

# ***SOUTHERN FLOUNDER***

## ***Natural History and Fishing Techniques in South Carolina***

*by  
Dr. Charlie Wenner  
and  
John Archambault*

*Educational Report No. 20*



John Kuczma tied the state record with this 17 lb. 9.6 oz. Southern flounder on 11-22-03 at Marlin Quay Marina, Murrells Inlet

***Marine Resources Research Institute  
Marine Resources Division***



***South Carolina Department of  
Natural Resources  
Post Office Box 12559  
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# **The Natural History and Fishing Techniques for Southern Flounder in South Carolina**

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## PREFACE

Several years ago, the Marine Resources Division of the South Carolina Department of Natural Resources (SCDNR) began the production of a series of booklets for the general angling public. The first was entitled "Natural History and Fishing Techniques for Red Drum in South Carolina." This publication presented a summarization of the biology of red drum based on SCDNR's research in South Carolina as well as some techniques for catching them. The second booklet was directed at the spotted seatrout, and it followed the same general outline as the first. I was pleasantly surprised by the favorable reception both of these received from anglers. Presently, there are somewhere in the neighborhood of 20,000 plus copies of each in circulation.

These booklets were distributed to the public at no charge, mainly at public events (fishing expositions) and tackle shops. The purpose of these booklets was for the SCDNR to provide anglers with materials that will increase their understanding of the species they fish for as well as (hopefully) increase their chances of catching a fish. The costs of printing, as well as the small charges involved with their distribution, were paid for by funds obtained from the sale of salt-water fishing licenses.

Most anglers prize southern flounder more for their wonderful characteristics in a frying pan or under a broiler rather than for their fighting abilities on the business end of a fishing line. The flesh is white, mild and firm. My idea of a nice flounder is a three-pound fish, filleted and skinned, placed in a shallow baking dish. The left and right fillets are separated by a generous layer of crabmeat stuffing. A small shot of white wine, a sprinkling of fresh ground black pepper and a couple of pats of butter complete the top decorations. After a short stay in the oven, the flavors of the flounder and crab meat blend together to provide a treat for the dinner table. Other folks approach their flounder fillets in a much simpler fashion - a breading followed by a bath in hot cooking oil. Either way, fresh flounder is a treat.

We hope this booklet will provide anglers with a better understanding of southern flounder both in South Carolina as well as throughout their geographical range. Just remember, as with the spotted seatrout booklet, I wrote the section on the biology of the species whereas

John Archambault contributed the "how to catch them" section. So if you can't catch them, blame John, not me.

As with the previous booklets, funds for the research came from the National Marine Fisheries Service (MARFIN Program grant number NA77FF0550) administered by the Southeast Regional Office, the U.S. Fish and Wildlife Service (Sport Fish Restoration Fund) and the South Carolina Saltwater Fishing License. The latter also paid for printing and distribution. We hope you enjoy this booklet, and if you have any suggestions or comments, please pass them along.

Many people participated in one way or another in this project. Our fellow workers in the Inshore Fisheries Section of the SCDNR provided assistance in more ways than could be counted. Among these folks were Bill Roumillat, Erin Levesque, Chris McDonough, Gina Perez, Richie Evitt and Robin Freeman. Karen Swanson provided both graphics expertise and the final layout. The efforts and expertise of Anna Martin in editing the original manuscript are greatly appreciated. Numerous anglers allowed us to sample their catch and cooperated in our quest for data needed to tell this story.

A special thanks is warranted for former Senator Fritz Hollings who helped us with our inshore projects for many years. If it were not for the Senator, much of the work on which this publication is based, would not have been done. Thank you for all your assistance, Senator Hollings.

*Charlie Wenner*

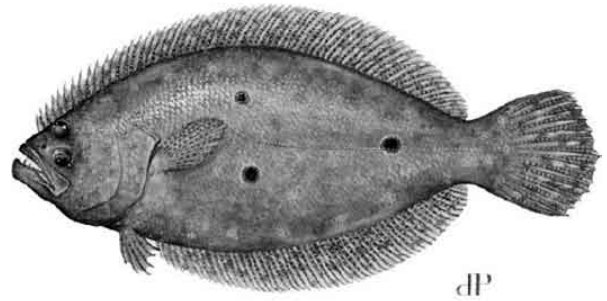
## INTRODUCTION

Because the names of fishes frequently vary regionally, the American Fisheries Society maintains a list of fishes in the United States in order to standardize their “official” common and scientific names. The scientific names are generally derived from Greek or Latin and are assigned to a species by the person who discovers it. Some scientific names describe a trait of the new fish; others may be assigned to honor a biologist who has contributed to knowledge of the group.

When classifying fishes or assigning them to the proper group, those with a similar physical appearance are placed in the same assemblage. The southern flounder is in the family Bothidae and is characterized by having the pigmented side up with both eyes on the top, left side of the body. Some flatfishes have the reverse condition with both eyes on the right side. The scientific name for the southern flounder, which is the official common name, is *Paralichthys lethostigma*. The genus name (*Paralichthys*) is derived from a combination of two Greek words (Paral + ichthys); translated, these mean “parallel fish.” The species name (*lethostigma*) comes from a combination of two Latin words (letho + stigma), which mean “forgotten spots.” Translating both the genus and species name and putting them together, we have a parallel fish with forgotten spots, referring to the lack of spots on the flattened fish.

There are many flounders in the family Bothidae in coastal South Carolina, most of which are small fishes that are relatively distinct from the southern flounder and rarely hooked by anglers. However, two other members of the genus *Paralichthys* are found in our inshore waters, the summer flounder (*Paralichthys dentatus*) and the Gulf flounder (*Paralichthys albigutta*) both of which frequent estuarine and near shore waters. These fish are less abundant and can be separated from the southern flounder by coloration as well as counts of fin rays and other bones.

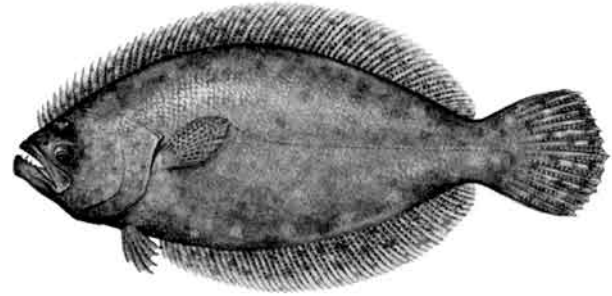
Visually, the southern flounder can be quickly separated from the summer and the Gulf flounder by the lack of spots (Figure 1) on the pigmented surface. The Gulf flounder has three spots that form a triangle near the tail; the summer flounder has five spots. In coastal South Carolina, the southern flounder is far more abundant, larger and caught in greater numbers by recreational anglers than the other two species.



### Gulf flounder - *Paralichthys albigutta*

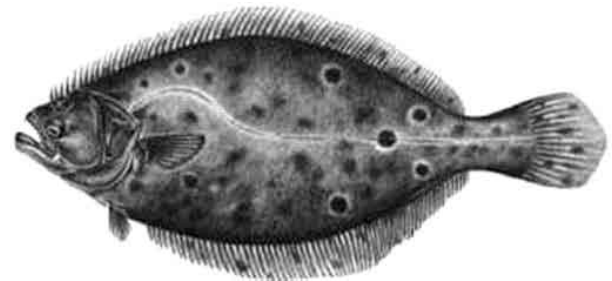
Note three spots forming a triangle.

(Illustration by Diana Rome Peebles for the Florida Fish & Wildlife Commission, Division of Marine Fisheries)



### Southern flounder - *Paralichthys lethostigma*

Note absence of spots.



### Summer flounder - *Paralichthys dentatus*

Note five spots on the body near the tail.

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Figure 1. The three species of paralichthid flounders found in South Carolina waters.

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As mentioned before, members of this genus of fishes are known as the “left-eyed” flounders. As you look down on a southern flounder, you will see that both of the eyes are on the left side of the body (Figure 2).

The southern flounder is found along the southeast coast of the United States from Albe-marle Sound, North Carolina to the lower east coast of Florida. The species is absent in the Florida Keys, but, once again appears in the fish catches on the Florida west coast near St. Petersburg. Southern flounder are found throughout the near shore and estuarine waters of the northern Gulf of Mexico to northern Mexico.

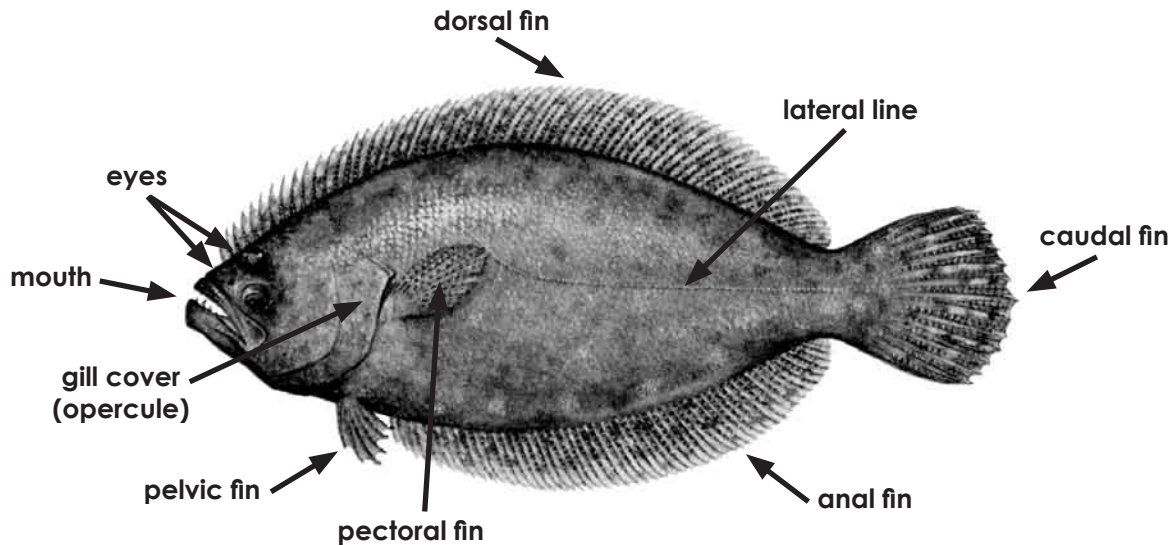


Figure 2. Exterior anatomy of the southern flounder.

## THE FISHERY

The southern flounder supports valuable commercial and recreational fisheries throughout the geographic range it inhabits. Since 1991, the total recreational catch in North Carolina, South Carolina, Georgia and Florida (east coast) has ranged from a low of 432,000 to a high of 830,000 fish (Figure 3) and appears to be quite stable from year to year throughout the region. An interesting aspect of the recreational fishery is the relatively large number of southern flounder that are caught and released alive (Figure 4). For ex-

ample, in 2003 about 30% of the estimated total catch was released alive, the annual average was 24% from 1991 through 2003. This translates into one of every four southern flounders caught by recreational anglers along the southeast coast is released alive.

In South Carolina, the estimated total catch of southern flounder in the recreational fishery has ranged from a low of about 25,000 fish in 1981 to a high of about 275,000 individuals in 1985 (Figure 5). The long-term average catch over a period of 23 years (1981 - 2003) was about

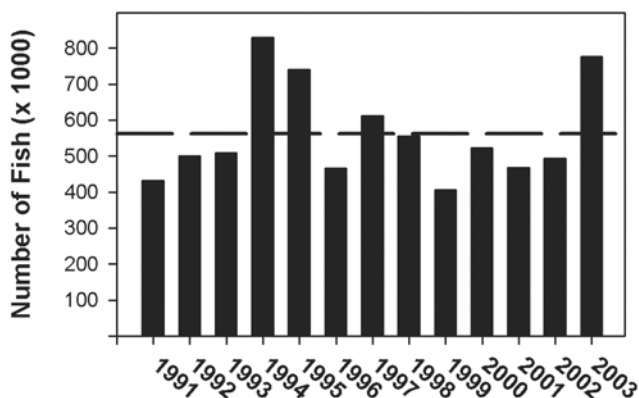


Figure 3. The estimated annual total catch in numbers for southern flounder in the recreational fishery along the southeast coast of the U.S. Dashed line is the average annual total catch from 1991 through 2003. Source of the data is the MRFSS (Marine Recreational Fishery Statistical Survey) of the National Marine Fisheries Service, Department of Commerce.

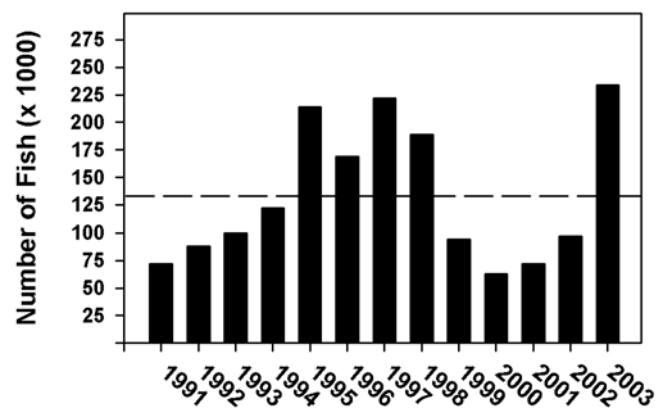


Figure 4. Estimated number of southern flounder caught by recreational anglers and released back into the water alive along the southeastern coast of the U.S. (North Carolina, South Carolina, Georgia, east coast of Florida) from 1991 through 2003. The dashed line represents the average for the thirteen year period. Source of the data is the MRFSS (Marine Recreational Fishery Statistical Survey) of the National Marine Fisheries Service.

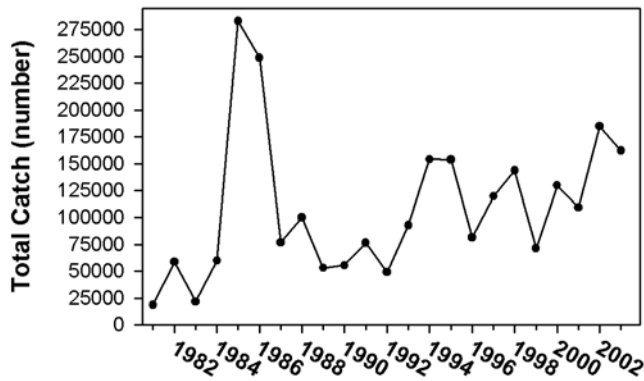


Figure 5. The estimated annual total catch of southern flounder in the South Carolina recreational fishery. Source for data is the Marine Recreational Fishery Statistical Survey (MRFSS) conducted by the National Marine Fisheries Service.

105,000 fish. During this same time interval, there has been an increasing trend for recreational anglers to release a substantial part of their catch alive. Since 1999, between 20 and 32% of the southern flounder catch has been returned to the water. These numbers are a result of both an increasing conservation ethic as well as adherence to the minimum size limit of 12-inches total length.

One aspect of the recreational harvest for which there are no data is the gig fishery. In this method of harvest, fishers patrol the shallows at night in shallow draft boats equipped with lights mounted on the bow. The lights are directed at the bottom, and as the boat is poled across the shallows, an individual standing on the bow spears the southern flounder made visible by the light. Gigging occurs at night in many remote areas of the coastal waterways, and there is little information on the number of participants, the amount of fish harvested or the sizes of flounders in the catch. North Carolina has an extensive gig fishery for southern flounder in the southern sounds (Core and Bogue Sounds). Some estimates have put the total catch of the gig fishery to exceed the hook and line fishery by a substantial amount. North Carolina's recreational anglers harvested 236,648 pounds of southern flounder in 2002. That same year, recreational gig landings were estimated to be 361,539 pounds, about 1.5 times the hook and line landings.

It is well known that the gig fishery in South Carolina is relatively extensive; however, we have no information on the total landings of this

fishery to compare with the catch by hook and line gear. In order to more fully understand the flounder fishery, additional data on the gig fishery are needed. The magnitude of the landings in number and weight, the number of participants in the fishery, the sizes of the fish in the harvest, and an average catch per trip would be extremely helpful in the determination of the health of the flounder population in South Carolina.

The average length of the southern flounders landed by anglers since 1990 was over 14 inches (Figure 6). The largest fish (on average) were seen in 2003. These averaged slightly less than 16 inches. The trend since 1990 could be the result of recreational anglers releasing the smaller fish (12 inches or less in total length).

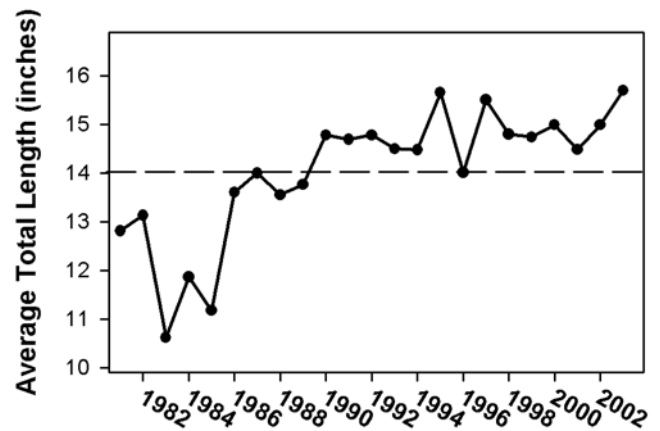


Figure 6. The annual average total length of southern flounders in the South Carolina recreational hook and line fishery's harvest. Dashed line is the average total length from 1981 through 2003. Source of the data is the MRFSS (Marine Recreational Fishery Statistical Survey) of the National Marine Fisheries Service.

### Life History: Early Life Stages

Southern flounders spawn in offshore waters during the late fall and early winter. The fertilized eggs are pelagic, that is, after the sperm and egg fuse and development begins, the eggs float to the surface. The eggs hatch in 48 hours when held at 70° F and the resulting larvae are a tenth of an inch long. The larvae are suspended in the water off the bottom and as they drift with ocean currents, the small southern flounder feed on very tiny animals related to crabs. In the larval stage, southern flounder swim like any other fish, and the eyes are located on opposite sides of the head. Also, they are largely translucent, which makes them less visible to potential predators.

The young are transported to the coast by ocean currents, and they begin to enter South Carolina's estuaries in late January. Once inside, they settle out of the water and begin their life on the bottom in the shallow tidal creeks. Figure 7 shows the early life stages that the southern flounder passes through as they change to a bottom-dwelling fish.

The initial stage is the yolk-sac larvae (A), which develops right after fertilization when the fish embryo feeds off the yolk. Note that the developing eyes are on opposite sides of the head at this point. In this stage, the mouth and the digestive track are not yet completely formed.

The two following stages of larval development (B and C) begin after the yolk sac has been consumed in early development. Now the mouth is formed, the digestive track is complete, and the fins start to develop; however, the eyes are still on opposite sides of the head. Next, the right eye begins to migrate across the skull (D) but does not complete its move until the next stage in which the eyes take on a "typical" flounder appearance and the body becomes pigmented (E). The larval southern flounder then settles out of the water column and begins life as a bottom-dwelling species (F and G).

As a result of this metamorphosis from larvae to juvenile, the left side of the southern flounder becomes the top, pigmented side, and the right side has become the unpigmented bottom. The eye movement results in the top of larvae C (Figure 7) becoming the right side and the bottom the left side. Now in their final pigmented form, the southern flounder settles to the creek bottoms.

Southern flounder spawn in offshore waters during late fall and early winter. The young are transported by ocean currents to estuaries along the coast. In South Carolina, the young move inside the estuaries and settle out in the shallow tidal creeks that meander through our cord grass marshes. Our samples in this habitat showed that the juvenile southern flounder were least abundant during the fall; their numbers increased in January and February and peaked in March. They showed a general decline in numbers through the late spring, summer and fall (Figure 8). Part of this decline is natural mortality, i.e., they die from disease, unsuitable environmental conditions, or are eaten by predators, and the remainder is movement from the nursery habitat to other areas of the estuaries and bays with increasing size.

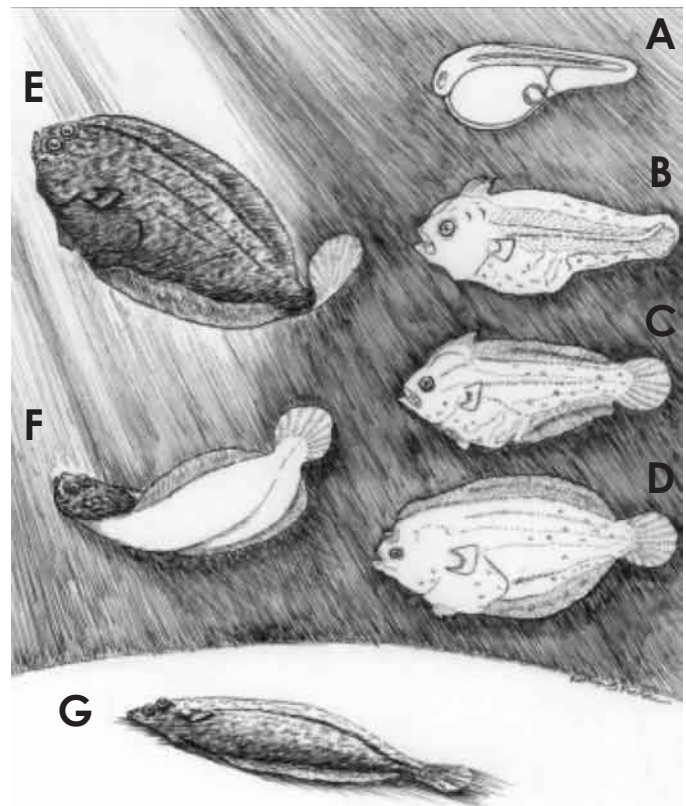


Figure 7. The stages of the southern flounder from early larva through the settlement as a juvenile. Source Southern Regional Aquaculture Center Publication No. 726, **Species Profile, Southern Flounder**, H.V. Daniels, N.C. State University.

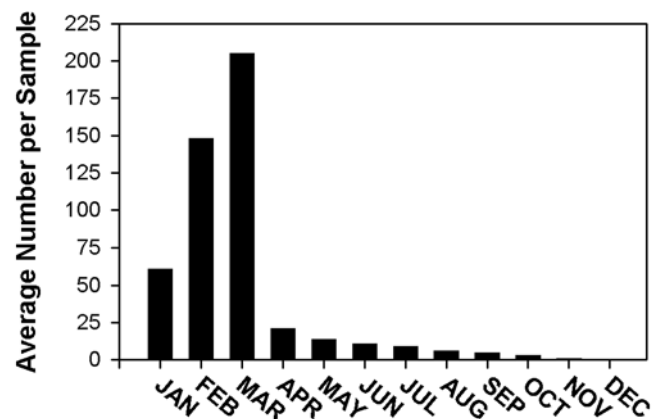


Figure 8. Average monthly catches of young southern flounder in the nursery habitat, i.e., the shallow tidal creeks. Note the rapid decline in their numbers after March, and their absence in December. Source SCDNR survey data.

Young southern flounder move into the shallow creeks from January through March. Since the water in the creeks does not warm up until sometime in March, the growth rate of the fish in



the nursery habitat is quite low for these months. Most fishes are unable to regulate their body temperature. When fish that live in temperate waters go into cold water, they decrease or stop feeding and reduce their growth. Southern flounder show the same behavior. As waters warm in April, the growth rate increases. The juveniles double in size between April and June (Figure 9). At a size of about 7 inches total length, the juveniles exit the shallow creeks and take up residence in the main branches of the estuaries.

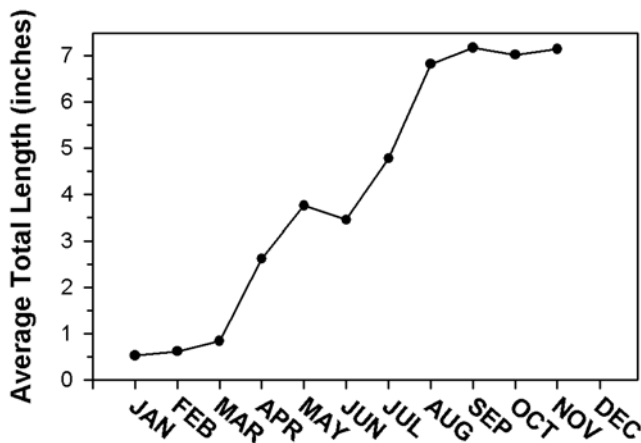


Figure 9. The average total length in inches for southern flounder sampled in the nursery areas (shallow tidal creeks) by month. Source SCDNR survey data.

Although juvenile southern flounders are found throughout South Carolina's estuaries, there is a tendency for them to be more abundant in shallow creeks that are further from the inlets. Many go to areas of very low salinity<sup>1</sup>, and some have even been found in fresh water. The Freshwater Fisheries Division of the SCDNR has encountered small southern flounder in their surveys of the freshwater areas of the South Edisto River.

The diet of juveniles in the nursery area varies according to size. Those about 2 inches in length feed on mysid and grass shrimp (Figure 10), while those between 2.5 and 8 inches eat mainly small fishes such as juvenile spot, young striped mullet and mummichogs (mud minnows).

After leaving their nursery habitat, the young southern flounders tend to be found over mud-drier bottoms. As they consume more and larger fishes, their growth rate increases until they reach about 10 inches in length at the age of one. However, these fish are still immature and do not spawn.

### Life History: Reproduction

There is a great deal of interest in culturing southern flounder because it is highly desirable as a food fish. For example, in North Carolina there is a Japanese market for both freshly caught and bled southern flounder and live fish. The fish are caught by commercial operators who use mainly gill nets<sup>2</sup>. For the freshly bled market, the area just before the tail fin is cut deeply, and the fish is placed on chipped ice. The fish's blood on the ice indicates that the flounder was alive at the time of packing. For the live market, the fish are held in special shipping containers that are saturated with oxygen, and then flown to Japan. These fish are then served in the sushi restaurants, and they fetch a very high price. The Japanese have buyers at the commercial landing points who inspect the flounders to insure the best quality.

With the increased value of southern flounders, attempts have been made to acclimate the fish to laboratory conditions and induce them to spawn. Most fishes of South Carolina have discrete spawning seasons. For example, red drum spawn in late summer (August through early September), and spotted seatrout spawn from late spring until the end of summer. These species have environmental "cues" such as day-length and water temperature that stimulate reproduction.

In the late fall as inshore water temperatures cool, maturing southern flounder migrate from the estuaries along the coast. They travel to some presently unknown locations on the continental shelf offshore where they spawn during December, January and February. Biologists estimate that the water temperature where spawning takes place is about 68° Fahrenheit (20° C).

<sup>1</sup> Salinity is a measure of how much salt is present in the water. Ocean waters may have from 32 to 36 parts per thousand of salt. As you go up-estuary, the freshwater from the rivers flowing into the estuary, cause the salinity to decline. The seawater is diluted by the freshwater which has zero parts of salt per 1000 parts of water.

<sup>2</sup> With regard to southern flounder, most fish, especially the larger ones, do not get gilled by the nets. They generally hit the net and settle to the bottom, merely laying on the net. The fisherman picks up the net carefully so that the flounders are "pursed up." Most of these fishes are alive when hauled onboard the boat.



**mysid**

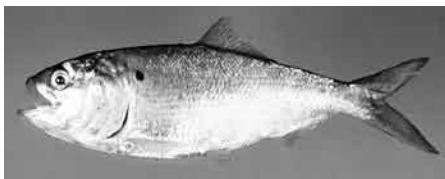


**grass shrimp**



**spot**

**mummichog**  
(© of New Hampshire Fish & Game, photo by John Craig Cloutier)



**menhaden**  
(© Don Flescher and www.fishbase.org)

**anchovy**



**striped mullet**  
(© John E. Randall and www.fishbase.org)

Figure 10. Favorite foods eaten by southern flounder.

Biologists at the Marine Resources Research Institute of the SCDNR performed a spawning study on southern flounder caught in the wild. These fish were transported to the laboratory where they were acclimated to tanks, and fed either mysid, grass shrimp, mud minnow, striped mullet, spot, anchovy, menhaden, live animals (mud-minnow, shrimp) or cut fish such as striped mullet and Atlantic mackerel (see Figure 10). The water temperature was decreased gradually

to simulate the seasonal decline in the fall, and the length of daylight was reduced to simulate the day-length at that time of year. As conditions progressed to those experiences by southern flounder in the fall, the reproductive organs of both the males and females began to develop. The fish spawned in the laboratory and fertilized eggs were produced and hatched into larvae.

Although these fish did spawn in the laboratory, many difficulties remain in the production of fish large enough to be marketed. Various institutions in North Carolina as well as the Japanese are devoting substantial resources to address the major problems associated with the mariculture of this species. At the present time, the technology is not available to produce fish for either commercial enterprises or for stocking.

### Late Juveniles and Adults

After moving from the shallow tidal creeks that serve as the young southern flounder's nursery area, the fish move to the larger parts of the estuary where most feeding and growth take place.

The southern flounder shows a great difference between the growth rates of males and females. In order to study the growth of a species in length and/or weight, some reference to time is required, since growth is a rate of inches or pounds per year. Therefore to describe growth, we need to know the length or weight and the period of time.

Fishes go through periods of fast and slow growth, which are reflected in areas of different density on many of the calcium containing structures in the body such as the otoliths, vertebrae and fin rays among others. Most fishes cannot regulate their body temperature with respect to the water they are in. Fish that normally thrive in warm water have a preferred range of temperature. Cold water results in inactivity and the reduction or cessation of feeding, which then slows the growth rate. As the waters warm in the spring, the fish begin to feed and growth resumes. When there is this break in the growth pattern, a check mark or ring is deposited on many of the hard parts like the otoliths.

The process is much like that seen in trees. Periods of slow and fast growth are shown by different rings in slices of the tree. The same phenomenon is seen in the boney structures of many fishes. In southern flounder, examination of the largest of the ear-bones (Figure 11), the sagitta,

when sliced through the center, shows a pattern of light and dark bands. The darker or denser bands reflect periods of slower growth whereas the lighter or translucent areas represent periods of more rapid growth. By counting the number of dark rings, you can calculate the number of winters that the fish passed through and, therefore, obtain an estimate of the age (Figure 12). By knowing the age and the date of capture, biologists are able to assign the fish to a yearclass. If a southern flounder has two rings on its otolith and was caught in June of 2005, the fish belongs to the 2003 yearclass. These are fish that resulted from the spawning in the winter of 2003.

Once we have determined the age of the fish and we know its length, weight and sex, we can show how growth changes in accordance with these three factors. In the southern flounder, females have a faster growth rate, reach a larger maximum size and live longer than males (Table 1). The differences in growth, size and life span are equivalent to those of two different species.

At every age, females are larger in both length and weight than males. The oldest two males examined were age five. Only 7.6% of the 1,361 males were three years of age or older. Females lived to at least age seven. Graphic comparison of the growth rates in length (Figure 13) and weight (Figure 14) of the sexes by age showed dramatic differences with males reaching a very small size and a limited weight in five years.

The percentage differences between the sexes, especially in weight after age one are stunning. For example at age 1, males are a very small percentage less heavy than females. After age one, the differences widen with time until age four when females weigh approximately 200% more than males. The long-term average size for southern flounders in the recreational

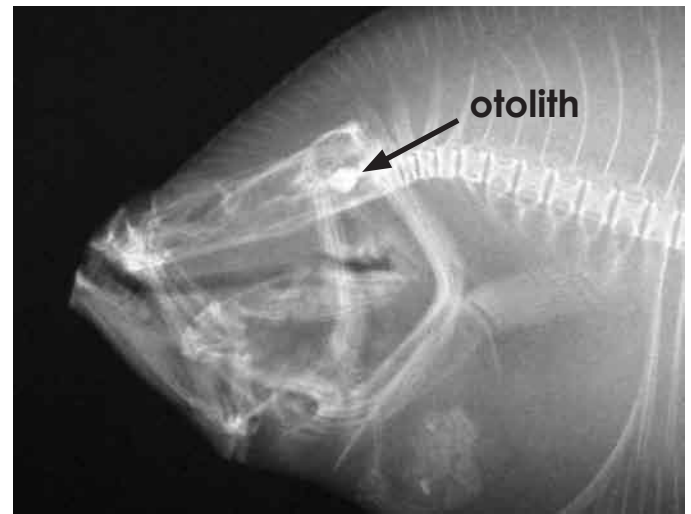


Figure 11. X-ray photograph of the southern flounder. The opaque area is the location for the otoliths. Source: "A practical handbook for determining the age of Gulf of Mexico fishes" by the Gulf States Marine Fisheries Commission, 2003.

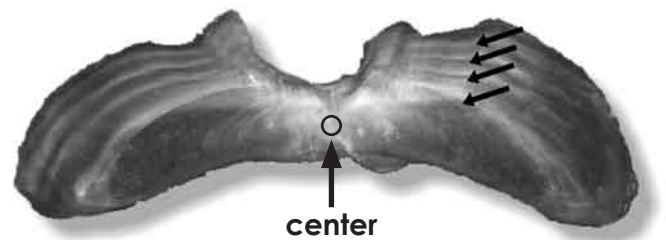


Figure 12. Section of a southern flounder otolith; white lines denoted by arrows are annual marks.

catch is approximately 14 inches total length. Knowing the aforementioned facts about growth, this figure translates into an average age of two years.

One question that is frequently asked by recreational anglers is how the length of a fish is related to its weight. Although male southern

Table 1. Comparison of the average size (total length in inches, weight in ounces) according to age of male and female southern flounder in South Carolina waters. Source SCDNR.

Age	Male Length	Female Length	Male Weight	Female Weight
1	9.7	12.3	6.2	12.8
2	12.0	15.8	11.3	27.7
3	12.7	17.7	13.6	39.6
4	13.5	19.4	15.4	53.6
5	13.6	20.7	17.9	64.0
6		21.8		84.0
7		23.3		87.0

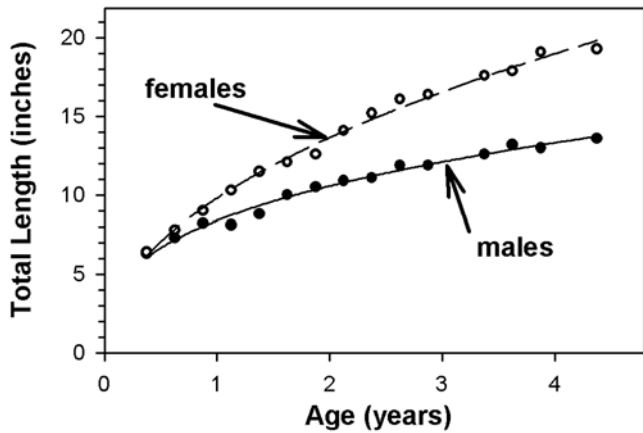


Figure 13. Comparison of males and females by length according to age. Dashed line portrays the growth of females whereas the solid line is for males. Source SCDNR.

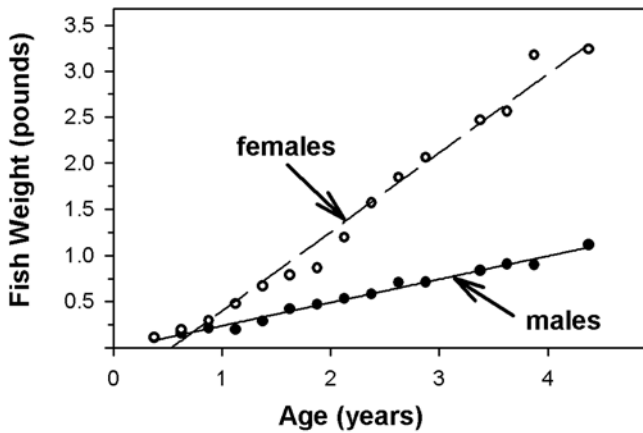


Figure 14. Comparison of males and females by weight according to age. Dashed line shows the trend in changes of weight with age for females whereas the solid line is for males. Source SCDNR.

flounder grow dramatically slower than females, males at one length weigh about the same as a female of the same length. For example, a 12-inch male weighs 11.1 ounces whereas a female of the same length weighs 11.2 ounces. Weight estimates of southern flounder at a given length are in Figure 15. It is interesting to note that a fish of 18 inches total length is more than double the weight of a fish that is 14 inches long. A flounder that is 14 inches long is about 2 years old, one that is 18 inches is about 3 years old. In a period of a year, the average female flounder will grow from 14 to 17 inches, which corresponds to an increase in average weight from 18 to 33 ounces (1.1 to 2.1 pounds). The fish almost doubles in weight in a period of about 7 months.

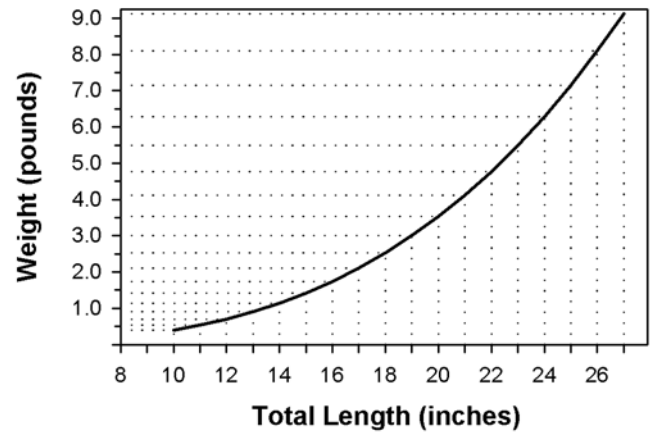


Figure 15. The relationship of total length in inches to weight in pounds for southern flounder in South Carolina. To obtain the estimated weight of a fish at a given length, go to the corresponding total length measurement on the bottom axis, then proceed vertically to the curve and then go to the weight axis on the left. The numbers on the left scale will give the estimated weight for a fish of that length. Note that these are "average" weights, at each length some fish will be heavier and others lighter than the average. Source SCDNR.

People involved with the handling of seafood, especially fish, have found that about one-third of the total weight of a fish is made up of edible muscle tissue. A 14-inch (total length) southern flounder would yield slightly more than a third of a pound in "fish meat" whereas a 17-inch fish would produce more than double that amount demonstrating the rapid increase in weight corresponding to an increase in length.

As mentioned earlier, juvenile southern flounders feed on small crabs and shrimp-like animals and begin to consume more fishes as they grow. Older and larger southern flounder feed mostly by ambushing their prey (see Figure 10). By blending the coloration of their pigmented side to match the color of the bottom, they become nearly invisible. For example, on dark-colored, muddy bottoms, they have a darker mottling than when on a sandy bottom.

Southern flounder have a special type of cell called a chromatophore in the skin on their pigmented side, which provides them with this adaptation. This cell contains a dark pigment (black and/or brown) called melanin. When the flounder is against a light bottom, the dark pigment is aggregated in one area of the cell, giving the fish a light coloration on the pigmented surface. When the pigment is dispersed through-

out the cell, the fish's color becomes dark. Both nerves and hormones control the concentration or dispersal of the pigment in the chromatophores in the skin of the fish. When the eye senses the type of bottom, it passes that information to the brain through the nerves. The pituitary gland at the base of the brain then releases a hormone that causes the pigments to move within the chromatophore. It is remarkable how quickly this change occurs in southern flounder moved from a dark background to a light background.

The southern flounder can also conceal itself by flexing its dorsal and anal fins to make a slight depression in the bottom causing the sediments to cover its back. The combination of this movement and the expansion or contraction of the chromatophores conceals the fish from both predators as well as prey.

This camouflage conceals the southern flounder and puts the fish in a position to strike prey as it passes overhead. As small juveniles, southern flounders feed on small crustaceans and juvenile fish. After growth and movement from the creeks to other areas of the estuaries, their diet changes both in the types of food eaten as well as the size of the individual food items. The primary food item of flounders 8 inches or less is grass shrimp (Figure 10). Other fishes consumed by 8-inch flounders include mummichogs (mud minnows), small striped mullet and spot. The diet of larger southern flounder consists mainly of these same fishes, which are consumed in a greater volume and larger size.

In an examination of over 300 stomachs from southern flounder, the following species of fishes were seen: tarpon, Atlantic menhaden, bay anchovies, mummichogs, silversides, silver perch, spotted seatrout, Atlantic croaker, star drum, white mullet and southern flounder. Southern flounder 16 inches or larger ate fishes almost exclusively.

The species in the diet tell something about the feeding locations of southern flounder in the estuary. Southern flounders feed where their prey is most abundant. Two of the dominant fishes (mummichogs and striped mullet) that were seen in the stomachs are found in tidal creeks, on flooded marsh surfaces, and along the edges of the marsh. They are not fishes of the open waters.

The most abundant prey species on the marsh surface are striped and white mullet as well as mummichogs. As the tide ebbs and water

flows off the surface of the marsh, many of the fishes found there move off with the tide. Our tidal marshes have gullies through which much of the water from the surface drains. As the tide ebbs, prey species use the shallow creeks as "highways" to get from the marsh to deeper water. Frequently southern flounders can be found at the mouths of these gullies. Southern flounders are found in the shallows using their camouflage (partially buried in the sediment with only their eyes visible with their color blending with the bottom color) ready to ambush an unsuspecting prey species (Figure 16).



Figure 16. Gulf flounders blending into the bottom near an off-shore reef as well as a southern flounder partially covered with sediment. Source SCDNR.

In our sampling of fishes in the shallow waters of South Carolina's estuaries, the southern flounders were the last of the large fishes to leave the shallows with the tide. In general, they are creatures of the shallows. For example, in addition to most of their diet being made up of fishes found along the fringes of the marsh, gig fishermen stalk the flounders in shallow water at night.

When making recommendations to fishery managers, fishery biologists often stress the importance of delaying the harvest of a species until they reach a size and age at which it is able to spawn. In many instances, the minimum size restrictions of a fish reflect the size at which 50% of the population is sexually mature. At the present time in South Carolina, the minimum legal size for the recreational harvest of southern flounder is 12 inches total length.

A few male southern flounders are mature between a length of 8 and 9 inches, 50% of the fish could spawn between 10 and 11 inches. All males are mature at a size of 13 inches total length. At 12 inches total length, about one-fifth (20%) of the female southern flounder are sexually mature. Half the females about 14 inches long were able to spawn. All fishes 16 inches and larger in length were mature.

Southern flounders are what biologists refer to as serial spawners. This species produces clutches<sup>3</sup> of eggs over the spawning season, that is, the fish spawn the mature eggs and sperm producing a group of fertilized eggs that hatch into larvae, rest a period of time that varies according to the species of fish, and produce another clutch of mature eggs. In general, larger females produce individual clutches with more eggs, have more clutches and spawn over a longer period of time than the small females. The number of eggs produced by a female during a spawning season is called the total fecundity. Although SCDNR biologists have been unable to determine the number of eggs produced in oceanic waters by southern flounder in the spawning season, research from holding three females with an average weight of six and three quarter pounds in the laboratory and conditioning them to spawn under artificial conditions gave estimates that from 17,000 to 260,000 eggs were produced by a female in a single batch. The laboratory spawning lasted forty days, and the three females produced slightly less than 18 million eggs. Fertilized southern flounder eggs float in seawater, whereas unfertilized eggs sink. Scientists estimated that one-third of the total number of eggs produced had been successfully fertilized by separating the eggs that sank from those that floated.

The movements of southern flounder from tag-recapture work have been studied by North and South Carolina as well as Georgia fishery biologists during the past two decades. In South Carolina, SCDNR scientists tagged 882 southern flounder that ranged in size from 7 to 24 inches in total length. Of these, recreational anglers recaptured 26 individuals, and SCDNR sampling recaptured an additional 98. Many of the

fish were within the same general area as they were marked and released. Some fish, however, had moved considerable distances. Three fishes tagged in Charleston Harbor had moved south to Georgia (St. Catherine Sound ~ 110 miles; Hampton River ~150 miles) and Florida (Matanzas Inlet ~250 miles). The fish that moved from Charleston Harbor to St. Catherine Sound made the trip in 17 days (averaging 6.5 miles per day during its travel). Surprisingly, this was a small southern flounder (11 inches total length). The Florida flounder was a larger fish (16 inches) and was recaptured after 15 months in the wild. As previously mentioned, most of the other recaptures were relatively near the point of the initial tagging.

In Georgia waters, DNR personnel marked 1,078 fish and received 75 returns. Their observations followed the same trend as seen in South Carolina some individuals demonstrated long distance movements. Thirteen individuals moved farther than the others, averaging ~110 miles from the point of origin. Of these, one individual traveled 350 miles to the north before being recapture in Surfside Beach, North Carolina. The remainder moved to southern Georgia or Florida. Fish tagged in North Carolina generally moved inshore in spring, offshore in late fall with the seasons, and were captured close to where they were first tagged and released. Those marked southern flounder that demonstrated longer movements usually swam south to South Carolina and Georgia waters. The studies showed that this species is capable of long-distance movements, mainly in a southern direction.

In general, tag returns from marked southern flounder have been relatively low when compared to those from red drum. Along the southeast coast, the tag returns to various agencies conducting the tagging studies were less than 10%. Some of the blame for the low rate of returns can be attributed to the tags themselves which often fell apart, as was the case with the failing of the Georgia DNR tag. The tag we first used in South Carolina was also inappropriate.

Spawning takes places in offshore waters from December through March. The exact location is still a mystery and probably will remain

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<sup>3</sup> A clutch of eggs is a group of mature eggs, those that can be fertilized, that are released by the female each time it spawns. Many fishes have spawning seasons that might extend over a month or two. During this period, each female will release several clutches of eggs.

as such. In my estimation, fishing on a group of fish that are actively spawning is not the wisest thing to do<sup>4</sup>.

Juveniles leave the creek systems in late April through June and move throughout the estuary. As these flounder grow, we are able to catch them with our nets to determine their abundance. Examining our catches of southern flounder in net surveys shows a seasonal pattern in abundance that follows a predictable cycle each year. Our lowest catches were in the coldest months (Figure 17), began to increase in March and reach a peak in August. The catches showed high numbers in July, August and September. In general, when a fish become more abundant it is found in more locations. Only 35 of 393 net sets (9%) made in January caught southern flounder whereas 56% of our samples in May and June had southern flounder.

When we analyzed the net catches by water temperatures, the trends followed the same pattern as the monthly net catches (Figure 18). As water temperatures warmed to between 86 to 90° F, the catches increased to a maximum. The lowest catches occurred in waters colder than 50° F. Southern flounder were present in only 3.5% of the 323 net samples made in these cold waters whereas they appeared in over 85% of the 457 sets made in 86 to 90° F<sup>5</sup>. In summary, we see them less frequently and in smaller numbers during the period between December and March. Most of the fish encountered during that period are immature fishes. The adults are offshore spawning and will not return to inshore waters in reasonable numbers until the spring. The seasonal movements for the adults are inshore to the estuary during the warmer months and offshore to spawn in the colder months. The immature fish go from shallow water in the warm months to the deeper channels of the river systems in the colder months.

We use the catch data from our trammel net survey as an “index” of the abundance of southern flounder as well as spotted sea trout and red drum in South Carolina waters. Each month we sample randomly chosen areas along the shore line from Winyah Bay south to St. Helena Sound

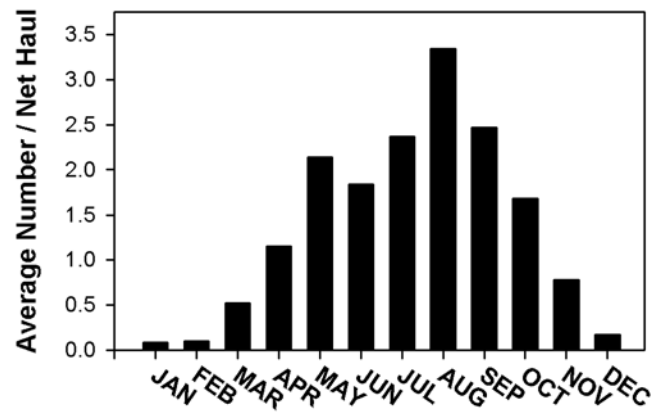


Figure 17. Monthly catches of southern flounder in SCDNR trammel net survey in South Carolina's estuarine areas. The data are for an eleven year period. Source SCDNR survey.

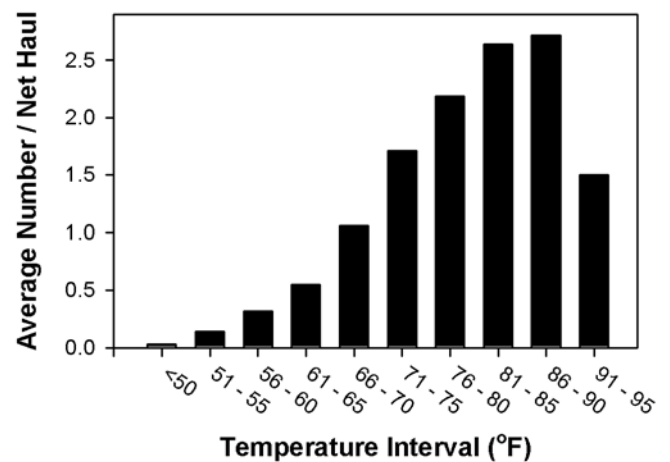


Figure 18. Average catches of southern flounder in SCDNR trammel net survey by water temperature intervals. Temperatures are in degrees Fahrenheit. Source SCDNR survey.

from just after high tide until low tide. At each of these, we set a 200-yard long net to catch the various types of fishes. In our sampling, we find that southern flounder are most susceptible to our nets in the latter stages of the ebb tide (Figure 19). Our average catches are much less at high tide. This makes sense because at high tide the fish are more spread out than at lower tides -

<sup>4</sup> A good saying to remember in regards to this is: “If your parents had no children, you probably won’t.”

<sup>5</sup> The last temperature interval is quite warm, 91 - 95°F. This temperature occurs in the shallow waters during mid-summer around the period of low tide. The water is less than 18 inches deep, and the dark-colored mud absorbs the heat from the sun. The overlying water quickly warms to high temperatures.

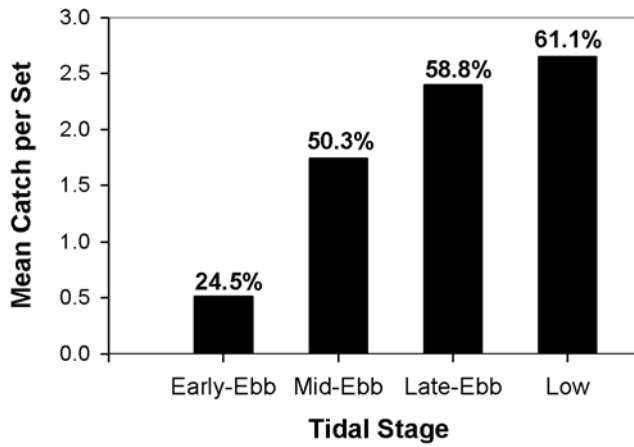


Figure 19. Average number of southern flounder caught in the trammel net survey in South Carolina estuaries by tidal stage. Data for the period from 1991 through 2003. The height of the bar is the average for each tide stage. The number on top of each bar is percentage of net sets made during that tide that captured at least one southern flounder. Sets made during December through February not included because of the rarity of this species in our survey during that time. Source SCDNR survey.

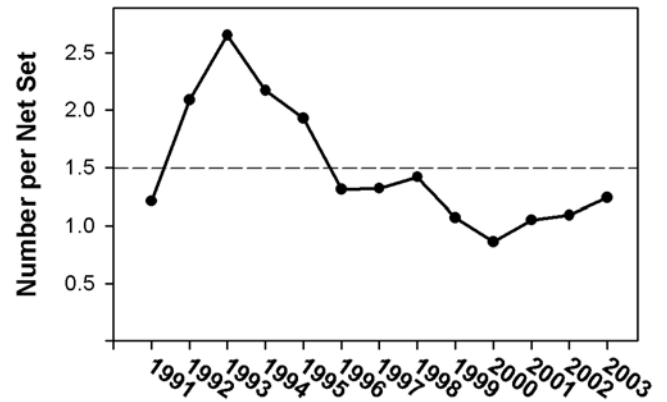


Figure 20. Average number of southern flounder caught in the trammel net survey in South Carolina estuaries by year. Sets made during December through February not included because of the rarity of flounder in our survey during that time. Horizontal dashed line is the average for the period from 1991 through 2003. Source SCDNR survey.

they are diluted because of more water in the estuaries and bays.

The yearly average catch for the 13 year period is about 1.5 southern flounder per trammel net set (Figure 20). For the last seven year the average catches are below the long term value, and recently they are about half of those from 1992 through 1995. From survey catches, the abundance of southern flounder in South Carolina's estuaries has shown a declining trend.

Biologists have determined that North Carolina's southern flounder population is over-harvested, and management measures are needed to reduce over-fishing and maintain the population at healthy levels. This species is very important to commercial fishermen with landings averaging 3.6 million pounds per year and a value of \$6.3 million per year. The North Carolina Division of Marine Fisheries has put a number of regulations on commercial and recreational fishermen to reduce the harvest of the southern flounder in their waters. Examples of these are a 14-inch minimum size limit for both recreational anglers and commercial harvesters, an eight-fish bag limit for anglers as well as closed seasons and gear restrictions for the commercial fishermen in state waters.



# Fishing for Flounder

## Introduction

I know enough about flounder fishing to realize, in fact, how little I actually know. Like many fellow South Carolinian anglers, I catch a few flounder on occasion, most coming as an unexpected bonus while targeting spotted sea trout or red drum. Therefore, when Dr. Charlie Wenner asked me to compose a 'how-to' section focusing on fishing techniques for this flounder publication, I knew I had better turn to the experts for their advice.

To that avail, I have enlisted the help of four successful flounder anglers. Although I think they did an admirable job, keep in mind these men are not professional writers, they are fishermen. Each has their own style of writing as well as their own techniques for fishing. Some tell a good story, some are concise and to the point, some troll and gig, and all are accomplished flounder fishermen.

### **Jay Sims, Georgetown**

Jay's consistent ability to capture flounder along the state's northern coast has been repeatedly proven by the many fish he has contributed to our wrack collection program over the years. He ranks among the top flounder taggers in the Marine Gamefish Tagging Program.

### **Melvin H. Burns, Jr., Florence**

### **Walt Cordina, Mount Pleasant**

Mr. Burns and Mr. Cordina were the top flounder taggers in 1999 for the Department's Marine Gamefish Tagging Program.

### **Dickie Hamilton, Port Royal**

Dickie is the best flounder fisherman that I personally know, and has many years' experience in the Charleston and Beaufort areas.

I was fortunate in finding four talented and successful flounder fishermen to contribute to this publication, and even more fortunate that two fish the northern South Carolina coast and two fish the central and southern coast. I have come to realize over the years that techniques employed to catch flounder differ significantly between the upper coast and the rest of the state.

In the areas around Georgetown and further north along the Grand Strand, mainstream anglers fish on the move. They prefer to present their bait drifting or trolling. While some flounder fishermen from the Charleston area and further south troll or drift, the majority of anglers 'still fish' – fishing either from an anchored boat or on foot. I often wonder why this occurs, and over the years have asked numerous anglers about the regional dichotomy in floundering. Our best guess is that a difference in habitat determines technique. Most flounder caught along the northern coast come from relatively small inlets and creek systems. Drifting or trolling effectively covers this constricted habitat. From Cape Romain south, the South Carolina coastline consists of larger sounds, bays, harbors and rivers. In this region, the greatly increased area of habitat seems to make it more effective to target specific smaller structures that concentrate the flounder. In any case, an angler from either region may benefit by learning both sets of fishing techniques, thereby doubling his or her chances of catching flounder.

Finally, I will include a brief section on fly fishing for flounder. While an expert at neither fly fishing nor flounder fishing, I have managed to catch more than a few flounder on flies. In the least, I hope to offer fundamental advice as well as a starting point for those interested in catching flounder on a fly rod.

## **Jackson Sims, IV**

### **Fishing for Flat Fish**

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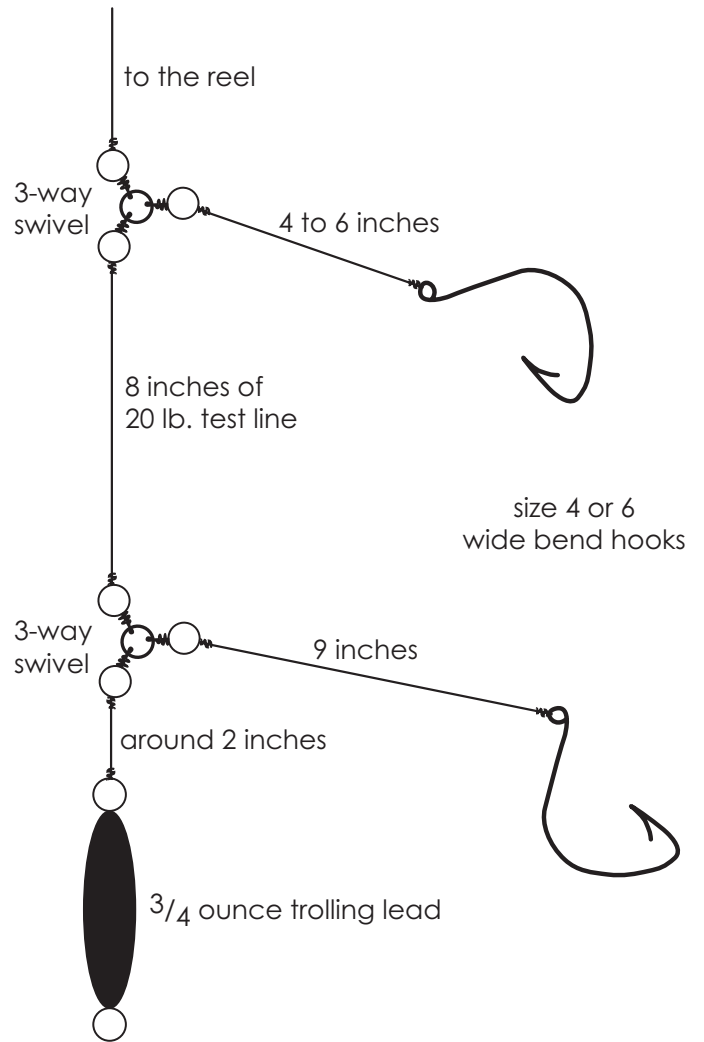
"Oh de flounder he looks so fine, hanging onto my little thin line..."

Flounder fishing in the northern coastal counties begins in the spring around three weeks before Easter or, as the ole timers will tell you, "...when de san nats is a bitin the flounder are in de creek." Smaller inlets, like Pawley's Island and Murrell's Inlet, will attract flounder faster in the spring because water temperature increases more rapidly than in larger estuaries like North Inlet or Winyah Bay. The recurring problem with early spring flounder fishing is the cold water algae that are still in the creek, so be prepared to pull a lot of 'grass' off of your line. As the summer progresses, these algae will die off and will be flushed out of the creeks.



Jay Sims (in the boat)

There are several rigs I use in catching flounder. Most frequently, I use the double hook rig. I construct my own flounder rigs using a medium three-way swivel connected to another swivel with around eight inches of 20 lb. monofilament. I attach my fishing line to one of the other legs on the top swivel. I then attach another piece of mono around 4 to 6 inches long to the other leg, then a number 4 wide bend hook. Although some people use larger hooks, I prefer a size 4 or 6 hook. They catch most flounder that bite, but be sure to use wide bend hooks. These hooks hold the bait better and fit in the flounder's mouth with ease. Also, to prevent it from tangling, the top hook should not be able to reach the lower swivel. To the bottom swivel, tie on a  $\frac{3}{4}$  ounce trolling lead with around two inches of line. On the other leg of the bottom swivel, attach around nine inches of mono and tie on another hook. Unfortunately, these rigs take time to make, and making them ahead of time they often tangle in the tackle box. I find that if you make the rigs, but leave off the hooks, they do not tangle as badly in your box. There are commercial rigs available with corks and spinners, but these tend to attract more bluefish.



### Now for the bait...

I have found that the best baits for flounder fishing are tiger minnows (striped killifish, *Fundulus majalis*). Although I do not know anywhere to buy them, with a  $\frac{3}{8}$  inch cast net and a stretch of sand bar near the inlet, you can catch your own. Look for schools of these minnows where the sand bar meets the grass. Watch for your shadow, the minnows will run from it. The size of the minnow is important. If the minnow is too small, the flounder will not reveal his hiding place on the bottom. Use a minnow around two inches or larger. My Dad always said, "The smallest flounder can eat the biggest minnow." When you catch a small fish, pull his mouth open and see how big it is.

In addition, other effective flounder baits can be caught. (See Figure 10 in previous section). Finger mullet can be collected with a cast net. Mud minnows can be caught with either a cast net or a minnow trap. Almost any fishing tackle store will supply traps. The best tide to

set a minnow trap is when the water is 'out of the grass falling.' Small creeks that have fairly deep holes at low tide are productive locations. If the top of your trap is covered by about 6 to 8 inches of water at dead low tide, then you're OK. If the tide is rising, try maneuvering farther up the creek where the minnows may be found, they seem to move up the creek with the tide. A crushed blue crab is the best bait to use in a minnow trap. I place two per trap and use two traps. Crushing the claws with a paddle, I step on the crab body and pull the back partly off, placing everything in the trap. I fish the traps for about fifteen to thirty minutes depending on the amount of minnows in the creek. I have had a full trap in five minutes. Leaving traps out too long will allow the mud minnows to eat the crab and escape.

The bait minnows can be kept alive in a minnow bucket. The best buckets permit water flow. The yellow variety is popular. Make sure that the bucket's door does not open when facing downward while trolling, and that the door closes after each minnow is removed. Do not overfill the bucket; about three dozen is the max. If you place too many in the bucket, they have trouble breathing.

Many flounder fishermen tie a stringer onto the line holding their bait bucket. The stringer should be long enough for the caught flounder to remain in water and strong enough so that it will not be cut in the fish's mouths. A piece of yellow polypropylene with a piece of copper tubing smashed and bent with a hook shape works well. Insert the poly line into the tubing and crimp the tubing about a quarter of an inch from where it joins the line, then bend the tubing and smash the other end flat so it will be easier to insert in the flounder's gills. Then tie the trailing line on your minnow bucket. Now you're starting to look like a real pro!

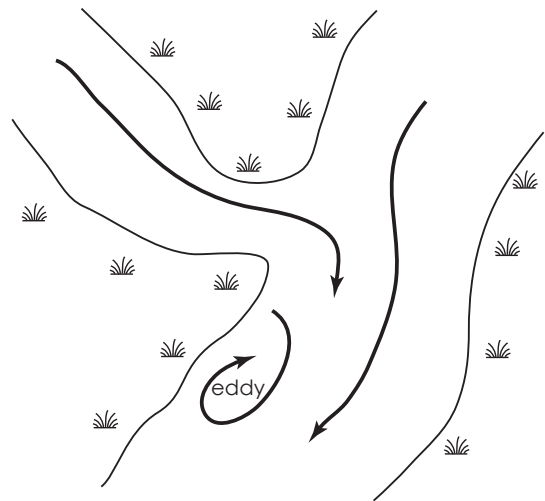
Another fine bait to use for flounder is made from the white side of a flounder already caught. Filet a piece around two inches long, and cut it into a diamond shape. Insert the hook through one of the pointed ends.

Now that you have your bait and rig, it's off to the fishing hole!

I find the most successful methods of flounder fishing are trolling and drift fishing. The best results often occur trolling against the tide, because the tide helps to slow your speed across the bottom. While trolling, make sure you can 'feel the bottom' (that is, you should be able to feel the

lead bumping across the bottom). While you are fishing, imagine you are on the lead going along, and after a while you will be able to tell if you are in oyster shell, small sand ripples, or mud. Concentrate on the bottom you are covering. Notice also the action of your minnow. When you first hook and drop the minnow it will be active, but as you begin trolling it will calm down. If the minnow becomes highly active again, it may be trying to dodge a fish or a crab, so be ready.

The best time to catch flounder, I find, is when the water is out of the grass, either rising or falling. You can catch flounder at full high tide, however, when the water is out of the grass the fish are concentrated in the creeks. If the water is out of the grass, then so are the flounder. Watch for eddies around points and sandbars that are out of the current, these areas hold bait as well as fish. Look for places where the tide flows backward. And with that, I suggest to look for places where the tide is screaming



by, like points or the intersection of creeks. In many of these areas there will be a place where the current reverses itself into an eddy and that is where the big boys will be hanging out. Try fishing on the lee side of oyster rocks and marsh islands – these areas will also hold fish.

When you get tired of trolling, cut off the motor and drift fish. This works well when the wind is not blowing too hard. Get comfortable in your seat, stick your pole over the side, grab a cool soda, and relax.

You are sitting in your boat relaxing, trying to determine what type of bottom you are going over, when your minnow suddenly becomes active. A fast 'bump', kind of out of the bottom

pattern, lets you know it is time to let your reel freespool. Some people count to ten, some longer, just depending on how the flounder are biting that day. If you miss the fish, count longer next time. Let the line tighten and set the hook. Sometimes you will not even feel the bite and the fish will feel like dead weight on the line getting pulled along. I still give them time to eat the bait. If you get a bite and it starts running with the line, set the hook immediately, because it is probably a trout, spottail, or bluefish. Some flounder fight best when they see the boat. Make sure your drag is not set too tight or they will pull the hook at the boat. One of the most important items you should have in your boat is a net. I use one twice the size of a basketball with about a four-foot handle. When you start fishing, make sure your net is not tangled with everything else in the boat. Fight the fish until you are able to place the net behind him in the water, trying not to let the fish see the net. Let the fish fall backwards into the net, then lift quickly. Watch out for the second hook when unhooking your fish. And remember your size limits.

## **Flounder Gigging**

“Two eyes looking up at two eyes looking down, the ones looking up hope they aren’t going to be found.”

Flounder gigging, graining, striking, or just plain stabbing flounder begins in the spring of the year. You hear stories of people gigging when the flounder first arrive in the creek, but the fish they capture are usually thin. I wait until the bait begins to show up in the creeks so the fish can thicken up.

Other than location, the weather is the most important factor when gigging. Ideally, the wind should be less than ten knots. A strong wind causes ripples on the surface, making it difficult to see the bottom. Wind also makes it hard to pole the boat.

I begin the flounder gigging season by walking with a lantern, a stringer, and a gig. As the fall approaches, it becomes too cool to comfortably wade wet. Then, my vehicle of choice is a small aluminum johnboat, around 14-16 feet, with a 15 horsepower motor. Choose a rig that does not draw much water, allowing you to get close to the bank. I use two 12 volt deep-cycle marine batteries for illumination, one for each of two lights. I purchase underwater lights with a glass bulb, found at most marine tackle stores.

The bulbs should be made for a 12-voltage direct current, and should be 75 or 100 watts. Always carry a spare bulb. Attach one light to the side of the boat ahead of where the first striker will stand. Place the other light ahead of the aft striker. Both lights should be on the same side of the boat letting you pole along with the tide. Strikers usually stand on the seats to lessen the glare. If the person in back has too much light shining in their eyes, simply adjust the front light.

For poles I use wooden dowels around 1 inch thick and 12-foot-long. Poles should be at least 10 feet long, but make sure they fit in your boat. Keep in mind you will have to pole for several hours, so the lighter the poles the better. Some people choose pre-made light-weight bamboo poles. I use a 5 prong gig head of medium strength. You do not want a frog gig, rather a gig that will hold a 5 lb. fish flapping in mud.

Once your gear has been assembled, keep an eye on the weather. If it rains during low tide the preceding day, the water will most likely be muddy. Heavy flooding tends to stain the water red in color. A good high-pressure system is best and once the “H” in “high pressure” is on you, the wind should be calm.

Ideally, look for a low tide around midnight. The fish will have time to settle in after dark and calm down. Hit the landing around 9:30 with two cans of bug repellent and some “Skin So Soft.” Run to the area you would like to start gigging, going slowly for the last couple of hundred yards so that your wake will not disturb the bottom. Then ground the boat and attach the lights. The person in front of the boat maintains the distance from the bank, while the person in back controls the speed. If the boat is going to stop abruptly, the person in the front should let the person in back know. Sudden stops can send people flying. Proceed at an angle where the person up front is in deeper water, as deep as they can see. The person in back will need to see to the top of the water line on the bank, or as close as possible without hitting the bottom. The shadow of the boat should never go over the flounder before you do.

When the tide is falling, the fish move down the bank with the tide. Look high for “prints” in the sand or mud where a flounder has been lying. They will look like a flounder. If you see one, stop and look deeper. Try to see which way he went. You can track flounder like this as long as

they don't go into water deeper than you can see. Sometimes, though, prints are left from an earlier tide. Once a flounder moves down with the tide, it will usually face toward deeper water, but I have seen them with their back out of water. Sometimes, when the flounder are lying in sand or mud, you will see only a hump on the bottom with two eyes. On oyster shells, you will see a flounder that is brilliantly camouflaged with spots of dark brown and white. If I see what I think is a fish, I will stick it as long as it is large enough.

When the tide begins to rise, the fish come from deeper water and head towards the bank. They keep rising with the tide until the water makes it into the grass. Once the tide begins flooding, most of the fish will be facing upwards or sideways, allowing them to see their prey much more easily.

When you gig your fish, try to stick it across the head. With this positioning, the flounder will have a difficult time getting off of the gig and you will not damage too much of the meat. Take a second to size up your fish to make sure it is legal (minimum total length of 12 inches), and if in doubt let it go. Some people choose not to gig a fish under 14 inches. When you find a fish, look around for another one. I have seen as many as four fish in my lights at once. To get your fish into the boat, make sure the prongs of the gig are through the fish, press and lift at the same time. Never pull back on the fish. With fish larger than 3 lbs., many fishermen will jump out of the boat (with tennis shoes or rubber boots on – beware of pluff mud or sharp oysters) and place their hand under the fish, trapping it on the gig head.

Flounder gigging is a great way to show youngsters the animals of the creek. Put them in the middle of the boat with a crab net so they can get their "aquarium" going.

Always keep safety and courtesy in mind. Beware of other boaters running with their lights off. This is a great hazard during the summer months. Be courteous to other strikers: watch your wake, because it will muddy up the bank and spoil things for them.

**Good fishing!**

## Melvin Burns

Residing in Florence, South Carolina, almost all of my flounder fishing is done in the Little River and Cherry Grove areas of the state. After many successful flounder fishing trips, locals dubbed me the 'The Creek Doctor', because they said that I have the right medicine to catch flounder. The expertise I provide is based on over twenty years of experience and should help you catch more flounder *most* of the time.

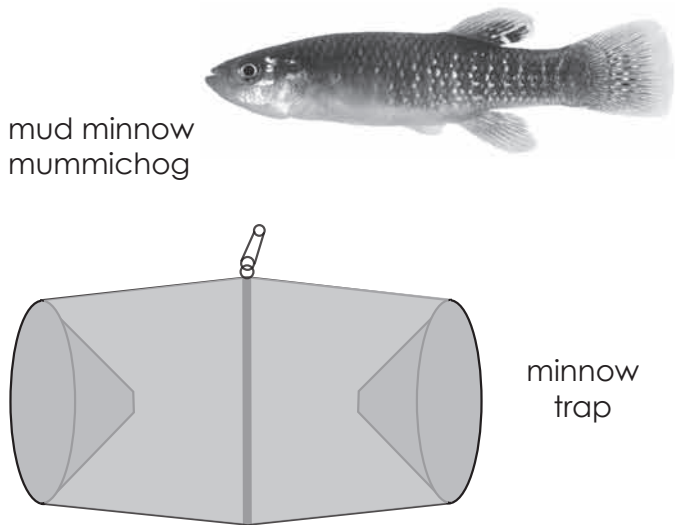
I have divided components of flounder fishing into three parts: bait, tackle and equipment, and fishing techniques.



Melvin Burns

## Bait

I believe one of the most important aspects of flounder fishing is deciding the type of bait to use. The most popular and easiest to obtain are known as 'mud minnows'. Mud minnows are easily caught in minnow traps baited with cracked crab, dry dog food, or even donuts. They are also available at most salt water bait and tackle shops. These minnows are very hardy and require very little care other than fresh salt water to keep them alive, and will even live in fresh water for days.



Based on the stomach contents of hundreds of flounder, I find that the best bait is what I call 'white bait'. This type of bait, mostly white to silver in color, includes mullet, croaker, spot, menhaden, and other species. (See Figure 10 in previous section). I catch my bait using a casting net, making a great effort to keep them alive by not crowding the bait buckets and maintaining their clean salt water. I will regularly use four or more buckets per trip to keep the bait fresh and lively. An interior live well with running salt water also works well.

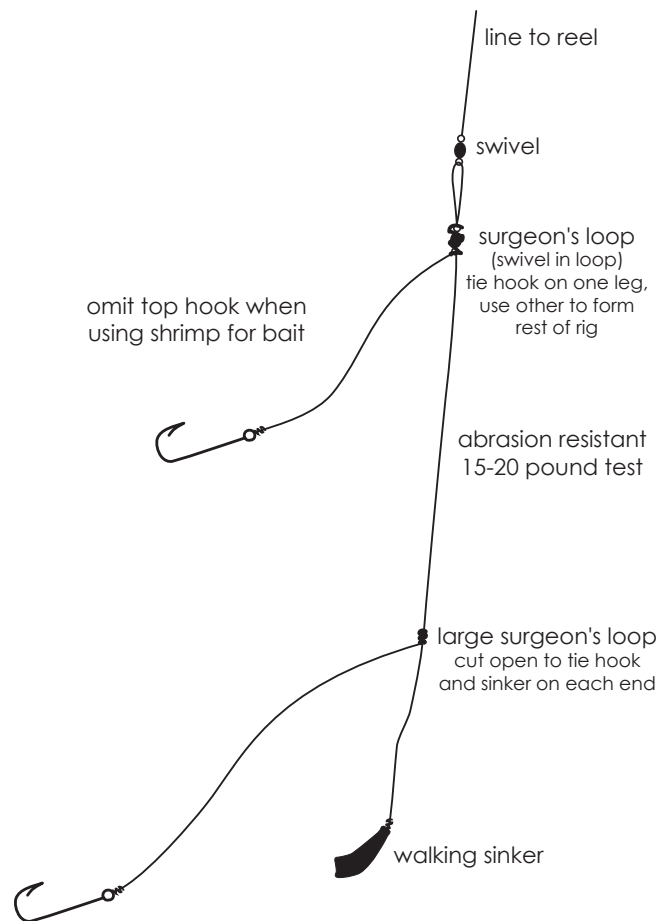
Shrimp, another excellent bait for flounder, notably when they fill the creeks, are the preferred bait for a variety of species of fish. Many shrimp are required and I fish them differently than minnows, as I will be explaining later.

### Tackle and equipment

My favorite flounder fishing tackle consists of a 6-7 foot medium-action spinning rod, and an open-faced spinning reel with a good drag system spooled with a 12 lb. test monofilament line. Bait casting reels work well, but I believe spinning reels offer an important advantage that I will later discuss.

My favorite minnow rig for flounder consists of two hooks, a 1/2 to 1-ounce 'walking sinker' and a two-way swivel. I use the toughest 15 to 20 pound test monofilament to tie the rig. (See figure) I also use the same rig for shrimp, with the exception of using only *one* hook.

Although any type of boat can be used with flounder fishing, I prefer a 14-16 foot aluminum boat with a solid idling 10-25 horsepower motor. A boat with these features maneuvers efficiently,



and up to four people can fish while drifting (to be explained next) without becoming tangled.

Never attempt to lift or drag the flounder into the boat, always carry a long-handled net when you fish.

### Fishing techniques

The most successful method of flounder fishing, I find, is to drift the double minnow rig with the tide. Keep the boat perpendicular to the bank while drifting, allowing everyone to fish from the same side of the boat. Use the motor only to keep the boat in this position while drifting, idling most of the time. Allow the baited rig to drift 20-25 yards from the boat with the bail open and the line held with the index finger. This provides direct contact with the line and allows you to better feel the strike. Once the strike is felt, release the line for 5-10 seconds to allow the flounder to swallow the bait. Then close the bail, and when the drifting boat takes the slack out of the line, set the hook, *hard*.

One of the most difficult things for beginning flounder fishermen to learn is to detect the strike of the flounder. It can vary from light to heavy

but almost without exception consists of *one* distinct “thump,” followed by a sensation that you may have picked up a crab or some type of trash on your line, giving it a “heavy” feel. This is the moment to release the line.

I find that the best fishing occurs during the two-hour period before and after the change of the tide, with the falling tide being the best most of the time. During the middle of the tide, the current typically moves the boat too fast to present the bait effectively. The quarter moon phases usually result in slower moving tides, allowing for better bait presentation. According to many previous years’ records, the best month for catching large numbers of flounder is May.

When using shrimp for bait, I use the single hook rig with a heavier weight, and fish the rig straight down beside the boat, alternately raising and lowering the rod to “bounce” the weight off the bottom. Maintain contact with the weight of the rig going up or down, so that the strike can be felt. This method is used only during the periods of slack or slow moving water. A lot of shrimp are required because *every* fish loves shrimp. I have used this method to catch many flounder when the creeks are full of shrimp and the flounder seem to stop biting minnows.

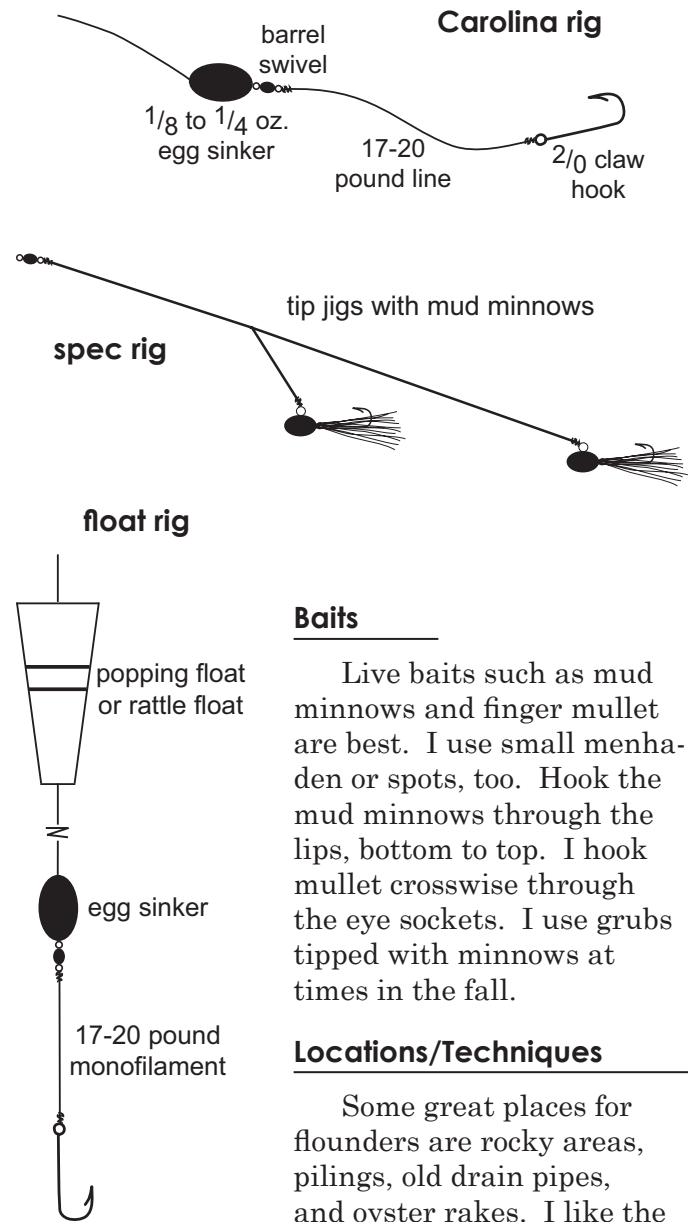
Generally, the best flounder fishing occurs in the deeper areas, and on the bars, ridges and flats around these deeper areas. I will drift the same area over and over until the action slows, then move on down to the next good location.

## Walt Cordina

I fish for flounder in mostly the Charleston Harbor and the Wando and Cooper Rivers. I enjoy flounder fishing as well as tagging them.

### Rigs

I use a simple rig that probably most anglers are familiar with, similar to a ‘Carolina rig.’ A 2/0 Eagle Claw hook is attached to one end of a length of 17-20 pound line measuring about 10 to 12 inches, with a #7 black swivel on the other end. I use a ¼ to 1/8 ounce egg sinker on the mainline. I also use the “spec rig,” consisting of two jigs, when fishing in the inlets. Finally, at times I use a float rig to keep a bait just off of the bottom.



### Baits

Live baits such as mud minnows and finger mullet are best. I use small menhaden or spots, too. Hook the mud minnows through the lips, bottom to top. I hook mullet crosswise through the eye sockets. I use grubs tipped with minnows at times in the fall.

### Locations/Techniques

Some great places for flounders are rocky areas, pilings, old drain pipes, and oyster rakes. I like the tide moving well, either incoming or outgoing, and I look for signs of bait around structure. I fish live bait very slowly on the bottom, working the whole area well. When the baits stops suddenly or I feel the bite, I drop slack and wait about 10 seconds before setting the hook hard. Sometimes I have a rock or oyster, but by setting the hook hard, the fish gets hooked well in the bony jaw. Sometimes I let the bait float over the bottom with a popping float. When the float goes under slowly, it usually means flounder. The spec rig is good in the inlets. Tip the jigs with a minnow and let the incoming tide move you along. I use grubs in the fall casting or trolling around oysters. I also jig the grub around pilings to get some nice flounder.

## Dickie Hamilton

The largest flounder I ever weighed-in was 9.5 lbs. I used to be able to catch a pretty good number of flounder between 6-8 pounds but even back in the 80's one over 8 pounds was a rarity for me. The second largest flounder I have ever seen on my line was probably 15-16 lbs. I was fishing with another MRD employee who is now deceased. Again, this was back in the early to mid 80's. We were fishing out of his boat in his spot. We had fished this spot together many times, often doing quite well. Usually we would take my boat as I lived just down the road from the landing, but for some reason we took his that day. Well, whenever I fish out of my boat I tilt the motor out of the water. When he did not tilt the motor up, I did mention twice that he should. Well, he did not and it just did not seem like I should be telling him how to fish his spot out of his boat. I remember we were doing pretty well with them that day. I dropped my rig down around these pilings twice and had a large fish immediately cut me off. Thinking I may need some heavier tackle I grabbed my other outfit. This was a heavy-duty 6 ft. rod. On the rod was my large diameter spool surf-fishing reel loaded with 25 lb. test line. I quickly put on another large finger mullet. Again, as soon as my bait hit the bottom a fish grabbed it and headed toward the pilings. Sometimes you can "horse" a large flounder straight up off the bottom and quickly net it before it gets the upper hand. That is what I tried to do. After a brief but heated battle I managed to winch it to the surface. There was water flying everywhere and in the chaos the second error was made. Never attempt to net any large fish from the rear. I had netted a 30 lb. spottail with this same net so it was a large landing net. As long as I may ever live I will never forget the sight of what happened next. When the tip of that flounder's tail touched the bottom of that net there was still probably half a foot of it's head sticking out beyond the hoop of the net and it literally went ballistic. It launched itself about a foot and a half into the air for a distance of about 10 ft. It came down a few feet behind the boat where it immediately swerved just enough to cut my line on the motor. My fishing buddy had personally netted a flounder over 13 lbs. and said this one was much bigger.

The largest flounder I have ever seen on my line would have likely topped the SC record of 17 lbs. I got a good look at it three times while

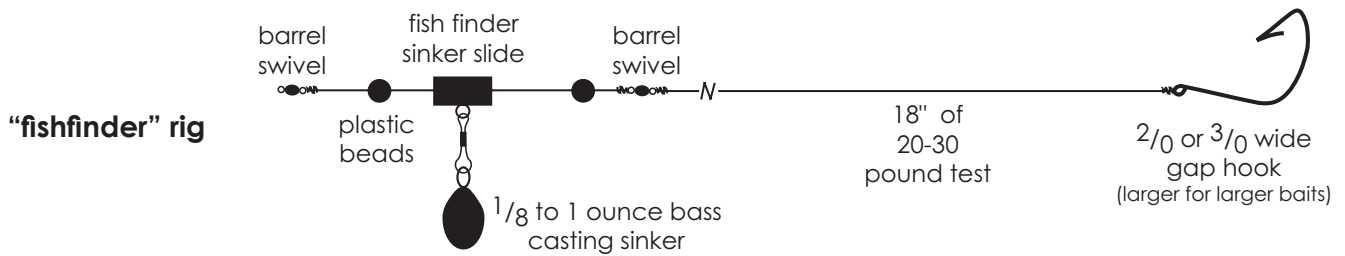


*Dickie Hamilton*

fighting it. I know a flounder this size is hard to imagine but I guessed its weight to be around 20 lbs. I was fishing an ocean inlet just after I moved down to Beaufort in 1988. I remember there was not anything unusual about the strike. I allowed what I thought was plenty of time before setting the hook. As soon as I set the hook I knew this was one of the largest flounder I had ever hooked. The area I was fishing was a series of depressions with mud cliffs and no real snags to speak of. I had no control over this fish but since the area was free of snags I was able to follow it up and down the bank for over 15 minutes. I know I had the fish on that long because I checked my watch after realizing this was possibly the biggest flounder of my life. The fish came to the surface, shaking its head, three times. The third time the hook was thrown free. This flounder was really one of those you occasionally hear described as being as big as the hood of a Volkswagen.

I have sketched out two types of flounder rigs I use depending on type of bottom. On the "fishfinder" rig, I sometimes use a small spinner by the hook or a small red float. I use the least amount of weight I can get by with to maintain contact with the bottom. I like the fishfinder [sinker slide and snap] because I can switch sinker size easily. The other flounder rig is for areas



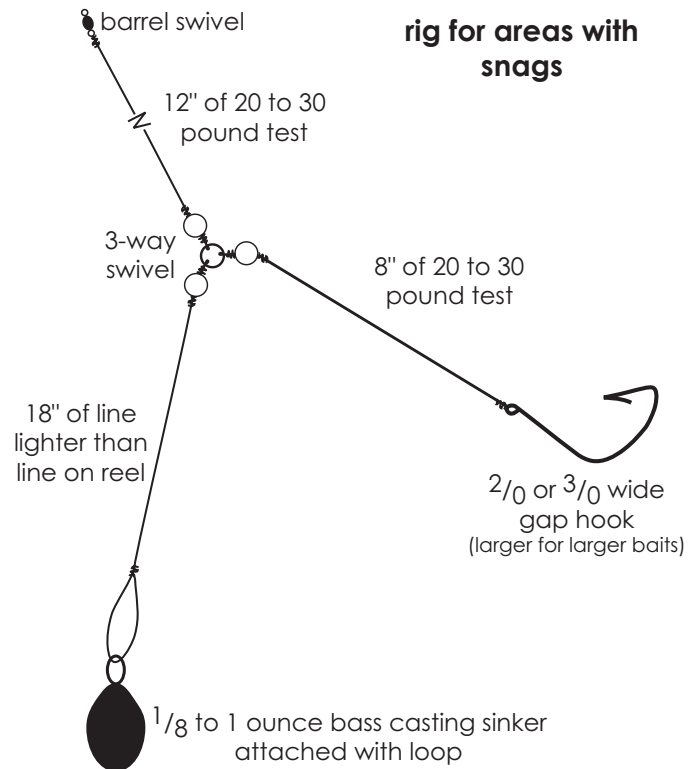


with a bottom with more snags. It is best fished more straight up and down from a boat.

The technique I most prefer when flounder fishing is to locate productive areas that can be fished from shore with light spinning tackle. I just personally enjoy bank and wade fishing more than sitting in my 13 foot Whaler all day. I do sometimes fish out of the boat to more quickly locate fish in new areas. Sometimes I will fish out of a boat if I am out for just a few hours or want to fish a spot I know to be good for a brief period during a tidal cycle and a boat is the only way.

I like to use a 6.5 foot graphite spinning rod and a good quality high-speed retrieve reel. For line I prefer to use 10 lb. Fire Line. I match that with one of the rigs I sketched out. Last, but not least, I do strongly recommend one of those "expensive" hooks. I like the Owner 2/0 wide-gap. This outfit and rig gives me, I feel, a little more advantage in successfully hooking flounder. Flounder usually grab their prey and lie on the bottom for some period of time before trying to swallow it. I use a graphite rod because graphite is more sensitive than fiberglass. I use a 6.5 foot rod and a high-speed retrieve reel to take up line more quickly while attempting to set the hook. I use 10 lb. Fire Line because of its no stretch and small diameter characteristics. I know I catch more fish, especially flounder that are usually just lying still on the bottom when I attempt to set the hook, using super sharp state-of-the-art hooks.

When flounder fishing with live bait I work my bait similar to how I would work a plastic worm if largemouth bass fishing. First, I cast my rig out slightly upstream and just let it sit for a moment. If nothing picks it up I begin a slow retrieve. I retrieve my bait by raising my rod to the 12 o'clock position and then reeling down to the 10 o'clock position. I repeat this until my bait is all the way back in. In this way I can maintain contact with the bottom and my rig at all times. I never use more weight than is necessary to maintain contact with the bottom.



When a flounder takes a bait, the strike can range from obvious to a nearly imperceptible tap to just resistance at the end of the line. Anytime I suspect a flounder bite, even if I only feel resistance and no real bump, I allow enough time for a flounder to swallow my bait before attempting to set the hook. I generally allow 30-60 seconds.

I do most of my flounder fishing May-September. The bait I use varies with the season. Early in the season I use mud minnows. By mid-July the young-of-the-year mullet are 2-3 inches in length. Once the mullet reach this size the flounder usually seem to prefer them to other baits. My favorite bait mid-July through September would have to be a 3-4 inch mullet. When after larger fish a 5-6 inch mullet makes better bait.

Generally I prefer live bait to artificial lures when after flounder. Artificial lures, that I have used with the most success include swimming grubs and beetle-spin type lures. My most

productive colors are clear with silver metal-flake early in the season and clear with silver metal-flake and a black back later in the season. Early in the season one of the more prominent prey species are silversides. The clear with silver metal-flake does a good job of imitating the silversides. I have found the same lure with a black back to be a better choice when finger mullet become more numerous. I sometimes use this same swimming grub in conjunction with a beetle-spin type spinner. This allows me to retrieve the lure a little slower without hanging up on the bottom while at the same time providing more flash and vibration. The addition of a very small piece of shrimp or other natural bait seems to enhance the effectiveness of artificial lures for flounder.

Flounder like structure. The most productive flounder fishing areas usually have some kind of structure. Good flounder structure can be something as obvious as pilings, rocks or trees falling into the water. Good flounder structure can also be something as subtle as the tip of an oyster bed, a point of marsh grass or even just a shallow depression in the bottom. Some of my most productive areas over the years have been depressions in the bottom that also had associated with them some more obvious structural features. Depressions and drop-offs allow flounder to get below potential prey. With eyes on top of their head, proportionally large mouth and teeth, and the ability to change the patterns on their dorsal surface to match the surrounding bottom features, flounder seem to be near perfectly adapted ambush predators. When feeding very actively flounder will move around after forage but generally seem to prefer to lie in wait, facing into the current, using structure and current to concentrate and deliver prey to them.

Whenever I catch a flounder, I fish that area thoroughly. Even if I fail to catch another I try to remember to fish that spot a little earlier in the tide another day in case I may have just missed them. Flounder seem to like the company of other flounder. If you catch one often you can catch others close by. I am not sure if they move around together in schools or just end up congregating together in certain areas. I do know from watching them in tanks and fishing for them that they form schools, or as I call them, pods.

One three-day stretch of flounder fishing stands out most in my memory. It was back in the early to mid 80's when I was still living in

Charleston. Day 1 = 33 flounder. Day 2 = 32 flounder. Day 3 = 28 flounder. What stands out most in my memory was the size of the fish and the fact that every one of these fish was caught out of a depression that was only about 15 by 20 feet. Each day I fished for only about 3 hours. All these flounder weighted 2 to 6 lbs., with the average probably around 3.5 to 4 lbs. I just kept casting into the exact same spot. Those flounder had to have been stacked on top of each other just like I have seen them do in aquaculture tanks.

I guess my most entertaining story, especially for my dad who was with me at the time, occurred around 1990 at the same inlet where I lost that 20 lb. flounder. We were standing on a steep sandy bank and casting toward some mud cliffs. I hooked a real good fish of about 7 lbs. I thought I had played the fish out so I began to slide it up the wet bank. As soon as I let up the tension from my rod the fish began flopping around and shaking its head, throwing the hook. At the time I was probably six feet above the fish standing on the crest of a steep sandbar. After throwing the hook, my flounder just laid there facing me. I knew I had only one chance. I remember beginning to stumble between my first and second step as I tried to run down the steep bank. After two head over heels rolls I ended up face down in the sand. When I looked up my face was about a foot from the flounder's face. In an instant, as I tried to claw my way toward my flounder, it executed a perfect back flip landing in the water. After a few moments I realized it must have been quite a spectacle because my dad was having a pretty good laugh. He asked me what exactly I had planned on doing to subdue the fish. After thinking about that flounder's face full of teeth and seeing all my claw marks in the sand I realized maybe it was better it worked out the way it did.

## John Archambault

### Catching flounder with flies

A fly rod may appear to be a mysterious wand. Is fly fishing magic? No. Is it an art form? Well, maybe. But mostly, fly rods and reels are simply more tools to present a lure to a fish. The biggest difference between conventional tackle, like spinning and casting gear, and fly tackle is that with conventional gear the lure is cast and it drags the light line behind it, while with fly gear the heavy line is cast and carries the lighter fly along. A fly fishing outfit consists of the rod, reel, backing, fly line, leader and fly. Because fly lines are only 90 to 100 feet long, an extra length of line (usually braided Dacron) is attached behind the fly line. This is called the backing. The leader connects the fly to the thick bulky fly line.

Fly tackle for flounder does not need to be fancy, but does need to be strong enough to do the job. Fly tackle (rods, reels and lines) is rated according to its 'weight', which is simply a system for consistently rating how heavy the fly line is. Fly tackle goes all of the way from 2 weight outfits suitable for small stream trout or panfish up to 14 weight sticks used offshore for tuna and billfish. With the exception of the specialized offshore fly tackle, the size of the flies and conditions encountered usually determine how heavy the outfit should be. Basically, a heavier line is needed to carry larger flies or to overcome stiff winds. A good compromise for flounder might be a 7-weight outfit. Such an outfit would also be effective for spotted seatrout and red drum (although for the larger reds some anglers might want to go up to a slightly heavier outfit).

Fly rod length and action are largely a matter of personal preference. The tendency today is set by many companies mass producing fast taper rods in the 8 ½ to 9 foot lengths. Longer rods provide more leverage in casting and handling line. Shorter rods can be less awkward for beginners, more manageable in close quarters, and offer better control when fighting fish. The standard 8 ½ foot rod is a fair compromise. Fast taper rods, which bend mostly near the tip, are better casting tools, allowing the angler to push a large bulky fly into the wind. Slower taper rods, which bend down into the butt, are more traditional and may be more forgiving of a less-than-perfect casting technique. Most fly rods designed for saltwater have fast to moderately fast action.



*John Archambault*

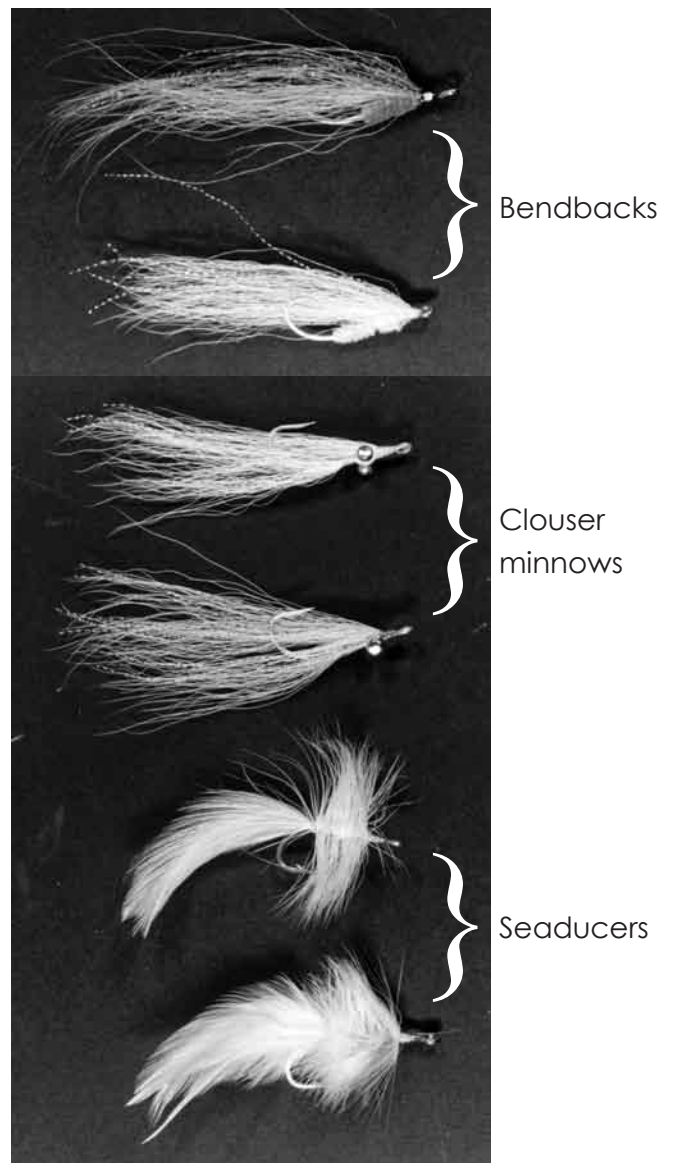
Regardless of length and action, fly rods should be made of good quality graphite. Unless you are a wealthy traditionalist, bamboo is not an option. A few fiberglass rods are still available, but these are significantly heavier than good graphite rods and tend to have much slower actions. Fishing for flounder with a fly rod is not a stalking and sight casting operation. Many casts need to be made simply prospecting – looking for the fish. At the end of the day, you will be happy to have the lightest and cleanest casting rod you can afford.

Reels for flounder fishing can be very basic. A fly reel does not function in casting. It is, as some people say, merely a place to store the line. Retrieving the fly is done by pulling in the line by hand and letting the loose coils fall. The reel is used when fighting big strong fish, but will seldom come into play with flounder. Many companies make inexpensive basic fly reels, including the major retailers such as Bass Pro Shops and Cabella's. For flounder, just keep in mind a few rules: the reel must be balanced to the weight of the outfit (must be capable of holding the appropriate fly line and a bit of backing) and must be corrosion resistant. If the outfit is to be

used only for flounder, and perhaps an occasional seatrout, a drag is not even necessary. If however, you intend to also fish for red drum or other larger, faster fish, then you will want to invest in a reel with a decent drag and the capacity for a bit more backing, up to about 150 yards.

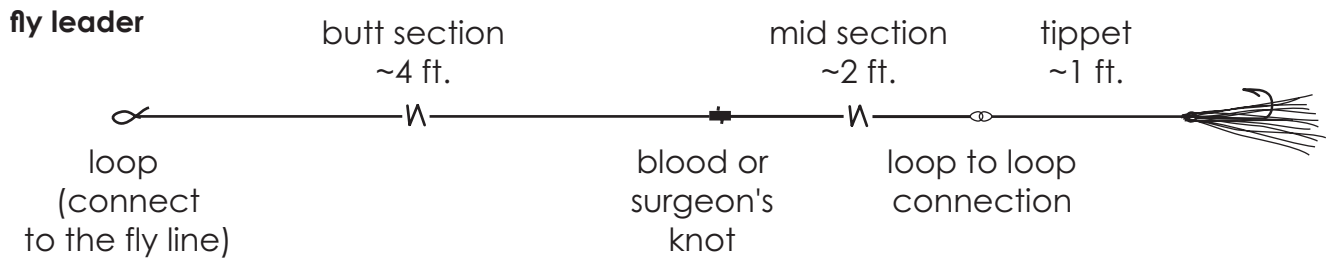
In addition to different weights, fly lines come in different tapers and floating and sinking models. For fishing in saltwater, where conditions are often windy and flies can be quite large, a 'weight forward' line is the norm. 'Weight forward' simply means that the thickest and heaviest portion of the fly line is nearer the front (nearer the fly). Floating fly lines are easier to manage than sinking lines, because they stay on top of the water where they can be seen and more easily picked up and moved. Sinking fly lines, of course, allow an angler to reach fish deeper in the water. Sinking-tip lines are also available in which the first few feet sink while the rest of the line stays on the surface. While flounder will sometimes chase a meal well up in the water column, catching them consistently requires presenting bait within inches of the bottom. With a weighted fly and a long enough leader, an angler can easily fish down to about six feet deep in quiet water with a floating fly line. Fishing deeper or presenting unweighted flies will usually require a sinking or sink-tip line. The weighted fly/floating line combination offers the advantage that the line rides above potential hang-ups. If anything snags, it will be the relatively less expensive fly, not the line.

And speaking of flies, what shall we tie on the end of the line to catch a flounder? As Dr. Wenner pointed out in the first section of the publication, flounders eat a variety of fish and shrimp. Therefore, flies can be quite varied. The most important consideration is getting the fly in front of the fish. (Presentation often outweighs fly or lure selection.) Weighted flies such as 'clouser deep minnows' (tied with lead eyes) and 'coneheads' (named for the inclusion of a lead cone) are good choices when tied on hooks in sizes from 2 to 2/0 or maybe even a bit larger. Because flounder are often found around oyster bars, rock piles, pilings and other structure - remember we want the fly very near the bottom - it is a good idea to consider snag resistant flies. Some flies, such as those that are tied so that the hook point rides facing up (inverted) like 'clouser deep minnows' and 'bendbacks', are naturally somewhat snag resistant. For others or for an

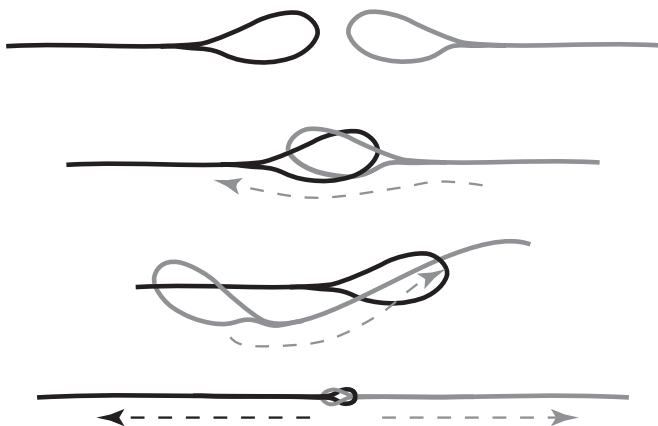


extra measure of snag resistance, monofilament weed guards can be built into almost any fly. Standard baitfish and shrimp color combinations work well. Try combinations of white or yellow with a bit of blue or green, or maybe a bright pink or orange.

The fly will need to be attached to the line via a leader. Tapered leaders can be bought, or it's fairly simple to tie your own. Tapering the leader from heavy monofilament near the fly line to lighter mono near the fly does a couple of things. First, it puts lighter line, which is harder to see and maximizes the fly's action, nearer to the fly. Second, it helps to transfer the energy of the fly line smoothly to the fly when casting. Most simply, if the fly line ended abruptly in a light, limp line, the cast would tend to collapse and not unroll smoothly. For a 7 weight line, consider starting with 4 feet of 40 pound test monofilament

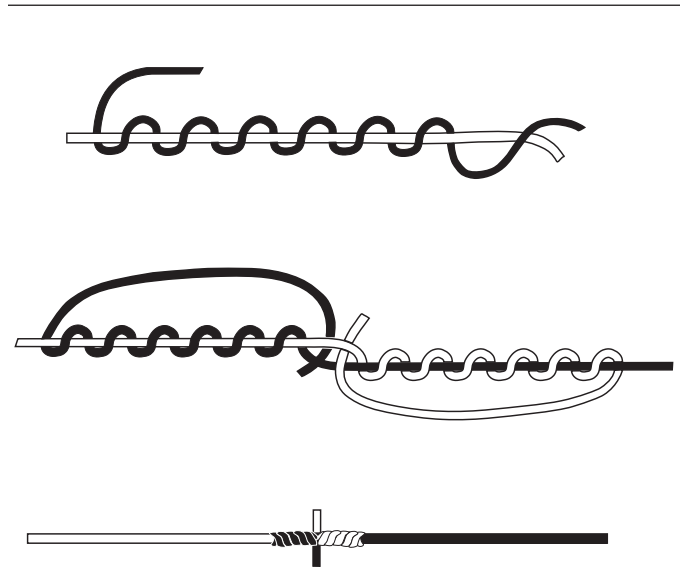


line nearest the fly line (the leader butt), followed by 2 feet of 20 pound line, and ending in a tippet (the part of the leader attaching to the fly) of 1-2 feet of 10 pound line. I attach the leader to the fly line and the tippet to the midsection with loop to loop connections. The connections allow you to replace the tippet or the leader with a minimum of new knots. The butt and midsection are joined together with a Surgeon's Knot or a Blood Knot. To make a longer leader, simply lengthen each segment slightly.



### loop to loop connection

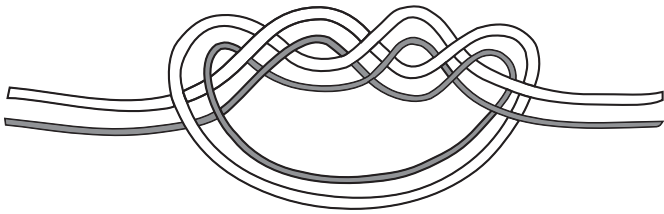
We have a crisp 8 ½ foot graphite rod balanced with a good corrosion resistant reel filled with a 7 weight, weight- forward floating line, an 8 foot leader tapered down to a 10 pound test tippet, and 1/0 yellow and white clouser minnow tied on the end. Now we need a place to fish, so let's consider. Fly-casting takes a bit of effort, so we want to fish where the flounder are most likely to be concentrated. We do not really want to have to search through a 50-acre sand flat. Where will the flounder concentrate? They are the ultimate ambush predators and are perfectly designed to lie on the bottom and wait for lunch to pass by their noses. Their eyes are on one side of their head just so that they can lie flat on the bottom. Their top sides are perfectly camou-



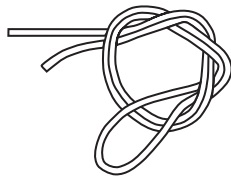
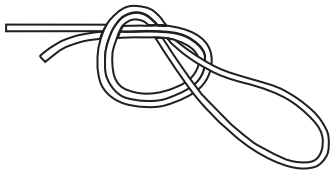
### blood knot

flaged and can even change color and pattern to match the background. They have a large mouth lined with big sharp teeth. They will lie in wait anyplace that baitfish or shrimp are likely to congregate or pass by. Creek mouths are perfect locations. As the tide ebbs and floods, the small creatures are forced to go past. Rock piles, groins, and oyster bars are also prime areas, especially if they are connected to a shoreline. Small fish and shrimp like to hide near such structure, and when they are traveling up or down the shore, they are forced to go around the obstruction. Expect the flounder to be lying on the bottom very near the rocks or shells.

Make your casts so that your fly will pass across the bottom near the structure. Repeated casts will often be necessary. Flounder rarely chase a lure very far, therefore, you will have to pass the fly right by their nose. Even when the fly does come close, the flounder may not strike. Sometimes a very jerky retrieve will cause the flounder to eat. Maybe the fly looks like it is getting away, triggering the predator to pounce. At the strike, you will feel a single light bump followed by a bit of extra weight. Often the 'bump'



**surgeon's knot**

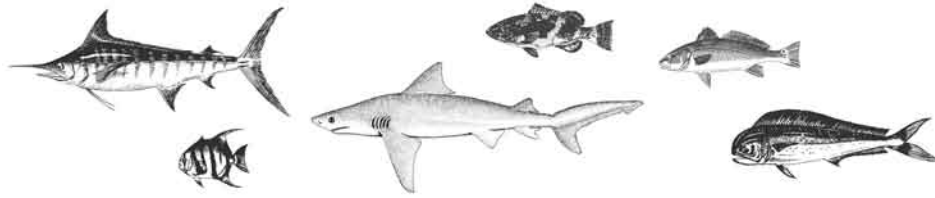


**surgeon's loop**

is missing and you will simply begin to feel as though you are dragging a bit of shell or weed. That's your flounder! Go ahead and set the hook. Sometimes you will set the hook on a shell or other snag, but if you only strike when you are absolutely certain a fish is on the fly, then you will miss most of the flounder. The pause before striking that is often recommended when fishing for flounder with bait does not really apply when using lures. At most, you may want to wait just a second.

Learning to recognize the subtle sign that a flounder is on your line is possibly the most important step to becoming a successful flounder fishermen. Often when two people fish for flounder side by side, one will catch many more fish than the other. Is that person getting more bites? Usually not. Usually the more successful angler is just better at recognizing when they have a fish on the line.





## SALTWATER RECREATIONAL FISHING CONSERVATION AND ETHICS

This publication was made possible in part with funds from the South Carolina Saltwater Recreational Fishing License Program, which was created in 1992 to manage and conserve the fishery resources of the state. Resident and non-resident anglers who purchase an annual saltwater recreational fishing license support activities such as the stocking of important species of fish like red drum in the wild, the restoration of the state's shellfish resources, providing improved fishing opportunities through the construction and maintenance of artificial reefs in both offshore and inshore waters, research initiatives, promoting a strong conservation ethic through the distribution of information, and conducting educational programs for students, teachers, and the general public.

Although most people once considered ocean resources to be unlimited, recent rapid declines in populations of many recreational species have demonstrated the opposite. Today, more than 100 species of marine fish are regulated by daily size and possession limits. These fish include, but are not limited to, spotted seatrout, black sea bass, cobia, red drum, sheepshead, spadefish, greater amberjack, king mackerel, Spanish mackerel, bluefish, and tarpon, as well as the various species of flounders, tunas, porgies, snappers, groupers, and sharks.

As fishing pressures continue to increase in association with population growth and development along the coast, the regulatory limits imposed on these and other additional species may become more restrictive. The adherence to these essential conservation measures is the responsibility and obligation of every fisherman who is privileged to bait a hook and cast a line in the waters of our state.

Fortunately, many of today's anglers accept and embrace the concept of resource conservation by practicing in increasing numbers the sportsmanship of catch-and-release. The few anglers who continue to be irresponsible and violate the law risk stiff fines and penalties from South Carolina Department of Natural Resources' Law Enforcement officers as well as being ostracized by fellow anglers.

All things considered, the future of the fishery resources of South Carolina and the long cherished tradition of recreational fishing look bright.





**SHOW YOUR SUPPORT FOR  
SOUTH CAROLINA'S MARINE RESOURCES**

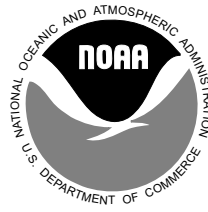
Attention fishermen, boaters, conservationists, and everyone who loves the water: The South Carolina Department of Natural Resources is proud to announce the creation of a Saltwater Conservation Vehicle License Plate. The “**Gone Fishing**” license plate features South Carolina’s most popular saltwater game fish, the red drum. The license plate portrays the importance of saltwater recreational fishing in South Carolina and serves as a symbol of fisheries conservation. Funds from the sale of the plate will help protect South Carolina’s marine resources and provide additional fishing opportunities through programs such as Red Drum Stock Enhancement, construction of Marine Artificial Reefs, and Oyster Recycling/Restoration.

To purchase this one-of-a-kind license plate, contact your local South Carolina Department of Public Safety’s Division of Motor Vehicles or visit [www.scdmvonline.com](http://www.scdmvonline.com). The cost of the plate is \$75.00 in addition to the regular registration fee.

South Carolina citizens are encouraged to purchase this special license plate to ensure the sustainability of our coastal resources for future generations.

**Make a Difference, Order Your  
Saltwater Conservation Vehicle License Plate Today!**

South Carolina Department of Natural Resources



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