



GOING FISHING



In today's fast-paced world, kids are shuttled from dance to piano lessons to basketball practice. Sometimes, all in the same day! Family time around the dinner table has decreased. Job-related stress is impacting Americans every day.

Recent studies have shown the positive health benefits of spending time outdoors. Here in South Dakota, we're lucky to have abundant natural resources to enjoy. Fishing is just one of the many outdoor activities that helps improve the quality of life for those who call South Dakota home, and our visitors.

A recent statewide angler survey revealed the top three reasons people fish in South Dakota:

1. To enjoy time in nature
2. For relaxation
3. To spend time with friends and family

What better way to combat stress than to go fishing with your family and friends?

How do you get started? A stroll down the fishing aisle in the sporting goods section of your local department store can be intimidating. There are dozens of rod and reel options and hundreds of different lures, weights, hooks, minnow buckets, contraptions and gizmos in every color of the rainbow.

A flip through the pages of this guide will show you that you only need the basics – some tackle and an inexpensive rod and reel combo to get started. You'll find tips on equipment, fish identification, knot tying and fish cleaning – everything you need to begin a lifelong passion for fishing.

This fishing guide is designed to show beginning anglers how simple fishing can be and set you on your way to improving your quality of life by getting outdoors.

Get outside and enjoy South Dakota's resources!

John Lott

Aquatics Section Chief
South Dakota Game, Fish and Parks



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Acknowledgments

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References:

Oklahoma Department of Wildlife Conservation, Fishing in the Schools

Minnesota Department of Natural Resources, MinnAqua

Missouri Department of Conservation, Angler Skills Series

KNOW YOUR FISH

South Dakota is home to more than 100 fish species. Many of these species will never be encountered on a fishing hook because their size, habits, or habitats make them unavailable or undesirable to anglers. Most fish that can be caught by hook-and-line are designated as sport fish species. South Dakota offers excellent fishing opportunities for nearly 40 sport fish, ranging from bluegill to walleye. This section covers a variety of species that are commonly caught when fishing from shore and are good targets for new anglers. For a more complete representation of South Dakota fish species, request a copy of the *Guide to the Fishes of South Dakota*.



BLUEGILL

Scientific name: *Lepomis macrochirus*

From the Greek, *lepomis* means “scaled gill cover” and *macrochirus* means “large hand,” in reference to its body shape and size.

See Chapter 6 – Fish Anatomy for definitions of body parts.

Average size: 6-9 inches, but rarely more than 8 inches in most South Dakota’s reservoirs. A 10-inch (or 1 pound) bluegill is considered a “trophy” catch with the state record bluegill weighing 3 pounds, 4 ounces. (The world record is 4 pounds, 12 ounces from a lake in Alabama.)

Habitat: Warm-water species that prefers clear water. A bluegill’s primary diet is aquatic insects that are often found in submerged vegetation. Therefore, clear water that can support plant life is important to this species. Submerged vegetation also provides cover for bluegills to hide from predators.

Diet: Aquatic insects and aquatic nymphs of terrestrial insects (example: caddisfly, dragonfly, mayfly, damselfly); also will prey on small fish, crayfish, snails.

Activity: During daylight, sunfish are fairly sedentary and spend much of their time hovering quietly near submerged cover or in the shade of a tree or structure. At mid-day they are found in deeper water or in shade of overhanging trees or under docks.

Identifying characteristics:

- » Deep bodied (body depth is less than three times the length of the body).
- » Small mouth (mouth does not extend back to the eye).
- » Dark spot near the base of the soft dorsal fin. Dark spot on the ear flap of the operculum.
- » Typically has vertical bars on sides of body.
- » Olive-green with emerald and brassy reflections.

- » Breast and belly yellow or reddish orange, especially in breeding males.
- » Spiny and soft dorsal fins are broadly connected and can appear to be one fin.

Interesting facts:

- » One of the most important prey fish (food for other fish) species in South Dakota.
- » Can spawn (reproduce) multiple times during the summer months.
- » Can lay 10,000-60,000 eggs per spawn.
- » Males create nests in groups. They sweep out circular depressions in the substrate of shallow water (1-4 feet), and care for and protect the eggs until they hatch.
- » Growth is very dependent on water temperature and subsequent food availability (for example, bluegill in Florida can grow 4 inches in the first year, while bluegill in Wisconsin may only reach 1.5 inches in same time).
- » When food is abundant, a bluegill can consume one-third of its body weight every week.

Fishing tips: Still-fish with a worm or kernels of canned corn under a bobber or use a slow retrieve with small jigs or spinners.



YELLOW PERCH

Scientific name: *Perca flavescens*

From the Greek, *Perca* means "perch" and in latin *flavescens* means "yellow".

Average size: 6-8 inches. In South Dakota, they can exceed 2 pounds.

Habitat: Found statewide primarily in cool water habitats of rivers, lakes and impoundments.

Diet: Feeds primarily on crustaceans, insects, snails, crayfish, and small fishes.

Activity: Feed throughout the day in deep water but often move into shallows during the evening.

Identifying characteristics:

- » Body is taller than wide.
- » Body is olive-green on the back with 6-8 dark yellow, vertical stripes on the side.

- » Ear flap has orange/yellow tip.
- » Mouth extends to the eye and has no teeth.
- » Fins are tipped in yellow.
- » Yellow-to-red paired fins.

Interesting facts:

- » Spawning takes place when water temperatures are between 45 and 55 degrees F.
- » Deposit long, tubular masses of eggs over submerged vegetation or brush.
- » Reproduction and population levels extremely inconsistent in many of the state's larger windswept waters because of high turbidity, wave action, and lack of vegetation.
- » South Dakota's second most sought after fish.

Fishing tips: Very popular for ice fishing. Responds well to wax worms or blood worms, and night crawlers also work well.



PHOTO BY JULIE GESER, NEBRASKALAND MAGAZINE



CRAPPIE

Scientific name: *Black – Pomoxis nigromaculatus, White – Pomoxis annularis*

From the Greek, *Pomoxis* means "sharp opercle", *nigromaculatus* in Latin means "black spotted" and *annularis* in Latin means "having rings" in reference to the grouping of spots on white crappie.

Average size: 9-10 inches. In South Dakota, they can exceed 3 pounds.

Habitat: Prefer water with aquatic vegetation and underwater structure such as logs, rocks or dead trees. Found in shaded water under overhanging trees. During heat of summer, will move to deeper water. Black crappies prefer clearer, quieter water. White crappies are more tolerant of stained or dirty water.

Diet: Adult crappies eat small fish, aquatic insects, crayfish and tadpoles. White crappies are more piscivorous (fish eaters) than black crappie.

Activity: Aggregate in loose schools; will eat during the day and night, but are most active feeding during the evening.

Identifying characteristics:

- » Deep bodied, but more elongated than bluegill.
- » Larger mouth than bluegill.
- » Dorsal, anal and caudal fins covered in black spots.
- » Black crappie have mottled black spots covering their backs and sides and have 7-8 spines on the dorsal fin
- » White crappie have black spots that are arranged into stripes on their sides and have only 5-6 spines on the dorsal fin.
- » White crappie tend to have greater length, but are less robust than black.

Interesting facts:

- » Crappies spawn in spring when water reaches 60 degrees.
- » Like other sunfish, crappies are nest builders.
- » Crappies have high reproductive potential, which often leads to overpopulation and a smaller-sized fish.
- » Males aggressively defend nests.
- » Crappies can grow 3-5 inches in first year, but growth rates are very irregular.

Fishing tips: Still fish with a worm or minnow under a bobber or use deep, slow retrieve of small minnows, plugs, spoons, jigs or spinners. Fishing from shore is best in the spring.



LARGEMOUTH BASS

Scientific name: *Micropterus salmoides*

This name doesn't make as much sense as others. The Greek word, *micropterus* means "small fin." The specimen referred to in naming this genus of fish had damage to the

soft dorsal fin, so that it appeared to have an additional small fin. *Salmoides* is derived from the Latin word "salmo, or trout", because the species was historically called a trout in southern states.

Average size: 12-17 inches. In South Dakota, they can exceed 9 pounds.

Habitat: Prefers warm, quiet water. Often found near structure (like flooded timber and brush piles) and vegetation, or edge of ledges and drop-offs into deeper water. Sight feeders most successful at finding prey in clear water. Seldom found deeper than light penetrates.

LARGEMOUTH BASS (continued)

Diet: Primarily feeds on other fish (piscivorous). Begins to consume fish when only 2 inches long. Also feeds on crayfish, large insects, frogs, anything that falls in the water or swims and fits into its mouth.

Activity: Most active at dawn and dusk; spends the day in deeper water or lurking about logs, drift piles and other cover, but moves into the shallows in morning and evening to feed. Will feed during the day in deeper water.

Identifying characteristics:

- » Slender bodied (body depth is three times or more the length of body), streamlined.
- » Very large mouth (when closed, mouth extends well past the back of the eye).
- » Dorsal fin almost completely separated into two parts: spiny dorsal and soft dorsal (soft dorsal has only cartilaginous rays and no spines).
- » Dark horizontal stripe on the side of the body.
- » Dorsal markings are green, lower sides and belly are white.
- » **Interesting facts:**
- » Top predator in farm ponds.
- » Mature females will be larger than males.

- » Can grow to 2 pounds in first year with abundant food.
- » Males are territorial and fiercely guard nests.
- » Fry (newly hatched fish) will school, and males will provide protection of schools.
- » In northern states, bass will live longer but not grow as large.

Fishing tips: Small bass can often be caught by still-fishing with a worm under a bobber in urban water bodies. For larger bass, slow-retrieve a plastic worm or frog, minnow, plug, spinner or spoon.



CHANNEL CATFISH

Scientific name: *Ictalurus punctatus*

From the Greek, *ictalurus* meaning "fish cat" and *punctatus* is Latin for "spotted" in reference to characteristic dark spots on the body.

Average size: 12-20 inches. In South Dakota, they can exceed 30 pounds.

Habitat:

Abundant in streams, rivers, reservoirs and ponds. Occupies a variety of habitats, but can be located underneath structure (fallen trees, cavities in rock piles). Channel catfish also rely on taste rather than sight for feeding, so they are tolerant of turbid water.

Diet: Diet is varied depending on what is available, includes fish, insects, crayfish, mollusks, and plants. Most food is taken from the bottom. Will feed on decomposing organic matter (dead fish, dead plants, etc.).

Activity: Most movement and feeding occurs after sunset and before sunrise. During daylight hours, will hide in natural cavities or remain sedentary in deeper pools and will move to shallows or near cover to feed.

Identifying characteristics:

- » Elongated, slender bodied.
- » Smooth, scaleless skin.
- » Sensory barbels (whiskers) around the mouth.
- » Small, fatty tissue adipose fin near the tail, doesn't help with locomotion like other fins.
- » Deeply forked tail fin.
- » Olive-brown to slate-blue coloration with white bellies.
- » Smaller fish have black spots on sides; larger fish lack spots and are often confused with blue catfish.
- » Spines on dorsal and pectoral fins are sharp and serrated, and protect them from predators when young. Anglers should be cautious of spines when handling channel catfish.

- » Eyes are comparatively small; channel catfish are not typically sight feeders.

Interesting facts:

- » Channel catfish will spawn in hollow logs and holes under rocks.
- » Summer spawner.
- » Males tend and defend the nests.

- » Highly variable growth rates depending on habitat.
- » Underutilized species in South Dakota.

Fishing tips: Fish worms, cutbait (chunks of dead fish), doughbaits, frozen shrimp or even hot dogs with a slack line off the bottom.



SMALLMOUTH BASS

Scientific name: *Micropterus dolomieu*

From the Greek, *micropterus* means "little fin" and *dolomieu* recognizes a French scientist.

Average size: 15-16 inches. In South Dakota, they can exceed 7 pounds.

Habitat: Found statewide in both warm and cool waters. Seldom found in murky water. Prefer rocky, clear-water habitats of lakes, impoundments, and small to medium-sized streams with moderate current.

Diet: Feed on whatever is available, but primarily on fish and crustaceans.

Activity: Sight feeder, active all day.

Identifying characteristics:

- » Long slender bodied.
- » Green to bronze in color with 9-16 vertical bars along the side.
- » Jaw extends to the middle of their red eye.
- » Three dark bars radiate from the eye.
- » Poorly separated dorsal fin between spiny and soft-rayed portions.

Interesting facts:

- » Native to the Minnesota River basin in extreme north-eastern South Dakota.
- » Found throughout the state because of stocking.
- » Males sweep out a nest in the sand or gravel for the eggs.
- » After spawning, males guard the eggs and fry.

Fishing tips: Look for rocky shores such as the face of a dam in spring and fall. Use bait that mimics a small fish or frog (jigs, crankbait). Live minnows on a jig or shiny lures work as well.



RAINBOW TROUT

Scientific name: *Oncorhynchus mykiss*

From the Greek, *oncorhynchus* means "hooked nose" and *mykiss* is the common name of this species in Asia, where it was first identified hundreds of years ago.

Average size: Average adult size is 8-15 inches, but can grow quite large in good habitat. A trophy fish is 20 inches.

The South Dakota state record is 19 pounds, 4 ounces. The world record rainbow trout weighed 48 pounds.

Habitat: Requires cold, well-oxygenated water. Can't survive extended periods in water temperatures more than 70 degrees F. Can survive year-round in the coolwater streams of western South Dakota.

Diet: Eats mostly insects, snails, crayfish and sometimes small fish.

Activity: Active throughout the day, but most active at dawn and dusk.

Identifying characteristics:

- » Streamlined body.
- » No spines on fins.

RAINBOW TROUT (continued)

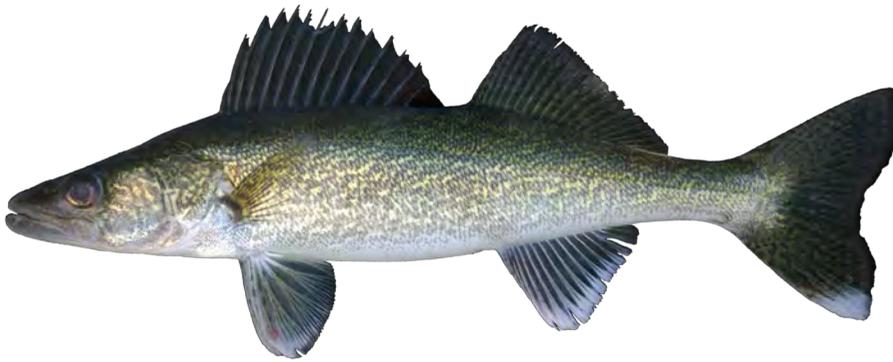
- » Very small scales.
- » Similar to catfish, trout have an adipose fin on their backs.
- » Olive colored on back with small black spots, white belly with pinkish stripe along sides.

Interesting facts:

- » Native to the Pacific coast of the United States and inland to the western slope of the Rocky Mountains.
- » Stocked seasonally in warm water ponds by SD Game, Fish and Parks for fishing opportunities.
- » Require silt free stream bed for successful spawning.

- » Females dig shallow pits to lay their eggs and then cover the eggs with gravel.
- » No parental care.

Fishing tips: Still fish with a worm under a bobber, slow retrieve of small plugs, spoons, jigs, spinners, or flies.



WALLEYE

Scientific name: *Sander vitreus*

From the German, *Zander* meaning “pikeperch” and Latin *vitreus* meaning “glassy”, referring to the large, silvery eyes.

Average size: 14-16 inches. In South Dakota, they can exceed 16 pounds.

Habitat: Found statewide in large streams, rivers, lakes and reservoirs.

Diet: Feeds primarily on fish, insects and crustaceans.

Activity: Very active in evening, and on windy, cloudy days.

Identifying characteristics:

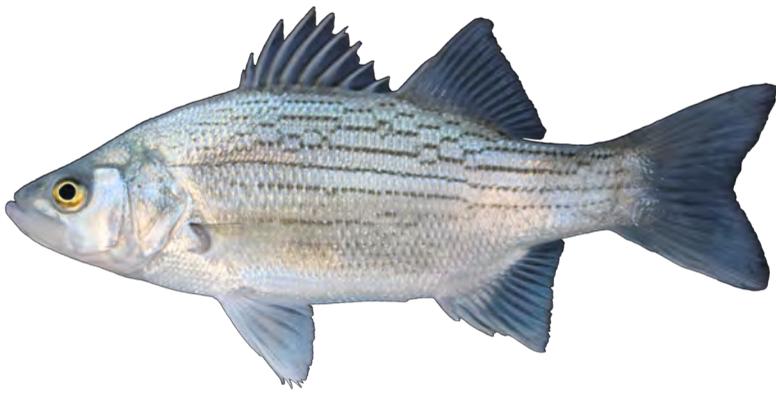
- » Torpedo shaped fish.
- » Large mouth filled with sharp teeth.
- » Large, white eyes and a single black spot near the rear base of the first dorsal fin.
- » White lower lobe of the tail fin and lower part of the anal fin.
- » Spawning occurs when the water temperature reaches 45 degrees F.

Interesting facts:

- » State fish of South Dakota.
- » Most sought after fish in the state.
- » Eggs are distributed over rocks and gravel.
- » Large numbers of walleyes are spawned and raised by South Dakota Game, Fish and Parks to maintain populations where natural reproduction is lacking.
- » It's size, sporting qualities, and delicious flesh make it a highly prized sport species.

Fishing tips: Spring use jigs with live minnows or plastics in shallow water. Summer use live bait rigs, crankbaits, or bottom bouncers with a worm. In the fall, use jigs or live bait rigs, and in the winter jig live bait.





WHITE BASS

Scientific name: *Morone chrysops*

Origin of *Morone* is unknown but *chrysops*, comes from Greek, meaning “golden eye”.

Average size: 12 to 13 inches. In South Dakota, they can exceed 3 pounds.

Habitat: Cool to warm water habitats.

Diet: Feeds on fish, insects, and crustaceans.

Activity: Active all day.

Identifying characteristics:

- » Moderate size scales.
- » Light olive to white coloration with 6 to 7 dark, horizontal stripes.
- » Body is taller than wide.
- » Two separated, elongated dorsal fins.
- » Front fin has sharp spines instead of rays.

Interesting facts:

- » Native to river basins that drain into the Gulf of Mexico, including the Mississippi River Basin.
- » Present in the Missouri River, larger tributaries and some glacial lakes.
- » Makes spring spawning runs to shallow shores of lakes, stream mouths, and sometimes upstream.
- » Flesh is firm and white.
- » Average lifespan is 3-4 years.
- » Schooling fish in open water.
- » Prefer clear water and hard bottom such as sand, gravel, or rocks.
- » Spawn in rivers and shoal areas of lakes.

Fishing tips: In spring, fish a bobber with a small jig baited with a minnow or pitch spinners/plastics and let them slowly fall, then retrieve.



PHOTO BY SAM STUKEL

WHAT IS A FISH?

This can be a difficult question to answer. There is great diversity amongst the animals that we call “fish,” and there are nearly 30,000 species of fish worldwide. Some fish live in salt water; others in fresh water. Some are vividly colored, others drab. Some are tiny, smaller than a fingernail, while others are gigantic, bigger than a school bus. Some look like what we expect of a fish, lots of fins and shiny scales. Others look like snakes or even blobs of flesh. So, what makes a fish a fish?

FISH LIVE IN WATER

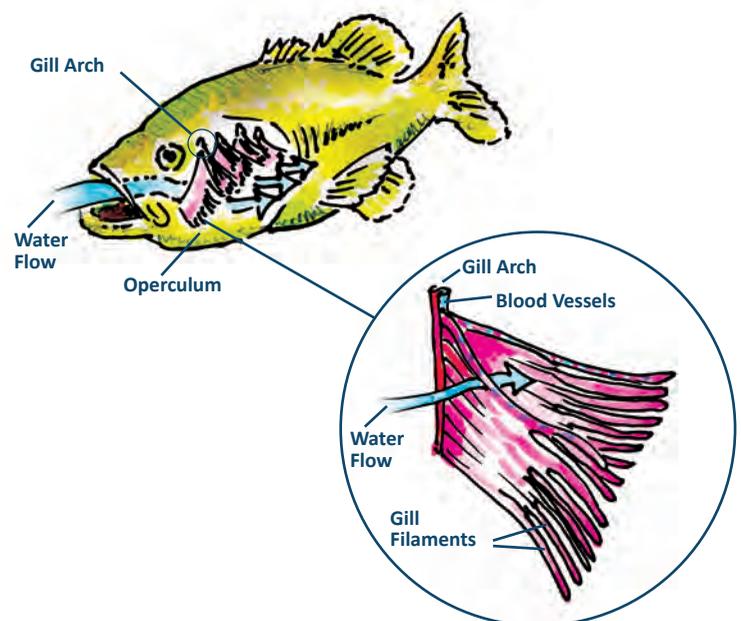
Fish are aquatic animals, and their bodies are adapted for ease of movement in water. For example, a fish’s body isn’t made up of a distinct head, trunk and tail like land animals. Instead, all parts are connected to form smooth contours, and the front is generally pointed to minimize resistance as it moves through the water.

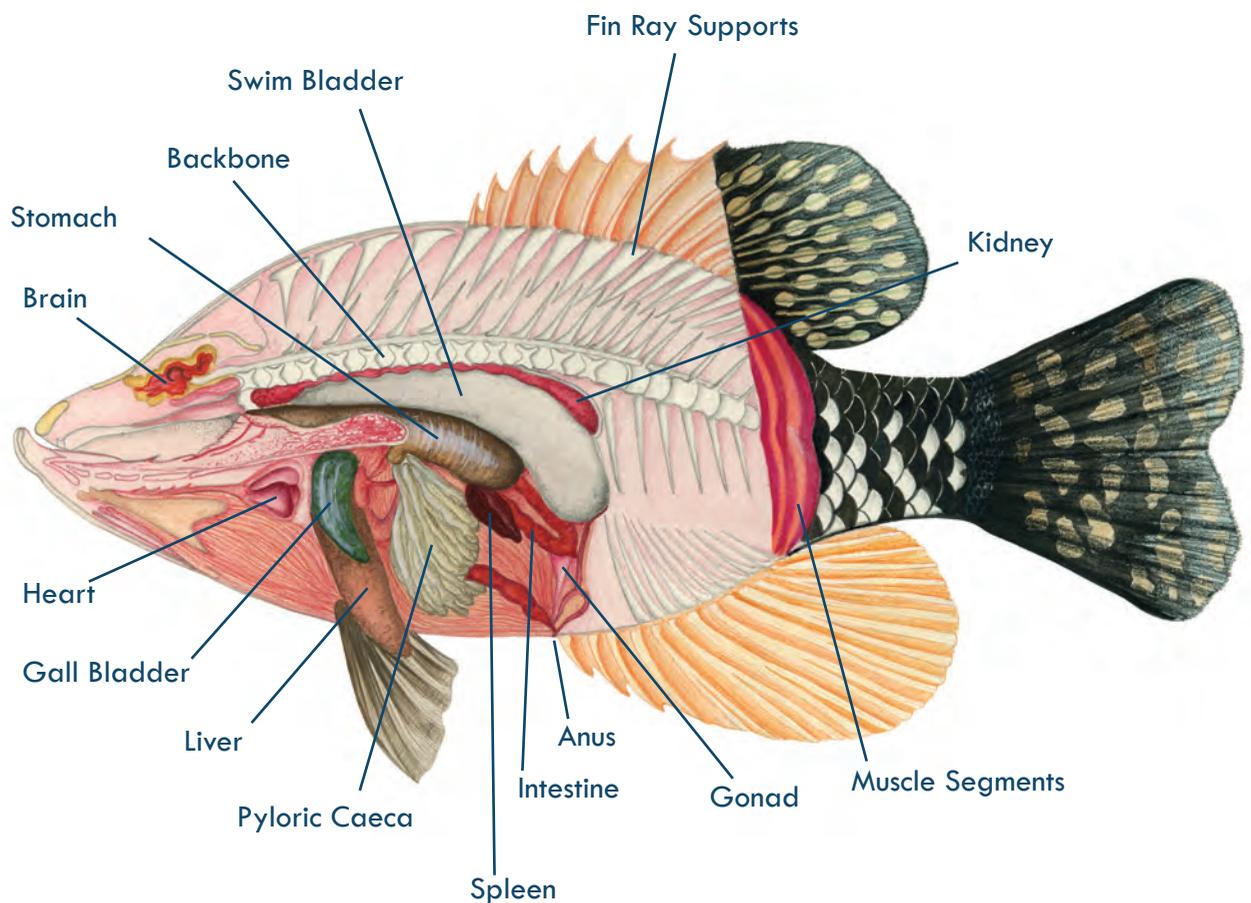
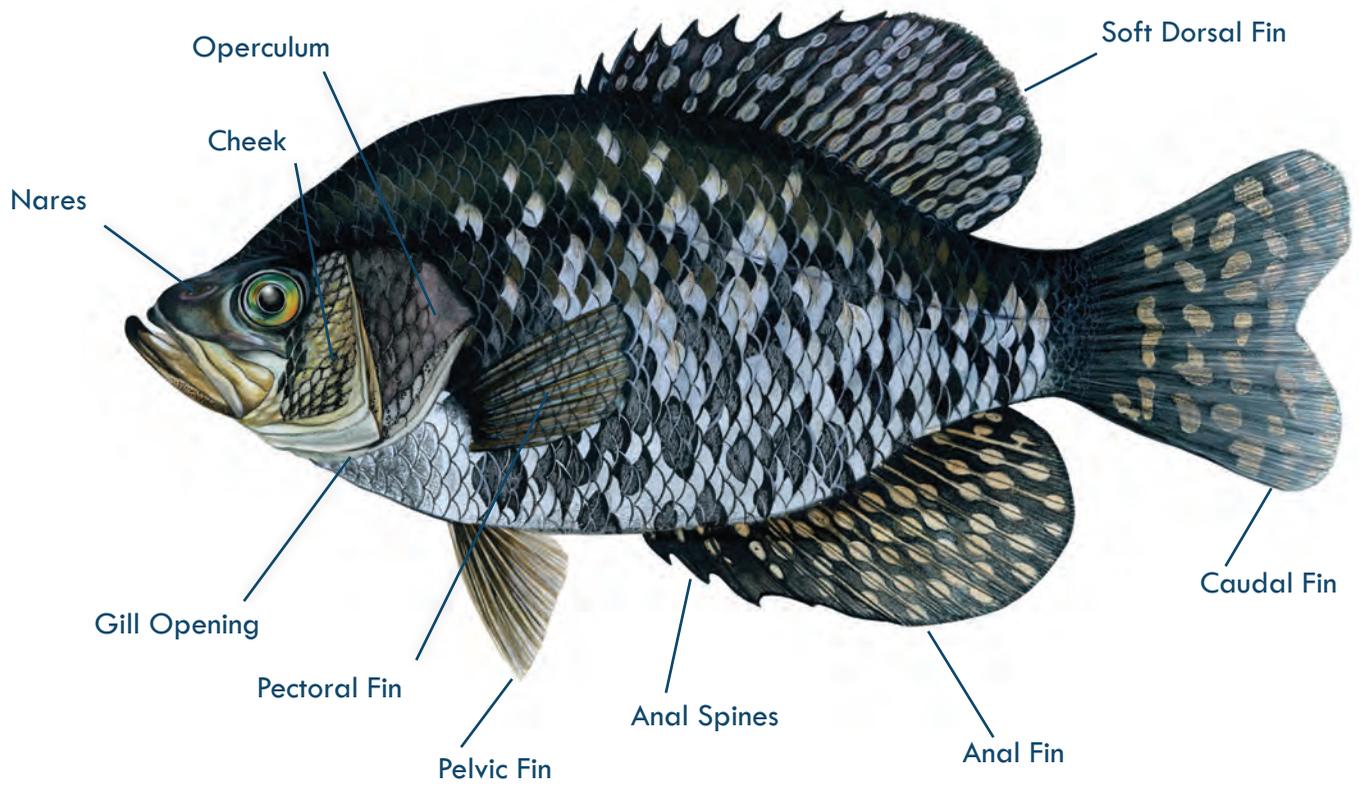
In fact, the shape of a fish’s body can be a good indicator of the type of habitat a fish prefers. Bluegill, for example, have bodies that are laterally compressed, meaning that that are flattened on the sides, and tall and narrow when you look at them head on. This shape allows them to maneuver easily through vegetation, rocks or submerged trees. Fish like walleye or rainbow trout have fusiform, or torpedo-shaped bodies. This shape allows them to move swiftly through open water or swim into a strong current.

FISH HAVE GILLS

Gills are another adaptation to living in water. Fish gills have the same function as lungs. Our lungs take oxygen from the air, and fish’s gills take oxygen from the water. Gills are feathery looking organs located on both sides of

the head and are covered and protected by a bony plate called an operculum. Healthy gills are red, full of blood vessels that take oxygen from the water and deliver it to the fish’s blood. A fish “breathes” by opening its mouth and sucking in water. As water moves through the gills, oxygen transfer takes place over the gill filaments before the water travels out of the body through the opercula.





FISH ANATOMY ARTWORK BY JACK CURRAN

FISH HAVE SCALES

Most fish have scales that cover their bodies and overlap each other like shingles on a roof. Just like a roof protects a house, scales protect a fish. Scales are typically composed of calcium carbonate and collagen and are strong, yet flexible. They can increase in size as a fish grows, but they

don't increase in number; however, damaged and missing scales can be regrown. Some fish, like trout, have very small scales; others, like common carp, have large, thumbnail-sized scales. Fisheries managers can often determine the age of a fish by looking at its scales. As scales grow, rings are created similar to rings of a tree. In temperate climates, the spacing between the rings becomes constricted during the winter when growth is minimal. The number of years a fish has lived can be counted by the number of constrictions in the growth rings.

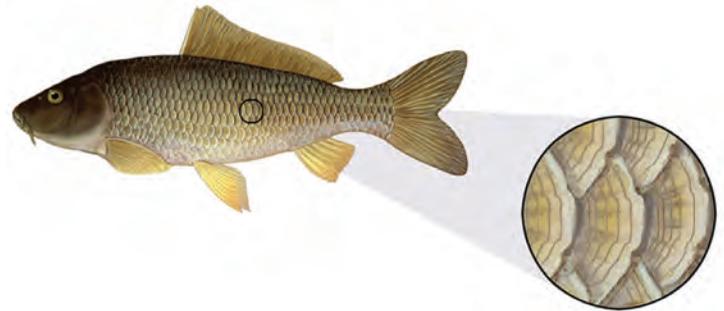
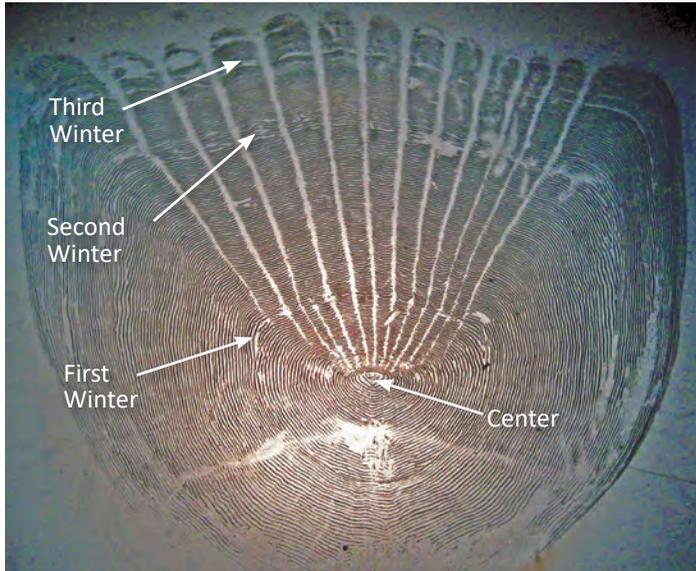


PHOTO BY LINSEY CHIZINSKI

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PADDLEFISH – A UNIQUE FISH

The American paddlefish (*Polyodon spathula*) is referred to as a “primitive fish” with few changes in the fossil record to the Late Cretaceous period, 75 million years ago. It is one of only two species in the paddlefish family and exists only in the Missouri and Mississippi River systems. The other is presumed extinct from the Yangtze River of China. Many of the paddlefish's characteristics are unique from other South Dakota fish species. Particularly different is its cartilaginous skeleton and tail shape, similar to sharks.

The paddlefish is most notable for its paddle-shaped rostrum, which is covered with sensory pores and believed to be used for detection of its food source of zooplankton. It collects zooplankton by filter feeding as it swims with its mouth wide-open. The passing water is sieved by specially adapted gills that collect and move the trapped organisms to the intestinal tract.

Since paddlefish do not actively feed on lures or baits, they are caught by snagging and archery methods during special seasons on the Missouri River. See the current Fishing Handbook for details. The South Dakota state record paddlefish is 127 pounds, 9 ounces.



ETHICAL FISH HANDLING

The process of catching a fish with a hook will obviously impart a certain amount of stress on a fish, but ethically we must strive to minimize the stress or damage to the least level possible. The following are guidelines to follow while you develop your own sense of ethical fish handling

- » Deeply engorged or difficult to remove hooks should be left in place with little or no string attached. The hook will disgorge or dissolve on its own while

being no more than a temporary piercing. Hooks are cheap.

- » Barbless hooks are less damaging to unhook. The barb on a regular barbed-hook can be smashed or partially smashed down with pliers. Fish fighting skills improve when you learn to use barbless hooks (hint: keep the line tight). Released fish should be released immediately. Fish need water for oxygen, so hold your breath and when you feel the need to breathe, put the fish in the water.

Take pictures quickly.

- » Kept fish should be treated and dispatched with respect. A cooler with ice water will reduce the fish's metabolism and senses, and will preserve the fish for a better quality meal. Keep no more than you can really enjoy.

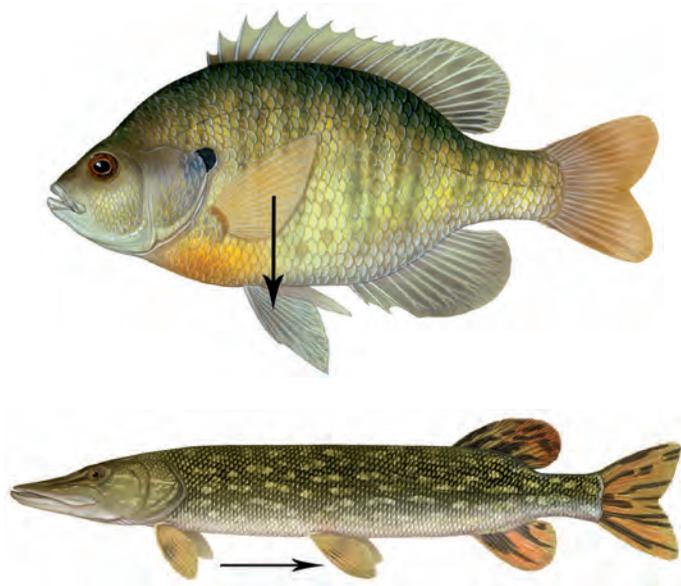
FISH HAVE FINS

Fins are put into action by muscles attached to the base of the fin's spines and rays. Spines are made of bone and are stiff and sharp, while rays are made of cartilage and are soft and flexible. Pectoral and pelvic fins are paired (one on each side of the body). Dorsal, anal and caudal (tail) fins are not paired. Some fish have two dorsal fins or a two-part dorsal fin, a spiny part and a soft rayed part.

Fin spines can be very sharp and even serrated. They help defend a fish against predators. The dorsal fin helps the fish to stay upright. Spines on the dorsal fin can be raised to make the fish appear larger and less likely to be attacked by a predator. The anal fin helps the fish to stay balanced and can also help it maneuver in tight places. Fish that are deep bodied, like bluegill, require greater stability and have long dorsal and anal fins. The caudal fin provides the power that propels the fish forward, and also acts as a rudder to steer the fish's direction. The shape of the caudal fin determines how fast the fish can swim and maneuver. Fish that require speed or continuous movement usually have forked tail fins. Forked tail fins have less drag than a rounded or square fin. The pelvic fins, located on the bottom of the fish, provide stability and balance, and help the fish hold a position. The pectoral fins are located behind the gills and work like the pelvic fins, and also help the fish steer, control depth, change speed and remain in one place.

Sunfish, bass, perch, crappie and walleye have pelvic fins that are located almost in alignment directly beneath the pectoral fins. In this body type, both fin pairs are located

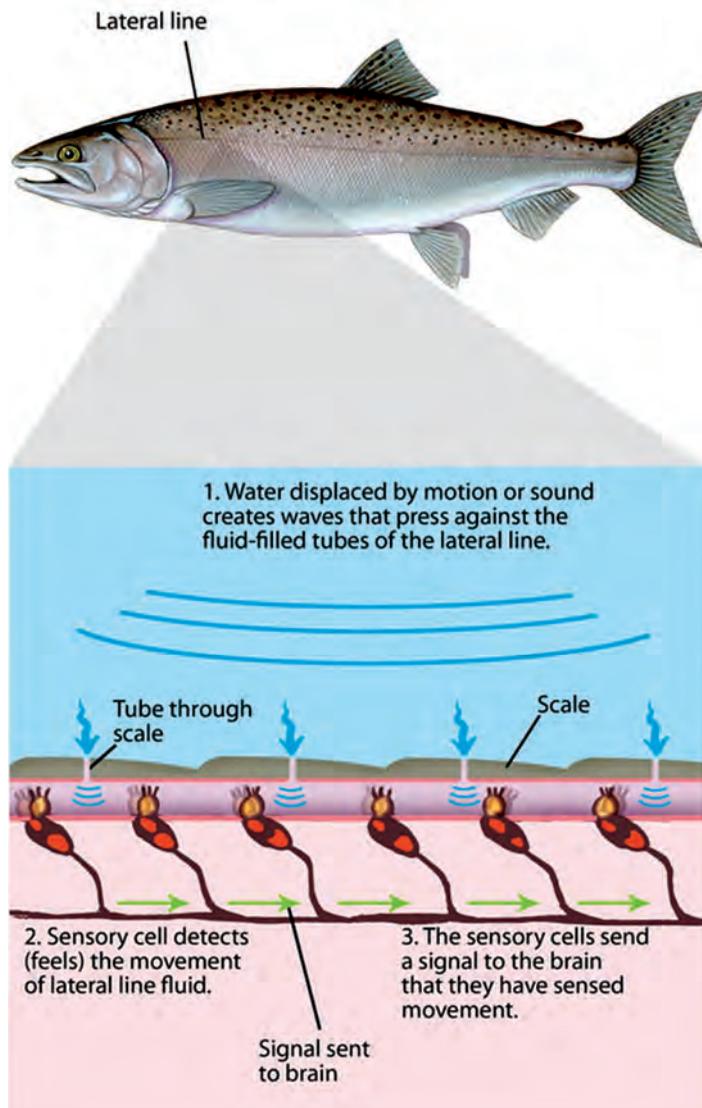
near the fish's center of gravity and provide greater maneuverability. Additionally, the pectoral fins are attached vertically rather than horizontally, and can also allow greater maneuverability through a variety of habitats. Lie-in-wait predators, like northern pike have dorsal and anal fins located towards the back of their long bodies, close to the caudal fin. These fins work together to propel the fish forward with a burst of power when ambushing unsuspecting prey.



C. VERSON, MINNESOTA DEPARTMENT OF NATURAL RESOURCES

FISH HAVE A LATERAL LINE

The line that runs along each side of the fish is actually a series of holes. The holes connect to nerves inside the fish that are sensitive to vibrations and water movements. This makes fish highly aware of their surroundings. Because sound travels much faster and further in water, fish have adaptations that make them very sensitive to sound.



FISH PRODUCE MUCOUS

They wear a coat of slime that covers their bodies. This reduces friction in the water, allowing fish to move easily in water without expending much energy. Another important function of the slime coat is to protect the fish from disease and parasites.

FISH HAVE A SWIM BLADDER

The swim bladder helps a fish to stay suspended in the water. It is a gas-filled chamber, and fish can adjust the amount of gas in the bladder until their density equals the density of the water. The swim bladder allows a fish to be neutrally buoyant. This also functions to help the fish reserve energy for other important activities like foraging for food or reproduction.

FISH ARE COLD BLOODED

A fish can't control its body temperature. Instead, internal temperature is determined by the temperature of the water a fish lives in. Some fish like the rainbow trout can only live in cool or cold water; others like the channel catfish, largemouth bass or bluegill are considered warmwater fish.

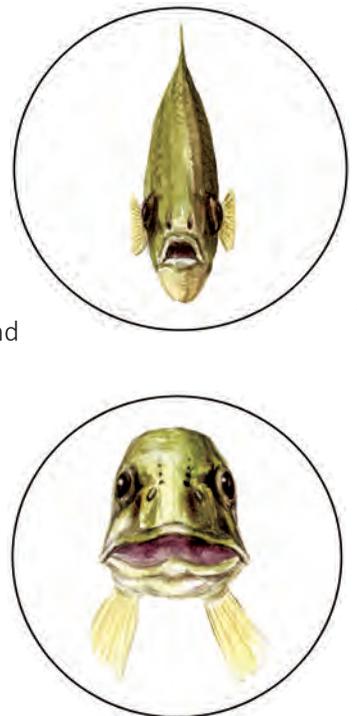
ADDITIONAL ANATOMY FEATURES

Eyes

A fish's eyes are placed on the sides of the head, allowing it to see in almost all directions except directly behind or underneath, although predator fish often have eyes that are located further forward on their heads. This provides them with better depth perception to pursue and catch their prey.

Large eyes can help fish see well in the dark or in murky water. Light doesn't travel very far underwater, so even fish in clear water can't see great distances. Like humans, fish can see colors and brightness, but many fish don't see a full range of color. Unlike humans, fish don't have eyelids and their pupils are fixed; they are always the same size regardless of the amount of light there is. Often, fish will spend bright sunny days in deep water or in the shade.

Fishing tip: Light bends when it passes from air to water. The greater the angle at which light enters the water, the more it bends. Because of this, a fish sees objects straight



overhead in their true locations, but the images of objects near the horizon are shifted. Light from an object that is on the horizon doesn't penetrate the water, so sitting while fishing at the water's edge can help you avoid being spotted by your target.

Ears

Fish have internal ears. They don't need an external opening because sound travels so well through water, however the structure of a fish's inner ear is similar to a human's. Bony structures called otoliths make up part of the structure of the inner ear and help a fish to maintain its orientation and balance in the water. Like scales, otoliths can be used to determine a fish's age.

Nares

Instead of a nose, fish have nares on their heads. Water constantly moves through the nares, and fish can detect odors with them. Unlike the function of a nose, fish do not breathe through nares.

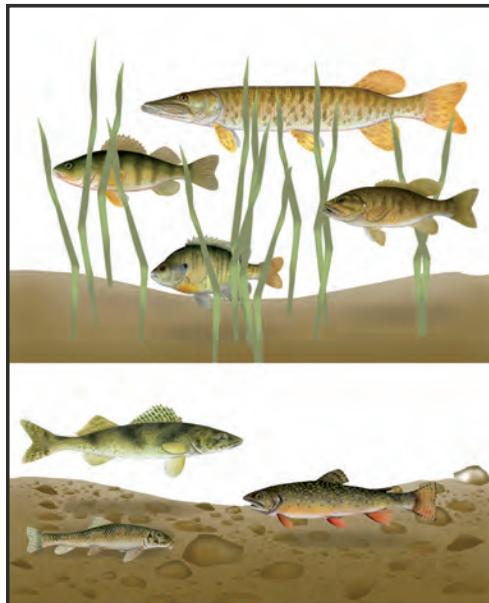
Coloration

Marine fish are known for having bright colors and bizarre patterns, but even freshwater fish have many colors and patterns. Fish that have vertical stripes often spend much of their time in aquatic vegetation, and the striped pattern on their bodies helps to camouflage them, either to hide from predators or to lie in wait for prey. Fish with spots or

blotches can blend in to a rocky or gravelly substrate.

Light-colored, silvery fish are camouflaged in clear, open water. Countershading, dark colors on top and light on bottom, helps fish to blend into their surroundings. The light bellies of many fish

make them difficult to see from below because they blend in with the light coming from the sky. Likewise, the dark backs of many fish make them difficult to see from above because they blend in with the depths of the water where light doesn't penetrate.



SO, WHAT IS A FISH?

What are some exceptions to this list of things that make fish unique?

- » Channel catfish don't have scales.
- » Not all fish have swim bladders. Sharks don't, and neither do paddlefish, a fish found in the Missouri River.
- » All fish live in water, but some fish can actually stay alive out of water for a period of time. The lungfish, which lives in parts of the world where there are dry seasons, can burrow into the mud when the water disappears. The fish remains inactive until the water comes back.
- » All fish have fins, but some fish have fins that are adapted to very specific environments and they don't even look like fins. The lungfish is a good example of this. Its fins look like legs.
- » Fish use gills to get oxygen from the water, but some fish, like gar, can use their swim bladders to get oxygen from the air. These fish can be observed snapping at the surface of the water to gulp air into their swim bladders.

So, not all fish have all of these characteristics, and some things that aren't fish have some of these characteristics. Snakes have scales, whales are aquatic, salamanders have gills, frogs are cold blooded.

Sometimes the definition can get a little sticky! But a good general guideline is that fish are cold-blooded, aquatic, they use gills to obtain oxygen, they have fins and scales, a slime coat and a lateral line. Fish are fish because they are adapted to living in a world of water.

THE BENEFITS OF EATING FISH YOU CAUGHT

A banquet-plate of fried crappie fillets is an environmentally low-impact renewable resource. A freshly caught catfish dinner is a high-protein, “good fat” (omega-3 fatty acid) delicacy. A shore lunch of grilled-on-a-stick white bass is a tasty memory within a fishing trip. Cleaning a stringer of trout with the help of a bunch of kids is an edible biology lesson. Catch and keep some; it’s good for you.

PRESERVING THE CATCH

Fish are a very perishable food product and the quality of the meal is only as good as the handling of the fish after the catch. If possible, fish should be kept alive until just prior to cleaning. A bucket of water or a fish stringer will work for holding fish for a short time. If you know you are going to be keeping fish, take along a cooler with ice and place them in it immediately after catching. Cleaned fish can be frozen for later consumption, but are very susceptible to “freezer burn.” Vacuum packaging or freezing in water will help lengthen frozen fish storage-life.

TOOLS

Fish can be cleaned in a variety of ways and a knife is the one tool that will be necessary for any method. While any long and thin knife will work, a fillet knife has a thin, pointed and flexible blade suited for delicate cutting. Also consider a small knife sharpener, which is often supplied with fillet knife packages. Electric fillet knives can speed up the filleting process, but practice is required to master this method. Mechanics pliers will be necessary for



skinning catfish, but a preferred tool is a fish skinning pliers that grip the skin more securely. Quality fillet knives and fish skinning pliers are not expensive and can be purchased at sporting goods and department stores. Fish can be cleaned on any surface, but a small cutting board allows for portable cleaning options and easier cleanup. Check the South Dakota Fishing Handbook for current regulations for how fish must be cleaned and how to legally transport.

LAWS

Where and when water specific size limits apply for a species of gamefish, fish must be kept whole with the head, skin and fins attached. Only gills, entrails, scales, and eyes may be removed. These provisions do not apply to the statewide daily limit of one walleye over 20 inches.

To legally transport fish, the fillets must be able to be counted. If freezing fish prior to transportation, the fish must be packaged individually. Also, individual pieces of fish constitute one fillet and two fillets are the equivalent of one fish, so you should not cut fish fillets into pieces prior to transportation.

FILLETING

The word fillet (or filet) comes from the French, meaning a slice of boneless meat or fish. To fillet a fish is to remove the flesh from the carcass and skin with as little of the bones left as possible. A fish fillet is perfect for frying, baking or sautéing and can be consumed with little bother from bones. Any species of fish can be filleted, but some fish species allow for better fillets due to their bone structure. Bass, bluegill (and other sunfish), walleye, yellow perch, white bass and catfish make good fillets. Carp, suckers and northern pike have numerous and large interstitial bones located in the muscle (Y-bones) that are bothersome and dangerous when the fish are filleted. There are other filleting or special cleaning methods that are better suited for these fish.



Through experience you will learn the worthwhile size of the fish you catch and keep.

1. To start a fillet, cut diagonally from the top of the back to the belly, behind the pectoral and pelvic fins; do not cut the backbone.



2. Next, cut along the backbone on one side of the dorsal fin. Slice at an angle without cutting the rib cage to a point just behind the anal opening.



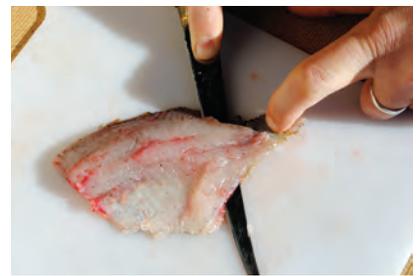
3. Then slice along the edge of the anal fin with the blade flat against the backbone. Continue to slice to the tail.



4. Now lay the free meat back carefully and cut it away from the rib cage. Cut through the skin to free the fillet. Turn the fish over and repeat.



5. Lay the fillet skin down on a flat surface. Hold the tail and cut through the meat down to, but not through, the skin. Rotate the knife blade so it is at an angle away from the tail. Pull on the skin and use the knife in a cutting motion. Don't try to slice the meat off, rather scrape it off with the blade and the pulling motion.



FILETING PHOTOS BY LARRY PAPER

SKINNING

Skinning a fish serves the purpose of removing the skin and scales while leaving the carcass whole. Whole fish carcasses are best suited for baking or frying. This is often done on catfish, which do not have scales, but can be accomplished on any fish. Scales do not need to be removed before skinning.

To skin and clean a catfish, start by making cuts just through the skin; along the back from head to tail and on both sides of the dorsal fin, around the body behind the head and pectoral fins, and both sides of the anal fin.



With the fish on its belly, firmly grasp the head with one hand and with pliers, pull on the loose corner of skin on the top near the head. The skin may need to be separated along this fresh cut before pulling to make the skin come free without pulling away the meat.



The skin on each side of the fish should pull off on each side of the carcass.



SKINNING PHOTOS BY LARRY PATE

SCALING

Removing the scales of a fish is easy, but can be a bit of a mess. Expect scales to fly everywhere so accomplish this task outdoors or in an easily cleanable area. Scaled fish such as sunfish, crappie and white bass are perfect for grilling or baking. The skin serves to prevent excessive moisture loss and damage to the meat while cooking. The skin is generally peeled off prior to eating.

To scale a fish, place it on a firm surface and with a dull knife or scaling tool, scrape off the scales from tail to head. Small strokes and working out from a small area works best. When completely scaled, remove the head, entrails and fins as described above in the skinning section.

COOKING FISH

Cooking your catch is the next-to-last step in finishing a great fishing trip. There are many methods of cooking fish. Below is a simple recipe for cooking your fish fillet. Pan Frying is a popular way to cook fish, and it is the quickest and easiest way to cook your catch at your campsite, at the park or on shore. Here are the basic steps:

Step 1: First, coat the fish fillet with flour. Feel free to add your favorite seasonings such as salt, pepper, season salt to the flour before coating.



Step 2: Dredge the flour-covered fillet in a beaten egg.



Step 3: Coat the fillet with bread crumbs.



Step 4: Heat some cooking oil in a skillet to 300 degrees. Test the heat by dropping a small piece of fish into the skillet. If it sizzles, the oil is hot enough.

Step 5: Add your fish to the skillet, cooking on each side for 3 or 4 minutes, or until the coating is brown.



Step 6: Enjoy with fellow anglers or family and friends. The final step to a successful fishing trip is enjoying the taste of your catch.



THE LAW AND THE MORAL CODE

“The true test of a man’s character is what he does when no one is watching.”

– John Wooden, American Basketball Hall of Fame player and coaching legend who led UCLA to a record 10 national championships.

REGULATIONS

South Dakota Game, Fish, and Parks is responsible for managing, conserving and regulating the state’s natural resources. That includes fish and aquatic resources. These resources are managed largely by creating and enforcing regulations on how the resources are used. Fishing regulations are laws about fishing that are designed to maintain healthy fish populations. These laws are determined in response to economic, social and cultural demands on the state’s fisheries.

In South Dakota, anglers 16 years old are required to carry a valid fishing permit. Money from the permits helps fund South Dakota Game, Fish, and Parks’ efforts to manage and conserve fishing resources. Additional funding for conservation efforts comes from taxes paid on fishing tackle and equipment.

Regulations are presented to the board of commissioners that govern the agency. Regulations adopted by the commission are published in the South Dakota Fishing Handbook. Handbooks are available anywhere fishing permits are sold, and at gfp.sd.gov.

All anglers are required to follow regulations, which include:

Daily bag limits: The number of fish that may be taken in one day (from 12:01 a.m. to midnight).

Possession limits: A possession limit establishes the maximum number of fish of a species or combination of species that you may possess. In South Dakota, there is no possession limit on fish kept at a person’s domicile. A domicile is defined as a person’s established, fixed, and permanent home to which the person, whenever absent, has the present intention of returning.

Length limits: Water specific restrictions on lengths of fish that anglers are allowed to keep.

Aquatic Invasive Species regulations:

– A person may not possess, transport, sell, purchase or propagate Aquatic Invasive Species.

– Fish may not be transported from one body of water to another.

– Bait and fish may not be transported away from the boat ramp parking area in water from a lake, river, or stream.

Catch-and-release: This regulation prohibits any harvest of a species. Certain trout streams within the Black Hills of South Dakota are catch-and-release only.

Harvesting of fish that does not comply with regulations is called “poaching” and is a violation of the law, punishable by fines or imprisonment.

Regulations shouldn’t be viewed as a restriction, a hassle or something that gets in the way of fishing. Regulations protect the state’s fisheries resources and the angler’s ability to go fishing.

ETHICS

What is the difference between regulations and ethics? Regulations are the laws. Ethics are the moral code that all anglers should follow.

An Angler's Code of Ethics:

- » Always practice safe fishing.
 - » Cast carefully.
 - » Handle hooks mindfully.
 - » Wear a life jacket when on a boat or in the water.
 - » Always be courteous and respectful of other people.
 - » Respect property.
 - » Give other anglers their personal space while fishing.
 - » Make sure you have permission to fish on private property.
 - » Obey fishing laws.
- » Have a permit when required.
 - » Know the regulations where you fish.
 - » Respect the outdoors.
 - » Observe but do not disturb wildlife.
 - » Release fish right away if not planning to eat them.
 - » Pick up trash, even if you did not leave it.
 - » Recycle used fishing line and bait containers.
 - » Invite friends to fish with you and help them learn.



PHOTO BY JEFF KURRUS

THE NORTH AMERICAN MODEL OF WILDLIFE CONSERVATION

The motivation for the North American Model of Wildlife Conservation had its origins in the 19th century with sportsmen's concerns over the extinction and near extinction of several species. This model rests on two basic principles: fish and wildlife belong to all U.S. citizens, and fish and wildlife should be managed so their populations are present forever.

Who owns and takes care of the wild fish swimming in the waters of South Dakota?

We do! The citizens of South Dakota are the owners and keepers of all the fish, and other aquatic wildlife that live in our waters. The responsibility to ensure equitable, sustainable and responsible use of wildlife resources also belongs to South Dakota citizens. South Dakota Game, Fish and Parks Department is tasked by the citizens of South Dakota to manage their fish and wildlife.

Who pays for the management of the aquatic wildlife swimming in South Dakota?

We do! More specifically, the anglers who purchase fishing licenses pay for the fisheries management practices used to ensure healthy and abundant aquatic wildlife. Anglers pay for the management of the parks and natural places in which our aquatic wildlife exists. Anglers are the citizens that make quality fisheries possible for all South Dakotans.

The citizen-ownership-of-wildlife concept was established early in our nation's development. During the late 1920s and early 1930s, it was recognized that many of the United States' animal species were under threat of extinction. To aid in the protection of animals, the Pittman-Robertson Act of 1937 placed an excise tax on firearms and ammunition that is solely used for the protection and restoration of animals and their habitats. Due to its popularity and success, in 1950 the Dingell-Johnson Act (also called Federal Aid in Sport Fish Restoration) placed an excise tax on sport fishing equipment (rods, reels, fishing line, lures, etc.). Sport Fish Restoration funds are returned directly to the states based upon a formula that includes the number of fishing permits sold.

This publication was paid for by Sport Fish Restoration funds specifically dedicated to Aquatic Education.

Fisheries management is a very simple term for broad responsibilities. South Dakota Game, Fish and Parks Aquatics Section management team is active in the study of South Dakota's aquatic habitats and organisms, water resources, human interactions and education.

Typical annual duties of a South Dakota Game, Fish and Parks fisheries management biologist:

Fisheries biologists across the state manage the fisheries by stocking, conducting surveys, and conducting research projects. The data collected helps to create rules and regulations that help the Department maintain the resource.



Stocking

Fish stockings are an important management tool used to help maintain desired densities of fish in waterbodies. Four general sizes of fish are used for stocking: fry, fingerlings, juveniles, and adults. Fry and fingerlings are produced in one of the state's five hatcheries (three state run hatcheries and two federally run hatcheries). Juveniles and adults are either stocked from products produced from one of the hatcheries or moved from one water that has too many to another that needs more fish. Species raised by hatcheries are walleye, yellow perch, largemouth bass, muskellunge, trout species, and chinook salmon.

Spawning

Fish spawning is an important spring and fall activity for fish management staff that supplies our hatcheries with the eggs needed to provide the fish for stockings. Eggs are taken from walleye, yellow perch, and

chinook salmon out of waters with healthy populations of these species. Eggs are collected from brood stock largemouth bass and trout that are kept on station in some hatcheries.

Surveys

Fisheries biologists also use various surveys to collect data on fish to determine management actions. With the fish collected, biologists measure fish length, weight, abundance, and age to understand fish population dynamics. This understanding helps to determine what management tools need to be used, such as fish stocking, fish removals or harvest regulations. Anglers are one of the best tools a fisheries biologist uses to understand how a fishery is doing. Creel/angler harvest surveys are the tool used to get a better feel of what anglers are harvesting along with some survey questions. The survey questions usually address issues like harvest regulations, stocking strategies, or management strategies.

Netting

Collection of fish is done by using gill nets, trap nets, or seines. A gill net is a net made of monofilament line to collect open-water fish species like walleye and yellow perch. The net has a float line on the top and a lead line on the bottom. They are set in open-water areas with anchors on each end to hold them in place. The mesh sizes determine the sizes of the fish sampled.





PHOTO BY JEFF KURRUS

Trap nets are a funnel-shaped net with a rectangular frame and a lead. The lead is staked to shore with the trap section set out in deeper water perpendicular to the shoreline and held in place with an anchor. Ideally the net is set on a gradual slope with the trap section set in water no deeper than 15 feet. The net is designed so that when fish swim along the shoreline, they run into the lead and try to swim around and go into the funnel. Species targeted with trap nets are panfish, walleye and yellow perch.

Electrofishing

Electrofishing (shocking) utilizes either a boat or backpack electrofisher. This sampling method targets bass, trout, panfish, and catfish. A gas-powered generator combined with a control box supplies an electric pulse into the water via an electrode. Fish are temporarily stunned, bringing them to the surface to be netted. Fish of all sizes are collected in a live-well for data collection and later released.

Tagging

Fisheries biologists conduct in-depth research projects such as tagging fish to track movements or collecting stomach contents from fish to understand what they are eating at certain times of the year. They also investigate other aquatic community organisms such as frogs, crayfish, mussels, snails, clams, insects, and zooplankton to determine their influence on fish populations.





ANGLER RESPONSIBILITY - AQUATIC INVASIVE SPECIES

What is an Aquatic Invasive Species?

An aquatic invasive species (AIS) is any aquatic species not native to South Dakota that has a negative impact. These species can alter food webs and compete with native species. They can also have negative impacts on human use such as fishing and recreation. Aquatic invasive species can affect infrastructure and cost millions of dollars to mitigate.

How did they get here?

Many AIS, like zebra mussels, were inadvertently brought to the Great Lakes region in cargo ship ballast water. Others, such as invasive carp, were imported for use in aquaculture ponds and, escaped captivity. Some of these AIS likely “hitchhiked” to South Dakota on boats, construction equipment and by downstream/upstream migration on large rivers.

What can we do to stop the spread?

There is no way to eradicate most AIS once they take residence in a waterbody. It is best to prevent them from entering our waterways. Anglers and recreational boaters are the first line of defense in the fight against AIS. Follow AIS prevention rules posted in the Fishing Handbook and refer to the website, SDLEASTWANTED.com. Check boats and fishing equipment for AIS and remove them prior to leaving a body of water. Pull all plugs from boats prior to leaving the boat ramp parking area. Bait and fish may not be transported away from the boat ramp parking area in water from a lake, river or stream.

Major AIS species found in South Dakota

Asian Carp: Silver and bighead carp can dramatically alter the food web in aquatic ecosystems. They are planktivores that directly compete for food with forage fish and young game fish. Additionally, silver carp pose a physical threat to boaters since they have the ability to leap up to ten feet



PHOTO BY: SAM STUKEL

introduced to the United States in the 1980's, they were first found in Lake St. Clair near Detroit. They were then able to spread throughout Mississippi River drainages of the Missouri, Arkansas, Tennessee, and Ohio Rivers. It is likely that zebra mussels were introduced to waters in South Dakota by hitchhiking on boats and equipment from infested waters in other states.

Zebra and quagga mussels have the potential to harm aquatic ecosystems and impact municipal and agricultural water systems. Both species are filter feeders that consume plankton and algae in the water. Each individual is capable of filtering over one liter of water per day.

These species also become troublesome for recreational users and water users when they attach to the insides of engine cooling systems and water intake structures and restrict the movement of water. The shells of both species are extremely sharp which could potentially limit the use of swimming beaches. In some areas of the country these species have been found in densities of over 700,000 individuals per square meter.

Zebra and quagga mussels spread in their larval state called veligers which are microscopic and free swimming. Veligers can be pulled into live wells, ballast tanks, and bait buckets and accidentally transported to other water bodies. They can survive up to 2 weeks without food.

from the water when startled. Both species can be found in the Missouri River below Gavins Point Dam, the James River, the Vermillion River (below East Vermillion Spillway) and the Big Sioux River downstream of Falls Park in Sioux Falls.

Silver Carp can grow up to 40 inches and weigh up to 60 lbs. They reach sexual maturity in 2 years and can produce up to 3.7 million eggs and spawn multiple times per year.

Bighead Carp can reach a maximum size of 55 inches weighing up to 90 lbs. They reach sexual maturity in 2 years and can produce up to 1.9 million eggs and can spawn multiple times in a year.



Zebra and Quagga Mussels were



You live in one of the best states to go fishing in the nation. South Dakota has hundreds of lakes with excellent public access and dozens of fish species. Fishing not only puts great food on the table but it is an enjoyable recreational opportunity. Fishing is something that families can, and should do together. Fishing is a great stress-reliever and connects us to the outdoors. It can be simple with a hook, bobber and worm or more challenging with fly rods and tiny dry flies. Fishing enters us on a journey creating memories that will last a lifetime!

This guide was written by those of us in the Fisheries Division who love fishing and want to share what we know. It was written for the benefit of those who might be interested in learning how to fish. We hope it has helped you and would really like to know if it has. If you have suggestions for improvement, a fishing story to tell or a photo to show us, please share with us through email, social media or a phone call. If you want more information, please contact us. We host programs for all types of outdoor activities. And, always remember to thank a fisherman, because those who buy fishing permits make the opportunity possible.

Below are additional resources that can help.

South Dakota Game, Fish and Parks website: For more information about licenses, regulations, and waterbodies, visit gfp.sd.gov.

South Dakota Game, Fish and Parks mobile app: Purchase and display your fishing permit on your mobile device plus gets all type of information such as regulations and maps of public land complete with GPS. To download the app search "SD GFP Outdoors" in your app store. The app is free!



