

Permit

Permit (*Trachinotus falcatus*) are a popular fish for recreational (sport) fishing, and the fishery draws in visitors from around the world. People in Florida enjoy permit fishing in many different ways. Some people enjoy “sight fishing,” where they look for the fish and cast to it, on flats with fly rods. Other people fish on offshore reefs with traditional fishing gear instead of fly rods. Some fishermen practice catch-and-release, while others keep the permit they catch. There is also a small commercial fishery for permit in Florida. And surf fishermen—commercial and recreational fishermen that cast from the beaches—also catch permit while looking for the species’ close cousin, the pompano.



BTT’s Dr. Aaron Adams demonstrates how to hold a fish without harming it.

The permit that swim around offshore reefs are usually the biggest and largest fish, but this means that sometimes they are breeding fish. These fish group together to reproduce around these reefs, and keeping breeding fish instead of releasing them can really hurt the permit fishery. Captured permit do not get the chance to reproduce and make more permit, so fishing on these offshore reefs can actually lead to less permit in the area.

The thrill of permit fishing brings in lots of money for local businesses and cities. People travel from all over the world to Florida for the fishing, spend lots of money on boats and fishing gear, and pay fishing guides and captains well so they can catch a big permit. These fish, when released alive after being caught, are really good for cities and towns.

Since these fish are so important and bring in so much money for cities and towns, it is important that we take care of them and do not keep too many of the fish that are caught. This is harder than you might think. Permit use many different habitats over their life cycle, and since they move a lot, it is hard to learn about them and see where they move. We don’t know much about permit life cycles, but we are going to talk about what we do know.

Ontogeny

There are not many animals that only use one type of habitat or one food source for their entire lives. As an animal grows, its needs change. For example, a small fish may eat worms and crabs, but as it grows, it might need to move to a place where there are bigger crabs and small fish to eat. These changes that naturally happen during a lifetime are called the “ontogeny” of the animal. In nature everything is connected, and animals can link different habitats, like seagrass meadows, coral reefs and the blue pelagic ocean, during their lives.

Permit use many habitats too. Permit are usually fished in clear, shallow waters called “flats” that can have shallow corals or sandy and/or grassy areas that are sometimes next to mangrove shorelines. Because permit are caught in these areas a lot, some anglers think permit live in these areas all the time. But permit actually live in many other habitats during different parts of their lives. Just like other fish, the permit’s “life history” connects different, important habitats.

Spawning

Permit usually move offshore to deep waters when they meet to reproduce several times every year in groups called “spawning aggregations.” As many as 250 to 500 mature fish travel from different places to offshore reefs or wrecks. Here, they will “broadcast spawn,” where all the fish will release eggs and sperm into the water at about the same time. In Florida, this happens in the months between February and July.



Permit use many different types of habitat throughout their lifespan. For small, juveniles, seagrass beds are particular important.

Not a lot is known about how permit reproduce, but scientists think that permit spawn in the same place, year after year. The places where they spawn are called “spawning aggregation sites.” Sometimes other fish, like snapper, grouper, and other jacks – the permit is a kind of jack – will also use the same place to spawn. When this happens, the place is called a “multi-species spawning aggregation site.”

The reason that many different types of fish would use the same place to spawn is because of the water currents in those areas. When all the fish send their sperm and eggs out into the ocean, they are hoping that the baby fish that are made will be carried to a safe place to grow up. The baby fish, called larvae, cannot swim well when they are first born. The adult fish have to pick places to spawn where the water will carry the new larvae to safe habitats like mangroves and shallow, sandy beaches.

Riley’s Hump in Florida’s Dry Tortugas National Park, southwest of Key West, is an example of a multi-species spawning aggregation site. It is a spawning site for mutton snapper, cubera snapper, and permit, as well as other species. It’s an underwater, coral-covered hill right in the middle of currents that carry larvae to mangroves and grass flats. Some of the winds and currents bring larvae to safe habitat nearby, while the swift Florida Current carries some larvae long distances, up along Florida’s mainland eastern coast and beyond.

Conservation

In the 1990s, a few caring fishermen successfully battled to stop fishing in spawning areas around the Dry Tortugas. Because of this, many fish species – including mutton snapper – have grown in number in many different places. We do not know a lot about the

number of permit in the U.S., but fishermen think that protecting that spawning site has brought permit numbers up and made fishing better. Since then, Florida has been stopping people from fishing for permit during permit spawning season, which seems to have helped permit numbers too.

Finding and protecting spawning aggregation sites and multi-species spawning aggregation sites is really important for researchers and people who care about the ocean and the fishery. After all, taking care of these important areas usually means more permit and better fishing.



Fly fishing for permit by casting to fish you can see is an exciting and challenging style of recreational fishing.

Larval and Early Juvenile Permit

Once larvae have been carried away from spawning sites, they settle in coastal areas and begin development. The larval duration for permit is short—about 15 to 20 days. Studying permit around Belize’s Turneffe Atoll and the Florida Keys has shown that almost all juvenile permit settle quickly on sandy windward beaches, and hunt in the seagrass beds nearby. Windward beaches face the wind direction, which means the sand is always being stirred up by wind and wave action. Surf zones, where the waves are crashing on the shore, are full of crabs, shrimps and worms that provide young permit with the energy to grow.



Permit like nothing better to eat than a small blue crab.

Larval permit are tiny when they settle, between 8 and 10mm. Around Belize’s Turneffe Atoll and the Florida Keys, juvenile permit can be found along most windward beaches, where they feed on the crabs and worms and start to grow. Juveniles on these beaches around the Florida Keys can grow as large as 157 millimeters.

Adult Habitats

Larger, near-adult and adult permit swim between many different types of habitats. As mentioned earlier, fly anglers usually target them in the shallows, in places such as back reef flats, seagrass meadows, and along mangrove shorelines. Surf zones full of crabs also attract adult permit, and so do crab trap floats, channel markers, and other floating manmade structures.

Fishermen fish for permit on both shallow and deep reefs, natural or manmade. There’s growing concern that targeting permit on offshore reefs means catching fish that are about

to spawn. We do not know much about how many permit there are, or how permit numbers have changed over time in Florida or internationally. We do know that other fish species – like snapper, groupers, and other jacks – can really drop in number when people fish their pre-spawning or spawning aggregations. Because we have seen the numbers of other fish drop when these spots are fished at spawning times, we have a good reason to believe that permit numbers would drop too.



Seagrass meadows are favorite foraging areas for permit.

Diet

As permit get older, they eat different things. Early juveniles hunt along windward beaches for tiny crab-like creatures called amphipods, copepods, and mysids—a tiny species of shrimp. Older juveniles feed on bottom-living prey like small crabs, surf clams and worms, and some types of small urchins and sand dollars. Softer prey items are more important for juveniles since they do not yet have the teeth to crush the hard shells of larger crabs. Adult permit feed in the shallows—mostly on crabs, clams, and urchins. Adult permit have small conical (cone-like) teeth that let them feed on larger, harder, more nutrient-rich prey like blue crabs.

Threats

Overfishing and habitat loss or habitat degradation can threaten permit by making their population numbers go down. Researchers are worried that removing fishing from offshore reefs, on or near spawning aggregation sites, could bring the number of spawning fish to dangerously low levels. There are other threats to permit populations that we know less about, too. Bycatch, or accidental catch of permit by fishermen who are targeting other species, is another issue. Even if these fish are let go, they are usually tired from fighting the fishermen, which leaves them in danger if there are predators nearby. There is even more danger if the fish has been caught offshore, where sharks and barracuda are more likely to hear the fish splashing and stop by to see what's going on. Other threats are damage to juvenile habitats, which can stop larvae settlement in these important habitats, leading to fewer juveniles in that area. Climate-change, coastal construction, and pollution are also hurting offshore reefs, seagrass meadows, and beaches, which are all important habitats that permit use during their life cycle.

Climate Change

Permit spawn and spend time near or on coral reefs. One of the effects of climate change is the pH of the ocean becoming more acidic, which has big impacts on coral reefs. As humans, we cannot feel the small changes in ocean pH that are happening with climate change, and most fish cannot feel them either. But the minerals that coral use to grow can dissolve more easily when the ocean gets more acidic, so the corals have a harder time growing. Meanwhile, climate change is also making sea temperatures rise. Rising sea temperature is killing corals very quickly by causing coral bleaching and spreading coral diseases. Increasing water temperatures can kill healthy corals, and make life even harder for suffering corals that can be a "tipping point." The corals cast off their "zooxanthellae," which are small organisms that give corals their color and most of their food supply. When zooxanthellae leave the coral, the coral turns white in color and cannot feed, so it usually dies.



Coral bleaching happens when zooxanthellae, the small organisms that live in the coral and provide food for the corals to live and grow, cannot live in the water anymore and have to leave the coral.

Also, increasing air temperatures are causing water temperatures to rise quickly in clear, shallow waters where seagrasses live. Seagrasses have certain temperatures they survive best in, which are growing warmer in many areas, making the waters too hot for seagrasses to live in. Climate change is also changing rainfall patterns, and in some places – especially in Florida’s Everglades – too much or too little water is causing massive seagrass die-offs.

As tropical cyclones become worse and sea level rises, more people are building structures on the coast that are meant to keep their houses and land safe. But this development has consequences that are not always expected. The roots of mangroves and seagrasses hold sand firmly in place. Removing seagrass and mangroves, while also stirring up the water during the building process, actually makes the coast less stable because the sand can be easily swept away by the sea. Not to mention all the fish that are no longer able to live in these places.

“Beach nourishment” projects are also very bad for permit and other fish. These projects are meant to make beaches bigger and draw in more people. To do this, people will dig up tons (literally) of sand from deep offshore and dump the sand onto the beach. You can imagine this is not great for those offshore environments, but it also buries any crabs, worms, or fish that are trying to live in the surf zone of the beach. This means that permit can no longer live or feed on these beaches.

