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KEEPING YOUR CHILDREN DRUG FREE...

"Hooked On Fishing- Not On Drugs"



This booklet was developed by Future Fisherman Foundation® staff Dave Case, Sharon Rushton and Ann Romer with the assistance of Dr. Charles Flatter, drug prevention and child development specialist at the University of Maryland and Marcel Malfregeot, drug free schools coordinator for Harrison County Schools, WV. Additional input was provided by Verdie Abel, Ohio Division of Wildlife, and Mark LaBarbera, *North American Fisherman*. Graphic design and production management was provided by Phisz Design.

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The Future Fisherman Foundation is the educational arm of the American Sportfishing Association.

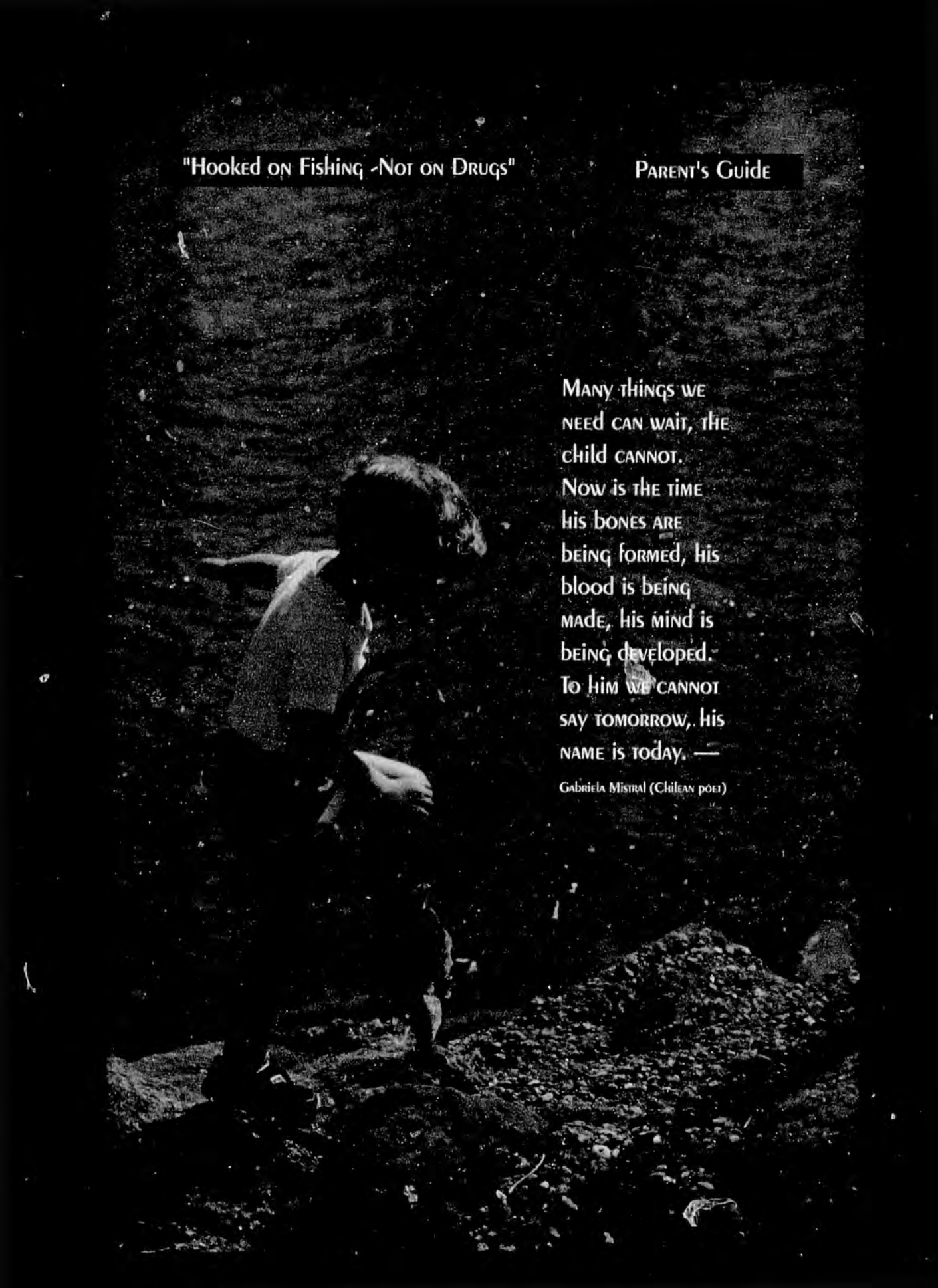
"Hooked On Fishing - Not On Drugs" is a program of the Future Fisherman Foundation.



American Sportfishing Association



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"Hooked ON Fishing -NOT ON DRUGS"

PARENT'S Guide

MANY THINGS WE
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child CANNOT.
NOW IS THE TIME
his BONES ARE
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blood IS BEING
MADE, his MIND IS
BEING DEVELOPED.
TO HIM WE CANNOT
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NAME IS TODAY. —

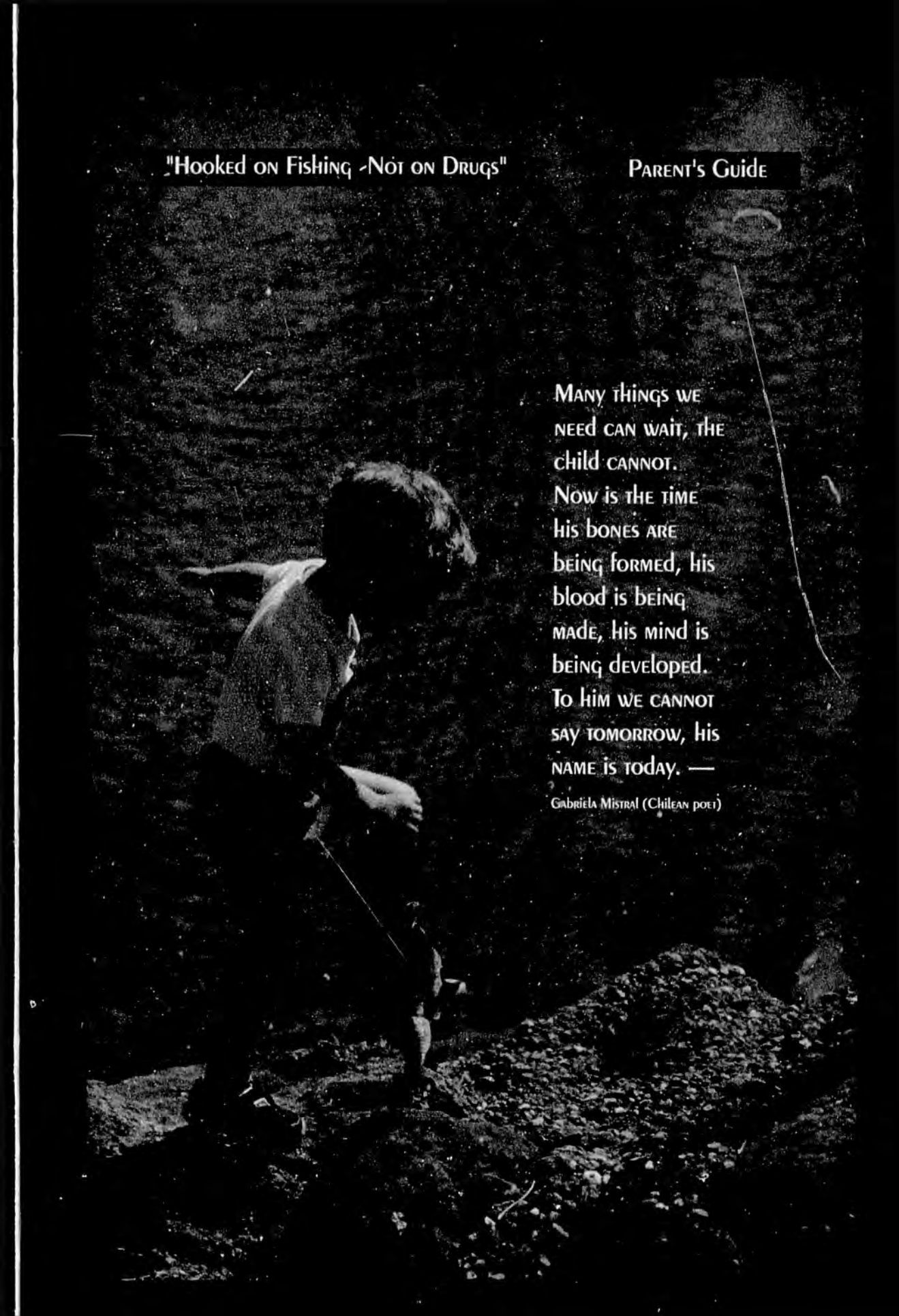
Gabriela Mistral (Chilean poet)

"Hooked ON Fishing -NOT ON DRUGS"

Sitting at the water's edge with your son or daughter, fishing lines extending peacefully into the rippling waters, just you and your child...does it make a difference? You bet! Can you do it even if you never fished before? You bet! This booklet will show you how easy it is...and how vitally important it is to your child's healthy future.

The most memorable times I had with my father and mother and two sisters were on our fishing trips. These were the times when we were a family, the times when we seemed to laugh and share. My dad started me fishing the streams of Colorado when I was about four years old. Through those fishing trips I learned so much while developing a special bond with my family. I learned an appreciation and love of the outdoors; I learned to be self-reliant; I learned values; I learned what was important in life. As I grew, I never felt the pressure or desire to experiment with drugs because I loved life as it was and did not want drugs or alcohol to interfere.

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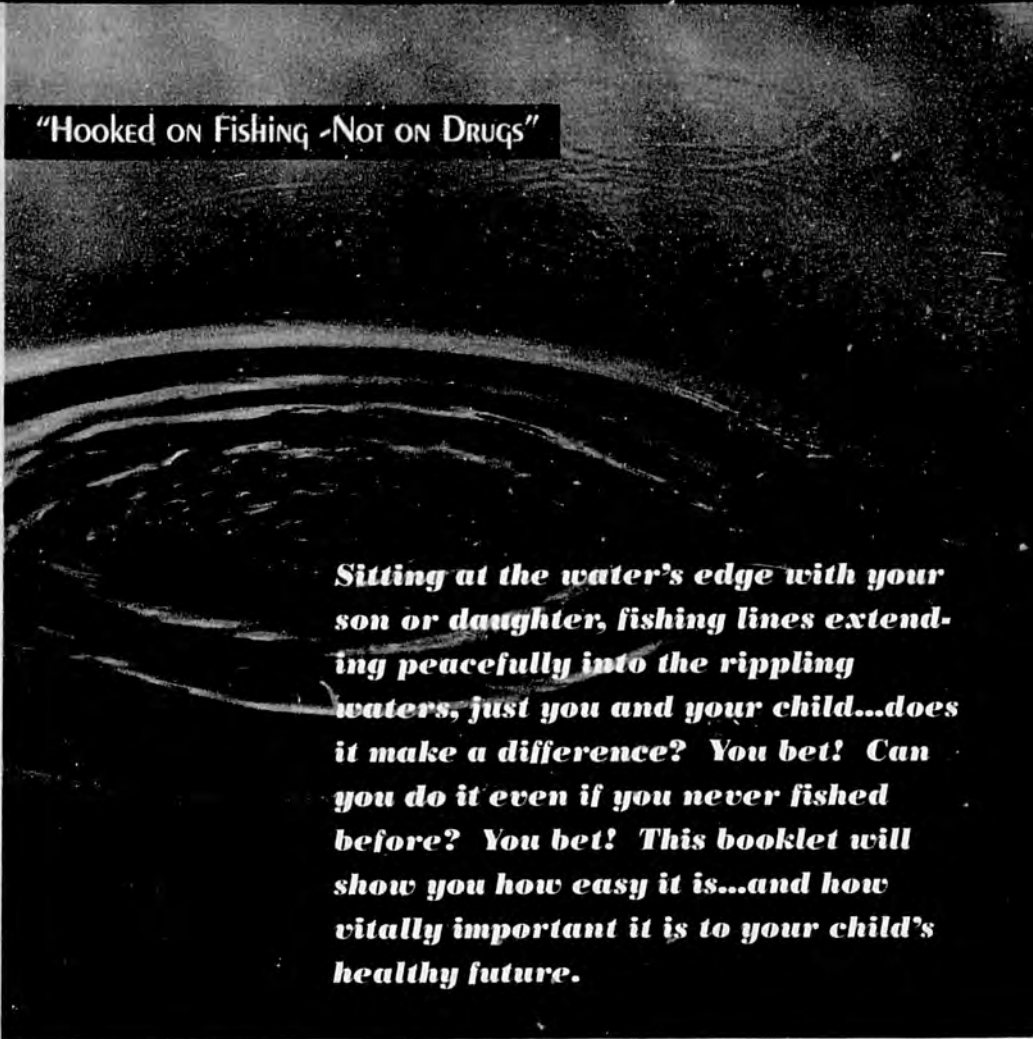


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personal story of how fishing has positively impacted his or her life and as with mine, the stories rarely were shared beyond the family. However, in early January of 1986, 14-year-old Matthew Deakins put his feelings into words in a letter to the Future Fisherman Foundation saying that while other kids his age were experimenting with drugs, he discovered he had no desire to—because of fishing! And that is how the “Hooked On Fishing - Not On Drugs” program was born.

Today the program is being used by schools, churches, police departments and a variety of other organizations. “Hooked On Fishing - Not On Drugs” links drug education, sport fishing, and environmental conservation together in a powerful combination providing a healthy alternative to enhance the development of life skills that divert children from using drugs. However, a very important aspect of the program is parental involvement—parents bonding with their children through fishing.

Through this brochure we want to help your children utilize fishing as a positive alternative to drugs and give you “how-to” information to help keep your children drug free.

We encourage you to spend time fishing and talking with your children. Everyone always says there is never enough time. Time is a matter of priorities. What is more important in your life than the future of your children? Children seem to grow into young adults overnight. Spending time with them is not something you can put off until tomorrow. Help them create memories that will last a lifetime, develop an activity that will keep them drug free, and instill family values...go fishing!

Sharon Rushton
Executive Director
Future Fisherman Foundation

"Hooked ON Fishing - NOT ON DRUGS"



"Hooked ON Fishing - NOT ON DRUGS" - A PARENT'S Guide

Effective drug education programs in our schools and communities are critical to addressing the drug problem today. However, without the support and involvement of parents in their children's lives and in drug education efforts, these programs have much less chance for success.

As a parent, you are your children's first and most important role model and you have the most influence in the formation of their values. You can build on the progress made in drug education programs by having strong, loving relationships with your children, teaching standards of right and wrong, setting and enforcing rules for behavior, knowing the facts about alcohol and other drugs, and really listening to your children. This booklet provides you with information to help you address and understand drug education and how fishing can enhance your relationship with your children and help keep them drug free.

GETTING "Hooked ON Fishing"

If you have never thought of a trip to the local pond or river as a healthy family activity and drug education technique, consider the following:

- Fishing provides a setting for parents and children to talk.
- Through fishing parents can get involved in their children's lives.
- Everyone is equal while fishing—children and adults, males and females, individuals with or without physical or mental disabilities. Everyone can feel a sense of accomplishment and be successful.
- As a result of this equality, fishing creates a common ground which opens lines of communication and bridges generation gaps.

"Hooked ON Fishing -NOT ON DRUGS"

- Fishing gets young people in touch with the outdoors and away from stressful distractions. It gives youth a time and place to think things out.
- Fishing is a fun activity that youth and family can enjoy for a lifetime.

WHEN YOU GO FISHING TOGETHER:

- You are away from the phone and television, creating a relaxed atmosphere.
- You can learn from each other and teach each other about a new skill.
- You can have fun!
- You are a family.



EFFECTIVE DRUG PREVENTION?

Can the simple act of going fishing really be used to combat one of the most serious issues affecting our young people today? Surprisingly, yes!

There's no single reason why youth start using alcohol and other drugs, but there are some common problems that lead children to experimenting with drugs. Some of them include:

- Boredom
- Lack of motivation
- Poor social and communication skills
- Lack of a sense of responsibility
- Inadequate problem-solving and decision-making skills
- Low self-esteem
- Peer pressure
- No or poor role models
- Inadequate family interaction/communication

The "Hooked On Fishing - Not On Drugs" program uses fishing to help address:

Positive alternatives. So children do not become bored, they need positive alternatives. Fishing is a fun, healthy activity youth can participate in with friends, family, or by themselves without feeling lonely.

Motivation. Having something fun to do and to look forward to is a motivator in a child's life.

Communication. Fishing provides a setting that enhances communication between fishing partners. Quiet and tranquil surroundings create the perfect environment for listening and talking. Keeping lines of communication open between family members is particularly important, and fishing outings provide and enhance these opportunities.

Self-esteem building. Succeeding in a skill that is revered by adults can significantly build a child's self-esteem. Success is not just determined by catching fish—it comes in learning to cast, tying knots, and being knowledgeable about fish.

Responsibility. If children are to fish, they take on responsibility. They must take responsibility for the equipment so it can be used again. As children are taught to fish, they also need to learn a responsibility to the fish and the environment. If they don't keep their fishing areas clean, they won't be allowed to return to fish. If they don't follow the rules and regulations and help to protect the environment, there will not be any fish to catch.

Positive role models. Children need positive role models. However, the most important role model is the parent. Quality time has to be spent with the child for that positive influence to rub off. Fishing provides that quality time.

"Hooked on Fishing, Not on Drugs"

Overcoming peer pressure. Having high self-esteem and positive alternatives like fishing, children can overcome negative peer pressure. They have the reasons and the strength to say no!

Good problem-solving and decision-making skills. Through fishing children learn to solve problems and to make decisions. Every time they go fishing, they have to decide what baits to use, what area of the water to fish, whether to let the bait sit still or how fast to reel, whether to keep or release the fish. They will encounter problems which they will learn to solve such as untangling their line.

Improved family interaction. Fishing provides families quality time to be a family because there are few distractions. It is an activity parents can start with the children as soon as they can walk and continue when the children become parents themselves.

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Just because a youngster fishes does not guarantee that he or she will remain drug free. However, children who possess the above life skills and can communicate with their parents are less likely to turn to drugs.

What If I Don't Fish?

No problem. It's easy to learn and costs very little. Learning to fish together can further enhance the experience between parent and child. You are more equal and have an opportunity for developing a true friendship as you learn to fish together.

The Future Fisherman Foundation offers several booklets to help you learn to fish, to learn about fish, and to learn about their environment. *Fishing Fun for Kids* is an illustrated how-to guide that is



excellent for both children and adults.

There is an order form for a "Family Pack" of materials in the back of this *Parent's Guide*.

Many state fish and wildlife agencies, public libraries, fishing tackle retailers, sports shows, communities, and others offer programs that teach you how to fish. Hundreds of magazines and several television shows also provide you information or materials about a variety of fishing techniques.

Tips ON Fishing Trips

Getting children started in fishing is an easy task. The excitement of watching a bobber dance on the water, the thrill of catching a bluegill or any fish, and the feeling of accomplishment make fishing attractive to all generations. The opportunity to spend quality time with Mom and/or Dad are also motivations for wanting to go fishing. Here are some tips to help you have a great time together:

Be relaxed. As you head out the door, leave behind the tension and take along a smile, an open mind, and a lot of patience.

Make it fun. Above all else, make the fishing trip fun and safe. Don't measure the success of the trip by the number of fish caught or the size of the fish. Make the trip successful simply by having a fun, safe time outdoors. Encourage children to explore the natural surroundings. Praise children for their patience and cooperation. Praise them for simply trying whether or not they master new fishing skills.

Make it a shore thing. Teaching children to fish from shore has some important advantages. It provides them more opportunity to go on their own or with friends when they are old enough. Give the first few lessons at a local park pond, farm pond, or lake with a dock or gentle shoreline where the children can run and play as their attention span runs short. If and when you progress to a boat, be sure to have the proper safety equipment for you and your youngster.

Fish for little fish. Catching fish is important; size isn't. Start new anglers off on species that are plentiful and more easily caught. Popular fish for beginners are bluegill and other sunfish. Most kids prefer to catch lots of fish versus big fish. Larger fish can be sought when the child has developed basic fishing skills.

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Start with the basics. Begin with simple equipment and bait. A cane pole, bobber, and hook with live bait will work for a variety of fish. Advance to simple spincasting equipment as the child's skill and interest level permit. Be sure the equipment your child uses is in good working order to avoid any unnecessary frustration.

Teach skills. People, regardless of their age, enjoy fishing more when they are in control and have the ability to do it themselves. Resist the temptation to do things for your children. If you are using live bait, teach them how to put it on the hook themselves. Teach them how to tie their hook to the line and how to cast. On future trips, help them develop these skills and their self-esteem, as they begin to master them.

Help solve problems. Help your children solve a problem and help them work it out. Avoid the temptation to solve it yourself without their help. Fishing lines getting tangled are a part of many trips. Don't scold your children. Let them know this happens to adults too and say, "Let's work together to straighten it out." Make sure the children assist. Watch for a reason why the children may be making a mess with their lines and help them understand what they can do differently in the future. If they are not catching fish, discuss ways they can experiment such as changing the placement of the float, moving the bait closer to some structure, or selecting another bait.

Be flexible. You may have decided that what is best to start with is a bobber and live bait. However, when you get to the water, your budding young angler wants to continually cast and reel. Instead of insisting on them sitting still and quiet, and since their chance of success is low if they continually reel in their live bait, change strategy. Take off the bobber and hook, and tie on an artificial ultra light lure that they can cast and reel to their hearts' desire.

Be responsible. Be a good role model and leave alcohol behind on a family fishing trip. Set a good example by picking up trash and leaving the fishing area looking as good or better than you found it. Show how to recycle aluminum cans, fishing line, and other materials.

Demonstrate the proper way to release fish if you aren't planning to keep them, and make good use of the fish you keep. Teach your child about the rules and regulations you must follow. Introduce young anglers to the many aspects of the outdoors so they can learn to respect the environment. Ask the child to help with the fish, all the way from the fishing pole to the frying pan.

Don't stay too long. How much time you spend fishing will vary with the age of the child and how cooperative the fish are. Outings with young children should be kept short. End the trip before your new angler gets restless. Remember when you are out on a boat, just a couple of hours bouncing and drifting can be uncomfortable for even the heartiest children.

Don't make the first trip your last. Talk with your child and listen to what was good, fun, rewarding, bad or boring so you make the trip even better next time. Regardless of your first experience, be willing to plan another trip.

Fulfill promises. If you promise to take your child fishing, consider it is as important as buying food, paying your rent/mortgage, or a meeting with your boss. Look at it as an investment in your family's health and security.

These are only a few tips to help teach children to fish. Each child will have different needs and wants, and each fishing trip will have to be adjusted accordingly. If we all take the opportunity to teach a child about fishing and the outdoors, we might have a healthier society, and the younger generation could have a brighter future. So next time your youngster asks you about fishing, grab the gear and go. Just remember, it's not whether or not you catch a fish, it's whether or not you have fun trying.

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INSTILLING ALCOHOL AND OTHER DRUG MESSAGES IN THE HOME

Helping youngsters develop positive alternatives to drugs, high self-esteem, and decision-making skills are important and the first steps in keeping them drug free. However, another important step is providing clear messages to your children about the use of alcohol and other drugs. It is important that your children understand that their use of alcohol and other drugs is unhealthy, illegal, and unacceptable. What can you do?

- Stand on a clear, firm, positive NO-USE policy and be willing to enforce the rules.
- Become knowledgeable about causes and effects of drugs and their availability.
- Talk with and listen to your children. Let them talk about their concerns and questions about drug use, about the use by their friends, about the pressure they sometimes may feel to experiment or use drugs. Do not dismiss, judge, or punish them for their questions and statements, but help them put the pieces together so they can make responsible, no-use decisions.
- Support law enforcement and school policies in regard to alcohol and other drug participation by youth.
- Be honest about your own use of legal drugs such as alcohol and tobacco; be honest without making them appealing. Don't say things like, "I need a cigarette," "I need a drink to relax," or "I can't wait to get a six-pack to make the fishing trip complete." Be open about how you began using any drug and what effect it has had on you.
- Do not introduce or support any drug use by your child, like buying them cigarettes, showing them how to use chewing tobacco, allowing them to taste

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your alcoholic beverage, letting them "play bartender" at home, serving you drinks or cleaning up partially filled beverage glasses.

- Teach and instill family values.
- Have every family member sign the "Hooked On Fishing - Not On Drugs" pledge card and carry it in his/her wallet or school bag.



CHILDREN AND ALCOHOL

Parents who are clear about not wanting their children to use drugs may find it harder to be tough about alcohol. After all, alcohol is legal for adults, many parents drink, and alcohol is part of some religious observances. As a result, we may view alcohol as less dangerous than other drugs, but the facts don't agree.

- Almost one out of three boys and one out of five girls classify themselves as drinkers by age 13. Over half of 6th graders report peer pressure to drink beer, wine or liquor.
- Alcohol-related accidents are the leading cause of death among young people 15 to 24 years of age.
- About half of all youthful deaths from drowning, fires, suicide, and homicide are alcohol-related.
- Young people who use alcohol at an early age are more likely to use alcohol heavily and to have alcohol-related problems; they are also more likely to abuse other drugs and to get into trouble with the law.
- Moderate to high doses of alcohol cause marked impairments in higher mental functions, severely altering a person's ability to learn and remember information.
- Very high doses cause respiratory depression and death.

OTHER GATEWAY DRUGS SHOULD ALSO BE TAKEN SERIOUSLY.

- 18 percent of high school seniors are daily smokers.
- Young people who use cigarettes are also at great risk for all other drug use.
- 1 out of 3 sixth graders say they feel pressured by their peers to use marijuana.

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UNDERSTANDING HOW CHILDREN GROW

Preschoolers

Drug education may seem unnecessary for preschoolers, but the attitudes and habits learned early can have an important bearing on the decisions children make later.

Three- and four-year-olds are not yet ready to learn complex facts about alcohol and other drugs, but they can learn the decision-making and problem-solving skills that they will need to refuse alcohol and other drugs later. Remember that children in this age group are not able to listen quietly for very long; they are more interested in doing things for themselves.

It's tempting for busy parents to do things for young children because it's quicker and easier. With a little planning, however, you can use the learn-by-doing approach to teach your preschooler how to make decisions. Let your child pick from a range of options that are acceptable to you. When the choice is made, make sure your child sticks with it.

Kindergarten-Grade 3

Five-to nine-year-olds usually feel good about themselves. They still think and learn primarily by experience, and they don't have a good understanding of things that will happen in the future. Fact and fantasy mingle easily; the world is seen as the child wishes it to be, and not as it actually is. Children of this age need rules to guide their behavior, information to make good choices and decisions, and consistency once the rule is established.

Discussions about alcohol and other drugs must be in the here and now, and related to people and events the child knows about. Most children are very interested in how their bodies work, so discussions should focus on main-

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taining good health and avoiding things that might harm the body.

Adults are very important both as teachers and as role models. Children are generally trusting and they believe that the decisions adults make for them are right. Helping your child know whom to trust is important. They need to understand that just because someone tells them to do something, it is not always right to do it.

Grades 4-6

This is a period of slowed physical growth when typically a lot of energy goes into learning. Children 10 to 12 years old love to learn facts, especially strange ones, and they want to know how things work and what sources of information are available to them.

Friends—a single best friend or a group of friends—become very important. What children this age are interested in or will be committed to often is determined by what the group thinks. Children's self-image is determined in part by the extent to which they are accepted by peers, especially popular peers. As a result, a lot of "followers" are unable to make independent decisions and choices.

This age is perhaps the most important time for parents to focus on increased efforts at drug prevention. These late elementary school years are crucial to decisions about the use of alcohol and other drugs. The greatest risk for starting to smoke comes in the sixth and seventh grades. Research shows that the earlier youngsters begin to use alcohol and other drugs, the more likely they are to have real trouble.



Your child will need a clear no-use message, factual information, and strong motivation to resist pressures to try alcohol and other drugs and to reinforce the determination to remain drug free.

Grades 7-9

During the early teens "fitting in" with friends is a controlling influence. In some ways, the onset of puberty is like a "rebirth." Children want and need to let go of the past and to find their own unique identity. This often means letting go of old friendships and ties with teacher and other adults, as well as old ways of doing things. The decision-making and problem-solving methods that they learned as young children are still helpful, but young teens will be making new decisions based on new information and new goals.

Young people this age can begin to deal with abstractions and the future. They understand that their actions have consequences, and they know how their behavior affects others. They sometimes have a shaky self-image: they are not sure whether they are growing and changing

adequately, they are often in conflict with adults, they are not sure where they are headed, and they tend to see themselves as not "okay." Strong emotional support and a good model of adult behavior are particularly important now.

Young people who use alcohol, tobacco, and other drugs typically begin before leaving the ninth grade. Be sure that family discussions about drugs emphasize the immediate, unpleasant effects of alcohol and other drug use. Telling

junior high school students who are smoking that they will get lung cancer or heart disease in several decades



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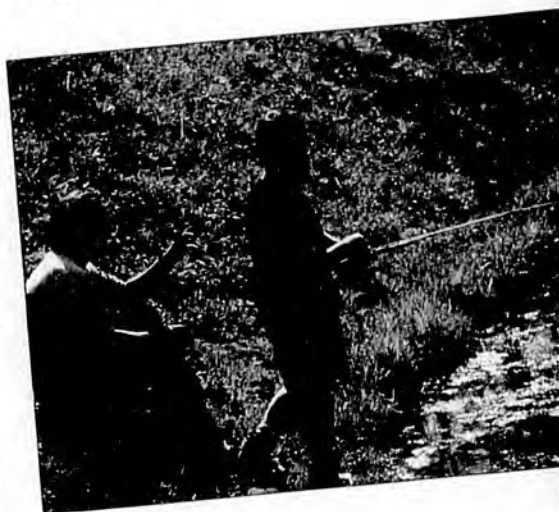
is less likely to make an impression than talking about bad breath, stained teeth and fingers, and burned clothing.

Many young people use drugs because their friends use drugs. A large portion of your prevention efforts during these years should be spent reinforcing your child's motivation to avoid alcohol and other drugs.

Counteract peer influence with parent influence. Reinforce your no-alcohol/no-drug-use rules and expectations so that your child clearly understands that drinking and using drugs are unacceptable and illegal. Children may argue that "everyone is doing it" and not experiencing any harmful effects. Inform your child that alcohol and other drug use is illegal for children and that "everyone is not doing it." Emphasize how unpredictable the effects of alcohol and other drugs can be, so that although many drug users may appear to function properly, drug use is extremely risky, and all it takes is one bad experience to change a life.

Get to know your child's friends and their parents. Meet your child's friends. Invite them to your home frequently. Share your expectations about behavior with other parents. Work together to develop a set of rules about curfews, unchaperoned parties, and other social activities.

Monitor your child's whereabouts. If your child is at "a friend's house," be sure that you know the friend and the parents. If your child is at the movies, be sure you know what film is playing and at which theater. Last minute changes in plans, such as visiting a different friend or going to a different movie, should not be permitted unless the child checks with Mom, Dad, or another designated adult.



Grades 10-12

High school students are future-oriented and can engage in abstract thinking. They have an increasingly realistic understanding of adults. Young people therefore want

adults to discuss their concerns and the ways they solve problems and make decisions. You may have a tremendous new opportunity to help your children at this age. At the same time, the teenagers continue to be group-oriented, and belonging to the group motivates much of their behavior and actions. During these years, young people often develop a broader outlook and become more interested in the welfare of others.



You may want to focus on the potential long-term effects of alcohol and other drugs during these years: drugs can ruin your teen's chances of getting into college, being accepted by the military, or being hired for certain jobs. Your teen may also be impressed by the importance of serving as a good role model for a younger brother or sister.

Although young people long for independence, it is particularly important to keep them involved in the family and family activities. They should join the rest of the family for dinner regularly, be part of family vacations, and remain part of family routines.

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COMMUNICATING WITH YOUR CHILD

The process of communication and trust literally starts from the day your child is born. How well you are able to talk with your child in those tumultuous teen years will, to a large degree, be determined by how well you communicated for the 12 years leading up to that time. The process of building an open, honest relationship with your child is a long-term, sometimes painful, process.

Here are some tips for improving your ability to talk with your child about alcohol and other drugs. Fishing as an activity is a great time and place to put these tips to work.

Be a good listener. Make sure your child feels comfortable coming to you with questions or problems. Listen closely to what your child says. Don't allow anger at what you hear to end the discussion. If necessary, take a 5-minute break to calm down before continuing. Take note of what your child is *not* saying too. If the child does not tell you about problems, take the initiative and ask questions about what is going on at school or in other activities. Most importantly, remember that talking or communicating is two-way. View fishing trips as a time to communicate, not a time to lecture.

Be available to discuss even sensitive subjects. Young people need to know that they can rely on their parents for accurate information about subjects that are important to them. If your child wants to discuss something at a time when you can't give it full attention, explain why you can't talk, set a time to talk later, and then carry through on it!

Give lots of praise. Emphasize the things your youngster is doing right instead of always focusing on things that are wrong. When parents are quicker to praise than criticize, children learn to feel good about themselves and they develop the self-confidence to trust their own judgment.

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Give clear messages. When talking about the use of alcohol and other drugs, be sure you give your child a clear no-use message, so that the child will know exactly what is expected. For example, "In our family we don't allow the use of illegal drugs, and children are not allowed to drink."

Recognize how your actions affect the development of your child's values. Parents are role models for their children. Simply stated, children copy their parents' behavior. Children whose parents smoke, for example, are more likely to become smokers. Evaluate your own use of tobacco, alcohol, prescription medicines, and even over-the-counter drugs. Consider how your attitudes and actions may be shaping your child's choice about whether or not to use alcohol or other drugs.



TEACHING YOUR CHILD TO SAY NO

Social, family, and religious values give young people reasons to say *no* and help them stick to their decisions. Every family has expectations of behavior that are determined by principles and standards. These add up to "values." Children who decide not to use alcohol or other drugs often make this decision because they have strong convictions against the use of these substances—convictions that are based on a value system.

Here are some steps that you can practice with your child to make it easier for the child to refuse an offer of alcohol and other drugs. Tell your child to:

- **Ask questions.** If unknown substances are offered, ask, "What is it?" and "Where did you get it?" If a party or other gathering is proposed, ask, "Who else is coming?" "Where will it be?" "Will parents be there?"
- **Say no.** Don't argue, don't discuss. Say no and show that you mean it.
- **Give reasons.** "I don't want to" or "I'm doing something else that night" or "The coach says drugs will hurt my game" are examples of some reasons that youngsters can use. Also, don't forget the oldest reason: "My parents will kill me."
- **Suggest other things to do.** If a friend is offering alcohol or other drugs, saying no is tougher. Suggesting something else to do—going to a movie, playing a game, or working together on a project—shows that drugs are being rejected, not the friend.
- **Leave.** When all these steps have been tried, get out of the situation immediately. Go home, go to class, join a group of friends, or talk to someone else.

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Additional Drug Education Resources

For additional information and guidance, your local school's drug prevention counselor is an excellent starting point. In addition, many hospitals, community colleges, and other organizations offer classes for parents that are designed to improve communication and understanding between parents and children. Consult your local library or community service organization for more information. Also check the blue pages of your local telephone directory for local police and mental health center listings, or call the National Clearinghouse for Alcohol and Drug Information at (800) 729-6686.

A PROGRAM THAT WORKS FOR LIFE

As parents, we must never forget the most important role we have – spending quality time with our children. As you've seen throughout this Parent's Guide, fishing provides you an opportunity to spend quality time with your child, to help your child develop the life skills necessary to say no, and to help instill family values.

The "Hooked On Fishing - Not On Drugs" program is also available to schools. When implemented in the school, it reinforces the messages you are providing at home. The more students are exposed to the program, the more likely classmates are to have a positive influence on each other.

We encourage you to be sure your local school system is aware of the value of this program. "Hooked On Fishing - Not On Drugs" exceeds all of the U.S. Department of Education's criteria for successful drug prevention programs. Schools that have implemented the program are excited about the difference the program is making with students.

*Most important of all, make a difference in your child's life. **Take him/her fishing today!***

Please give us your comments:

➤ This *Parent's Guide* was: ☐ very useful ☐ somewhat useful ☐ not useful

➤ What did you find most helpful about this *Parent's Guide*?

➤ What did you find least helpful about this *Parent's Guide*?

➤ Before reading this *Parent's Guide*, had you ever been fishing?

☐ yes, often ☐ yes, a few times ☐ no

➤ As a result of reading this *Parent's Guide*, are you going to go fishing more often with your child? ☐ yes ☐ maybe ☐ no

➤ What would make this *Parent's Guide* more useful to you?

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1033 N. Fairfax Street
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The Future Fisherman Foundation welcomes letters from families about their fishing experiences and the positive influences fishing has had.

Please give us your comments:

➤ This *Parent's Guide* was: ☐ very useful ☐ somewhat useful ☐ not useful

➤ What did you find most helpful about this *Parent's Guide*?

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➤ Before reading this *Parent's Guide*, had you ever been fishing?

☐ yes, often ☐ yes, a few times ☐ no

➤ As a result of reading this *Parent's Guide*, are you going to go fishing more often with your child? ☐ yes ☐ maybe ☐ no

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"Hooked ON Fishing - NOT ON Drugs"

Family Pack

- The Future Fisherman Foundation has a variety of materials relating to sport fishing, aquatic education, and the "Hooked On Fishing - Not On Drugs" program. For your convenience, the Future Fisherman Foundation has put together a family pack of materials that includes the following:

- 5 "HOF-NOD" pledge cards
- 3 "HOF-NOD" decals
- 2 "HOF-NOD" bumper stickers
- 1 "HOF-NOD" teen brochure
- 1 "HOF-NOD" poster
- 3 *Fishing Fun For Kids* booklets
- 1 *Sport Fishing and Aquatic Resources Handbook*

- ☐ I would like to receive the "Hooked On Fishing - Not On Drugs" (HOF-NOD) Family Pack. I have enclosed a \$10.00 check or money order payable to the Future Fisherman Foundation.

28

- Mail to:
- Family Pack
Future Fisherman Foundation
1033 N. Fairfax Street
Suite 200, Dept PB
Alexandria, VA 22314

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Address _____

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Sport Fishing *and* **Aquatic Resources Handbook**



**Alaska Aquatic Education
Division of Sport Fish**



Sport Fishing *and* **Aquatic Resources** **Handbook**

Authored by
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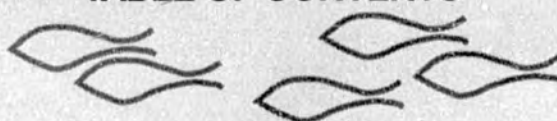
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PREFACE

AN IMPORTANT MESSAGE TO ALL PARENTS AND ADULTS

It is very important to give our children proper recreation that will not only entertain them for now but will enlighten them throughout their lives.

Today's world is full of distractions which take away from families being together and spending good quality time with each other. One of the biggest problems facing our children today is drug abuse. We, as parents and adults, must take an active interest in our children's behavior. We must provide the support and guidance which are needed to resist drugs. We are the role models for our children. Our life styles and attitudes will be copied by future generations. It is up to us to make the difference today and set the proper examples of right and wrong.

A great way to improve family communication is involvement in fishing. Fishing takes you away from the distractions of everyday life and puts you in touch with your children. There are no TVs or telephones to interfere while you are fishing. This quiet time creates the perfect environment for listening and talking.

You say you don't know how to fish or don't know much about fishing! Don't be ashamed to admit that to yourself or to your children. Learning together will help make you and your family a better group of anglers, and at the same time help your children to build self-esteem, self-confidence and self-respect. Taking time for fun can be a positive alternative to drugs.

Please join us in helping our youth enjoy a drug-free environment while enjoying fishing as a lifelong form of recreation and entertainment.

ACKNOWLEDGEMENTS

Many people can take credit for the development of this Sport Fishing Aquatic Resources Education Student Manual, Intermediate Edition, for it truly was a team effort. The initial step was taken by the Aquatic Resource Education Council who provided support for the development of aquatic resource education programs by developing the *Aquatic Resources Education Curriculum*, a manual for teachers, in 1987. Without this momentous preliminary step, supported by the AFTMA Sport Fishing Educational Foundation, the development of this student manual might not have happened.

Both the author, Bob Schmidt, and the graphic artist, John Rice, have produced outstanding work to ensure the highest quality student materials available for aquatic resources education.

The experience, support, and suggestions of aquatic education professionals from thirteen states and the U.S. Fish and Wildlife Service had notable impact in shaping the content, scope, and sequence of this student manual. George Babey's exceptional dedication is acknowledged for his extensive review of the technical aquatic education segments of the text. In addition, gratitude is extended to the following group of professionals who critically reviewed the entire text:

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Louis R. Jensen
Indiana State University

Fishing. . . an Introduction

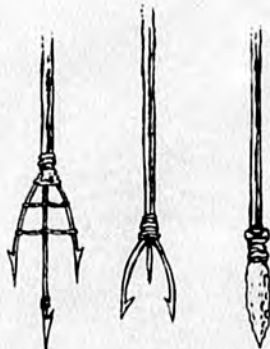
WHAT IS FISHING?

Fishing is trying to catch fish. It is one of the oldest and most popular outdoor activities.



The earliest evidence of primitive people shows that they fished using their bare hands and clubs. They used fish as food.

Throughout the years, new techniques were invented. Primitive people made spears out of bone, antler, horn, or stone. Often they would



build a dam or a stream with rocks. The dam made a pool where the fish would gather, helping the fishermen catch fish.

Hooks have been used for fishing for thousands of years. The first hooks were made of animal bones, shells, bronze, antlers, and horns. The shape of hooks used by primitive people are very similar to those used today.



Today, more than 50 million people fish for recreational enjoyment. They are called anglers. Although the catch is often shared and eaten with other people, anglers **do not sell their catch**. Many anglers choose to practice catch and release fishing, returning their catch unharmed as soon as it is caught.

Sport fishing means different things to different people. Fishing

lets some people get away from the hustle and bustle of the daily routine to enjoy our nation's rich natural resources. Some people see fishing as an exciting and demanding sport. Others combine fishing with boating, picnicking, camping, backpacking and viewing wildlife.

Fishing is something everybody can do—boys, girls, moms, dads, grandparents. Even if someone has a disability, fishing offers a good time.

WHAT ARE AQUATIC RESOURCES?

Aquatic resources refer to things living in or on the water. This book is about aquatic resources

education because it talks about more than just fish and fishing. In order to become a good angler, you need to know about where a fish lives—its **habitat**, water. Water is our greatest aquatic resource.

You'll also be introduced to many types of fish and places because what you do to the water in your state can impact fishing in another state or several states. Secondly, in your lifetime, you might have a chance to travel to other states. This book will also help you become familiar with fish and fishing techniques that you may not see in your home state.

CHAPTER

1

Let's Catch Fish

Fishing tackle is used to get your bait or lure to the fish. You don't need a lot of equipment to begin fishing. In fact, it's a good idea to begin with basic, simple tackle. You can try more difficult tackle after you've mastered some basic skills.



TYPES OF FISHING TACKLE

Pole and Line

The simplest fishing tackle is a pole; however, for some types of fishing, even a soda can with fishing line wrapped around it can be used!

The pole can be made of cane, bamboo or a straight piece of tree branch. You do not use a reel

with a pole. Cut a piece of fishing line as long as the pole. Tie the line to the tip of the pole and a hook to the other end of the line. A small sinker, called a "split shot," is squeezed onto the line above the hook. The sinker makes it easier to swing the bait out into the water and keeps the bait under the surface. You may also want to use a bobber or float. By moving the bobber up or down the line, you can change the depth of your bait in the water. With a pole and line you can

fish the area near the bank, where many fish often live.

Rods and Reels

Other types of fishing tackle use reels to store large amounts of line. They let you cast a bait or lure farther. They also help you retrieve lures correctly, fish in deeper water, and battle larger fish more easily. There are four kinds of reels: spincast, spinning, baitcast, and fly. Each kind uses a different type of rod.

Spincasting

Spincasting tackle is ideal for beginning anglers because it works well and is easy to use. A spincasting rod has small line guides and a straight handle. Spincasting tackle is often used while fishing for bluegill, crappie and other panfish. The spincasting reel mounts on top of the rod's handle. The fishing line comes out of a small hole in a cover on the front of the reel.

Casting With a Spincasting

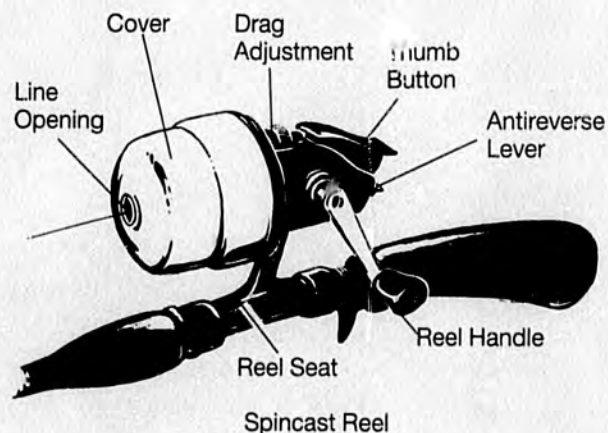
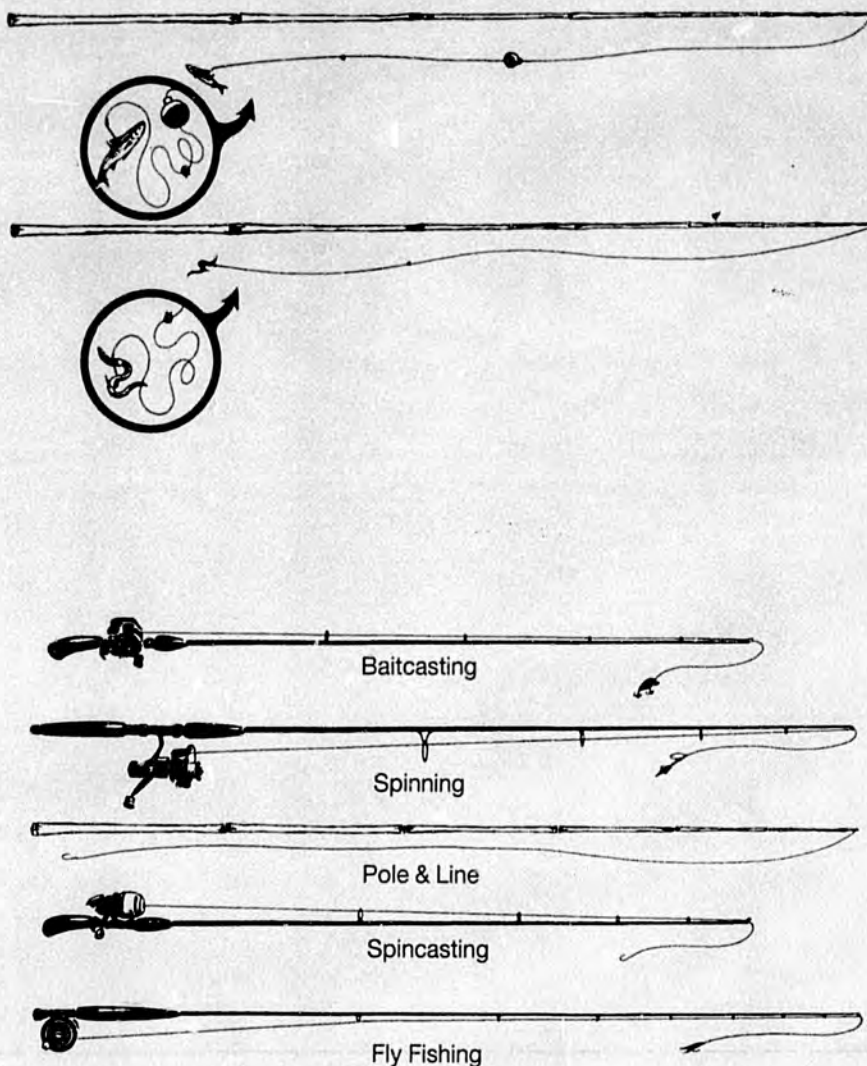
Outfit. To cast, grip the pistol grip with one hand. If you're right-handed, turn the rod sideways so the reel handle points straight up; if you're left-handed, point the reel handle straight down. Push the reel's thumb button down and hold it down.

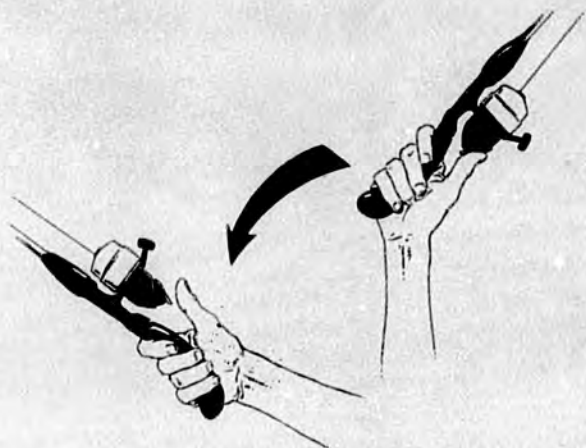
Face your target area and turn your body at a slight angle. The arm holding the rod should be closest to your target. Aim the rod tip toward the target-about level with your eyes.

Swiftly and smoothly, bend your casting arm at the elbow, raising your casting forearm until your hands reach eye level. When the rod is almost straight up, it will be bent back by the weight of the practice plug. As the rod bends, move your forearm forward with just a slight wrist movement. When the rod reaches eye level,

release the thumb button and let the line travel freely.

If the plug lands close in front of you, you released the thumb button too late. If the plug





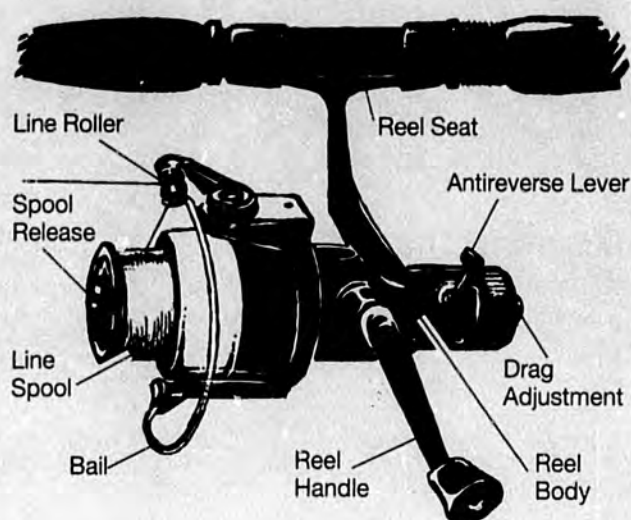
went more or less straight up, you released the button too soon.

Learning how to use a spincasting rod and reel isn't too hard, but it does take practice. Buy a practice casting plug. This is a rubber or plastic weight without hooks. Then, tie it to the end of the line. Find a spot where you can practice safely. Put a target on the ground about 25 feet away. Practice casting until you can consistently hit the target with your casting plug. Being able to hit a target is much more important than being able to cast a long distance!

Spinning

Spinning rods have a straight handle with large line guides that are on the bottom of the rod. A spinning reel is often called an "open-face" reel because the spool of fishing line isn't covered. The reel mounts under the handle. Spinning rods and reels allow for more line to be quickly peeled off the reel, allowing for casting longer distances.

Learning how to use a spinning outfit may take more practice than spincasting. Casting with a spinning outfit is very similar to using spincasting equipment. However, at the beginning you grasp the spinning rod's handle, placing the reel "stem" between your second and third fingers. Your thumb should be on top of the handle and your forefinger extended to touch the spool cover. With your other hand, rotate the reel spool until the line roller is directly beneath your extended forefinger. Pick up the line in front of the roller with your forefinger and open, or cock, the reel's bail with your other hand.

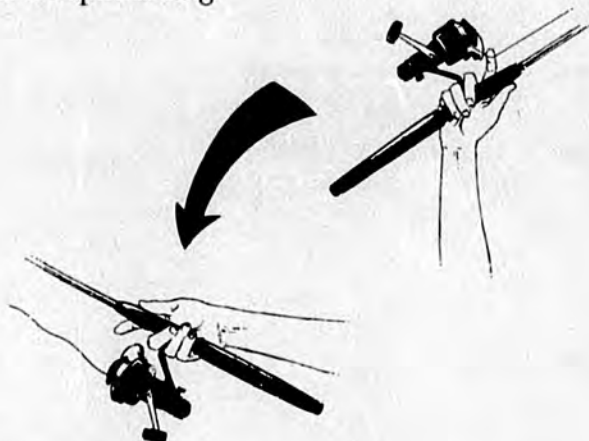


Spinning Reel

(Some reels have a lever so you can grasp the line and open the bail in one motion.)

After you have accomplished this procedure, casting is very similar to that for spincasting except that when the rod reaches your eye level as you are casting, you release the line from your forefinger rather than releasing the thumb button. Again, if the plug lands close in front of you, your forefinger released the line too late. If the plug went more or less straight up, you released your forefinger too soon.

To prepare for practice follow the same steps as for spincasting.

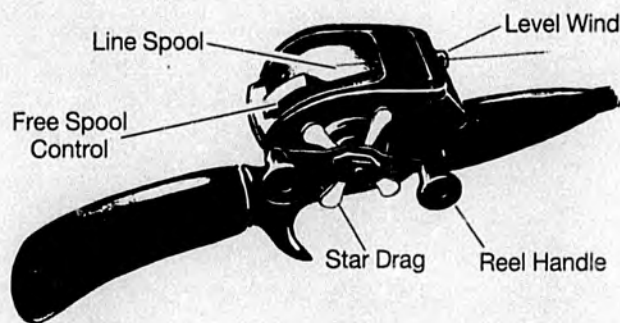


Baitcasting

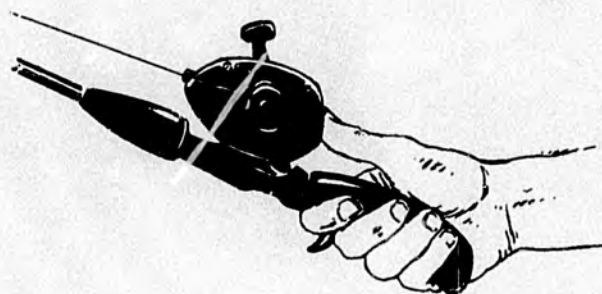
A baitcasting rod can have either a pistol-type grip or a straight handle. As in spincasting, the casting reel and line guides are mounted on top of the rod. Unlike the other two types of reels, the casting reel's line spool turns as you cast and can

snarl the line if it is not controlled properly. Learning to control this spool makes casting tackle harder for most people to learn, and is considered a skill for advanced anglers.

Drag. All reels have an adjustment called a drag that controls how easily the line is pulled off the reel. When set correctly, the drag lets a larger fish pull some line from the reel until the fish becomes tired. Follow the directions that come with your reel to set the drag correctly.

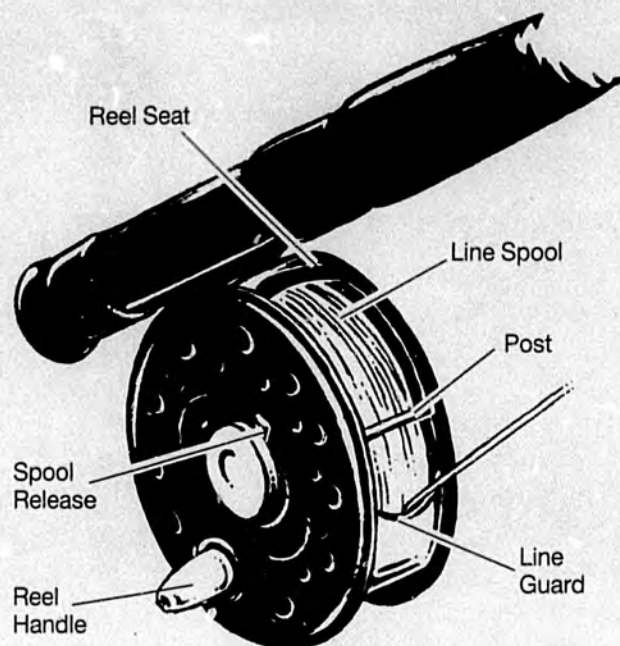


Baitcasting Reel



Flyfishing

Flyfishing tackle is different from all of the other types. In flyfishing, you are casting the line that carries the "fly." With other fishing tackle the weight of a bait or lure pulls line from a reel. In flyfishing, the reel is only used to store the line. Flycasting is usually the most difficult to learn. However, with proper instruction, anyone can learn how.



Fly Casting Reel

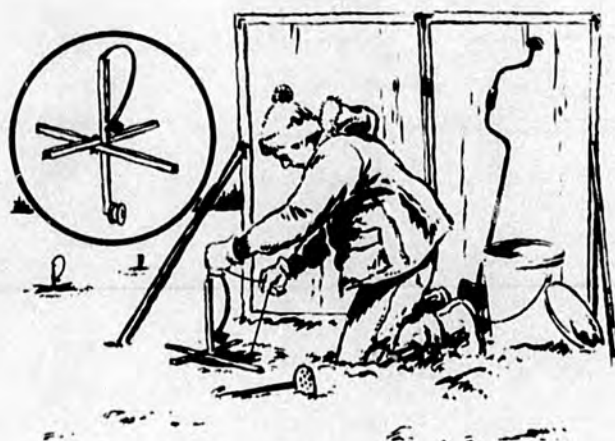


Saltwater

Saltwater tackle requires special equipment because saltwater will corrode any aluminum, steel or iron parts. The metal parts of saltwater tackle usually are made of stainless steel or nickel chrome. Saltwater tackle ranges from the ultralight equipment used in inshore fishing to the extremely large and heavy tackle for deep sea fishing.

Ice Fishing

Ice fishing is a very specialized sport. One- to three-foot rods are most often used. Simple reels are used to hold the line. Ice fishing can also be done with tip-ups. Tip-ups fit over a hole in the ice. When a fish hits, it releases a lever. This causes a flag to tip up, alerting the angler.

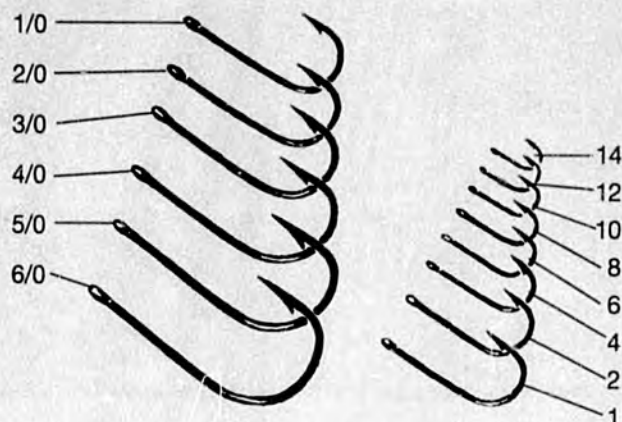


OTHER FISHING TACKLE

Fish Hooks

Fish hooks come in a variety of sizes and styles. When you fish with natural or live bait, a package with an assortment of hooks ranging from sizes No. 6 through No. 10 is suitable. However, when you fish for catfish or bullheads, larger hooks are needed.

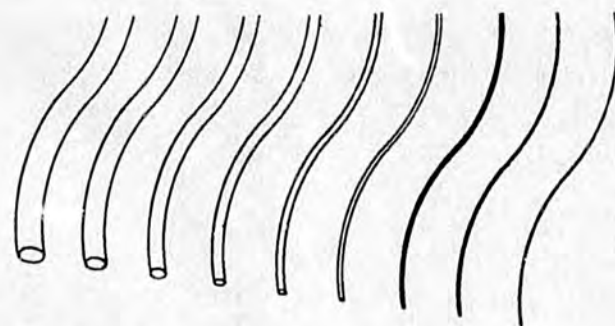
The barbs on the hooks can be bent down if you intend to release your catch. This will make your fishing more challenging and reduce fish mortality.



Common Hook Sizes

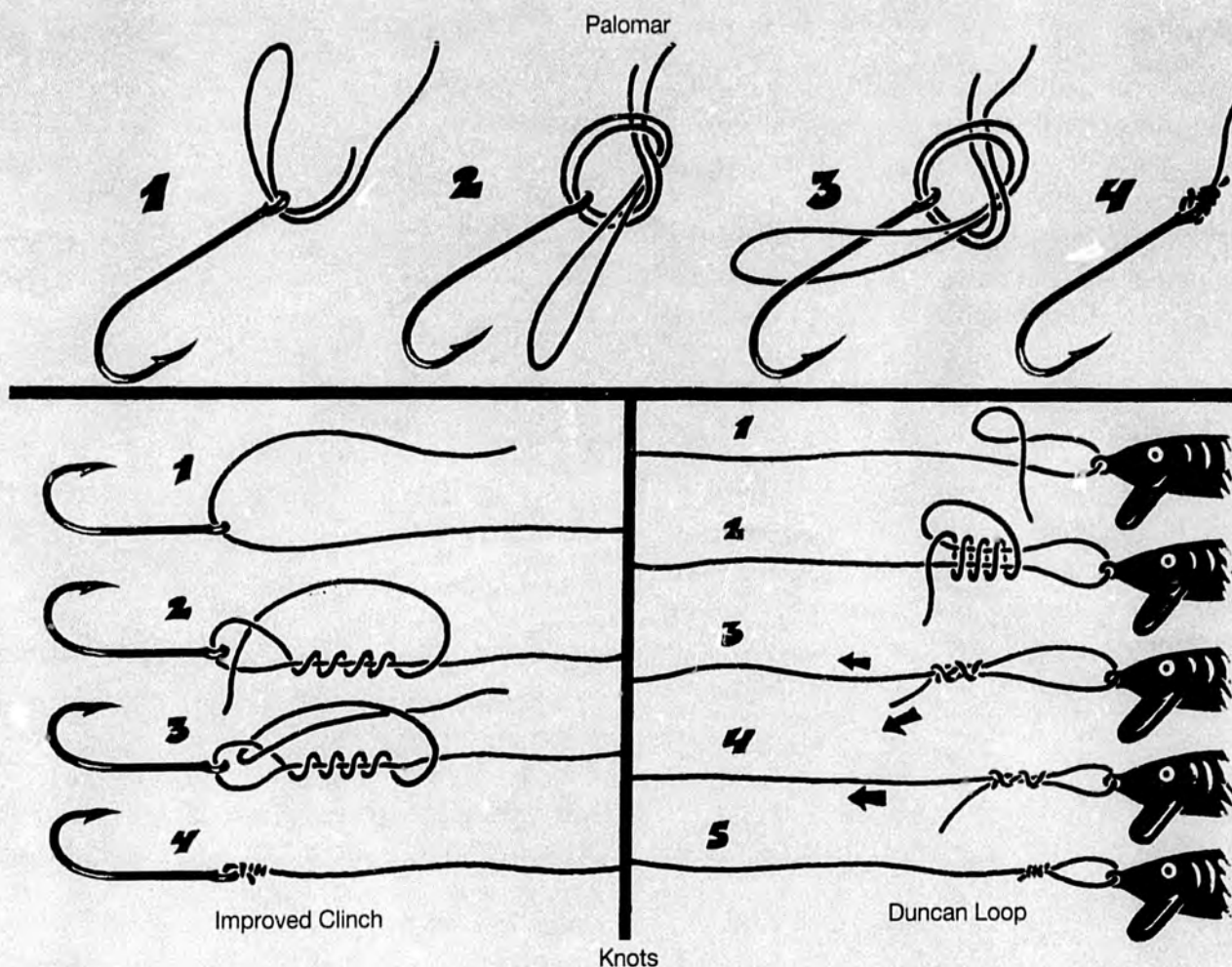
Fishing Line

Fishing line comes in a variety of sizes, or strengths, called **pound-test**. For example, ten pound-test line is stronger than four pound-test. You must match the pound-test line to the size of rod and reel, the bait you're using, and the fish you are fishing for. For example, small ultralight spincasting and spinning reels can use up to six-pound-test line. Larger spinning reels can use stronger line. Bait casting reels can use from 6- to 30-pound line, but 8- to 16-pound-test lines are most common. Using heavier line than necessary may reduce the number of bites or strikes you get, because heavy line is more visible in water.



80# 60# 30# 20# 12# 8# 6# 4# 2#
Pound Test

To connect your line to your hook you need to learn to tie **fishing knots**. Although dozens of fishing knots are used you only need to learn two or three good knots for most fishing. Here's how to tie three common knots:



The palomar and improved clinch knots are used by many anglers for attaching hooks and lures. They are both very strong knots.

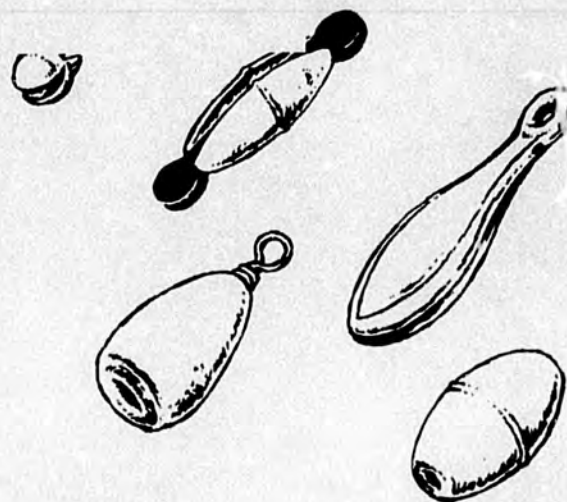
The loop knot is used for minnow type baits and diving lures. The loop attached to the lure allows the lure to move more freely.

Sinkers

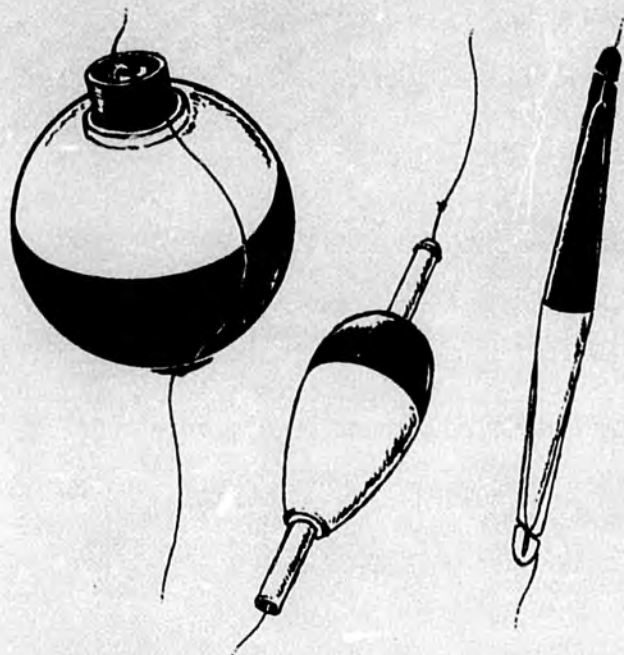
Sinkers range in size from split shot the size of a BB to weights of a pound or more. BB-size split shot to 1/4-ounce sinkers are most common. Sinkers allow you to cast your bait and help take it down to the bottom.

Bobbers

Bobbers are used to keep your bait at the depth you want it. They also help you to know when you have a strike. Use a bobber that's just large enough to keep your bait from dragging it under



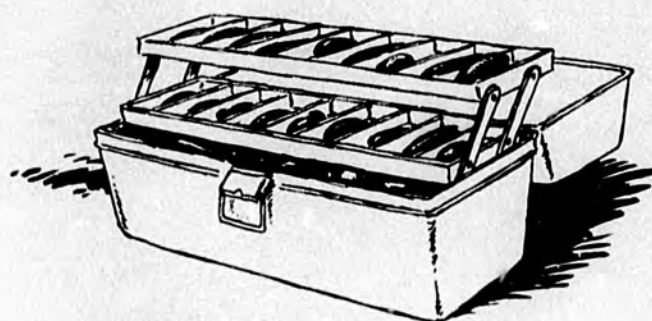
the water. Pencil style bobbers are more sensitive than round ones. Because of this it is easier to tell if a fish is biting. Round bobbers are easier to cast. Slip bobbers can be easily adjusted to allow you to fish at different depths. Their main advantage is that they are easy to cast. They come in both round and pencil styles.



Many bobbers attach to fishing line with a spring clip and move up or down the line easily, depending on how deep you want to fish your bait.

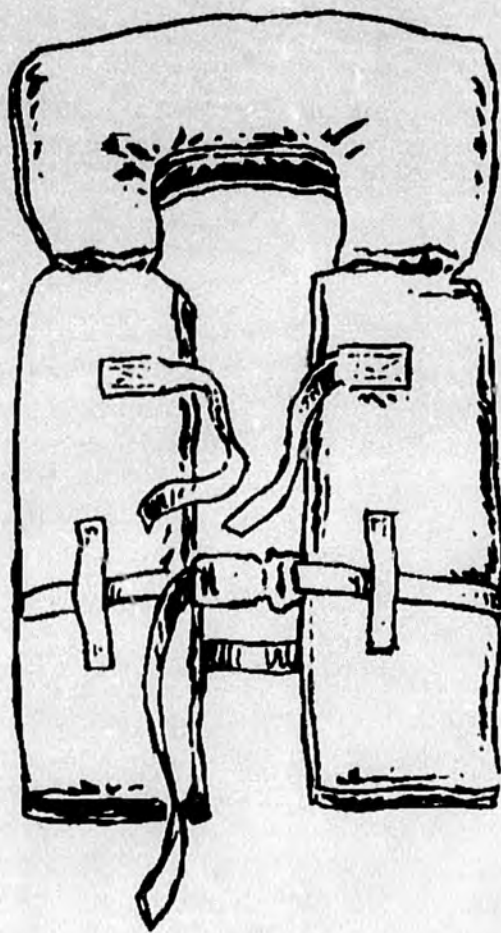
Tackle Box

A tackle box is useful for storing hooks, sinkers, bobbers, lures, and other things you need for fishing. A small, top-opening box with two trays is a good first box.



Personal Flotation Device (PFD)

A personal flotation device, also known as a life jacket, should be part of your essential fishing gear. You should always wear one if you are fishing near deep or fast moving water. When you are fishing from a boat, you must always



wear a PFD. If you choose a PFD with pockets, you can also use it as a fishing vest to hold your tackle.

Other Accessories

Other equipment anglers find useful includes a container for live bait, snaps and swivels, a line clipper, long-nose pliers with wire cutters, a hook disgorger for removing fish hooks, a fish scaler, and a stringer or ice chest to keep your fish fresh. In addition, you should always have your first-aid kit with you.

NATURAL BAITS AND BAITING YOUR HOOK

As you learn more about fish behavior you'll learn more about how to choose the best bait for different situations. Several types of live or natural bait will help you catch fish. Always check your fishing regulations to make sure the bait you choose is legal for the lake you are fishing.

Some of the best baits for freshwater fishing include worms, leeches, minnows, crayfish, crickets and grasshoppers. Good saltwater baits include sea worms, eels, crabs, shrimp, strips of squid, and cut-up pieces of fish.

Worms

Worms are a good bait for nearly all freshwater and saltwater fish, although sea worms are often used in saltwater fishing. You can find enough worms for fishing from a few shovels of dirt in your garden or from a shaded, damp area. Worms can also be purchased in fishing tackle stores and bait shops.

If you have small worms, thread the hook through the side of the worm at several places along its body. For bait-stealing fish such as sunfish, thread the worm on the hook until the hook is completely covered.

Minnows

Minnows must be stored in a minnow bucket with plenty of cool water to keep them alive. Never crowd them.

One way to hook a minnow is through both lips, beginning with the bottom lip. You can also hook a minnow through the tail, behind the head, or through the back.



Minnow



Worm



Grasshopper



Leech



Shrimp



Clam

Crickets and Grasshoppers

Both land and water insects can be used for bait. When using small insects, you should use hooks made of thin wire.

Bait Leeches

Leeches are excellent bait for many fish. They should be hooked through the sucker in the tail.

Clams, Mussels, and Sea Worms

These baits are good for perch, drum, sea trout, and rockfish. Completely remove their shell and thread onto the hook.

Shrimp

Shrimp can be used either alive or dead for saltwater fish. Hook the shrimp through the tail. You can also peel off the shell and thread cut up pieces of shrimp on the hook.

PREPARED BAITS

For bottom-feeding fish like carp and catfish, bread, small pieces of cheese, and canned corn are good. You can buy commercially made baits. Many anglers, however, like to make their own bait for these fish. Here are two recipes for bait to catch bottom-feeding fish:

Carp Doughballs

1. Mix 1 cup of flour, 1 cup of yellow cornmeal, and 1 teaspoon of sugar in a bowl.
2. Take a 1-quart container of water and pour just enough of it into the mixture to make a heavy dough.
3. Roll the dough into balls about 1/2 inch to 1 inch in diameter.
4. Mix the rest of the water with 1 cup of molasses and pour it into a pan.
5. Put the pan on the stove and bring the molasses and water to a boil.

6. When the mixture is boiling, drop in several doughballs, but don't overcrowd them. Cook them for 2 to 3 minutes.
7. Cook the rest of the doughballs, a few at a time, in the same way.

You can store the cooked doughballs in the leftover water and molasses.

When using doughballs or stinkbait (a smelly catfish bait) use small treble hooks. A treble hook has three points. Some have a spring wrapped around the shank to help hold the bait.



Many manufacturers make a variety of "stinkbaits." Homemade stinkbait can be made using the following recipe.

Catfish Stinkbait

1. Fill a jar with pieces of a forage fish like shad.
2. Cover the jar with the lid, but leave the lid loose so gases will escape.
3. Put the jar in direct sunlight for a day or two.

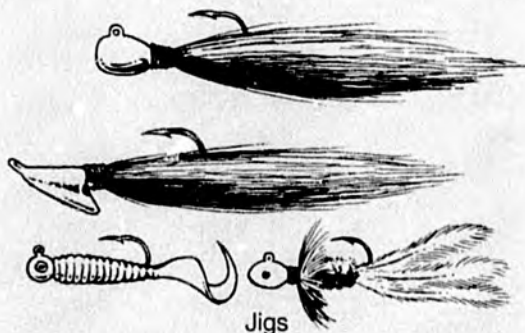
When you open the jar, you'll know your catfish "stinkbait" is ready to use.

LURES

Fishing lure companies make lures in many sizes, styles, colors, and patterns. Read the instructions in or on a lure package to learn how to use each lure. Here are a few types of lures:

Jigs

Jigs have weighted metal heads and a "tail" made

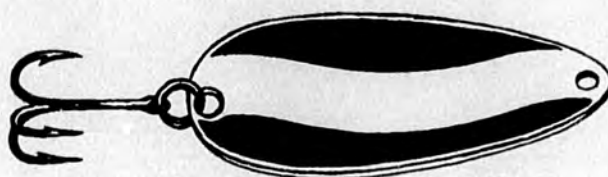
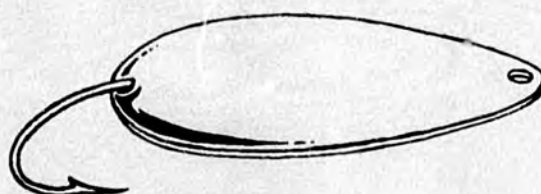


Jigs

of animal hair, soft plastic, feathers, or rubber. Anglers sometimes add a minnow or piece of pork rind to the jig's hook. Jigs can be used to catch nearly every kind of freshwater and many saltwater fish.

Spoons

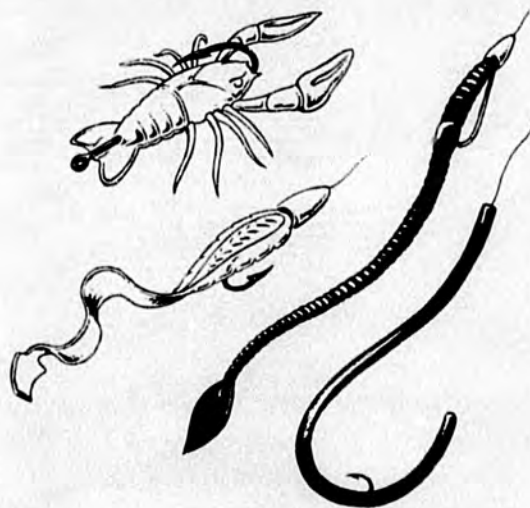
Spoons are metal lures designed to look like a swimming baitfish. Many spoons are made to be cast. Others are meant to be trolled behind a moving boat.



Spoons

Plastic Baits

Soft-plastic worms, minnows, and crayfish are available in many sizes and colors. You can use them with or without a weight. Sometimes,

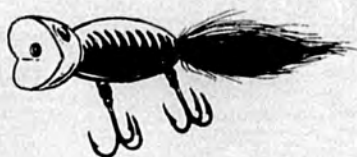


Plastic Baits

plastic baits are used with a jig head, spinner or spinnerbait. Some plastic baits have scents attractive to fish built into them.

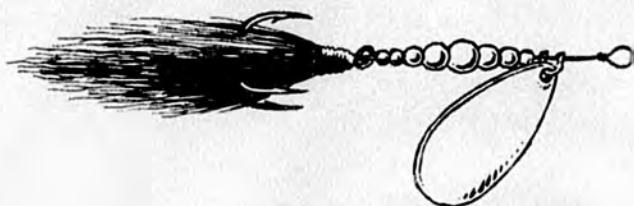
Plugs

Plugs have a body made of plastic or wood and are designed to be used on top of the water or at depths below the surface. Topwater or floating plugs are designed to float on the surface. Diving



Plugs

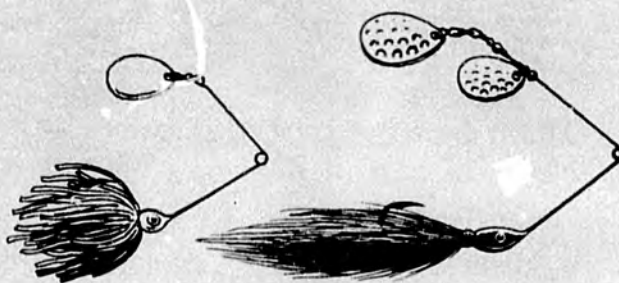
plugs have plastic or metal lips so they will dive to a certain depth. These diving plugs are often called "crankbaits" because they are often used with baitcasting reels that operate like a crank.



Spinners

Spinners

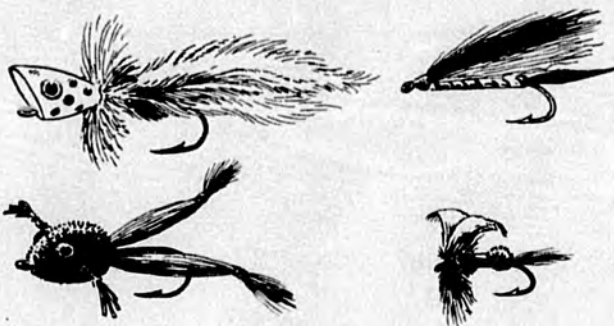
Spinners have one or more blades that spin, or revolve, around a straight wire shaft. Some spinners have tails made of soft plastic or animal hair.



Spinnerbaits

Spinnerbaits

Spinnerbaits are lures with one or more blades that spin around a "safety pin"-type shaft. Most spinnerbaits have skirts made from animal hair, vinyl, rubber, or other materials.



Poppers and Flies

Poppers and Flies

Poppers and flies are small lures used with spincast and flyfishing tackle. These baits are very good for panfish and other fish that feed on the surface such as trout and bass. Fly tying can be a very rewarding hobby.

As you understand more about the environment fish live in and how they behave, you will learn which bait or lure is best for specific fish during different seasons of the year.

ACTIVITIES

ACTIVITY 1 — VISITING A FISHING TACKLE STORE

After reading this chapter, take your book to your local fishing tackle store. Locate the items of equipment mentioned to see how they look in real life. Ask the owner to show you the different types of lures, rods and

reels, fish hooks, and fishing lines, commercially prepared baits, and other equipment. Have him explain anything that you do not understand.

ACTIVITY 2 — KNOT TYING

Find a piece of heavy twine or thin clothesline and a bolt with a big eye to represent the hole in a hook. Practice tying the palomar, improved clinch, and loop knots described in your book. Practice until you can tie these knots without looking at the directions. Practice with monofilament line after you have learned how to tie these knots.

ACTIVITY 3 — PRACTICE CASTING

Place a piece of cardboard in your yard, driveway, or other safe place. Take your fishing outfit with a practice plug without hooks. Stand about 25 feet away and practice your casting by aiming at your cardboard target.

Practice until you can hit your target regularly. To make a game of this, make three targets and with two friends have a casting contest. Each person gets 10 casts. Count three points for each cast that hits the target and one point for a plug that hits the ground and bounces onto the target. The highest score wins.

ACTIVITY 4 — COLLECTING YOUR OWN BAIT

Look on your lawn at night after a rain. Cover the lens of a flashlight with red cellophane so that the light won't scare the worms back into the ground. When you see one, grasp it quickly just below the collar-the enlarged part of the worm's body. Don't try to pull it out at once. As soon as you grasp it, the worm will try to crawl back into its burrow. Just hold on for a few seconds until the worm relaxes and can be removed easily.

CHAPTER

2

Fishing Safely

Fishing isn't a dangerous sport, but you should prepare to keep safe and comfortable in the outdoors. It is possible to get caught unexpectedly in bad weather, encounter insects, spend too much time in the sun, or get caught on a fish hook.

Wearing the proper clothing helps to protect you from injury. It also keeps you warm in cold weather and cool in hot weather. Rainwear and other gear keep you from getting wet and chilled.

Avoid problems by preparing for the unexpected.

SAFETY AROUND WATER

Water accidents claim many lives each year. Obviously you will be around water if you are fishing and accidents can happen at any moment, sending you into the water. A bank can give way if you are careless onshore. You can slip on a rock, step into a deep hole while wading, or fall out of a boat.

Anglers should learn how to swim and use caution around water at all times. You should always use the "buddy system" and have a friend or an adult with you in case something goes wrong.



Types of PFDs

Personal Flotation Devices (PFDs)

Personal Flotation Devices (PFDs), often called "life vests," are not just for wearing in boats. Anytime you are on or around deep or fast-moving water, it is always best to be wearing your PFD. U.S. Coast Guard and/or state laws

require you to have an approved PFD when you are in a boat. The rules say a boat must have one PFD for each person on board. Certain types of boats must also have a cushion or ring that can be thrown to a person in the water.



Wading

There are several rules you should follow for safe wading.

1. Always wade with another person.
2. Always wear your PFD.
3. Find out how deep the water is.
4. Find out how strong the current is.
5. Find out what the bottom is like.
6. Use a stick or staff. Shuffle your feet along the bottom to avoid holes.

While wading you can protect your ankles by wearing high-top shoes or wading boots. Long, lightweight pants can protect you from jellyfish and sea nettles in saltwater and from snags and rocks in freshwater.

Reach-Throw-Row-Go

Reach-throw-row-go is a method of rescuing a person who falls overboard or an angler or swimmer in trouble.

The first safety step is to **REACH** out with an oar, tree limb, or other long object if the person is close to you. If you can't reach the person, then **THROW** them a life-saving device. This can be a boat cushion or ring that floats. If possible, it should be tied to the end of a line so you can pull the person to you. If a cushion or ring isn't handy, anything that floats can be thrown. Plastic coolers, ski belts, or even beach balls can be used in an emergency.

If there is nothing to throw, **ROW** a boat to the person in trouble. There should be someone else in the boat to help pull the person in trouble into the boat. The person should be pulled in over the stern, or back, of the boat. If the boat has a motor, it must be shut off before you get to the person in the water. Don't let the person try to climb in over the side of a small boat. This can tip the boat over. If the boat is small, have the victim hang on the gunwales, and tow him to shore.

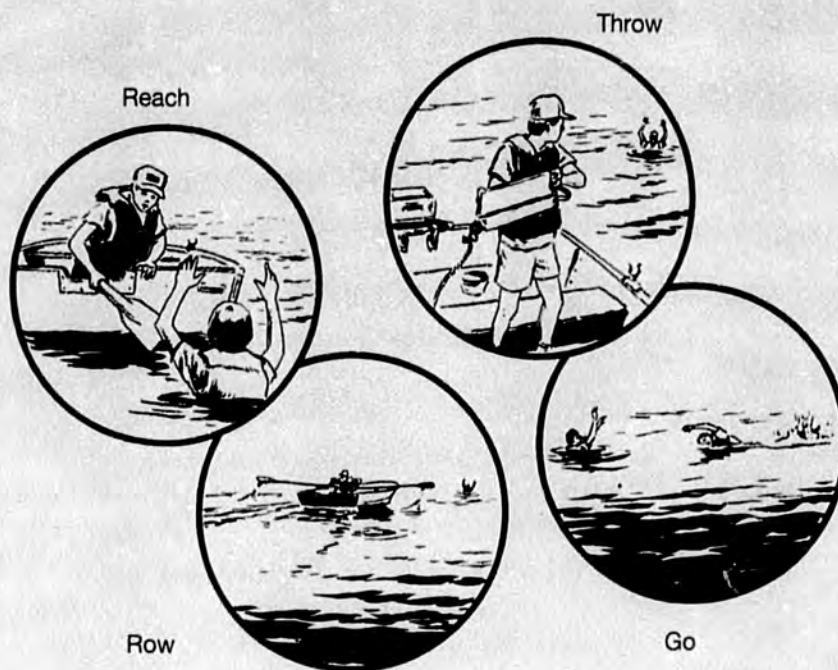
Swim out to save the person in trouble **ONLY** as a last resort and **ONLY** if you are an experienced lifeguard or have had life-saving training. **GOing** into the water after the person in trouble is very dangerous. People who are drowning often panic and injure or even drown someone trying to rescue them. **GOing** quickly for help is often the best choice.

Swimming

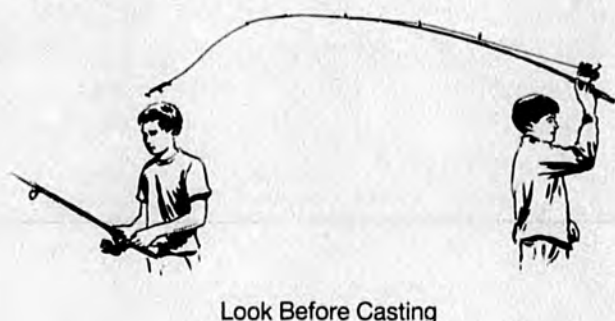
If you fish, you should know how to swim for your own safety. Many young anglers like to go for a swim during a fishing trip just for fun or to cool off. Don't swim if there is any doubt about your ability. Never dive into the water of an unknown area and don't swim after a heavy meal or in cold water. Swim only when an experienced swimming partner is with you.

Safety With Fishing Equipment

Handle your fishing equipment responsibly. Hooks can be dangerous if you do not handle them properly. Look behind you before you cast to make sure your hook will not be caught on a power line, a tree, or a person. If you leave your



tackle laying on the ground, another person can trip on it and fall, step on a hook, or break your tackle.



Take caution and use long-nose pliers to help remove hooks from a fish. If a hook is deep inside the fish, either cut off the line and leave the hook in the fish, or use a hook disgorger. Hooks left in fish will work themselves free or rust out.

When transporting your equipment, remove the hook or lure from your line and store it in your tackle box.

FISHING IN WARM WEATHER

Because the hot summer sun is harmful your skin must be protected as much as possible when fishing. Long pants and long shirt sleeves provide better protection than shorts and short-

sleeved shirts. In warm weather lightweight and light-colored clothing reflects the sun and is cooler. Dark clothing is warmer because it absorbs heat.

Even in warm weather it's a good idea to take a sweater or jacket and rain gear. Even though it may be warm during much of the day, many fishing trips begin early when it's still chilly and end late in the evening when it gets cool.

Western-style hats offer good protection from glare and against sunburn. Lightweight, light-colored, baseball-style caps are also popular and will help keep you cooler. In tropical areas, such as Florida and the Gulf Coast, some saltwater anglers put a cloth on the back of their caps to keep their necks from getting sunburned. Hats also protect your head from hooks on poor casts.

A pair of high-top sneakers is ideal for protecting your feet from sharp rocks and glass while wading in the summer. They will also protect your feet while you are fishing from the bank. For fishing from a boat wear shoes designed to keep you from slipping on a wet boat deck (boat shoes).



FISHING IN COLD WEATHER

If you fish in cold weather, several layers of clothing can keep you warm. Clothing layers trap air between them and offer great insulation. As it warms up during the day, you can always take off some of the clothing.

Long underwear, a warm shirt, and warm pants help to hold your body's heat. Additional layers of clothing can include an insulated vest and a rain parka, which are also good for keeping you warm on cold, windy days.

Caps and hats are important. They prevent loss of body heat from your head-and-neck area. Headgear used for fishing during the winter should protect most of your head, including your ears. Some good choices are an insulated hat or cap or a wool stocking cap. A knit scarf can protect your neck.



Fishing is difficult with most gloves. There are gloves, however, that let you tie knots and handle fishing tackle. They include lightweight rubber gloves and "hunter/fisherman's gloves," gloves that have a flap so you can expose your fingers. Gloves without fingertips are also good.

Before fishing on ice, it is a good safety practice to check the thickness of the ice. Drill a hole with an ice auger near shore and along your route of travel, measuring the thickness of the ice as you move. Do not fish on ice unless it is at least four inches, and preferably more, thick. Thinner ice is dangerous because it can break easily.

You need warm clothing, long underwear, pants and shirt for cold weather and ice fishing.

A snowmobile suit and insulated boots with thick soles are ideal. A warm hat, heavy gloves, and a skier's mask are also needed. Hand warmers are also helpful. A personal flotation device, when worn under clothing, provides extra warmth and also emergency flotation if you go for an unexpected icy plunge.

GENERAL PROTECTION ITEMS NEEDED FOR ALL-WEATHER FISHING

Sunscreens

Anglers should avoid suntanning, which is harmful to the skin. We get vitamin D from the sun, so it can be helpful. However, too much sun can cause skin cancer. A sunscreen lotion can and should be used to keep the sun's ultraviolet (UV) rays from reaching your skin. One with a Sun Protection Factor (SPF) of 15 on the label gives good protection.

Rainwear

All anglers must have rainwear. Several styles are available. A rain poncho is good, but many anglers prefer a two-piece rain suit with a jacket and pants.

Good rainwear is waterproof, not just water-repellant. It should have a full hood to protect your head, a storm flap over the jacket opening, a zipper, buttons or snaps, and elastic around the cuff and ankle openings to keep water out.

Sunglasses

Sunglasses protect your eyes against the sun's glare from the water. Many anglers like polarized sunglasses that reduce glare and let them see below the surface of the water to spot fish and other objects. Some sunglasses are treated to protect your eyes from the sun's harmful ultraviolet light rays.

Hip Boots and Waders

Hip boots and waders are designed to keep you dry and protect you against the chill of cool

water. For cold-water wading, wear insulated boots. Hip boots only come up to your hips and are held in place with belt straps. Waders come up to the top part of your chest. They are held in place by suspenders and you should wear a belt on the outside. They will protect you while surf fishing, wading a stream, or fishing in deeper water.

Under most circumstances, if you fall in the water with your hip-boots on, do not try to remove them; first bend your knees. Air trapped in the boots will make them float at the toes. This can help keep you afloat as you paddle toward shore.

INSECTS AND INSECT BITES

Insects can be pests. Common ones are mosquitoes, chiggers, ticks, black flies, bees, wasps, and hornets. While you cannot avoid insects entirely, there are some things you can do.

1. Try to avoid areas with lots of insects.
2. Don't use cologne, perfume, or other scents that might attract them.
3. Don't wear blue clothing. Blue seems to attract mosquitoes.
4. Wear a long-sleeved shirt and long pants.
5. Turn up your shirt collar.
6. Use an insect repellent, but do not get it on your lures or bait since fish can smell it and may not bite.

No one likes sunburn and insect bites, but they happen. Aloe vera and other salves and lotions can provide relief for minor cases of sunburn. Insect bites and stings can be dangerous. If you have extreme reactions to a sting, carry a special prescription injection kit for such an emergency.

For most people, removing the bee's stinger and applying a pain-killing balm or a paste of baking soda or meat tenderizer will help to relieve the pain and reduce swelling, itching, and inflammation. Remember to always scrape a bee

stinger from your skin. Squeezing it and pulling can inject more poison and prolong your discomfort.

BASIC FIRST AID

Removing a Hook From Your Skin

Occasionally an angler will get a fish hook in the skin. Removing a fish hook is best left to a doctor or a hospital's emergency room. Once a fish hook enters the skin beyond the barb, it is hard to remove. *Never* remove a hook from around a person's eyes, face, the back of the hands, or any area where ligaments, tendons, or blood vessels are visible.

There is a method that can be used to remove a hook if it is not in a vital area. First cut the hook away from the rest of the fishing lure. Then, put a loop of heavy twine or fishing line around the bend of the hook. Next, hold down the eye and shank of the hook, pressing it lightly to the skin. Grasp the loop in the line and, with a sharp jerk, pull the hook free.

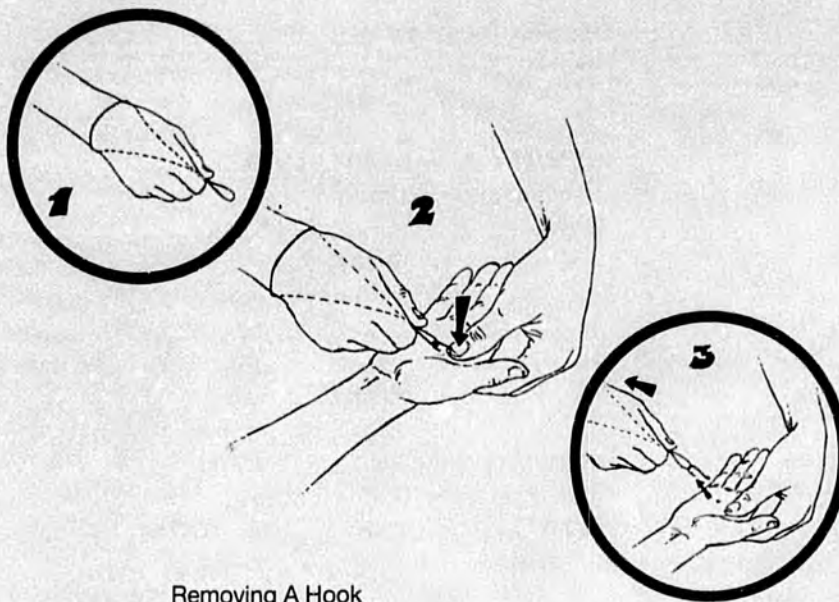
Any hook wound should be followed by a tetanus shot if the victim has not had one in the past five years.

Cuts and Bleeding

In all cases of serious bleeding where there is a large or deep cut, call a doctor, get the victim to a hospital, or call paramedics at once. Small cuts can be handled by adhesive bandages and antiseptic. For large or deep cuts, pressing directly on the wound with a clean gauze pad or handkerchief will reduce bleeding. Use the procedure taught at Red Cross training courses to ensure that proper amounts of pressure are applied.

Hypothermia

Hypothermia means your body is losing heat faster than it can produce it. Without treatment your life is in danger. Exposure to the cold along with wind, wetness and exhaustion causes hypothermia. It doesn't have to be freezing cold for



Removing A Hook

you to develop hypothermia. Many cases of hypothermia develop in air temperatures between 30 and 50 degrees F. Cold water takes away body heat 25 times faster than air of the same temperature. Any water colder than 70 degrees can cause hypothermia.



H. E. L. P. Position

To protect yourself from hypothermia stay warm and dry. Remember that wind makes you colder. If you fall into cold water with a PFD on, don't thrash around. Excess movement speeds

up heat loss. Instead, bring your knees up towards your chin and bend your legs as though you are sitting. This is called the Heat Escape Lessening Position or "H.E.L.P." This helps hold body heat and slows cooling.

To detect hypothermia, watch for these signs: uncontrollable shivering, fumbling hands, frequent stumbling, a lurching walk, vague slow speech, drowsiness or apparent exhaustion.

To treat hypothermia, get the victim out of the cold. Give warm drinks, remove all wet clothing and get the victim into dry clothes, and if possible, into a warm sleeping

bag next to another person to provide body heat. Try to keep the person awake.

Other Medical Problems

Snake bites and broken bones are rare, but serious, emergencies. A person with a broken bone should not be moved until medical help is found.

Snakes rarely bite if they are left alone. A person bitten by a poisonous snake should be kept calm and quiet and taken to a doctor or hospital at once. If possible, determine the type of snake that caused the bite.

ACTIVITIES

ACTIVITY 1 — FISHING SAFETY-SELF TEST

For each given situation below, think of a possible accident and a safety practice to avoid this accident.

1. Wading in streams
2. Fishing from a bank
3. Fishing from rocks
4. Fishing from boats
5. Fishing from piers
6. Fishing from a boat in rough water
7. Ice fishing
8. Wearing waders/ hip boots
9. Tangled messy tackle box
10. Fishing in a crowded area
11. Handling a hooked fish
12. Handling an unhooked fish

13. Climbing, leaning and reaching while in a boat
14. Fishing gear not properly secured
15. Fishing or boating without PFDs
16. Fishing or boating on a hot sunny day
17. Fishing or boating on a cold, wet day
18. Fishing or boating and using alcohol
19. Fishing without a buddy
20. Fishing/swimming in unfamiliar waters
21. Horseplay near the water
22. Fishing at night from boat or shore
23. Cleaning and/or filleting fish
24. Disobeying posted signs
25. Overloading a boat

ACTIVITY 2 — WHAT SHALL I WEAR?

Place sheets of different colored construction paper or scraps of fabric in the sun. After five minutes feel each one. Are the dark-colored ones warmer or cooler than the light colored ones? What does this tell you about the color of clothing to wear to stay cool while fishing during the summer? What color of clothing should you wear in the winter?

ACTIVITY 3 — WATCH THAT REFLECTION.

Place a small mirror in the sun. Angle it towards your hand or arm. Do you feel the intensity of the sun? If the

sun is in the right position when you are fishing from a boat you get reflected sunlight that can cause sunburn, just like the reflected light from a mirror.

ACTIVITY 4 — INSULATION

Materials: insulated cup, paper cup (same size), covers of cardboard, 2 thermometers and water.

Heat enough water for both cups to 180 degrees F. Fill both cups to the same level. Poke a hole in the cover for each cup and insert the thermometers to the same depth in the water. Note the temperature in each cup every 3 minutes. Which cools faster?

The insulated cup holds more of the heat in. Would insulated clothing help keep you warm?

ACTIVITY 5 — PRACTICING HOOK REMOVAL

With your teacher or another adult and using the procedure described in this chapter, use an orange to practice hook removal.

ACTIVITY 6 — MAKING A FIRST-AID KIT

With an adult's assistance, make a list of things that should go into a basic-first aid kit to carry while you are fishing. Gather these items and make a first-aid kit to pack with your fishing gear.

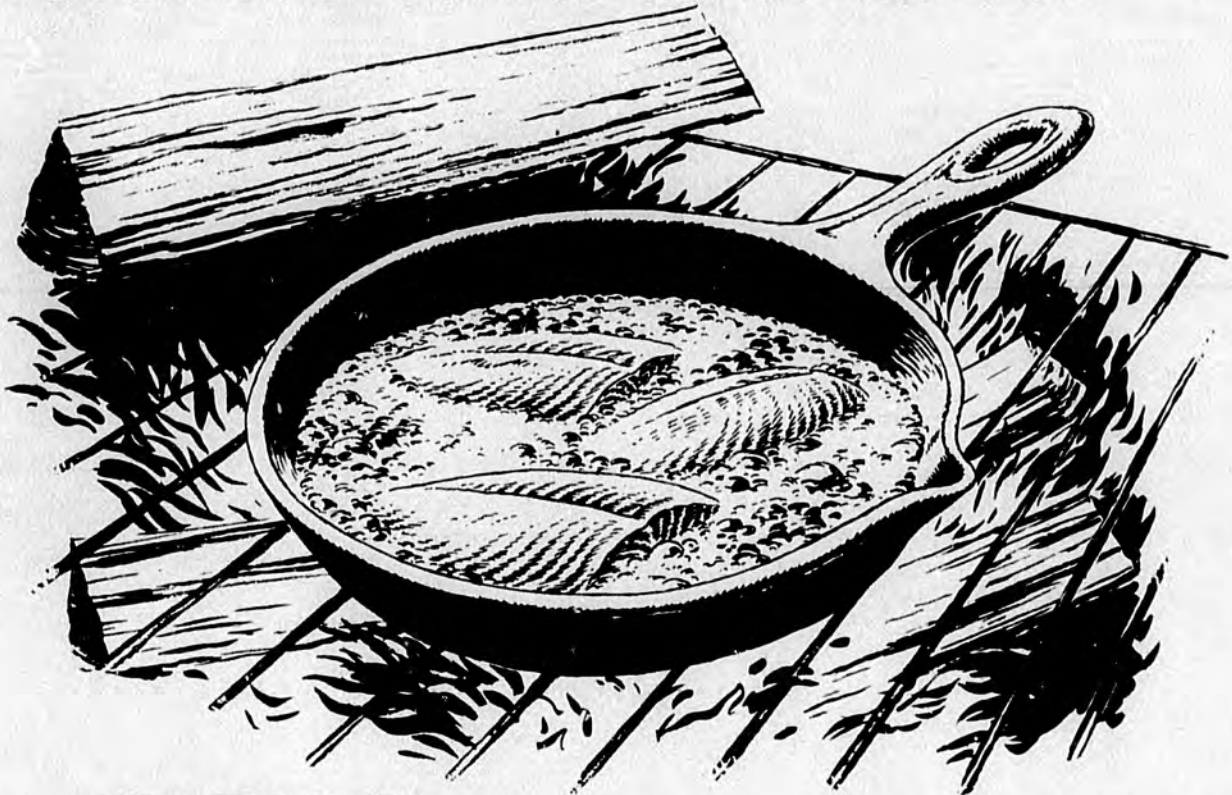
CHAPTER

3

Caring For Your Catch

Many fish are used as food. Fish are a good source of protein and are eaten by people around the world.

A fish that you plan to eat must be kept fresh. To ensure its freshness it must be kept alive until it is cleaned. You can put live fish in the livewell of a boat or on a stringer in the water. If a fish can't be kept alive, it should be cleaned and placed on ice to avoid spoilage. If you don't plan to keep a fish, free it quickly without harming it.

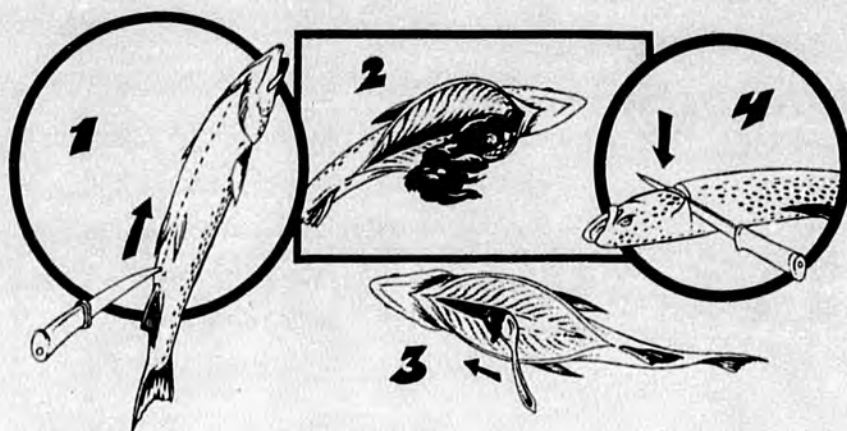


RELEASING A FISH

To release a fish, keep it in the water if you can. Handle it carefully with a wet hand so it can be freed unharmed. If it's a fish without sharp teeth like a bass, hold its lower lip between your thumb and index finger. If it has sharp teeth like a walleye or northern pike, carefully hold it around

the body. Never hold a fish by the eyes or gills if it will be released.

Never tear a hook out. This can harm the fish and it may not live. If the fish is hooked deeply and you can't easily remove the hook, cut the line to release the fish. The hook will rust, dissolve, or become loose without harming the fish.



Cleaning a Fish

If a fish loses consciousness, try to revive it by gently moving it forward and backward so water moves through its gills. When the fish begins to struggle and can swim, let it go.

CLEANING FISH TO EAT

Ask an adult to teach you how to use a knife to dress a fish so nobody gets hurt.

First insert the knife tip into the fish's vent and move the blade up along the belly, cutting to the head. Keep the knife blade shallow so you don't puncture the intestines. Then, spread the body open and remove all of the entrails. Some fish have a kidney by the backbone. You can remove it by scraping it out with a spoon or your thumbnail. Cut off the head and rinse the fish in clean water.

To keep a dressed fish fresh, surround it with ice in an ice chest or cooler. As the ice melts it should drain from the cooler. Never store fish in ice water.

Most saltwater fish don't keep well when put in a livewell or kept on a stringer. They must be put on ice to keep them fresh.

Scaling

Scaling means to remove the scales from the skin of a fish. Scale fish on a flat surface using one hand to hold it by the head. Rake

the scales from the tail toward the head with a fish scaler or a large spoon. Remove the scales on both sides of the body. After you remove the head, gills, guts, and fins, cook the fish with its skin on.

Small fish, like bluegill and crappie, are usually scaled, cleaned and then cooked whole. Cook scaled fish with the bones in the body and remove them just before you eat.

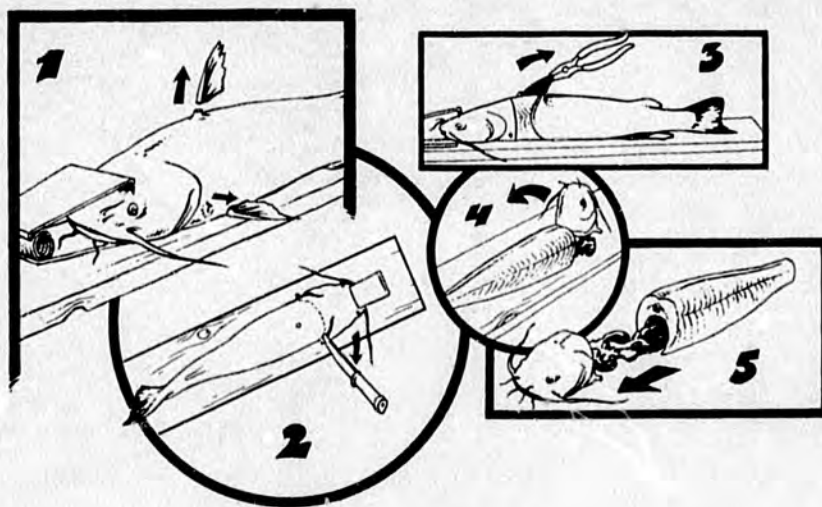


Scaling a Fish

Skinning

Removing the skin improves the taste of many fish. It also removes a layer of fat just under the skin. Catfish are usually skinned.

To skin a catfish or bullhead, hold its head firmly on a flat surface with a clamp. For safety,



Skinning a Fish

it is a good idea to snip off a catfish's spines before skinning. Then, cut through the skin behind the head and the pectoral fins. Use pliers to remove the skin from the body, pulling from the head toward the tail. Grasp the head of the fish with one hand and the body with the other. Break the backbone at the head. Pull the head and guts away from the skinned body. After you wash the fish in clean water, it's ready for cooking. You remove the fish's bones just before you eat it.

People also fillet catfish. However, they are more difficult to fillet than most other fish.

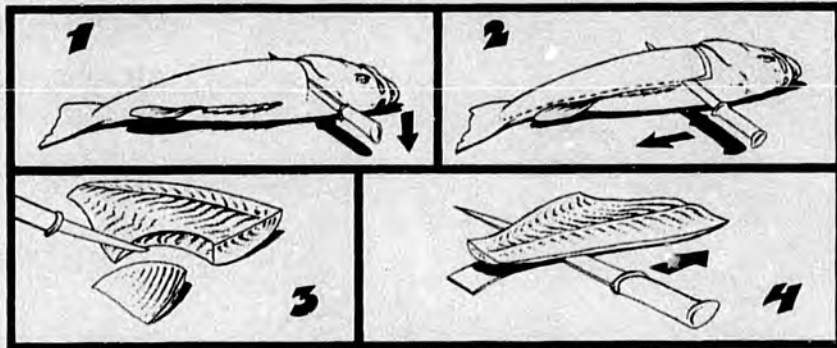
Filleting

Filleting means getting the meat of the fish without the bones. Larger fish, such as large-mouth bass, northern pike, salmon, and walleye, are usually filleted. A filleted fish has its skin and all of its bones removed before cooking. Scaling isn't necessary. Fillet knives have a long, thin, blade that's very sharp and specifically designed for filleting fish.

Have an adult help as you learn to fillet. A fillet knife is dangerous and must be handled safely. If you have any slime on your hands or the knife handle, wash it off to prevent slipping. Always keep your hands in back of the blade. For added safety, wear metal-mesh "fish-cleaning" gloves to protect your hands.

To fillet a fish, lay it on its side on a flat surface. Cut the fish behind its gills and pectoral fin down to, but not through, the backbone. Without removing the knife, turn the blade and cut through the ribs toward the tail. Use the fish's backbone to guide you. Turn the fish over and repeat the steps.

Next, insert the knife blade close to the rib bones and slice the entire rib section of each fillet away. Then, with the skin side down, insert the knife blade about a 1/2 inch from the tail. Gripping this tail part firmly, put the blade between the skin and the meat at an angle. Using a little



Filleting a Fish

pressure and a sawing motion, cut against—not through—the skin. The fillet will be removed from the skin.

Wash each fillet in cold water. Pat dry with a clean cloth or paper towel. The fillets are ready to cook or freeze.

Steaking

A large fish is often cut across the body into thick steaks. First, clean the fish and skin or scale it. Usually, a fish is scaled only if the scales make it difficult to cut the steaks. Before steaking, chill the fish or put it in a freezer until it is partly stiff.

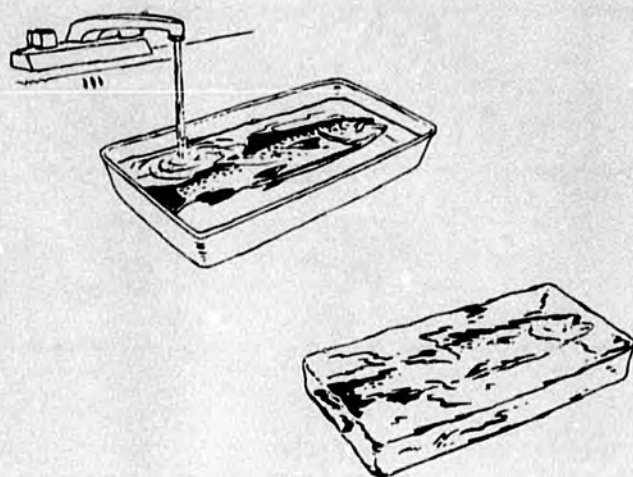
For most fish, cut through the body, working from the tail toward the head. Make each steak from 1/2-inch to 1-inch thick. After steaking, trim away any belly fat or bones that you can see, but not the backbone.

STORING FISH

Keep a fish alive or chilled from the time it is caught until it can be stored. Clean it as soon as possible to preserve its flavor. However, a fish can be kept for up to a day before cleaning if it is iced or chilled. After a fish is cleaned and skinned, filleted, or steaked, there are several ways to store it.

Icing

After a fish is dressed you can ice it. This is the best way to transport fish. Use an insulated cooler and leave the cooler's drain plug open so ice water will run out. Water spoils the flavor of the fish.



Freezing a Fish in Ice

Refrigeration

Before refrigerating a fish, wash it in cold water and dry it with a clean cloth or paper towel. Then wrap it in waxed paper, plastic wrap, or aluminum foil and store on ice in the refrigerator. Usually, you can store a fish in the refrigerator for up to two days. Large fish or large pieces of fish will keep longer than small pieces. Lean fish (panfish and walleye) store better than fatty fish (trout).

Freezing

Frozen fish last from three to twelve months. However, the preparation for freezing is important.

A fish can lose its flavor if it comes in contact with air. One way to prevent this is to wrap the fish in aluminum foil. Then, wrap it again with freezer paper.

Another way is to freeze the fish in a solid block of ice. Use a refrigerator container. Place the fish into the container, but use enough water to just cover the fish.

To thaw a frozen fish, put it in the refrigerator overnight or place the wrapped fish in cold water. Do not try to thaw fish in a microwave because part of the fish will begin to cook before other parts are thawed. Don't thaw fish at room temperature.

Other Ways

Smoking, pickling, and canning are other ways to store or prepare fish. Look for recipes in cookbooks or your public library.

WAYS TO COOK FISH

Frying

Many fish are panfried; however, broiling or baking are also popular methods of cooking fish. Panfrying is nothing more than cooking both sides of the fish in hot cooking oil. Coat the fish with flour, breading, cornmeal or batter before frying. The batter mix can be a pancake-type batter or one made with spices or even a little baking soda. Make sure the oil is hot enough. Heat the oil in a skillet and put a small piece of fish in it. If it sizzles, the oil is hot enough.

To deep-fry fish, put them completely into a deep pan of hot cooking oil. Fillets or small fish can be used with or without batter.

Recipes

There are many recipes for cooking fish. Most cookbooks have them. Here's a simple recipe for panfried fish.

Panfried Fish

Ingredients:

- Lean whole fish, dressed
- 1/2 cup milk
- 1 egg
- 1/2 cup flour
- Salt, pepper, and herb seasoning
- Cooking oil, butter, or margarine
- Lemon
- Parsley

Mix the egg and milk. Dip the fish into the egg-milk mixture and then coat the fish with flour. Instead of flour, you can use a heavier, breaded coating or pancake batter. Turn on the burner and set it to a high heat. Put some oil,

butter, or margarine into the cooking pan. Use enough to cover the bottom to a depth of 1/8 to 1/4 inch. When the oil is hot enough, put in the fish. Adjust the heat so that the oil will not smoke or burn. Cook the fish until it is brown on one side. Then, turn it over and cook the other side until it's brown, too. Remove the fish from the pan and place it on a paper towel to drain. Put the fish on a serving platter and sprinkle with lemon juice and parsley. Butter and herbs are also tasty on panfried fish.

Other Ways To Cook Fish

There are many ways to cook fish that are both tasty and healthy. Broiling, grilling, baking, and poaching are good ways to cook fish. People prefer to fix fish these ways for a change and because oil is not used. This makes them healthier for those people who have to watch their diets. You can ask your parents if you can help as they prepare fish in these ways.

The microwave is an especially good way to cook fish quickly and easily. Place fillets in a microwave dish, add a liquid like water or lemon juice, cover them, and cook on high for six or seven minutes for one pound of fillets. Let stand for five minutes and then eat.

SAFETY OF EATING FISH

Most fish are safe to eat. However, some waters are pollute' in such a way that it makes some fish unsafe to eat. Most often the health benefits of adding low-cholesterol fish to your diet greatly outweigh any health risks. If you are unsure of the safety of the area you are fishing, contact your state's natural resources agency or health department.

Some pollution problems in fish can be reduced by cleaning fish carefully. Skinning fish removes fat under the skin. Many pollutants can

be contained in this fat. Trim fat from around the backbone, along the sides, and from the belly of the fish.

ACTIVITIES

ACTIVITY 1 — CARE OF YOUR CATCH

With adult supervision, clean and prepare a fish you have caught. If you have more than one fish you can use different methods to prepare them for storing or cooking. Depending on the species you can scale, skin, or fillet your fish. If you do not plan to immediately eat the fish, prepare it for freezing following the procedure listed in this chapter. Perform all of the necessary steps yourself, realizing some assistance may be required.

ACTIVITY 2 — PREPARING FISH TO EAT

One of the best aspects of fishing is actually eating the fish. Before you even catch one of your own, you can try your hand at cooking.

Buy any type of fish fillet; even inexpensive fish are delicious if prepared properly. There are many ways to cook fish, but choose to fry, broil, or grill your fish fillets. After cooking the fish have your family sample your cooking.

ACTIVITY 3 — POND FOOD

Besides the fish you catch, there is another very tasty food that you can prepare from a pond. The common cattail grows in abundance in almost every pond.

In the spring of the year try this vegetable: In the shallow water, find cattail shoots sticking up about two feet. Pull gently and they should come loose below the water line. There will be a white section several inches long at the end. Cut this off and peel off the outer layers and boil in salted water for three to four minutes. Drain and top with some butter. This is "Cossack asparagus".

ACTIVITY 4 — RECIPE BOOK

Start a cookbook of fish recipes: include the favorites of your family and ask your friends for their family's favorites. Be sure to tell how to prepare the fish before cooking including the use of any seasoning or spices. Write each recipe on an index card in a card file for future reference. Recipes can be organized by species of fish and then by the type of cooking method.

CHAPTER

4

Fishing From Shore

Shore fishing offers many opportunities for anglers. You can fish from the banks of rivers and streams, the shorelines of inland lakes and ponds, and in the surf on the Atlantic, Pacific and Gulf coasts. You can also fish from manmade structures such as piers, jetties, walkways, and bridges.

Shore fishing is available to everyone, even large family and club groups. And because there's no boat to own or rent, it's low in cost.



FISHING LOCATIONS

Many anglers often fish from shore. Although some species of fish are rarely caught by shore anglers, there are still plenty of other species

available to shore anglers. For example, free-swimming ocean fish are not found close to shore. Others like deep-dwelling lake trout are not often caught by shore anglers. Fish commonly caught by shore anglers include species

that live near structure (bass, northern pike, sunfish, and stream trout) and those that feed on the bottom (carp, catfish, suckers, perch and walleye).

One big advantage of shore angling is that almost everyone has some body of water near home that offers fishing.



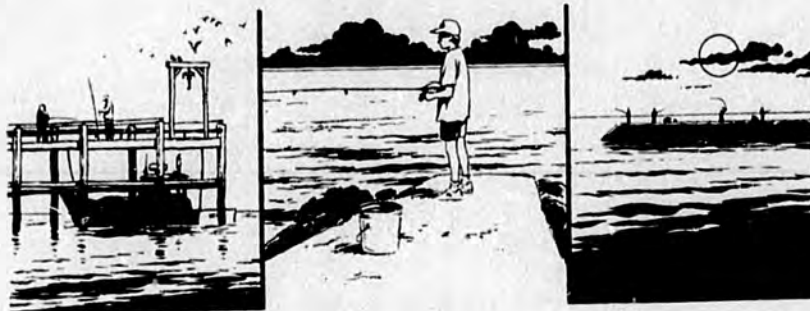
Shore Fishing

Lakes and Ponds

Many lakes and ponds have shoreline structure such as docks, logs, stump fields, brush and rock piles, and downed trees. Such things, which provide shelter, shade, and protection for fish, are ideal fishing spots. The best locations may be remote and far from roads.

Rivers and Streams

Rivers and streams are also good places, especially those with structure such as islands, sand bars, rocks or rock piles, and log jams within casting distance of shore. Many anglers fishing shallow rivers combine shore fishing with shallow-water wading. Being able to fish from the middle of a stream lets you cast to more structure. Remember, most fish face the flow of water and wait for food to come to them.



Breakwaters and Jetties

Breakwaters and jetties are similar to piers; they, too, extend into the water and offer a platform from which to fish. Most are built to protect harbor areas and boat slips from the wave action of the open ocean or a lake. Those designed for fishing have rocks arranged so that they're flat on top. When fishing breakwaters and jetties that aren't flat on top, use extra caution.

Fishing the Surf

Surf fishing is a special type of shore fishing. Surf anglers either fish from the shore or wade into the shallow waters along the coasts. Usually, there's little visible structure, so surf fishermen must learn to "read" the water to detect shallow sloughs, pockets, tide rips, and other areas where fish may be present.

Piers

Fishing piers are structures that extend into the water for a few dozen feet or as much as several

Walkways and Bridges

Walkways are like piers, but are specially built fishing platforms that are near or run parallel to bridges, piers, shoreline bulkheads, or similar

structures. An example is a walkway along a bridge, but constructed at a lower level. This keeps anglers safe from auto traffic and puts them closer to the water.

Fishing isn't always allowed from bridges because of the danger from traffic. Bridges where angling is permitted must be fished carefully.

SHORE FISHING TACKLE

In most cases, tackle for shore fishing is no different from that used in fishing from a boat under the same conditions and for the same species of fish. Freshwater tackle is usually light for sunfish, small catfish, trout, smallmouth bass in streams, suckers, and small walleye. Medium tackle is used for largemouth bass, smallmouth bass in lakes, northern pike, carp, large catfish, and salmon. Heavy tackle is used for large salmon and trout, muskies, striped bass, and large carp.

Surf-fishing tackle is larger than that used for freshwater fishing because the fish are often bigger. Weights used to keep baits or lures on or near the bottom in currents and moving tides are also heavier. Medium to heavy tackle is used. A typical surf-fishing outfit consists of a large spinning reel with 12- to 20-pound test line and a heavy 8- to 12-foot rod. Long rods allow you to cast farther. Surf anglers usually use live bait until fish are visible. Then they switch to lures.

APPROACHING FISH

Fish are wary creatures. This is especially true in shallow water near the shore. Anglers must walk carefully because vibrations from their footsteps can be transmitted to the water and sensed by fish, spooking them away.

Vibration is less of a problem when fishing rivers and streams because the water's current conceals most bank vibrations.

When wading, avoid dislodging rocks that might make sounds that scare fish. Vibration isn't a problem when fishing from breakwaters, jetties, and piers.

When you fish still waters, these tips will



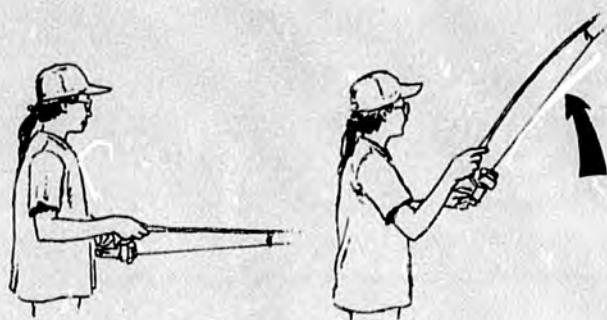
help you avoid being seen by fish. You should stay as low as possible, stay close to shrubbery, and wear dark or camouflage clothing. These are important since fish near the surface can easily detect movement on shore.

HOOKING AND LANDING FISH

Setting the Hook

"Setting the hook" refers to the method of forcing a hook into a fish's mouth.

In most cases, one sharp snap of the rod is all that is needed, provided the hook is sharp. Some situations, however, require more force than others. For example, a single hard strike is needed when using a soft-plastic worm rigged Texas style (the hook is concealed inside the worm) because the strike must drive the hook through the worm first and then into the fish's mouth. Striking too hard or repeatedly with a soft-mouthed fish such as a crappie, shad, or sea trout can pull the hook through the mouth.



Setting the Hook

Fighting a Fish

When a fish feels the hook, it struggles to get free. This might involve jumping, making a long run, swimming back into snags, or swimming around obstacles. Each species of fish fights differently. Some experienced anglers can often tell what species of fish is on the end of the line just by the way it fights. Carp, bonefish, and chinook salmon are strong, powerful fish that tend to make long runs. Largemouth bass and steelhead trout both run and jump. Tuna dive for the bottom. Trout and tarpon fight wildly when first hooked. Northern pike and cobia (ling) often come to the boat easily, but fight strongly near the boat. Sunfish zig-zag toward cover to take full advantage of their body shape.

Fish hooked and played in shallow water are more likely to jump and behave more frantically than those hooked in deep water. When hooked, deep-water fish often seek the bottom. Large bass are less likely to jump than smaller bass.

It's possible to land many small fish just by reeling them in. They'll fight, but this can be easily overcome by the strength of the line and the fishing rod. Much of the enjoyment of fishing, though, is gained by using lighter tackle that

allows the fish to fight. However, if you plan to release the fish, do not fight it so long that it becomes exhausted and later dies.

Fighting larger fish requires a technique called "pumping the rod." To do this, retrieve line quickly as you lower the rod until it is horizontal and pointed at the fish. Then stop retrieving line and slowly raise the rod up. When the rod is at about the 11 o'clock position, repeat the process until the fish is near and ready to be landed. Never let the line go slack in the process.

Landing a Fish

Fish can be landed by hand or with landing tools such as a net.

When you fish from the shore, beaching fish is a popular way to land them. This method, however, should only be used if you plan to keep and eat the fish because it will harm the coating on its body.

To beach a fish, lead it into increasingly shallower water, gradually sliding the fish on its side onto dry land. In saltwater, time your retrieve with an incoming wave. As the wave recedes, quickly grab your beached fish and pull it ashore.

Landing nets are commonly used for landing fish. Long-handled nets are used for boat or shore fishing and fishing from docks and jetties. Short-handled nets are used for stream fishing. The size of the net depends on the size of the fish you plan to catch. Some people use a circular net with a long rope instead of a handle; this is used for pier and bridge fishing.



Pumping the Rod



To net a fish, you must first have the fish under control as much as possible. Next, lead the fish to the net. Place the net in the water and lead the fish into the net head first. Then if the fish should try to escape, it will swim into the net. Once the fish is completely in the net, raise the net by the handle. If you have a heavy fish, also grasp the net's rim to prevent the handle from bending or breaking.

A popular way to land bass is by hand. Carefully avoiding hooks, many bass anglers use the thumb and index finger to grip a bass by its lower jaw. This holds the jaw wide open and temporarily paralyzes the fish. This makes hook removal easier.

To handle a fish with sharp teeth such as walleye or northern pike, carefully hold it around the body. Never hold a fish by the eyes or gills if you plan to free it. Other fish like chinook or Atlantic salmon have a strong tail and you can grasp them in front of the tail fin.



SAFETY

Fishing from shore isn't dangerous, but safe fishing requires common sense. In addition to following the safety precautions in Chapter 2, "Fishing Safely," there are a few other things you need to be aware of.

- Wear some type of footwear like a tennis shoe to protect you from glass and sharp objects.
- Wear a personal flotation device and use a wading stick or staff to help keep you from falling.
- River banks can erode making them unstable. Watch out for these unstable areas and stay away from them.
- Watch for rising water levels below dams or during incoming tides. Waters can rise quickly, trapping you away from shore.
- Rocks, muddy banks, and downed trees can be slick, making it easy to slip.
- Rocks and downed trees can also turn when you step on them, making you fall.
- When fishing from an area where there are lots of people, be particularly careful when casting. You want to catch fish, not other anglers.

GET PERMISSION

Although many shore fishing locations are for public use, others are not. Always get permission to fish on private property and pay attention to any special requests or regulations of the landowner. Make sure all gates are left as you found them (open or closed). Do not walk through crops or livestock. Help to keep the place clean and offer to share your catch with the landowner.

ACTIVITIES

ACTIVITY 1 — TESTING YOUR PFD

Personal flotation devices are needed while fishing, but many people have never been in the water with one on. Obtain a PFD, and go to a local swimming area or pool with an adult. Make sure the PFD is on securely, and jump in. Try to go underwater; try floating on your back and swimming a short distance.

If you ever do have an accident and must rely on a PFD, this experience will help.

ACTIVITY 2 — HOW DOES A FISH SENSE VIBRATIONS?

Bang a tuning fork or gravy stirrer against one hand and feel the vibrations in the hand holding it. Fish feel objects that "bang" the water because they create vibrations that fish feel through the line of cells in their lateral line. How effective do you think the lateral line in a fish might be?

ACTIVITY 3 — SELECTING FISHING EQUIPMENT

Using fishing magazines and catalogs, cut out the pictures of the equipment you need to begin fishing from shore. Pretend that you have \$100.00 to purchase your equipment. Paste the pictures of your equipment selections onto posterboard or construction paper. Write the cost of each piece of equipment and add up the total cost. Did you stay within your budget?

ACTIVITY 4 — SETTING THE HOOK

It is important that you learn how to set the hook. Before you learn to set the hook you must remember to keep slack out of your line. If there is slack in your line you will not be able to properly set the hook and you will lose a lot of fish.

When you feel a fish bite or strike your bait, quickly lower the tip of your rod and at the same time reel up the slack line. When your rod is pointing at the water, quickly snap the rod upward, keeping your hands in front of you and your elbows close to your body so that you remain in control. Begin reeling immediately.

To practice this, tie the end of your line to some immovable object. Back away from the object about 20

feet. Pretend that you have a strike, lower your rod while reeling up the slack, and with a quick snap of your wrists raise the rod to set the hook.

ACTIVITY 5 — FIGHTING A LARGE FISH BY PUMPING THE ROD

Sometimes when you hook a large fish you cannot just reel it in. At these times you must know how to pump the rod to land your fish.

To pump the rod effectively, you must again remember to keep your elbows next to your body and not lift your hands over your head. After you have set your hook, raise the rod tip to a vertical position, then slowly lower the rod reeling in line as you lower the rod. When the rod reaches a horizontal position, stop reeling and again lift the rod to a vertical position, keeping your elbows close to your body. Repeat this process over and over until the fish is close enough to land.

To practice pumping the rod, tie your line to some object weighing approximately five pounds. Back away about 20 feet and take the slack out of the line. Raise the rod by pulling the tip up, and then, keeping the line tight without any slack, lower the rod reeling as you go, and then lift the rod again. The object you have your line tied to will come closer to you each time you raise your rod.

ACTIVITY 6 — KEEPING A FISHING LOG BOOK

Each time you go fishing record the following information in a special notebook:

- Date fished—
- Place fished—
- Number and kind of fish caught—
- Types of lures or bait used—
- Weather conditions—
- Time when fishing was best—
- Who fished with you—

It is helpful to keep a record of your fishing trips so that you can look back to check on your success under different fishing conditions. This can help you become a more successful angler.

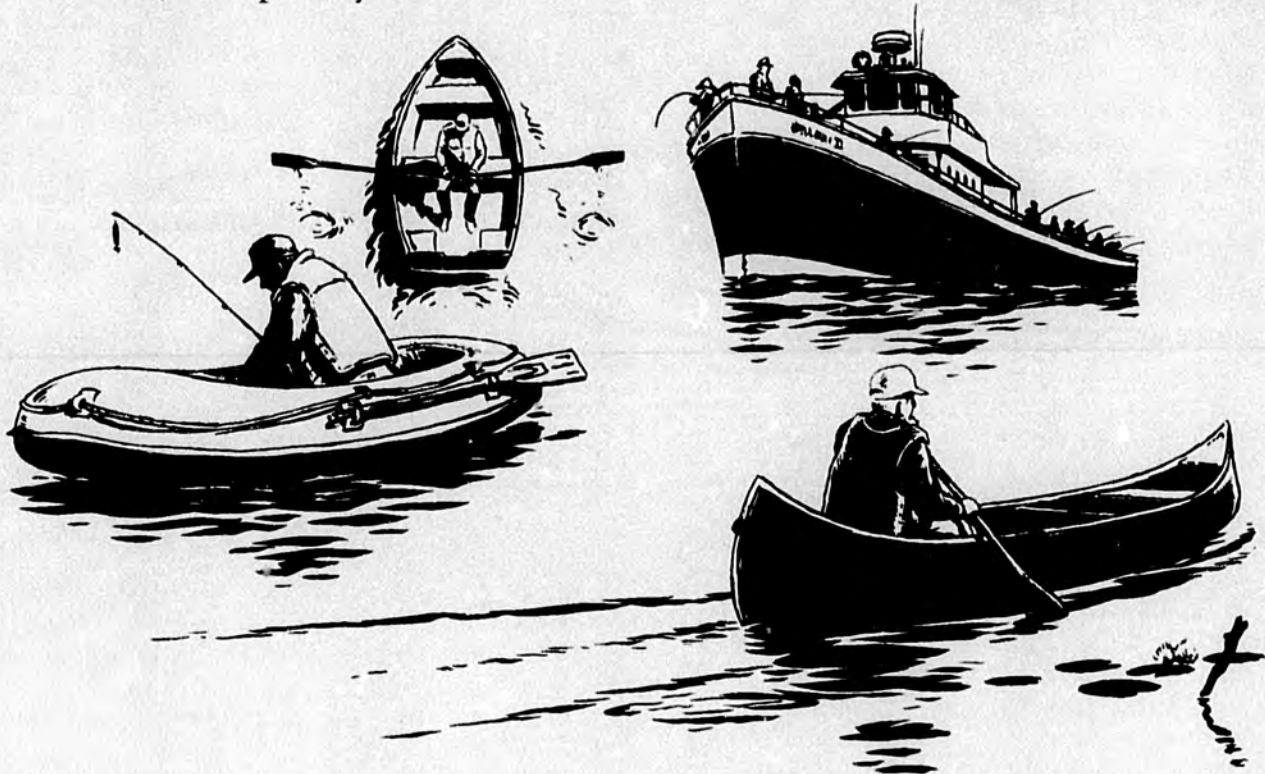
CHAPTER

5

Fishing From Boats

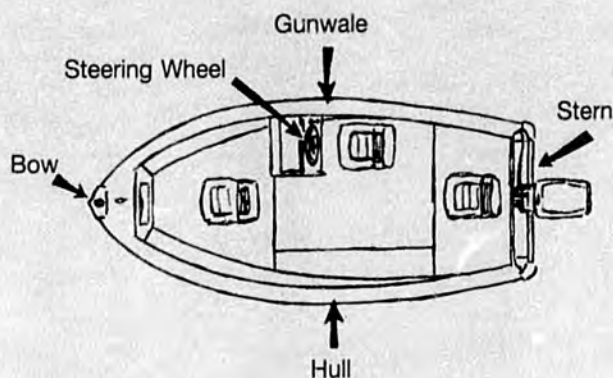
Fishing from a boat allows you to cover a larger part of a body of water than shore fishing. In their simplest form, boats can be nothing more than a platform that you sit or stand on. Some boats are made for rivers and streams, for small lakes, or for large bodies of water. Oars or paddles, electric motors, or gasoline motors move them through the water. Boats are made of wood, metal, fiberglass, rubber, and other materials.

Some boats used for fishing include canoes, skiffs, jonboats, V-hull boats, cathedral-hull boats, and specialty boats.



If you decide to try fishing from a boat, there is a lot to know before you go. You need to know about:

- The boat and how it handles.
- The equipment on the boat and how it works.
- The waters you will be boating on and any hazards such as submerged trees and rocks.
- The weather conditions and emergency procedures.
- The safety devices on the boat and how they work.
- Your own personal abilities-how much you know-how much you can do before you become too tired.



As the operator of a boat you are legally responsible for the boat and the safety of those on board. You must also understand the rules of navigation and the courtesies of safe boating. Always complete a boater safety course prior to operating a boat for the first time.

WAYS TO MOVE BOATS

Pole, Paddles, and Oars

Long poles can be used to move a small boat in shallow water. Paddles are mainly used with a canoe, but many states require that a paddle or pair of oars be part of a boat's emergency equipment. Oars can be used to move a boat on small bodies of water.

Electric Motor

A battery-powered electric motor can be used to move a small boat slowly on small ponds or on lakes. An electric motor is also often used on boats with outboard motors. The outboard is used to reach a fishing spot quickly. Then, the electric motor is used to control the boat's position while fishing.

Outboard Motor

An outboard motor is a gasoline engine mounted on a boat's stern, the back of the boat. Outboards range from one-horsepower to large engines of 200 horsepower or more. You control small outboards with a steering handle, often called a tiller. Large outboards are controlled with a steering wheel.

Inboard Engine

An inboard motor is completely inside the boat.

Inboard engines can run on gasoline or diesel fuel and are usually found on boats 18 feet or longer.

HANDLING A BOAT

Learning how to use a boat safely is very important.

Steering

On a smaller boat with an outboard motor, the motor's handle is used to steer the boat. Since the engine is mounted on the rear of the boat, it pushes the stern around, making the bow go in the opposite direction.

To turn starboard (right), move the handle to the left. To turn port (left), move the handle to the right. On larger boats with an outboard or inboard motor, a steering wheel is used to steer, much like driving a car.

Speed

The speed of a boat depends upon both the size of the motor and the boat. The speed of the motor is controlled by a throttle. This throttle has the same purpose as the gas pedal on a car.

Gearshift

The smallest outboard motors have no gearshift. The boat moves as soon the engine is started. Larger motors have a gearshift lever. There are three positions—forward, neutral, and reverse. Place the lever into neutral to start the engine. Then, when it's running, you put the lever in forward or reverse gear to move forward or backward.

Placing the shift lever in neutral will not stop the boat. Since a boat does not have brakes you must learn to judge your speed and maneuver carefully using the forward and reverse controls to avoid hitting docks and other boats or objects.

FLOAT PLAN

Always let someone know where you are going, the water course you plan to take and when you plan to return. In an emergency this can save your life!

BOATING LAWS

Anglers using boats must obey boating laws. A boat must have emergency equipment on board. For example, a U.S. Coast Guard-approved personal flotation device (PFD) is required for each person on board. Other equipment depends on the type and length of the boat.

To boat safely:

- Successfully complete a boating safety course.
- Never operate a boat while under the influence of alcohol or drugs.
- Drive at a safe speed.
- Operate a boat outside of protected or swimming areas.
- Operate a ski boat away from swimmers or anglers.
- Keep out of the path of larger vessels and sailboats.
- Remain seated. Stand up only if necessary. Always wear your PFD.
- Anchor outside of a shipping channel.
- Do not overload a boat with too many passengers or too much equipment.
- Use navigation lights at night.
- Use an outboard motor that is the right size for the boat.

Boaters also must follow the "Rules of the Road," which include knowing which boat has the right-of-way. However, sailboats have the right-of-way over power boats. The U.S. Navigation Rules include:

- Boats approaching each other must stay to the right at all times and pass each other port (left) side to port side.

- You can overtake another boat on either side, but you must use caution so that your boat's wake does not endanger the boat being passed.

- When boats approach at an angle, the boat on the starboard (right) side has the right of way and must hold its course and speed. The other boat must keep clear and pass behind the boat with the right of way.

STORMS

Boating during a storm can be dangerous, especially when there is lightning, strong wind or high waves. The first thing to do is make sure everyone is wearing a PFD. Put all fishing rods in the bottom of the boat. Stay low or lie down in the boat to reduce the risk of capsizing. Get off the water as soon as you can.

Don't fish during an electrical storm. Anglers are killed every year when their rods or boats are hit by lightning.

If you can't get off the water, try to prevent waves from coming in over the stern or striking the boat on its side. The best way is to keep the boat moving at a slight angle into the waves. Moving with the waves can be dangerous. They can come in over the transom and fill the boat with water. This could sink the boat.



If you have no choice and must ride out a storm on the water, use a heavy anchor with a long line attached to the bow of the boat. The anchor line needs to be at least seven times the depth of the water so that the anchor can hold to the bottom. If the anchor drags, make sure that the boat is not pulled into rocks, shallow water, or rougher water.

EQUIPMENT AND STORAGE

A boat should always be kept tidy. Life-saving gear must be stored where it can be reached quickly. Gasoline containers should be placed in the stern and clamped in brackets or held down with cords. Anchors should be stowed in the bow with the anchor line coiled neatly for instant use.



Batteries should be stored in battery boxes and have their terminals covered to prevent electrical shorting and fires. All other gear, including fishing tackle, should be stored so that it

doesn't move around or blow out when the boat is under way.

Learn to use a compass correctly, and then always carry one on board because fog, rain, or darkness can cause you to lose your way.

EMERGENCIES

By staying alert and watching out for other people and potentially hazardous situations, you can avoid conditions that cause boats to sink or capsize. Many accidents are caused by speeding, unsafe turns, overloading the boat, or hitting an underwater object. Capsizing and people falling overboard cause many life-threatening situations. Everyone should wear a PFD at all times.

If someone falls overboard, throw a PFD with a line attached. Then, carefully bring the boat to the person, stopping the engine when near the person in the water. Maneuvering a boat into position and pulling someone out of the water without capsizing the vessel is very difficult. Review Chapter 2 to learn the correct procedure.

Every boat with a gasoline engine should have at least one fire extinguisher. It should be a Coast Guard-approved extinguisher for electrical and gasoline fires. Keep it where it can be reached quickly, near the stern of the boat, but not too close to the engine.



Methods of Fishing
from Boats



BOAT READINESS CHECKLIST

A checklist is a good way to make sure your boat is ready for use. Your checklist should include the following items:

- **Fishing License.** A fishing license, where required, must be carried while fishing.
- **Boat Registration.** Boat registrations, when required, must be carried while using a boat.
- **Fuel.** A boat's fuel tank should be filled before each trip. Use the 1/3 rule—use 1/3 of your fuel for the trip out, 1/3 for the trip back, and keep 1/3 in reserve in case of an emergency. Always clean up any spilled gasoline.
- **Fire Extinguisher.** A boat should be equipped with at least one Coast Guard-approved fire extinguisher.
- **Lights.** A boat used at night must have operating navigation lights. Navigation lights are a red (port) light, a green (starboard) light, and a white stern or masthead light. Check to make sure they're working.
- **Personal Flotation Devices.** PFDs are required on all boats and some boats also must have at least one PFD that can be thrown to a person in the water. Wear your PFD and make sure that it fits properly. Test it in a pool or swimming area to ensure that it will float you with the clothing that you would normally wear when fishing.
- **Paddle or Oars.** Since motors tend to break down at the worst times, oars or a paddle are an absolute must for emergency use.
- **Lines.** Lines are not legally required, but are necessary for docking, anchoring, mooring, or towing.
- **Other Items.** Other items that may be included in a BOATERS' DUFFEL BAG are:
 - VHF-FM Radio
 - Chart and Compass
 - Rope and Throw Bag
 - Visual Distress Signals
 - Bailer (can, scoop, bucket)
 - Binoculars
 - Food and Water
 - Medical Supplies
 - First-Aid Kit
 - Special Medications
 - Sunblock (SPF 15, at least)
 - Tool Kit
 - Whistle or Horn
 - Extra Clothing
 - Sunglasses
 - Sun Hat
 - Rain Gear
 - Wool Sweater
 - Stocking Cap
 - Gloves

The Coast Guard Auxiliary, the United States Power Squadron, and some state agencies offer courtesy boat examinations to see that a boat has the required safety equipment on board.

DON'T SPREAD AQUATIC WEEDS

All weeds should be removed from a boat and trailer before launching. Weeds such as milfoil can be spread from lake to lake by boaters. Milfoil can ruin fishing by spreading rapidly, interfering

with boating access. The excess vegetation can also protect too many small fish which causes overpopulation. In addition, when these weeds die, they decompose, removing oxygen from the water, creating low-oxygen conditions that can cause fish to die.

COURTESY ON THE WATER

Common sense and courtesy makes everyone's day on the water safer and more enjoyable.

People go boating to have fun and fun can only come if everyone's rights are respected and all rules of boat and water safety are obeyed.

ACTIVITIES

ACTIVITY 1 — WHERE CAN I GO FISHING?

Obtain a book about your state which lists bodies of water where public fishing is allowed. This book should also tell the specific regulations for each body of water. Your local sporting goods store or your local conservation officer should have copies of this book.

Make a chart placing the names of the bodies of water in your area that you will want to fish along the left side of the chart. Using these column headings: (1) open season, (2) types of boats allowed, (3) types and sizes of engines allowed, (4) speed limits, (5) size restrictions for different species of fish, (6) other information of your choice, write in the appropriate information for each body of water.

As you continue to fish, new categories can be added such as number of fish caught, species caught, bait used, time of day, season, water temperature, etc. This information can be very valuable as you continue angling.

ACTIVITY 2 — LOADING YOUR BOAT

Boat safety depends on how much weight is in the boat and how it is arranged. Cut a half-gallon cardboard milk carton in half lengthways, and throw away the half with the pouring spout. Using the other half, try loading it

with some form of weight such as stones, nails or something similar. How much can your "milk boat" handle? What happens when you pile your weights at one end? What does this tell you about the importance of balancing the load in your boat?

ACTIVITY 3 — WHY WOODEN BOATS HOLD WATER

Older boats were made of wood, and after being stored over the winter or for long periods out of the water they could leak badly when put into the water. They would stop leaking, however, after being in the water for a while. This activity may help explain why they quit leaking.

Fill a glass container 1/2 full of dry beans. Fill the container to the top with water. Mark the level of the beans with a piece of tape and put the container out of the way until the next morning.

Examine the container. Compare the level of the beans with the tape. Is the level of the beans higher or lower? How about the water level? Why are they different? Did the beans soak up the water? Does this help you to understand why the boat stopped leaking.

ACTIVITY 4 — BOATS FOR DIFFERENT USES

Collect pictures of boats used for different types of fishing. Under each boat tell what type of fishing you would use the boat for and what equipment would be needed to meet safety regulations in your state.

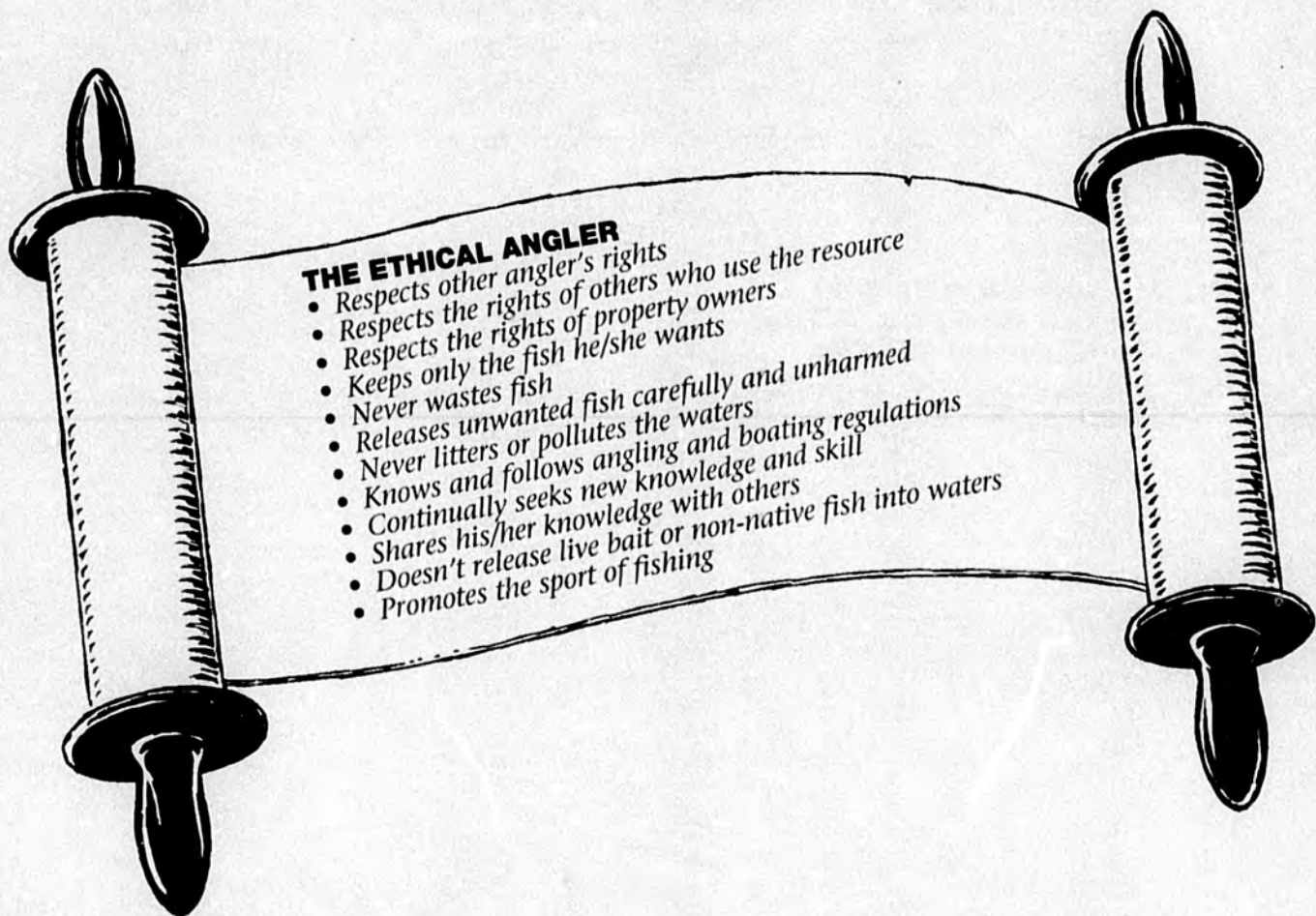
Paste on a piece of poster board and label the parts of each boat with their proper names.

CHAPTER

6

A Good Angler Is

As an angler you have an important responsibility. It's much more than obeying fishing laws. Good anglers also respect others and the resource. Your actions will allow many other people to enjoy fishing in the future.



THE ETHICAL ANGLER

- Respects other angler's rights
- Respects the rights of others who use the resource
- Respects the rights of property owners
- Keeps only the fish he/she wants
- Never wastes fish
- Releases unwanted fish carefully and unharmed
- Never litters or pollutes the waters
- Knows and follows angling and boating regulations
- Continually seeks new knowledge and skill
- Shares his/her knowledge with others
- Doesn't release live bait or non-native fish into waters
- Promotes the sport of fishing

RESPECT FOR OTHERS

Respect For Other Anglers

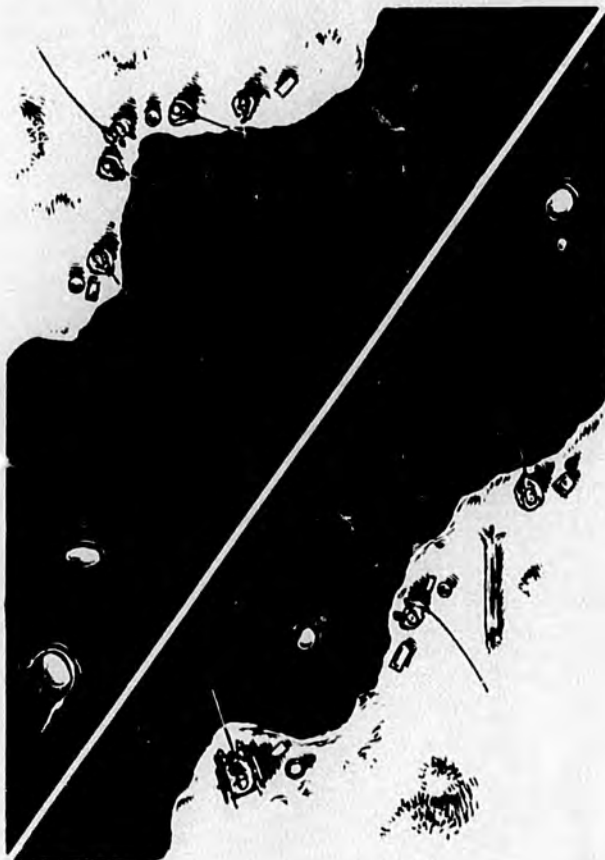
Anglers respect the rights of others. Some people may enjoy sitting on the bank of a pond and

fishing peacefully. Others may prefer using a boat to catch fish. You can fish the way you like and not judge how someone else chooses to fish. Following the **Golden Rule** is a good plan: treat other anglers as you would like to be treated.

For example, if you were fishing would you like to have another angler start fishing too close to you? You would probably be angry because the other angler was crowding you! If you left your spot to land a fish, you would feel that you had the right to return to your original fishing spot. When we respect the rights of others as we enjoy fishing it makes the day more pleasant for everyone.

Respect For Non-Anglers

Some people use our water resources for activities other than fishing. Respect their right to use the area.



Respect For Land-owners

You may not always be fishing on public waters. If you have to cross someone's land to get to the water, always ask the landowner for permission

first. If you want to fish privately owned waters, always ask permission from the land-owner before fishing. This is true whether or not the land is posted. If you have to go through gates, be sure to leave them as you found them. If you opened the gate, close it immediately. Do not litter! Leave the area cleaner than you found it. If you catch some fish from the landowner's pond, offer to share your catch with them. Doing these things is a good way to get an invitation to come back.



RESPECT FOR THE RESOURCE

Good anglers respect our country's water resources. These resources need to be protected so others can enjoy them. We all share this responsibility.

Never Litter

Never leave any litter behind. If you walk to a fishing spot, *carry out everything* you carry in. This includes ...food wrappers, old fishing line, bait holders, empty cans or bottles and plastic bags. Pick up litter left behind by others, too. It is easy to carry a small paper bag for this purpose. If you are fishing from a boat, be sure your litter is put into a closed container so it can't blow out of the boat. If we all do these things our lakes and streams will be much cleaner.



Picking Up Litter

Sinking empty soda cans or bottles is worse than leaving them on shore. You are littering the bottom of the lake. Carry empty containers when you leave your fishing spot and recycle them.

Never Waste Fish

Good anglers know that fish are food and should never be wasted. Never keep more fish than you can use. If you catch a fish that's too small to eat or one that's under the legal or minimum size, it should be released quickly and carefully. Releasing a fish and watching it swim away unharmed is a wonderful feeling. If you want to show your fish to others, take a picture before releasing it. The picture will bring you many fond memories and the fish can bring enjoyment to another angler.

To release a fish, keep it in the water if you can. Handle it carefully with a wet hand so it can be released unharmed. If it's a fish without sharp teeth like a bass, hold its lower lip between your thumb and index finger. If it has sharp teeth like a walleye or northern pike, carefully hold it around the body. Never hold a fish by the eyes or gills if it is to be released.

Tearing a hook out can harm the fish so badly that it may not live. If the fish is hooked deeply and the hook can't easily be removed, cut the line to release the fish. The hook will rust, dissolve, or become loose without harming the fish. The use of barbless hooks makes it easier to release fish.

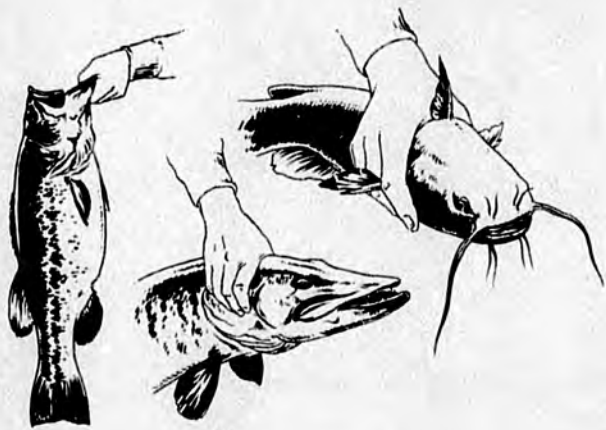
If a fish loses consciousness, try to revive it by gently moving it in a figure-eight pattern so water moves through its gills. When the fish begins to struggle and can swim, let it go.

Today, some species of fish exist in limited numbers. More and more anglers know this and participate in "catch and release" fishing. Now, many anglers take only what they need for food and release the rest unharmed. This makes it possible for other anglers to enjoy catching them again.

Some fish take longer to become adults and may not spawn (lay their eggs) until they are three to seven years old. Then, they spawn only once a year. You should release many of these fish. They include bass, lake trout, muskellunge, northern pike, sturgeon, walleye, and most large gamefish. Catching and then releasing these species is a good practice.

Other fish species mature earlier and spawn more than once a year. For example, bluegill and many other panfish spawn when they are two to three years old.

Until recently, few anglers realized that the populations of certain gamefish in the large oceans could become threatened. However, to increase fish populations, fish hatcheries are raising and stocking fish in the Atlantic and Pacific Oceans and the Gulf of Mexico. Today, redfish, snook, seatrout, striped bass, and other saltwater fish are being raised for stocking.





Know And Follow Fishing Regulations

Fishing laws are meant to protect the resource and make sure there is fishing to be shared by everyone. If you fish, it's important that you know the rules and regulations. Ignorance of the law is no excuse. Fishing is a wonderful privilege; obeying fishing regulations is the responsibility that goes with it.

If there are fishing seasons, you must know them. Seasons protect fish during spawning and limit the catch on heavily fished waters. Limits on the number of fish that can be caught are meant to keep anglers from taking too many fish at one time. This makes it possible for more people to share the resource.

Report Violators

Anglers also have a responsibility to help state agencies protect our natural resources. Today, many states have a special telephone number so individuals can report those who violate fish and game laws.

Protect The Area Around The Waters

Never destroy the beauty of an area. Do not spray paint or carve names or other words on rocks or trees. Do not drive through streams and riparian areas. Leave wildflowers and other plants growing in the wild. Do not destroy or pick them.

Continually Seek New Knowledge and Skill

A good angler is always trying to learn more. . . increasing fishing skills, learning more about the behavior of fish, and learning more about the harmful things people do to the resource. In this way, you can become part of the solution-not part of the problem. You don't have to know it all now; you will learn something each trip.

Share Knowledge

Good anglers share their knowledge with others and introduce their friends to the sport of fishing and the benefits of protecting the environment.



Participate in Resource-Enhancement Projects

A good angler gets involved in projects to enhance the resource. Some students do it as a class project. Others join or form clubs whose members will work on projects such as improving a stretch of water on a stream, building fish structure in lakes, or just cleaning up the bank around a lake, stream, or river.

ACTIVITIES

ACTIVITY 1 — WHAT CAN I DO TO ENHANCE THE RESOURCE?

Design and draw a fishing scene that shows one or more examples of how to be a good angler. These examples may give you some ideas.

1. Picking up litter.
2. Showing respect for fellow anglers.
3. Showing courtesy to non-anglers using the water for recreation.
4. Helping a beginning angler.
5. Showing respect for wildlife.
6. Showing respect for private property where you are fishing.
7. Following fishing regulations.

ACTIVITY 2 — HELP CATCH A POACHER

Design and create an attractive poster that informs anglers about fishing violations and how to report violators. Obtain permission from local area bait, sporting or fishing shops to display your poster throughout the season.

ACTIVITY 3 — ADOPT A POND

Take an active part in eliminating trash from your favorite water resource. Adopt part or all of a local pond or stream. Adopting means that you assume responsibility for this area all of the time. During your fishing time or during periodic checks, pick up all trash that you can safely reach.

Enlist the help of friends. Talk to other anglers about adopting another area. Write the local newspaper urging similar actions from other anglers. If your pond or stream is heavily used and lacks a trash container, check with your local department of Natural Resources about a permanent trash barrel.

ACTIVITY 4 — WHAT IS BIODEGRADABLE?

Place some fishing line, a pop can tab, a hook and perhaps a plastic worm in a hole in your yard, garden or in a bucket filled with dirt or potting soil along with some vegetable peelings or material you have left from preparing your fish for cooking. Cover up your items and let them stay there undisturbed for six to nine months. Then dig them up and examine each item. Which items left in a pond will decay? Which will be left to litter the environment and perhaps cause harm to fish and other aquatic animals?

CHAPTER

7

What Is Water?

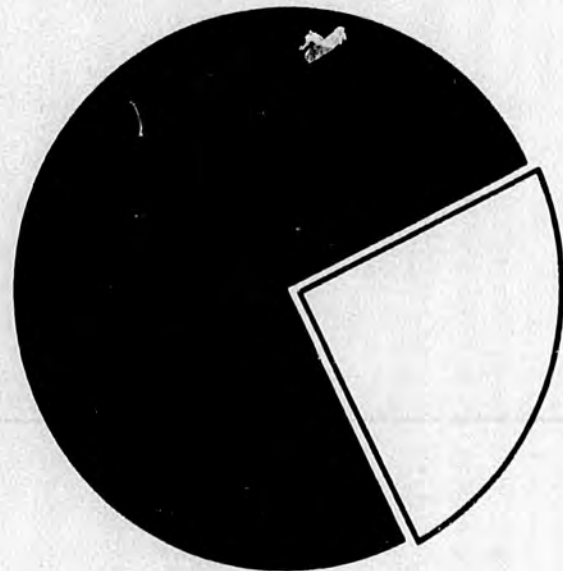
Good anglers are concerned about the fish's primary need-WATER. You probably don't think much about water even though you use it everyday. Water is very important because there's nothing else like it in the world. Fish are not the only animals that could not live without it. We couldn't live without it and can't afford to take it for granted.



There is a lot of water. It covers about 70 percent of the earth, but only about three percent of it is fresh water. Most of the fresh water, about 75 percent, is in the form of ice. In fact, the frozen areas of the world have as much fresh water as all the world's rivers will carry for the next 1,000 years.

The demand for unpolluted fresh water is increasing because the earth's population is increasing. How much water does the average person use? Here are some answers:

- In the home, each person uses about 70 gallons of water a day.
- It takes three gallons to flush a toilet.
- It takes 15 to 30 gallons to take a bath.



- It takes five gallons for a one-minute shower.
- It takes ten gallons to wash dishes.

This is a lot of water, but more than half of the water used in the United States is used by industries. For example, it takes 250 tons of water to make a ton of newspaper and ten gallons to produce one gallon of gasoline. You can see why it is important to conserve water.

SHARING WATERS

As you have seen, anglers and boaters are not the only ones who use bodies of water and have an effect on fish populations. Industries and power

plants use large amounts of water. Communities need water for drinking. Farmers use it to water their crops and livestock. Barges and ships use waterways to bring products to market. Water is also used for waste disposal.

The demands for water use can cause conflicts among those using our water resources. The results are not always good for the fish and not everyone is concerned with fish.

An occasional conflict arises when people want to dam a river for irrigation, for controlling floods, or for the production of electricity. Dams create lakes or reservoirs that are habitat for fish such as largemouth bass and crappie. However, the reservoir destroys several miles of river that might have been prime habitat for trout, smallmouth or rock bass.

Water is too valuable to waste. With so much demand for our water it is important that each of us do our part to conserve it.:

How You Can Conserve Water

- Reducing water use in the kitchen and bathroom.
- Shutting the water off between rinsing dishes or brushing our teeth.
- Turning the water on only when we are actually using it.
- Taking showers since they use less water than baths.
- Using flow-restricting devices on shower heads.
- Fixing leaky faucets.
- Running only full loads of clothes in the washer.
- Placing a plastic bottle or brick in the water tank of the toilet so that it will use less water for each flushing.
- Not using water for watering lawns or washing cars during times of water shortage.

FACTS ABOUT WATER

How Much Water Is There? The bad news is that there is a limited amount of water on earth. **In fact, there's no more water today than there was when the earth was formed.** The good news is that water is recycled. Over time, it's used over and over again. Because of this, it's important not to pollute water so that it can be used safely by humans, fish, and other life forms that depend on it.

The Water Cycle

The heat from the sun causes water on the earth to evaporate, or turn into a vapor, and rise into the air. As this vapor rises, it cools, condenses into water droplets and forms clouds. Sooner or later, the water returns to earth in the form of rain, snow, sleet or hail.

When water strikes the earth, some of it returns to vapor through evaporation. Some of it enters brooks, creeks, streams, and rivers. Eventually, this water makes its way into the oceans. Water also seeps into the ground, becoming groundwater. It moves slowly until it reaches rivers or lakes or drains into large underground areas called aquifers.



The Water Cycle

Water Is A Solvent

Water is often called the "universal solvent." This is because water can dissolve so many things. Water can dissolve some things like salt and sugar very quickly. Other materials may take thousands or even millions of years to dissolve. For example, flowing water can dissolve rock. That, along with other types of erosion, is how the Grand Canyon and other canyons and river valleys were formed.

Boiling And Freezing Points

Water turns into ice at a temperature of 32 degrees F, 0 degrees C. It boils at a temperature of 212 degrees F, 100 degrees C, and turns into a gas or vapor. It is a liquid between 32 and 212 degrees F and 0 and 100 degrees C. Water also has the ability to store a large amount of heat. This is important because it means that water heats and cools more slowly than land or air.

An angler should know about water temperature. In spring, water temperature rises very slowly. Water warms and cools more slowly than air. Although the air temperature may be warm, the water in some areas may still be too cold for some kinds of fish. Late in the year, the opposite may be true. In fall, water temperature drops very slowly. The air may be chilly, but the water temperature may still be warm. Fish are more active in warmer water than in cold water. Thus, when fishing in colder water, anglers should work their baits and retrieve line more slowly.

Why Ice Floats

Another interesting fact is that cold water is not always heavier than warm water. Water continues to get heavier as it cools, until it reaches a temperature of 39.2 degrees F. At this temperature, one cubic foot of water weighs more than 62 pounds. Then, something unusual happens. Water colder than 39 degrees F begins to get lighter. No other liquid acts this way.

What does this mean to us? Well, if water colder than 39 degrees F did not get lighter, ice wouldn't float. Instead, ice would form on the bottom of a lake and kill fish and other life in the water. The fact that water gets lighter before it freezes is important in deep northern lakes.

Turnover

As the sun melts ice on a lake in spring and begins to heat the surface water, a change takes place. When the surface water begins to warm, it sinks to the bottom, helped by wind and currents. This pushes colder water from the bottom toward the surface. This mixing of water is called "turnover." Turnover often occurs in the spring and fall. After the turnover, the water temperature of the mixed water is nearly the same throughout the lake. During this period fish are likely to be scattered and at any depth.



Turnover

Water Layers

In summer, however, something else occurs on many deep or large lakes. The water forms three layers, each with a different range of temperatures. The sun warms the top layer (**epilimnion**) of water faster than the wind can mix it. Another layer (**hypolimnion**) is the heavy cold water at the bottom of the lake. This layer may have very little oxygen. The third layer is a

narrow one that separates the top and bottom layers, called the "metalimnion," and contains a thermocline. Here the water temperature changes rapidly with only small changes in depth.

Why is knowing about these layers important? One reason is that the bottom layer in some lakes has little oxygen. This forces fish to move to a higher level and into the metalimnion, near the thermocline. So in summer on lakes that separate into layers, fish will frequently move to the epilimnion to feed and then return to their preferred temperatures near the thermocline.

Freshwater lakes are not the only places where water forms into layers. It also happens in saltwater estuaries and in the oceans.

WATER QUALITY

We need to make sure that we keep our waters clean and free from pollution. For fish and other animals to live and thrive, the quality of water is very important.

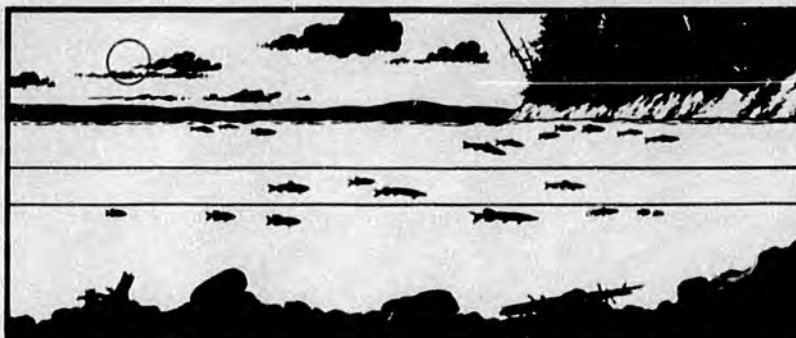
When harmful things enter our waters, the waters become polluted. Polluted water cannot be used for drinking, swimming, or fishing. The key lies in eliminating pollution. Fortunately, **you can make a difference!** In the next chapter you will learn about different types of pollution. You will also learn how you can become part of the solution instead of part of the problem.

If water is kept clean and used wisely, there will be enough for our many needs.

ACTIVITIES

ACTIVITY 1 — THE WATER CYCLE

Fill half of a large metal tray with water and place in a freezer. Remove the tray when the water is frozen. With an adult's help, heat a half-filled pot of water to a boil. Place a small wire grate over the pan and put your frozen tray on the grate. Observe the following: 1. Evaporation of water, by heat as the level of the heated water goes down; 2. Formation of water vapor above boiling water; 3. Water droplets forming on the cold surface of the frozen tray; and 4. Accumulation of droplets that form



Water layers

and fall from the underside of the frozen tray. Relate what you observe to the water cycle present on earth. The heat of the stove represents the heat of the sun's energy.

ACTIVITY 2 — OIL AND EGGS DON'T MIX

Chicken eggs are similar to fish eggs. Both have a porous covering that allows gases to enter and leave the egg. Place a fresh chicken egg in a two-cup liquid measurer almost full of water. Notice the bubbles forming on the egg's surface. Let it sit for five minutes and check it again. Gently tap the side of the cup. What happens to the bubbles? Now take your egg out and dry it completely. Cover it with vegetable oil or lard. Place it back in the water. What difference in bubble formation do you see? What might happen to fish eggs in an oil spill?

ACTIVITY 3 — WATCHING TURNOVER

Fill a 9- X 13-inch pyrex or other ceramic, heat-resistant dish with water. At one end place a small plastic bag filled with ice. Carefully add some boiling water in the end opposite the bag of ice. Place several drops of green or blue food coloring next to the bag of ice. Watch where the drop of dye goes. Add a drop next to the warm water. What happens to this dye? The cold water sinks and the warm moves over the surface. This is what happens as turnover in a pond in the spring. The opposite happens in the fall. Water colder than 39.2 degrees F rises, creating another period of turnover.

ACTIVITY 4 — A LOT OF WATER DOWN THE DRAIN

Below are the estimated populations for the years 1990 and 1995. If each of these persons will use 70 gallons daily, then how much water will be used daily in 1990? in 1995? If your mind is warmed up, try this problem. What is the total water amount that might be used for one week in the year 1990? 1995?

Year	Population
1990	249,657,000
1995	259,559,000

ACTIVITY 5 — CHANGE IN WATER TEMPERATURE

Fill a pint cardboard milk container with room-temperature water. Leave an inch of space at the top. Fill a half-gallon carton with room-temperature water, leaving about two inches of space at the top. Have another pint container filled only with room-temperature air. Put a safe, breakproof thermometer in each. Put lids on each container or cover the tops with aluminum foil. Put the containers outside on a very cold day, in a refrigerator or freezer, or in a chest filled with ice. Every 15 minutes, record the time and the temperature in each container. Stop the experiment before the water freezes.

Which changes in temperature more slowly—a large body of water or a small one? Does water change temperature more slowly or does air?

ACTIVITY 6 — WHERE DOES ICE FORM?

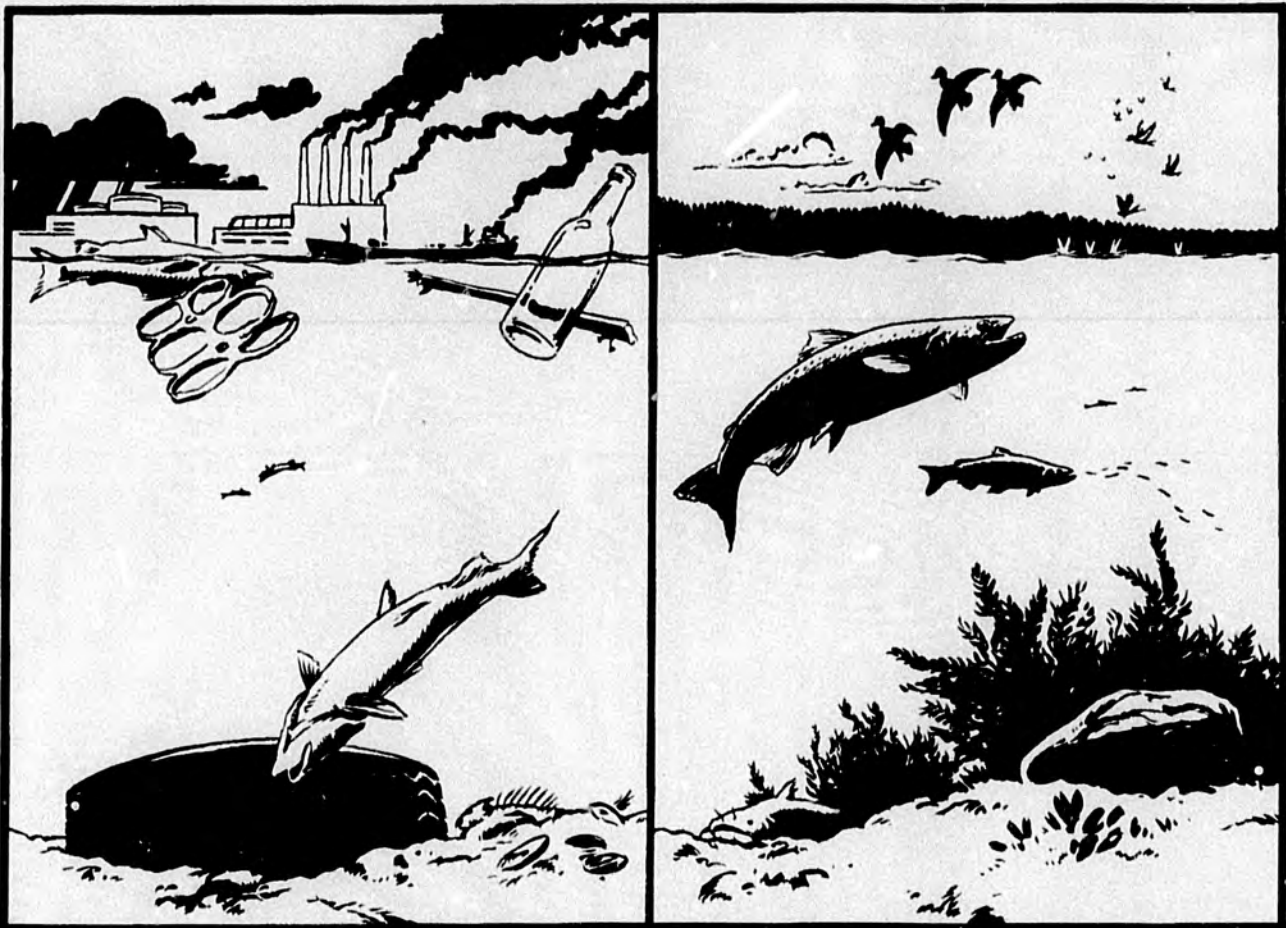
Fill a paper cup with cold water, but leave about an inch of space at the top. Use a marker pen to draw a line on the cup at the top of the water. Freeze the water in the cup and study the line. If the water expands above the line and takes up more space in the cup, then it must be lighter or less dense than it was. Could this expansion explain why water freezing in a crack can break a rock or concrete?

CHAPTER

8

The Problem With Pollution

Clean, pure water may be our most precious resource. Pollution is anything that spoils its cleanliness, purity, and overall quality. Many things that reduce the quality of the water pollute our ponds, lakes, streams, rivers, ground water and oceans.



Some, like gradual erosion of nearby land, occur naturally. However, uncontrolled development or careless farming methods increase ero-

sion and ruin waterways. Some pollutants enter our waters from the rain or air. Unfortunately, some pollution is even caused by thoughtless or

uncaring people. Pollution is not only a danger to fish and other creatures that depend on clean water to live, but also to people!

Pollution problems may differ depending on where you live. In the northeastern U.S., acid rain may be the biggest threat to fish and other wildlife. Along Lake Superior, asbestos particles from mining waste has been a problem. Timber harvest in mountainous areas can cause erosion and sediment to flow into lakes and streams. Mercury is a concern in many lakes in Wisconsin and Minnesota. Around much of the Great Lakes, PCBs and other chemicals are a concern.

In most large urban communities, the main cause of water pollution is a combination of sewage and industrial waste. Unfortunately, some water can't be used because it is too polluted by chemical industrial waste. For instance, eight billion gallons of fresh water flow past the city of New York every day as the Hudson River empties into the Atlantic Ocean. That's enough water to supply each of 40 million people with 200 gallons a day if it could be used. The Hudson River, however, is too polluted to be used as a water supply.

To be a good angler you need to be familiar with the major kinds of pollution. When you are old enough to vote you will be asked to make decisions about proposed laws. You will want to be knowledgeable so you can make decisions that are healthy for the environment. No matter what age you are, you can always write your state legislator or congressional representative to express your views. Fish can't write, so they have to depend on you to make sure our waters remain clean.

Those who are concerned about water pollution use two terms—**point-source** and **non-point-source**.

Point-source pollution is pollution that can be traced to a definite point at which it enters the environment. Point-source pollution can come from industries that dump wastes, chemicals, or heavy metals into the environment. Toxic waste dumps

and waste water treatment plants are also point-source pollution sites.

Non-point-source pollution is more difficult to identify because it doesn't enter the water at a definite, easy-to-locate place. Often, it's caused by herbicides, pesticides, and fertilizers used on many lawns, farms, gardens and orchards and that eventually enter a waterway and harm the food chain.

TYPES OF POLLUTANTS

Silt Or Sediment

Have you ever seen a stream that looks dirty? This dirty look is usually caused by the excessive erosion of silt or sediments from nearby lands. Silt or sediment is fine particles of soil that end up in our waters. A small amount of sediment reaching the waters is natural. However, surface mining, timber harvest, construction, and poor farming practices can leave soil unstable. Then, when it rains, the soil is carried off by the water which eventually runs into a river or lake. There are modern methods of farming, logging, and mining that minimize erosion.

So, how can excessive silt hurt water? When it settles to the bottom it has a smothering effect. It can kill plants or other small organisms. It can smother fish eggs and young aquatic life. It can cover up the rocks where the fish's food lives. If the silt does not settle, the water ends up with a dirty look. This muddy water does not allow light for use by plants and other aquatic life. The result is a ruined body of water that no longer supports the fish we want to catch.



What you can do to help stop silt or sediment:

- Help slow erosion in your own yard. Re-seed bare spots in the yard. Put mulch on exposed soil in flower and vegetable beds.
- Don't run bikes or any motor vehicle in streams or on stream banks. This creates silt and causes erosion of the banks.
- Don't cut trees or other vegetation at the water's edge even if you are trying to create fish structure. Vegetation helps to hold the bank in place and prevent erosion. Cutting too much vegetation can also cause loss of shading, leading to an increase in water temperatures.

Agricultural Wastes

Agricultural wastes include manure, liquid and granular fertilizers, silo liquids and pesticides. Cattle, hogs, sheep and poultry raised on feed lots are a big problem. They concentrate a lot of wastes over a very small area. One cow produces as much waste as 17 people every day. Some of this waste is washed directly into rivers. In addition, farmers spread manure and fertilizer on their open fields that may eventually enter a body of water.

Pesticides are chemicals used to help farmers control pests that ruin their crops. If properly used they generally create little or no problem. However, when they enter a water system through



careless use, they usually cause environmental damage by killing fish and other organisms in the water.

How you can reduce agriculture wastes:

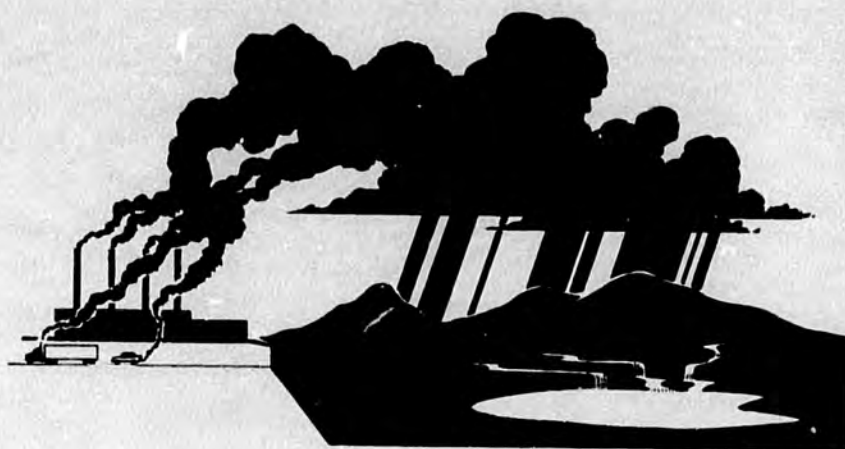
- Use fertilizers and lawn- and flower-care chemicals sparingly. Try organic alternatives to harsh chemicals.
- Maintain a compost pile to produce fertile soil from unwanted yard and kitchen waste. Do not dump grass clippings or leaves into the gutter along your street. They will eventually enter a waterway and decay, using up precious oxygen in the water. Instead, put clippings and leaves into the compost pile.

Acid Rain

Acid rain is one of the biggest problems facing the quality of our water today. Many bodies of water are suffering from the effects of acid rain. Acid rain is a result of industries and autos burning oil and coal (fossil fuels) for fuel. Industry smokestacks and automobile tailpipes send sulfur dioxide and nitrogen oxides high into the atmosphere. These elements can remain in the air for several days and travel hundreds of miles. While in the air they mix with water vapor and turn into sulfuric and nitric acids. Eventually, this harmful acid returns to earth in rain, hail, fog, dew, sleet, snow, or as dry particles. This acid damages plant life and may eventually kill insects, frogs, and fish in our waters.

The amount of acid in liquids is measured on a scale from 0 to 14. This is called the "pH" scale. A pH of 7.0 (distilled water) is in the middle of the scale and is considered neutral—neither acidic nor alkaline. Things below 7.0 such as lemon juice (pH of 2.0) are acidic. Things above 7.0, like ammonia (pH 11.0), are alkaline.

The pH scale is logarithmic. This means that a pH of 6 is *ten*



Acid Rain

times more acidic than a pH of 7. A pH of 5 is 100 times more acidic than a pH of 7 and a pH of 4 is 1,000 times more acidic than a pH of 7.

Because carbon dioxide and water found naturally in the atmosphere have a pH of 5.0 to 5.6, natural rain is slightly acidic. However, acid rain that falls in the northeastern United States often ranges from 4.0 to 4.6 pH. In most regions of the country the lakes and rivers can tolerate this acidity without any loss of water quality. A natural buffering ability present in most soils that contain limestone can neutralize acidity. However, several regions of the country are damaged by acid rain because they have thin soils and granite bedrock. Granite is low in limestone and cannot neutralize (buffer) acid precipitation.

The northeast, the Rocky Mountains, areas of the northcentral and southeastern U.S. and eastern Canada are most affected by acid rain.

Once a body of water contains too much acid, the creatures in the water's food chain begin to die. Eggs and larvae are sensitive to low pH and unable to survive. As water becomes more acid, the fertility of eggs is reduced, fewer hatch, and fish may not grow to adult sizes. Eventually, fish or insects, the fishes' food, may no longer be able to live in water with a low pH.

Acid rain is a worldwide problem because it can be carried in the atmosphere for great distances before falling back to earth.

Pollution sources in midwestern states can actually harm waters on the east coast! As a result, thousands of lakes in the United States, Canada, and other countries are suffering from its effects. If steps are not taken to reduce acid rain, many more bodies of water may be ruined forever.

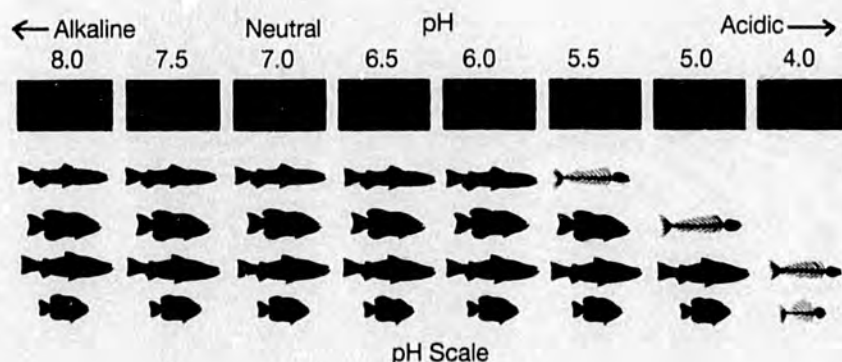
How You Can Help Reduce Acid Rain:

- Car pool whenever possible.
- Make sure all vehicles at home have their engines tuned properly.
- Conserve electrical use in the home. Oil and phosphate fuels are used at many power plants and contribute to acid rain.

Sewage

Sewage consists of human wastes and garbage. It also includes water used for laundering or bathing. Most sewage is treated at a treatment plant that removes the solids and dissolved substances. However, when a treatment plant gets overloaded or has a malfunction, sewage gets dumped into rivers. Today's laws are quite strict, but sewage pollution is still a major problem, especially in large cities.

Sewage depletes the dissolved



oxygen in water. Sewage wastes contain nutrients that serve as fertilizers. They cause algae (tiny plants) to bloom in great quantities. When these organisms die, oxygen is used for the process of decomposition, and the fish go without adequate oxygen and sometimes die. If this situation gets bad enough, all the fish in a river below a treatment plant may die. As you have learned, fish must have an adequate supply of oxygen or they will not survive.

Raw sewage can also cause serious diseases in humans who use the water or eat shellfish from polluted areas. Sewage may also make waters unhealthy to swim in.

What You Can Do:

- Don't make sewage treatment harder by dumping chemical or other cleansing agents in drains or in the toilet.
- If your house is on a septic system instead of a city sewer system, it is important to service the system periodically.

Industrial Waste

Industries produce everything from food products to hazardous wastes. Most industries produce some form of liquid waste that has to be treated before it is released into public waters. These waste waters contain many toxic chemicals. Although some discharges are treated, some of this chemical waste is still discharged directly into aquatic systems.

What You Can Do To Reduce Industrial Waste:

- Recycle. Some industrial waste can be reduced by recycling.
- Write your legislator and congressional representative. Express the importance of having strong legislation to protect our water resources.
- Never pour anything into a storm drain. Household chemicals, paints, or soaps dumped down the gutter flow into streams untreated.

Petroleum Products

Accidental oil spills can have disastrous effects on aquatic life. Petroleum products can kill by direct contact with the fish's gills. Oil may also suffocate eggs and young fish, since the young inhabit shallow waters where oil tends to concentrate. Marine birds, sea otters and turtles may also be killed.

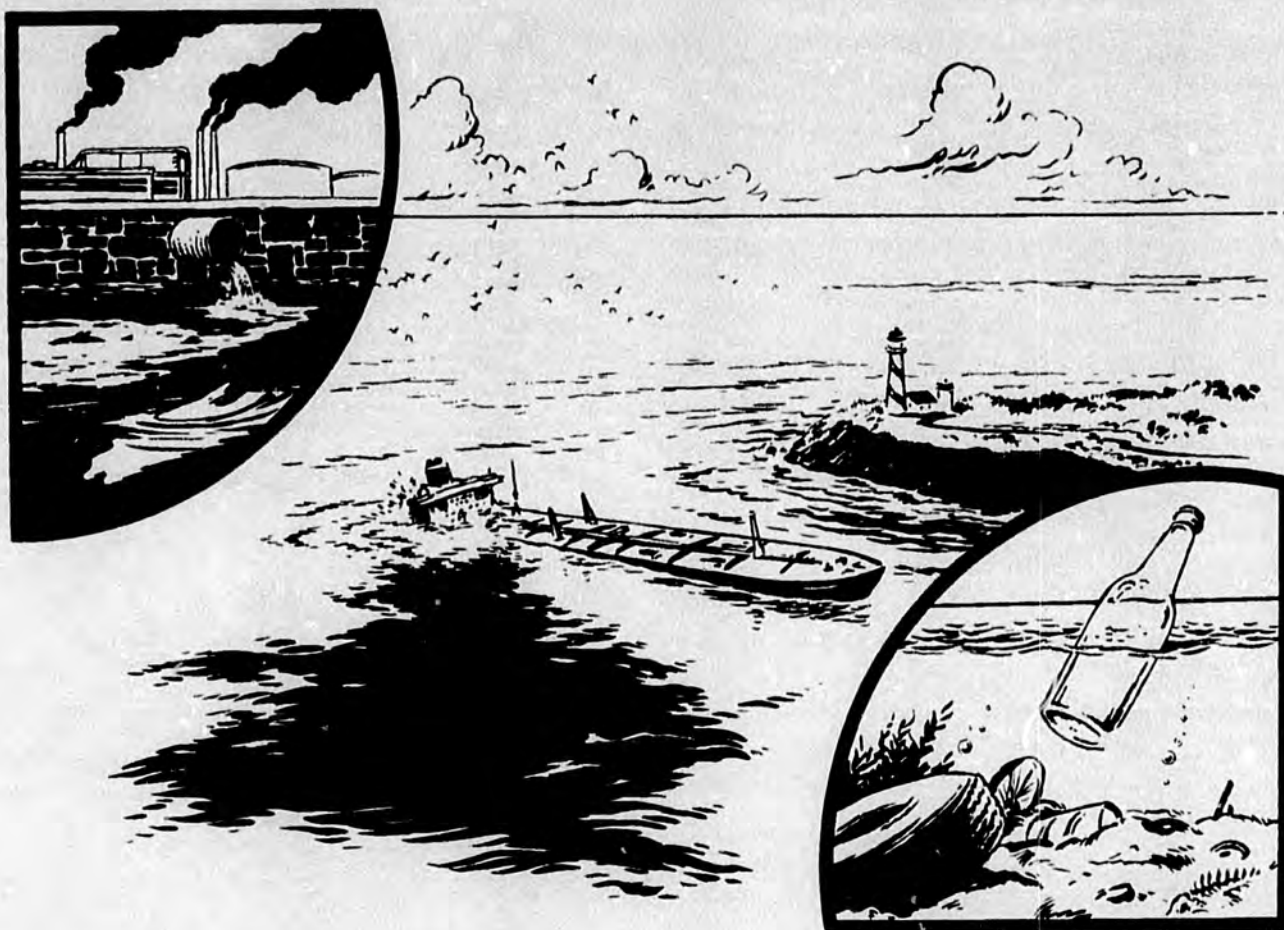
What You Can Do To Reduce Petroleum Wastes:

- Recycle used automotive oil. Oil drained from cars and disposed of improperly creates more oil in our waters than a single oil spill from a tanker. Drain the oil from your car into a container and take it down to a service station that recycles oil.

Trash

We have become a throw-away society and are running out of dumps to put our trash. Some people do not even try to dispose of their trash appropriately and throw it along our waters. No one enjoys fishing or swimming and having to contend with broken bottles, sharp cans and other trash. Sinking cans, bottles or other trash in the water may put them out of sight temporarily, but they are still there and it is still wrong.

Plastics are particularly hazardous. They are not easily biodegradable and will be around for a long time, maybe for hundreds of years. Thousands of fish and birds die every year from entanglement in plastic six-pack rings that come from canned drinks. Nylon fishing line discarded by thoughtless anglers can also kill birds by entanglement. Some sea turtles even mistake plastic bags for jellyfish (their favorite food) and choke to death when they eat a plastic bag by mistake.



What You Can Do To Reduce Trash:

- **Recycle!** Always dispose of your trash properly, especially plastics. If you see trash around your favorite fishing spot, pick it up for recycling or place it in a garbage can where it belongs. Carry a litter bag at all times.
- If you see your friends littering, explain to them that they may be doing a lot more harm than they realize. Don't let them sink cans, bottles or other trash. Even though it goes out of sight temporarily it can cause long-term problems.
- Cut up large tangles of fishing line into short sections before you discard it in a trash can, or recycle it. Some places collect fishing line for recycling. Also cut up six-pack plastic rings. This little extra effort will help save fish, birds and other aquatic animals and will probably make you feel good too.

Nuisance Species

Nuisance species are living organisms that upset the delicate balance of a particular body of water. These may be considered biological pollutants.

Not all bodies of water are the same. Even lakes close together may have different characteristics. In some bodies of water a particular type of fish may be part of the balance. However, in a different body of water that same species may throw off the entire balance. The same is true of some types of vegetation and other aquatic life. Some types of vegetation may prove helpful in one lake and a disaster in another.

For example, crappie are excellent sport fish and in many lakes they fit in well with the balance of the lake. However, if put into a different setting the crappie could ruin the entire lake. In the wrong setting the crappie could populate faster and compete for food and space. You could end up with a lot of little crappie and little else.

Certain kinds of vegetation might be healthy for some water systems. In others, that same

vegetation/weed might take over. Too much vegetation can interfere with boating access and protect too many small fish that will then cause an overpopulation of small fish. Also, when weeds die, they decompose removing oxygen from the water. When the oxygen level gets too low, fish will die.

The Great Lakes have had many problems with unwanted species. One problem species introduced by way of ballast water from a ship, was the zebra mussel. The mussel reproduces rapidly. Biologically it is still not known what impact the mussel will have, but it could block spawning grounds for several native fish. The mussel also attaches itself to intakes of water supplies and power plants, causing millions of dollars in damages.

What You Can Do To Prevent Nuisance Species:

- Never release fish from one body of water into another.
- Never release fish or vegetation from an aquarium.
- Never dump your left-over minnows into a lake or river.
- Remove aquatic weeds from trailers and boats and discard them before moving to another lake.

POLLUTION MUST BE STOPPED

Major sources of pollution must be stopped if quality fisheries are to exist. Even the large oceans and estuaries of the world are fragile ecosystems that require attention and careful use to protect them for our future use and enjoyment.

How will you feel if you go fishing and your favorite river is so polluted that the fish have died?

We can all help. While many of these problems seem out of your hands, there are many problems you can solve in your area by getting your classmates, friends, and neighbors to vocally protest the problem.

Our own actions on a daily basis are important. We each have a responsibility to make sure our own actions are not depleting or polluting the water. An individual action, either positive or negative may seem small. However, when you multiply that by millions of us who live in each state, these actions have a tremendous cumulative impact. Remember we all live downstream of someone.



ACTIVITIES

ACTIVITY 1 — TESTING pH

Acid rain can cause severe problems in some areas, but if the soil surrounding the lake contains limestone, the acid can be neutralized.

Limestone is made of calcium carbonate, which is also a major ingredient in antacid tablets. Get two antacid tablets, and crush them into a fine powder.

Get a lemon and squeeze the juice into a glass. The pH of the lemon juice is comparable to the pH of acid rain. Test the juice with litmus paper to determine the pH.

Pour the crushed antacid tablets into the lemon juice and observe the reaction. The acid is being neutralized like soil containing limestone. Now test with litmus paper again to test the pH.

ACTIVITY 2 — HOW MUDDY IS MUDDY?

Pour about 1/4 cup of pond water on a white paper plate. Gently lay a piece of absorbent paper toweling over it to soak up the water. When the toweling is wet, remove it. What is left on the white plate is the sediment or

particles of soil that were suspended in the water. However, some may have been picked up on the towel. Take a couple of samples from several ponds and compare them.

ACTIVITY 3 — POLLUTING A POND

To a gallon jar of pond water add some plant fertilizer or even a big shake of fish food. Let your water sit for several days and then observe what is happening. First smell. Then look for green growth, which will indicate rapid algae growth. The oxygen content of this water will drop quickly and fish and other life will die.

ACTIVITY 4 — DEVELOPING A LITTER POSTER

Pollution can be many things. Collect litter from the lake, pond, or area around the pond where you fish.

Classify the litter as to composition: paper, plastics, metal, etc.

Construct a poster that depicts the types and amounts of litter you found. Devise a way to help cut down on littering in the area.

ACTIVITY 5 — HOW SILT DESTROYS WATER QUALITY

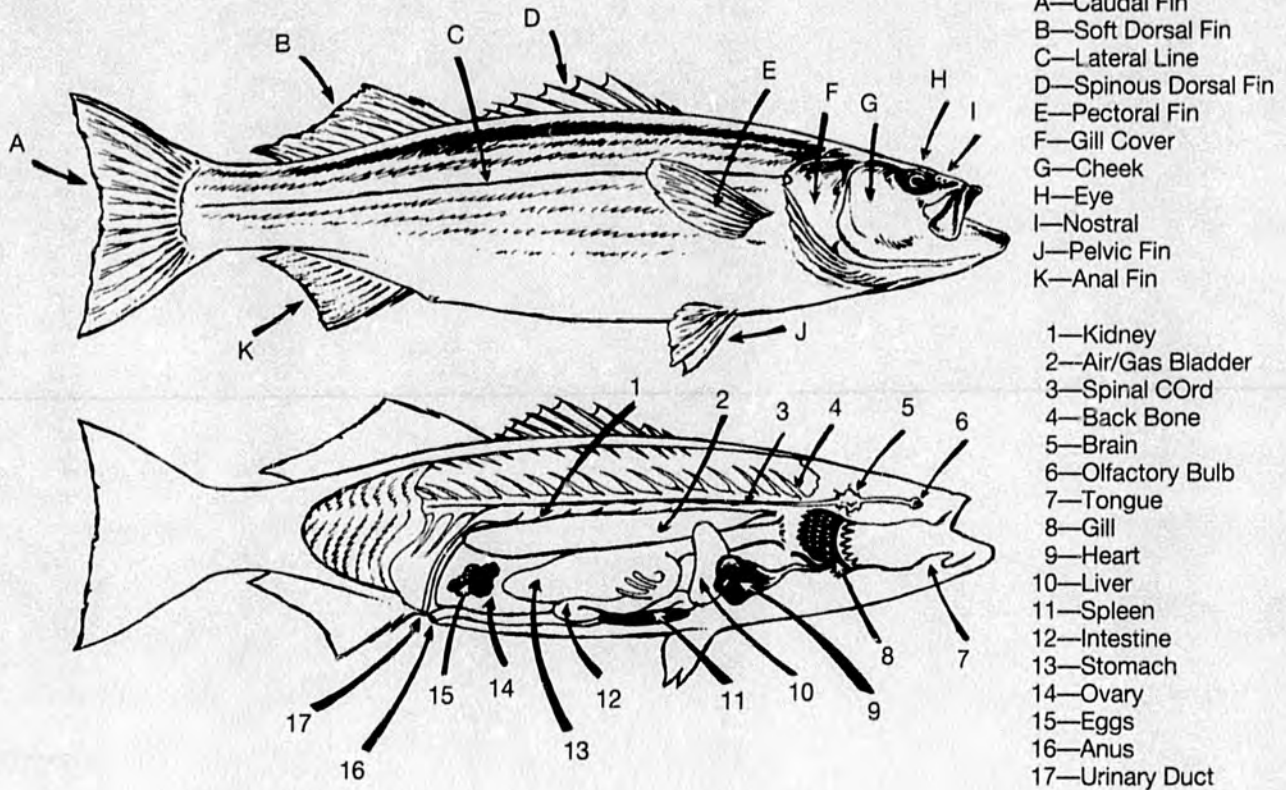
To show how silt and sediment cover a lake bed or river bottom, make a jar aquarium with gravel and small plastic plants on the bottom. Add clean water. To demonstrate the settlement of silt, take a small jar of dirt and water. Add this mixture to the aquarium and record the results over a period of time. What happens to the dirt in the water? What happens if more dirt is added?

CHAPTER

9

What is a Fish?

All fish are aquatic. This means that although some fish can spend time out of water, all fish must return to water to breathe and to keep from drying out. However, not all creatures that live in water are fish. So, what is a fish?



- **Fish are cold-blooded animals.** Cold-blooded means they have a body temperature that is close to that of the water in which they live.
- Fish are the only **vertebrates** (animals with a backbone) **that are able to live in water without breathing air from the atmosphere.**
- Their bodies are supported by a **skeleton**,

made up of bone or cartilage, and have a brain case (cranium) that holds the brain.

- **Fish also have permanent gills.** Most fish also have fins, scales, a slimy mucus and a swim bladder.

Fish have been around for more than 400 million years. Today there are about 21,000 species! Fish live in water from a few inches deep to as much as five miles beneath the surface. Fish

live in waters from the North and South Poles to the Equator.

Fish come in many sizes, shapes, and colors. Different species (types) prefer different aquatic environments (surroundings) and live their lives in different ways. The more you know about fish, the better the angler you'll become.

PARTS OF A TYPICAL FISH

Fins

Why do fish have fins? Fins make it possible for a fish to stay upright, move and maneuver in water. Fins are thin membranes usually supported by rays or sharp bony spines.

What kinds of fins do fish have and what are their names?

The **dorsal** fin and the **anal** fin help fish keep their balance and move in tight places. **Pectoral** fins are found on each side of a fish's body, just behind its gills, and help a fish stay in one place and to dive or surface. The **pelvic** fins are found on each side of the belly and aid in positioning and balance. The **caudal** fin is another name for the tail fin and it helps fish move.

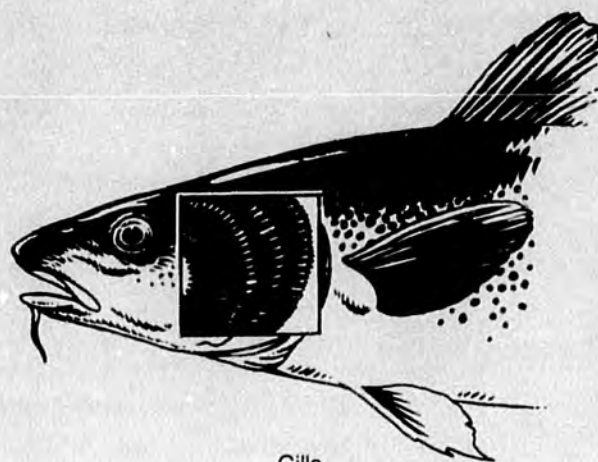
Some fish, such as salmon, trout, and catfish also have a small, fleshy **adipose** fin on their backs behind the dorsal fin.

Gills

Why do fish have gills? Fish get the oxygen they need to live from water. They use the gills on each side of their head to remove oxygen from the water as it enters through their mouth and then passes over the gills. The gills provide oxygen for life, and without them fish could not live. **Injury to the gills is often fatal.**

Scales

The bodies of most fish are covered with scales. Scales help protect their body from injury and disease. Fish don't grow more scales as they get older, the scales just get bigger. As a fish grows, each scale grows rings like the rings on a cross-



Gills



Rings of Fish Scale

section of a tree trunk. By studying a single scale's rings, scientists can tell a fish's age.

Mucus

Fish are coated by mucus (slime) that helps protect a fish from infection and disease and reduces friction with the water, making it easier to swim. When you plan to release a fish, it's important not to damage this slimy coating. Touching a fishes body can destroy or remove this protective layer. **If you must handle a fish's body, wet your hands first.**

Swim Bladder

Many fish have a gas, or swim, bladder in their bodies. This makes it possible for them to sus-

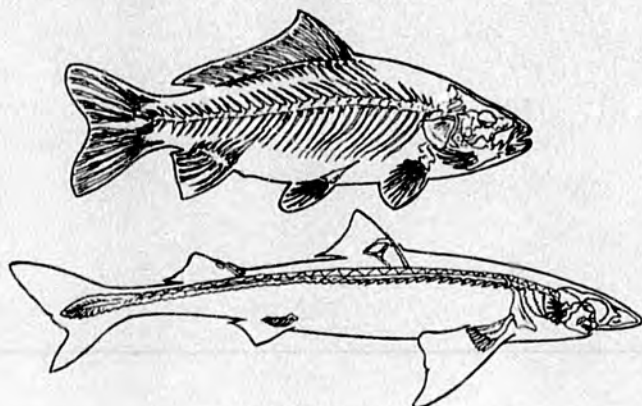
pend themselves in water and not sink to the bottom. In most fish, the bladder is an air-tight sac; in others fish can add or release gas to remain in deep or shallow water.

Some fish don't have a swim bladder or don't rely on one because they're always moving. Some examples are mackerels, sharks, and tunas.

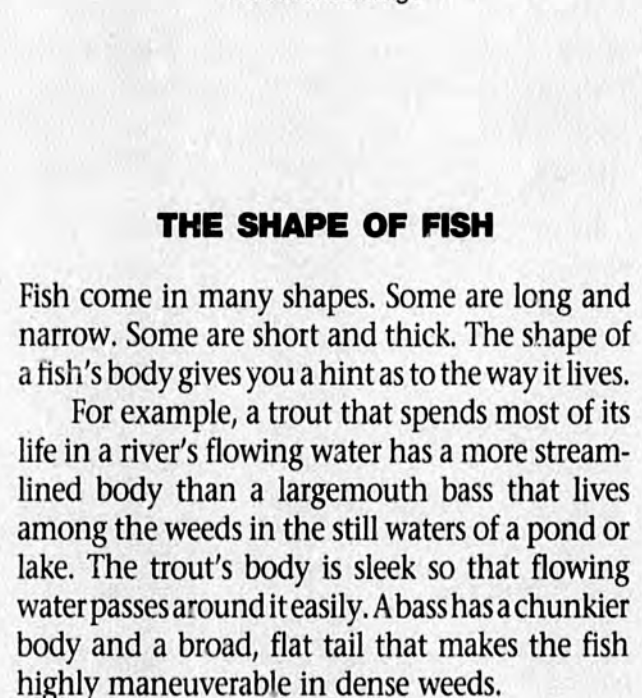
Skeleton

Most fish have a bony skeleton. However, some fish, including lamprey, sturgeons, and sharks, have skeletons of cartilage rather than bone. The skeleton protects their organs and supports the muscles. The location and flexibility of the spine allow fish to swim.

Fish with Bony Skeleton



Fish with Cartilage



THE SHAPE OF FISH

Fish come in many shapes. Some are long and narrow. Some are short and thick. The shape of a fish's body gives you a hint as to the way it lives.

For example, a trout that spends most of its life in a river's flowing water has a more streamlined body than a largemouth bass that lives among the weeds in the still waters of a pond or lake. The trout's body is sleek so that flowing water passes around it easily. A bass has a chunkier body and a broad, flat tail that makes the fish highly maneuverable in dense weeds.



Trout



Largemouth Bass



Catfish



Sunfish



Flounder

Fish Shapes

Flat fish such as flounder often lie right on the bottom. To help them see, both eyes are on one side of their head! Catfish have a body, head shape, and coloration that hint that they live and feed on the bottom. Bluegills are compressed, which indicates that they can move in tight places and do not have great speed.

FISH COLOR

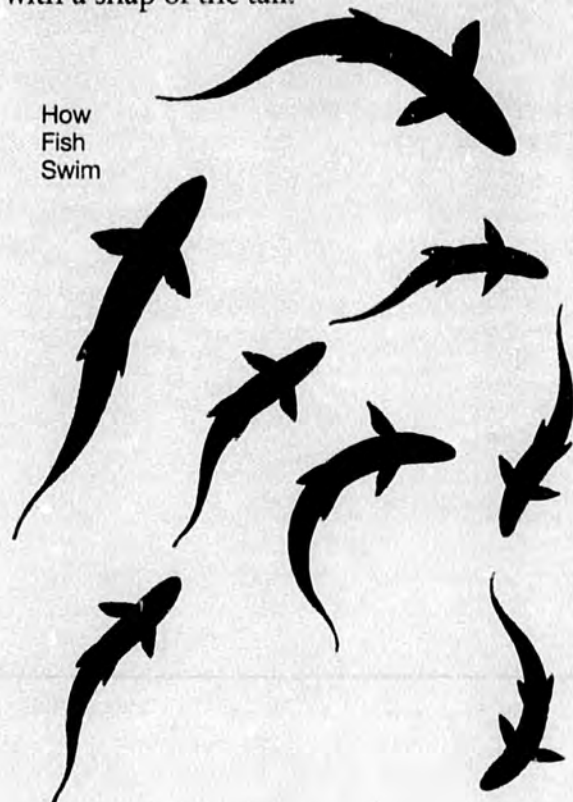
Fish, especially saltwater fish, come in a variety of colors and patterns. In most cases, the coloring of fish allows them to blend in with the place where they live. For example, the upper part of the body of a bullhead, which spends much of its time near the bottom, is dark. So, from above, it's difficult to see a bullhead against the muddy bottom of a river or a lake.

Pike look like sunlight beaming through a weedbed. Almost every fish is light on its belly and dark on its back. This protective coloring

helps them to stay hidden from the smaller fish they feed on, and from larger fish that want to eat them!

HOW FISH SWIM

Most fish swim by moving their bodies in a series of wavy, snake-like motions. Each motion ends with a snap of the tail.



Some fish can swim very fast. For example, members of the tuna family can swim up to 50 miles an hour by snapping their tails as much as 10 to 20 times a second! Each tail snap moves a tuna about the length of its body.

THE SENSES OF FISH

Understanding how a fish hears, sees, and smells will help you catch more fish.

How Fish Hear

Fish hear sounds very well and sound travels five times faster in

water than it does in air! That's why you hear anglers talk about the need to move quietly on the bank of a pond or in a boat. Fish can be scared away from where you are trying to fish.

How do fish hear? They have "ears" beneath the skin on each side of their heads. Sound reaches the ears through their skin, flesh, and bone.

Fish also have another way to "hear" sounds. It is called the **lateral line**. This line begins at the head and extends almost to the tail along each side of the fish. The lateral line detects any vibrations in the water. This helps them stay in tight schools, navigate streams, detect predators, and find food.

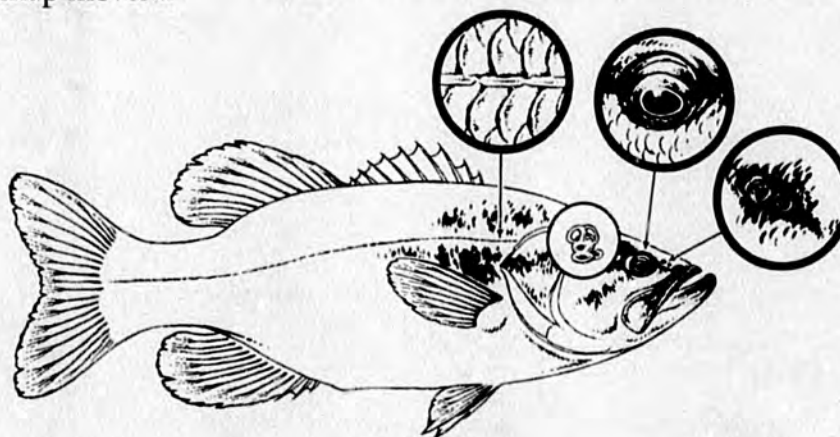
How Fish Smell

The sense of smell is important for many fish. Fish use smell to find food, get warnings of danger, and find their way to spawning areas over long distances. Anadromous fish such as salmon are good examples of this as they can travel several hundred miles to return to their spawning grounds.

All fish have at least two nostrils, called "nares," in their snouts. Behind the nares is a chamber lined with sensors that can detect the slightest odor.

How Fish See

Fish first use their sense of smell or hearing to find food. Many fish then use their sight to make the final attack. Fish can't blink because they have no



Fish Senses

eyelids. And because they have a fixed iris, they have to move into the shade or into deeper waters to escape bright sunlight. The eyes of fish are round and located on the side of the head.

Fish are also nearsighted! Objects at short distances can be seen very clearly, but objects farther away are blurry. But, they can see nearly all around except for a small area directly behind them.

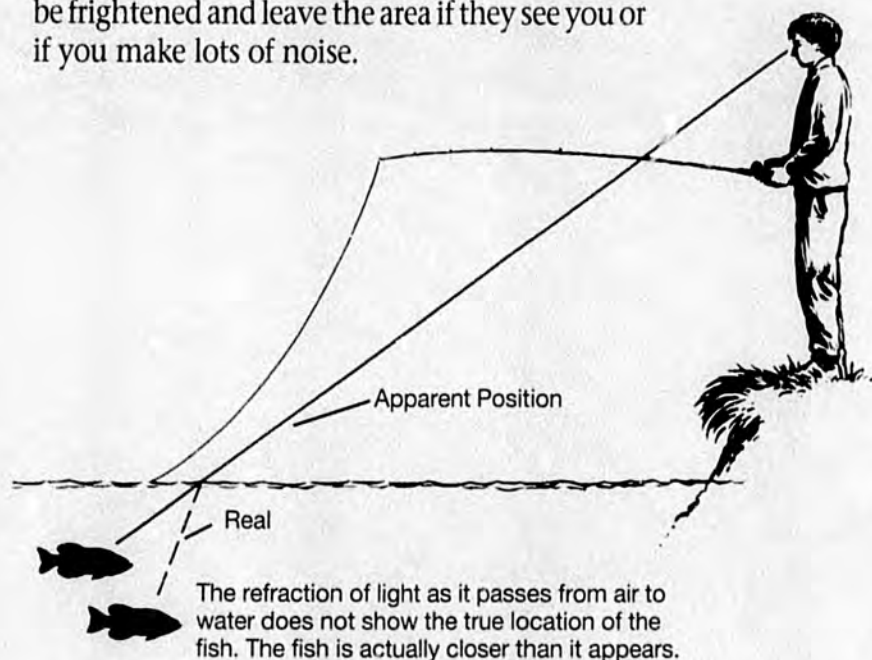
Can fish see colors? Scientists say they can. Many species of fish can see at least 24 different shades of color.

Why Fish Senses Are Important

Most fish are alert to what is happening around them. Therefore, once you know how fish use their senses, you will become a better angler.

When an angler sees a fish under water, the fish is actually closer than it seems. This is because light rays bend (refract) as they pass from the air into the water, like light going through a prism. To a fish, an angler standing on the shore seems to be directly over the fish. Because fish can see you on the bank it is important to keep a low profile while fishing.

When trying to approach fish, remember that fish see and hear very well. These factors can determine what you catch. Approach your fishing area quietly and without being seen. Fish can be frightened and leave the area if they see you or if you make lots of noise.



ACTIVITIES

ACTIVITY 1 — HOW OLD IS YOUR FISH?

For this activity you will need two or more fish of different sizes, tweezers or forceps, and a magnifying glass.

Using the tweezers, carefully pull out a scale. Repeat from the same area on another fish. Compare the size of the scales since they grow as the fish grows. Then examine each with the magnifying glass. Note the "rings" in each. Count the rings to determine each fish's age. Which fish is older? Annual growth shows up as a new ring.

ACTIVITY 2 — IDENTIFYING THE EXTERNAL PARTS OF A FISH

One of the best places to observe healthy, active fish is in an aquarium. If you don't have an aquarium at home visit your local pet store. Introduce yourself to the owner or a worker, and explain why you are there.

By looking at the fish, identify the following:

- | | |
|-----------------|----------------|
| 1. Dorsal fin | 5. Caudal fin |
| 2. Anal fin | 6. Pelvic fin |
| 3. Pectoral fin | 7. Adipose fin |
| 4. Gills | 8. Scales |

Here are some questions you might ask the owner:

1. How often do you feed them?
2. What do you feed them?
3. Do the fish know when it's feeding time?
4. Why do the tanks have filters?
5. Can the fish see us as we see them?

ACTIVITY 3 — FISH DRAWING

Select your favorite species of fish, draw it and then color. Paste your picture on a piece of poster board or construction paper. On a piece of writing paper, write facts about the fish—the species name, where it lives, what it eats, and what might eat it. After finishing, paste this information under your drawing on the same piece of posterboard.

ACTIVITY 4 — WRITING A FISH STORY

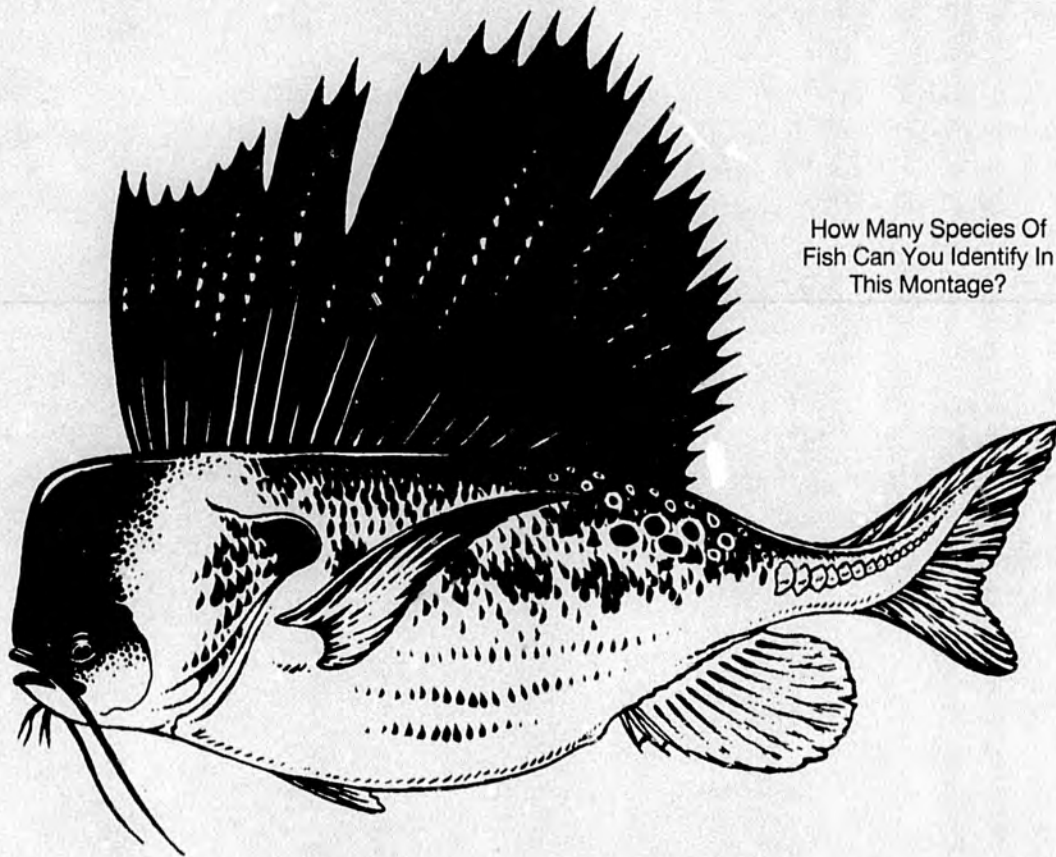
Write a story from a fish's point of view. Tell what kind of fish you are, where you live, how you live, what you eat, and what you hide from.

CHAPTER

10

What Kind of Fish is This?

Everyone should know the names of the fish they catch. Studying pictures of fish can help you learn. Seeing live fish is better. Once you have seen a live fish a few times you should at least recognize the family it belongs to. Later, you can try to identify the exact species. For example, after catching a few bass, it will be easy to identify a bass. Later, you will be able to tell whether the fish is a largemouth bass or a smallmouth bass.



How Many Species Of
Fish Can You Identify In
This Montage?

Fish have two kinds of names. One is a common name. It isn't unusual for the same fish to have many common names, depending on the state where it lives, but a fish has only one scientific name. For example, common names

for the largemouth bass include bigmouth bass, black bass, largemouth black bass, green bass, and bayou bass. Its scientific name, however, is always *Micropterus salmoides*, wherever you go.

Most anglers learn to identify fish by sight.

Some fish are easy to identify. Others may be more difficult because some species look alike. To tell the difference between similar species, anglers look closely at the shape, pattern, or color of the fish. Looking at the fins, mouth, and other characteristics will also help tell you what kind of fish it is.

SOME COMMON FRESHWATER FISH

The Sunfish Family

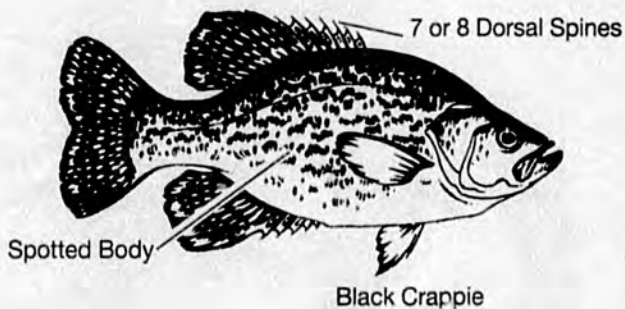
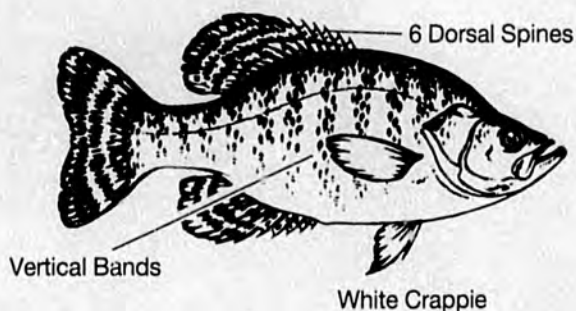
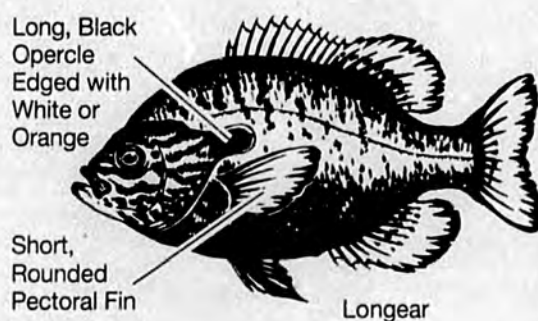
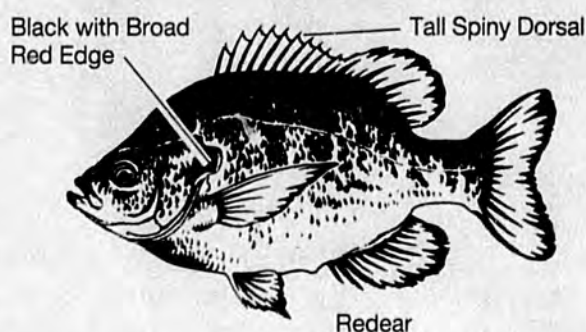
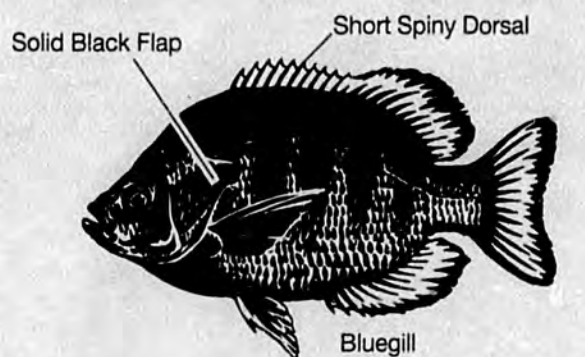
North America has 30 species of fish that are members of the sunfish family. The key to telling them apart is the dorsal fin on the fish's back. All members of this family have a dorsal fin with two connected parts. The front portion has stiff spines while the rear portion has soft rays.

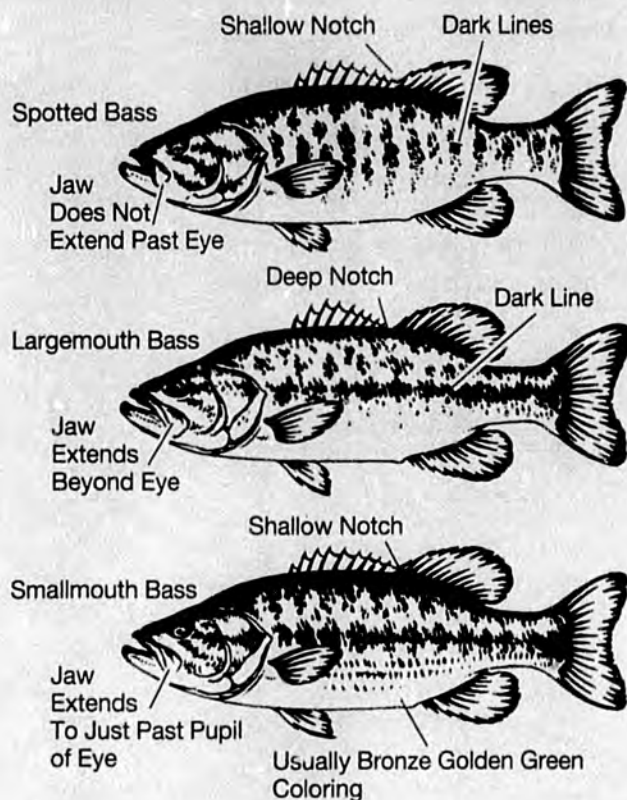
The sunfish family can be separated into three groups—sunfishes, crappies, and the black basses.

The sunfishes include the bluegill, pumpkinseed and longear. The bluegill can be identified by the solid black flap on the gill cover and a dark blotch at the back of the dorsal fin. The pumpkinseed has a bright orange breast and wavy blue bands on its head. The longear has a long black flap on the gill cover with a white margin. The many common names for bluegill will amaze you. In some areas, the bluegill and other sunfish are called bream, roach, sunnies, kiveres, and johnny-roach!

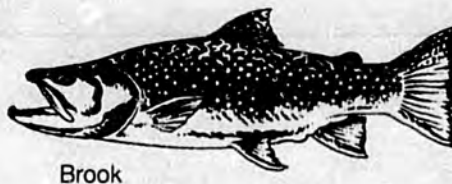
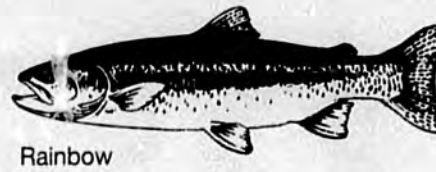
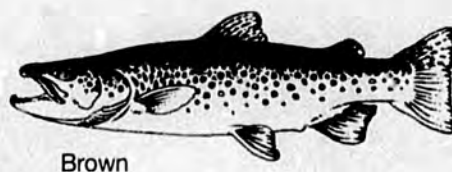
The crappies are the white crappie and the black crappie. Black and white crappies look much alike. Usually, the black crappie has more dark blotches on its body. The white crappie is more silvery with black markings that form seven to nine vertical bars on the sides of its body. To make sure, you can count the spines in the dorsal fin. Black crappies have seven or eight. White crappies have only six.

The black basses include the largemouth, smallmouth, redeye, and spotted bass. To tell the difference between largemouth bass and smallmouth bass, study the jaw. On the largemouth, the jaw extends back beyond the eye. The jaw of the smallmouth, however, extends just behind





the pupil of the eye. Another way to tell the difference is to look at the dorsal fin. Smallmouth bass have a shallow notch between the spiny and soft-rayed sections. Largemouth have a sharp notch at this same place.



Trout and Salmon

Trout and salmon belong to a family of fish known as the Salmonidae. There are 39 different North American species in the Salmonidae family and all have a fleshy adipose fin between the dorsal fin and the tail.

Scientists break down the family Salmonidae into several groups. The major groups of interest to the angler include trouts, chars, Pacific salmon, grayling and whitefish.

Trouts—The true trouts includes the brown trout, golden trout, cutthroat trout, Apache trout, Gila trout, and Atlantic Salmon. Generally true trouts have darker spots on a lighter background,

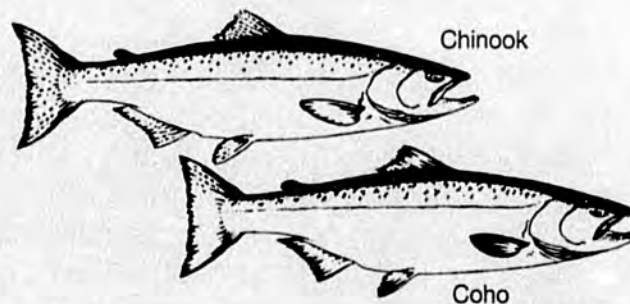
while chars have lighter spots on a darker background. Cutthroat trout, common in the western states are identified by a red slash mark under the lower jaw.

Chars—The chars include brook trout, lake trout, and Dolly Varden and bull trout. The brook trout has worm like markings on its back and pink or reddish fins edged with white. Dolly Vardens have red, orange, or yellow spots. Lake trout have very pale spots on the body and on the dorsal fin, anal fin, and the tail.

Pacific Salmon—Pacific salmon include the chinook, chum, sockeye, pink, coho, and the steelhead/rainbow trout. The chinook is also called the king salmon and the coho is also called the silver salmon. These fish are found from California to Alaska. In addition, they have been stocked in the Great Lakes and in some other large, freshwater lakes and reservoirs. The rain-

bow trout is also stocked in coldwater lakes, rivers and streams throughout North America.

Pacific salmon are **anadromous** fish. This means they live in saltwater but move into freshwater streams and rivers to spawn (lay and

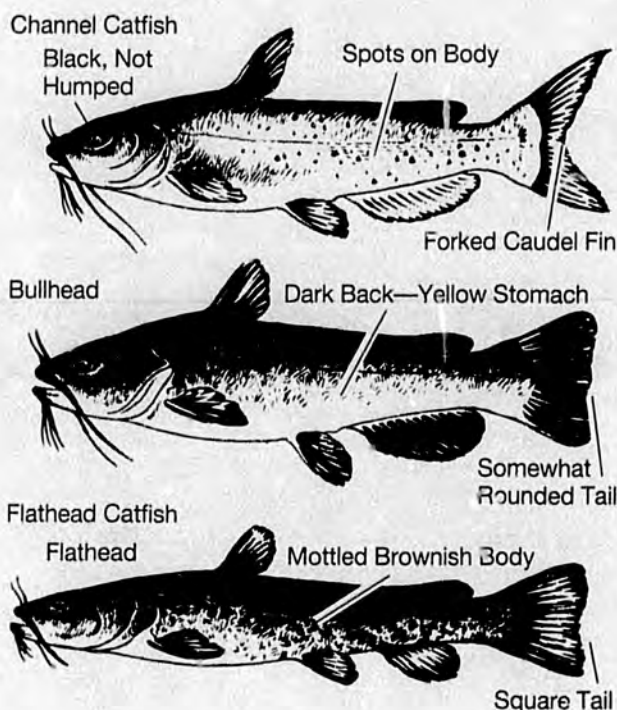


fertilize the eggs). Depending on the time spent in a river, their body color changes from bright silver to dark or brilliant hues.

Whitefish and Grayling—Within the lower 48 states, the whitefishes and grayling live in a limited area in the northern and western states. They are widely distributed in Alaska and Canada.

The Catfish Family

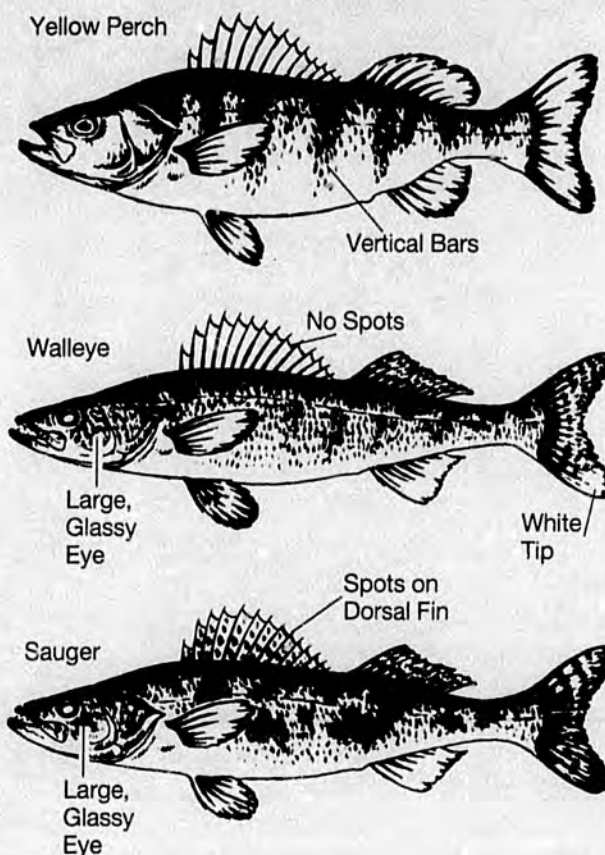
Catfish have smooth skin with no scales. Catfish, however, have "whiskers" or barbels around their mouths that contain many taste buds. Catfish can actually taste their food before they put it into their mouth. Catfish have sharp spines on the dorsal and pectoral fins. If one of these spines punctures your skin, it can cause a painful wound.



Bullheads, which are members of the catfish family, have rounded tails, while channel and blue catfish have forked tails. The flathead catfish has an almost square tail, similar in appearance to bullheads. Members of the catfish family also have a large adipose fin between the dorsal fin and the tail.

The Perch Family

The members of the perch family include the yellow perch, walleye, and sauger. Yellow perch have dark backs, yellowish to golden sides, and dark vertical bands on the back and sides. The dorsal fin is split into two parts, and their lower fins may be reddish or orange.



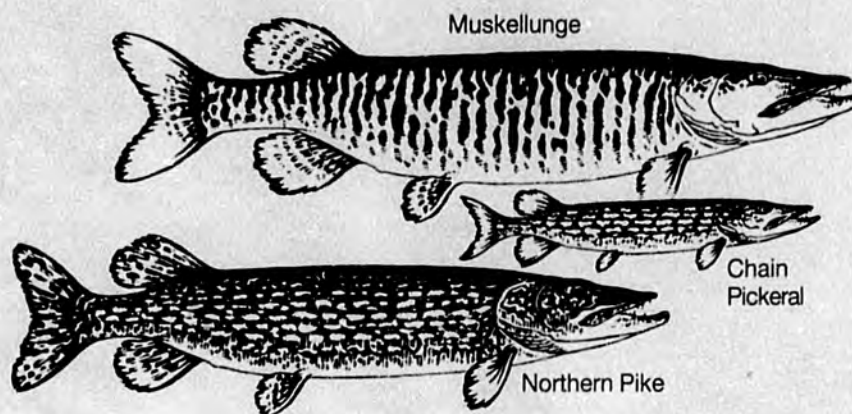
Walleye and sauger are difficult to tell apart. Their bodies are round and they have slightly forked tails. You can tell them apart by looking at the spiny dorsal fin. The walleye has a large dark blotch near the base of the last few spines and dark streaks throughout the dorsal fin. The sauger has distinct dark spots throughout the dorsal fin, but no blotch.

They both have sharp teeth and large, glassy eyes. These features allow them to feed on fish, even in the dark! Their bodies are olive-green to golden on the sides and their bellies are white. The tail of a walleye has a silver or white tip. The sauger doesn't have this feature.

The Pike Family

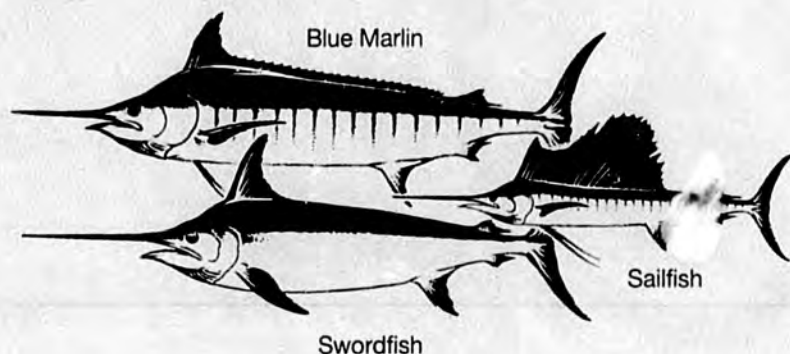
This family includes the chain pickerel, grass pickerel, red fin pickerel, northern pike, and muskellunge (muskie). The members of the pike family have long, slim bodies with the dorsal fin set well back on the body near a forked tail. All pike have long snouts (almost like a duck bill) and sharp teeth. The chain pickerel, which grows to nine pounds, is larger than the grass pickerel or red fin pickerel. It has black, chain-like marking on the sides.

The northern pike has bean-shaped spots on its side and dark spots on fins and the tail. The muskellunge has vertical bars on its body. On the northern pike, the entire cheek has scales but only the upper half of the gill has scales. Both the cheek and gill cover are fully scaled on a pickerel. If you look under the jaws of both fish, there are tiny holes. The pike has five on each side. The muskie has six to nine on each side. Pike grow to 50 pounds while muskie may reach 60 pounds!



the striped marlin is higher than that on the blue. Also, the blue marlin has a much higher anal fin than the striped marlin. White marlin have a rounded dorsal fin.

The swordfish has a very long, wide bill and a high, curved dorsal fin.



SOME COMMON SALTWATER FISH

Billfish

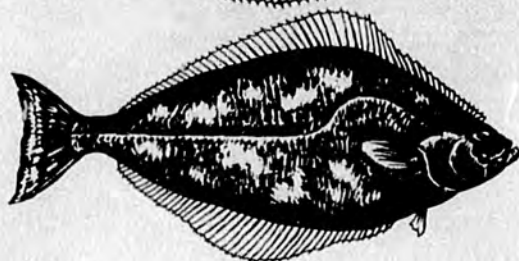
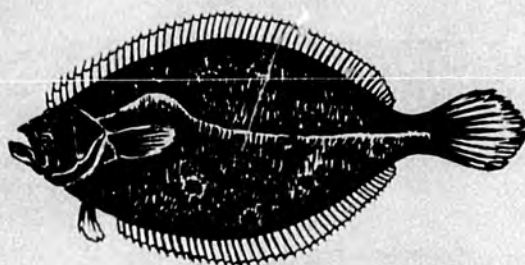
This is the name given to a group of large fish that live in temperate and tropical waters. They all have long, pointed upper jaws that form a "spear" or a "sword." Billfish include the marlins, sailfish, swordfish, and spearfish. Billfish are easy to identify if you study their fins. The sailfish has a large dorsal fin on its back that is taller than the deepest part of its body.

Blue, striped, and black marlin have pointed dorsal fins, but there are other differences. The black marlin has rigid pectoral fins. They don't fold back as they do on the blue and striped marlins. The pointed front of the dorsal fin on

Flounder

Flounder belong to a group of flatfishes that live on the sandy or muddy bottoms of bays and along the shores of most oceans. They have a dark, mottled coloring on one side of their bodies that helps them hide from predators. The other side is white. These fish swim on their right side. Some have both eyes on the left side of their bodies. Others have both eyes on the right side. This characteristic helps you identify particular species.

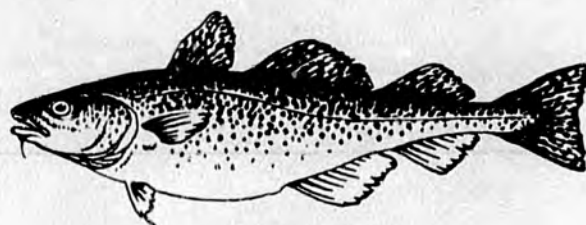
Summer Flounder



Pacific Halibut

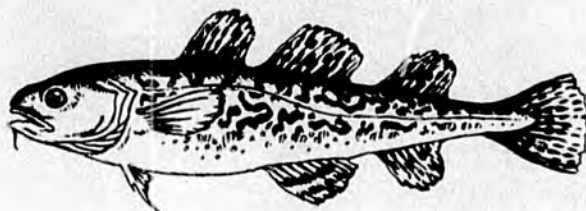
Cods

Members of the cod family are found in cold northern and Arctic waters. Most live in shallow waters near coasts but can be caught in deep water. Almost all cods live on the bottom. They have small scales and soft-rayed fins. Usually, they have a large mouth and a barbel on the chin.



Atlantic Cod

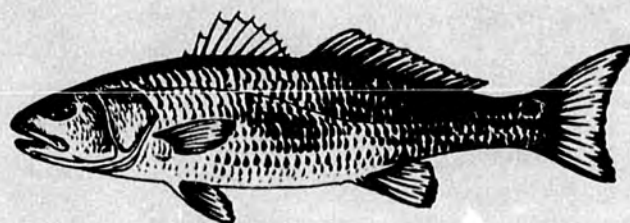
Atlantic Tomcod



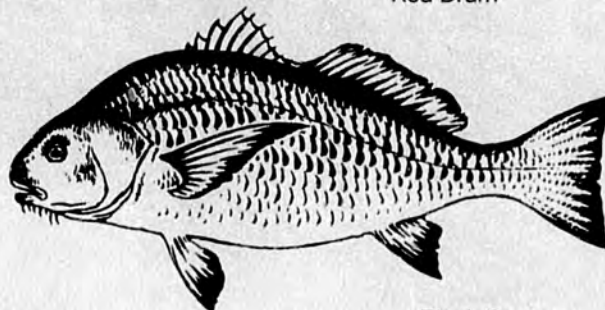
Cod family members include the Atlantic cod, tomcod, hake, pollack, and haddock. The only freshwater cod is the burbot. They inhabit cold, deep northern lakes.

The Drum Family

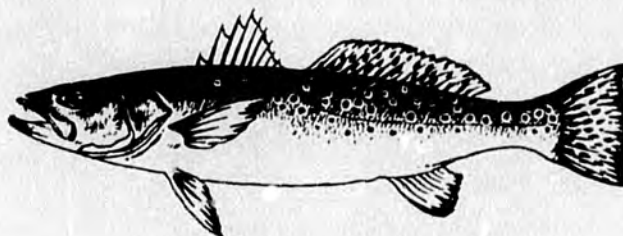
Drums are found throughout the world, generally in temperate and tropical waters. Usually,



Red Drum



Black Drum



Spotted Sea Trout

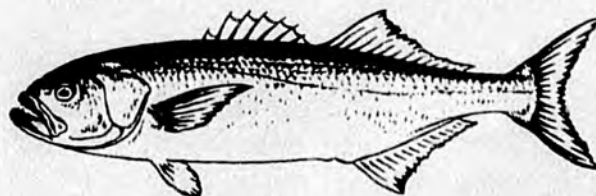
they live over sandy bottoms in shallow water near estuaries. They have a lateral line on the sides of the body that extends onto the tail fin. Usually, drums have one or more barbels on the lower jaw.

Members of the drum family include the red drum, black drum, spotted seatrout, common weakfish, corvina, spot, and croakers.

Bluefish

Bluefish range in size from one to over 20 pounds. They are a bright silver and blue color and have powerful jaws lined with sharp teeth. Bluefish eat eels and bait fish that they encounter in their travels.

More anglers pursue bluefish than any other



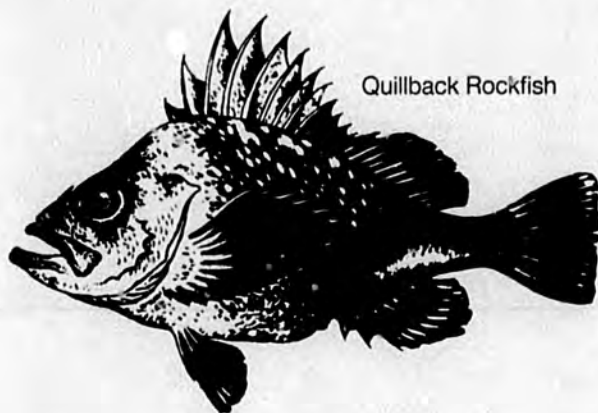
Bluefish

fish on the east coast of the U.S., although their distribution is worldwide. Atlantic Coast fish winter in warm waters off Florida and migrate all the way to Maine by summer's end.

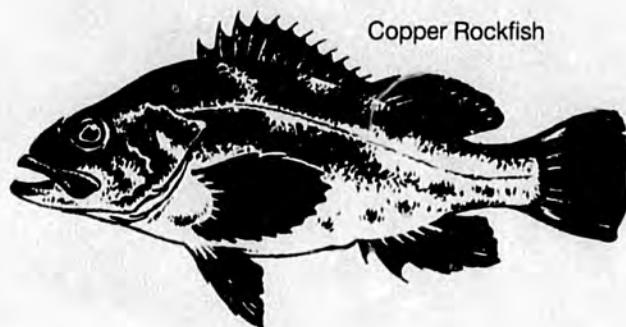
The adults spawn in warmer southern waters. The juveniles (called "snapper blues") head northward just before the adult in the spring. West coast bluefish make similar seasonal migrations along the Pacific Coast.

Rockfish

A variety of species caught along West Coast shores are known collectively as "rockfish." Popular favorites are black rockfish, quillback rockfish, copper rockfish and yelloweye rockfish. Other fish caught in the same areas are greenlings, lingcod, sculpins and dogfish (a shark).



Quillback Rockfish

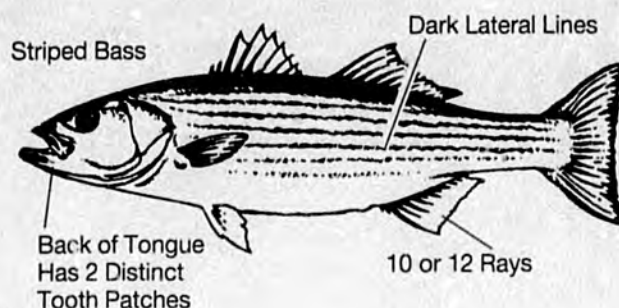


Copper Rockfish

ANADROMOUS FISH

Anadromous fish are fish that live in saltwater but move into freshwater streams and rivers to spawn. Anadromous fish include fish in a variety of families. They include striped bass, shad, At-

lantic and Pacific salmon, and some sturgeon. Some species of trout and char, including the rainbow or steelhead trout, brown trout, Dolly Varden, brook trout, and cutthroat trout move from freshwater streams and rivers to the ocean or large freshwater lakes for a period of time where they grow at a much faster rate. These are called "sea-run" or "lake-run" fish.



ACTIVITIES

ACTIVITY 1 — MAKING A FISH PRINT

Using a freshly caught fish, obtain printing ink and rice paper to make a fish print. Carefully roll, paint or spread printing ink onto the fish, covering all parts from head to tail. Using rice paper, slightly longer and wider than your fish, immediately cover the fish while the ink is wet. Pat down gently or rub carefully with a wooden blade over the paper to form your fish ink print. Thin layers of ink produce the best ink print. Remember to hold the paper carefully as you gently rub the paper onto the inked fish. Let your paper dry as you lift it carefully from the fish. Your print can be labeled, autographed, and identified according to its physical features or simply framed and displayed. Cotton T-shirts work even better than rice paper and can make you a unique shirt!

ACTIVITY 2 — WHO AM I?

Read each of the following phrases and write the name of the correct fish on the line from the choices provided.

Largemouth Bass, Pumpkinseed, Catfish, Drum, Sunfish, Trout

1. I have whiskers, but don't meow _____
2. I have rays, but not sunbeams _____
3. I have an orange breast, but you can't plant me to grow
Jack-O-lanterns _____
4. I sport a wonderful array of colors
but no pot of gold _____

5. My jaw goes way beyond my eye, but
I don't talk much _____
6. I have a lateral line that extends
into my tail but I'm not musical _____

ACTIVITY 3 — FISH IDENTIFICATION

Learn to identify fish common to your area. Visit a local bait or sporting goods shop where there are mounted fish on display.

List the names of the fish and ask if they were caught in your area. While looking at the fish, make note of the one thing you think would help you to recognize this

species. Compare this trait to other mounts of the same kind and to other types of fish. You will soon find that each species can be easily recognized.

ACTIVITY 4 — MAKING A FISH IDENTIFICATION CHART

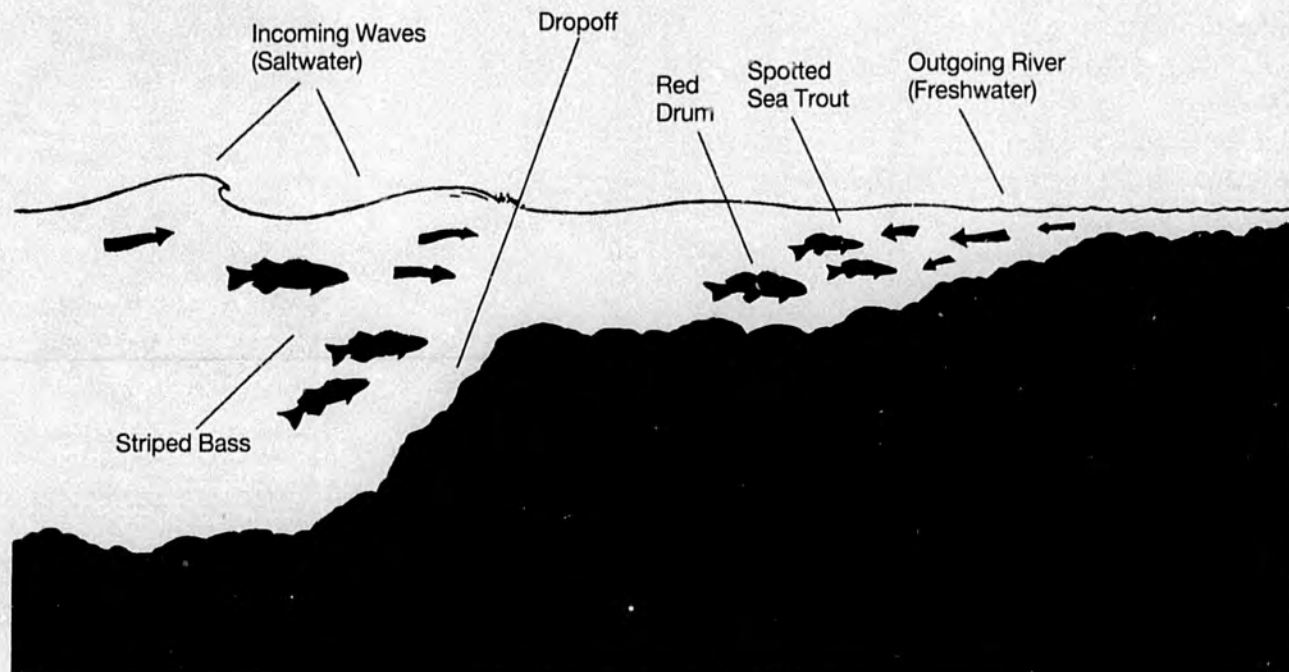
Find pictures or draw species of fish that you plan to catch. Make a chart with two columns—one for family of fish and the other for identifying characteristics. Suggestions for fish families include: sunfish, crappie, trout, catfish, perch, pike, billfish, flounder, cod, rockfish, etc.

CHAPTER

11

Where Do Fish Live?

To catch fish the angler must first locate them. Fish are found nearly everywhere there is water with enough food, oxygen and cover. Near your home there should be a body of water that has fish living in it.



Fresh water & Saltwater Meet

Not all fish can live in the same kind of waters. Fish can tolerate different environmental conditions, including different:

- Amounts of salt
- Amounts of oxygen
- Types and amounts of food
- Water temperature
- Hiding areas (cover and the bottom)
- Breeding areas

SALINITY (AMOUNT OF SALT)

One major factor that separates fish is salt. Some fish cannot live in areas where there is much salt and others need salt in the water to live. However, some fish can live in both saltwater and freshwater!

Freshwater

Freshwater contains much less salt than the ocean. Most ponds, reservoirs, and rivers across

North America are freshwater. Some common freshwater fish are bluegills, carp, catfish, crappie, bass, perch, northern pike, trout, and walleye.

Saltwater

Many kinds of fish live in the salty water of the oceans. A fish's kidney keeps the proper balance of salt in its body. Popular saltwater fish are bluefish, cod, flounder, striped bass (also found in freshwater), sea trout, tarpon, tuna, halibut, rockfish, seaperch, lingcod, and yellowtail.

Brackish Water

An estuary is where fresh water streams and rivers meet the salt water from the ocean. The amount of salt (salinity) changes daily with the flow of tides, rain, or drought. This water is termed "brackish." Changes in the amount of salinity will determine which fish can live in the area. Species found in these waters include redfish, sea trout, snook and striped bass.

Some fish live in saltwater, but swim up streams and rivers to spawn (lay their eggs). These fish are called **anadromous fish**. They include shad, salmon, and some types of trout.

OXYGEN

Without an adequate supply of oxygen in the water, fish cannot survive. Fish such as carp can live on less oxygen than fish like trout. **What can affect the amount of oxygen in the water?** Living plants within a lake or stream add oxygen to the water through **photosynthesis**—the process of using sunlight to make food. Oxygen can also enter water from the surrounding air. In a stream, moving water tumbling over rocks picks up oxygen from the air.

Decaying plants use oxygen from the water to decompose. Pollution of many kinds reduces oxygen in water. Chemicals dumped into water trap oxygen and take it out of the natural system. Thermal pollution, the heating of water through industrial use, reduces the amount of oxygen

MORE



Brook Trout
5 ppm



Largemouth Bass
4 ppm

OXYGEN



Carp
3 ppm



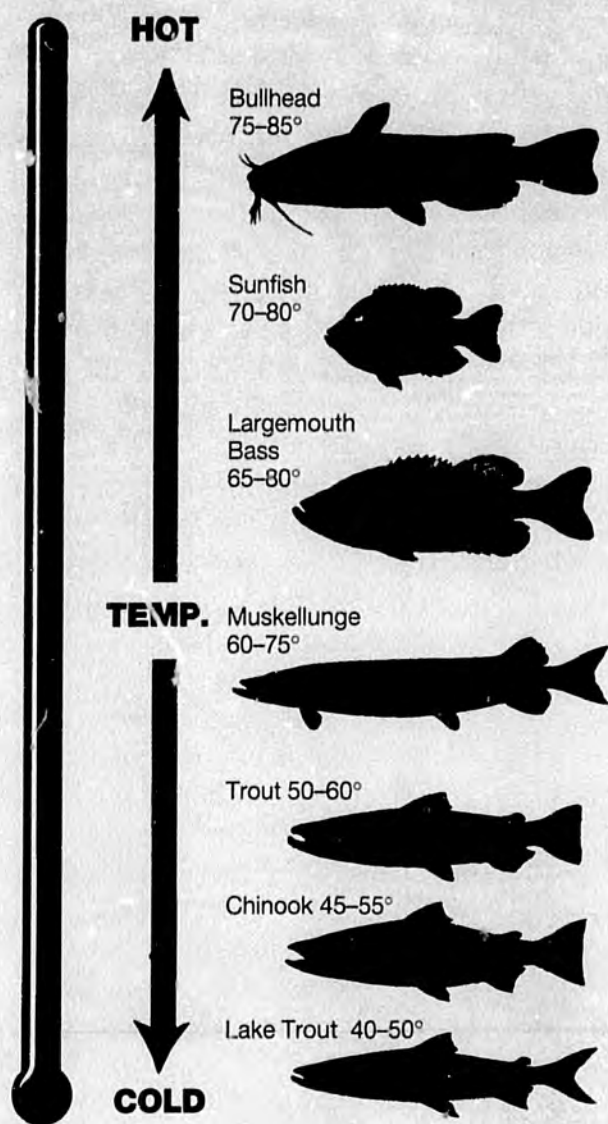
Bullhead
2 ppm

The oxygen levels listed are approximate minimum requirements (ppm = Parts Per Million).

water can hold. Water temperature affects the amount of oxygen that water can hold. Colder water can hold more oxygen molecules than warm water. Oxygen levels can change from one location to another in the same body of water.

FOOD

The amount and type of food available plays an important role in which fish will be present in a body of water. The amount of competition with other fish is also a factor. This will be covered in greater detail in Chapter 12.



The temperatures shown are optimum ranges. However all of these fish may survive in near freezing water temperatures.

WATER TEMPERATURES

Each fish has a different range of water temperature in which it can survive. Some fish can live in a wide range of temperatures, but trout require cold water. Although fish cannot always find the exact temperature they prefer, they are usually found in water close to that temperature.

WATER QUALITY

Fish must have water with adequate oxygen in which to live. Good-quality water will support more species of fish and greater populations of

fish than polluted water. Water that is stagnant, polluted, or lacking adequate oxygen will not support large numbers of fish.

Water quality affects fish species differently. Some fish can live in poorer water conditions than others. For example, carp can live in water that trout could not tolerate.

COVER

Cover such as aquatic plants, rocks, logs, or any other type of cover is a requirement for many fish. Fish choose certain types of cover for two main reasons. First, it provides them with protection from enemies. Second, it puts them in the best possible position from which to catch an unsuspecting meal that is drifting or swimming by.

AQUATIC HABITATS WHERE FISH LIVE

Each species of fish prefers a certain habitat. Habitat is where a fish lives and must contain: adequate oxygen, tolerable temperature, adequate food and hiding places (cover). Suitable spawning habitat must be available for fish to reproduce.

Freshwater Lakes And Ponds

Many lakes were formed thousands of years ago by glaciers, massive "rivers" of ice, which carved valleys and holes into the earth. These valleys and holes were filled with melting water from the glaciers and became lakes. Dams built to block the flow of rivers have also formed lakes, often called reservoirs or impoundments.

Ponds are tiny lakes and many are shaped like a bowl. Many farm ponds are used to store rainwater for crops or livestock. They are often great places to fish!

The Water's Surface. Many tiny creatures live right on the water's surface in lakes and ponds. If you look very closely, you may be able to see these dust-size creatures.

For some fish, the surface is a good place to feed. Bass, bluegill, and trout often eat insects that fall on the water. Anything that makes a disturbance on the water's surface attracts the attention of fish. Small fish swimming near the surface can be an easy meal for larger fish.

Open Water. "Plankton" are tiny plants (phytoplankton) and animals (zooplankton) in the water. Most are smaller than the head of a pin! Small fish like to roam open areas of a lake and feed on zooplankton. Larger fish often follow these small fish and feed on them. Then anglers try to catch the larger fish. This is called a "food chain."



Larger fish usually lurk below the small fish, forcing them toward the surface. Whenever you see small fish on the surface in open water, it usually means that larger fish are feeding. While feeding on these fish, they may make splashes you can see.

Other signs that larger fish are nearby are the frantic movements of the small fish. The small fish may even jump out of the water while trying to escape!

The Shoreline Shallows. The shallow water along the shore (littoral zone) is important. This is where many rooted plants, such as cattails, rushes, lilies, pondweed, and marsh grasses, grow.

Some lakes also have areas covered by rootless floating plants that make it difficult to fish. All of these plants are important because they produce the oxygen that fish need to live. They also provide a place for fish to find food and shelter from other hungry fish.

Shallow water attracts both small and large fish. Small fish, like bluegill, spawn, feed and hide in the plants, brush-piles, and logs in the shoreline shallows. Larger fish come to the shallows to feed on the smaller fish and also to spawn. Northern pike and bass often hide in the weeds and ambush smaller fish as they swim by. Larger fish often come to the shallows when there isn't much light. That's why early morning and evening are some of the best times to fish shallow areas.

Deep Water. Deep water is a home for many types of aquatic life. There is little light, no current, and the water temperature changes less than at the surface. Deep water is a good place for aquatic animals to hide, but there may be too little oxygen to sustain life, especially in late summer.

Freshwater Rivers And Streams

Flowing rivers and streams are always changing. Water currents constantly carry sediment (sand, rock and soil) downstream. The shape of a river bed controls the amount of water and sediment the river can carry.

During or after a heavy rainfall, the water level and the speed of a water current increases. This enables the river to carry suspended sediments and results in the "murky" or muddy water you often see.

The water level in a river can drop quickly in very dry weather. During a drought a river can be reduced to a series of pools. This forces fish and other creatures to adjust to the new conditions if they are to live.



Fish Locations in Flowing Water

The River Banks. In a straight stretch of river, the main force of the current is in the middle. The deepest water is also in the middle and the area near the shore is the shallowest. When there's a sharp bend in the river, however, the strongest current and deepest water is at the outside edge of the bend.

Deep Water. In flowing water, there is less current near the bottom. Because of this, most fish stay with their bellies almost touching the bottom. They like to take advantage of low spots and other structure that have even less current than the surrounding water. They do this to save their energy and to avoid being pushed downstream.

Most fish in a river face the flow of water and wait for food to come to them. Trout and salmon like cold, moving water. Usually, they'll stay near the edge of the current and eat whatever food comes along. At night or when light levels are low, the fish often move to shallow water to feed.

Estuaries

An estuary is the wide lower course of a river where the river's current meets the tides. In most estuaries this is where salty water mixes with the fresh water of rivers or streams. An ocean tide brings in saltwater and carries out some freshwater. As the waters mix, the water with the most

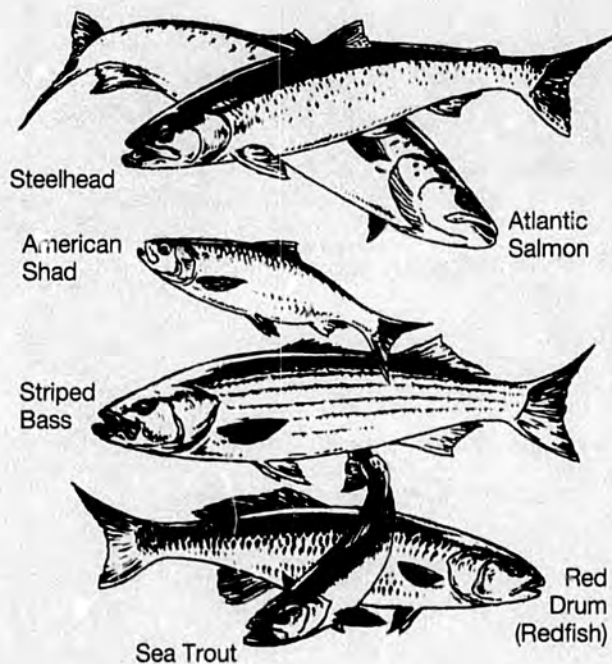
salt is near the bottom. The water with less salt, called "brackish" water, is near the surface because it is lighter.

An estuary is exciting for anglers because both freshwater and saltwater species of fish live there. Estuaries are biologically very productive areas, but they are often converted to industrial sites.

Wetlands

A wetland is an area of wet, spongy land where the water remains near or above the surface of the ground for most of the year. Wetlands are often found between open water and dry land. There are several types of wetlands including marshes, swamps and bogs. Wetlands occur in freshwater, saltwater and estuaries. Almost all are teeming with life.

Many people used to think that wetlands were waste areas. For this reason more than 50% of the wetlands in our country have been drained or destroyed. What a mistake!



Some Estuary Species

Today we understand that wetlands provide vital spawning habitat for numerous fish, and are also important to birds and mammals.

Wetlands are also important because they help to purify our water by filtering out impurities and sediment. Wetlands also help control floods and store large amounts of water for a long time.

Marshes and swamps are very important areas for fish. Marshes are more open and have grasses, reeds and other non-woody plants. Swamps have many trees and shrubs.

Most **bogs** are found in northern climates. Bogs are areas with acidic soil and a heavy growth of mosses. Peat moss is formed in bogs by the build up and partial decay of plants. Because of the acid water, fish are usually not found in bogs.



RIPARIAN ZONES

Riparian areas are a middle zone of vegetation along streams and rivers. Due to the influence of water, the vegetation in a riparian zone is typically larger and more dense than the vegetation outside the zone.

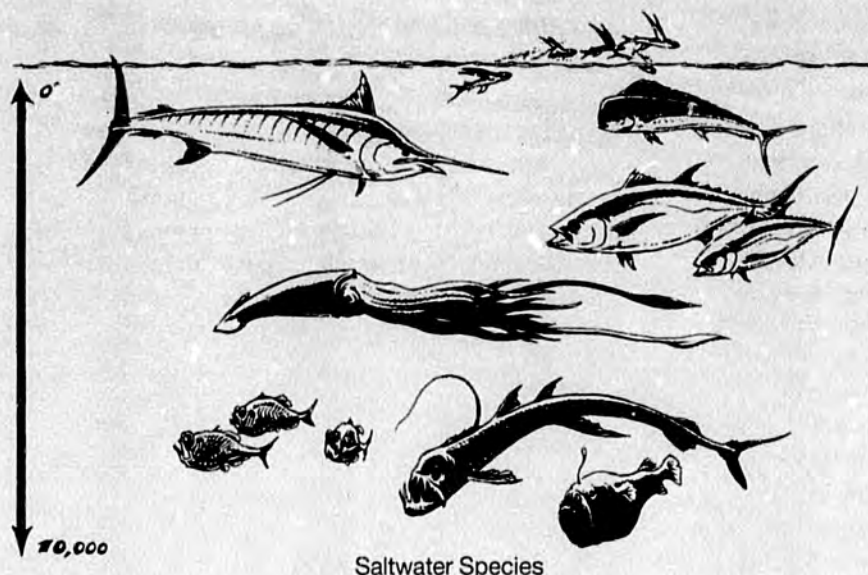
In the drier parts of the country, riparian zones are very obvious. Only the small section near the water has any green vegetation. In parts of the country where more rainfall occurs, riparian zones are not as easy to point out, but they do exist.

Like wetlands, quality riparian areas play a vital role in maintaining the quality of the water in streams and rivers. When humans or livestock destroy the vegetation, the quality of the water is not as good.

Riparian vegetation provides food and shade for aquatic plants and animals. Leaf litter and terrestrial insects fall from vegetation into streams, providing a source of food for fish. Elimination of the vegetation along the river can cause the temperature of the river to rise because there is nothing to shade the water from the sun.

Quality riparian zones can cleanse water and act as a sponge in times of heavy rain. This assists in the prevention of flooding. When the rains stop, and water levels drop in the river, the riparian area slowly releases water back into the river. This helps the river or stream to maintain a more stable water supply for fish and other plants and animals that depend on it.





THE OCEANS

Did you know that land takes up only one quarter of the earth? Oceans cover nearly three-fourths of the Earth's surface!

The Intertidal Zone

The intertidal zone is a low, flat area of the shore. It is the area covered by the sea at high tide and exposed at low tide. Crabs, snails and other creatures live here. Predator fish, like sharks, feed in this shallow area at high tide. Their bellies may scrape the bottom while their fins and backs are out of the water. Many other kinds of fish also feed in this zone because it is rich in food. On the West Coast tides can fluctuate 15 to 20 feet. Almost all bank fishing is done in this environment.

Coastal Waters

Coastal or waters near shore, are seldom as clear as the open ocean. Lots of sediments are stirred up by waves. Water temperature affects the variety of creatures in the water. The warmer coastal water has more forms of life than the colder waters of the open ocean.

In coastal areas, the ocean bottom may have sections of exposed rock, but most of it is sand or sediment. Fish live at all depths in this coastal water. Most, however, are found close to the bottom. Many feed near cover such as a rock or

a coral reef where they can ambush prey. Other fish roam, searching for an easy meal.

Most saltwater anglers fish in coastal waters, because there are dozens of different fish species to choose from. Many marine fish migrate up and down the coast-line seasonally. Smart anglers monitor water temperatures to determine which species they should be fishing for.

The Open Ocean

Most kinds of fish that live offshore grow quickly, at least during their early years. A marlin grows from the size of a pinhead to 9-1/2 pounds in 12 weeks! Catching large fish in the open ocean takes special tackle, great skill, stamina, and large, safe boats.

ACTIVITIES

ACTIVITY 1 — HABITAT SCRAMBLE

See if you can figure out the water habitats or fish by using the clue to unscramble the word. Write the answers, from the choices below, on the line provided.

Estuaries, shoreline shallows, bogs, oceans, ponds, lakes, intertidal zone, rivers, wetlands, coastal waters

1. dsonp. tiny lakes _____
2. wleatnds. wet, spongy land _____
3. lisoheiren hslaswo. . . . rooted plants live here
(2 words) _____
4. errvis. cause erosion _____
5. sgbo soggy, acidic areas _____
6. sacloa tswear . . . have a mostly sandy or sediment
bottom (2 words) _____
7. dtinlaetri eozn. . .uncovered at low tide
(2 words) _____
8. eansco covers 3/4 of the earth's
surface _____
9. risseetau salt and freshwater mix

10. klase carved by glaciers _____

ACTIVITY 2 — HOW WATER TEMPERATURE AFFECTS OXYGEN LEVELS IN WATER

For this activity you will need the following: 1 goldfish, a thermometer, and a clear container (gallon jar).

Place a large goldfish in water that is room-temperature. Observe the movement of the gill covers. Count the gill movements (gulps) for 30 seconds. Do this five times, and figure the average number of gulps per session.

Now pour some warm water from your hot water tap into the water. (Use enough warm water so that the temperature increase is noticeable—about 5 degrees F). Wait about 10 minutes, repeat your observations, compute the average number of times the fish gulps per session, and compare the two averages.

When did the fish gulp more, in warm or in cold water? The fish gulps more when there is less oxygen: he is gulping more to get more.

Hopefully, this activity will show you that cold water can hold more oxygen than warm water.

ACTIVITY — 3: ECOSYSTEM WORDSEARCH

This wordsearch has 15 words that can be classified as Animal, Plant, or Nonliving. Divide a paper into three columns labeled with these three classifications. As you find a word, write it in the proper column and circle it in the puzzle. Remember, the words may run in any direction.

Word Puzzle.

W E H S I F T A C W B D H K I L
W L J C F P X T H A N Q E S S O
Y J D B T K K L Q R P X R K D M
R A V E W X O N B K S E O Y L J
J H S I D B R E A M T A N P Z O
E T Y X E S H R C A T T A I L A
R V V N E S S A R G T T T S M T
U T J O W X M T A M P O B J S R
T S R O K A O H G W O N N I M I
A R K C C N Q G P C Z U K W A H
R F W A U N C I N N K B R W T X
E L I R D E K L N A T E O U P G
P U E S H A Y N O P T R V M X E
M B Y Z H G N U Y A M S J T N Y
E F X S W L Z S W S V F H R J R
T V L T I A A L I R B B K H L B

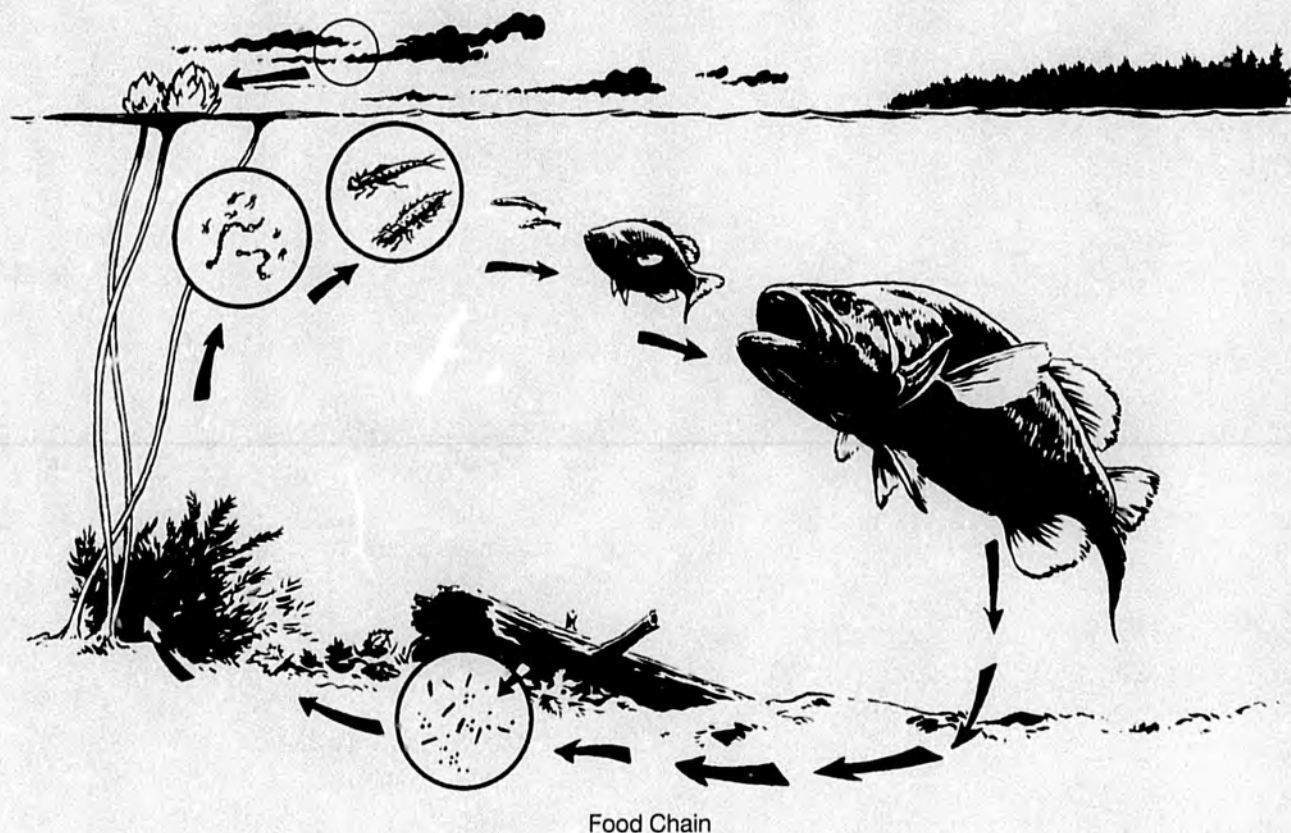
ALGAE
BREAM
CATFISH
CATTAIL
DUCKWEED
FISH
GRASS
HAWK
HERON
MINNOW
OAK
SUNLIGHT
TEMPERATURE
WATER
WORMS

ACTIVITY 4 — MAKING A SHOE-BOX ECOSYSTEM

Make a shoe box ecosystem for fish. Show the bottom of a pond or stream—structure, food sources, plants, water level, and fish. Turn the shoe box on its side and add details to make a three-dimensional view. Many can be made from construction paper. Other materials such as stones can represent boulders; sticks can represent dead trees, etc. Use your imagination as you develop your ecosystem.

12

If you like to fish for bluegill, you may think that all you need to do is learn about bluegill. But to know bluegill you have to know the following things about a bluegill's habitat:



- How is a bluegill affected by non-living things such as water, temperature, pH, and chemicals?
- How is a bluegill affected by living things in the water such as plants, other fish, and other animals that live in the water?
- How is a bluegill affected by living things around the pond such as birds and humans?

- How is a bluegill affected by non-living things that come into water such as soil, pesticides, and trash?

This is what **ecology** is all about. **Ecology is the study of the relationships of organisms with other organisms and non-living factors.** You have learned about non-living factors that affect fish. In this chapter you will learn about the

living organisms that relate to the fish. To make this relationship easy to understand, think of the bluegill as part of a food chain or food web.

FOOD CHAINS AND WEBS

All living organisms belong to "food chains." A food chain is made up of a series of organisms that produce and consume food. It is the path that food (materials and energy) takes through a group of organisms.

For example, a food chain may begin with tiny floating plants (phytoplankton) and small animals (zooplankton) that eat the plants. The next step in the chain may be small fish like bluegill that eat the small organisms. The next step may be a largemouth bass that eat bluegills. The final step may be an angler who catches and eats the largemouth bass, or a crayfish that eats the largemouth bass after it has died.

An **ecosystem** is more complex than this example. An ecosystem may have hundreds of food chains intertwined and linked together. Northern pike, for instance, do not exist only on bluegill so pike are part of other food chains, too. Also, other big fish like largemouth bass eat bluegill, so bluegill are part of other food chains. Everything is then a part of a "food web."

Food chains link together to form **food webs**. If you pull any one part of that web, you affect everything in the web. If you take away or pollute the water, the bluegill cannot survive. But what if you take away the plants? The bluegill does not feed on plants, but it feeds on the insects and other organisms that eat the plants. If the plants are gone, then the insects are also gone. Also, if you take away the plants where will the bluegill hide from bigger fish? What will happen to the bigger fish if the bluegill are gone?

To further understand this, it helps to know the different roles played in the food chain. In a lake or an ocean, living organisms are either **producers** of food or they are **consumers**. In some cases, organisms can be both.

Producers

Green plants and algae are producers. They use water and the energy from the sun to produce their own food through a process called photosynthesis. Plants produce oxygen when bathed in sunlight. Green plants use some of the food for themselves. The rest is used by other forms of life. Plants are the basis of all life on earth!

Plants form the broad base of the food chain. Animals could not live without green plants. Rooted plants are extremely visible, but the food chain usually begins with one-celled microscopic organisms. They are almost impossible to see with the naked eye. These plants are called "**phytoplankton**." **Plankton** is a general term for all of the small life in the water.

Consumers

Animals are consumers. Some animals, called primary consumers or **herbivores**, feed on plant life. Some herbivores are extremely small animals called **zooplankton** that feed on microscopic plants. Other examples of herbivores are insects, worms, shrimp, and some fish.

Carnivores are meat eaters and form the second order of consumers. Some scientists call these animals "foragers." Many panfish such as bluegills and crappie fall into this category along with crayfish, shiners, crabs, alewives, and menhaden.

Predators are even higher level consumers, preying on herbivores and carnivores. These are the gamefish that many anglers want to catch and include pike, muskie, bass, trout, salmon, tuna, tarpon, and bluefish. Some fish's diets change as they grow older. Very young bass may eat algae and microscopic animals at first but switch to insects, smaller fish and other animals as they grow older. Finally, human beings are the highest order consumers, eating organisms from all the levels below them.

Decomposers

Decomposers are things like bacteria and other microbes that break down dead plants and animals. As dead plants and animals decay through this process, they release basic nutrients back into the system. These nutrients are used by plants during photosynthesis and by other animals in their battle for life.

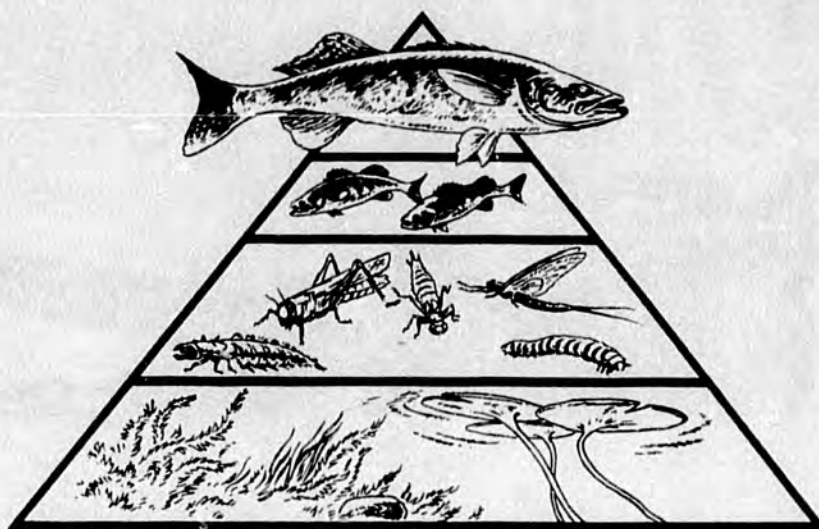
Predators And Prey

Each species of fish relates in a number of ways to other species of fish. Each species relates to others it hunts for food, to others it competes with for food, and to those that it is food for.

At some time in its life, every fish can be considered a predator—a fish that preys on another animal. Bluegill, often the prey of largemouth bass, raid the nests of the bass and eat the eggs. Also, after bass eggs hatch bluegill will eat newly hatched bass fry. Through this reversal of the predator-prey relationship, fish populations are kept in check.

Predator fish try to stay close to their prey. Some lie in ambush until a victim comes close. The prey is captured as the predator bursts from its hiding place. Barracuda, flounder, largemouth bass, muskie, northern pike, and trout often do this. Others search under rocks for food. Tautog (blackfish) searching for crabs or smallmouth bass chasing crayfish are good examples of this. Still other predator fish swim, sometimes in schools, to find prey. Many kinds of saltwater fish such as tuna, bluefish, and mackerel do this.

Predator fish select and attack one victim at a time. They prefer a victim that is alone, injured, or simply looks or behaves differently. That is why many lures are designed to look like an injured minnow. Predator fish also prefer to attack prey from below.



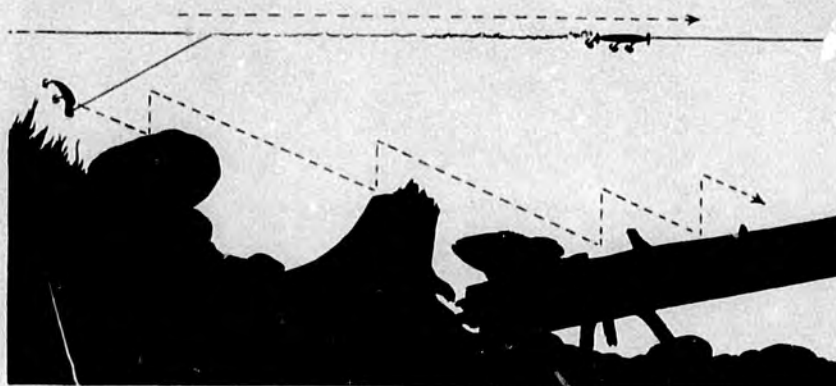
Food Pyramid

Carrying Capacity

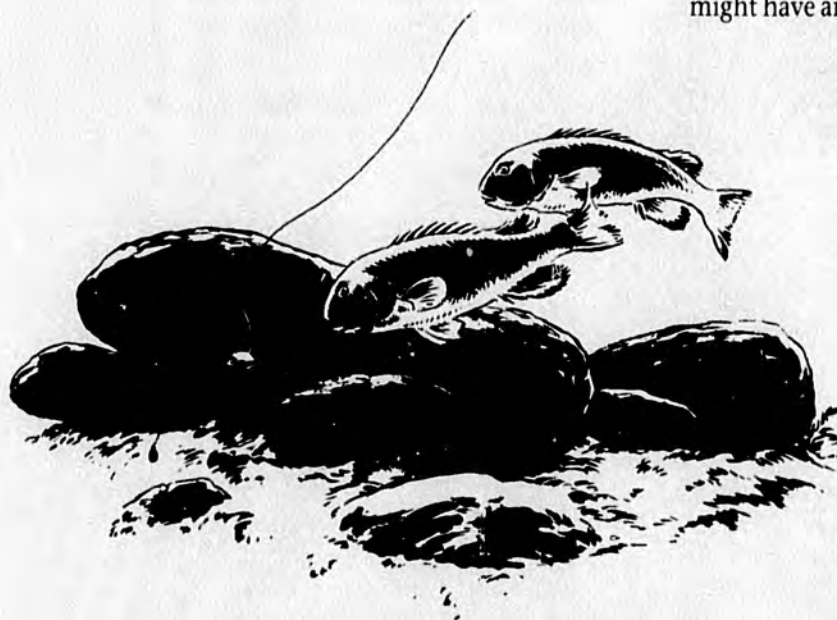
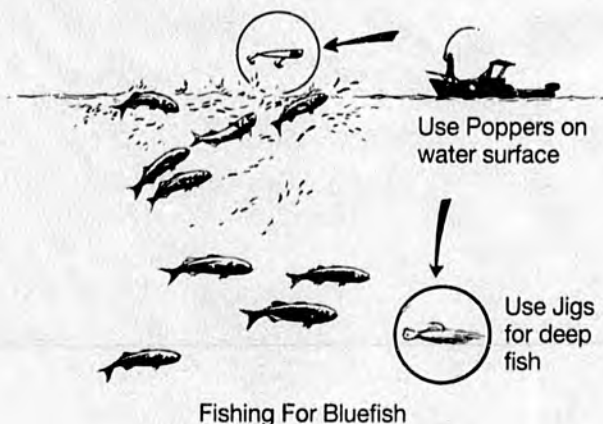
Every body of water has a limit on the number of living things it can support. This is called carrying capacity. Food supply plays a vital role in determining the carrying capacity and the size of fish in a particular body of water. Carrying capacity can be shown as a pyramid. For example, large walleye require a great deal of food to survive each fishing season. To produce and sustain a ten-pound walleye requires about 100 pounds of perch each year. One hundred pounds of perch depend on one ton of minnows. These minnows need five tons of worms and insects to survive and the worms and insects need 50 tons of plants for their support. In this example of a pyramid, it takes 50 tons of plants for one ten-pound walleye. Now you can see how valuable one large gamefish is!

USING FOOD-CHAIN INFORMATION IN FISHING

You can be a successful angler if you learn to fish productive water. Look for plant growth, algae, and minnows in the water you fish. Without this food base, the number of predator game fish will be limited. Turn over several rocks or logs on the bank. If you find a crayfish you can almost be



certain that there will be bass in the lake. Look for living things such as bugs, worms, spiders, dragonflies or other insects that can provide food for fish.



Fishing For Tautog (Blackfish) Using Crabs in Rocky Habitat

Water that is stagnant and/or polluted with pesticides, chemicals, and trash has few plants. It may not have enough oxygen to support a good fish population. You probably will not have much luck fishing this kind of water.

If you are fishing for predator fish that ambush their prey, you should fish close to places where the fish may be hiding. Work

your bait close to tree stumps, weed lines, and open spots in weed beds. Your success will probably increase if you can make your lure appear to be injured. Remember, predators attack one victim at a time and are attracted to those that appear injured.

Through applying your understanding of the food chain you will catch more fish. Learn all that you can about the fish you want to catch! Then, select a productive area to fish, present your lure or bait skillfully, and **HOLD ON TO YOUR ROD!!**

ACTIVITIES

ACTIVITY 1 — MAKING A MINI-ECOSYSTEM

First you need a gallon glass jar. Your school cafeteria might have an empty one that they would let you have.

Make sure that it is completely clean by rinsing thoroughly with hot water. Do not wash with soap or detergent. Fill the jar with fresh water. If you use city tap water you need to let it stand for 24 hours so that chemicals added by water-treatment plants evaporate. Add some elodea or another water plant purchased from a pet store. Finally, add a snail and seal the jar tightly with a lid. Place it in a nice sunny place. The plant (a producer) will provide the oxygen and food for the snail. The snail will provide the carbon dioxide and waste materials for the plant. How many snails do you think could be placed in your jar before it is too crowded or over its carrying capacity?

ACTIVITY 2 — MAKING A FOOD WEB

From magazines, collect pictures of a fish, wading bird, frog, minnow, man, eagle, snake, and a water insect. Starting with the frog, lay out the picture on a piece of poster board. Now place the insect picture about two inches away to the right. Very lightly draw an arrow from the insect to the frog. About two inches below the insect place the fish. Now draw an arrow from the insect to the fish, an arrow from the frog to the fish, and one from the fish to the frog. Continue adding pictures and drawing arrows, making sure the arrows point from the animal doing the eating to the one being eaten.

You have produced a food web that can tell you a lot about the relationships between animals. What would

happen to the other animals if the insects were to die off? What would happen if the frog population should rise drastically?

ACTIVITY 3 — SEASONAL LURE PREFERENCES OF FISH

Pick a species of fish and find out what lures attract this species. Draw or find pictures of these lures. Make a chart to show the best seasons to use the lures you have selected. Each lure should be written in the column or columns when it is best used.

Type of Fish _____
Good for: Summer Spring Fall Winter

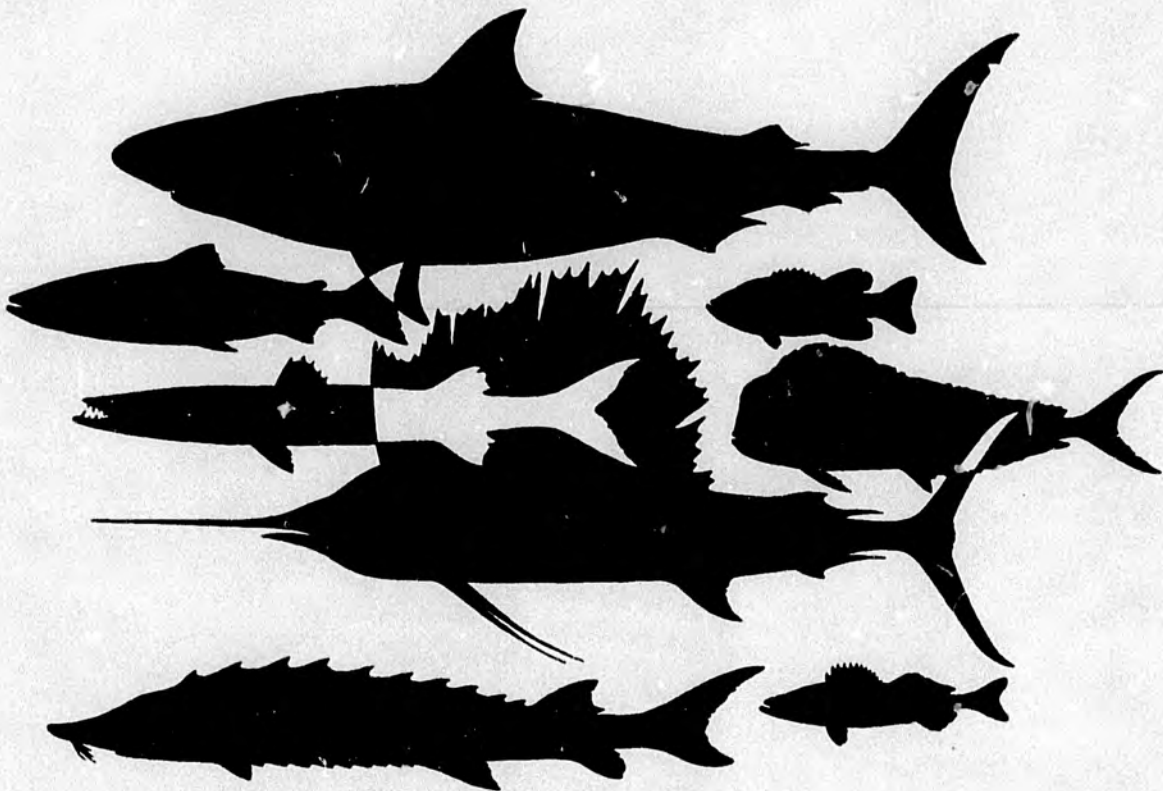
CHAPTER

13



Why Do Fish Act The Way They Do?

Learning why fish act the way they do is both interesting and important. Once you understand their behavior, you will appreciate fish and their role in nature. You can then use this information to know where and how to fish.



THE FISH'S BODY

Shape Of The Body

The body shape of a fish controls what it does, how it moves, and what it eats. For example, the northern pike and the barracuda have

long, slender bodies. They are able to lunge ahead quickly to strike at a small fish or a lure. They can't, however, turn as quickly as a bass or a bluegill to catch food or chase your lure or bait.

The shape of their body also controls the speed at which they can swim. Trout and salmon

are fast swimmers because their body muscles control wide, powerful tails. Carp, sea bass, and yellow perch are not fast swimmers, but they slowly cover productive areas in search of food. Usually, the larger the fish, the faster it can swim.

Senses

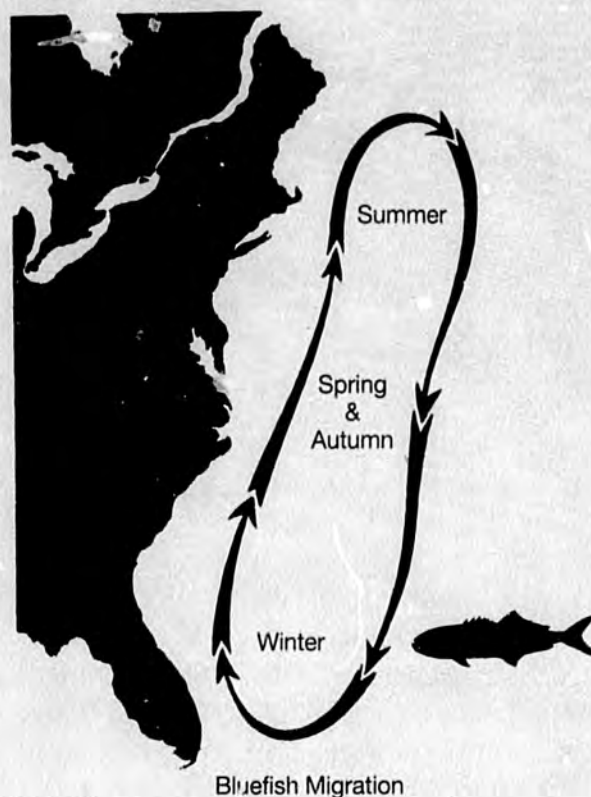
The senses of some fish are better developed than those of others. Some fish use their sense of smell to find food. Eels and salmon are well known for their ability to smell. Other fish, such as bonefish, sturgeon, and catfish, use their sense of taste to feed. Catfish have taste buds all over their bodies so that they can taste food even before taking it into their mouths. Many fish use their senses of sight and hearing to feed. These include barracuda, billfish, striped bass, and trout. Sharks use the senses of sight, sound, and smell to feed.

Shape And Location Of The Mouth

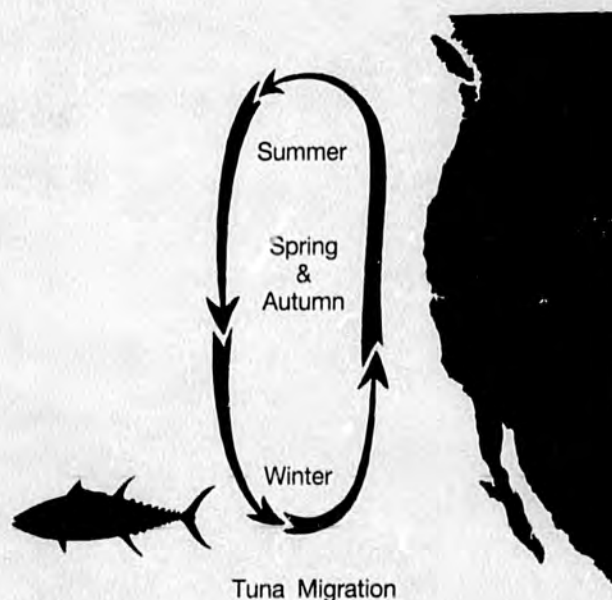
You can also tell where fish like to feed by looking at the shapes and locations of their mouths. The sharp, pointy teeth of fish like the muskellunge, walleye, sea trout, and bluefish make them ideal for catching and holding slippery baitfish. The mouth of fish like the catfish, sturgeon, bonefish, carp, and cod makes them ideal bottom-feeders. Bottom-feeders are constantly moving while other fish prefer to wait and ambush passing food.

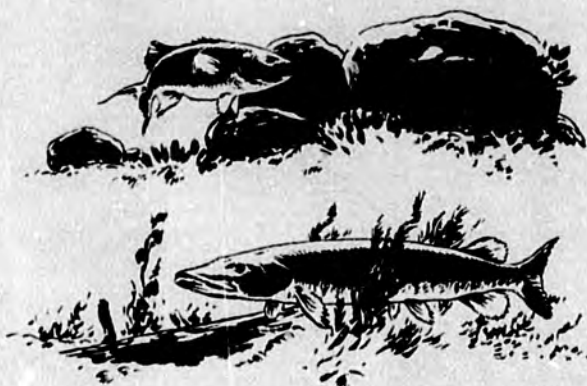
HABITAT

Different fish prefer different kinds of living areas, or habitat. Some fish like the open waters of a lake or an ocean. Fish that like open waters are sometimes called "free-swimmers." They swim from place to place searching for food and water that has the most comfortable levels of oxygen, water temperature, and other living conditions. Saltwater free-swimmers include billfish, bluefish, dolphin, and tuna. Freshwater free-swimmers include crappie and perch in lakes and ponds, and coho and chinook salmon in the Great Lakes.



Other fish like to spend much of their time near certain objects or structure in the water. Some saltwater fish prefer nearshore structure such as sand bars, rocky bottoms, and oyster beds. These include sea bass, sea trout, and tautog. Many freshwater fish, including largemouth bass, northern pike, muskellunge, and walleye, also like to spend much of their time near some kind of structure such as a drop-off or near a weed bed.





Fish Near Structure

FOOD AND OXYGEN

Just like you, fish must have food on a regular basis. How and what a fish eats affects its movement and presence at different water depths.

Some fish feed by constantly searching the bottom (suckers and flounder), others actively feed from the surface, the mid-depths, and on the bottom (bluefish/trout). Some will pick up any type of dead bait (catfish) while others insist on live bait or a lure that resembles live bait (billfish and barracuda).

A fish uses a considerable amount of energy to find food and eat. To save energy, some fish hide and wait for food to come by. Other fish hunt for food constantly.

Fish also need oxygen in the water. Trout live well in swift-flowing streams with plenty of oxygen, while carp and bullheads can survive in still, shallow waters with much less oxygen.

In colder water, a fish needs less oxygen and food. In warmer water, a fish breathes more quickly and feeds more often.

REPRODUCTION

Reproduction, or spawning, plays a very important role in the life and behavior of fish. In spring, largemouth bass, bluegill, crappie, and other fish come into the shallows to make beds, sometimes called nests, for laying eggs. They make these nests using their tails

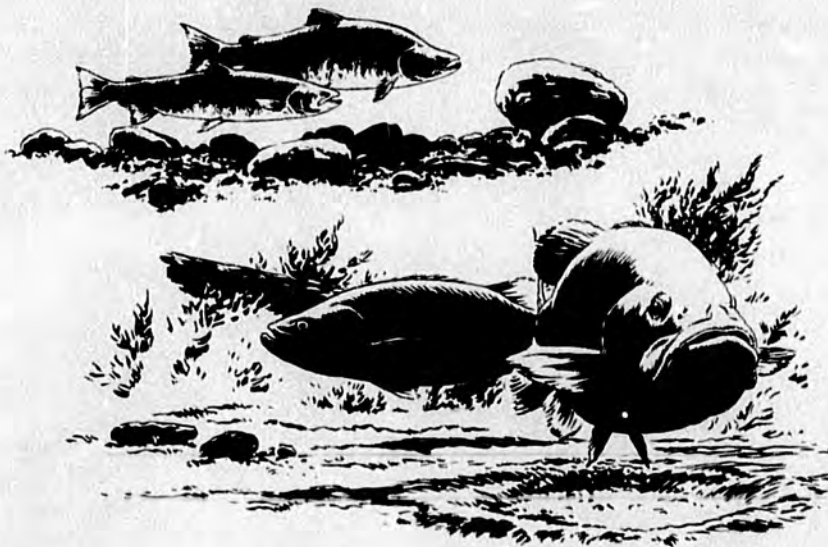


Atlantic Salmon Migration

to "sweep" the bottom and clear a place for their eggs.

Salmon and shad make long migrations from the ocean to the headwaters of rivers to lay eggs in the same waters where they were hatched. They deposit their eggs in beds that they carve out of the stream bottom. Striped bass and yellow perch make similar, shorter spawning runs up tidal or tributary streams to spawn.

Some fish do not lay their eggs in nests but in open water.



Fish Spawning

Walleye deposit their eggs over gravel bars or rocks, where water flow keeps them from getting covered with silt or dirt. Bluefish and grass carp broadcast their eggs in open water to increase hatching success.

Most fish spawn in spring, but brook and brown trout, most Pacific salmon and lake trout spawn in the fall.

SEASONS AND MOVEMENT

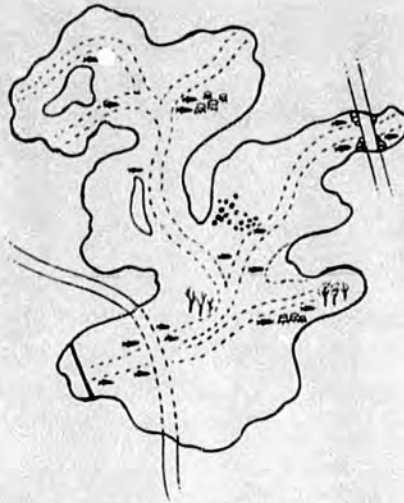
Fish react to the changing seasons. During the year, there are changes in water temperature, the amount of light, and the number of hours of daylight. In summer, there is more light and more hours of sunlight than during the winter. When light increases, fish such as flounder and bass, move out of the unprotected shallows (where they could become prey for birds or shore animals) and move to deeper waters. When water temperatures are lower during the winter months in northern areas, the activity of fish slows down. The fish also eat less food and may be found in deeper waters. When water warms in the spring, most fish return to shallower waters, begin spawning, and feed more often. Anglers call this cycle a "seasonal pattern." Species of fish can be counted on to repeat this pattern year after year.

Fishermen use this kind of information to become better anglers.

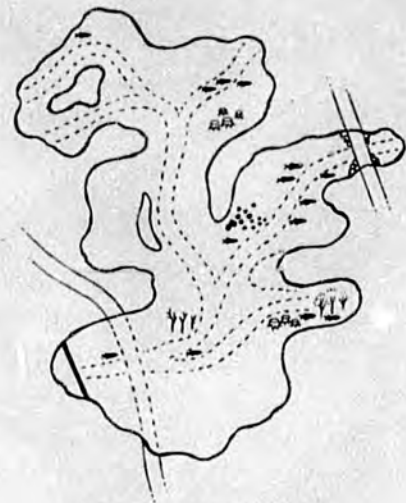
A saltwater fish's movements are based on season, tides, currents resulting from tidal flows, and movement of their prey. Bluefish found in Florida in the winter may be found in Maine during the following summer. Similarly, tuna "wintering" in Mexico, may visit Canada in the summer!

CURRENT

Fish react to current in different ways. Some fish hide or rest by a rock or other structure. Other fish will seek a current and follow it for the informa-



Fish Locations—Summer



Fish Locations—Winter

- tion (smell, taste, temperature) that it provides.

In all cases fish will head into a current. This doesn't always mean they will be facing upstream. An eddy is a current, often found below a dam, that turns back upstream. A fish in an eddy will be facing downstream but headed into the eddy current.

It is important for you to learn what affects the behavior of the species you are trying to catch. If you understand them and their life style, you will have a better chance of catching them.

ACTIVITIES

ACTIVITY 1 — VEGGIE FISH

Select several vegetables, such as a carrot, celery, onion, and potato. Assume that each of these is a fish shape. Now fill the sink with water. Move your veggie fish through the water. Watch the ripples and feel how they move through the water. Which one has the most drag or pull? Which glides easily. Which color would give the most protection in a muddy pond? Add fins cut from a cardboard container or a milk carton. Make a cut in your vegetable and insert your fins. Check your manual to make sure you have included all of the fins.

ACTIVITY 2 — CAN FISH HEAR?

Using a fish in a bowl or aquarium, try to determine if it can hear you speak. Try this.

Every day before you feed the fish, yell at it from a distance of about two feet. Yell the fish's name, call it as you would your dog or just yell any word.

After ten days of doing this, see if the fish comes to you or to the area in which you normally put the food.

Try the same experiment again, except this time, tap on the glass instead of yelling. How does the fish react after ten days?

What does this tell you about how fish learn what is going on around them.

ACTIVITY 3 — OBSERVATION OF FISH BEHAVIOR

Visit an aquarium where fish can be observed. Notice:
(1) how many times the fish opens and closes its mouth

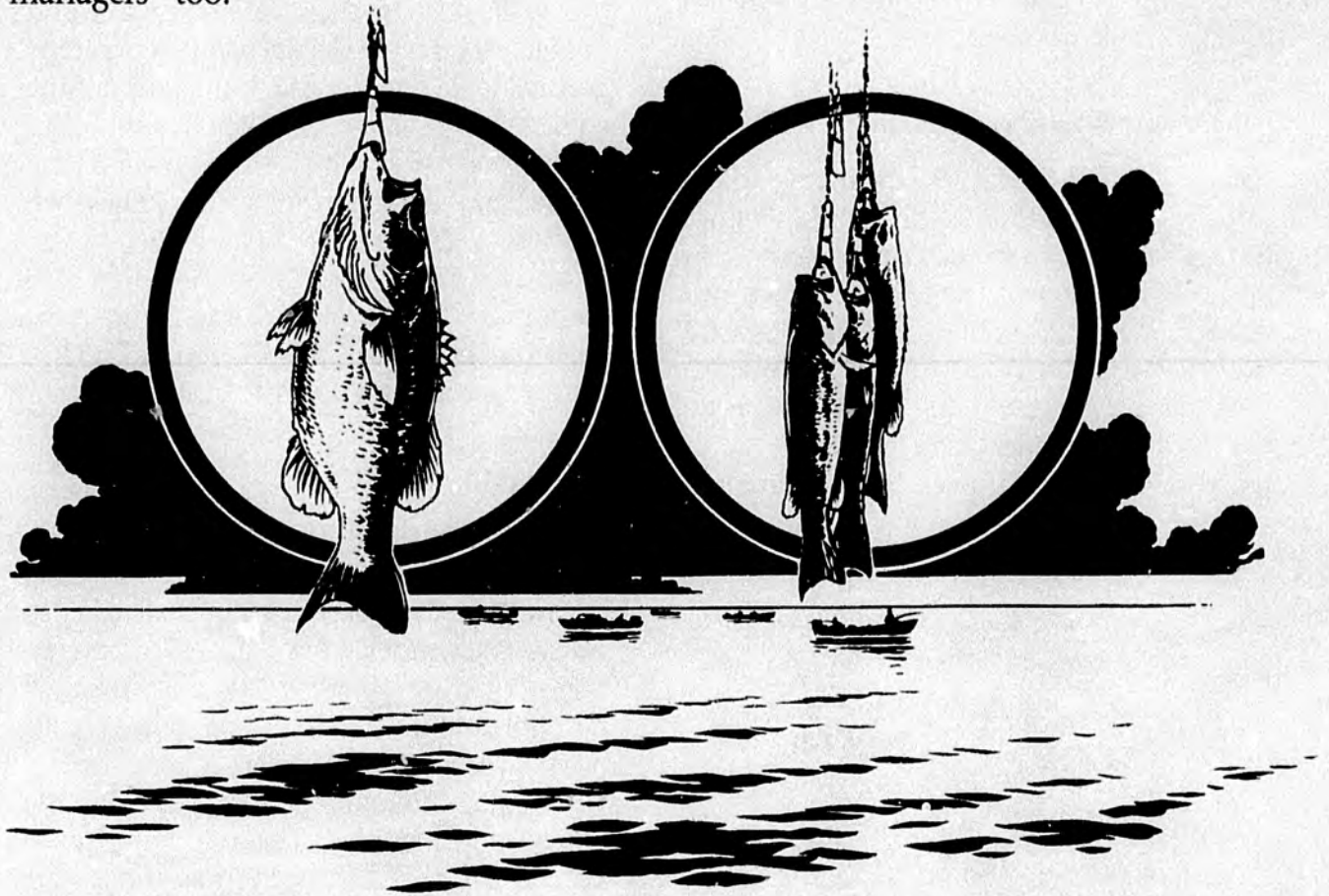
in one minute; (2) how many times the gills of the fish open and close in one minute; (3) how long the fish remains in the same location; (4) how many movements the fish makes in one minute; (5) where the fish remains according to water level (top, middle, and bottom); (6) what behaviors the fish shows when swimming, resting, eating or searching for food. Notice any reaction of the fish to loud noises, or slow or rapid movements of an object in the water moving toward the fish. Identify the kind of fish being observed and its habitat. Write down your observations for future reference.

CHAPTER

14

More Fish For Everyone!

It seems like everyone likes to go fishing! Boys, girls, moms, dads and even grandparents like to fish. More than 50 million Americans fish. Fisheries managers are responsible for maintaining healthy and productive fish populations. But with so many anglers, this is not an easy job. More and more fisheries managers are starting to become "people managers" too!



What is good fishing to one person, may not be good fishing to another. Some anglers don't care what they catch as long as they catch something. Other anglers are only interested in

a certain species of fish. Some want to catch lots of fish while others want big fish. Still others don't care if they catch anything as long as they get to relax in the beautiful outdoors.

MANAGING FISH POPULATIONS

A fishery manager must first consider the habitat in order to manage fish. As you have learned already, fish require the right water temperature, oxygen level, food source and cover. If you stocked a trout in warm water, you would be wasting the fish because it would not survive for very long. Likewise, if you put pike in a lake without vegetation, they wouldn't do very well either.

Most fish will spawn naturally and produce their own young. In these cases, a fishery manager does not have to stock fish every year. The fish replenish the waters on their own. A manager will then manage the fishery by improving the habitat, regulating the catch, and trying to balance the populations of fish species sharing the aquatic environment.

Hatcheries And Fish Stocking

Federal and state hatcheries raise many kinds of fish for stocking. Most hatcheries raise freshwater fish, but saltwater fish such as striped bass, red drum, salmon, snook, and sea trout are now being raised successfully. Fry, the smallest fish stocked, are the least costly to raise, but many of them die after release. Adult fish survive better but cost more to raise. Many states stock a combination of large and small fish in many lakes and rivers each year. States often stock trout

because they are fairly easy to raise, are good sport fish, and aren't as costly as other species.

Raising and stocking fish, however, is costly and sometimes not necessary. Why stock trout in a lake if the yellow perch fishing is great? Why risk upsetting the balance in a great bass lake by stocking northern pike? Fisheries managers realize that each lake or river has its own unique combination of fish present. This assortment of fish represents the "carrying capacity" of that aquatic system. Smart anglers know that if they sample different waters, they will discover a wide variety of fish. They also know that all of them are fun to catch and just about all of them are great to eat!

Certain fish populations, including sunfish, perch and bullheads, would benefit by more people fishing for them. Many anglers don't even know all these fish are out there waiting to be caught! Without enough angling pressure, panfish may overpopulate a lake or pond, resulting in lots of very small fish. This phenomenon, called "stunting" can be helped by anglers who take some of these panfish home to eat. More and more anglers are also discovering that these panfish can be the most delicious fish to eat! Refer to Chapter 3, Caring For Your Catch, to learn how to fillet these taste treats!

Managing Habitat

There are many ways to protect habitat for fish populations.

Aquatic plants are important for fish in most waters. They provide oxygen, attract food, and offer protection. However, too many plants are harmful and can "choke" a lake. Aquatic plants are hard to control. To manage weed growth, cutting, poisoning, uprooting excess plant growth and introducing fish that eat vegetation have all been tried. One of the best controls is limiting the plant food that enters the water in the form of sewage, fertilizers, or farm waste.

Building "artificial reefs" to attract and provide a home for both freshwater and saltwater fish is another way fisheries managers improve some fisheries. Such artificial habitat provides



cover, safety, and food for fish. Artificial reefs can be as simple as sinking a weighted Christmas tree in a lake or as complex as sinking an old ship offshore in the ocean. Reefs are important because they provide an area for the bottom of the food chain to develop. The algae and plankton that develop there are a source of food for bait fish and for game fish. Also, many fish are attracted because the reefs provide them with cover. If you haven't guessed by now, reefs are good places for you to fish! However, always check with management authorities before attempting to put something in the water to attract fish. You may need a permit to place structures in a lake or stream.



Habitat Improvement

Working to improve water quality by reducing the amount of pollution entering the water is one of the best methods of improving fish habitat. State agencies make most of the efforts to improve habitat, but fishing clubs, scout troops, businesses, and local community groups supervised by state or federal fisheries people have helped on local projects too. Building small dams to raise the level of a pool of water, placing rocks or logs on banks to reduce soil erosion, organizing a stream clean-up effort, and building small reefs are projects that can be done in your area.

FISHING REGULATIONS

Modern fishing tackle, boats, and electronic equipment make it possible for anglers to catch many fish. People are also learning about fish and fishing by watching TV programs and reading books and magazines. Also, students like you study fishing and others attend special fishing courses. Because so many people are now learning how to fish skillfully, there's a danger that anglers may catch too many fish from some bodies of water.

Fishing laws or regulations protect the resource and help all anglers enjoy more success. The fact that most anglers must have fishing licenses is a common example of a fishing law or regulation. In most states, however, very young anglers and resident anglers of retirement age are not required to purchase a license.

Other regulations may:

- Set a limit on how many fish of a certain species you can take in one day.
- Set a starting and ending date for a fishing season.
- Set a limit on the number of fishing lines and hooks that you are allowed to use.
- Regulate the type of tackle and fishing method used.
- Set size limits for fish.

There are good reasons for such fishing laws. All are intended to conserve and improve fish populations. Often, fisheries biologists study bodies of water to check on fish numbers and the health of fish populations. Sometimes, they suggest a new law if it will help keep the fish population healthy. For example, if there is a fishing season in your state, it may have been introduced to protect fish during spawning or as a way of limiting the number of fish caught on heavily fished waters. Size limits are also meant to protect fish of spawning size before they are caught.

Some states have fishing laws that apply throughout the state. Other states may have different laws for different bodies of water. No matter where you fish, check the fishing regulations carefully before you fish.

Daily fish limits are meant to keep people from taking too many fish at one time. This makes it possible for more people to share in a fishery. Plus, they enable conservation officers to arrest "poachers" for stealing more than their fair share of the resource. You can help conservation officers protect your fish, forests, and wildlife by obeying the laws and reporting any violations that you see. Some states have a special telephone number for reporting fish and game violations.

FISHERY RESEARCH

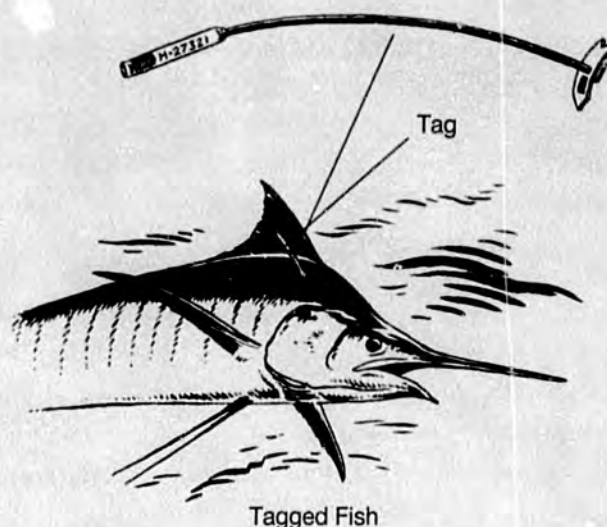
Fisheries biologists are the scientists who manage fish populations. To do their job, they need as much information about a fishery as possible. They try to learn the needs of anglers and the condition of fish populations.

Biologists also need to know how many fish are being caught. They sometimes do this by taking information from anglers after a day of fishing. Sometimes, biologists study fish by collecting them with nets or in other ways. Biologists also mark fish with special tags or by clipping one or more of their fins. When marked fish are collected later, the biologists can learn many things. A tag or fin clip can tell them how fast fish are growing, how many are caught, and how far they have traveled.

After studying this information, biologists try to decide the best ways to produce more and better fishing for anglers while still conserving the resource.

FINANCING OUR AQUATIC RESOURCES

Do you know who pays for most of the research and other efforts to improve sport fisheries? Anglers do! The same people who use and enjoy them. Some money comes from the sale of fishing licenses and special-use stamps. Other money comes from a special government program. It's called the **Federal Aid in Sport Fish Restoration Program**. Some people also refer to



this program as "Dingell-Johnson" or "Wallop-Breaux." Here's how this government program works:

When an angler buys fishing tackle and a boater buys fuel, they each pay a tax that goes into a fund. Other money comes from the sale of tackle and boats imported from other countries. All of this money is then shared by the states to help pay for certain projects. The project may be building a public fishing pond or a large fish hatchery. The money can also be used to pay for managing fisheries, fisheries research, or for teaching people about the environment, conservation, water safety, and fishing. Each year, the Federal Aid in Sport Fish Restoration Program provides more than \$200 million for such purposes.



Your purchase of hunting and fishing equipment and motorboat fuels supports Sport Fish Restoration and boating access facilities

YOUR ROLE

You can help those whose job it is to protect and improve our waters and fish populations. One way is to know and obey the laws for the waters you fish. You also can:

- Practice catch-and-release if you don't plan to eat a fish.
- If you catch a tagged or fin-clipped fish, you can report it to your state's natural resources agency.
- After fishing, leave the fishing spot cleaner than you found it.
- Never litter and do your best to remove any trash left by others.
- Get involved and support good conservation laws and programs.
- Teach others about our valuable aquatic resources and how to help conserve them.
- Report poachers to your local conservation officer.

Through your efforts, we will all have good places to fish for years to come!

ACTIVITIES

ACTIVITY 1 — LEARNING FISHING REGULATIONS

Obtain a copy of your state fishing regulations. Learn who needs a license, how to obtain a fishing license, and why a license is necessary. Identify the legal season opening and closing dates for different species, areas open to fishing, the legal methods for catching fish, and the size and number of fish permitted by law for several species. Notice that different lakes may have different regulations.

ACTIVITY 2 — DEVELOPING A CHART OF FISHING REGULATIONS

Make a list of five fish that you are interested in catching, and then make a chart with these topics:

- Species of fish (your five choices)
- Minimum length
- Daily limit

Using your book of fishing regulations, fill in the data for your table.

This chart would be a welcome addition to the inside lid of your tackle box. Secure it well with tape so you can refer to it on your fishing trips.

ACTIVITY 3 — IMPROVE YOUR ANGLING WATERS

Contact your local chapter of a national or state organization involved in conservation and restoration projects. Volunteer to help this organization in projects involving fish stocking, tagging, or litter clean up, habitat improvement, or projects for the disabled.

ACTIVITY 4 — VISITING A FISH HATCHERY

Arrange a trip to a hatchery. Observe the methods and procedures necessary in the raising and stocking of fish. Find out what they feed the fish, how they keep the fish healthy, and how big they are when they are stocked.

ACTIVITY 5 — HOW MUCH MONEY IS SPENT ON AQUATIC RESOURCES?

Go to the library and find out how much money your state received last year from the Federal Aid in Sport Fish Restoration Program. You may have to ask a librarian to help you find the answer. Tell the librarian to look for the Wallop-Breaux Amendments to the Federal Aid in Sport Fish Restoration Act. Another way to find the answer is to write or call the federal aid coordinator at your state's natural resources agency or your local conservation officer. Also determine what projects these funds were spent on.

ACTIVITY 6 — WHAT LOCAL LAWS PROTECT US FROM POLLUTION?

Make a list of industries in your community that are next to a stream, river, or lake. Ask your local health department if there are special laws to protect these waters from potential pollution.

APPENDIX

A

Fishing For A Career!



What do you want to be when you grow up?

Many people would love to have a job that's related to fishing. There are many career opportunities for people interested in aquatic resources and the out-of-doors. Whether you're interested in teaching, biology, ecology, business, research, law enforcement, sales, writing, conservation, or various aspects of fishing, there is an option for you.

Federal, state and private agencies employ people with interests and skills in many of these job categories. Thirty-seven different federal agencies have some responsibility for managing the fish populations on their lands. Examples include the U.S. Forest Service, National Park Service, Bureau of Land Management, and the

U.S. Army Corps of Engineers. Two federal agencies have federal authority for enforcing federal laws regarding the fishery. Basically, the U.S. Fish and Wildlife Service is in charge of freshwater and the National Marine Fisheries Service is in charge of saltwater.

THE U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service is a federal government agency in the Department of the Interior. The Service manages a system of national wildlife refuges for migratory birds and a system of fish hatcheries and research areas in an effort to improve wildlife and fish resources.

The Fish and Wildlife Service is also responsible for enforcing several federal laws. These include the Endangered Species Act, the Marine Mammal Protection Act, and the Migratory Bird Treaty Act.

The Fish and Wildlife Service administers federal money to state governments, gives technical help to state and foreign governments, takes part in international meetings on wildlife conservation, and keeps the public informed about the condition of America's fish and wildlife resources.

THE NATIONAL MARINE FISHERIES SERVICE

The National Marine Fisheries Service is a federal government agency in the Department of Commerce. It provides management, research, and service for the protection of saltwater (marine) species. It also enforces the federal laws governing saltwater fish and mammals. This includes regulating both the taking of sport fish and commercially harvested living marine resources.

STATE NATURAL RESOURCES AGENCIES

The name of the state agency that deals with fisheries and wildlife varies from state to state. Some examples are: Department of Natural Resources; Department of Conservation; Department of Fish and Game; Game and Fish Commission; Department of Fisheries, Wildlife, and Environmental Law; and Department of Environmental Protection. You should find out what it is called in your state.

State Natural Resources Agencies protect and improve our waters and fisheries by:

1. Raising and stocking fish
2. Improving habitat for fish
3. Developing regulations to protect the resource
4. Conducting research on fish populations

5. Teaching citizens how to fish and to conserve resources
6. Using the media to keep the public informed
7. Building access sites to fishable areas

There are numerous employment opportunities in state natural resources agencies. Several of these are discussed below.

Fisheries Biologists

Each state and many federal agencies employ many fisheries biologists who help manage fish populations. Fisheries biologists must have an interest in biology, life sciences, and aquatic biology. Today, math, statistics, computer science, public speaking and writing are other areas biologists need to complete their science degree.

Fisheries biologists often work outdoors where they gather information and samples for study. This information helps them manage and conserve fish populations and protect the environment. They must have a good knowledge of fish and how they live. They also must know the interests of anglers and others who use the state's resources.

Law Enforcement Officers

State natural resources agencies enforce state laws designed to protect natural resources. The people who do this were once called fish and game wardens, but now some are called wildlife officers, conservation police, or law enforcement officers. Today, however, such officers do more than enforce laws that protect fish, forests, and wildlife. They also enforce environmental and pollution laws. In some states, they have the same authority as a state police officer.

Fish Hatchery Manager

People who raise fish in hatcheries or fish farms practice a skill called aquaculture. State hatcheries raise fish for stocking. Hatcheries raise everything from trout, bass, and catfish to striped bass and drum in both fresh and saltwater.

TEACHERS

Teachers who teach biology, ecology, and other sciences, including the study of fisheries, are needed at all educational levels. They may teach in the classroom or in the outdoors. Some may do research. Teachers need patience and a desire to work with young people.

CONSERVATION REPRESENTATIVES

Many non-profit groups are involved in the outdoors, including efforts related to fisheries. The Izaak Walton League of America, Trout Unlimited, the American Fishing Tackle Manufacturers Association, the Sport Fishing Institute, and the National Wildlife Federation, among others, are interested in our aquatic resources. These organizations have representatives who study laws and regulations, work to pass federal and state laws, represent anglers before the U.S. Congress and state governments, plan volunteer work, and publish newsletters and other materials to keep the public informed.

BUSINESS OPPORTUNITIES

If you think that you would like to go into business for yourself you have several options.

Tackle Shop Dealers

Tackle shop owners are in a field related to fishing, but their busiest times are when others are fishing. Tackle shop work involves long hours. Those selling live bait may open at 4 a.m. and close as late as 9 p.m. each day. A few may even be open 24 hours a day at certain times of the year. To be successful you must have a good business background and a knowledge of fishing and tackle.

Fishing Guides

You may know a fishing guide in your hometown. Guides provide boats, tackle, and fishing

experience to paying customers. A successful guide must have the ability to locate fish, to get along with people, and a desire to take anglers to fishing areas and help them catch fish. Most guides work part-time and may have another job. For example, a teacher may guide on weekends or in the summer. Many tournament anglers began their careers as fishing guides.

Charter Boat Captains

Charter captains are much like fishing guides. They usually operate larger boats that hold six (charter boat license) or more (party boat license) paying customers. Charter boat captains must be licensed. Most operate their business along the seacoasts or on the Great Lakes. Charter boats range from about 20 to 55 feet in length. Some captains own their own boat; others operate them for their owners. Most charter captains have another job because they can't charter all year long. Some may move to another location to continue chartering year-round. For example, some Great Lakes charter captains travel south for the winter to work in warmer climates.

Commercial Fishermen

Commercial fishermen harvest fish to sell for food. They work with nets, traps, and long lines. The hours can be long and the work difficult and dangerous, especially in severe weather. When the fishing is good, the pay can be high. The work, however, is affected by many things, including government regulations, foreign imports, loss of fish stocks, pollution, breakdown of equipment, and poor economic conditions.

Fishing Tackle Manufacturer

Many people have begun tackle businesses with little money. They have started producing products in their home or garage for local sales, with some eventually building plants to produce and sell their products across the country. Today, some people start a small tackle business and succeed with good, new or unusual products.

Today, much fishing tackle is made in other countries and imported into the U.S. Some of the best jobs in the tackle industry are in areas related to the sale and marketing of tackle.

Manufacturer's Sales Representative

Tackle manufacturers depend on local or regional sales firms to sell their products to distributors and dealers. Sales representatives, often called "reps," own their own sales and marketing companies and contract with manufacturers to distribute tackle and equipment.

A sales rep is often responsible for selling in a number of states and must do a lot of traveling. A rep must enjoy meeting people, have good selling ability, and know fishing and fishing tackle. A good business education and experience in sales, promotion, or marketing are helpful.

PRINT AND BROADCAST MEDIA

Numerous career opportunities are open to you if you have an interest in journalism or radio or TV.

Outdoor Writers

Outdoor writers write about recreational activities. These include freshwater and saltwater fishing, hunting, camping, boating, hiking, canoeing, bird watching, photography, and skiing.

Many colleges have schools or offer courses in journalism. Most outdoor writers have a love of the outdoors and begin by writing and selling articles to state or regional magazines and newspapers. Some become full-time outdoor communicators with a large newspaper or national magazine. Others remain "free-lance" writers. Free-lance writers sell their written articles to a variety of newspapers or outdoor magazines or write books for publication.

Publishers

Publishers produce magazines, newspapers,

newsletters, fishing annuals, regional and local guidebooks, and other publications. They are often in charge of the entire publication, including editorial and advertising workers. They also arrange the printing, distribution, and sales of the publications.

Broadcast Media

Many radio and television stations offer outdoor programs on fishing and other topics. These programs have become very popular. Some tournament and other well-known anglers have become the stars of these programs. The production of radio and television programs requires the talents of producers and directors, skilled technical people, cameramen, writers, and other specialists.

TOURNAMENT ANGLERS

A growing number of professional anglers are fishing tournaments for money. Very few of them, however, can make a sufficient full-time living from tournament winnings. Many receive endorsements from tackle manufacturers, conduct seminars at sport shows, and develop television or radio programs or video tapes on fishing. Even with these opportunities many professional anglers have other full-time jobs. Tournament angling is very competitive and demands a lot of angling skill, stamina, traveling, and sometimes luck to be successful.

OTHER CAREERS

There are many other careers related to fishing in some way. They include aquatic scientists for business, industry, and consulting firms; tour guides for local, state, and national parks and recreation areas; recreation specialists; research biologists; and environmental educators. College degrees are required for many of these jobs. There are many exciting and challenging careers waiting for you.

ACTIVITIES

ACTIVITY 1 — CAREERS EXPLORATION

Ask your teacher to invite one or more of the following people to class to discuss their job: fisheries biologist, conservation officer, representative of a non-profit conservation organization, tackle shop dealer, fishing guide or charter boat captain, outdoor writer or broadcaster, fishing tackle manufacturer, commercial fisherman, or a representative of any other job related to fishing.

ACTIVITY 2 — POSTER OF FISHING-RELATED JOBS

On the top of a piece of poster board, carefully title your poster: Jobs Related to Fishing. Show at least five jobs related to fishing that would be of interest to you. Find pictures in magazines and paste them on your poster board or draw and color them. Write the title for the jobs you have chosen under each picture.

ACTIVITY 3 — WRITING ABOUT ANGLING

Pretend that you are an outdoors writer and write a story about the outdoors that relates to angling, conservation, or some other topic of interest to you.

APPENDIX

B



Glossary Of Terms

Acid Rain. Rain, dew, sleet, or snow that has become acidic from sulfur compounds in the air. Most acid rain comes from coal-burning factories and exhausts of autos.

Adipose Fin. The fatty fin on some species of fish such as catfish and bullheads.

Algae. Simple, tiny photosynthetic plants found in water.

Anadromous. Any species of fish that lives in saltwater and spawns in freshwater. Some examples are salmon, shad, and striped bass.

Anal Fin. The fin found on the lower portion of a fish's body near the tail.

Antireverse Lever. A lever or knob that prevents a reel handle from turning backwards as a fish tries to take line.

Backin 3. A soft, strong fishing line, such as braided dacron, that is wound onto a fly reel before fly line is added.

Backlash. Fishing line tangled on a casting reel; caused by the line spool continuing to turn after the line has stopped coming off the reel.

Bail. A wire device that spools the line onto an open-face spinning reel.

Baitcasting. The name given to casting tackle that uses a baitcasting reel; also called a "levelwind" reel.

Barb. The spur found on the point of most fish hooks. It is designed to help keep a fish from escaping from the hook.

Barbel. A whisker-like projection from the jaws of some fish such as a carp or catfish. Barbels help a fish to taste and feel.

Bass Boat. A boat designed for bass fishing.

Bobber. Also called a fishing "float" or "cork." It is designed to float on the water's surface and keep a bait or lure at a selected depth.

Bow. The forward part of a boat.

Buzzbait. A fishing lure designed to run on the surface. It has a large blade for creating a disturbance on the water's surface.

Cane Pole. Equipment that uses a long, slender rod and no reel; sometimes called a "bank pole."

Carnivore. A flesh-eating animal.

Catadromous. Any species of fish that lives in freshwater and spawns in saltwater, such as the eel.

Catfish. A group of fish without scales named for the long barbels around their mouths that look like the whiskers of a cat.

Caudal. Related to, or being a tail; the tail fin.

Chart. A "map" of water areas; shows shorelines, water depths, reefs, rocks, shoals, wrecks, and other areas of danger.

Charter Boat. A boat that is available for charter and can take out several passengers.

Cone. A cover on spincasting reels that prevents the line from coming off the spool during the cast. It protects the spool from dirt and grit; also called a "nose cone" or "reel cover."

Conservation. The wise use of a natural resource.

Cove. A small bay or inlet in a body of water.

Crankbait. Plug designed to dive to a certain depth as it is retrieved.

Creel. A fish basket or personal fish carrier used to carry fish when fishing on or near shore.

Creel Limit. A term to indicate the number of fish, by species, that can be caught legally in one day.

Current. Any movement of water, whether caused by tides, ocean water movements, or flowing water in rivers and streams.

Depthfinder. Also called fish finder or sonar; devices that signal the bottom and record it on a flashing dial, LCD screen, or graph paper.

Dissolved Oxygen. The oxygen mixed in water and used by fish; put into water by such things as wind, current, plants, and microorganisms.

DNR. Department of Natural Resources; abbreviation for the name of the natural resources agency in many states.

Dorsal Fin. A fin located on the back or uppermost part of a fish.

Downrigger. A fishing device used on boats that allows a troller to fish a lure at a precise, constant depth; a reel of heavy line or wire cable, a heavy weight to keep the cable taut, and a release clip for a fishing line. When a fish strikes a lure at the end of the fishing line, the line is released from the clip and heavy weight so an angler can fight a fish without any weight on the line.

Drag. A system in fishing reels that prevents a fish from taking line off a reel too quickly.

Drag Knob. The knob that allows the adjustment of the reel's drag pressure.

Dry Fly. A fishing fly tied to stiff hackle material that allows it to float and imitate an adult stage of a stream insect such as a mayfly, caddis fly, or stone fly.

Ecology. A branch of biology that studies the relations between organisms and their environment.

Ecosystem. A complex ecological community or environment forming a functioning whole.

Epilimnion. The warm layer of water above the thermocline.

Erosion. A process by which the surface of the earth is constantly worn away by the action of wind, water, and glaciers.

Estuary. A place where saltwater and freshwater mix, usually at a river mouth or in lagoons.

Ethics. A set of moral principles or values dealing with what is good and bad and with moral duty and obligation.

Eutrophic. A type of body of water that has high levels of nutrients.

Eye. The part of a fish hook where line is attached or where the hook is attached to a lure.

Fillet. Removing the boneless, edible part of a fish. It involves cutting out the flesh or muscle and usually then skinning the fish; the part of the fish cut out and ready to cook.

Fillet Knife. A knife with a long, thin, flexible blade used to fillet fish.

Fingerling. A young fish, about as long as the length of your finger.

Fisheries Management. The science of managing fish populations through research, habitat manipulation, stocking, water quality control and regulations.

Flasher. One type of depthfinder that uses blips of light on a circular dial to indicate the bottom and objects in the water.

Float. See "bobber."

Float Plan. Tells some person on land the boater's plans for the day and the expected time of return.

Fly. An artificial lure designed to look like an insect or small fish; made of fur, feathers, wool, tinsel, and other artificial materials; designed to be cast with a fly fishing outfit.

Food Chain. Also called a "food web" or "food cycle": the chain of organisms in a community that produce food and consume it; the path that food (materials and energy) takes through a group of organisms.

Freshwater. Water that contains little or no salt.

Fry. A method of cooking fish in hot oil; small fish that have just hatched out of the egg; after growing to several inches long they are called "fingerlings." See "fingerling."

Gaff. A "j" shaped, barbless hook on a long handle used to hook large fish while landing them.

Gill. A breathing organ located behind the gill cover on a fish's head.

Gill Net. A net that has a mesh size designed to catch fish by their gills, preventing them from escaping. Different mesh sizes are used to catch different-sized fish.

Gorge. A primitive type of fish hook. A length of stick, bone, flint, thorns, or other material that tapers to a point on each end. Some had a groove near the middle where a line was attached. The gorge was then inserted in bait. When swallowed and the line drawn tight, it lodged in the fish's gullet or throat.

Grip. That part of the rod held by the angler. Usually made of cork or a synthetic material.

Guide. One of the circular rings made of metal or artificial material attached to the shaft of a rod for the fishing line to travel through; someone who is hired to show a customer how and where to fish on a body of water.

Habitat. The place or type of site where a plant or animal normally lives.

Herbivore. A plant-eating animal.

Hip Boots. Waterproof boots that come up to the hips and are used by wading anglers.

Hull. That portion of a boat in contact with water.

Hypothermia. The rapid and abnormal chilling of the body. It can occur even in mild and warm weather. Victims must be warmed by special means to prevent greater or long-term damage or death.

IGFA. Abbreviation for the International Game Fish Association; a group that keeps records on fish catches and supports sport fishing.

Ice Auger. A large ice drill used to cut a hole in the ice for fishing.

Ichthyology. The branch of zoology that deals with fish, their classification, structure, habits, and life history.

Impoundment. A natural or manmade body of water.

Jig. A type of lure with a weighted head molded on a special type of hook. Often, rubber, plastic, feathers, and other materials are tied onto the shank of the hook.

Jigging. Fishing a lure, often a jig, while using an up-and-down motion with the rod.

Jonboat. A small boat, usually made of aluminum, with a square-shaped bow. It designed for use on calm waters or rivers. Jonboats range in length from about 8 to 16 feet.

Lateral Line System. A system of sense organs in fish; a series of pores or canals running along a line on each side of the body and on the head; detects pressure changes, including vibrations, in the water.

LCD. Abbreviation for Liquid-Crystal Display; a type of depthfinder that records its information on an LCD screen.

Leader. Any material used between the main fishing line and the hook or lure; can be made of monofilament or wire and be heavier or lighter than the fishing line. Often, a heavy leader is used to prevent fish with sharp teeth from breaking the line.

Levelwind. The part of a baitcasting reel that makes sure the fishing line is wound evenly onto the line spool.

Livewell. A container built into a boat for storing fish and keeping them alive.

Lure. Any artificial bait used to attract and catch fish.

Map. A drawing of land features. Maps are useful to find streams and access points to rivers and lakes. See "chart."

Marl. A type of bottom under a body of water; a mixture of clay and carbonate of lime.

Migration. The movement of animals, including fish, from one area to another.

Monofilament Line. A single, strong synthetic material used for fishing line.

Natural Bait. Bait that is found in nature, such as insects and worms, and common to a fish's habitat.

Net. A device used to capture fish.

Non-point-source Pollution. Pollution that enters water through run-off from land.

Nymph. A larval phase of an aquatic insect; an artificial fly tied to imitate a nymph; used primarily for trout fishing.

Olfactory Nerves. Nerves involved in the sense of smell.

Oligotrophic. Lake type used to describe bodies of water characterized by low amounts of nutrients in proportion to their total volume of water.

Open Face. A spinning reel that has the spool uncovered or exposed.

Organism. Any living thing.

Oxygen. A gas that is necessary for all life, including fish life. In water, oxygen is in a dissolved form and is taken in by fish through their gills.

Panfish. A name given to small fish, such as bluegill, sunfish, and crappie, because they can fit in a frying pan.

Pectoral Fin. Either of the fins of a fish that corresponds to the forelimbs of a four-legged animal.

Pelvic Fin. One of the paired fins of a fish comparable to the hindlimbs of a four-legged animal.

PFD. Abbreviation for Personal Flotation Device; commonly called a "life vest."

pH. The hydrogen ion content, or the acidity or alkalinity of any substance. In water, most fish find neutral pH most comfortable. On a scale of 0 to 14, neutral is in the middle. A low pH means acidic water; high pH is caustic or alkaline. Either condition, in the extreme, can harm fish.

Photosynthesis. A chemical process that takes place inside cells. Light energy is used to make carbohydrates from carbon dioxide and water. A waste product is oxygen. The process is done by plants, including aquatic plants.

Population Density. The number of individuals of a given population occupying a unit of space. For example, the number of bass per acre.

Practice Plug. A weighted plug without hooks designed for use while practice casting with a fishing rod.

Predator. An animal, like a fish, that feeds on other organisms, including other fish.

Predator-prey. The relationship between a predator and that which it feeds on.

Pumping. A method of fighting fish that involves raising the rod to pull the fish closer, and then gaining line by reeling as the rod is lowered.

Push Button. A lever or knob on a spincast reel. Pressing the push button holds the line in place until pressure is released, at which time the line and lure can be cast.

Quarry. Prey; anything hunted.

Reading Water. The ability to look at a body of water and select the spots most likely to hold fish.

Redd. A nest dug on the bottom of a body of water by spawning fish.

Reel Body. The part of the reel that holds the gears and other controls.

Reel Foot. Reel part used to hold the reel on the rod. It is held by the reel seat.

Reel Seat. That part of a rod designed to grip a reel by the reel foot.

Reservoir. See "impoundment."

Retrieve. The act of rewinding fishing line onto a reel spool and retrieving a bait or lure.

Rigging. The process of setting up a fishing rod and attaching a bait or lure.

Rod Butt. The end of the rod handle.

Saltwater. Water with salt in it such as the ocean or the sea.

Sand Spike. A pointed hollow tube, usually of aluminum or plastic, designed to stick upright in sand to hold a surf rod.

Scale. One of the small covering plates on the body of many fish; removing scales from a fish's body before cooking; a device used to weigh fish.

School (of fish). A number of fish of the same species that are grouped together.

Scoring. A method of preparing fish by making narrow cuts almost all the way through, which allows hot oil to cook up the small bones.

Season. The period of time during the year that a particular fish can be harvested by an angler.

Sediment. The matter that settles to the bottom of a liquid such as water.

Sedimentation. The accumulation of sediment.

Setting the Hook. The act of embedding a hook in a fish's mouth.

Shank. The part of the hook between the eye and the bend, usually the longest part of a hook.

Sinker. A weight used to get or keep a bait or lure down in the water.

Skirted Spool. A type of spool found on open face spinning reels where a flange extends from the rear of the spool to cover the cup and spool housing.

Slough. A swampy place; marshy inlet.

Snag. An underwater structure that tends to cause a lure or bait to become hung up.

Snap Swivel. A small snap to connect lures or rigs to a fishing line that has a swivel to help prevent the line from twisting.

Snelled Hook. A hook that has a short length of leader tied to it.

Sonar. Another name for a depthfinder.

Spawn. The act of releasing eggs into the water by female fish for fertilization by male fish.

Spawning Run. The movement of fish to an area for the purpose of spawning.

Species. A biological classification of plants and animals.

Spinner. A standard lure that consists of a rotating blade on a shaft that holds a body or beads and ends with a hook.

Spinnerbait. A type of lure that has a jig-like head and hook molded onto a right-angle wire holding one or more spinner blades. There are single- and double-blade styles.

Spool. Device to store fishing line on any reel.

Spoon. A type of lure made of metal that is designed to look like a small fish.

Sport Fishing. Fishing for recreation, not for profit or commercial reasons.

Star Drag. A drag system consisting of several layers of soft and hard washers in a reel and controlled by a star-shaped wheel.

Steak. A chunk of fish that is made by cutting fish into steaks by transverse cuts through the body. Used for larger fish.

Stern. The rear end of a boat.

Stickbait. An artificial lure that floats and has no built-in action, but must be worked by the angler.

Still Fishing. Fishing in one spot and waiting for a fish to take the bait.

Streamer. A type of fly tied to a long shank hook, using feathers for the "wing" and designed to imitate a stream minnow.

Strike. The point at which a fish takes a bait or lure. Also known as "to strike" a fish; to set the hook.

Structure. A term anglers use for anything in the water that may attract fish. It includes rocks, weedbeds, stumps, piers, docks, and points of land. Structure can also mean any change, including type of bottom and water temperature.

Suspended Fish. Fish that hover considerably above the bottom in open water.

Swivel. A small fastener consisting of two eyes with a central barrel or swiveling portion. Designed for fastening lines and line/leader combinations to help prevent line twist through lure action.

Tack. A slanting or zig-zag course against the wind or waves.

Tackle. Fishing gear or equipment.

Tackle Balance. Term used to describe how a rod, reel, line, and bait or lure should be matched.

Tackle Box. A portable storage container for fishing tackle.

Tapered Leader. A leader used in fly fishing. Thick at one end it tapers to a thinner end, or tippet, the end where the fly is tied.

Taxidermy. Any of several methods of preserving fish for mounting as a trophy.

Terminal Tackle. The hooks, weights, snap swivels, and other tackle attached on or near the end of a fishing line.

Test. Line strength as stated on the label.

Thermocline. The layer of water where temperature rapidly changes from warmer water to colder water.

Transom. The rear of the boat; the portion onto which the motor is mounted.

Treble. A hook with three points used on many lures and for bait fishing.

Trolling. A method of fishing where lures or bait are trailed on the end of fishing line behind or to the side of a moving boat. This makes it possible to fish a large area rapidly.

Turbid. Not clear; muddy; cloudy.

Turnover. A very brief period when a lake is in turmoil. A mixing or "turning over" of the water takes place as cold water on the surface settles and water from below rises. This turnover homogenizes lakes that have stratified (layered according to water temperature) in summer and reoxygenates the water.

Ultralight. The name given to lightweight fishing tackle for casting small, lightweight lures.

Waders. A waterproof garment that covers an angler from the feet to the chest for wading in deeper water.

Watershed. The region drained by one river system.

Water Pollution. The contamination of water.

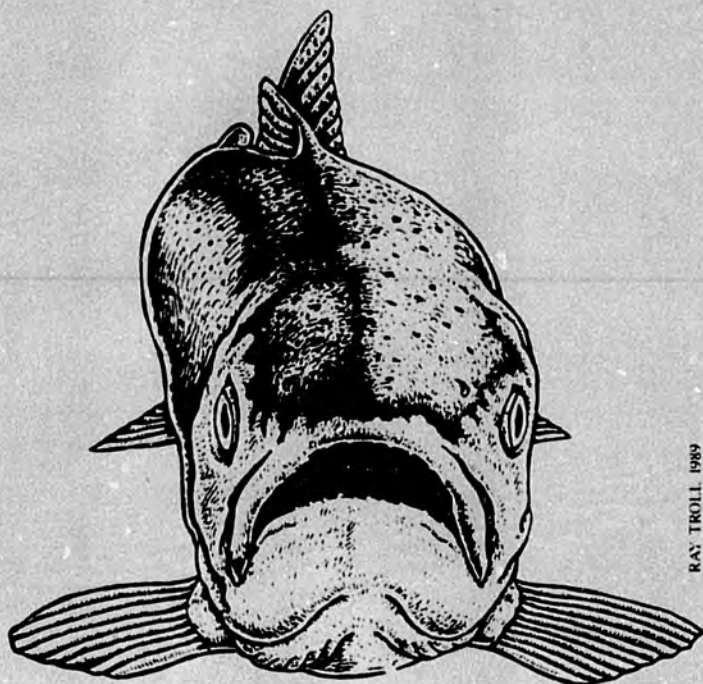
Weedless. A hook or lure that is designed to pass through aquatic vegetation without getting snagged.

Weight Forward Taper. A fly line with the heavy thick "belly" portion towards the front, with a front taper leading to the end to attach the leader, and a rear taper leading to a long line that is thin and takes little room on the reel.

Wet Fly. A fly that imitates an aquatic or land insect and sinks in the water; made of soft water absorbent materials.

Alaska's Trophy Angler Catch and Release Program

There's a good deal more to catch and release fishing than occasionally letting a fish go. Catch and Release takes planning on what tackle to use and how you will fight, handle, and release fish, and it involves a commitment to maintaining Alaska's wild fish resources. To encourage anglers to release some of the fish they catch, the Alaska Department of Fish and Game, Division of Sport Fish has created the **Alaska Trophy Angler Catch and Release Program**. Information on this program can be found in the Alaska Sport Fishing Regulations Summary.



To Release A Fish

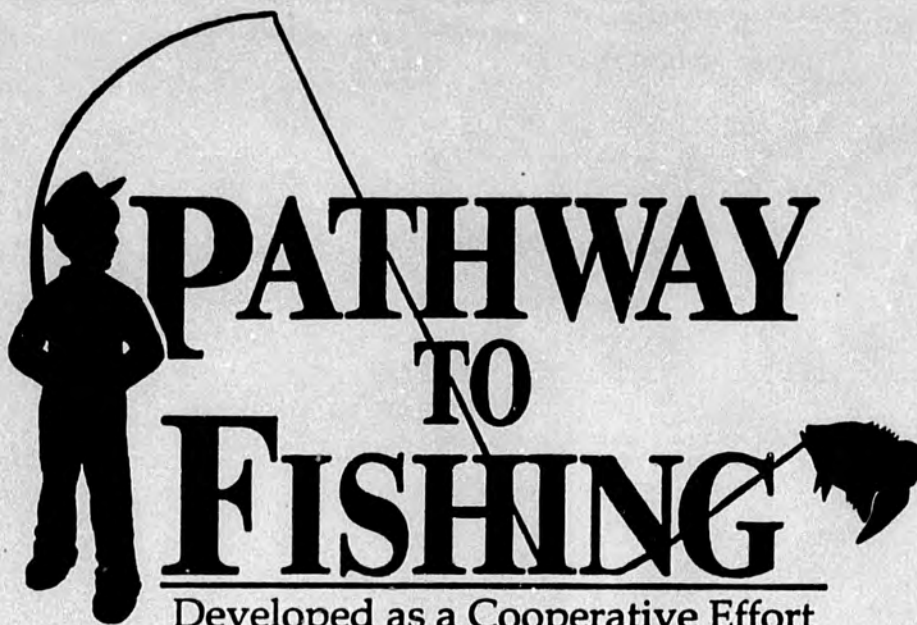
- Land the fish quickly
- Keep the fish in the water
- Keep hands away from the gills
- Handle the fish gently
- Back the hook out
- Cut your line if the fish is deeply hooked
- Support the fish facing into the current until it swims away



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PATHWAY TO FISHING

Developed as a Cooperative Effort

by

U.S. Fish and Wildlife Service

National Park Service

Bureau of Land Management

Bureau of Reclamation

USDA Forest Service

Berkley

and

The In-Fisherman

USER MANUAL



Berkley



In-Fisherman®

Pre-publication issue produced by Berkley and In-Fisherman for the AFTMA Press Forum.

**An Invitation to Enjoy Fishing
and Fishery Resources**

The opportunity to enjoy recreational fishing is a right available to all Americans. Fishing is a healthy and wholesome activity with no participation boundaries. When used and managed carefully, fishery resources are a perpetual gift from past generations that we can enjoy today and preserve for our children to enjoy tomorrow. However, maintaining and enhancing the quality of our Nation's fishery resources requires the conscientious efforts of resource managers and anglers.

Pathway to Fishing is a program that teaches aquatic ecology and basic fishing techniques. The program is designed primarily for youth and demonstrates how knowledge of fish biology and aquatic habitats can be used to become a successful angler and catch a variety of fish in a diversity of aquatic systems. *Pathway to Fishing* emphasizes angler ethics and safety to further ensure enjoyable fishing experiences and provides information about local fishing opportunities.

Pathway to Fishing was created through the generous efforts of Berkley and In-Fisherman in cooperation with the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Reclamation, and USDA Forest Service. This partnership has resulted in a program that fills a very important need — encouraging stewardship and ethical enjoyment of aquatic resources. We are grateful for the opportunity to participate in the partnership that produced this exciting program.

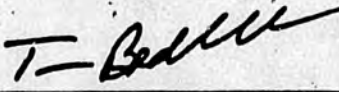
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The In-Fisherman

USER MANUAL

PATHWAY TO FISHING USER MANUAL

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Pathway to Fishing

Summary

Pathway to Fishing is a 12-station, 1-hour, walk-through program that teaches fishing basics, aquatic ecology, and angler ethics. It also provides information about local fishing opportunities. *Pathway to Fishing* is fun for the participants and the instructors. This program was developed as a cooperative effort of the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Reclamation, USDA Forest Service, Berkley, and In-Fisherman.

Pathway to Fishing is geared toward youth who have little or no fishing experience, but the program can be beneficial to people of all ages. Parents or guardians are encouraged to accompany the children through the program and learn with them. *Pathway to Fishing* can be taught at the water's edge or miles from a fishing spot, indoors or outdoors, and in any season. It can be presented as a stand-alone program or as an activity that is part of a larger event such as an outdoor show or a National Fishing Week event.

Pathway to Fishing is best conducted with 16 or more instructors; however, the program can be conducted with just one instructor. *Pathway to Fishing* contains all the information needed for anyone interested in teaching people about fishing, the aquatic environment, conservation, and angler ethics. Organizations conducting *Pathway to Fishing* are encouraged to obtain the assistance of experienced anglers, local fishing tackle dealers, biologists, and Federal, State, or local fishery management agency personnel.

The *Pathway to Fishing* packet contains a User Manual, posters, Certificates to be awarded for completing *Pathway to Fishing*, *Ethical Angler* Decals, Knot Cards, Evaluation Forms, and an instructional video cassette.

Event organizers must provide a variety of readily available or easily made instructional props (e.g., life jackets, fishing tackle) and up to 15 spincast fishing rods and reels.



Part 1. Operation Guide

Part 1. Operation Guide

This *Pathway to Fishing* package* contains an Instructor Guide (Part 2), posters, printed materials for distribution to participants (and Masters), and a video cassette. A comprehensive list of materials for the entire event is provided at the beginning of the Instructor Guide. This part explains how to conduct a *Pathway to Fishing* event and use the Instructor Guide.

OVERVIEW OF AN EVENT

Pathway to Fishing can be presented by one or several instructors to a small group of participants in about one hour. However, the program is designed to accommodate a large group of participants. With a large number of participants, small groups (10-15) enter the *Pathway to Fishing* one group at a time. When the first group has completed Learning Station 1, that group moves on to Learning Station 2 and another group can start the *Pathway*. When using this schedule, up to 180 participants per hour can complete *Pathway to Fishing*. Each Learning Station takes 5 minutes to present. **It is essential that the instructor(s) at each station remain on schedule so the program moves smoothly.**

The physical configuration of *Pathway to Fishing* depends on the facility where the event is conducted. A sample physical configuration for *Pathway to Fishing* is shown in Figure 1. Attention should be given to separation of Learning Stations so that the presentation at one Learning Station does not interfere with the presentation at the other Learning Stations. Where space is limited, it may be necessary to use portable dividers to separate Learning Stations; or you may separate the stations with time — wait for the first group of participants to complete Learning Stations 1 and 2 and move to Learning Station 3 before starting the next group at Learning Station 1. For safety and ease of instruction, the area for practice casting (Learning Station 8) should be spacious (see Figure 1 for dimensions) and away from obstructions (like tree branches or power lines if the event is held outdoors). Casting should be directed away from the other Learning Stations.

* The content of "Pathway to Fishing" was developed using In-Fisherman copyrighted information and more specifically, the In-Fisherman F(Fish) + L(Location) + P(Presentation) = S(Success)TM educational service. Use of this teaching format or the concepts contained herein in a setting other than this educational program is strictly prohibited without written consent of In-Fisherman. ©September 1991 by In-Fisherman® Inc. All Rights Reserved.

STAFF

The people conducting a *Pathway to Fishing* event are one key to a successful event — an event that has a positive impact on the participants. There is no "typical" instructor for *Pathway to Fishing*. People with a wide diversity of interests and backgrounds make excellent instructors. The narrative is designed to accommodate this diversity. Most organizations presenting *Pathway to Fishing* will find that a successful program will involve anglers to present those Learning Stations that teach fishing techniques, fish biology, aquatic ecology, safety, angler ethics, and cast-

ing (Learning Stations 1-9). Instructors with a biological background can be very helpful for Learning Stations 1 and 2. Solicit the assistance of fishery biologists or conservation officers for presentation of local fishing opportunities and fishing regulations (Learning Station 11).

One person can present *Pathway to Fishing* to a group of 5-10 participants. This single instructor would, in sequence, present all the Learning Stations. This approach can be effective and may be desirable in some applications. However, the single instructor must learn and deliver much material and be very creative and energetic to maintain the attention of the participants for the entire program.

Most presentations of *Pathway to Fishing* will involve 16 or more instructors (see Figure 1) — one to handle registration, four for Learning Station 8, and one for each of the other Learning Stations. If possible, two or three people should handle registration and program evaluations and at least three people should assist the instructor at Learning Station 6 (knot tying). Two instructors at the other stations can help each other and make the presentations more lively and interesting.

Depending on the layout of the Learning Stations, it may be necessary to help each group of participants move to the next Learning Station in sequence. This can be done by each instructor pointing to the next Learning Station at the completion of their presentation, by having staff to guide each group to the next Learning Station, or by confining the movement of participants with clearly marked paths.

USE OF THE INSTRUCTOR GUIDE

Pathway to Fishing was developed to teach people how to catch fish, to be safe and ethical anglers, and about aquatic and fishery resources. The *Pathway to Fishing* Instructor Guide (Part 2) is provided to ensure relative uniformity in the information presented and is written for broad application. Some components such as the diversity of fishes, fish anatomy, safety, and angler ethics, are universal in application. These components should be presented "as is" wherever *Pathway to Fishing* is presented. Other aspects, such as how to catch fish, types of waters, and aquatic ecology, should be locally relevant. Your teaching efforts will be more effective if you focus your presentation on familiar situations. Instructional flexibility and creativity are encouraged, however, mere recounting of personal fishing experiences is discouraged.

Remember that you are teaching basic fishing techniques, not sophisticated methods used by specialized anglers. Keep your presentation simple. The majority of your audience will be youth. For example, in Learning Station 6 (knot tying) teach only the improved clinch knot; do not try to teach 2 or 3 knots. You only have 5 minutes.

The Instructor Guide contains two categories of information — text and hints. The text provides the information to be presented and is written in the "second person" (i.e. as spoken to an audience). The text also contains cues (in shaded boxes) to display or use a poster or a prop. Instructors are encouraged to present all information in the text. One of the most difficult tasks of each instructor will be to complete their presentation within the five-minute time period. Some of the text is back-

ground information provided to increase, as necessary, the instructors knowledge of the material presented. Instructors may elect to use different examples and props to achieve a more effective presentation. **Instructors should carefully plan and rehearse their presentation so that important points are covered in the five minute time period.**

Hints are suggestions, options, or alternatives to increase the effectiveness of the presentation. Hints will be shown in boxes in the Instructor Guide.

VIDEO CASSETTE

The video cassette contains a promotion for *Pathway to Fishing*, the set-up and operation of a typical *Pathway to Fishing* program, and presentations for Learning Stations 1, 2, 3, and 4. This video cassette is included to give first-time users a visual concept of *Pathway to Fishing*. You may also find the video cassette useful in promoting *Pathway to Fishing* or encouraging a co-sponsor to assist you in conducting a *Pathway to Fishing* event.

POSTERS

This *Pathway to Fishing* package contains a set of 13 posters. The poster with the blue *Pathway to Fishing* logo can be used to advertise the event and should be displayed at the entrance to the event or the registration table. The other posters are used at the *Pathway to Fishing* Learning Stations. The Instructor Guide provides instructions about cues for posters to use at different Learning Stations.

For some presentation situations, it may be desirable to mount the posters on heavy cardboard or foamcore poster board. This will make the posters more durable and easy to display.

PROPS

The Instructor Guide lists the props suggested to successfully present the program. Most of these props can be easily obtained. Several of the props are fishing lures or fishing outfits. **For safety, take the hooks off all lures and fishing outfits that the participants will handle.**

Learning Station 10 demonstrates fish handling. This is an important Learning Station because many beginning anglers (and even some experienced anglers) are uncomfortable handling fish. It is not possible to use live fish to demonstrate fish handling. A poster is included to show safe and convenient methods for holding a variety of sport fish. However, actually handling facsimiles of fish would help make the participants more comfortable and confident about holding the different fish they may catch. There are a variety of alternatives for fish facsimiles. Fiberglass replicas of fish are useful but expensive. Fish facsimiles can be carved from soft wood or polyfoam (the kind used for furniture padding). The intent, regardless of the material used, is to create a facsimile that allows you to demonstrate how to hold a fish without injury to yourself or the fish. In creating the facsimile, the emphasis should be on key features important to proper handling of the fish and removing hooks.

PATHWAY TO FISHING LOGO

A *Pathway to Fishing* Logo Master (PTF.1) is included in the package. Use this logo whenever posters, flyers, or other *Pathway to Fishing* promotional materials (e.g., T-shirts, caps) are produced. T-shirts and caps are popular items and a low-cost way to promote your event. Consider adding your organization's name as a sponsor.

MATERIALS FOR DISTRIBUTION

Each *Pathway to Fishing* participant should receive an *Ethical Angler* Decal, a Knot Card, and a *Pathway to Fishing* Certificate as they complete the program. One hundred *Ethical Angler* Decals and 100 Knot Cards are enclosed in the *Pathway to Fishing* package. Masters of the *Ethical Angler* (PTF.2), Knot Cards (PTF.3a, PTF.3b), and the *Pathway to Fishing* Certificate (PTF.4) are included for duplication.

On the *Pathway to Fishing* Certificate, a blank line is provided for the date and space is available at the bottom to add your organization's name or a signature line. You may want to make a high-quality copy from the Certificate Master, add the date and organization name or signature line, and then make copies for the event.

REGISTRATION FORM

Have each participant or their parent/guardian complete this form prior to starting Learning Station 1. The Registration Form has two purposes. First, it allows you to obtain each participant's name. As soon as a group enters *Pathway to Fishing*, the name from the Registration Form can be neatly lettered onto the *Pathway to Fishing* Certificate to be presented at Learning Station 12. A second purpose of the Registration Form is to obtain information about participants and their parents that can be used to evaluate *Pathway to Fishing* and improve educational efforts. Please return the Registration Forms, along with the Evaluation Forms and the Event Form, to the U.S. Fish & Wildlife Service (see Event Form).

A Master Registration Form (PTF.5) is enclosed in the folder on the outside back cover of this User Manual. This Master Registration Form should be used to photocopy additional Registration Forms as needed.

EVALUATION FORMS

Two types of evaluation forms are included: (1) Participant and Parent/Guardian Evaluation and (2) Cooperator Evaluation. Using these evaluations will help you to be more successful in future presentations of *Pathway to Fishing*. The Participant and Parent/Guardian Evaluation can be distributed and collected at the Registration table or you may find it more convenient to use a separate table and staff for the evaluation. The instructor at Learning Station 12 should ask the participants and parents/guardians to complete an evaluation form and direct them to the Registration Table or other table as appropriate.

The organizations that developed *Pathway to Fishing* are interested in ways to improve the effectiveness of this program. Please send completed Evaluation Forms, along with completed Registration Forms and the Event Form, to the U.S. Fish and

Wildlife Service (see Event Form).

A Master for each Evaluation Form (PTF.6, PTF.7) is included in your *Pathway to Fishing* package. These Master Evaluation Forms can be photocopied as necessary for additional events. The Masters for the participant and Parent/Guardian Evaluation and the Cooperator Evaluation are designed to be printed in a 5- inch by 8- inch format. We suggest you have these forms copied onto card stock so they can be easily used.

EVENT FORM

It is important to the organizations that developed *Pathway to Fishing* to know when, where, and by whom *Pathway to Fishing* events were conducted. Your assistance will allow us to evaluate and further improve *Pathway to Fishing*. A Master Event Form (PTF.8) is enclosed and should be completed after your *Pathway to Fishing* event. This completed form, along with completed Registration Forms and Evaluation Forms, should be mailed to:

U.S. Fish and Wildlife Service
1849 C Street, N.W.
Pathway to Fishing
ARLSQ - 820
Washington, D.C. 20240

PLANNING, PARTNERS, AND PROMOTION

Enlisting enthusiastic and creative instructors is one key to the success of a *Pathway to Fishing* event. But a second key to a successful event is proper planning and promotion before the event.

Different applications of *Pathway to Fishing* will require different types and amounts of planning and promotion. Table 1 provides a generalized planning schedule for a *Pathway to Fishing* event. Additional planning will be necessary if *Pathway to Fishing* is presented as part of a larger event or if a fishing event will follow *Pathway to Fishing*.

The initial stages of planning will affect the course of action. If *Pathway to Fishing* will be conducted as part of a large annual event (e.g., a State Fair, an outdoor show), schedule the event with the planning committee for that event at least one year in advance.

Involve other organizations and cooperators — they will simplify your planning and ensure a more successful event. For example, the Chamber of Commerce in many towns and cities publishes a calendar of events, and a local park and recreation department has staff that can assist you with all phases of planning and conducting your event. Table 2 lists some potential sources for assistance with your program. There can be costs (e.g., materials, fishing tackle, publicity) involved in presenting *Pathway to Fishing*; co-sponsors may donate equipment or provide funding.

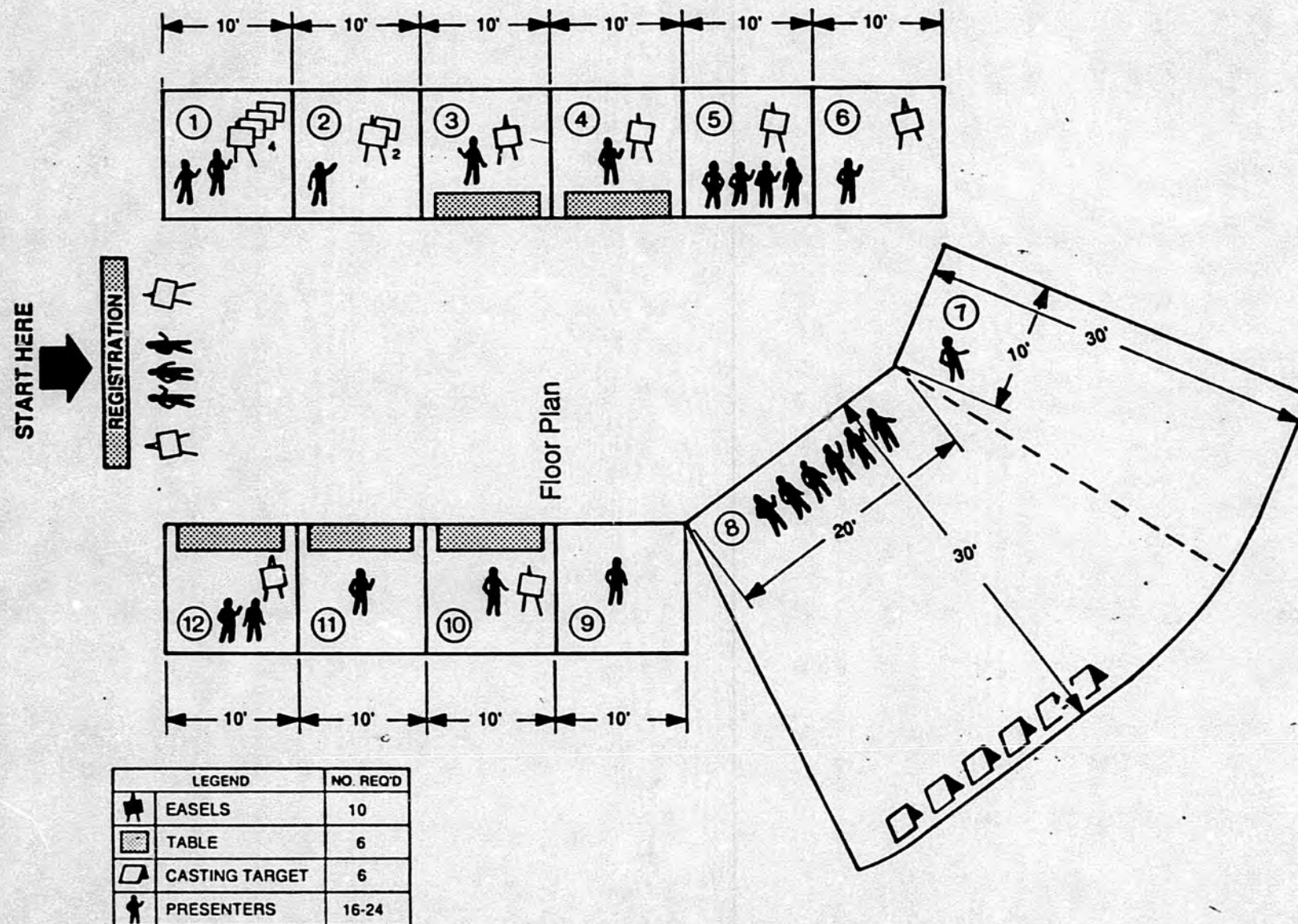
The best way to promote a *Pathway to Fishing* event is to work with an organiza-

tion or a co-sponsor that has public relations specialists and follow their guidance. You have several ways to announce (promote) your *Pathway to Fishing* event. First, get *Pathway to Fishing* on your community's event calendar; this calendar gets wide distribution. Second, work with the media (newspaper, radio, television). Because your event is free and presented as a public service, the media generally will provide you with announcement time or space. Sample Public Service Announcements for the printed media (PIF.9) and for radio and television (PTF.10) are included. Simply fill in the required information and submit it to the appropriate outlet.

If large attendance at a *Pathway to Fishing* event is part of your plan, you will need the advertising power that the media can provide. However, be aware that the media survives financially by selling advertising. Your choice of a co-sponsor and how the co-sponsor is given credit for the event can affect the cooperation you receive from the media. Co-sponsors deserve credit for their participation, but ensure that the public service aspect of your event is evident. An organization that previously has not conducted a public event should involve the media in early planning stages.

Posters and flyers are an important part of a good publicity campaign. Although posters and flyers do not reach as large an audience as the printed and electronic media, they do provide a "hard copy" of the event. Posters and flyers can be especially effective when displayed or distributed in schools or at large public events (e.g., a fair, an outdoors show) at which *Pathway to Fishing* is a component.

**FIGURE 1. PATHWAY TO FISHING FLOOR PLAN
FOR A *PATHWAY TO FISHING* EVENT.**



**TABLE 1. A GENERAL PLANNING SCHEDULE
FOR A *PATHWAY TO FISHING* EVENT.**

Six months prior to the event

- Select a coordinator or coordination committee to:
 - Determine the size of the event
 - Set the date
 - Find cooperators and co-sponsors (including suppliers of spincast rod and reel outfits for casting.)
 - Identify presenters, including fishery biologists and conservation officers
 - Select the site
 - Integrate with other concurrent events
 - Determine promotion/advertising program
 - Send invitations to dignitaries (as soon as a date, cooperators, and site are confirmed)

Twelve weeks prior to the event

- Design and print posters, flyers
- Make arrangements for appropriate physical facilities (e.g., portable restrooms, tables and chairs, signs, parking, trash cans, etc.)
- Make arrangements for optional materials (e.g., T-shirts, caps, participation prizes, etc.)

Eight weeks prior to the event

- Make arrangements for flyer distribution
- Print copies of materials for *Pathway to Fishing* (e.g., Registration Forms, *Pathway to Fishing* Certificates, *Ethical Angler* decals, Evaluation Forms, Knot Cards)

Four weeks prior to the event

- Confirm all previous arrangements
- Copy and distribute *Pathway to Fishing* Instructor Guides
- Make arrangements for all props
- Put up posters
- Send Public Service Announcements to the media (newspaper, radio, television; ask that they be run two weeks before the event)
- Invite media to attend and cover the event

Two weeks prior to the event

- Confirm all previous arrangements
- Distribute flyers
- Pick up any contributed materials (rods and reels, participation prizes, etc.)

**TABLE 2. POTENTIAL COOPERATORS AND SITES
FOR A *PATHWAY TO FISHING* EVENT.**

Cooperators and co-sponsors

Schools
 Local fishing clubs
 Youth organizations (e.g., Boy Scouts, Girl Scouts, 4-H, YMCA, YWCA, etc.)
 Civic and fraternal clubs
 Fishing tackle wholesalers, retailers, and factory representatives
 Businesses
 Chamber of Commerce
 Local park and recreation department
 County Extension Service
 State fish, wildlife, and natural resource agencies
 Federal agencies (e.g., U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Reclamation, USDA Forest Service, Soil Conservation Service, Bureau of Indian Affairs, National Marine Fisheries Service, U.S. Army Corps of Engineers)
 Media (radio and TV Stations, newspapers)

Sites

Schools (indoors or outdoors)
 National, state, county, and municipal parks
 State, county, or municipal fairs
 Public buildings or outdoor properties
 Private business buildings or parking areas
 National Wildlife refuges
 National, state, or private fish hatcheries
 National, state, and county forests
 Visitor centers
 Shopping malls
 Consumer sport shows



Part 2. Instructor Guide

Table 3-LIST OF MATERIALS

Learning Stations	Provided in Pathway to Fishing Package	To be Provided By Organizers Instructors, or Sponsors
Registration	<i>Pathway to Fishing</i> Logo Poster Registration form	Tables Chairs Organization banner Pencils
1 - Fish Biology	F+L+P=S™ poster Fishes poster Aquatic Ecosystem poster Fish Anatomy poster	Easel for posters (optional) Trophy fish mount or replica
2 - Location (Where Fish Live)	F+L+P=S™ poster Lake Map poster	Easel for posters (optional) Remarkable board, chalkboard, or flip chart on stand Marker or chalk Depthfinder Rod and reel with rubber-legged jig (hook removed)
3 - Presentation (Livebait and Lures)	F+L+P=S™ poster	Easel for posters (optional) Large hook Ultralight spinning rod and reel with matching float, shot, small hook Tackle box full of tackle, includ- ing: rubber frog lure, minnow lure, plastic worm, spinner- bait, spoon, rattling bait, large muskie-type lure, crappie jig, surface lure (all hooks re- moved) Jar of prepared bait
4 - Presentation (Rods and Reels)	F+L+P=S™ poster	Easel for posters (optional) Spincast rod and reel Cane pole Baitcasting rod and reel Spinning rod and reel Fly rod and reel
5 - Tying Knots	Knot poster	Easel for posters (optional) Spool of monofilament line Spool of braided line Spool of fly line 1/4" soft docking rope Bell anchor 16" pieces of braided or monofila- ment line Fingernail clipper Casting plugs
6 - Safety and Angler Ethics	<i>Ethical Angler</i> poster	Easel for poster (optional) Kids life vest Adult life vest Sunglasses Hat Ball of tangled line

Learning Stations	Provided in Pathway to Fishing Package	To be Provided By Organizers Instructors, or Sponsors
7 - Casting Demonstration		Baseball, bat, glove Spincast rod and reel with casting plug Casting target (washtub, Hula Hoop, rope circle, boxes...)
8. Hands-on Casting		15 spincast rod and reel combinations with casting plugs attached to end of line. 6 casting targets (Hula Hoops, boxes, rope circles, washtubs, etc.)
9. Detecting bites, hooking, and fighting fish		Rod and reel with balanced line, bobber, bait (hooks removed) Forked stick Catfish outfit (rod and reel, line, sinker) Spinning rod and reel with plastic worm (hooks removed) Spincast rod and reel with casting plug
10. Handling and releasing fish	Fish Handling poster	Easel for poster (optional) Fish facsimiles Cotton work glove Pliers Hookout or hemostat (surgical forceps) Fingernail (line) clipper Large fish hook on a piece of line (size 2/0) Small fish hook on a piece of line (size 8)
11. Local fishing opportunities and regulations		Easel for poster (optional) Regional maps Regulations booklets
12. Success/Close	F+L+P=S TM poster <i>Ethical Angler</i> decals (100) Knot Cards (100) Certificates Masters for duplication (in folder): <i>Pathway to Fishing</i> Logo (PTF.1) <i>Ethical Angler</i> (PTF.2) Knot Card (PTF.3a, PTF.3b) Certificate (PTF.4) Registration Form (PTF.5) Participant and Parent/Guardian Evaluation Form (PTF.6) Cooperator Evaluation (PTF.7) Master Event Form (PTF.8) Print Public Service Announcement (PTF.9) Radio/Television Public Service Announcement (PTF.10)	Trophy fish mount or replica

LEARNING STATION 1 - FISH BIOLOGY

Posters/Props: $F+L+P=S^{\text{TM}}$ poster
Trophy fish
Fishes poster
Aquatic Ecosystem poster
Fish Anatomy poster
Easel (optional)

Welcome to *Pathway to Fishing!*

Traveling through the learning stations today, you will be learning about a formula called $F + L + P = S^{\text{TM}}$. This formula will help you catch fish like this one. (*Hold up trophy fish.*)

$F+L+P=S^{\text{TM}}$ poster

The "F" factor stands for FISH. Knowing some things about the fish you are fishing for will help you catch them. The "L" factor stands for LOCATION—where you look for fish in a pond, lake, river, or reservoir. "P" stands for PRESENTATION—choosing the right equipment (like rods and reels, lures or live bait) and how to use it. When you practice the formula, you get SUCCESS, and that means lots of fun and fish too!

Fishes poster

We will start with the "F" (FISH) factor. There are over 20,000 different kinds of fish ranging in size from tiny minnows to gigantic sturgeon and sharks.

Some fish live only in freshwater, such as (*instructor points to fish on the poster while participants or instructor names*) largemouth bass, yellow perch, bluegill, crappie, catfish, walleye, pike, muskie, and rainbow trout. Others live in the ocean, such as sharks, red drum, and bluefish. And some fish, such as striped bass and salmon, live in the ocean and in freshwater.

Hint: Point out diversity of fish, but emphasize the fish that are common and popular in your area.

Fish anatomy poster

Let's identify the parts of a fish: (*Point out each.*)

Fins are used for swimming and positioning.

Of course, fish use their _____ (*Instructor points to eyes*) to _____. (SEE things.)

Fish have a very good sense of smell. The sense of smell is concentrated in the **nares**. Fish do not use nares to breathe.

Fish get oxygen from the water through their **gills**. The gills are very delicate so you should be careful not to damage the gills when handling a fish.

Some fish have **scales** and all fish have a covering of **mucus**. Scales and mucus help to protect the fish.

All fish have a _____ (*Instructor points to the mouth*). What is the mouth for? (FEEDING.)

Let's take a closer look at a few fish. (*Instructor points to sunfish on the Fishes poster.*) A sunfish has a small mouth like a Cheerio. (*Instructor makes shape of Cheerio using hand*) Sunfish eat tiny animals. Notice its body shape. Sunfish and other small fish hide in tiny places so they can race away from bigger fish, like a pike!

The pike has a huge mouth with hundreds of teeth. Fish like the pike or muskie are called **predators**. They eat other fish including the sunfish.

Hint: Use fish-eating sport fishes that are familiar to your audience for examples.

Aquatic food chain poster

All living things are part of an **ecosystem**. The plants and animals in a lake or a stream ecosystem are part of a **food chain**. Food chains can be relatively simple. For example, trout eat insects. Food chains also can be long and complicated. For example, a yellow perch eats small insects and **plankton** (small plants and animals suspended in the water), a walleye eats the yellow perch, and finally a walleye becomes dinner for a pike or muskie.

Knowing what a fish eats helps you find where it lives. For example, a bluegill may be found in a weedbed where aquatic insects live. A bass may be found cruising along the outside of a weedbed looking for bluegills to eat.

Hint: Remember to use fish and habitat examples that are familiar to your audience.

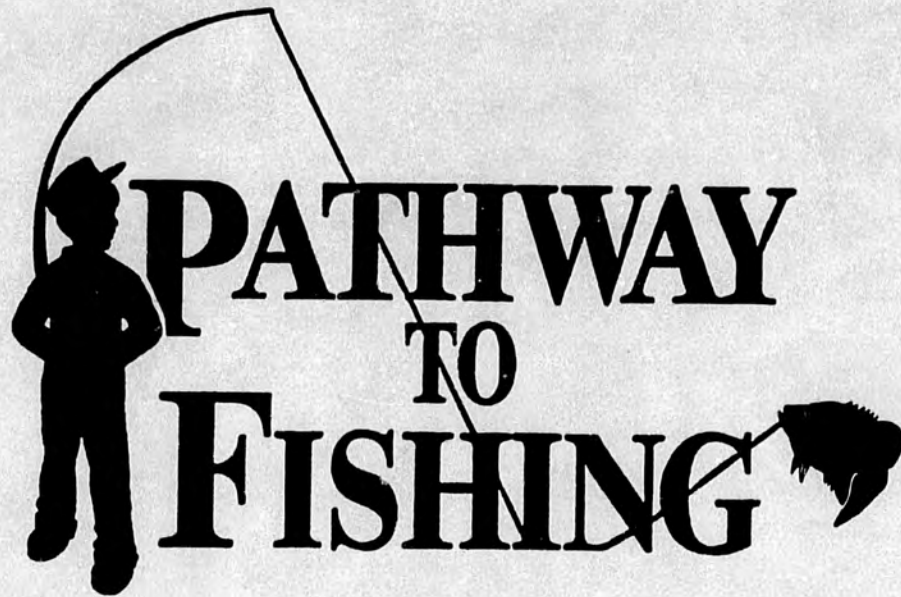
The senses of fish determine how they respond to their environment. Just like you, fish can see, taste, hear, smell, and feel. The sight of a crayfish to a smallmouth bass provokes feeding. The sense of taste is also important. If a fish doesn't like the taste of its **prey** (animals hunted for food), it will spit it out.

There are other factors about fish biology important to catching fish. Where a fish lives is determined by what it feeds on, but also by its need to survive. Some fish, like sunfish and yellow perch that are eaten by larger fish, live where they can hide from predators.

Fish also live in their **comfort zone**. The comfort zone is where a fish finds the right water temperature, oxygen, light, and current. Different types of fish have different comfort zones. Another factor that affects where a fish lives is spawning. Different types of fish spawn at different times and in different locations.

So, what does the "F" factor stand for? (FISH) Remember, the more you know about the fish you are fishing for, the more likely you are to catch them.

At the next station, you will learn more about the meaning of the "L" factor in our fishing formula for success.



F (FISH)
+ L (LOCATION)
+ P (PRESENTATION)
= S (SUCCESS)TM

Poster showing various sportfishes from
fresh and saltwater
(to be included in published User Manual)

Poster of fish anatomy
(to be included in published User Manual)

/

**Poster of aquatic ecosystem and food chain
(to be included in published User Manual)**

LEARNING STATION 2 - LOCATION (WHERE FISH LIVE)

Posters/Props: F+L+P=S™ poster

Remarkable board, chalkboard, or flip-chart

Erasable marker or chalk

Lake map

Depthfinder

Rod and reel with rubber-legged jig (hook removed)

Easel (optional)

What does "F" stand for? (FISH) Right. And understanding things about fish can help you catch them.

F+L+P=S™ poster

Now that you understand the "F" factor, let's learn about LOCATION—where fish live and why they live there.

Fish live in lakes, ponds, rivers, streams, reservoirs, and oceans.

Fishing starts before you wet your line. You should first study the water and learn about the features of a fish's environment that affect where they live.

Lake map poster

You learned that fish are found in their comfort zone and where they find food or can hide.

When hunting for birds or deer, we can see where they are or where they have been. But fish are hidden by the water. We have to know what the underwater world looks like. Lake maps help us locate underwater structure, such as a bar, where we expect to find fish. Lake maps are available at most tackle shops.

Good anglers know that fish feed and hide near **structure and cover**. Structure is the type of bottom, such as rock or mud, and changes in depth. **Points, bars, and dropoffs** are good structures to find fish. (*Point to these areas on the lake map as you define them.*) Points are areas where shallow water extends from shore into deep water. Bars (also called shoals or reefs) are shallow areas surrounded by deep water. Dropoffs are areas where depth quickly changes from shallow water to deep water. Cover is places where fish can hide – rocks, stumps, logs, weedbeds, docks, brushpiles, etc.

Sometimes we can see cover such as docks, stumps, or weedbeds. We can also learn about what is on the bottom by feeling it with the lures we use. Imagine this area is the lake bottom. (*Instructor motions around learning station using rod and reel with rubber legged jig - bounced across the ground and over a kid's leg - give analogy of a log.*) We can also tell how deep the water is.

And, we can use electronic **depthfinders**. They send out signals and a picture shows us what is below the surface. (*Hold up a depthfinder.*)

Remarkable board, chalkboard, or flip-chart

Let's draw a picture of a pond. (*Draw side view of pond with nothing in it.*) A pond without structure and cover is like a room without furniture. There is no place for fish to hide.

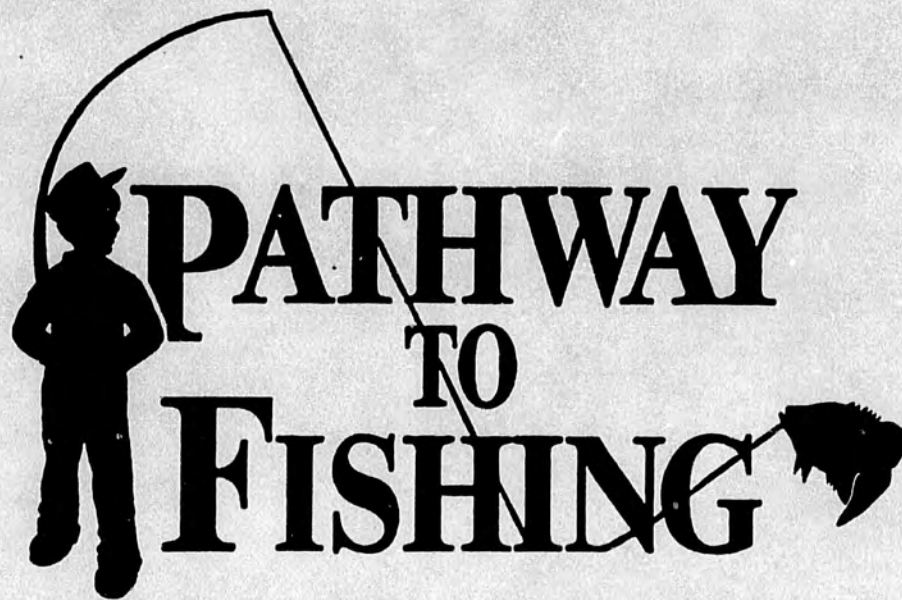
Fish do not just scatter throughout a body of water. Instead, they are attracted to structure. *(Add a point to pond side view.)* That is structure - any change in a flat clean bottom.

Fish use structure and cover to feed, rest, and hide. Cover includes things like stumps. *(Instructor draws in a stump and a couple of fish nearby.)* See? Now fish have somewhere to hide. Cover could also be lily pads, a fallen tree, bulrushes, or rocks. *(Instructor draws in each element and fish nearby.)*

So, what does the "L" factor mean? LOCATION.

And fish are attracted to what? STRUCTURE AND COVER.

Great! Now that we know more about fish and where to find them, we need to know what type of bait to use. You will learn all about the "P" (PRESENTATION) factor in the next learning station.



F (FISH)
+ L (LOCATION)
+ P (PRESENTATION)
= S (SUCCESS)TM

Poster of lake map indicating various structural elements
(to be included in published User Manual)

LEARNING STATION 3 - PRESENTATION (LURES AND LIVEBAIT)

Posters/props: F+L+P=S™ poster

Large hook

Ultralight spinning rod and reel with matching float, shot, and small hook

Tackle box full of tackle: rubber frog, minnow lure, plastic worm, spinnerbait, spoon, rattling bait, large muskie-type lure, crappie jigs, surface lure (hooks removed on all lures that will be handled by kids)

Jar of catfish bait

Easel (optional)

F+L+P=S™ Poster

You have learned about fish and what they eat (*Instructor points to "F" on poster*), and you have learned that fish live in their comfort zone around structure and cover (*instructor points to "L" on poster*). This station is about presentation (*instructor points to "P" on poster*) —how to get fish to bite.

You have to use the right bait to get fish to bite. Presentation is using the right bait, in the right way, at the right time.

One of the best ways to fool fish is with something they eat all the time — live bait. Can you name some live baits? (NIGHTCRAWLERS, CRICKETS, GRASSHOPPERS, LEECHES, CRAYFISH, FROGS...)

To use live bait you have to match the hook size to the size of the bait. (*Hold up a large hook.*) You wouldn't use this to fish for panfish like crappie, would you?

(*Hold up ultralight rod with float, shot, small hook.*) This is a good all-purpose panfish rig. What kind and size of baits should you use?

Prop: Tackle box full of tackle

One of the most fun ways to catch fish is to fool them with lures. Some lures perfectly mimic prey. (*Pick up various lures from tackle box and ask what they mimic — these should be lures that obviously look like a frog, minnow, and worm.*) The trick is in the action you add.

The lure does not always mimic live bait. (*Hold up spinnerbait and a spoon.*) The important thing is to add the right movement at the right time.

Not only are fish attracted to movement, but also to size, color, vibration, sound, and scent. How about this bait? (*Hold up a rattling bait.*) What attracts a bass to this lure? SHAPE, because it looks like a fish. (*Now shake it.*) What else might attract a bass to this lure? (SOUND.)

Knowing what a fish eats helps you select the right bait or lure. We learned what fish eat when we talked about the FISH factor. And we learned how to LOCATE fish. But now we have to figure out the right bait and how to get the bait right where the fish is.

Fish like catfish and carp eat plants and animals that live on the bottom. Use minnows, worms, corn, or prepared bait. (*Hold up jar of prepared catfish bait.*) Let the bait sit still on the bottom.

Fish like bluegill, trout, and crappie eat tiny animals, minnows and insects that can be found just about anywhere — on the bottom, on the surface, or in between. Use live minnows, small worms, or tiny lures like leadhead jigs. (*Hold up a leadhead jig and other small jigs from tackle box.*) Be sure to try fishing at different depths until you find fish. Once you do, suspend the bait below a float to keep it hanging at the level of the fish.

Fish like bass and walleye eat baitfish that roam at any depth as well as animals like crayfish that live on the bottom. Use live baits or lures that look like the live animals that they eat. (*Hold up plastic worm, crankbait.*) Try these baits near the bottom, but be willing to try other depths. Bass often take baits from the surface. (*Hold up surface bait.*) Make the baits act like the food they imitate. Do you think your lure would attract a bass or a pike if the lure acted like a wounded fish?

Fish like pike and striped bass eat big baitfish that may roam at any depth. Use big live baits or lures that look like the things they eat. Fish them at different depths and make them act like the prey they imitate. (*Hold up pike / muskie lure.*)

Hint: Use a diversity of examples, but use examples of fish and how to catch them that are locally relevant.

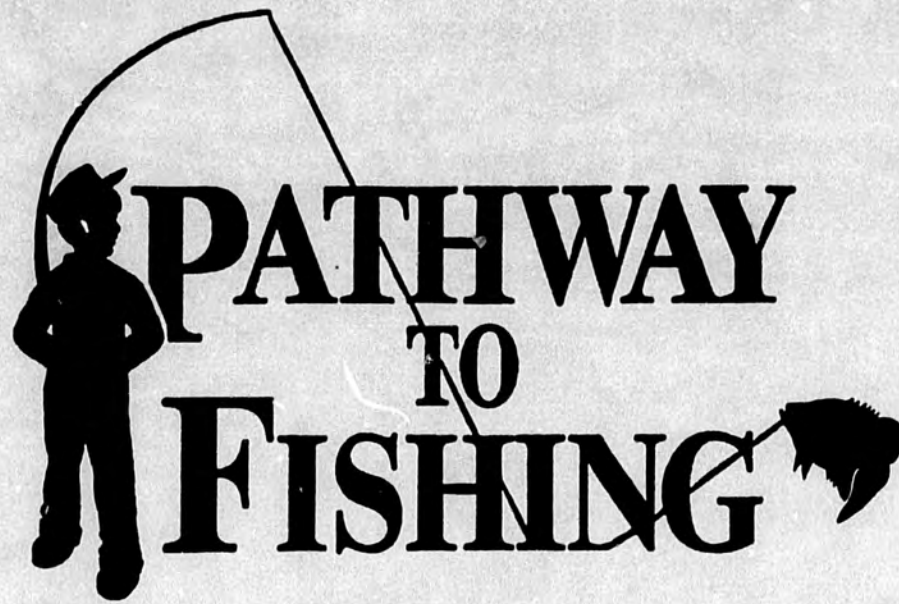
A quick review:

What does "F" stand for? FISH. Learning more about fish will help us catch them.

And "L"? LOCATION or where fish live.

And how about "P"? PRESENTATION or the type of lure or live bait to use and how to use it.

Now you are ready to learn about another important piece of equipment, a rod and reel.



F (FISH)
+ L (LOCATION)
+ P (PRESENTATION)
= S (SUCCESS)TM

LEARNING STATION 4 - PRESENTATION (RODS AND REELS)

Posters/Props: F+L+P=STM poster
Cane pole
Spincast rod and reel
Baitcasting rod and reel
Spinning rod and reel
Fly rod and reel
Easel (optional)

F+L+P=STM poster

The PRESENTATION factor (*instructor points to "P" on poster*) also means choosing the right rod and reel as well as the right bait or lure. For small fish and small bait or lures, you need to use a light rod. For big fish and heavy baits or lures, you need a strong rod. You have to use the right rod and reel to fish effectively.

You can catch fish with a cane pole and no reel or even just a hand line. You might have more fun though with a good rod and reel outfit. You can get a good all-around rod and reel combo for about \$25 to \$30.

There are four basic types of reels: spincast, spinning, baitcasting, and fly reels.

Spincast reels are the easiest to use and are a good choice for a "first" outfit. (*Instructor holds up spincast rod and reel.*) The reel is mounted on top of the rod handle and has a fixed spool so it will not backlash. To cast, you simply push the thumb button in and release it when you are ready to release your bait. The line goes out through a small hole in the front of the reel. Spincast reels are also called pushbutton reels.

Spinning reels mount under the rod. (*Instructor holds up a spinning rod and reel.*) You use your index finger to control the line when casting. With spinning reels, you can use lighter line, cast smaller lures, and cast farther. Spinning reels are a little harder to use than spincast reels, but are easily mastered by 10 year olds who have experience with a spincast reel.

Baitcasting reels operate like a powerful little winch. (*Instructor holds up a baitcasting rod and reel.*) The reel seems misnamed because it is used a lot when fishing with artificial lures. It has lots of power to fish in heavy weeds. They can backlash, called a birdnest, if not used properly. Baitcast reels require more practice to use and are best for medium-weight and heavy lures.

Fly reels are used specifically for fly-fishing.

We recommend that you start to fish with a spincast reel. Once you are experienced with a spincast rod and reel, try the other types. You will learn more about spincast reels and get to practice using them in other learning stations.

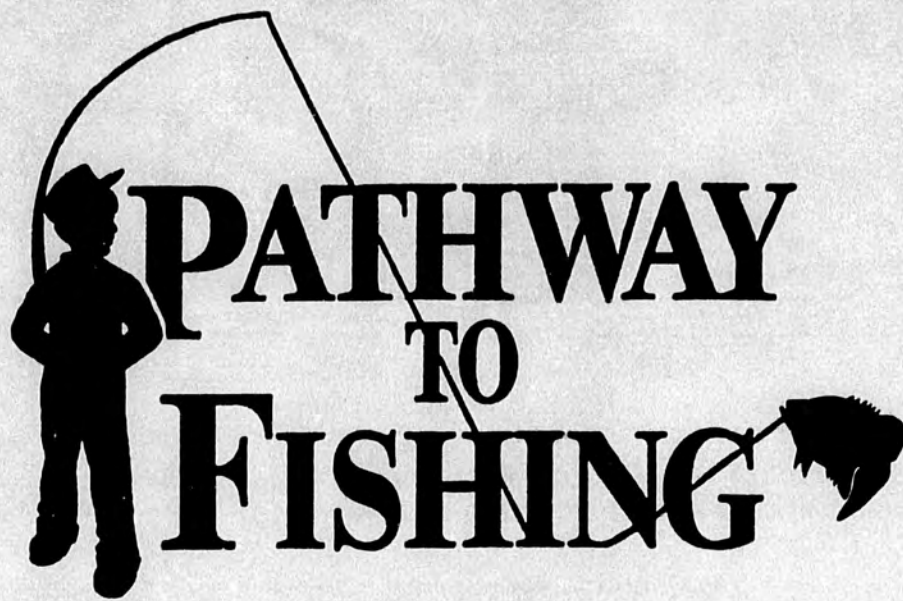
Rods are designed to be matched with the type of reel that is mounted on them. Casting rods are meant to be used with baitcast or spincast reels. The handle on these rods has a trigger and the guides are smaller. Spinning rods are meant to be used with spinning reels. They have larger guides and the handle does not have a trigger. Most rods are 5 to 7 feet long. Longer rods can cast further, but they are difficult to use for the beginning angler.

For beginning anglers, a 5- to 6-foot rod rated for 6- to 10-pound test line will work great. Most rods list information on them about the line test and lure weight that work best. This makes rod selection pretty easy.

Packaged combos are available that are balanced outfits including rod, reel, and line. All you add is a hook, bait, and water!

Just remember, your rod, reel, line, and lure should all be balanced. When starting out, keep your fishing tackle simple.

You are ready to move on to the next *Pathway to Fishing* learning station—tying knots.



F (FISH)
+ L (LOCATION)
+ P (PRESENTATION)
= S (SUCCESS)TM

LEARNING STATION 5 - TYING KNOTS

Posters/Props: Improved clinch knot poster
Spool of monofilament line
Spool of braided line
Spool of fly line
1/4" soft docking rope for instructor
Bell anchor
16" pieces of braided or monofilament line
Fingernail clipper
Casting plugs
Easel (optional)

Hint: At least one assistant per 5 participants is helpful at this station.

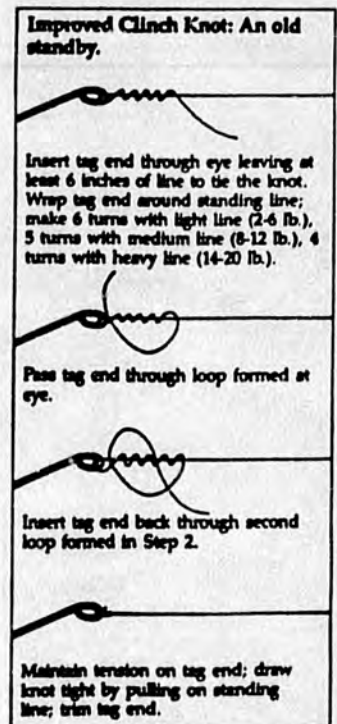
Who can tie their shoes? Well, tying a fishing knot is just as easy. When you hook a big fish, you will need a strong knot that will not slip or break.

Fishing line comes in many pound tests. Anglers fishing for small panfish use light line (like 4- to 6- pound test). Those pursuing medium size fish, like walleyes, bass, and catfish, use 8- to 14- pound test line. And anglers fishing for big fish (pike, stripers, muskie), use heavier line like 17- to 30- pound test. The three types of line are monofilament, braided, and fly line. (*Hold up spools of line.*) Use good quality line and keep it in good condition for the best success.

Most fishermen use monofilament line. We are going to learn how to tie a simple knot that is really strong, called the improved clinch knot. (*Teacher ties knot to anchor using rope, then kids practice with pieces of line and casting plugs.*)

Tips to remember about line and tying knots:

- Keep twists and spirals uniform so your knots are neat and small.
- Wet the line by the knot before snugging the knot; moisture reduces line-weakening friction.
- Tighten knots with steady pressure. Watch for slippage and retie if necessary.
- Trim the extra line with a fingernail clipper. Leave about 1/8 inch of line when you trim the end. This lets the knot slip a little without coming undone.
- Check your line each time you catch a fish. If it is nicked or scraped, strip off a few feet of line and retie.



Fishing line is the only connection between you and your fish. At the last Learning Station, you will receive a card with instructions on tying a few other knots. Take it home and practice.

Poster of Improved Clinch knot
(to be included in published User Manual)

LEARNING STATION 6 - SAFETY AND ANGLER ETHICS

Posters/Props: *Ethical Angler* poster
Kids life vest
Adult life vest
Sunglasses
Baseball hat
Ball of tangled line
Easel (optional)

You have learned about fish, where they live and why, and how to catch them. So, you are ready to go fishing, right? **WRONG.**

Before going fishing, we must first learn about being a safe angler. That way fishing will be more fun. Being a safe angler is easy, because it just takes common sense.

The most important thing you can do is to wear a **personal flotation device (life vest)**. Whether you are fishing from a boat, dock, or shore (especially near a dam) always wear your life vest — even if you are a good swimmer.

This life vest would not do me much good, would it? (*Instructor slips on a life vest that is way too small—just fits over his or her arm.*) It is important that your life vest fit properly, like this one. (*Instructor puts on an appropriate-size vest and zips it up.*)

Besides wearing a life vest, wear a hat and polarized sunglasses to protect you from flying hooks and the sun's glare. (*Instructor puts on hat and sunglasses.*)

We are still not quite ready to go fishing. First we should check the weather report. When you are fishing, you will come in contact with many types of weather such as high winds, fog, and the most dangerous, lightning.

Each year lightning claims more lives than all other weather-related accidents combined. Lightning strikes tall objects. An angler in a boat is tall compared to everything around. So is someone on shore. In either case, never hold a fishing rod during a lightning storm. If you get caught in a storm, seek immediate shelter in a house or vehicle. If you are outside, get in the lowest spot you can find, like a ditch. Do not stand under trees or poles.

When you are fishing, keep your eye on the sky! Leave when you see a storm coming. Otherwise, it might be too late.

All anglers should be good swimmers and know first aid. If you get hooked and the hook has penetrated beyond the barb, do not attempt to remove the hook. Go to a doctor or a first-aid station.

Hint: Preach prevention and casting safety.
Do not instruct people how to remove a hook.

Now we are ready to go out fishing. We know we will have fun because we will be fishing safely.

It is important to be safe. It is also important to behave in such a way that everybody can enjoy fishing. These good behaviors are called **ethics**. Fishing is a gift. We should be thankful for the opportunity to enjoy it and do our part to preserve it.

All good anglers live by an angler's code.

An ethical angler:

1. **Supports conservation efforts** — without good resource management, there will be no place to fish and no fish to catch.
2. **Practices catch and release** — it is okay to keep a few fish to eat, but release the rest so they can be caught again. Be sure to take your camera when you go fishing so you can take pictures and show your friends. Pictures also make good reminders of how much fun you had.
3. **Does not pollute; properly recycles and disposes of trash**—pollution kills fish. Proper recycling and trash disposal prevents pollution and keeps our environment enjoyable. Never leave trash on the shore or throw it out of the boat. Never sink cans, or leave bait containers. And never throw fishing line in the water. This kills fish, birds, and other wildlife. Keep it in your pocket until you get home. And then, take it to a recycling drop-off center.
4. **Practices safe angling and boating** — you will have more fun if you are a better angler and a safer boater.
5. **Obeys fishing and boating regulations** — these regulations are for your safety and to ensure the quality of your resources.
6. **Respects other anglers' rights** — everybody will have more fun fishing.
7. **Respects property owners' rights** — many areas will be closed to fishing if you are not respectful of private property.
8. **Shares fishing knowledge and skills** — help others become better anglers so they will have more fun.
9. **Does not release live bait into waters** — the bait you are using may not occur naturally where you are fishing and may have bad effects on the fish community if released.
10. **Promotes ethical sport fishing** — encourage other people to go fishing, experience the fun, and be an ethical angler like you.

If we all take care of the environment now, everyone can enjoy fishing and the great outdoors in the future.



The Ethical Angler:

- 1. Supports conservation efforts.**
- 2. Practices catch and release.**
- 3. Does not pollute; properly recycles and disposes of trash.**
- 4. Practices safe angling and boating.**
- 5. Obeys fishing and boating regulations.**
- 6. Respects other anglers' rights.**
- 7. Respects property owners' rights.**
- 8. Shares fishing knowledge and skills.**
- 9. Does not release live bait into waters.**
- 10. Promotes ethical sport fishing.**

LEARNING STATION 7 - CASTING DEMONSTRATION

Posters/Props: Baseball, bat and glove
Spincast rod and reel with casting plug
Casting target (box, Hula Hoop, rope circle, washtub,
etc.)

Every sport has tools needed to play the game. In baseball we use a bat, ball, and glove. In fishing, our tools are a rod, reel, line, and lure or bait. Casting is an important part of fishing. An accurate cast puts the bait right where the fish are, not in the trees. At this Learning Station, we will show you some casting basics. At the next Learning Station, each of you will practice casting at targets.

How many of you have used a spincast rod and reel before? The rod has a pistol grip handle. (*Instructor demonstrates.*) Wrap your index finger around the trigger. Use two hands to hold the rod if you need to. The reel has a push button. When you hold the button down, the line stays in. As soon as you let your thumb off the button, the line comes out. (*Instructor demonstrates casting.*)

Here are a few things that will help you become a better caster:

- Reel in your plug so it hangs no more than 4 inches from the rod tip.
- Treat the plug as if it were a hook. Be sure no one is standing behind you when you cast.
- Stand with your feet shoulder distance apart.
- Keep your feet planted on the ground when you cast. Do not step into the cast like you are throwing a baseball.
- Face the casting target. Aim your rod tip toward the target.
- Keep your elbow and upper arm close to, but not against, your body. Let your wrist do the casting.
- Imagine that your arm is the hand on a clock with noon being here. (*Point directly above you.*) Smoothly lift the rod tip by bending your elbow and wrist. Stop the rod tip behind you at the 10 o'clock position.
- Move your forearm and snap your wrist as you release the plug. Lift your thumb from the push button to release the plug when the rod tip is at 2 o'clock. If you release too early, your plug will fly up in the air. If you release too late (after 2 o'clock) your plug will slam to the ground.
- Follow through so the rod tip points at your target.
- Cast nice and easy; you do not have to whip the plug at 100 miles per hour.

(*Instructor demonstrates proper casting while aiming at target. Remind kids not to cast sidearm.*)

In the next Learning Station you will be practicing what you have just learned.
Have fun!

LEARNING STATION 8 - HANDS-ON CASTING

Posters/Props: 15 spincast rod and reel combinations with casting plugs attached to end of line
6 casting targets (boxes, Hula Hoops, rope circles, washtubs, etc.)

Hint: 1 instructor for every 3 to 4 participants is helpful to assist with snags, twists, problems. Have the kids line up facing the targets and give each a spincast outfit.

At this Learning Station, you will get to practice what you just learned.

Remember these things when you are casting:

- Reel in your plug so it hangs no more than 4 inches from the rod tip.
- Treat the plug as if it were a hook. Be sure no one is standing behind you when you cast.
- Stand with your feet shoulder distance apart.
- Keep your feet planted on the ground when you cast. Do not step into the cast like you are throwing a baseball.
- Face the casting target. Aim your rod tip toward the target.
- Keep your elbow and upper arm close to, but not against, your body. Let your wrist do the casting.
- Imagine your arm is the hand on a clock with noon being here. (*Point directly above you.*). Smoothly lift the rod tip by bending your elbow and wrist. Stop the rod tip behind you at the 10 o'clock position.
- Move your forearm and snap your wrist as you release the plug. Lift your thumb from the pushbutton to release the plug when the rod tip is at 2 o'clock. If you release too early, your plug will fly up in the air. If you release too late (after 2 o'clock) your plug will slam to the ground.
- Follow through by tracing the path of the lure with the rod tip.
- Cast nice and easy; you do not have to whip the plug at 100 miles per hour.

Hint: Be sure to acknowledge the participants if they hit the target!

At the next Learning Station, you will learn about setting hooks and fighting fish.

LEARNING STATION 9 - DETECTING BITES, HOOKING, & FIGHTING FISH

Posters/Props: Rod and reel with balanced line, bobber, bait
Forked stick
Catfish outfit (rod and reel, line, sinker)
Spinning rod and reel with plastic worm
Spincast rod and reel with casting plug

Because you learned about the $F+L+P=S^{\text{TM}}$ formula, you are in the right place and using the right equipment for SUCCESS — catching a fish. Before you can catch a fish, you have to know when you have a bite. Then you have to set the hook and fight the fish so you can bring it close enough to grab or net it.

The first step in catching a fish is knowing when you get a bite. Sometimes detecting bites is easy. If you are using a bobber, the bobber goes down when a fish takes the bait. (*Hold up a balanced rig with a bobber.*) But you want to be sure to have the right size bobber for the bait you are using. Remember what you learned about matching your equipment to the fish you are fishing for and the bait you are using.

Catfish anglers often rest their rod in a forked stick (*prop a rod on the forked stick with line out, held in place by sinker*). When a fish takes the bait the line twitches — the fish is mouthing the bait — and then moves off. If you are holding the rod (*pick up rod from forked stick*), pinch the line between your fingers to feel the strike.

When you are casting and retrieving a lure, a fish will grab it and you will know right away that you have a fish. But when you are retrieving a leadhead jig or a plastic worm, sometimes you need to watch for your line to twitch, or you can use your finger (*show holding finger on line*) to detect the strike.

Once the fish has taken the bait, you need to set the hook. This is easy. Set the hook by quickly lifting (sweeping) the rod tip up and back at an angle. (*Instructor demonstrates by having a kid hold a casting plug.*) The line tightens, the rod bends, and the power of the sweep and the rod moves the hook into the jaw of the fish. In most cases, one sharp snap is all it takes. It always helps to keep your hooks sharp!

When you pull on the line, you are pulling the fish. The fight occurs as you try to get the fish to come to you and the fish tries to escape. The fish may jump, swim away from you, or swim into cover.

Keep the rod bent and the tip high to keep the line tight. Let the rod work as a shock absorber. The rod will help you fight the fish by pulling the fish to you. If the line becomes slack, the hook might come out of the fish's mouth and the fish could get away.

Most reels have a drag that acts like a brake to let the line out under resistance and keep the line from breaking. (With 8- to 10- pound test line, set the drag so a 10-year old can just barely pull the line out. For very powerful fish, the drag must be set lighter.)

Do not reel when the fish is taking line or when the line is so tight that you cannot gain line. Use the power of the rod to pull the fish toward you — lift the rod tip from about 3 o'clock to 1 o'clock. Then, keeping the line tight, reel back down to about 3 o'clock.

Demonstrate entire process—playing fish, setting drag, pumping fish using assistant or volunteer as the fish.

Once you have a fish at the boat or shore, you need to land it. You will learn all about landing, handling, and releasing fish at the next Learning Station.

LEARNING STATION 10 - HANDLING AND RELEASING FISH

Posters/Props: Fish handling poster
Cotton work glove
Pliers
Hookout or hemostat
Fingernail (line) clipper
Large fish hook (size 2/0)
Small fish hook (size 8)
Easel (optional)

Hint: The instructor(s) for this station should be experienced anglers or a fishery biologist. These people will be familiar with the techniques for handling different fish.

At this station, participants learn how to handle fish to avoid injury to the fish and to themselves. This station should emphasize handling fish that they are likely to catch locally. It also is a good opportunity to emphasize catch-and-release or catch-photograph-and-release.

Use of fish facsimiles is suggested in this station. The facsimiles should look like the fish the participants will catch but do not have to be art. The emphasis should be on realistically simulating those parts of the fish that should be handled delicately (e.g., gills, esophagus) or parts not to handle at all (e.g., eyes) to prevent injury to the fish and those parts (e.g., fin spines, teeth, abrasive gill arches, opercular spines) that can injure the person handling the fish. Information about creating facsimiles of fish is provided in the Operation Guide (Part 1).

Sometimes landing fish can be scary, especially when the fish is big and has a mouth filled with sharp teeth, like a pike. Since fish are caught on hooks, special care must be taken so you do not get hooked. Gill arches can cut, too. By learning how to handle fish, you can prevent accidents.

One common mistake anglers make is trying to land a fish before it is tired. This does not mean you must wear the fish out. Just be sure the fish is not still fighting when you pick it up.

The best way for a beginning angler to land fish is with a net; however, with practice many fish can be lifted from the water without a net.

Fish Handling poster

Hint: The instructors should show the participants how to hold different fish. Point to the poster or demonstrate with fish facsimiles. When using fish facsimiles, pass them around and help each participant hold the fish as instructed. A live fish will often wiggle and flop when you hold it. Grasping the fish firmly, but not so hard that you will injure it, will keep the fish from wiggling and getting free.

Bass and crappie are probably the easiest fish to land because they have a built-in handle — their lower jaw. Grab the lower jaw using your thumb (inside the mouth) and index finger (outside the mouth) and lift with your index finger. This immobilizes the fish, making hook removal easy. They have very small teeth like sandpaper that will not hurt you.

Small species of fish like yellow perch and sunfish can be landed by grabbing them across the body with your hand. Grab them slightly behind the head and then slide your hand back along the body to push down the sharp dorsal spines.

Most anglers handle toothy critters like walleye, pike, and muskies by grabbing them behind the head and squeezing tightly so they cannot wiggle loose. Walleyes have sharp gill plates that can cut your fingers if you grasp too close to the head.

Catfish have sharp spines in the dorsal and pectoral fins that can cause puncture wounds and infections. A good way to hold catfish is to slide your hand (from the head of the fish toward the tail) over their head so the notch of your hand between the thumb and index finger is against the front of the dorsal spine. Then put your thumb behind the pectoral fin on one side of the fish and your fingers behind the pectoral fin on the other side of the fish. Catfish are quite hardy, so grasp them firmly.

Contrary to popular rumors, no freshwater sport fishes and few marine sport fishes have venom glands associated with spines. It hurts to get stuck with a spine just like it hurts to get stuck with a needle.

If you have ever tried to hold wet noodles in your hand, you have some idea of how to handle a trout. Trout do not have hard spines like bass and catfish, but many do have a mouth full of sharp teeth — so you do not want to grab them by the jaw. It is best to try to keep the trout in the water and gently cup one hand under its soft, slick belly while you remove the hook with the other hand. If you need to lift the trout out of the water, be sure that your hand is wet so you do not remove the tiny scales that protect the fish.

A wet cotton work glove can be a very useful tool for handling fish. There is nothing wrong with using a glove until beginning anglers become more comfortable handling fish. In fact, a wet cotton glove can inflict less damage to a fish than one handled with a dry hand, especially if using the glove allows you to more quickly and surely handle the fish.

When you have firmly grasped the fish, remove the hook. The best release method is to keep the fish in the water and use a pliers, hookout, or hemostat (surgical pliers) to remove the hook or lure. When used properly, hooks removed using these devices cause less damage to the fish and you have less of a chance of getting hooked yourself.

Release the fish back into the water as gently as possible. Never throw it. If the fish is overly tired, hold it in an upright position until it is ready to swim away. Do not slide the fish back and forth in the water; gills only work when water flows from front to back and this will do more harm than good. Never hold a fish by the eyes or gills.

If a fish is hooked deeply in the throat and the hook cannot be removed easily, cut the line and release the fish. The fish's enzymes will usually cause the hook to dissolve without harming the fish.

Decide whether to keep or release a fish as soon as you catch it. It is important to practice catch and release. Watching the fish swim away is a great feeling, and you know that others will have to opportunity to catch the fish and have fun as you did. A fish's chance of survival is greatest if you release it immediately. Fish kept on stringers have a very low chance of surviving if you decide to release them later.

Learning to handle fish properly is one of the most important skills you need in fishing. It is a skill you want to practice and master.

Fish Handling poster
(to be included in published User Manual)

LEARNING STATION 11- LOCAL FISHING OPPORTUNITIES AND REGULATIONS

Posters/Props: Regional maps
Regulations booklet
Other handouts

Arrange for local conservation personnel to discuss local fishing opportunities, regulations (length, possession limits, seasons), and explain the role of aquatic resource management agencies in preserving fishery resources.

Hand out regional maps, regulations, safety brochures, etc.

LEARNING STATION 12 - SUCCESS

Posters/Props: $F+L+P=S^{\text{TM}}$ poster
Trophy fish mount or replica

$F+L+P=S^{\text{TM}}$ poster

What does the "F" factor stand for? FISH
What does the "L" factor stand for? LOCATION
What does the "P" factor stand for? PRESENTATION

The final letter in our formula is the "S". "S" stands for SUCCESS, which is what each of you will have when you practice the formula.

Knowing some things about the fish you are fishing for, where fish can be found, and what equipment to use means you will catch fish and have fun! Do not forget to be a safe and ethical angler. Someday you might even be lucky enough to catch one like this! (*Instructor holds up trophy fish mount or replica.*)

Remember, the opportunity to go fishing is a gift. This gift was passed on to you; it is your responsibility to share this gift and pass it to others. A good angler always obeys the *Angler's Code of Ethics*. (*Hand out Ethical Angler decals and read the Angler's Code.*)

Congratulations! Since each one of you has traveled through all the *Pathway to Fishing* Learning Stations, you receive a Certificate of completion along with some other things for you to take home.

Thank you all for coming today. We would like you to complete an evaluation of this *Pathway to Fishing* program. (*Tell the participants and parents where to obtain and complete the forms.*) Good luck fishing!

Hand out Pathway to Fishing Certificates, Knot Cards, and other miscellaneous donated items or goodie bags.



PATHWAY TO FISHING

Developed as a Cooperative Effort

by
U.S. Fish and Wildlife Service • National Park Service • Bureau of Land Management
Bureau of Reclamation • USDA Forest Service • Berkley • and The In-Fisherman



PATHWAY TO FISHING

Developed as a Cooperative Effort

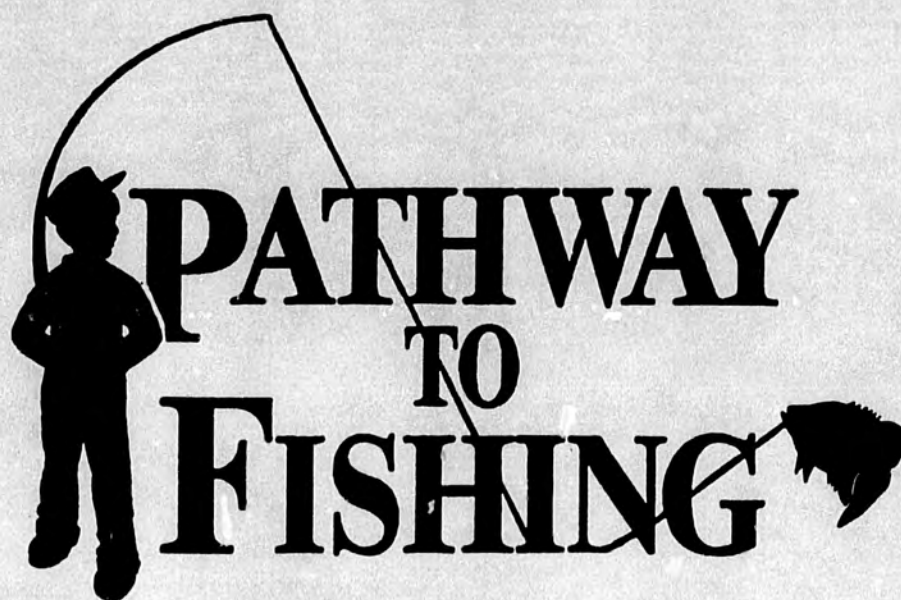
by
U.S. Fish and Wildlife Service • National Park Service • Bureau of Land Management
Bureau of Reclamation • USDA Forest Service • Berkley • and The In-Fisherman



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F (FISH)
+ L (LOCATION)
+ P (PRESENTATION)
= S (SUCCESS)TM



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This is to certify that

has participated in the Pathway to Fishing
instructional seminar.

*The individual named above has
the knowledge to fish safely and successfully while
demonstrating a concern for nature, our environment,
and the rights of other anglers.*

Awarded this day in the interest of better fishing tomorrow.

Berkley

In^{the}Fisherman:



PATHWAY TO FISHING REGISTRATION FORM

MASTER

1. Participant name: _____
2. Address: _____
3. City _____ County _____ State _____ Zip _____
4. Phone number: (_____) _____
5. Age: _____
6. Gender: Male _____ Female _____

Answer for the participant:

7. Have you fished before? Yes _____ No _____ How many times in the past year: _____
8. Have you participated in any other beginning fishing, conservation, or outdoor ethics program? Yes _____ No _____
9. If Yes, name of program: _____
when: _____

Answer for the male parent/guardian:

10. Do you fish? Yes _____ No _____ How many times in the past year: _____

Answer for the female parent/guardian:

11. Do you fish? Yes _____ No _____ How many times in the past year: _____

Answer for the family:

12. Do you own a boat? Yes _____ No _____
13. Approximate value of fishing tackle (do not include value of boat): \$ _____
14. Where do you fish? (check all that apply)
 - () within 5 miles of home
 - () 5-10 miles from home
 - () 10-50 miles from home
 - () 50-100 miles from home
 - () more than 100 miles from home
 - () I presently do not fish
15. Where do public fishing opportunities exist? (check all that apply)
 - () within 5 miles of home
 - () 5-10 miles from home
 - () 10-50 miles from home
 - () 50-100 miles from home
 - () Don't know
16. Population of town/city where you live (check)
 - () rural, do not live in town or city
 - () less than 10,000 people
 - () 10,000-49,999 people
 - () 50,000-249,999 people
 - () 250,000-999,999 people
 - () 1 million or more people

MASTER

**PATHWAY TO FISHING
PARTICIPANT AND PARENT/GUARDIAN EVALUATION**

1. Youth's age: _____ years.

2. Youth's gender: Male _____ Female _____

Answer for the youth participant

3. What part of *Pathway to Fishing* did you like best? _____

4. What part(s) did you not understand? _____

5. Did this program make you want to go fishing? Yes _____ No _____

6. Did this program make you more aware of safety? Yes _____ No _____

7. Did this program make you more aware of the importance of angler ethics? Yes _____ No _____

8. Did you learn something new about fish and where fish live? Yes _____ No _____

9. Do you want to learn more about fish and where fish live? Yes _____ No _____

Answer for the parent/guardian

10. What part of *Pathway to Fishing* did you like best? _____

11. What part(s) did you not understand? _____

12. Did this program make you want to go fishing? Yes _____ No _____

13. Did this program make you want to take your child fishing? Yes _____ No _____

14. Will you purchase fishing tackle for your child? Yes _____ No _____

15. Did this program make you more aware of safety? Yes _____ No _____

16. Did this program make you more aware of the importance of angler ethics? Yes _____ No _____

17. Did you learn something new about fish and where fish live? Yes _____ No _____

18. Do you want to learn more about fish and where fish live? Yes _____ No _____

19. Additional comments: _____

(PTF.6)

—Thank You!

MASTER

**PATHWAY TO FISHING
PARTICIPANT AND PARENT/GUARDIAN EVALUATION**

1. Youth's age: _____ years.

2. Youth's gender: Male _____ Female _____

Answer for the youth participant

3. What part of *Pathway to Fishing* did you like best? _____

4. What part(s) did you not understand? _____

5. Did this program make you want to go fishing? Yes _____ No _____

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7. Did this program make you more aware of the importance of angler ethics? Yes _____ No _____

8. Did you learn something new about fish and where fish live? Yes _____ No _____

9. Do you want to learn more about fish and where fish live? Yes _____ No _____

Answer for the parent/guardian

10. What part of *Pathway to Fishing* did you like best? _____

11. What part(s) did you not understand? _____

12. Did this program make you want to go fishing? Yes _____ No _____

13. Did this program make you want to take your child fishing? Yes _____ No _____

14. Will you purchase fishing tackle for your child? Yes _____ No _____

15. Did this program make you more aware of safety? Yes _____ No _____

16. Did this program make you more aware of the importance of angler ethics? Yes _____ No _____

17. Did you learn something new about fish and where fish live? Yes _____ No _____

18. Do you want to learn more about fish and where fish live? Yes _____ No _____

19. Additional comments: _____

(PTF.6)

—Thank You!

PATHWAY TO FISHING COOPERATOR SELF-EVALUATION

MASTER

1. What was your role in this event?
Instructor ☐ Sponsor ☐ Organizer ☐ Other ☐
2. Did you enjoy this event? Yes ☐ No ☐
3. Do you think the youth learned from this event? Yes ☐ No ☐
4. Do you think the adult participants learned from this event? Yes ☐ No ☐
5. Did this program make you more aware of safety? Yes ☐ No ☐
6. Did this program make you more aware of the importance of angler ethics? Yes ☐ No ☐
7. Did you learn something new about fish and where fish live? Yes ☐ No ☐
8. Do you want to learn more about fish and where fish live? Yes ☐ No ☐
9. Did you stay on time? Yes ☐ No ☐
10. Were all parts of the manual easily understood? Yes ☐ No ☐

11. What could be improved (please be specific)? _____

12. What did you do differently from the Operation or Instructor Guide that was effective?

13. Would you participate in another *Pathway to Fishing* event? Yes ☐ No ☐ /

(PTF.7)

—Thank You!

PATHWAY TO FISHING COOPERATOR SELF-EVALUATION

MASTER

1. What was your role in this event?
Instructor ☐ Sponsor ☐ Organizer ☐ Other ☐
2. Did you enjoy this event? Yes ☐ No ☐
3. Do you think the youth learned from this event? Yes ☐ No ☐
4. Do you think the adult participants learned from this event? Yes ☐ No ☐
5. Did this program make you more aware of safety? Yes ☐ No ☐
6. Did this program make you more aware of the importance of angler ethics? Yes ☐ No ☐
7. Did you learn something new about fish and where fish live? Yes ☐ No ☐
8. Do you want to learn more about fish and where fish live? Yes ☐ No ☐
9. Did you stay on time? Yes ☐ No ☐
10. Were all parts of the manual easily understood? Yes ☐ No ☐

11. What could be improved (please be specific)? _____

12. What did you do differently from the Operation or Instructor Guide that was effective?

13. Would you participate in another *Pathway to Fishing* event? Yes ☐ No ☐

(PTF.7)

—Thank You!

**PATHWAY TO FISHING
EVENT FORM**

Event chairperson(s) _____

Name of organization _____

Mailing address _____

City _____ State _____ Zip _____

Daytime Phone (____) _____

Name(s) of co-sponsor(s) _____

Date of event _____ Time of event _____

Location of event _____

Number of people conducting *Pathway to Fishing* event _____

Did you attempt to have a State or Federal fishery manager or conservation officer participate in the event? Yes _____ No _____

Did they participate? Yes _____ No _____

Was this event part of another event? Yes _____ No _____

If Yes, name or type of event: _____

Number of children that participated: under age 5 _____

age 6 - 10 _____

age 11 - 16 _____

Percentage of youth with at least one parent/guardian _____%

What type(s) of publicity did the event receive? (circle all that apply)

None Poster Flyer Radio Television Newspaper Other _____

How would you rate the success of your *Pathway to Fishing* event? (Circle one)

Highly successful Moderately successful Not successful

Will your organization conduct another *Pathway to Fishing* event?

Yes _____ No _____ If yes, when? _____

Please provide any additional comments on the back of this form or on a separate page. Thank you for your cooperation. Return this form and completed Registration Forms and Evaluation Forms to:

U.S. Fish and Wildlife Service
1849 C Street, N.W.
Pathway to Fishing
ARLSQ - 820
Washington, D.C. 20240

Thank You.



**RADIO AND TELEVISION
PUBLIC SERVICE ANNOUNCEMENT**

For release _____ (insert date 2 weeks before event)
through _____ (date of event)

Pathway to Fishing

There's really nothing to match the excitement of that first fish tugging on your line!
You have to feel it for yourself!

If you want to learn about fish, where they live, how to catch them, and how to cast, take a walk through *Pathway to Fishing*. You will get personal attention because experienced anglers and biologists teach you in small groups. In 60 minutes, you will learn how to catch your first fish.

Ask Mom, Dad, or a friend to bring you to _____ (location)
on _____ (date) between _____ (begin time) and _____ (end time).
New classes begin every 5 minutes. You will ALL learn about fish and how to catch them. The event is FREE and it's FUN.

Tag:

Pathway to Fishing was developed by Federal Land Management Agencies, Berkley, and the In-Fisherman.

This event is sponsored by _____ (name of local sponsors)
of _____ (name of city).

Alaska State Legislature

REPRESENTATIVE
PETER KELLY

Mailing Address:
119 N. Cushman, Suite 203
Fairbanks, Alaska 99701
(907) 456-8161



While in Juneau
State Capitol
Juneau, Alaska
99801-1182
(907) 465-2327

House District 31

House Of Representatives

Sponsor Statement

House Bill 256

House Bill 256 is a promotional venture to attract Alaskan's and visitors to buy fishing licenses and join in the fun of fishing in Alaska. Although the bill is primarily oriented towards sport fishing, getting individuals into the act of fishing is another way of helping them learn the importance of Alaska's fishery resources.

Fishing is Fun Week is a National event with it's own promotional energy. HB 256 would bring Alaska into the fun event.

It is the intent of the sponsor of this legislation to increase the participation of Alaskan's as well as visitors to Alaska in the appreciation of Alaska's bountiful fishing opportunities. HB 256 will get new anglers hooked on fishing, and seeks to reel back in those who have gotten away from the activity.

FISCAL NOTE

STATE OF ALASKA
1995 LEGISLATIVE SESSION

BILL NO. HB256

Revision Date: _____ Dept. Affected: Fish and Game
Title: An Act authorizing the Commissioner of BRU: Division of Sport Fish
Fish and Game to establish a free sport fishing Component: Sport Fisheries
Sponsor: Representative Kelly
Requester: House Special Committee on Fisheries COMPONENT SERIAL NO. 464

Expenditures/Revenues

(Thousands of Dollars)

OPERATING EXPENDITURES	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0

CAPITAL EXPENDITURES						
----------------------	--	--	--	--	--	--

CHANGE IN REVENUES ()						
------------------------	--	--	--	--	--	--

FUND SOURCE

(Thousands of Dollars)

1002 Federal Receipts						
1003 GF Match						
1004 GF						
1005 GF/Program Receipts						
1006 GF/MHTIA						
Other						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0

Estimate of any current year (FY95) cost: \$ _____

POSITIONS

FULL-TIME						
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

Assumptions: Any initial loss of license sale revenue will be compensated by new anglers that result from these activities.

Prepared by: John Burke *Mark Stone for John Burke*
Division: Sport Fish
Approved by Commissioner: Frank
Agency: Fish and Game

Phone: 465-6187
Date: 2/16/95
Date: 3-24-95

PREPARER TO PROVIDE ALL DISTRIBUTION COPIES TO GOVERNOR'S LEGISLATIVE OFFICE

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DEPARTMENT OF FISH AND GAME

POSITION PAPER

Bill Number: HB256

Sponsor: Representative Kelly

Bill Title: An Act authorizing the commissioner of fish and game to establish free sport fishing days.

Department Position: Support.

This legislation would give the commissioner of fish and game the authority to designate not more than two days each year on which a person, resident or nonresident, may sport fish without a fishing license or king salmon tag. A number of states have free fishing days associated with National Fishing Week Activities and other recreational fishing educational activities. Free fishing days allow people who would like to try fishing an opportunity to do so without the necessity of purchasing a license. The legislative intent is that recreational anglers in Alaska have this same opportunity.

Free fishing days offer people who do not ordinarily fish the opportunity to experience fishing without the associated expense of a license. A free fishing day in conjunction with National Fishing Week activities or winter fishing carnivals can serve to introduce or reacquaint people with recreational fishing; people who might otherwise not participate because of the expense of a license. Free fishing days are an effective centerpiece for department sponsored or assisted aquatic education programs. These programs primarily focus on the conservation concepts and angler ethics required to promote a sustained yield from recreational fishing resources.

It is important that the commissioner have the flexibility to designate the days in question. Traditionally National Fishing Week occurs in early June during the peak of most king salmon fisheries. Many of these fisheries are intensely fished and fully utilized. It is possible that a free fishing day would create a derby-like situation in these already crowded fisheries. This may not be a positive effect as a disproportionate number of fish might be harvested in such a situation. This could significantly complicate management and perhaps even the intended allocation of harvest. It is also possible that the department could lose significant revenue from the loss of king salmon tag sales. Though this scenario is possible, we do not think it is likely. In any event if such a situation developed, the commissioner could chose

to designate the free fishing day after the peak king salmon fishery.

Initial license and king salmon tag sale opportunities that are lost due to a free fishing day should be compensated by the new anglers that result from these activities.

We feel that free fishing days would not only result in more recreational anglers, but could also indirectly result in a more informed public relative to ethical angling practices and the conservation concepts necessary to promote a sustained yield from the recreational fishing resource.

Commissioner's Signature: _____

Frank R.

Date: _____

3.24.55



National Fishing Week Steering Committee

Field Office: 2944 Patrick Henry Drive, Suite 15
Falls Church, VA 22044-2926 • 703/532-7730 • Fax 703/241-9717

The following states have provided the dates for their 1994 Free Fishing Day(s). In general, this allows the public to fish without a license. *Individual states may place some restrictions and other regulations may apply. Check with your State Fish and Game Agency or the National Fishing Week Steering Committee for specific state information.*



NATIONAL FISHING WEEK JUNE 6-12, 1994 FREE FISHING DAYS

Alabama:	June 11	Nevada:	June 11
Arizona:	June 11	New Hampshire:	June 4
Arkansas:	June 10 - 12	New Jersey:	June 11 - 12
California:	June 11 & Sept 24	New Mexico:	June 4 & Sept 24
Colorado:	June 4 - 5	New York:	June 25 - 26
Connecticut:	June 11	North Dakota:	June 11 - 12
Delaware:	TBA	Ohio:	June 4 - 5
Florida:	June 11 - 12	Oklahoma:	June 11 - 12
Georgia:	June 11 - 12 & Sept 24	Oregon:	June 11
Idaho:	June 11	Pennsylvania:	June 4 - 5
Illinois:	June 10 - 13	Rhode Island:	June 4 - 5
Indiana:	June 11 - 12	South Carolina:	June 11 - 12
Iowa:	June 10 - 12	South Dakota:	May 21 - 22
Kansas:	June 11 - 12	Tennessee:	June 11
Kentucky:	June 4 - 5	Texas:	June 4
Louisiana:	June 11 - 12	Utah:	June 11
Maine:	June 19 & Feb 20	Vermont:	June 11
Maryland:	June 4 & 11, July 4	Virginia:	June 4 - 5
Massachusetts:	June 18 - 19	Washington:	June 11 - 12
Michigan:	June 11 - 12	Washington, D.C.:	June 6 - 12
Minnesota:	June 11 - 12	West Virginia:	June 11 - 12
Missouri:	June 11 - 12	Wisconsin:	June 5

THE NATIONAL FISHING WEEK STEERING COMMITTEE
2944 PATRICK HENRY DRIVE
SUITE 15
FALLS CHURCH, VA 22044-2926
(703) 532-7730

Not all states planning to sponsor Free Fishing Day(s) have approved dates and are listed as "TBA."

Post-It™ brand fax transmittal memo 7871		# of pages > /
To <i>M. Kramer</i>	From <i>Ron Johnson</i>	
Co.	Co.	
Dept.	Phone #	
Fax # <i>452-5428</i>	Fax #	

Midnight Sun Flycasters
P.O. Box 81031
Fairbanks, Alaska 99708

March 13, 1995

Dear Sirs,

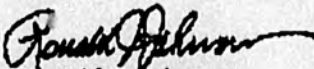
The Midnight Sun Flycasters would like you to consider introducing legislation that would offer individuals an opportunity to fish in Alaska without a fishing license for at least two days out of the year. It appears that many of the lower 48 states have such provisions for people in their states.

Free fishing days are an important promotional tool across the country. The purpose of free fishing days is to encourage new people to get acquainted with the great sport of fishing. Alaska could promote the excellent fishing opportunities that we enjoy. This event could also promote tourism and economic benefits for our state.

The Midnight Sun Flycasters of Fairbanks Alaska is a nonprofit Flyfishing club in the interior of Alaska. Our purpose and desire is to promote and work for the betterment of sport fishing, to encourage and advocate conservation of resources in our lands, streams and lakes and to promote the education of the public in regards to our wonderful heritage of sport fishing.

We would like to see these days take place during National Fishing Week. Thankyou for considering our desire.

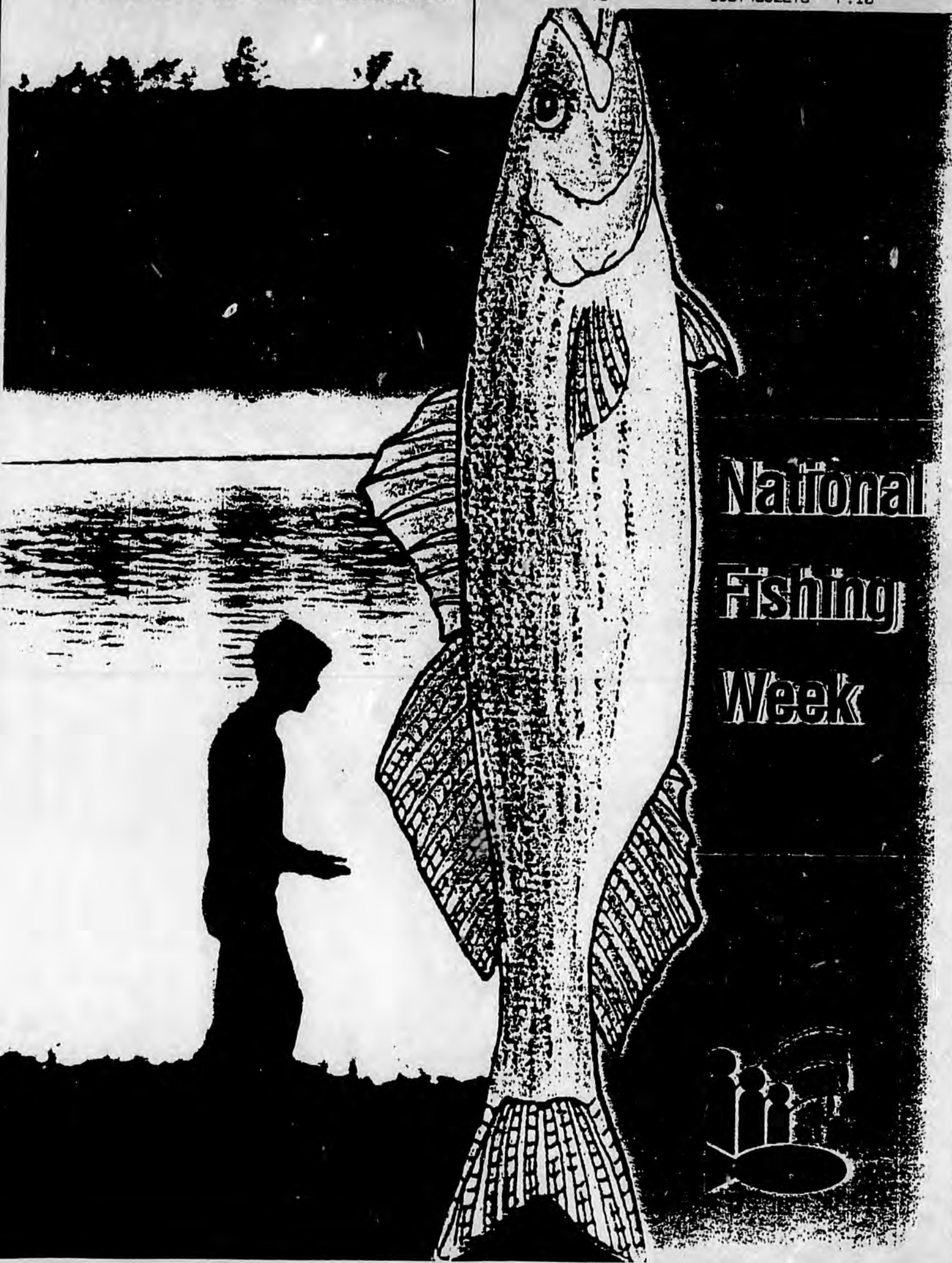
Sincerely,


Ronald J. Johnson

President MSFC

(907) 431-6139

Letter of Support for HB 256



National
Fishing
Week



MAY 18 1992



Fishing is a healthy outdoor recreational activity in New York which grows more popular every year. The reasons are as many and diverse as the waters where the sport can be pursued.

New York is a state truly rich in water resources. The mammoth Great Lakes, sprawling reaches of Long Island's coastal shores, legendary Catskill streams, rare splendor of our Finger Lakes, miles of rivers and tiny Adirondack ponds all have their beauty and each offer unparalleled fishing potential.

That potential is made real for present day fishermen by the continuance of New York's century-old tradition of sound fisheries management carried forward by dedicated professionals. Their efforts have resulted in a breadth and scope of fishing opportunity unmatched in the nation. We also help people learn about fishing so they can enjoy this lifetime recreation.

Fishing has a particular fascination for children of all ages. Mindful of this affinity, New York makes available to young anglers a formal and enjoyable educational program. The Sportfishing Aquatic Resources Education Program (SAREP) uses trained volunteers to impart to our youth a feeling for the traditions of sportfishing and solid knowledge about conservation, management and wise use of our aquatic resources. More than 2.3 million anglers 16 years and older and about one million children enjoy angling in New York each year. Cumulatively they fish more than 50 million days and spend in excess of \$2.5 billion annually in pursuit of their favorite fish.

To give both residents and nonresidents an opportunity to savor the joys of fishing in New York, we again invite the public to enjoy two free days of fishing on June 27-28, 1992. No license is required for this weekend, allowing first-time anglers and those who have gotten away from the sport a chance to win a line and perhaps ignite a lifetime love affair. Good stewardship of our natural resources is an easier goal to attain when all of our citizens have an appreciation for and a stake in those resources. Fishing is a great place to start that linkage. This year we celebrate this observance throughout June, beginning with National Fishing Week, June 1-7, and culminating with our free fishing days on the last weekend.

NOW, THEREFORE, I, Mario M. Cuomo, Governor of the state of New York, do hereby proclaim June, 1992, as

FISHING MONTH

In New York state.



BY THE GOVERNOR:

G I V E N under my hand and the
Privy Seal of the State at the
Capitol in the City of Albany
this fourth day of May in the
year one thousand nine hundred
hundred and ninety-two.

Mario M. Cuomo

Andrew J. Tambelli
Secretary to the Governor



Alaska Sportfishing Association

P. O. Box 24-1847

Anchorage, AK 99524-1847

Representative Pete Kelly
State House
Juneau, Ak 99801
Via Fax

Dear Representative Kelly,

We have just been advised of HB 256 which authorizes the Commissioner of Fish and Game to establish free sport fishing days.

The Alaska Sportfishing Association (ASA) feels that the bill provides everyone the opportunity to take part in one of Alaska's premier activities. It should increase the awareness of both Alaskans and our visitors to the sport of fishing and the use of our incredible Alaska outdoors.

ASA wholeheartedly supports HB 256 and urges its passage.

 3/14/95
Phil Cutler, President

STATE OF OKLAHOMA



EXECUTIVE DEPARTMENT

Proclamation

WHEREAS, there are over one million anglers including women, children, senior citizens and handicapped, who enjoy fishing reservoirs, lakes, ponds, streams and rivers in Oklahoma; and

WHEREAS, June 7 - 13, 1993 has been proclaimed as National Fishing Week; and

WHEREAS, fishing is an established recreational activity in Oklahoma enjoyed by over one million anglers, including women, children, senior citizens and handicapped; and

WHEREAS, fishing generates more than \$442 million annually to the benefit of local economies; and

WHEREAS, the Oklahoma Wildlife Conservation Commission has recognized June 12 and 13 during National Fishing Week as "Free Fishing Days" in Oklahoma;

WHEREAS, of "Free Fishing Days" in Oklahoma, the first state in the nation to designate a "Free Fishing Day" celebration;

NOW THEREFORE, I, David Walters, Governor of the State of Oklahoma, do hereby proclaim the week of June 7 - 13, 1993, as

NATIONAL FISHING WEEK

In the State of Oklahoma.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of the State of Oklahoma to be affixed.



Done at the Capitol, in the City of Oklahoma City, this 26th day of May, in the Year of Our Lord one thousand nine hundred and ninety-three, and of the State of Oklahoma the eighty-fifth year.

John Kramer
SECRETARY OF STATE

David Walters
GOVERNOR