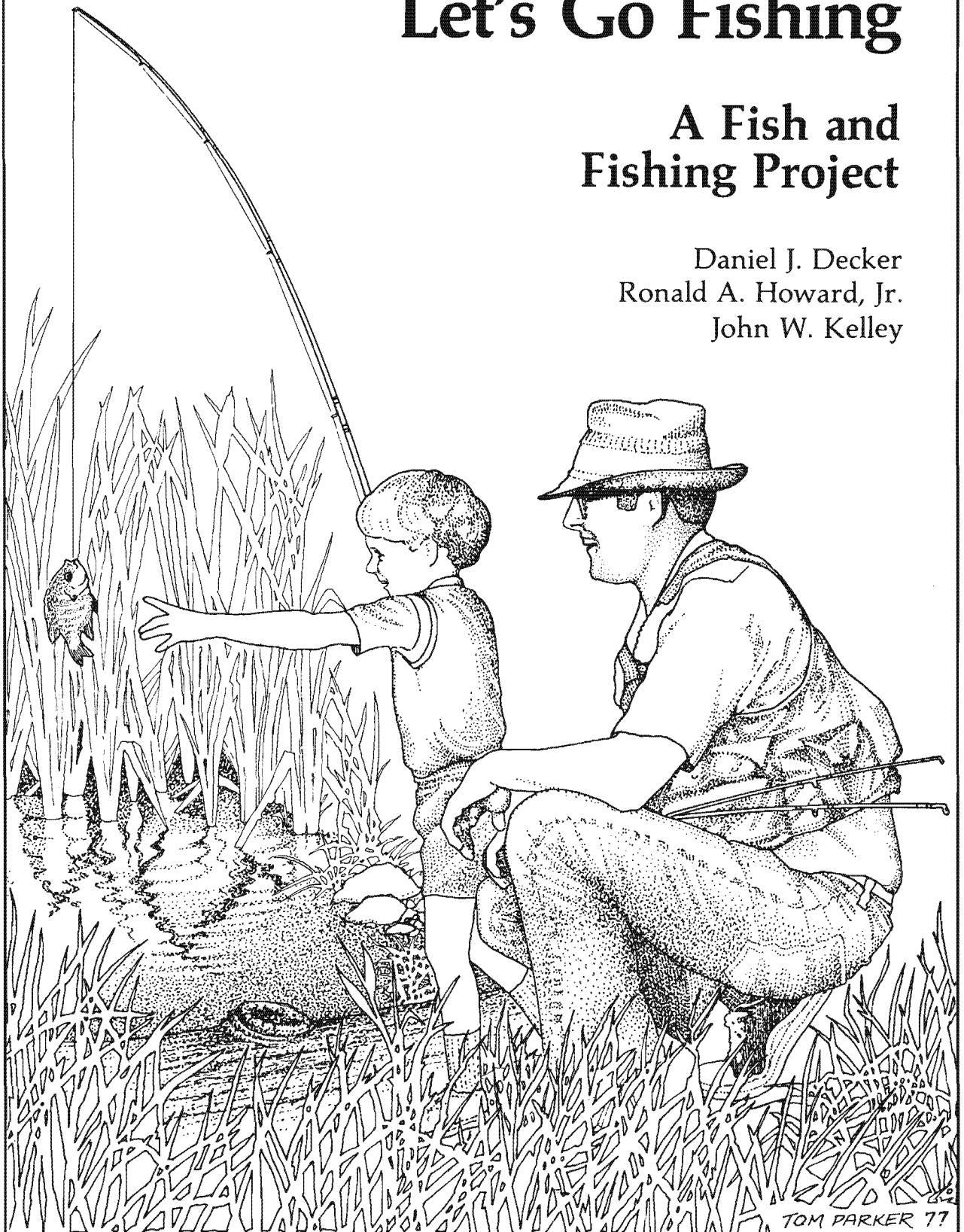


Let's Go Fishing

A Fish and Fishing Project

Daniel J. Decker
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John W. Kelley



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Introduction

Project Philosophy and Goals

Fishing is one of the oldest and most popular of the outdoor sports. Like most activities, fishing requires a certain degree of knowledge and skill for success. In fact, studies have shown that less than 10 percent of the fishermen catch more than 90 percent of the fish. Since the other 90 percent of the anglers are still pursuing their sport in spite of poor success, there must be more to fishing than just catching the fish.

A famous fisherman recently stated that his goals had changed over the years. At first he wanted to catch the greatest number of fish. Later, he fished for the largest fish. Still later he found he enjoyed going after hard-to-catch fish most of all. To a beginning angler the first fish can be hard to catch, and the challenge of catching fish consistently can provide more than enough motivation for his or her continued participation in the sport of angling.

Some beginning fishermen are lucky enough to have experienced friends or relatives to teach them how to fish. Unfortunately, not all young anglers are that lucky. This guide and associated materials have been designed to aid those beginning anglers in learning the basic elements of how, when, where, and with what to fish.

The goals of this project go beyond these obvious skill development activities, however. The perception and understanding of life processes (food habits, predation, habitat requirements, and so on) are encouraged through these activities. We also seek to provide a framework for the development of a personal philosophy of the human relationship with, and role in, nature.

Activity Format

Just as children must learn to walk before they can run, attaining proficiency in sport fishing can be best developed using a step-by-step process. This guide has

been designed to assist you in helping youngsters in that process. You are the best judge of what to use with your group, but this guide is a suggested approach to teaching young people how to fish.

The material is presented in five major sections. Each section contains sufficient material for about one and one-half hours of activity. A discussion of the materials covered and a suggested procedure for each section is included. These discussions are designed to provide an adequate background for the leader with no previous fishing experience. Materials, equipment, and teaching aids needed for each session are also included. A listing of available supporting materials is in the appendix.

Field Trips

Many types of field trips could enhance this project. Leaders are encouraged to use their own ingenuity, time, and available resources in any manner they see fit. At least three field trips have been suggested. The basic purpose and procedure for each will be outlined for your use in planning your own field trips.

Regardless of how you arrange your field trips, be sure that everyone is properly clothed from head to toe for the conditions and weather that you expect to encounter. Food and beverages may be necessary, depending on the timing and duration of the trip. A first-aid kit and ready access to transportation in the case of an emergency are essential. Everyone should have a life preserver. Safety and good sportsmanship should be stressed.

On all field trips you should be alert to any interesting natural phenomena that you encounter. The basic aquatic environment should be discussed whenever convenient, and any "teachable moments" that present themselves should be grasped as productive mini-lessons. These occur most often by letting young people investigate on their own. Environmental appreciation can be a beneficial side effect of learning how to fish.

The aid of other adult volunteers to assist on field trips may prove useful from everyone's standpoint. Many experienced fishermen would be glad to help out.

Lesson 1: An Introduction to Fishing Tackle

Objectives

To help youth

1. Develop an understanding of some values of sport fishing,
2. Develop a vocabulary of basic fishing terminology,
3. Learn to tie an improved clinch knot,
4. Develop skills in basic spin-cast technique,
5. Have fun while acquiring these skills.

Materials and equipment

1. Spin-cast rods, reels, and line (8–10 lb. test)
2. Extra spool of monofilament line (8–10 lb. test) for knot tying practice
3. Rubber practice casting plugs
(If slide set is used)
4. Slide projector
5. Screen
6. Extension cord
7. Spare bulb for projector

Teaching aids

1. *Tackle Terminology* slide set
2. Fishing equipment display board
3. Knot tying diagrams (clinch and improved clinch knots)
4. Diagram of over-hand spin-casting technique

Note: All teaching aids for this project should be available from your county Cooperative Extension office.

Why Go Fishing?

The answer to this question is delightfully simple — because it's fun! Perhaps there is no better way to spend leisure time than fishing. Fishing provides satisfaction to people seeking challenging, relaxing, thrilling, or inspiring experiences. Since it has so many facets, sport fishing has attracted participants of all ages and from all walks of life. This wide appeal makes it one of the most popular outdoor sports.

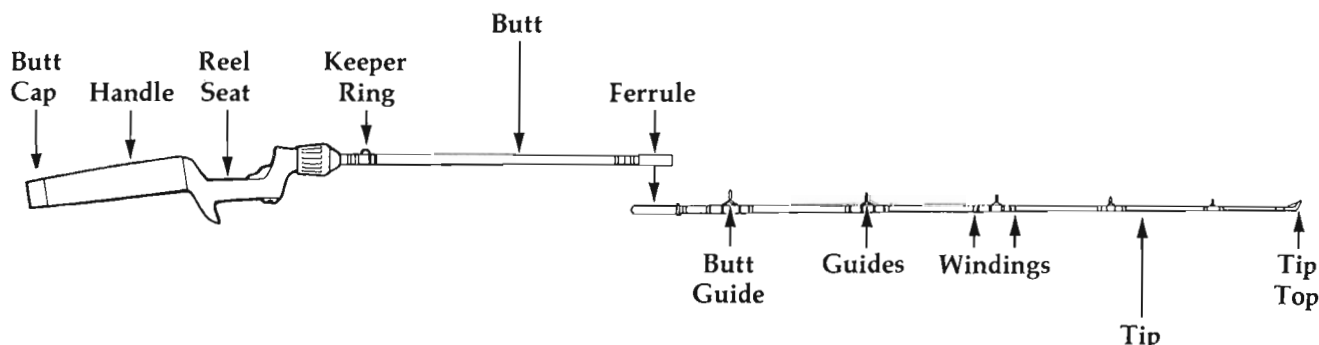
Fishing has been the subject of many a philosophical treatise. Historically, the best known is Isaak Walton's *The Compleat Angler*. To summarize Walton's feelings toward angling we can borrow from his classic book. "*The Lord does not subtract from one's measured time those hours he spends a fishing.*"

As a recreational activity fishing has several real advantages. It can be done any time of day, in any weather, during any season, and almost anywhere. The equipment used can be very simple and inexpensive or very sophisticated and costly. This tremendous versatility increases sport fishing's appeal so that almost everyone is interested. So, another answer to the title question is a resounding "Why not?" We can't think of a plausible answer for that one, so rather than waste time with more dialogue, "Let's go fishing!"

What Do You Need?

Before anyone can begin any sport activity a basic understanding of common terminology is needed. For instance, if you have no idea what a star drag is, instructions on how to use one are a bit difficult to understand. This discussion introduces some basic fishing terminology. As your group progresses, more will be presented. Through this step-by-step approach the youth will develop the necessary vocabulary and skills to learn about fishing.

Figure 1. Spincast rod showing basic parts



Tackle Terminology

Fishing rods

There are several types of fishing rods, sometimes mistakenly referred to as "poles." Although the old fashioned cane pole is still useful, most serious fishermen use rods of more modern design. A rod has guides and usually a means for attaching a reel, while a pole has no guides and the line is tied to its tip.

The four basic types of rods commonly used today are the casting rod, spinning rod, spin-casting rod, and fly rod. Each has a companion reel of appropriate design.

The basic parts of a rod (fig. 1) are the (1) butt cap (or hood), (2) handle or grip, (3) reel seat, (4) butt, (5) ferrule, (6) tip, (7) butt guide, (8) guides, (9) tip top, (10) keeper ring, and (11) windings.

The number, size, and spacing of guides vary by rod type and length (fig. 2). Rod lengths vary considerably, but generally the casting and spin-cast rods are shortest, averaging about 1.52–1.83 meters (5–6 feet). Spinning rods are most frequently 1.68–2.13 meters (5½–7 feet) long, and fly rods are longest at 2.13–2.74 meters (7–9 feet). Spinning and fly rods usually have straight grips, while casting and spin-cast rods usually have offset grips. Most modern rods are made of fiber glass, but graphite fibers, metal, or cane (bamboo) are also used in making rods. In this project we will concentrate on the spin-cast rod.

Reels

The reel is designed primarily to hold, release, or retrieve line. As mentioned earlier, specific types of reels are made for specific types of rods (fig. 2). However, they have some common features, including a spool, handle, housing, and brace (fig. 3).

The spin-cast reel is relatively simple to operate and skill in its use may come quickly. It has a stationary spool protected by a cover called a housing and is usually mounted on top of the rod. A thumb button or push button, when fully depressed and then released,

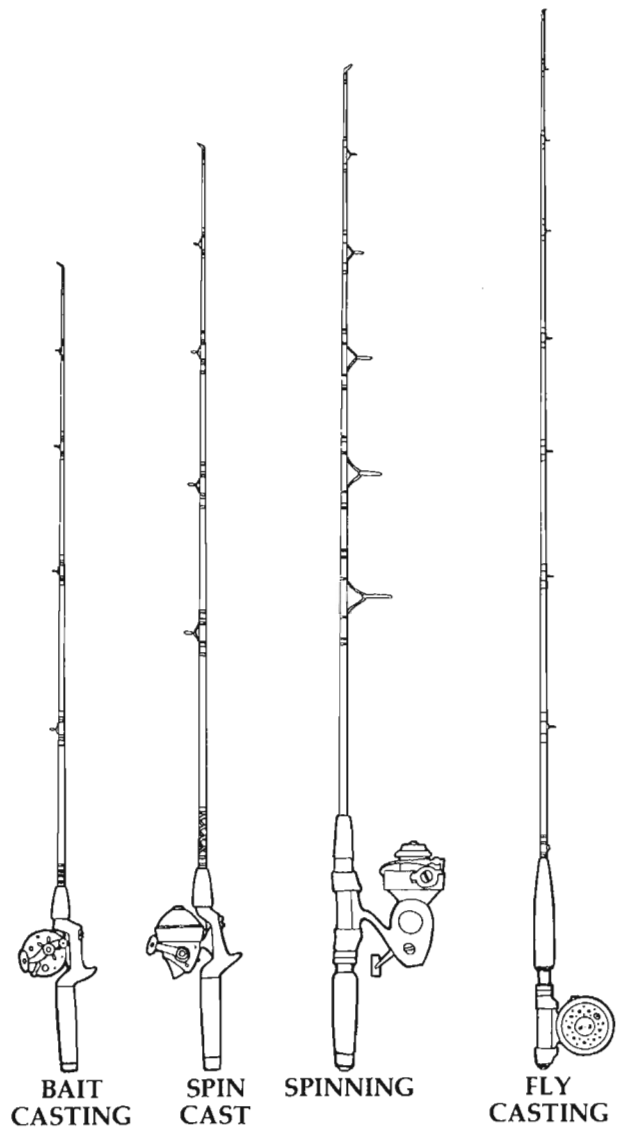


Figure 2. Typical rod and reel combinations

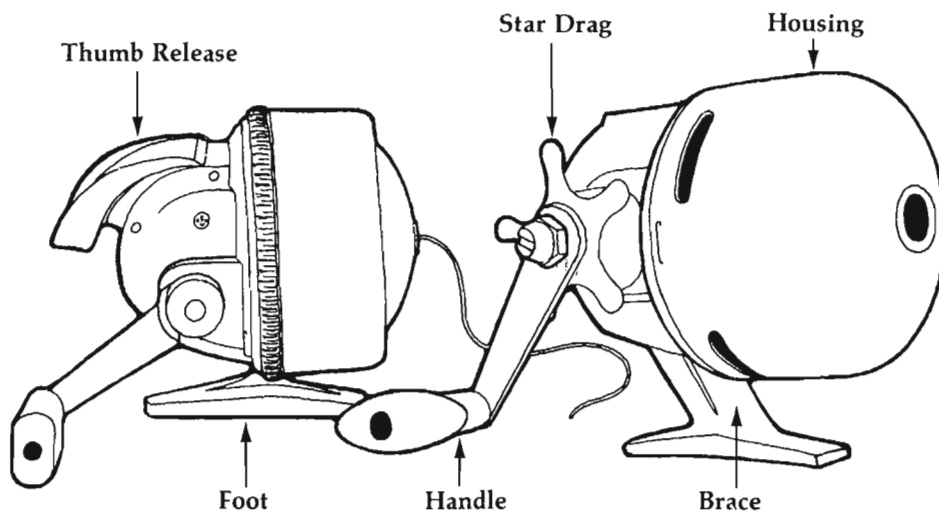


Figure 3. Parts of a basic spin-cast reel

permits the line to leave the spool freely. Just as it can release the line for a cast, it can also stop the line from flowing. This is done by fully depressing the thumb button. Turning the reel handle activates a line pick-up device. As we shall see later, timing of these actions is critical to effective casting.

The reel's drag has a very important function. When properly set, the drag lessens the chance of a fish breaking the line, since the force needed to take line off the spool is less than the breaking strength of the line. The drag also aids in tiring the fish by forcing it to pull against the action of the rod and by permitting the fish to take line only with effort. Even a large fish will eventually tire under this constant pressure.

It is extremely important that the drag be set properly. This should be checked each and every time a fisherman goes afield. One good method for drag adjustment is to have one person hold the rod in a normal position (about 60° from ground) while another person pulls down on line (with no hooks attached). If the rod appears to be under extreme stress and no line is released by the reel, the drag adjustment screw should be loosened until line is released. If, on the other hand, the line is released with too little pressure, the drag should be tightened until greater effort is required for the line to slip from the reel. It is better to have too little tension on the drag than too much. Line should slip from the reel at about one-half its breaking strength.

Line

Only a few basic types of line are available. These include braided nylon or dacron, monofilament, wire, and fly line. Only monofilament line will be discussed here. This line comes in various strengths, listed on the spool as a "pound test." "Pound test" means the average amount of pressure (dead weight) that a line can support without breaking. Generally the 6-, 8-, and 10-pound test strengths are used for most freshwater fishing activities.

As one would guess, the greater the strength of a line, the thicker and heavier it usually is. This affects the casting quality, especially distance, of the line. The weight of the bait or lures generally used, size of fish, action of rod, and many other factors enter into the selection of line size.

Hooks

Hooks are curved lengths of metal wire modified so they have a loop for attaching the line on one end and a point for attaching the fish on the other. Hooks come in many sizes and styles, but they all have the same basic parts (fig. 4). Variations of the basic hook include differences in shank length, wire diameter, gap size, and numbers of hook points (double or treble hooks). Snelled hooks are regular hooks which come with a short length of line attached. They can be convenient when you are bait fishing.

Hooks must be sharp to be effective. Sharp hooks

are also dangerous, so handle them with care. A small file or whet stone may be useful in keeping your hooks sharp.

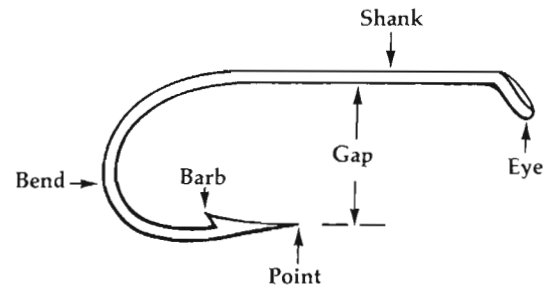


Figure 4. Basic parts of a fishhook

Sinkers and split shot

These lead weights, collectively referred to as sinkers, are meant to either hold your line stationary on the stream, lake, or pond bottom, or to carry the bait or lure deeper in the water. Sinkers come in various styles, with a wide range of (weights) in each style. The most common styles (fig. 5) are the dipsey (or bell), split shot, clinch-on, bank, egg, and the pyramid. The split shot (used for stream fishing) and the dipsey or bell sinker are probably the most widely used freshwater fishing weights.

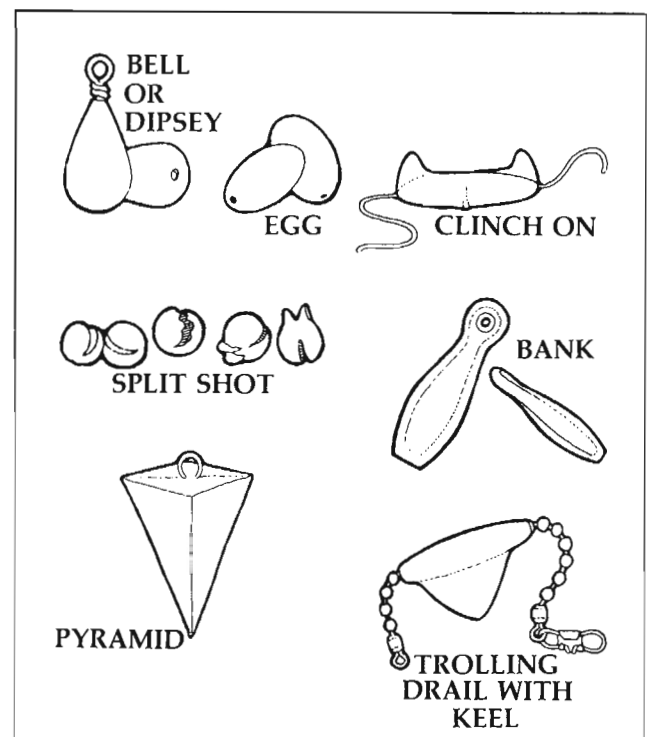


Figure 5. Commonly used sinkers

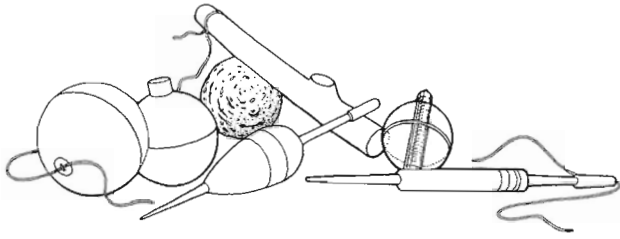


Figure 6. A variety of ball- and quill-type bobbers or floats

Bobber

The bobber is a floating object used either to keep live bait off the bottom or as a visual indication of when a fish has taken your bait. Bobbers come in many shapes and sizes (fig. 6). They are often made of cork or wood, but the hollow plastic sphere is most common. These are attached to the line by spring-loaded hooks, eliminating the need for a knot.

Natural bait

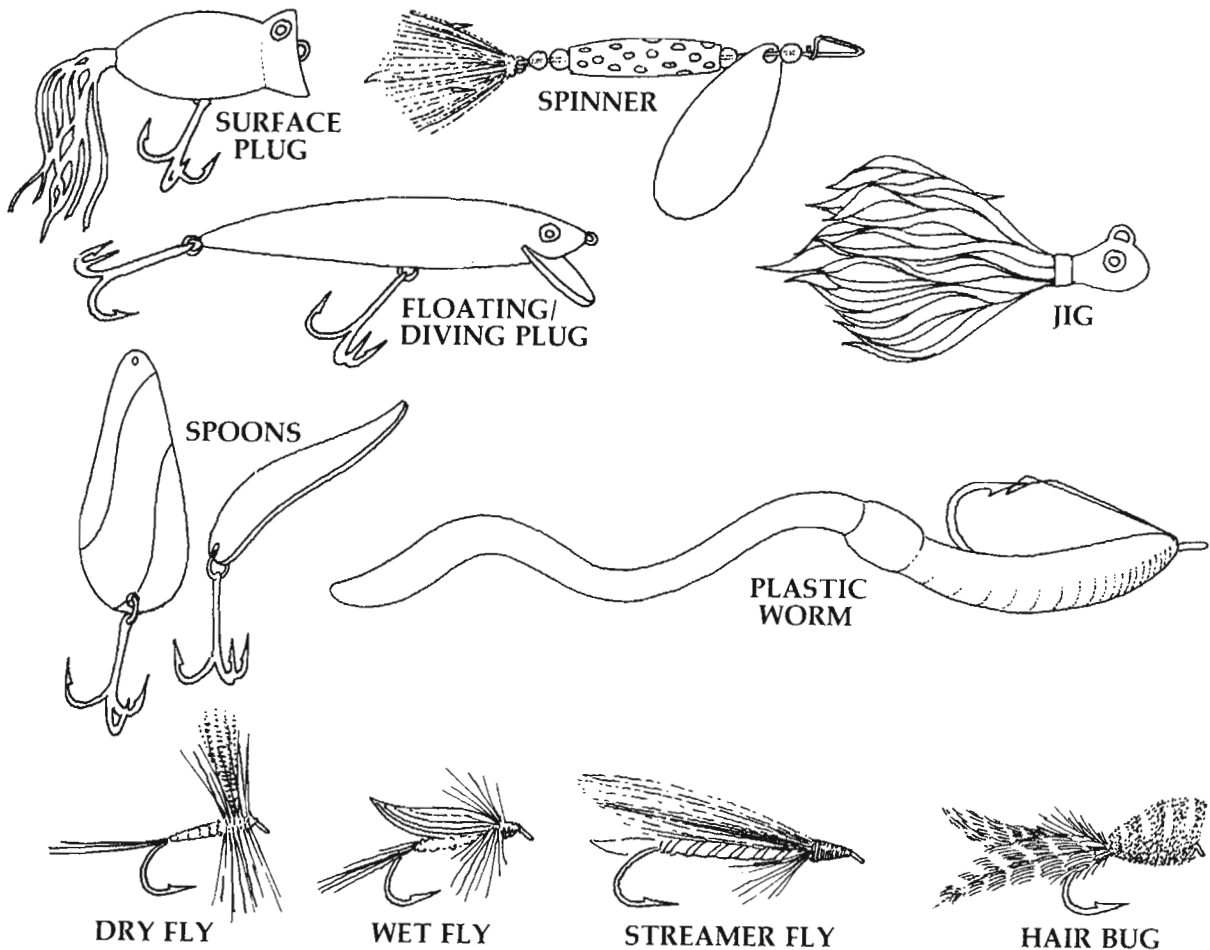
Beginning fishermen most commonly use natural bait. The little garden worm or larger night crawler are the youngster's old standby for consistently catching fish. Several other natural baits are also used frequently. They include minnows, crayfish, frogs, tadpoles, salamanders, grubs, insects and insect larvae (like helgramites and grasshoppers), eggs, cutbaits, doughballs, and cheese. The collection, storage, and use of these baits will be covered later.

Artificial lures

Artificial lures can be grouped in six basic categories. These run from realistic imitations of natural baits to exotic inventions that attract the fish with sound, flash, or action (fig. 7). Plastic worms of various colors are the most popular imitations of live bait, but other soft plastic baits are also used to catch fish.

Plugs are wood, metal, or plastic imitations of

Figure 7. An assortment of artificial lures



minnows, frogs, mice, or other fish foods. Sometimes they are merely fish attracters which are either brilliantly colored or constructed to make noise. These lures are designed as surface plugs, floating-diving plugs, and deep-running plugs.

Two other types of lures can be considered as variations of the surface plug. One is a popper, made of wood or plastic to resemble a small frog or mouse or large insect. The other is a "bug" which is designed to imitate the same creatures, but is usually made of lighter material, such as cork or deer hair. These lures are usually used with fly casting tackle.

Spinners are subsurface lures that are imitations or suggestions of minnows. They have a blade, usually silver or gold in color, which revolves as the lure is moved through the water. The body of a spinner may be either solid or a group of plastic or metal beads strung together on a wire shaft. Often the rear of the lure is dressed with hair or feathers. Spinners come in many sizes and shapes. A snap-swivel should be used when fishing with spinners to prevent line twisting.

Spoons are metallic subsurface lures that wobble or dart when drawn through the water. As the name implies, they are shaped like the bowl of a teaspoon. Like spinners, spoons imitate or suggest minnows in their flashing movement. They come in a wide variety of sizes and styles. Some are metallic silver or gold, while others are painted in a multitude of colors.

Jigs are heavily weighted lures designed to bump along the bottom. They are effective on most species of game fish. Jigs usually have a lead head with body materials of plastic, feathers, or hair.

Flies are very light lures designed nearly exclusively for use with fly fishing equipment. Wet flies, streamers, and nymphs are used as subsurface lures and dry flies float on the water's surface. Their construction is commonly of feathers and fur or hair, although many other light-weight materials are sometimes used.

Swivels

A swivel resembles a bead chain with wire eyes on either end. They are designed to spin freely. On the commonly used snap-swivel, one eye holds a wire snap, which is used to attach a lure to the line.

Snap swivels serve two purposes. They make changing lures more convenient because a new knot need not be tied each time. They also prevent the line from twisting when using a lure, especially a spinner, which spins as it is retrieved through the water. A twisted line soon becomes unmanageable, tangling frequently and casting poorly.

Nets

A net is useful as part of your fishing gear. Nets help in landing those big ones that have a habit of "getting away," and they aid in the careful handling of fish that you would like to release. Both wooden and aluminum frames are popular in the smaller hand nets. Aluminum is used almost exclusively on long-

handled, boat nets. The bag of the net may be of nylon, cotton, monofilament, or even rubber cords.

Tackle box

Tackle boxes, usually made of fiber glass, plastic, or metal, have two main uses. They help keep lures and other tackle neatly in order, and they provide a handy means of carrying tackle on fishing trips. They also provide protection for the tackle. A small tackle box is almost a must even for the beginner.

Stringers

There are two basic types of stringers. One, made of chain or plastic rope, has large wire or nylon snaps. The ends of the snaps are sharp so that they may be slipped through the skin behind the fish's lower jaw.

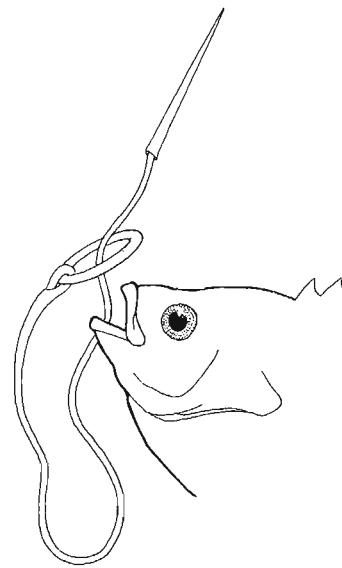


Figure 8. Proper method of using a rope stringer

When the clip is resnapped the fish is securely held. The second type is a plastic or fiber cord with a ring fastened to one end and a pointed metal needle attached to the other. The pointed metal end is pushed through the skin behind the fish's lower jaw as described above. It is then passed through the metal ring, forming a loop around the fish's jaw and holding it securely (fig. 8). Stringers are intended to keep the fish alive. They do so only if they are properly used. Use of stringers is discussed in detail in a later lesson.

Bait holding devices

Two types of worm containers can be used besides the popular old tin can (fig. 9). One is a fibrous box with a metal frame and lid secured with fasteners. The second is a small metal or plastic box, of various shapes, which fastens to your belt. The larger container is good when fishing from a boat or still fishing from shore. The smaller "bait can" is handy

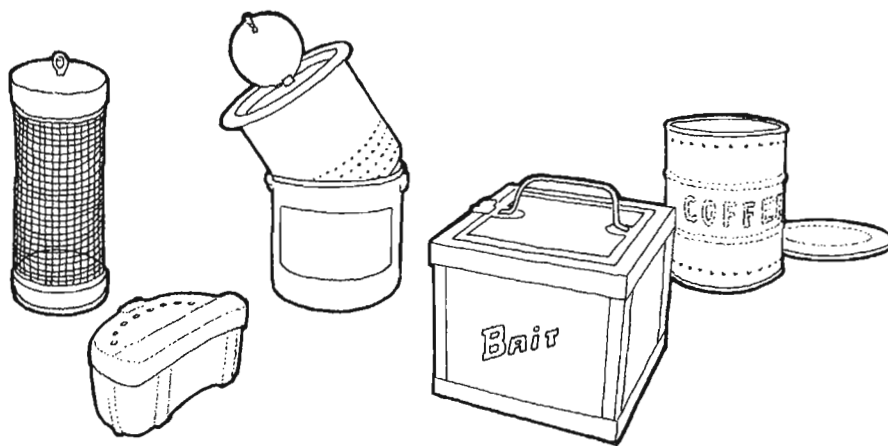


Figure 9. Some commonly used bait containers

when wading streams where carrying a large container would be awkward.

For bait fish there are two types of buckets or pails. One is metallic with a hinged flip-top lid, held in place by a spring latch. Frequently metal bait buckets have fiber or perforated metal liners. Plastic, fiber, or styrofoam pails are also used. They usually have a lid that can be removed and a wire or plastic cord bail (handle). Bait buckets are designed to hold water and bait, and they often have modifications to make aeration easy.

Clothing

Proper footwear varies by the type of fishing being done. Hip boots and waders are appropriate when stream fishing and standing in the water. Sneakers work well for summer wading if the water is warm. Sneakers are also a good bet when fishing from the shore or from a boat, provided the weather is warm and dry.

Head gear should shed rain and shield the wearer from the sun. Raincoats or ponchos are also useful. Some of the best fishing is during foul weather, so be prepared and take advantage of it.

Life preservers

Whether fishing from a boat or from shore, children should wear life preserver vests and adults should at least have boat seat cushion life preservers available. There are no exceptions.

First-aid kit

First-aid kits should be in every tackle box. Each person should have at least a rudimentary knowledge of first-aid procedures. Cuts, scrapes, and bruises are not uncommon among fishermen. Anglers may also encounter bee stings and other insect bites. A good insect repellent is often a necessity for comfortable fishing.

Activity Suggestions

Tying an improved clinch knot

Any beginning fisherman should know certain basic knots. One of these is presented here, and others will be introduced in later sessions.

The improved clinch knot is used to tie the line to hook, swivel, or lure. While it is not difficult to master, it is essential. Tying this knot requires only five easy steps (fig. 10).

1. Holding the hook securely, put the end of the line through the eye of the hook.
2. Still holding the hook, twist the free end of the line around the standing end of the line about six to eight times.
3. Put the free end through the loop formed between the eye of the hook and the first twist (the one closest to hook).
4. Bring the free end under the loop just formed by it, between the last twist (furthest from hook) and the hook eye.
5. Holding both the free end of the line and the hook in one hand and the fastened end of the line in the other, pull the knot tight.

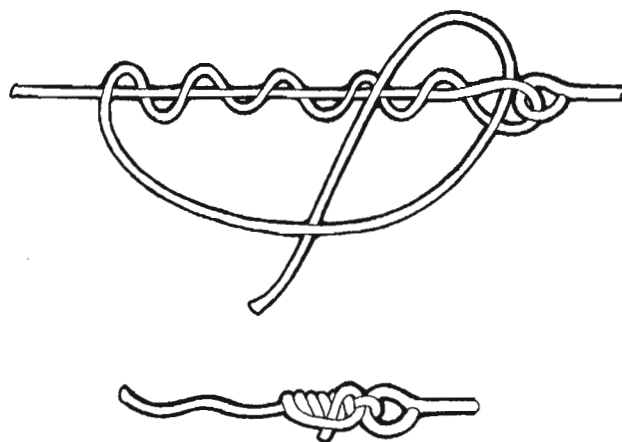


Figure 10. How to tie the improved clinch knot

You have just completed an improved clinch knot. The free end of the line can now be trimmed, leaving a strong, neat knot.

This knot should be demonstrated to your group. Using the diagrams provided, each step can be explained and demonstrated. The extra spool of monofilament line can be used for practice knot tying. The members of your group should be able to successfully tie this knot before going on to the next activity.

Introduction to spin-casting

As mentioned earlier, spin-casting is relatively easy to learn. Like many “easy” things though, it may seem difficult at first. Once the basics are mastered, increased skill develops rapidly with practice.

A beginner should become familiar with the spin-cast reel and its operation. Attach the reel to the rod. If there is no line on the reel, remove the front cap (housing), pass the end of line from a supply spool through the hole in the cap and tie the line to the reel spool with a slip knot. Replace the cap, and holding the line taut with the thumb and forefinger about 7 to 8 cm (3 in.) in front of the reel (this insures proper line feeding), wind on the monofilament. Ideally a spincast reel should be filled with line to within about 0.5 cm ($\frac{1}{8}$ in.) of the lip of the spool. Press and release the release button permitting the line to feed freely. Pass the free end through each guide, being careful not to mistakenly wrap it around the rod. Using the improved clinch knot, tie a rubber practice plug onto the line.

To get a feel for how the reel works, hold the rod out in front of you, reel up the line until the practice plug is hanging about 10 cm (4 in.) from the rod tip. Quickly, fully depress the button. The plug will remain in its position. Now remove your thumb from the button. The plug should fall to the ground. Holding the line taut with your thumb and forefinger, start winding in the plug. With the first revolution of the reel handle you will hear a “click.” This is the sound of the pick-up pin being activated within the reel. Now the line is rewound onto the spool. These are the basics of operating the spin-cast reel.

The next step is to learn basic overhand casting technique. One bit of advice is important — let the *rod* do the casting. It is important to make the cast in one smooth motion. As the diagram (fig. 11) illustrates, the rod is put under a great deal of tension with this type of cast. The bend and action of the rod created by the plug moving backward, while you have started the rod in a forward motion, greatly increases the power, and thus the distance, of the cast.

As the diagram illustrates, the cast begins with the rod in front of you, pointing toward the “target” of your cast. You should adopt a firm, but natural stance. The rod should be held with the reel facing up. Using wrist and forearm action, bring the rod swiftly to an upright position, then bring your forearm down and forward without pausing, snapping the wrist for added acceleration.

When the rod is held in the beginning position, the thumb button should be fully depressed and held there until the rod is nearly straight in front of you at the end of the cast. When the rod is at about a 45° angle with the ground, the button should be released, allowing the line to leave the reel freely. If the button is released too soon, the plug will go high rather than far. If it is released too late, the plug will strike the ground immediately in front of you.

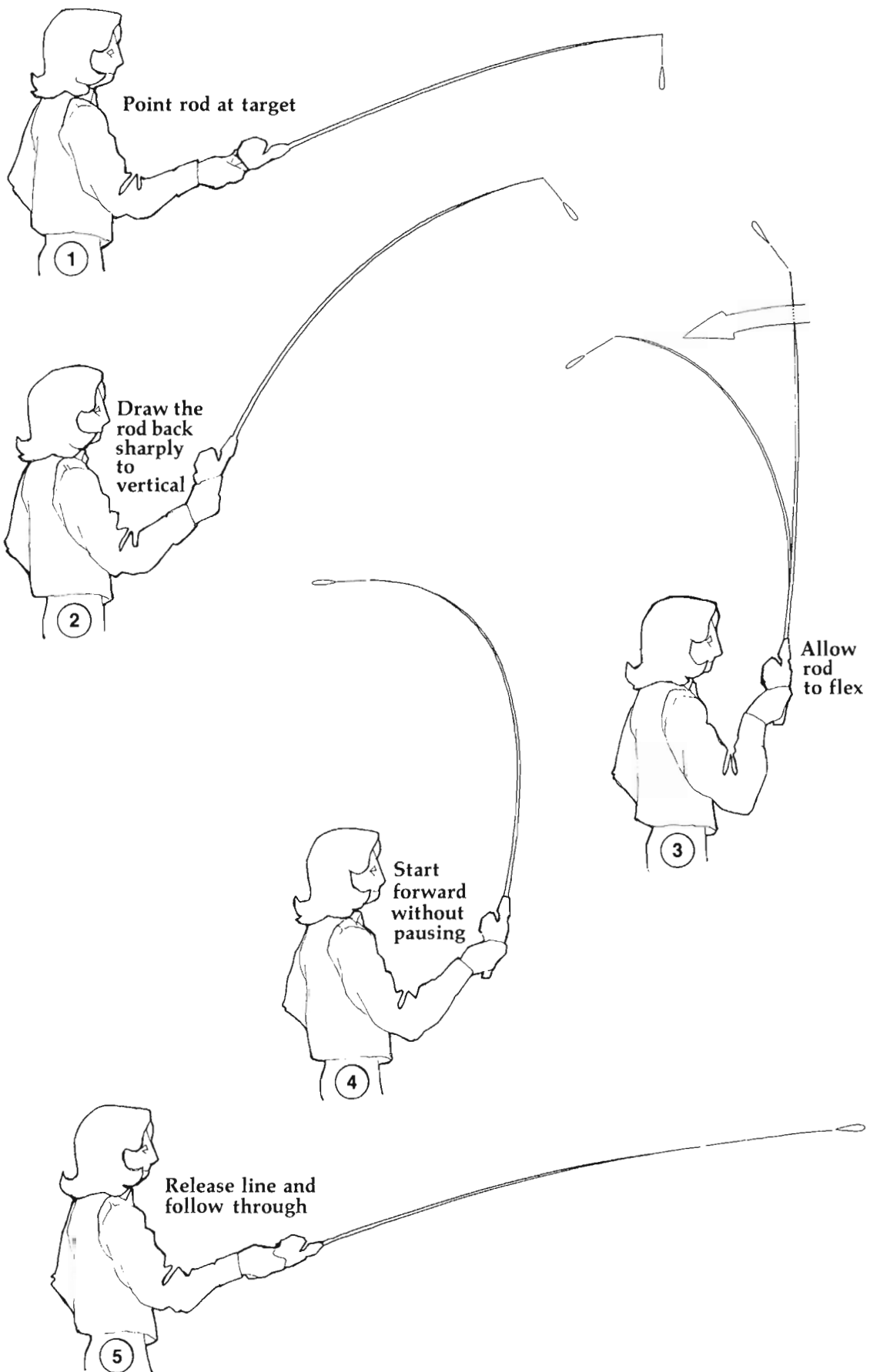
This casting technique should be demonstrated several times to your group. Before casting practice begins, each individual in your group should be aware of the necessity for safety. No one wants to be poked in the eye or ear by a rod or knocked in the head with a practice plug.

Each youngster should rig his or her own practice rod, including tying on the plug using the improved clinch knot. If there aren't enough rods and reels for each person, divide them into teams, encouraging mutual evaluation of technique.

The practice area should be large enough to minimize tangled lines and broken windows. A large grassy lawn or playground is best. An empty parking lot or the like can be used if necessary. If this type of area is used, intermittently check the line for fraying caused by abrasion with the rough surface.

Inform your group that this is only the first of several practice sessions. They should concentrate on proper technique. Distance and accuracy will come in time, but only if the proper technique is mastered.

Figure 11. Steps in making an overhand cast



Lesson 2: Before You Go Fishing...

Objectives

To help youth

1. Learn how to store, transport, and care for tackle and equipment properly,
2. Learn basic safety precautions associated with fishing,
3. Become familiar with pertinent fishing laws,
4. Develop a fishing ethic,
5. Learn how to tie a blood knot,
6. Develop proficiency in casting,
7. Have an enjoyable learning experience.

Materials and equipment

1. Spin-casting rods and reels
2. Extra spool of monofilament line
3. Copies of state fishing regulations — these are available through state conservation departments and licensing agents
4. Practice casting plugs

Teaching aids

1. Diagram of sidearm casting technique
2. Diagram of blood knot

This session covers several important subjects for all fishermen. These are care of tackle, safety, laws, and ethics. In addition, casting practice is continued. A new casting technique and a new knot are introduced.

Care of Tackle and Equipment

Good fishing tackle need not be overly expensive, but it does represent an investment. With reasonable care and consideration quality tackle and equipment should last many years. Several devices have been designed to help protect your fishing equipment.

A tackle box, as described previously, is convenient for carrying and organizing much of your tackle. It also protects your tackle from loss and damage. The compartments and trays in a tackle box not only decrease confusion and inconvenience, but they also reduce hook dulling and damage to lures.

While a tackle box is a large protective device, smaller containers, like plastic pill bottles or boxes, can provide security and accessibility for smaller items. Compartmentalized plastic and aluminum boxes are manufactured for holding hooks and lures. They are

especially handy when you are wading or changing fishing location often and when only a small selection of tackle is needed. They are also the most common method for storing, protecting, and carrying flies.

Rod cases are extremely important containers. They are usually long tubes of plastic, aluminum, or fiberboard with a removable cap on one end. These stiff cylinders are designed to protect your rod while transporting or storing it. A cloth stocking is usually provided with better rods. When placed in the rod sack, and both put into a case, your rod is well protected.

Treble hook protectors are simple little plastic gadgets designed to fit over the treble hooks on your lures. They protect your fingers, keep hooks from dulling or scratching other lures, and decrease hook tangles. They may not be a necessity, but they sure are helpful.

An angler must be constantly aware of hazards in relation to use and care of equipment. Exposure of your tackle to extreme heat or sunlight is hazardous. Many types of plastics used in lure manufacturing will melt under the extreme temperatures that can occur inside a tackle box when it is exposed to direct sunlight. This can easily happen when a tackle box is in the back seat of a car or the luggage area in the rear of a truck or station wagon. Heat and sunlight also damage lines.

Make sure your tackle box is properly latched before you pick it up. The unfortunate results of neglecting this bit of advice are obvious. This has happened in boats or on docks where the contents of an unlatched tackle box have been dumped into the water.

Try to keep your tackle box and equipment dry when not in use. Rust and corrosion can ruin hooks, lures, knives, and tools. Rust and other things can cause your hooks to become dull. Remember, dull hooks miss fish. The use of a compartmentalized tackle box, smaller containers for loose single hooks, and protectors for treble hooks all cut down on this problem. Sometimes hooks become dull just through regular use. They should be checked occasionally (especially if you get snagged) and, if dull, either replaced or sharpened.

Your fishing line should be checked frequently, especially the last meter or so, for excessive wear or fraying. A fish's teeth, sand, stones, or a worn tip can cause abrasion, resulting in a frayed line. A good fish can easily break a frayed line. Many a "big one that got away" is the result of carelessness in using a frayed line or poorly tied knots.

The line guides on your fishing rod also should be checked occasionally for wear. The line sometimes creates grooves in them, and those grooves can cause excessive line wear. Also, the thread windings that secure the guides to the rod sometimes become worn, eventually breaking and unravelling.

Rods can take a lot of normal use, but abuse can quickly damage them. A few common abuses can be avoided by following these simple rules.

1. Don't put rods where they can be stepped on.
2. Don't lean rods on car doors where they can be broken if someone unthinkingly slams the door. Doors of all kinds are hazardous to rods.
3. Don't drop or throw the rod. While it may not cause the rod to break immediately, it may weaken it only to be broken at a later time (like when a huge fish is on it!).
4. Don't become overzealous in whipping your rod when your hook becomes snagged.
5. Never hold a rod by its tip; always use it properly.

Reels should be cleaned at least once a year, more often if used under sandy, dusty, or salty conditions. Always try to keep dirt and grit out of your reel. A wise fisherman carries a simple reel repair and lubrication kit on fishing trips. Whenever you transport your equipment minimize bouncing, rubbing, and pressure on it. With a little common sense good fishing equipment will last for years of good service.

Safety

Safety hints should be stressed constantly. Broad coverage of some important safety considerations is given here. The leader should use his or her discretion regarding the depth to which these subjects should be covered.

The life preserver is essential to the fisherman using boats or fishing treacherous waters. Life preservers come in two basic forms useful for fishermen — vests and cushions. *Every* member of a fishing party should have one or the other type whether fishing from a boat, dock, or steep shore. Strict adherence to this rule is mandatory. All fishermen should be good swimmers, but regardless of their swimming ability they should wear a life preserver or have one handy.

When wading, fishermen should constantly watch for glass or other hazardous trash, holes, and slippery rocks. They should also be aware of sudden changes in water level that frequently occur in reservoirs or in streams below impoundments. Swift water can easily knock a fisherman off balance, so a wading staff and life vest should be used at all times under those conditions.

Fishermen should be aware of poisonous snakes, plants, and insects which occur in their area. Proper precautions should be taken to avoid them. The fisherman should be familiar with first-aid treatments for bites, stings, and irritation.

Hooks are an ever present hazard for fishermen. There is no substitute for care to avoid getting hooked or hooking a companion. Don't leave hooks lying around. Look around before casting to be sure the area is clear of people and obstructions. Remove lures or hooks from your line when not using them. A lure with two or three sets of treble hooks bouncing at the

end of a rod can be very dangerous.

If someone does get a hook imbedded, cut the shank off with pliers and let a physician remove the barb. Don't yank the hook out! Those barbs are meant to hold fish, and they do a pretty good job on people, too. In an *emergency*, hooks may be removed by pushing them through and cutting off the barb. Hooks in or near an eye demand a physician's attention. Don't touch them. A physician should be consulted whenever possible even if you remove the hook yourself because a tetanus shot may be advisable.

Another possible source of hazard for fishermen is the fish themselves. Care should be taken in handling any fish. Most have sharp spines in their fins. The fish in the pike family lack these spines, but they have several rows of very sharp teeth. The gill covers (opercula) of many fish also may be sharp. There are different methods for safely handling these fish. Those methods will be covered more thoroughly in a later session.

Laws Regulating Sport Fishing

In order to avoid over-exploitation of our fishery resources, many regulations have been made regarding sport fishing. Many years ago people felt the supply of fish was inexhaustible, and anyone could catch as many fish as he (she) wanted at any time in any way without depleting this resource. Today we know this is not true. The amount and kind of food and habitat available determines the number and size of fish in the water.

Common law states that the resource, fish, belongs to everyone. We who share the resource have developed a number of fishing regulations through state governments to insure that the resource will be shared equally by all who wish to use it both now and in the future. Conservation officers are public employees, enforcing our laws with respect to our resource. Fishing regulations are designed to serve several purposes: 1) to provide enough fish for harvest today, 2) to assure fish supplies for the future, and 3) to provide a fair means of sharing the resource.

One of the most immediate concerns is whether or not a license is required by any members of your group. The law requires that any person 16 years of age or older (this may vary in some states) must purchase, and carry while fishing, a current fishing license. These can be obtained at many fishing equipment retail stores or from town and county clerk's offices. Revenue from license fees go toward law enforcement, stream right-of-way acquisition, stocking programs, and other management programs.

The rules and regulations concerning fishing are numerous and variable by area, by species, and from year to year. Specific information should be obtained from a current fishing guide, which is distributed by license issuing agents, or by consulting a conservation

officer.

One other law, that concerning trespassing, warrants attention. A license to fish does not give a person the right to trespass. Respect the landowner's rights.

NOTE: You may want to ask a Conservation Officer to present the foregoing part of this session. Feel free to ask, since that's a major part of the responsibilities of the job.

Toward a Fishing "Ethic"

Most of the time spent fishing is not done under the supervision of another person or a conservation officer. You are "on your honor" to abide by the laws. Since self-discipline is essential to the continued security of the resource, an ethic should be instilled and nurtured in young people. Respect for the resource and the right to use it must be developed. Courtesy, manners, honesty, consideration, and other virtues should be encouraged as being just as important while fishing as they are in every other aspect of one's life.

The object of sport fishing is enjoyment: relaxation and recreation. If all of us who fish would follow a few simple rules, we would all have more fun (and probably catch more fish, too). Some rules apply to the way we act toward the resource (fish and water); others apply to the way we treat other people.

Fisherman-Resource Relationships

1. Know and observe all conservation laws. Remember, we made the laws to protect our resources. They are useless if we do not obey them.
2. Inform others of the laws and insist they obey them. Sometimes people break the regulations out of ignorance. You will be helping them and protecting your resources by making the rules known.
3. Report violations of fishing or water quality regulations to the proper authorities. Conservation officers are your employees enforcing your conservation laws. They cannot be everywhere at once, so they need the help of all of us in protecting our resources.
4. Keep only the number of fish for which you have an immediate need. Every fish that is returned to the water unharmed can be caught again by you or someone else. These "recycled" fish are very valuable to all fishermen.
5. Participate in management practices. Getting involved in the work of maintaining and (or) restoring the fishing in your area can be almost as much fun as fishing. Many organizations can use your help in their activities. Even carrying out someone else's trash is a valuable contribution to better fishing experiences for everyone.

Fisherman-People Relationships

1. Respect the rights of landowners. Act like a guest on private or public land (state land belongs to all of us). Do not litter, disturb plantings or livestock, or damage fences, bank cover, and the like. Your behavior affects not only your future use of the area, but that of others as well.
 2. Respect the rights of other fishermen, even if they do not respect yours. Remember that the fishery belongs to all of us. Users of all legal methods of fishing have a right to their sport. Do not do anything that would detract from their enjoyment.
 3. Always give the other person plenty of room to fish. Crowding another fisherman, even if he or she has a "hot spot," will reduce both their enjoyment and yours. Greed has no place in sport fishing.
 4. Always take care not to frighten fish that someone else is fishing for. Making excessive noise, walking heavily (particularly on soft or boggy soil), banging tackle boxes, oars, and so forth, as well as being seen by the fish, can frighten them. Stay well back from high banks and be cautious in your movements. The other person will appreciate it.
 5. Take your time and enjoy the experience. Nobody likes to fish with a road-racer. By taking plenty of time to read the water and to fish it carefully, you will catch more fish and enjoy the fishing more.
 6. Be courteous and generous with other anglers. Let the other angler have the chance to use choice spots at least as frequently as you do. Where fishing methods are not compatible, let the one using the least disturbing method fish the water first. A likely order would be dry flies, wet flies, bait, artificial lures (spinners, spoons, and plugs).
 7. When meeting another angler, discuss how to share the water. Skipping a stretch of water, alternating pools, and (or) waiting a period of time are all good ways to avoid angler-angler interference.
 8. Give the other angler more than half of the breaks. This rule is just another case of the *Golden Rule*: "Do unto others as you would have them do unto you." Courtesy, generosity, and good sportsmanship are nearly as contagious as animosity, greed, and poor sportsmanship. Everyone will have a better time if all of us try to practice our best behavior. In that way fishing can be one of the best forms of relaxation and recreation.
- You, as a leader, should take every opportunity to reinforce these points among members of your group. They should become part of the youngster's philosophy toward fishing—thus an "ethic" evolves.

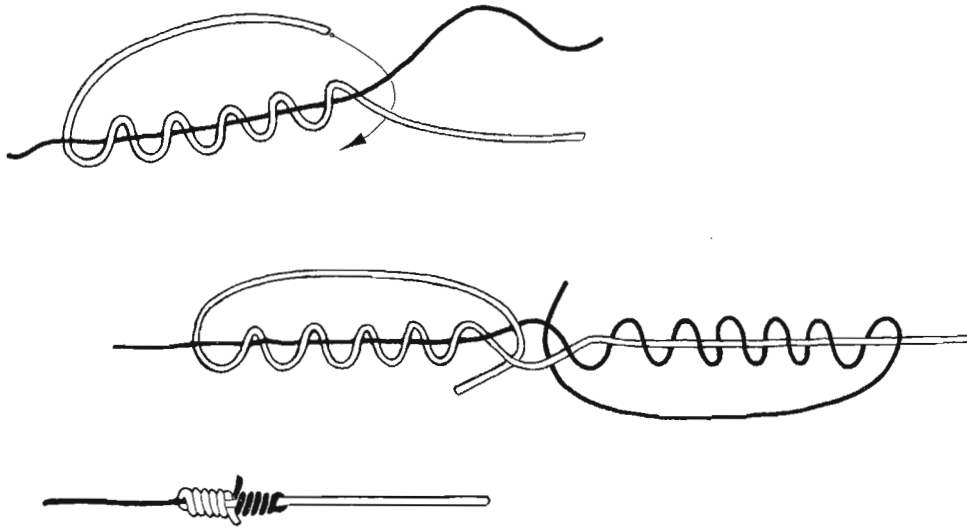


Figure 12. How to tie the blood knot

Activity Suggestions

Tying the blood knot

The blood knot is useful when trying to tie two pieces of line together, provided they are of nearly equal diameters. This knot is not used as often as the improved clinch knot, but it is one of the basics that should be learned.

To tie the blood knot (fig. 12) cross the two sections of line and at their intersection hold them between your thumb and forefinger. About 7 or 8 cm (3 in.) of each free end should be extended. Take one of the short ends and wrap it around the other line's attached portion at least 3 to 5 times. Bring the remainder of the free end down and push it through the loop formed by the two pieces of line near your thumb and forefinger. Carefully switch hands, using the thumb and forefinger of the previously free hand to hold the line intersection in place.

Twist the remaining free end around the remaining fastened end about five times. Poke this free end through the loop formed by the two lines at your thumb and forefinger. Be sure that this end is pushed through that loop in the opposite direction of the first end. Holding each free end between the thumb and forefinger of each hand, slowly draw all four sections of line together. After they have been pulled tightly together, forming a neat knot, the excess portions of the two free ends may be trimmed close to the knot.

You should practice this knot several times to get the hang of it. Don't be discouraged if you don't tie it correctly the first time. By making mistakes yourself you will be in a better position to help members of your group avoid them, or explain why they made them.

The sidearm cast and casting practice

The overhand cast introduced last time is the easiest cast to learn, but often other casting techniques are useful. Occasionally overhead obstructions prevent the use of the overhand cast. Other times your target may have an obstruction (such as tree limbs) effectively blocking your line and lure from above. Under these types of conditions a side-arm cast may be used to better advantage.

The side-arm cast begins with your casting hand at belt level (fig. 13). The rod should be parallel with the water surface (or lawn surface) and aiming directly at your target. For a right-handed caster the left foot should be slightly in front of the right foot, the body orientated with the left side angled toward the target. The rod and reel should be held with the right hand. Fully depress the release button with your thumb and hold it there. The plug should be hanging about 10 cm (4 in.) from the tip of the rod. With a swift movement, bring the rod to your right, keeping it parallel to the water surface. When the rod is about a 90° angle (right angle) from its original position, stop the rearward movement. As the momentum of the casting plug forces the rod into a deep bend, sharply move the rod forward with both your forearm and wrist for maximum power. Release the thumb button just an instant before the time when your control thumb is pointing at the intended target. When the plug goes to the right of the target, the button was released too early. When the plug goes to the left, it was released too late.

Demonstrate this cast to your group. Since the rod is held to the side rather than overhead, more room is needed per individual when practicing.

Before beginning this practice session you should inform the group that at the next session there will be a casting game and contest. Both accuracy and proper technique should be stressed.

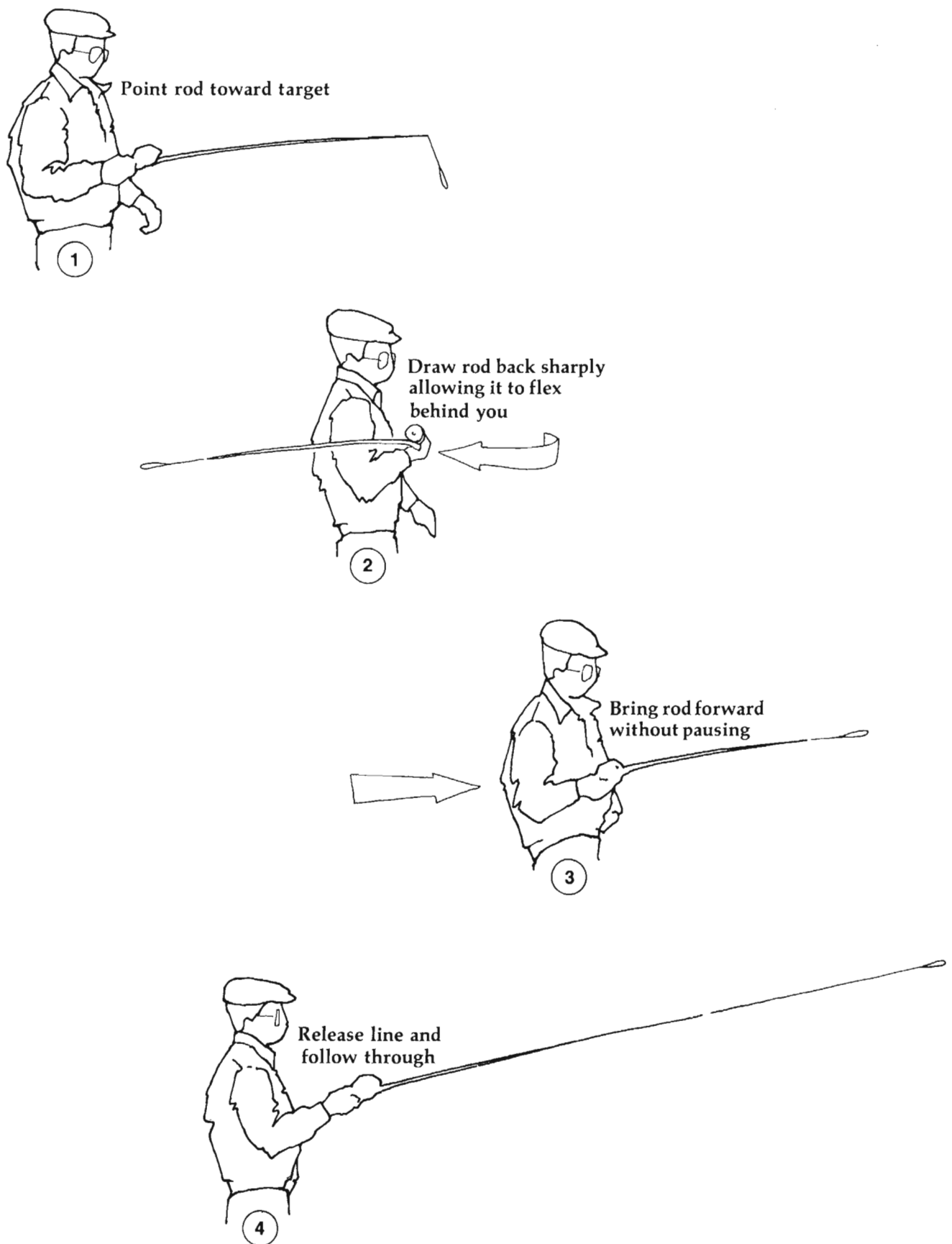


Figure 13. The sidearm cast is like an overhand cast turned on its side

Lesson 3:

Natural Baits and Basic Fishing Technique

Objectives

To help youth

1. Identify the various types, methods of capture, proper storage, and use of live bait,
2. Learn the techniques involved in hooking, playing, landing, and handling of fish,
3. Demonstrate the casting skills acquired through participation in a casting game and contest.

Materials and equipment

1. Spin cast rods, reels, and line
2. Rubber practice casting plugs
3. Sections of rope, each about 3 m (9 feet) long
4. Pencils and pads of paper
(If slide set is used)
5. Slide projector
6. Screen
7. Extension cord
8. Spare bulb for projector

Teaching aids

Slide set *Natural Baits and How to Use Them*

This session deals with two new areas. Natural baits are discussed in an introductory manner, including methods of capture, storage, and use of various types of baits. In addition this section discusses proper techniques for hooking, playing, landing, unhooking, handling, and releasing fish. This discussion is intended to introduce beginners to the basic principles involved. Only actual experience will result in proficiency in these basic fishing skills.

Natural Baits

The various types of natural baits commonly used by fishermen were presented earlier. They include worms, minnows, crayfish, salamanders, grubs, frogs, insects, and insect larvae (for example, grasshopper, helgramite), eggs, cutbaits, and doughballs.

Worms and night crawlers can be dug up with a potato fork or shovel. They also can be forced to the ground's surface by pushing a potato fork into the ground, pulling back on the handle and then quickly releasing it. The vibration will cause worms in the upper soil layers to come to the surface where they are easily picked up. Night crawlers can be collected after dark with the aid of a light. A red filter is often helpful in catching them. These critters come out and crawl on the ground, especially after a rain, making them easy to collect. Both worms and night crawlers can be stored in a container partially filled with sphagnum moss, leaf mulch, or commercial worm-bedding materials. Worms are effective bait for nearly every species of freshwater fish. They are usually hooked lightly through the head or the breeding ring allowing the ends to trail freely.

Minnows can be caught using a seine, dip net, or minnow trap. Stale bread, broken into tiny crumbs, makes good bait to attract them. Minnows can be stored for a short time in a typical baitfish pail filled with water. They are good bait for large trout and salmon, largemouth and smallmouth bass, northern pike, pickerel, muskellunge, rock bass, perch, and crappies. Minnows are usually hooked through the lips or just behind the dorsal fin using light wire hooks.

Crayfish can be caught in a modified minnow trap using chunks of scrap meat. The entrance to the trap should be level with the stream bottom to facilitate their entry. A more straightforward method is to catch them by hand. This is actually quite fun; and since you are usually wading in streams or along lake shores in the summer to get them, it can be very refreshing too. Crayfish can be stored for a short time in a typical bait pail filled with water. They are particularly good bait for largemouth, smallmouth, and rock bass. Crayfish are usually hooked through the tail when they are used as live bait.

Salamanders can be gathered along the edges of shallow spring brooks or in moist, shaded spring seeps. They are usually found under small rocks and can be easily caught by hand. Be careful not to grab them by the tail because the tails will often break off. Salamanders can also be stored in a bait pail for short periods of time, but only 1 or 2 cm water or damp moss should be added. Trout, largemouth bass, smallmouth bass, rock bass, sunfish, and bluegills all readily take salamanders for food. Like minnows, salamanders may be hooked through the lips. Some fishermen prefer to hook them lightly through the skin just in front of their hind legs.

Frogs can be caught along the banks of any stream or standing body of water. While many people prefer

to catch them by hand, a more efficient method is to use a tightly meshed net of some type. Baitfish pails filled with about 5 cm (2 in.) of water make good temporary storage containers for frogs. Largemouth and smallmouth bass, northern pike, pickerel, and muskellunge include an occasional frog in their diet. Frogs are usually lip hooked; harnessed in special rigs, or hooked lightly through the skin of a hind leg.

Insects and insect larvae require different methods for capture. The grasshopper and cricket are commonly caught by hand or with nets. Aquatic insect larvae can usually be found by overturning stones in streams. Often the larvae are attached to the underside of the stones. Aquatic insect larvae can be temporarily kept in baitfish pails also. In many states it is illegal to remove insects or insect larvae from waters inhabited by trout. Terrestrial insect larvae such as grubs are commonly found under rotting logs or other wood and in rotting leaf litter. They can also be found in freshly turned sod. These can be stored in almost any type of convenient container. Whatever is used should have a layer of leaf mulch on its bottom. Insects and their larvae are good bait for bluegills, sunfish, rock bass, perch, crappies, trout, and largemouth and smallmouth bass. Use light wire hooks to keep injury to a minimum when using insect larvae for bait.

Fish eggs are acquired from fish that were full of roe (eggs). These can be used on a hook singly, as with large salmon and trout eggs, or tied in a small sack made of pieces of nylon, cheesecloth, veil, or similar materials when using smaller eggs.

Cutbaits are chunks of fish, scrap meat, or liver which are used when still-fishing. They are cut into 1–2 cm ($\frac{1}{2}$ – $\frac{3}{4}$ in.) cubes.

Doughballs can be made in several ways. They are usually made according to some “secret” recipe, but any bread dough recipe will do. Sometimes ingredients such as fruit jello powder or oil of anise are added for variety. The size of these balls can vary in diameter from the size of a dime to the size of a nickel.

Eggs, cutbaits, and doughballs can be carried and kept in just about any type of container. The eggs and cutbaits can deteriorate if exposed to warm temperatures for any length of time. Fish eggs, cutbaits, and doughballs are effective baits for suckers, carp, and bullheads. Fish eggs are also good for trout and salmon.

Regardless of what type of bait and container you use, one rule applies—keep them *cool*. For bait kept in water, frequently replenish or replace the water to keep it cool and oxygen rich. As mentioned earlier, this section on natural baits is given only superficial treatment. We hope it has been adequate in introducing the beginner to some basic considerations on the various types, uses, collection, and storage of natural baits.

To Catch a Fish

Although important, knowing only how to cast and what bait to use is not sufficient to ensure a successful fishing trip. What do you do after a fish takes the bait you’ve offered? We’ve termed these subsequent steps, “To Catch a Fish.” The discussion below describes the main points, but only through actual experience will their importance be realized. Catching a few fish will develop these skills rapidly.

Hooking a fish

After you’ve made a cast to a likely looking spot with a nearly irresistible bait, what should you expect? More often than not the answer will be nothing. Sometimes you’ll be fortunate and your line will come to life. You may feel some short, jerky actions or a heavy steady tug. A fish has taken your bait. Slowly retrieve your slack line, not too much though. You don’t want the fish to know that you’re on the other end of the line!

With the slack line drawn up, wait for the next hint of activity on the fish’s part. Holding the rod and reel in your left hand and the reel handles in your right hand, keep the rod at about a 45° angle with the water surface. Feel a little tug? Raise the rod tip upward, very slowly. Feel a harder tug? Jerk the rod up and back swiftly. If the fish is not on, retrieve your hook and rebait, if necessary. If the fish is on, hurry up and read the next section.

Playing a fish

Playing a fish consists of a contest between fisherman and fish. In effect, the fish does everything it can to throw the hook and the fisherman does everything possible to prevent or counteract the fish’s maneuvers. The fisherman must keep tension on the line until the fish becomes tired so it can be brought to net. He or she must try to prevent the fish from throwing the hook or getting tangled among logs, roots, or rocks and breaking the line.

When playing a fish the rod tip should be held in a nearly vertical position. This allows you to have the best control of the fish, keeping its head up and making it work against as much rod action as possible. If the fish makes a powerful headlong rush away from the fisherman, the drag will allow the line to be stripped from the reel. When a large fish makes such a move it is advisable to lower the rod tip and “give it the butt,” taking the strain at a heavier section of the rod. This keeps the rod from coming under severe strain, which could cause it to break. No fish can break a rod by itself. It needs help from the fisherman. If the fish rushes toward the fisherman, the line must be wound up quickly enough to maintain tension. No slack should be allowed in the line. If a fish does head for a snag, the pressure placed on the line must be increased to turn it back into the open water. If it jumps, the rod must be pulled back to keep the line taut. The amount

of pressure required for these maneuvers is learned only through experience. As the fish tires more line can be retrieved. Eventually, the fish will become exhausted and you will be able to land it.

Landing a fish

After a fish has been sufficiently tired to allow you to bring it in you must "land" it. Methods of doing this include beaching, grasping with the hands, or netting. The latter method is best for several reasons and is the one preferred for the beginner.

To net your fish, lead it toward the net with the rod. Net the fish head first. To do this it is obvious that you don't reel the fish right up to the end of your rod. Leaving about 10 feet of line allows you to hold the rod high and keep things under control. If the fish is not adequately tired it may make a sudden rush as it nears the net. Having the extra line out and the rod held high will increase your chances to control such a last ditch effort. Before the fish is close enough to see you, submerge the net. Lead the fish over it, head first, and lift smoothly. Do not chase the fish with the net since this would frighten it further and increase the difficulty in netting.

Unhooking a fish

All fish are slippery, therefore they are more easily handled in a net. If you are going to keep a fish, but want to kill it rather than keeping it on a stringer, kill it first and then remove the hook. To kill a fish cleanly, hold it by the body and give it a sharp blow to the base of its head with a hard object. If you are going to release a fish, be especially careful to avoid handling or injuring its gills. You must also be careful not to squeeze a fish too hard since this can cause injury.

To remove a hook from a fish you would like to return or place on a stringer, hold it in the net, being careful that all the spines on its fins are depressed. Using your fingers, if it is hooked in the lip, or forceps, if it is hooked deeper in the mouth, push the point of the hook rearward (away from the eye of the hook) and up. This should cause the hole to enlarge slightly, allowing the barb of the hook to pass through without unduly ripping the flesh. Never attempt to remove a hook by yanking it straight out. This will only result in embedding the hook more firmly and cause further injury to the fish.

If the fish is to be returned, carefully place it in the water. Don't just give it a heave. If you are in a swift flowing stream, release the fish in a calm pool or near shore. This will give it time to recover before it must swim against a current. If the fish does not recover, put it on your stringer. It's better to eat it than to let it be wasted.

A fish that is to be placed on a stringer should be attached by its lower jaw, not by its gills. Putting a stringer snap through a fish's gills will cause it to die rapidly. The reason for using a stringer is to keep your catch alive and "fresh" for as long as possible, so care in attaching the fish to the stringer is very important.

There you have it, the procedure for hooking, playing, landing, and unhooking a fish. The real test is successfully following the procedure under actual "field" conditions.

Activity Suggestions

Casting practice and game (contest)

This activity period should offer the young people a chance to demonstrate their casting skill in a mildly competitive atmosphere and give the leader an opportunity to re-emphasize the importance of using proper technique and to critique each individual's casting. The casting game should be preceded by about a 15 minute warm-up period. The casting game itself can consist of several possible procedures. An example is suggested below.

A foul line should be established. Each contestant must keep both feet behind that line while casting. Targets should be placed at about 10 meters, 15 meters, and 20 meters. These can be pieces of rope shaped to form a circle on the ground. The circle could be from 0.5 to 1 meter in diameter. The first (closest) circle could be worth 1 point for every time a plug lands within it. The second and third circles could be worth 2 and 3 points per hit, respectively. Each person should be allowed 3 casts per circle or a total of 9 casts.

This contest could be run once with everyone using an overhand cast, then again with everyone using a side-arm cast. You can have eliminations and then make the better casters compete against each other. For this round the targets could be made smaller and (or) placed at greater distances. Some members of your group may not be able to cast accurately but may be able to cast long distances. In order to permit them to show their skill, a contest to see who can cast the farthest may be used.

As you can see, there are as many interesting variations to such a game as there are leaders to dream them up! Buckets, hoola-hoops, bicycle tires, or just about anything could be used as targets. This game should be both fun and challenging to your group.

Bait field trip

This field trip should be used to reinforce the lesson on the collection, storage, and use of natural baits. You should collect worms, grubs, crayfish, salamanders, minnows, and aquatic insect larvae (where legal). This should be done in anticipation of a fishing trip to be conducted in the near future. The methods described above should be sufficient preparation for this outing.

If you take your group to almost any medium-size stream you can collect these baits. On a very small spring brook the use of life preservers may be omitted. These brooks often have an abundance of easily captured natural baits. Everyone should be able to identify the baits gathered and tell which fish they are used to catch.

Lesson 4:

Fish Identification and Basic Fishing Tactics

Objectives

To help youth

1. Learn to identify the common species of freshwater fish,
2. Learn to identify various freshwater fish habitats,
3. Become acquainted with some common fishing techniques,
4. Achieve a basic understanding of fish biology and ecology.

Materials and equipment

(If slide set is used)

1. Slide projector
2. Screen
3. Extension cord
4. Spare bulb for projector

Teaching aids

1. Slide set: *Freshwater Fish Identification*
2. Bulletin S108: *Guide to Freshwater Fishes of New York*
3. Diagram of generalized fish

In this session commonly encountered fish species, fish habitats, and fishing tactics appropriate for each species are covered. For further information on fish habitats or aquatic ecology, leaders are encouraged to read *Environmental Awareness* and other elements of the Fish and Fishing project.

Fish Identification

Proper identification of fish species is important since most laws relate to species. Species regulations may vary from state to state, so be sure to check your fishing regulation guide before going fishing. A selected group of commonly caught species are included here. The suggested slide set may be useful to you.

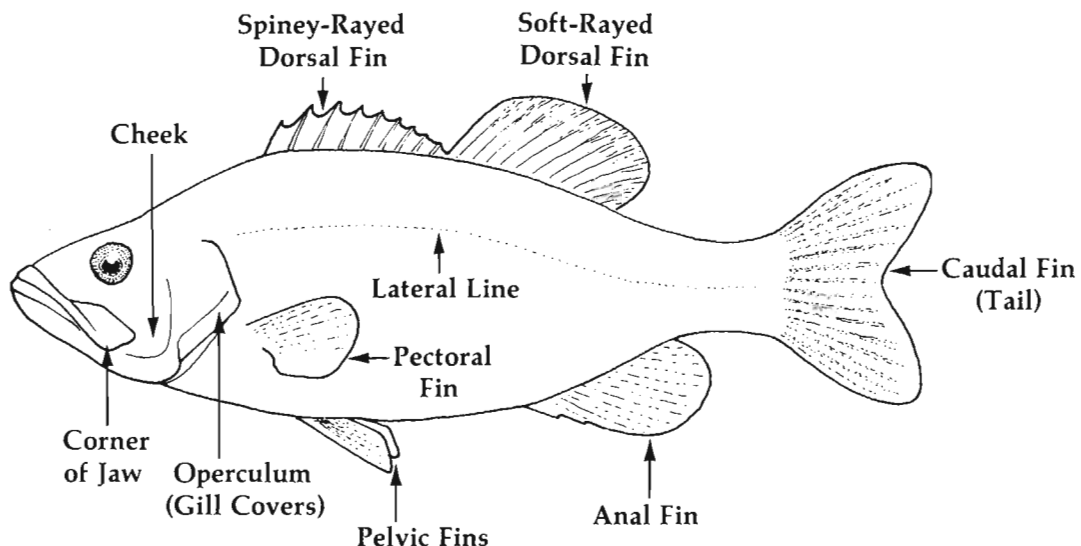
General characteristics

Before you can learn to identify fish you must be able to recognize some of the characteristics used to distinguish between them. Characteristics commonly used in the field are variations in structures, pattern, or color. Figure 14 illustrates several of the characteristics useful in fish identification. The shape of the head and body are often useful in fish identification (fig. 15). In addition, the size, shape, and color of the gill covers (operculum) vary among species; and they are useful in identification. The presence or absence of scales on the gill covers is also used to identify some species. The shape and position of the mouth and the presence or absence of barbels ("whiskers") are sometimes clues to a fish's identity.

Fins are named for both their location on the fish and their structure. Fins are divided into two categories: median fins and paired fins. The dorsal, adipose, caudal, and anal fins are median fins. The pectoral and pelvic fins are paired fins. Not all fish species have all of these.

The dorsal and adipose fins are located on the back (dorsal) area of a fish. The dorsal fin has rays of either soft or stiff (spines) bony material. The adipose fin is small, soft, and located between the dorsal fin and the

Figure 14. A generalized fish showing some identification characteristics

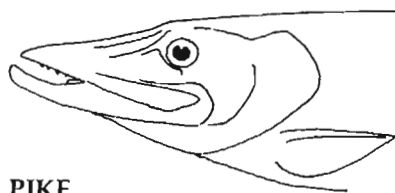


tail. The tail is called a caudal fin, which can be either squared, slightly forked, or deeply forked. On the under (ventral) side of a fish, between the anus and tail, is the single anal fin.

The pectoral fins are located just behind the operculum. The paired pelvic fins are located ventrally. They vary in position on the fish's belly from being directly under the pectoral fins to being slightly ahead of the anus.

The body covering of a fish helps a great deal in its identification. It can be smooth and skin-like or scaly. Most fish have scales, and the shape and size of these scales can help in identification.

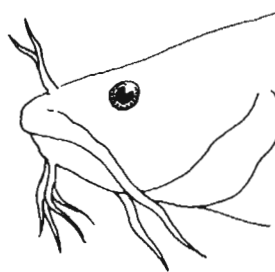
The presence or absence of a visible lateral line organ aids in fish identification. It is a strip of sensory tissue on each side of a fish's body found about midway between the back and belly of the fish, and runs from the gill covers to the tail. Although barely noticeable on some fish, it is very pronounced on others. The species descriptions listed below focus on features that can be used for field identification of fish. The heavy lines on the figures indicate key field marks. You should refer to the text for a clear understanding of those field marks.



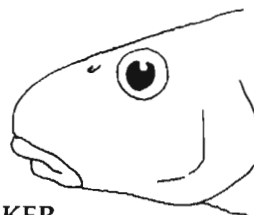
PIKE



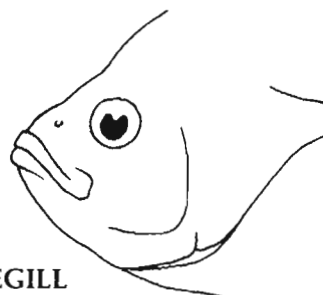
**LARGEMOUTH
BASS**



BULLHEAD



SUCKER



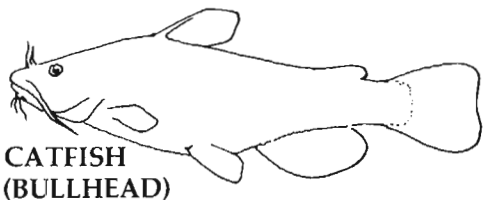
BLUEGILL



PIKE (PICKEREL)



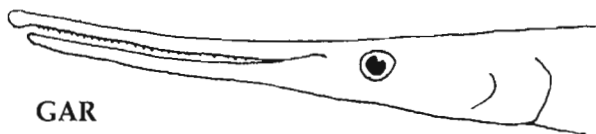
**SUNFISH
(BLUEGILL)**



**CATFISH
(BULLHEAD)**



TROUT



GAR

Figure 15. Head shapes and body shapes can be useful in identification

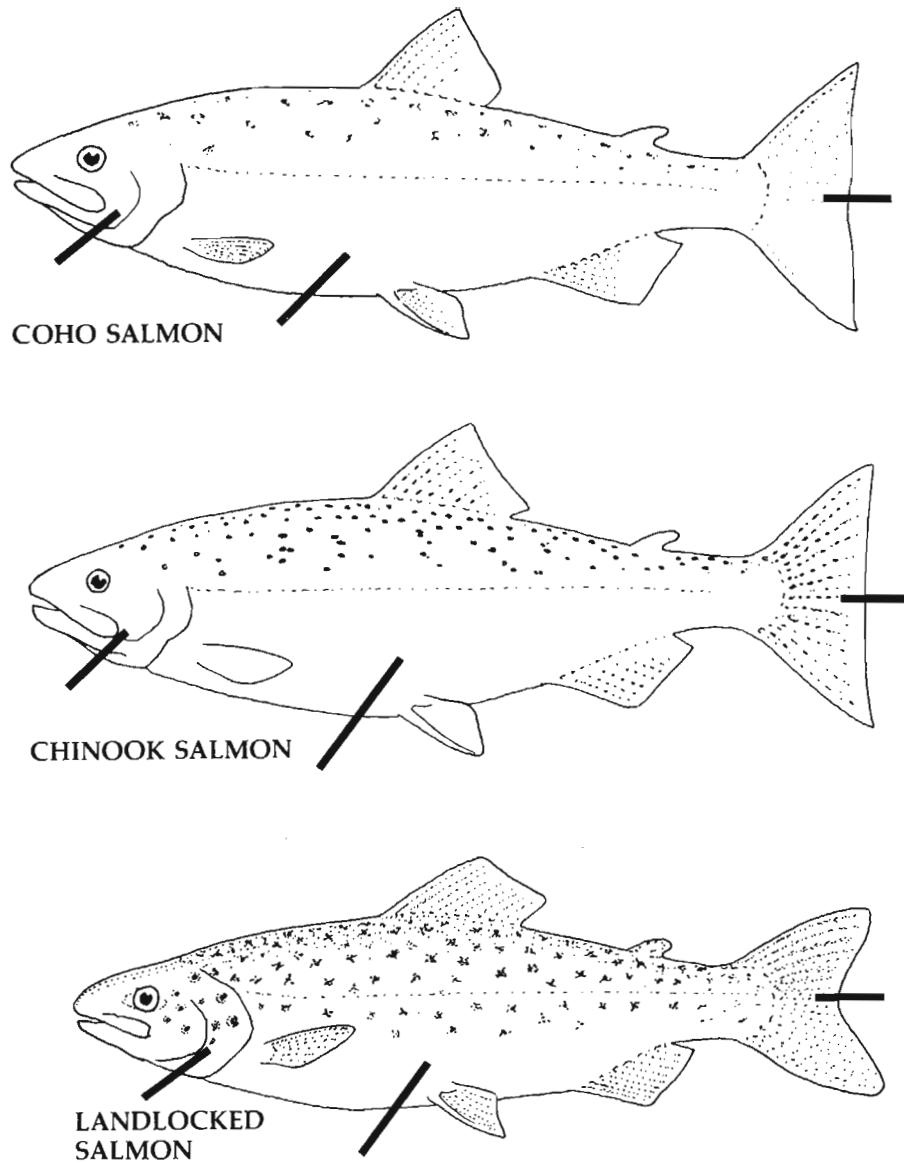


Figure 16. Field marks for coho, chinook, and landlocked salmon

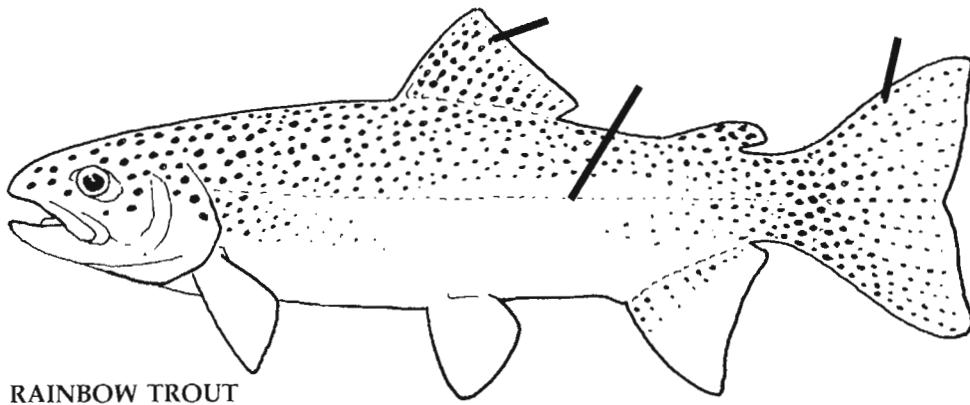
The several species of salmon and trout share many characteristics. They have soft-rayed fins (no stiff spines) and an adipose fin. All trout and salmon have very fine scales and a thin, faintly visible lateral line.

The **coho salmon** is generally silver colored with black spots resembling x's above the lateral line and has no spots on the tail or operculum. The **chinook salmon** is also generally silver and has black spots above the lateral line, on the dorsal fin and on both lobes of the caudal fin. The **landlocked salmon** has a bluish brown back and sides, with a silvery belly. It has large black spots resembling x's on its back and sides above and below the lateral line and on the gill covers. However, no spots are usually found on the caudal fin of landlocked salmon (fig. 16).

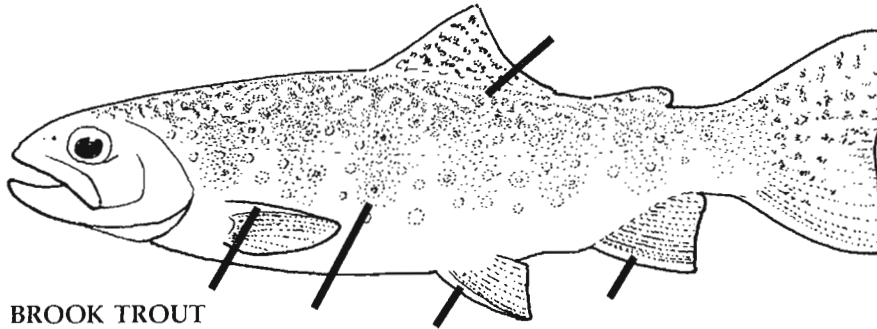
Rainbow trout (fig. 17) may closely resemble the coho and chinook salmon when found in large bodies

of water. These particular rainbow trout are often called "steelheads." The magnificent color normally found in rainbow trout may be only faintly visible in steelheads. The color of a rainbow can vary from this general silver to fish with a dark back, silvery belly, and a bright red streak running from below its eye to its tail along the lateral line. Rainbows have black spots on the head, operculum, back, and sides (above and below lateral line). They also have black spots on the dorsal, adipose, and caudal fins. Only the rainbow trout and chinook salmon have rows of black spots along the rays of the caudal fin.

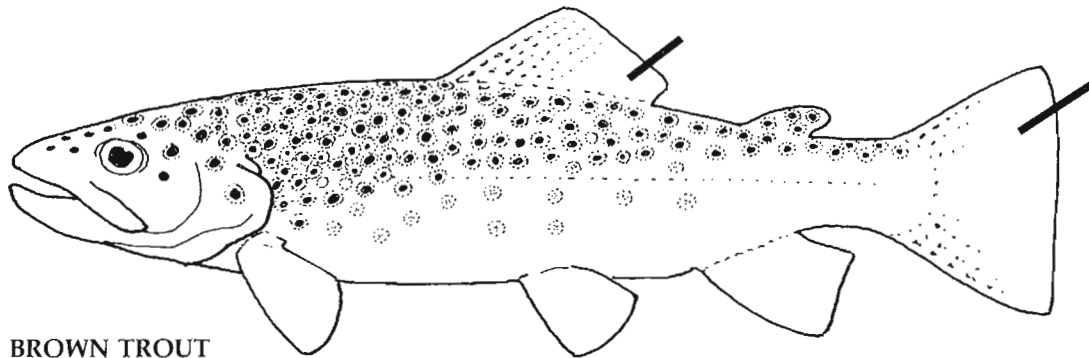
Brown trout are generally a golden brown color overall. Usually they are heavily spotted with both black and reddish-orange spots. The black spots are most abundant dorsally and the reddish-orange spots are most abundant along the lateral line. The spots



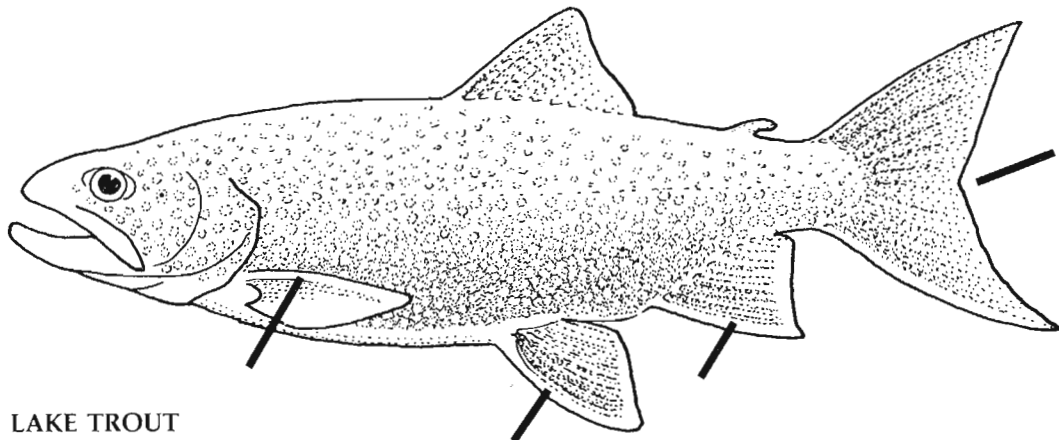
RAINBOW TROUT



BROOK TROUT



BROWN TROUT



LAKE TROUT

Figure 17. Field marks for rainbow, brook, brown, and lake trouts

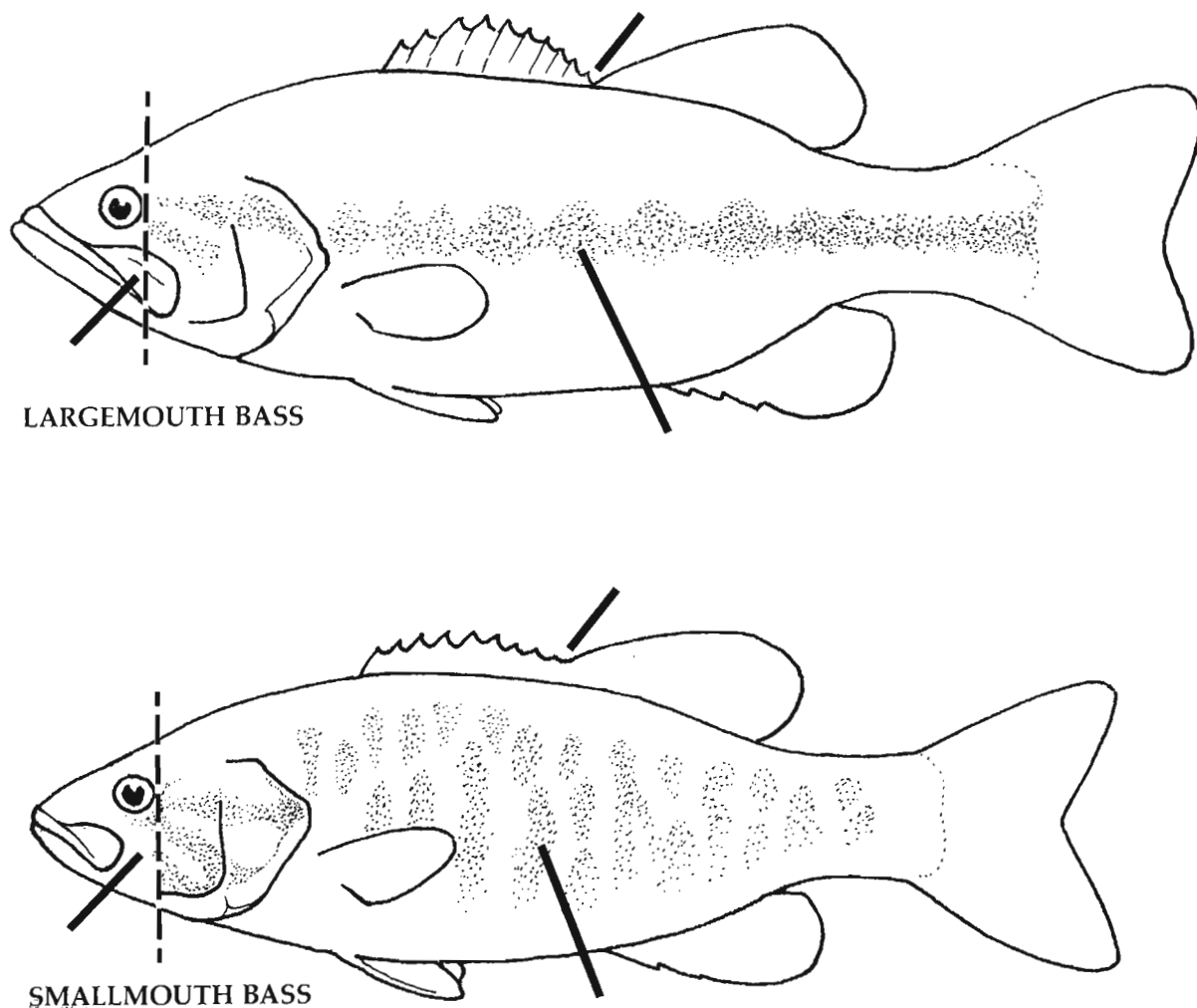


Figure 18. Field marks for largemouth and smallmouth basses

may have lighter colored "halos" around them. Spots are often present on the adipose fin but not on the other fins. The head and gill covers are usually heavily spotted.

Brook trout are unlike any other trout except the lake trout in that they have a white line on the leading edge of the pectoral, pelvic, and anal fins. This trout has both light yellowish spots and red or pink spots. The red or pink spots are encircled with a bluish "halo." Its back is mottled in a dark and light pattern sometimes described as "worm tracks" (vermiculations).

Lake trout have moderately to deeply forked tails. They vary in color from blue-gray to bronze-green. Many pale spots appear on the belly, sides, head, and back, and often occur on the dorsal, adipose, and caudal fins. Like the brook trout, lake trout have white lines on the margins of the pectoral, pelvic, and anal fins.

The **splake** is a hybrid cross between a brook trout and lake trout. As such, it has modified characteristics

resembling each of those species. Its tail is not as deeply forked as the lake trout's, and it usually lacks the red spots with blue halos common to the brook trout.

The **largemouth** and **smallmouth black bass** are so named because of the relative sizes of their mouths. They have several similar characteristics (fig. 18). They have double dorsal fins, the anterior (front) section of which is spiny rayed and posterior (back) section is soft rayed. They lack adipose fins and their tails are moderately forked. Their scales are large and coarse.

The largemouth differs from the smallmouth on three key characteristics. Its mouth is larger with the upper jaw extending beyond the eye. The mouth of the smallmouth does not reach beyond the eye. On the largemouth bass, the dorsal fin's spiny section is nearly separated from the soft section, almost appearing as two distinct units. The smallmouth's dorsal fin has a slight depression between the two portions, but looks like one continuous fin.

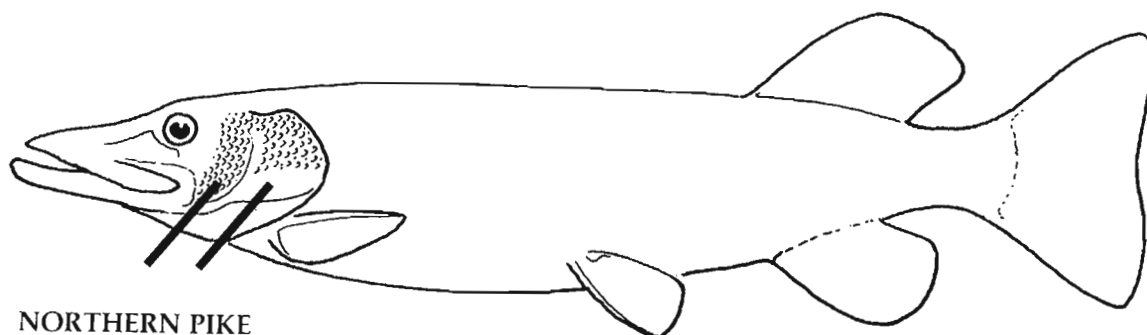
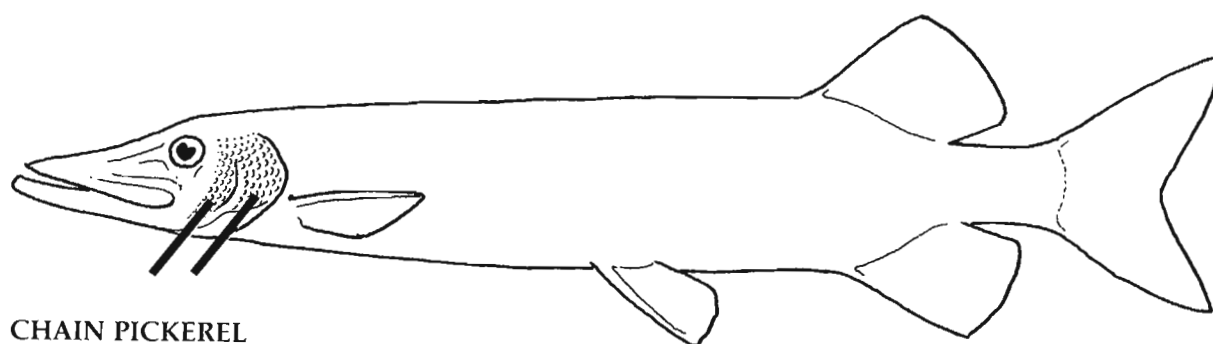


Figure 19. Field marks for pickerel, pike, and muskellunge

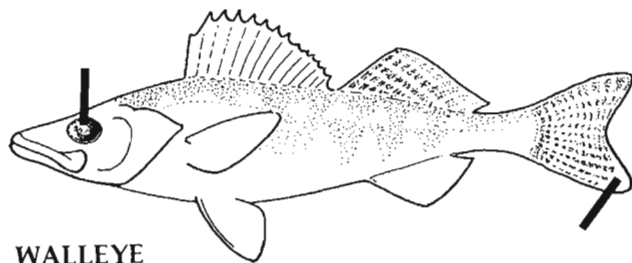
These two species also differ in color. The largemouth is usually dark green with a dark horizontal band from head to tail. The smallmouth, on the other hand, is usually bronze or brown with darker brown vertical bands resembling thick stripes.

The three common members of the pike family are **northern pike, pickerel, and muskellunge** (fig. 19). They are all long, lean fish. Their mouth is shaped roughly like a duck bill. They have rows of very sharp teeth, slanted rearward to ensure a good grip on their prey. (These fish should be handled carefully.)

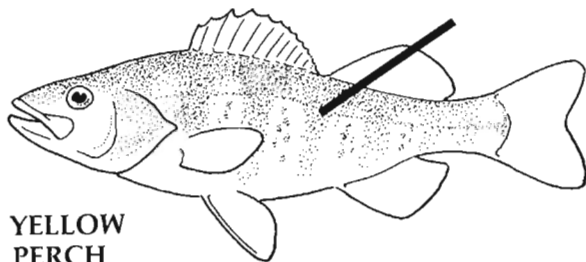
All the fins on pike are soft rayed. No adipose fin is

present, and the dorsal fin is located posteriorly, directly above the anal fin. The scales on pikes are of medium-size (larger than trout, but smaller than bass).

Northern pike have the medium-size scales on their cheeks and the operculum. The lower half of the operculum is covered with very fine scales. The back is dark green in color, blending into lighter green on the sides and white on the belly. The sides are dotted with bean-shaped yellow spots. The fins have dark spots resembling bands or stripes.



WALLEYE



YELLOW
PERCH

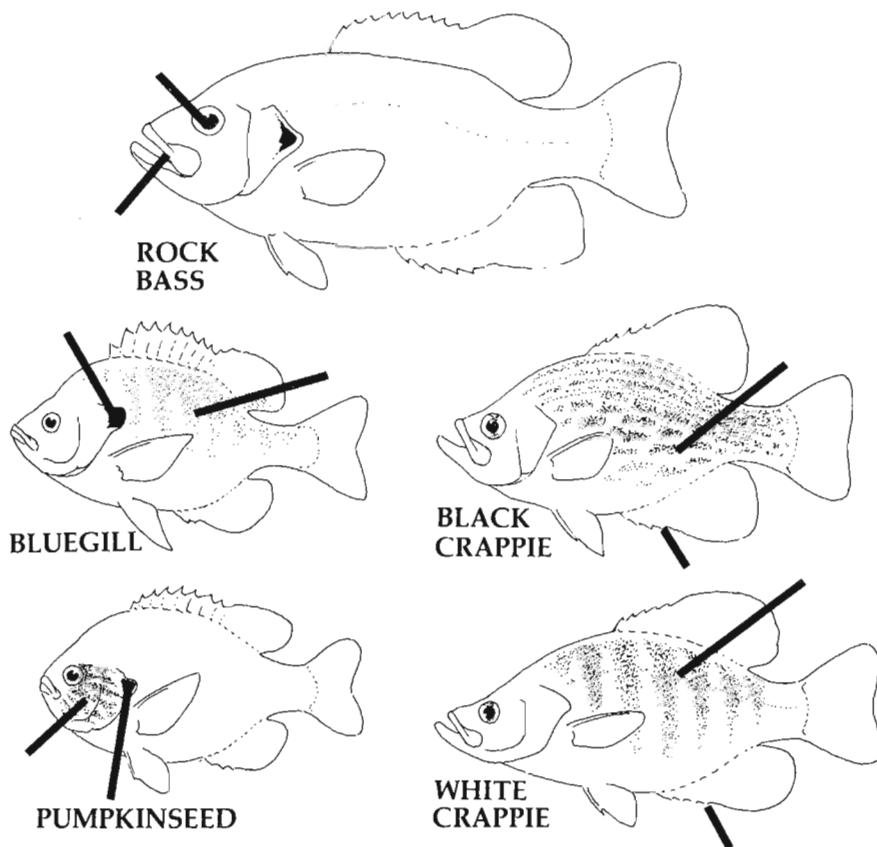
Figure 20. Field marks for walleye and yellow perch

Chain pickerel have gill covers and cheeks that are entirely and uniformly scaled. They get their name from the dark, chain-link shaped markings on their sides. The overall color ranges from dark green on the back to light green or bronze on the sides fading to yellow or white on the belly.

Muskellunge (or muskie) are the largest members of the pike family. A key characteristic in their identification is the absence of any scales on the lower half of both the cheeks and the gill covers. Their color varies considerably with the back and uppersides dark olive or bronze, shading into a grayish hue on their lower sides. They can have overmarkings of darker bars, spots, or blotches.

The **walleye** (fig. 20) is often called a "walleyed pike," but it is not a pike at all. It is a close relative to the yellow perch. Its seemingly oversized eyes are glassy and shine at night under a light. This fish's tail is forked, and it has two dorsal fins. The front (anterior) fin is spiny, and the rear fin is soft rayed. The anal fin also has spines, and no adipose fin is present. The walleye's gill covers are sparsely scaled and its body scales are large. The overall color of a walleye is a mottled dark olive to brassy. Its belly is light colored; and its back has six to seven vertical dark bands, although they may be faint. The spiny dorsal fin has no dark spots. Walleyes have a silver or white tip on the lower lobe of the tail.

Figure 21. Field marks for rock bass, bluegill, pumpkin seed, black crappie, and white crappie



The **yellow perch** has a moderately elongated body with a slight humpback appearance. Its pectoral, pelvic, and anal fins are yellowish to orange. It has two dorsal fins and a moderately forked tail. Its color is usually olive on the back, blending to golden yellow on the sides and then to white on the belly. Six to eight dark bands extend vertically from the back to below the lateral line.

The **bluegill** (fig. 21) and **common sunfish** (pumpkinseed) are very similar in shape and general appearance. They are usually small (less than 25 cm), nearly round (side view) and thin (front view). They have spiny-rayed dorsal, pelvic, and anal fins. Although both are brightly colored fish, they vary on a couple key factors. The operculum tag or gill flap on a bluegill is broad and black, with no trim. The pectoral fin is long and pointed. Its basic body color can be yellow to dark blue. The sides of this fish often are overmarked with six to eight dark vertical bars.

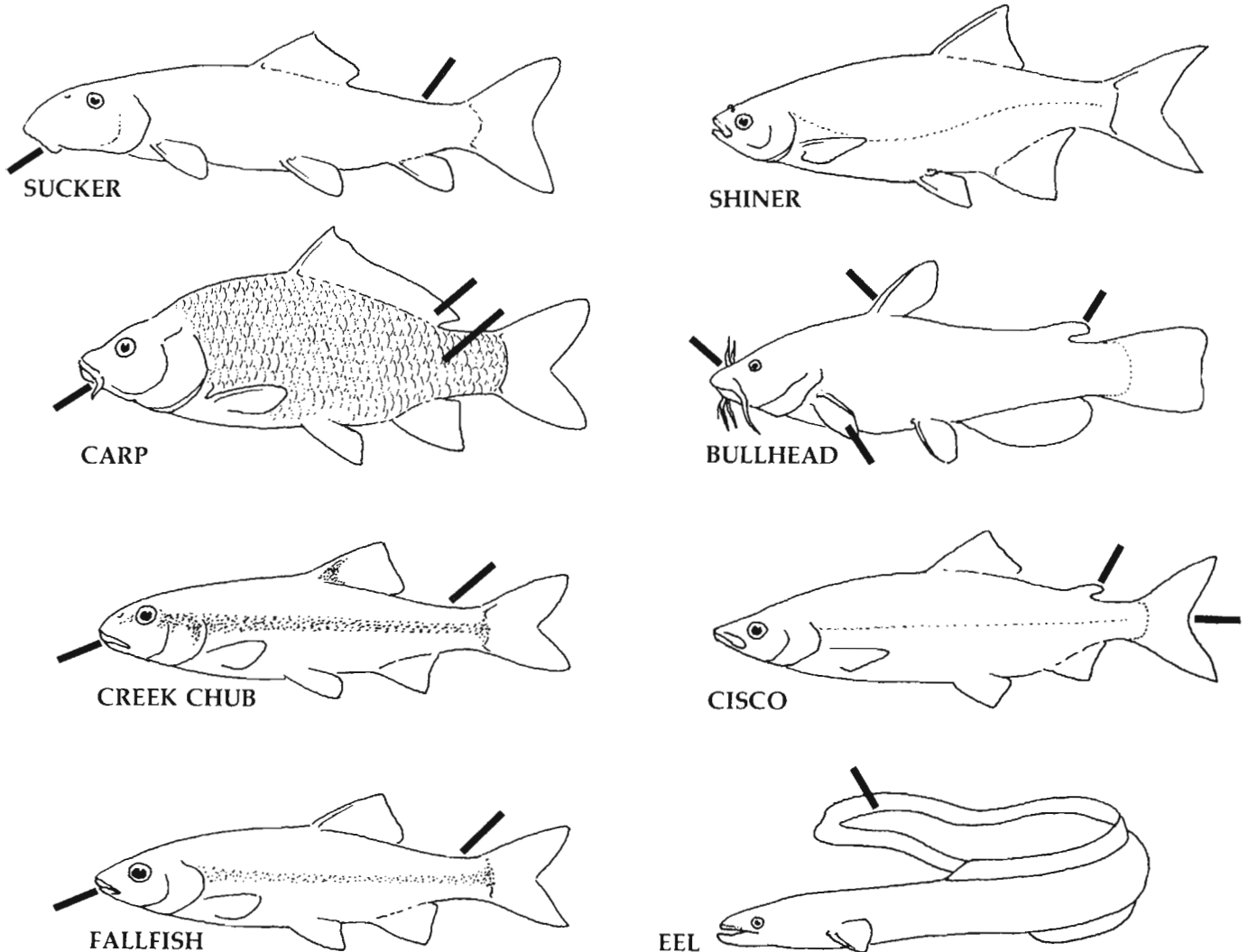
The black gill flap on a pumpkinseed is trimmed with a bright red or orange spot on the tip. Its body is usually light olive with spots of various colors and a yellow or orange belly. Blue lines radiate out from the eye and across the head and gill covers.

Crappies resemble other sunfish in shape, but they are a little more elongated. The rays of their dorsal and ventral fins are longer than those of a sunfish. The black crappies have silvery or golden sides darkening to a dark olive or black on their backs. They have dark spots or blotches scattered irregularly on their sides. White crappies have silvery-olive sides darkening into an olive-green on the back, and they have seven to nine dark bars running vertically on their sides.

Rock bass also resemble other sunfish in general shape, but they have a larger mouth and large red eyes. They are mottled dark olive-brown color on sides with a solid brown or olive back.

Carp are heavy bodied fish with very large scales.

Figure 22. Field marks for some additional food or sport fish species



They are usually a gold-olive color on the back, with bronze colored sides and golden or white on the belly. They have large barbels on each side of their mouths (fig. 22).

Collectively called “chubs,” **creek chubs** and **fallfish** are usually small (less than 30 cm). The creek chub is usually 7–20 cm (3–8 in.) and fallfish are usually 20–37 cm (8–15 in.) long. They have large scales and are silver with darker backs; some have tiny barbels. They have a relatively large mouth.

Shiners resemble chubs but lack barbels and have smaller mouths. They usually are used for bait rather than caught for sport.

Suckers can be easily identified by the shape of the mouth, which has round and fleshy lips, with the upper one curved downward. Suckers are often caught by anglers fishing for other species.

Bullheads are often called “catfish.” They have no scales and are usually a light chocolate to dark brown color on their backs and upper sides, fading to yellowish or white on their bellies. They have several barbels about their mouth. The pectoral and dorsal fins each have one spine. An adipose fin is present on these fish.

The **cisco** is a relatively uncommon fish in distribution, but in lakes where it occurs it is usually quite abundant. The fins of these fish are soft rayed and the adipose fin is present. They have a deeply forked tail. Their gill covers are scaleless, but their body covering is comprised of large scales. They are silvery colored fish with a dark back. No spots, bands, or mottling are found on these fish.

The **eel** is a long, snake-like, slimy fish with no scales. Its color varies from black to light brown on back and sides, and it usually has a white belly. Its dorsal and ventral fins start far behind the pectoral fins and each extend to the tip of its pointed tail.

These descriptions have outlined only a few of the fishes in our waters. For further information, you may want to consider the other publications that are part of the Fish and Fishing Project.

Fish Habitat and Fishing Techniques

While nearly any body of water can be considered fish habitat and most hold some species of fish, certain fish prefer certain habitats. It is essential to have some basic knowledge of these preferences if you hope to catch fish consistently. The following discussion will briefly cover the more important habitat types and fish species commonly occurring in them. These different water types and fish species require different fishing techniques. We will consider only natural baits used with spin-casting tackle in describing those techniques.

Small streams

Brooks and small creeks 1–4 meters wide are the home of brook trout and brown trout. Small chubs and shiners sometimes inhabit these same waters. The water is generally cool to cold and well aerated. These streams can vary from rapidly moving mountain spring brooks to slow, meandering, lowland creeks.

For trout fishing on small streams, the worm is an effective bait. Fished in pools, under banks, and in pockets behind boulders, worms are almost certain to catch fish. But two words of caution—go easy—should be remembered when fishing these waters. Don’t let fish see you, hear you walking on the banks, or see mud and debris floating downstream. They recognize all of these as indications of danger.

Medium-size streams

Creeks and small rivers 4–10 meters wide can vary from rapidly moving rivers to sluggish, meandering creeks. The kinds of fish found in each varies according to depth, water temperature, and oxygen content. Generally, brook, brown, and rainbow trout are found in the cool rivers. Spawning salmon and smallmouth bass may also be present at certain times of year. In large pools, sunfish, perch, or bullhead may be available. Chubs and suckers will probably be present along with carp.

On these medium-size streams, worms, crayfish, salamanders, and minnows can all be very effective for getting game fish. These can either be cast and allowed to drift freely, or they can be cast into a deep pool and allowed to rest on the bottom. The first method allows you to cover a good deal of water and the second method requires patience. Both techniques can be very productive. Cutbaits and doughballs can be used for some species of fish, particularly carp, suckers, bullheads, and eels. Since a current is usually present, a sinker or split shot may be desirable when fishing this type of water.

Large streams

Large streams over 10 meters wide usually have regions of fast and slow (deeper) water providing a mix of habitat types. All trout may be present, as could salmon during spawning periods. The basses, sunfish, rock bass, perch, pickerel, bullhead, eel, walleye, carp, and suckers will probably be living somewhere in this stream. Both northern pike and muskellunge are relatively common in some large rivers.

On large streams the fishing is usually best in eddies, pools, or long, deep runs. Nearly all common species of fish may be present in these streams and the natural bait fisherman can catch them quite readily. Once again the use of some weight is usually necessary to keep the bait on the bottom. A bait cast upstream and slowly retrieved as it drifts down and below the fisherman may attract fish actively feeding in the current. The techniques used on medium-sized

streams are also useful on larger streams and rivers.

Ponds and lakes

Small ponds are usually the home of sunfish, bluegills, largemouth bass, and bullheads. Pickerel and perch may also be found here.

Medium-size lakes often hold bass (both largemouth and smallmouth), crappies, pickerel, sunfish, perch, rock bass, bullheads. If cold enough or deep enough, some may have populations of northern pike, walleye, and the various trouts.

Large lakes and reservoirs may hold any of the fish species found in that region. Almost all large lakes have the basses and some trout. Many have northern pike and walleye. Several large lakes have salmon, but only a few have muskellunge. Pan fish are usually found in all large lakes.

In these bodies of standing water three different fishing techniques are useful. A cast-retrieve method can be used for most game fish. Secondly, a still-fishing method with a sinker might prove satisfactory if bottom feeding fish are desired. And thirdly, the use of a bobber when still fishing could bring satisfactory results in bodies of water where your bait would become lost in a weed-covered or rock-strewn bottom.

When using a cast-retrieve method, look for sunken logs, rocks, or patches of lily pads or other aquatic vegetation. These are cover for fish. They act as shade or protection for small fish and as areas for concealment for predacious fish. Cast to the edge of this "cover" and expect to tie into a fish with each cast.

Basic Fish Ecology

What do fish eat? Where do they live? How are they adapted to their environment? Answers to these questions are useful to fishermen. They are also basic to an understanding of fish ecology. Trout and salmon need cool or cold water for their survival. Bass and pickerel live and grow best in warmer waters. What foods are found in these different environments?

How are fish appendages adapted for the food they eat and the aquatic environment they occupy? The sleek trout lives and feeds in fast water, while the sucker feeds on the detritus on sluggish stream bottoms. The sharp-toothed, torpedo-like pickerel preys upon other fish.

What color is a bullhead? Like the mud at the bottom of the pond where it lives and feeds, it's brown. Pickerel are green, not unlike the weeds where they lie while awaiting their prey.

Shape, appendages, coloration—these are adaptations for survival in each fish. You can't expect to teach your group everything about fish ecology, but you can call their attention to the obvious points, such as those just mentioned. This is an effective way to enhance your group's environmental perception while teaching them a wonderful sport. It will make

them better fishermen and better citizens too. *Environmental Awareness* is a very useful pamphlet stressing these types of questions and answers. Perhaps you would like to get a copy for your local 4-H office.

Suggested Activities

Casting game

The casting game may be used again as an activity to end this session.

Fishing trip

This field trip should be in the late afternoon or early evening. It should be conducted soon after the bait collecting session so that the problem of keeping the bait fresh will be minimized. If you would like, both trips may be during the same day (or weekend). A pond or lake with a good population of panfish should be the habitat type picked. These are generally easier to fish than are streams. Each member of your group should have a life preserver.

Having other adults assist you is a good idea. A ratio of one adult for three or four youngsters is about right. During this fishing trip proper technique and fish catching procedures should be emphasized. Everyone in the group should be able to identify the fish that are caught. Review of the characteristics of each species caught would be helpful. Unless they are going to be used, all fish caught should be carefully returned to the water; but you may want to have "Care of the Catch" immediately after this trip so that the fish can be used for demonstration purposes.

Lesson 5:

Care of the Catch

Objectives

To help youth

1. Learn to keep fish properly before cleaning,
2. Learn to clean fish properly,
3. Learn basic fish preservation techniques,
4. Learn elementary fish cooking methods.

Materials and equipment

1. Fresh whole fish
2. Knives (fillet and sharp pocket knives)
3. Scalpers
4. Cleaning board (or fillet clip board)
5. Wrapping paper or plastic wrap
6. Garbage pail with plastic bag liner
7. Cooking utensils and ingredients
(salt, pepper, butter)

(If slide set is used)

8. Slide projector
9. Screen
10. Extension cord
11. Spare bulb for projector

Teaching aids

1. Slide set: *Care of the Catch*
2. Fish cleaning techniques diagram

Fishing is more than learning to cast, collecting bait, picking the right habitat, and catching fish. For many fishermen enjoying properly handled and well-prepared fresh fish is an important part of fishing. To ensure that this meal will be as delicious as possible, care must be taken from the moment the fish is caught.

Fish should not be kept on a crowded stringer in warm, shallow, or muddy water. This will cause them to die more rapidly and could ruin their flavor. In fact, such conditions may result in spoilage of the fish before they are taken home.

If not kept alive, your fish should be killed and dressed immediately after they are caught. Even with hardier species, it is probably best to kill them immediately. This prevents bruising which can detract from a fish's flavor. It is also much more humane than allowing the fish to die slowly on the bank or in the creek. Rapid removal of the internal organs prevents the enzymes and bacteria in the stomach and intestines from contaminating the flesh. Such contamination may result in spoilage and disflavor.

The internal organs can be removed by cutting the fish's belly open, from vent to mouth (fig. 23). Care should be taken not to cut into the stomach or

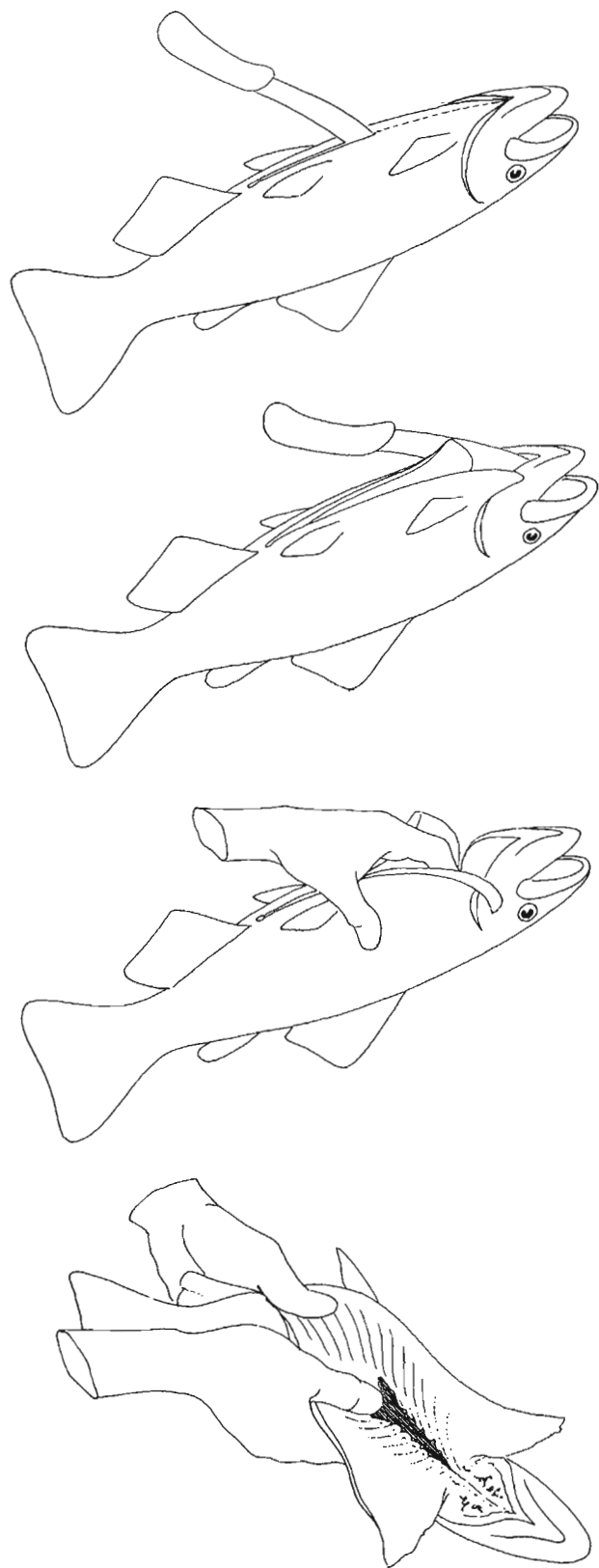


Figure 23. Field dressing a fish

Figure 24. Pan dressing a fish

intestines. If the gut is accidentally cut open, immediately flush the area with water. Neglecting to wash away the spilled stomach contents will invariably lead to poor flavor and increased possibility of spoilage.

After making the incision, the organs (including gills) can be removed easily. Along the backbone on the inside of the rib cage there is a long, dark red organ, the kidney. It resembles clotted blood and is usually covered by a thin membrane. The kidney should be removed by scraping with a knife blade or thumbnail.

The fish with all its internal organs removed is called field dressed. It should be placed in a cooler with chipped or crushed ice immediately, if possible. Ice should be placed inside large fish to speed cooling. As the ice melts, drain it from the cooler. Allowing fish to lie in the water may cause some loss in flavor.

If you don't have an ice chest, wrap the fish in a moistened cloth or burlap bag and put them in a cool shaded spot where good ventilation is present. Fish should be kept this way for only a very short time. When transporting fish, they should always be kept in a cooler with ice for best flavor preservation and food quality.

Cleaning fish

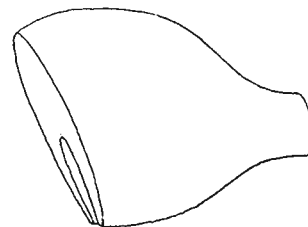
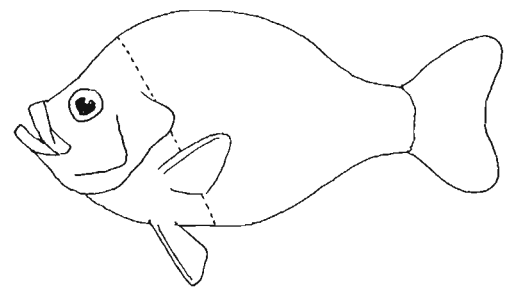
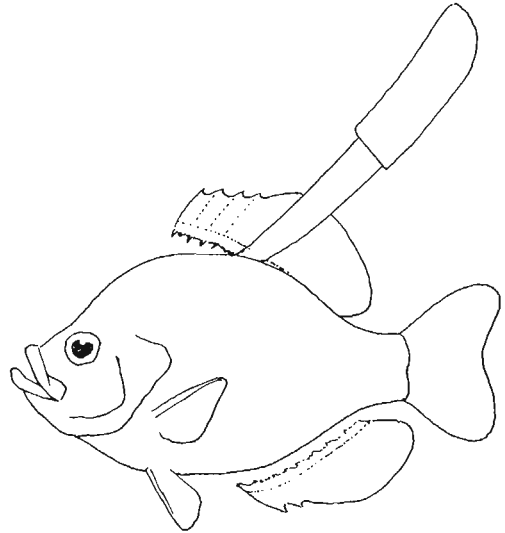
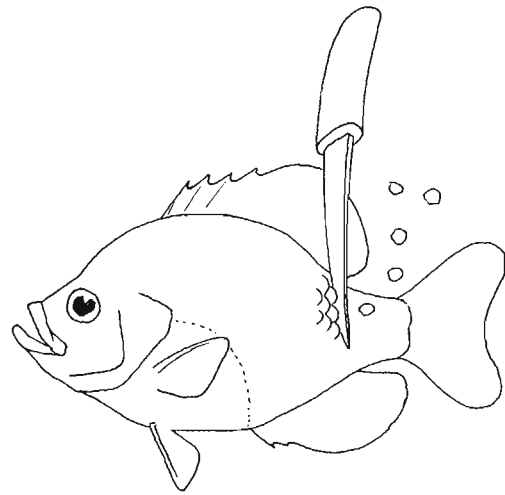
Getting your fish ready for the pan can be done once you are home. You will need sharp knives, pliers, a scaler, and a cleaning board. In addition, newspapers, a garbage pail (with plastic liner) and running water will be helpful. A couple of the many ways of cleaning fish are outlined below.

Pan dressing

Small fish can be scaled and their fins removed. Such fish are called "pan-dressed" (fig. 24). To scale a fish you should use a scaler or a knife. Scaling is accomplished by holding a fish's tail firmly and scraping the scales from the fish. Use short strokes going from tail to head. The fins can be removed by cutting along each side of the fin. The cuts should be about 1–2 cm ($\frac{1}{2}$ to $\frac{3}{4}$ in.) deep. Using pliers, grasp the posterior (rear) section of the fin and pull toward the fish's head. You will see that the "roots" of the fin's spines are removed with the fin in this manner. The fish's head can be removed by cutting behind the pectoral fins and across the back. Break the spine and cut the remaining flesh connecting head and body. Don't use your knife to cut through the spine or it will become dull in a very short time. The tail may also be removed if desired.

Filleting

Filleting (fig. 25) is a relatively easy way to clean larger fish. Done correctly, it produces a nearly boneless piece of meat that is easily fried, broiled, or



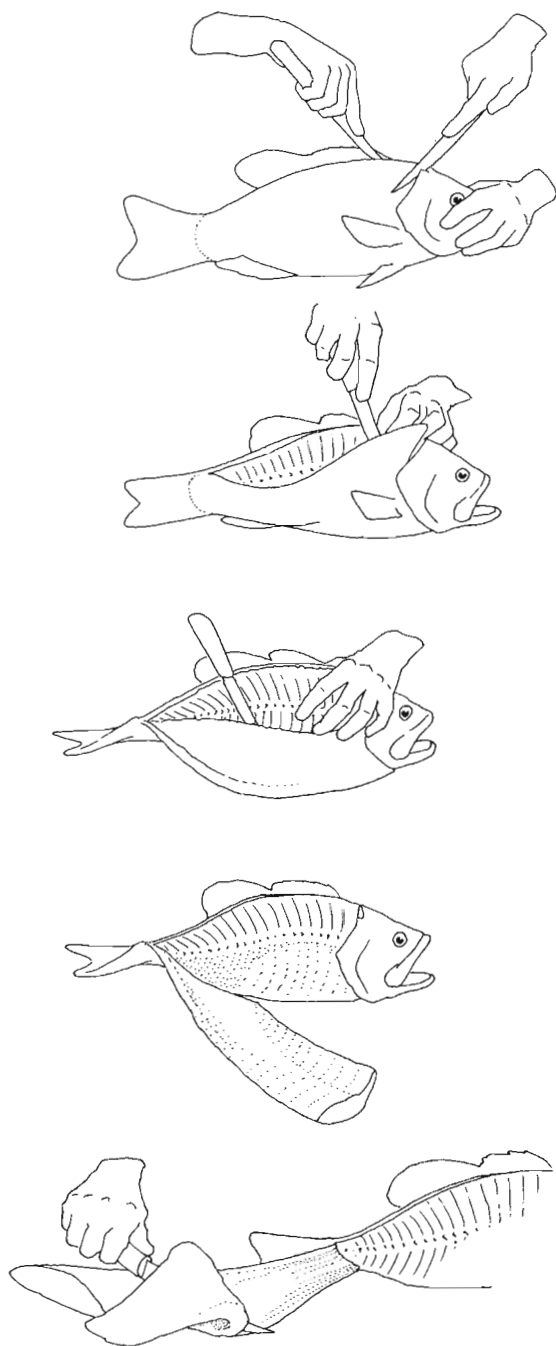


Figure 25. Filleting a fish

barbecued. Fish can be filleted without scaling or removal of head and fins. A long, slender, thin-bladed knife called a fillet knife is used. To fillet a fish, cut just behind the pectoral fin until you touch the backbone. Turn your knife and cut toward the tail with the knife blade running flat along the backbone. The dorsal and anal fins will remain on the carcass. Stop before cutting through the skin of the tail, then flip the newly created flap of skin and flesh back over the tail so that the flesh side is up (skin side down). Starting at the fold on the tail where the skin is still attached, carefully cut down through the flesh until you are near the skin. Don't cut the skin. Turn your knife on

its side so that it is between the flesh and skin. Keeping the skin tight, carefully cut the fillet off the skin by running the knife down the length of the fillet. By keeping the knife tight to the inside surface of the skin and keeping the skin snugly stretched, little meat will be lost. After removing the rib bones you should have a boneless fillet.

Skinning

Bullheads require a different cleaning procedure (fig. 26). They must be skinned. This is done by cutting the skin, not the flesh, entirely around the head. Hook the lower jaw on a spike in a skinning board. Grasp the skin along the cut with pliers and pull it back the length of the fish. Remove the fins, head, and tail similarly to the procedure for any other fish. Be careful of the sharp single spines in the dorsal and in each pectoral fin.

You may want to skin other fish rather than scaling them. Cut their skin around the head after removing the fins and tail. Cut the skin along the back and along the underside from head to tail. At the cut near the top of the head, carefully cut the skin from the flesh. Once this is started, the skin from that side can be pulled off. Occasionally the flesh near the belly will tend to tear off with the skin. Try to prevent this by cutting to free the skin from the flesh in that region. After removing the skin from both sides, the fish's head can be removed, leaving a skinned, pan-dressed fish.

Freezing fish

There are no better tasting fish than those freshly caught and cooked. However, our meal plans don't always allow us to cook them soon after they are caught. When more than 24 hours will pass between cleaning and cooking the fish, they should be preserved to maintain their quality.

Freezing is the best method of preserving fish if it is done correctly. A few precautions will ensure high quality fish. The fish must be properly cleaned and prepared if it is to taste good after being frozen. Freezing cannot improve the taste of poorly handled fish. Proper freezing will result in very little flavor loss, however.

Before your freshly caught and cleaned fish are frozen they should be in the form in which they will be cooked (for example, filleted, whole). This saves space in your freezer and saves time when you finally want to prepare it.

When freezing fish you must take proper precautions to minimize the chances of oxidation (rancidity) and dehydration (freezer burn). It is advisable to skin fish because of the considerable amount of fat located directly under the skin. Removing this layer will reduce the chances of the frozen fish becoming rancid. Freezer burn can be reduced by wrapping the fish in airtight freezer paper, heavy plastic wrap, or aluminum foil. The fish should be tightly covered to eliminate air pockets. Each piece of fish should be wrapped individually, and the package should be labelled and dated.

Figure 26. Skinning a catfish

Fish also can be frozen by glazing or in ice blocks. To glaze-freeze your fish, freeze the fish pieces on a tray first, then dip the pieces in water so that a thin ice glaze forms around the piece creating an airtight covering. The glazed pieces can then be wrapped in meal-sized portions, labelled, and stored.

Fish can be preserved in an ice block by first freezing the fish pieces in a plastic or waxed container (for example, empty 2-qt. milk carton), then adding water to cover them and freezing the block of ice around the fish. Do not add water to unfrozen fish since they will become water-logged and lose much of their flavor. When using the ice block method be sure to leave enough room in the container to allow for expansion of the freezing ice.

Fish should not be kept in a deep freezer for a period in excess of three months if you want to ensure freshness and fine flavor. Fish should not be kept in common refrigerator-freezers for more than a month's time.

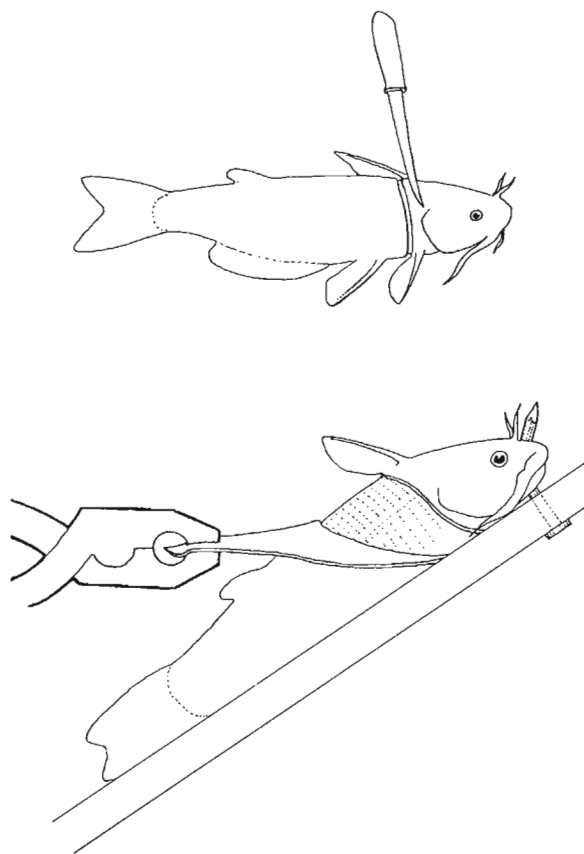
Thawing frozen fish should be accomplished as rapidly as possible. Fish should not be set out to thaw at room temperature or be thawed by leaving in hot water. The best method is to run cold water over the wrapped or glazed fish. Fish in ice blocks should be allowed to sit at room temperature until the excess ice is thawed. As soon as the frozen fish itself is exposed to running cold water it should be used. Cooking should occur as soon after thawing as possible to ensure freshness and good flavor.

Elementary Fish Cookery

The fish cooking method used most often is pan frying. This is a quick and easy way to transform your fish into a delicious meal. To pan fry your fish, preheat a frying pan. Under medium heat, melt enough butter in the pan to keep the fish from sticking. After the butter is hot enough to begin foaming, place the fish in the pan. Cook until you can flake the meat off easily with a fork. You should only turn the fish over once, browning both sides. Try not to overcook the fish. While it is frying you can sprinkle it with salt and pepper to your liking.

Two common and simple variations of this pan frying is to roll the fish in flour or to dip it in a thin, seasoned batter before frying. No matter which of these you use, don't place a lid over your cooking fish. This will cause steaming and won't permit the surface of the fish to become crispy.

Be careful of fine bones when eating. Always eat fish carefully; even filleted fish may contain small bones. Eat slowly and savor every bite! Fish may be cooked in a wide variety of ways. Your county extension office and numerous cook books can offer suggestions for further experimentation. Your fresh fish should do very well in most recipes.



Suggested Activities

Fishing for food

This fishing trip should be taken in the early morning and be at a different habitat type than the first fishing trip. A large creek would be ideal. Casting, catching, and handling fish should be stressed. Following this trip a fish cleaning session should take place, permitting each person to clean a fish. Enough of the legal fish caught should be kept so that everyone will have at least one fish to clean.

If you desire, a fish dinner could be the culmination of this field trip and the whole project, since this is the last activity. As an alternative you might want to demonstrate the different fish freezing methods and have a dinner at another date. Whichever sequence you choose, do have a fish dinner. Nothing can be more satisfying than catching one's own bait, using it to catch a fish, properly cleaning the fish, cooking it, and then sitting down to a delicious meal.

Further information and activities

You might want to try some of the more advanced elements of the Fish and Fishing series. Your 4-H agent can provide information on those materials. 4-H also has materials available on other natural resources projects. Perhaps you would like to explore some of them.

Appendix

Sources of Information for the Beginning Fisherman

The beginning fisherman may be a bit amazed when confronted with the mass of information available about fishing. He or she may want to go to other sources for additional information or for reinforcement and advice. You, as a leader, may feel that it would be helpful to find individuals or reference materials that provide more indepth coverage of a particular aspect of fishing than does this guide.

A list of some of the possible information resources is supplied below. Individuals who may be able to help your project, organizations that may be able to supply information, and a few literature references that have proven useful over the years are included. The lists are not intended to be (and cannot be) all inclusive. They are just a sample representing some of the available resources.

Suggested References

A Guide to Fresh and Salt-water Fishing. George Fichter and Phil Francis. Golden Press, NY.

Exploring Freshwater Fisheries. R. A. Howard, Jr., D. J. Decker. Leaders' Guide 147L-5-7. Cornell Cooperative Extension, 7 Business & Technology Park, Ithaca, NY 14850. 24 pp.

Fishes of the Great Lakes Region. Carl F. Hubbs and Karl F. Lagler. University of Michigan Press, Ann Arbor, MI 48106.

Fishing Films. Fisherman's Information Bureau, 20 N. Wacker Drive, Chicago, IL 60606.

Freshwater Fishes of Canada. W. B. Scott, E. J. Crossman. Bulletin 184. Fisheries Research Board of Canada, Ottawa. 966 pp.

Guide to Freshwater Fishes of New York. D. J. Decker, R. A. Howard, Jr., W. H. Everhart, J. W. Kelley. Bulletin 147S108. Cornell Cooperative Extension, 7 Business & Technology Park, Ithaca, NY 14850.

How to Know the Freshwater Fishes. Samuel Eddy. Wm. C. Brown Co., 135 S. Locust Street., Dubuque, IA 52003, 1957. 253 pp.

Iowa Fish and Fishing. J. R. Harlan and E. B. Speaker. Iowa State Conservation Commission, 1956, 377 pp.

Let's Cook Fish—A Complete Guide to Fish Cookery. Fishery Dept. Series No. 8, Superintendent of Documents, U.S.G.P.O., Washington, DC 20402.

Marine Foods (Bibliography and Resource List). N.Y. Sea Grant Advisory Service, Fernow Hall, Cornell University, Ithaca, NY 14853.

McClane's Standard Fishing Encyclopedia. A. J. McClane, ed. Holt, Rinehart, and Winston, NY.

Publication List. NYS Department of Environmental Conservation, Conservation Education, Albany, NY 12233.

The Fisherman's Encyclopedia. Ira N. Gabrielson, ed. Stackpole Books, Cameron and Kelker Streets, Harrisburg, PA 17105.

Slide Sets (available from county extension offices or Department of Natural Resources, Fernow Hall, Cornell University, Ithaca, NY 14853.)

Care of the Catch

Freshwater Fish Identification

Tackle Terminology

Organizations

These organizations have a good deal of helpful literature, and their local members make good guest speakers or assistants on field trips.

American Fisheries Society
5410 Grosvenor Lane
Bethesda, MD 20014

American Fishing Tackle Manufacturers' Assn.
20 North Wacker Drive
Chicago, IL 60606

American League of Anglers
810 18th St., N.W.
Washington, DC 20006

Bass Anglers' Sportsmen's Society
P. O. Box 3084
Montgomery, AL 36109

Bass Research Foundation
P. O. Box 3385
Montgomery, AL 36109

Brotherhood of the Junglecock, Inc.
R.D. 1, Box 69
Reistertown, MD 21136

Department of Natural Resources
Fernow Hall
Cornell University
Ithaca, NY 14853

Federation of Fly Fishermen
11242 Braddock Drive
Culver City, CA 90230

Izaak Walton League of America, Inc.
1800 North Kent Street
Suite 806
Arlington, VA 22209

New York State Cooperative Extension
County Offices are listed in your telephone directory

New York State Sea Grant Advisory Service
New York Sea Grant Institute
State University of New York
99 Washington Avenue
Albany, NY 12210
(518-474-5787)

Local Sportsmen's Clubs

(These can be obtained through your regional conservation officers.)

Sport Fishing Institute
Suite 503
719 13th St., N.W.
Washington, DC 20005

State Conservation Departments
(Refer to the Conservation Directory or a local conservation officer for addresses.)

Trout Unlimited
4260 East Evans Avenue
Denver, CO 80222

Individuals

The following is a list of some persons who may be of help to you or members of your group. Doubtless you will think of others who could have been included.

Fishery science instructors

Fishing guides

Officers or members of local fishing or sportsmen's clubs

Outdoor television show personalities (local station)

Outdoor writers (local paper)

Owners and (or) operators of fish hatcheries (state and private)

Sporting goods store owners or salesmen

State fisheries biologists or technicians

Taxidermists

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