powderhorn Park, and Northeast Minneapolis YMCA. Volunteer trainings at all three locations, produced student clinics. Presently volunteer trainings are being conducted at Brooklyn Center Community Center (Minneapolis) and at Ramsey County Park and Recreation (Maplewood). Student Clinics are to follow.

Michelle Kvale, St. Louis County Program Assistant, just completed a 2-week Adventure staff Day-camp Counselor training. She is also planning a youth session, June 20-22, at the Duluth YWCA. Michelle will be conducting volunteer trainings, clinics and day-camp sessions throughout the summer. Day-camps are very popular and a well respected program in the Duluth area for summertime youth activity.

Ilo H. reported that all event information is currently being entered into Dbase files for information, tracking, and reporting purposes. One area we have yet to master is in delivering this kind of program to our special populations, (i.e.: Hmong, Asian, American Indian and Hispanics) since traditional methods are not very effective. John Miller then asked the following questions: 1) How many volunteers have been trained? Ilo H. and Linda E. reported approximately 65 have been compiled and put onto the computer files. 2) How many student sessions? Linda E. reported that to date, only four full student sessions had been completed. 3) How many participants? Ilo H. reported that there was an average of 18 youth per completed clinic. Linda said that many of the program statistics have not been compiled, but when they are a copy will be submitted to the LCMR and committee members.

Martin W. wanted to know how volunteer training/student clinics impacted day-camps. Martin asked Bob G. if St. Anthony or Phyllis Wheatley have camps and if Hennepin County participates--or Hallie Q. Brown--any Older Boys Clubs? Bob G. said that such camps exist. It is just a matter of getting in contact with the leaders running the camping programs to see if **MinnAqua** would be given an opportunity to make a presentation or do a session. Linda E. highlighted two upcoming programs: 1) Wilder

Forest with youngsters from Neighborhood House and Hallie Q. Brown will have career development event underneath the statewide **MinnAqua** program; 2) Steve B. will work with Minneapolis Parks to take two or three youngsters from each Park and bring them to Theodore Wirth once a week throughout July for a special event. Linda E. asked the committee members to provide her with any additional camps who are potential prospects and should be added to the schedule. Martin W. spoke of the Older Boys Club from his past. Ilo H. mentioned that this organization has not been responsive to her calls or the efforts being made in their direction.

She also spoke of being formerly involved in using fishing as therapy with pre-delinquent youths. There are numerous groups needing this program. We do need to determine which populations to reach and in which priority. Speaking from personal experience, she had found foster home programs to be very important.

Special Events:

Soaring Eagles, an American Indian organization, had several shortened sessions conducted for youngsters ranging in age from 9 to 14. The objective in running a shorter session was is to provide a "taste" of what the **MinnAqua Program** can do--also used as an informational session.

Dowling School (Minneapolis school with Environmental Education emphasis) also got a "student nibble" of the **MinnAqua Program.**

The Northwest Sports Show was a "Minnie Nibble" done by Steve Bilitz. The presentations were 8-10 minutes long and done twice a day over the weekend.

The Panfish Opener was a conglomeration of the different training groups (Hallie Q. Brown, Powderhorn Park and the NE Mpls. YMCA) and the public. John M. had suggested that we use the opening weekend to introduce and publicize a never before "Panfish Opener." This was successfully accomplished with good media coverage on the front page of Mpls. Star! Ilo H. inquired if anyone had seen or heard any other publicity on the Panfish Opener? Judy M. related that one of the questions asked in publicizing the Walleye Opener, was "do you have anything going on in the Twin Cities?" The media are always "going north" to publicize some fishing event, so this was a wonderful way to let them know about what was going on in the Twin Cities.

Steve B. reported that there was an excellent attendance at the Panfish Opener! The day was spent doing activities which involved everyone: Soda can competition, fish printing, and fish fry. Representative Kahn gave a presentation at the awards program. The day provided a great way for everyone to get "A Taste of **MinnAqua**!" Over 250 kids and 125 adults registered and got fed. Ilo felt that "The most important part of the event was when the kids from Hallie Q. Brown got really psyched and snockered the other two teams 30 to 1 in the casting competition. They had practiced what they had learned from the clinics and were on "cloud 9" after getting 1st place. Recently, the 1st place Fish Bowl for the "First Annual Panfish Opener and Soda-Can Contest" was presented to the Hallie Q. Brown team. The fish bowl will be a traveling recognition award for other such competitions.

Two additional highlights from the Panfish Opener: 1) Representative Phyllis Kahn became the proud owner of her very own soda can and long rod to fish with and, 2) The print donated by artist, Jon Wright called, "Sun Bay Bluegills" and framed by Wild

Wings. Linda E. clarified that this painting will be presented to organizations who contribute facility, time, and staff that goes far beyond normal expectations. The organization will have this award for one year in recognition for helping support the **MinnAqua Program**. The first recipient of the award was the Minneapolis Park Board.

Bud F. then asked, "How many volunteers or adult supervisors did it take for this event of 250 kids?" Steve B. responded by saying, "125 adults! which included parents, volunteer trainers from the three centers, Powderhorn Park staff volunteers, and **MinnAqua** staff." Jane L. suggested that in the future there needs to be more volunteer staff. Linda E. clarified that some volunteers did not come. Jane commented on how well the volunteers worked and attended to the needs of all participants. Steve B. supported her comment.

Program Evaluation Comments:

Steve L. praised the program and recognized the Staff's efforts in collecting a fare amount of information to document all accomplishments in terms of attendance. He questioned the staff on what has been done to document its accomplishments in terms of knowledge, behavioral changes, value judgments, etc. "Are there plans to move in that direction?" he asked. Linda E. stated that part of his inquiry will be covered in a sub-committee meeting and that he might want to join the Operations subcommittee for that discussion.

Dick B. spoke reinforcing Steve L.'s focus which is the real bottom line of all this even though we say, "Wow, it's a lot." Evaluation is a serious concern and one the committee and staff needs to dedicate energies toward better defining. We need to do this not only to secure funding and prove that the public dollars and the time put into this program have value, but that we have to rest assured it will make a difference in the lives of people in this state and particular among our own personnel. Steve B. added that making that difference is so much more important than any of the numbers you might see.

Ilo H. clarified that this program represented a pilot non-traditional, non-formal education process and that formal education should come later. The **MinnAqua**-Urban Angler is a pilot program used to reach the community and get things going. This program is a way to try out or take a look at non-formal education techniques. The results will be seen in the first year. She doesn't think we should mix evaluations of how to judge or measure the benefits of this program with those of formal education. Steve L. responded by stating that she was mixing apples and oranges--formal and informal. One thing Steve feels is that you have to do regardless of how long-term your program is to find ways to measure what you are trying to accomplish right from the start. Ilo H. referenced the DNR Bemidji Aquatic Resources Attitude and Knowledge Survey that is being done. This study may be the baseline data which this program can use to later survey our people. Linda E. mentioned that these are some of the things that she wants to discuss in the evaluation sub-committee. We need to see what we want to accomplish. Attitude and behavioral evaluation are needed. We need to know how to ask the questions to get those answers.

Steve L. spoke advocating the opportunity for youth to experience the out-of-doors--coming in contact with their environment, to become sensitive to it and have respect for it. Those are very powerful and long-lasting memories. Ask any kid what he or she remembers about school and their answer will most often be, "field trips." That is part

of what we should measure--the love and desire attitude. He is more concerned about the ability of us to measure those things.

John M. commented that we may be at a point where we should begin to attach experiences to learner outcomes for measurement purposes. Concern and sensitivity for our environment through such positive experiences as this program offers is primary.

Jane L. felt that each organization will perhaps have a different emphasis toward aquatic education based on a number of variables. Ilo H. shared that she would also like measured the importance of mentors--inter-generational networking. (i.e., Seniors and youth.) J. Miller shared concern about results based on a lot of money going into this program. Hard to measure how this will make a difference.

Linda E. clarified that right now the LCMR was evaluating our success by asking for a report that showed how we were reaching our target populations--Blacks, Whites, Espanics, and other cultural groups--what groups working with and in what counties. Linda said that evaluations would be discussed more extensively in the Operations sub-committee.

Bob G. voiced concern in how we plan to evaluate behaviors and changing attitudes, and how to clarify it for LCMR's use. He cautioned that some of these special populations, have a lot more social factors to be concerned with in getting these answers than what this fishing program can address. If we are looking for concrete answers, we will have to go a little bit deeper than just what the fishing program has to offer. If we are not aware of the social interactions of each group, the conclusions we come up with might not be accurate. For example, what represents success to one group is not to another. Perhaps our evaluations should be fashioned around each individual group. This is a societal problem that we are going to have to work through.

Ilo H. spoke of various orientations--educational circles vs. social psychology circles.

BREAK:

Linda E. broke the discussion to present Ilo with a going away gift and cake in recognition of her dedicated work to the **MinnAqua Program.**

TAK Fishing Weekend:

Steve B. reported that evaluations from that week-end event are coming in from the 270 Information Packets sent out. The goal was to: 1) get more people out fishing, 2) publicize the **MinnAqua Program,** 3) look ahead to other parts of the state and find potential organizations that may have interest in hooking up with the **MinnAqua Program.** Ten evaluations have come in. With each evaluation turned in, the recorder/organization receives a certificate signed by the Governor thanking them for sponsoring a TAK Fishing event.

Judy M. reported on the recent White Bear TAK Fishing event. Approximately 83 kids, split up between St. Joseph's Home for Children and Gillette Children's Hospital, were taken out to fish. Half of the kids were of diverse cultures. Goal: 1) Create unity via hats and T-shirts, rods, reels and tacklebox, 2) Demonstrate to the public a simplified process of going fishing (30 events are going on in the north). St. Joseph Home for

Children will use their equipment for an upcoming weekend trip and have plans to take more summer fishing outings in the future. This would not have been possible otherwise. Gillette tells her that this event is also worth a lot to the kids and is growing. **MinnAqua** could take over this event and other summertime events if we wanted to. Judy M. stated that her division is getting more and more requests from handicapped groups to be involved in fishing. St. Joseph's uses it as a "behavioral carrot" for kids and if they don't make it, they are not able to participate. 27 kids from St. Joseph's were in attendance at this TAK Fishing event.

MinnAqua needs to determine if TAK will become one of its annual events.

Bob G. wanted to know how it is run and how tightly rules are adhered to.
Judy M. clarified that one adult was paired with a child but she doesn't enforce it.
Bob G. asked if there is a possibility of taking a kid fishing in the wintertime?
Judy M. responded that the Bass Federation and DNR have talked about it, but DNR would rather act in an advisory capacity and/or supply materials for such a program. **MinnAqua** should take a look at this, since the Bass Federation is willing to help with a wintertime fishing event. Judy shared photos taken of various kids who participated; some of these children were severely handicapped.

Judy spoke of needing a marketing plan. Many responses from outside the Urban area are coming in requesting to be included in future events. Some interest has been voiced in having **MinnAqua** as a part of the Aquatennial.

Judy M. said that the Bass Federation experienced a burn-out this year with the TAK event and does not want to take full responsibility for any special events like TAK Fishing.

Jane L. aired concern about the possibility of overextending our efforts but also taking advantage of ready-made opportunities. One of our roles might be to continue to find a sponsor who feels ownership of the program to the point of caring the burden of administration. We need to discuss reasons for "burn-out" of the volunteer groups.

Judy M. spoke about the volunteer celebrities: Dale Thompson, Chris Gaters, Matt Stevens, John Melander, and the Shiek, a professional wrestler. These celebrities were excellent role models and really help make the event special for the kids.

<u>Curriculum up-date:</u>

Steve passed out a sample of the various fishing materials included in the revised **MinnAqua** training folders. Volunteer leader training is split into five packets which take a minimum of 10-12 hours for training. Steve highlighted some of the changes within each packet. Kid Packet information is also available in the training packets as well as bound into a folder for each youth.

Mary K. being new to this program, inquired about what exactly is the aquatic education component? Are we teaching fishing, or are we teaching aquatic education? Mary asked for clarification of how the events are structured. Ilo H. defined it as "teaching aquatic education through learning how to fish." There is a very strong emphasis on fishing techniques, resource, knowledge and understanding/appreciation of and for our

natural resources through the process of a common language called fishing. Linda E.

added that copies of the curriculum materials and session outlines were available and would help to further clarify the structure.

Mary K. asked about what grade level the DNR Fisheries management brochure was geared to. Judy M. reported that it was geared to 9th grade reading level. Ilo H. commented that giving this brochure to each participant, is very important to them. Bob G. remarked that as we are talking about this, that something he recalls that was very valuable to him as a child was a South Bend information wheel that turned allowing you to select fish and fish information. Bob suggested that we look into a similar educational take-home learning tool.

Linda E. reported that she has a volunteer who will help us create an electronic board that can have velcro changeable components to provide a similar learning tool. Bob G. spoke of how many such educational tools are already in place/invented that we could utilize in our program. Ilo H. informed the group that it has been proposed and is being worked on to get up and running a call in "hot-line" to provide answers to fish and fish related questions of the caller.

Steve B. reported at length on student clinics and time length changes to accommodate needs of organizations. Currently a student clinic is six hours of instruction. How this is broken up is flexible depending on how it best accommodates the needs of the organization(s) and also accomplishes instructional goals. Linda E. further clarified that each sessions activities are prioritized to help insure coverage of most important concepts no matter how short time limitations are with any group.

Ilo H. pointed out the two key words highlighted in the leader pac units. Student clinics are not stiff or classroom-like atmosphere. Making learning fun is a high priority. Steve B. reinforced Ilo's point. Trying to train volunteers and give a "Taste" to our students at the same time became very difficult and non-productive. Linda E. explained the value of having three different levels of activities in order to minimize non-productivity; 1) Volunteer trainings, 2) Clinics, and 3) **MinnAqua** staff going out and putting on our own programs.

Incentives built into the program that are based on time commitments on the parts of organizations/individuals who are involved. We strongly encourage organizations to go through the entire clinic series: (listed on today's notes.)

Martin W. asked if we had looked at Arkansas's natural wildlife education program. Linda E. confirmed that the Arkansas program was implemented based on Missouri's program, and it worked well.

<u>Cooperative Projects:</u>

Steve B. reported that the Science Museum is going to provide vouchers for youngsters within the Metro area who are underprivileged and who completed their entire clinic training to visit the Museum's "H_2O" exhibit. Sue Anderson is to be recognized for all her work in getting this "perk" organized and ready to go. Thank you, Sue. Name list and contact will be supplied from the organization to the Science Museum. In the case that the trainee is not affiliated with a particular organization, we will personally process these people.

Program equipment: (on paper).

LCMR and AFA proposal.

Favorable and supportive comments were given! On June 1st the AFA was approved for Federal Aid Reimbursement. We are also looking into additional (RIM) funding.

The meeting was adjourned for lunch.

Notes of Sub-Committees

New Sub-Committee Membership:

Operations & Evaluations: Bob De Vries, Linda Erickson-Eastwood, Mary Kroll, Steve Laursen and John Miller

Communications: Sue Anderson, Judy Melander and Martin Weddington

Recruitment: Bub Fuchs, Bob Gibson, Ilo Howard, and Jane Lampland

Curriculum & Training: Steve Bilitz, Jeri Ezaki, Roger Grosslein and Karen Van Norman

OPERATIONS & EVALUATIONS:

1) Panfish Opener & TAK Fishing - big successes; should do more programs like this!

2) Need to evaluate:

- emotional feelings
- love/desire of nature
- stewardship
- specific learner outcomes--connect them
- individual change and institutional changes
- agency understanding
- mentors role and importance
- social factors involved

3) TAK Fishing.

- **MinnAqua** identity associated with this year's event
- 30 events centered in North
- 1/2 participants from other cultures at White Bear Lake program
- How many adults with one kid to be clarified in regulations
- Need similar events for winter
- Aquatennial is another event to get involved in

- Expand to other areas as volunteers and time permits
- Need more informational promotions before events to get others involved

4) Advisory Committee

- Is it a good mix for statewide? Not enough representation for statewide board.
- Balance and coordination between agency and private sector (actual users) needed
- $500,000 from Dingel Johnson (DJ) to use for education if get a project approved but don't need to use the monies for education
- Move to detailed plan for statewide program
- Bob De Vries against having D.J. or RIM monies used to work with the schools or support MES.

5) Things to measure and report on to maintain funding and support.

- Survey who goes fishing
- Organizational objectives and how to organize things in future
- Educational objectives keyed to learner outcomes
- Skills gained
- Environmental awareness
- Stewardship
- Intercultural/handicapped impacts for groups like Camp Confidence or Camp Courage
- How to build a working advisory committee
- Coordinate with other formal education projects: Aquatic Wild (biggest), Sea Grant, and Christine Kolinser's in-service model for teachers

COMMUNICATION COMMITTEE REPORT:

1) Recommendation:

MinnAqua Program needs an overall communication plan with subcommittee components (i.e. communication plan). The overall plan could then identify goals, allow prioritization, acknowledge existing networks (organizations, wildlife centers, community groups, other agencies, etc.), identify audiences, determine actions, and product development. Many questions are unanswered or at least not communicated. Such as who are **MinnAqua's** audiences (Legislature for funding, recruiting volunteers and sponsors, recipients, ?). A frustration is that the focus has been on product development only. (Yes, we realize why this has happened.)

2) Information nights and promotional materials:

There is a problem getting attendees to commit to a volunteer program. Recommendation: Information night is "scary"--too technical and overwhelming five sheets of expectations for the course and leader. Some comments are: Too many nights to commit to, and inconvenience of times and nights identified. Include more hands on activities--don't show, but involve. Keep it simple. Have fun!

3) Special Events:

Many opportunities exist. An immediate prioritization must be done. Upcoming events (that we know of) are; 1) July 14, Water Day at Science Museum of Minnesota. Should **MinnAqua** have display? 2) Aquatennial, August. We have received invitation to participate on weekend. Focus on kids. Who can work? What is exhibit? We would be included in ongoing plans and join many other exhibits. 3) State Fair. By next Wednesday, a commitment for display and written development has to be submitted if **MinnAqua** is to advertise program. Will **MinnAqua** staff/volunteer participation in Outdoor Stage programs? An evaluation of special events needs to be developed (by Operations & Evaluation subcommittee). Also, develop a annual calendar of events (include county fairs, community festivals, agency events). Would allow **MinnAqua** to tap into ongoing events and not invent new events, also permit advanced planning.

4) Product Development:

1) Brochure development - **MinnAqua** staff would have to create. Must determine need, is this the right vehicle for audience, and distribution. Big question. Can a brochure be developed to address all audiences? 2) Article in Minnesota Volunteer. Could be used by recruitment subcommittee as well as a complementary article for kids (every Minnesota library and school gets free copy). 3) Exhibit. Develop traveling display. Focus panels and individual audiences. Address--why should I get involved, show success stories, why **MinnAqua** is important in "my" community, etc. 4) Develop reporting system and improve visibility with Legislature. Include editorials, invitation to events, thank you's, etc.

RECRUITMENT COMMITTEE:

In addition to integrating the values of cultural diversity to all aspects of the program, MinnAqua has a legal as well as ethical responsibility to provide aquatic education opportunities to all groups within the state. It further has an opportunity to provide national leadership in providing aquatic education to special cultures, elderly and handicapped populations. The recruitment sub-committee recommends that this area of the program be given and requires special focus and allocation of staff and resources to accomplish a model program in this area.

Recruitment Recommendations:

- "Special population" contacts (newspaper, churches, elders, community leaders)
- Cultural diversity training for DNR (sensitivity to cultures)
- Empowerment of cultures
- Recruitment of culturally sensitive staff person
- Find out what they want/need then empower through employment and volunteers.

- Testimonials from community leaders about the importance and benefits of the program to their communities.
- Keep our eyes open for promising individuals in the program.

CURRICULUM & TRAINING:

1) Volunteer gifts of appreciation:

The care of volunteers is very important. Use of a gift like a **MinnAqua** T-shirt better idea than the book bag. Cost for T-shirt with **MinnAqua** logo approximately $5. each. Suggestion to start simple because these type of incentives can grow into an expensive proposition in a short period of time. As you gain many new volunteers, and this program can do that rather quickly, they will then expect the same gifts as the small number of volunteers received in the past.

2) Student gift "Goodie bags:

A good idea that should not be too costly. Include a small amount of useful fishing equipment that will get them started in fishing. Use donated items wherever possible. Weigh cost from a publicity standpoint.

3) Student Clinic format and materials:

The minimum of six hours is a reasonable length for full-fledged clinics. Use the shorter "Nibbles" to get potential student groups "hooked" into wanting more **MinnAqua** programs. During this pilot stage, use a basic clinic series, measure those results, and then revamp clinic length, if necessary. Get away from lecture/classroom talks to more hands-on, doing activities that teach the same concepts that are being talked about.

sb\6/20/90

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