

Albula vulpes (Bonefish or Western Atlantic Bonefish)

Family: Albulidae (Bonefish)

Order: Albuliformes (Bonefish)

Class: Actinopterygii (Ray-finned Fish)



Fig. 1. Bonefish, *Albula vulpes*.

[<http://www.fishbase.org/Photos/PicturesSummary.php?StartRow=5&ID=228&what=species&TotRec=11>, downloaded 8 May 2016]

TRAITS. *Albula vulpes* commonly called bonefish is a marine fish with an elongated and fusiform (spindle-shaped) body (Fig. 1). The body seems slightly compressed but is rounded at the belly. Bonefish have bright silver scales on their ventral and lateral sides but adult fish may appear dark blue-green in colour when looked at from directly above in water. This is so because on the dorsal side there are dark streaks which run in between the scales. Fins are silvery with a dusky appearance. The caudal (tail) fin is deeply forked and the upper lobe is slightly larger than the lower. The dorsal fin has a triangular shape made up of 15-19 soft rays while anal fins have 7-9 soft rays (Jones et al. 1978). The head region has no scales or dark bands, and there is a conical snout that protrudes past the inferior mouth, and 12-14 branchiostegal (gill) rays. Bonefish have sexual dimorphism and the adult females are generally 2-5 cm larger than males which usually range from 40-50cm in length, although bonefish can sometimes grow to be around 100cm in length. They typically weigh between 2-4 kg but larger individuals can reach a weight up to 9 kg (Burger, 1974). The fish is named for the many fine bones in its flesh.

DISTRIBUTION. *Albula vulpes* was thought to occur globally in tropical and sub-tropical regions (Fig. 2). This wide range is now thought to be split between eight or nine physically similar but genetically distinct species. The western Atlantic range starts from North Carolina in North America through the Gulf of Mexico and the Caribbean to Brazil in South America, and is now referred to *Albula vulpes*, the western Atlantic bonefish (Colborn et al., 2001).

HABITAT AND ACTIVITY. They are marine species which can occur in both subtidal and intertidal regions (when covered by tides). Intertidal regions include flats such as mud, sand, marl and algae beds as well as mangrove areas, coral reefs and shallow estuaries (Morey, 2010). Subtidal regions are generally adjacent to intertidal regions and can reach depths up to 100 m. During feeding times, bonefish can be found at intertidal regions and retreat to subtidal zones when not feeding and for spawning. Bonefish are migrant species which inhabit areas only for several days. They can be found in oxygen poor water due to high tolerance levels and biological adaptations such as have lung-like airbladders which they inhale air into.

FOOD AND FEEDING. Bonefish are pelagic (open water) fish but are predominately benthic and epibenthic predators, feeding at the bottom. They feed on molluscs, worms and crustaceans such as xanthid and portunid crabs and snapping and penaid shrimps (Crabtree et al., 1998) which are found in very shallow waters approximately 30cm in depth. They also feed on small fishes such as toadfish. Their dorsal and caudal fins can sometimes be seen as they feed (Fig. 3). Prey are located from the benthos and may be dug up using the conical snouts of the bonefish (Fig. 4). They have specialised dental plates with granular teeth and also grinders present in their throat which makes it possible to crush and grind prey for consumption. The variety in the diet of the bonefish depends greatly on the habitat which it is found and feeds in. Small to medium-sized bonefish feed in schools which are dispersed slightly. Larger-sized bonefish may be found singly or in pairs during feeding.

POPULATION ECOLOGY. Small-medium sized individuals are often found in schools which can range from a few individuals of similar size or up to 100 individuals. Larger individuals, however, can remain solitary in deeper waters especially during warmer months. Schools disperse during feeding. Bonefish also form schools during spawning. Populations are extensively distributed in tropical and sub-tropical regions however population sizes are currently decreasing. They are a migrant species which only inhabits a particular area for several days, then moves on. The average lifespan of bonefish are 5-10 years but they can live over 20 years especially in captivity (Crabtree et al., 1996). Young and larval bonefish can be preyed on by numerous aquatic predators. Barracuda (*Sphyraena barracuda*) and a variety of sharks such as lemon sharks (*Negaprion brevirostris*), blacktip sharks (*Carcharhinus limbatus*) and tiger sharks (*Galeocerdo cuvier*) prey on adult bonefish (Cooke and Philipp, 2004). Humans are also predators of this species.

REPRODUCTION. Bonefish reach sexual maturity at 2 years of age when female fish are around 25 cm in length. Spawning occurs throughout the year with the peak spawning season extending from the months of November to June (Burger, 1974). Bonefish are less reproductively active during warmer summer months. Spawning takes place offshore where there are currents which will help to disperse fertilized eggs and larvae to other locations. It usually takes place at night in the full moon phase but possibly at the new moon phase as well. Spawning occurs in schools (Fig. 5), and random external fertilization occurs. Eggs are released into the water and are externally fertilized by sperm in the near vicinity. Bonefish undergo a leptocephalus larval stage. That is, there are three distinct stages in transformation from the fertilized egg to a juvenile fish of about 5cm. After this development, juvenile fish continue to grow until they reach adult size (Morey, 2010).

BEHAVIOUR. They are a schooling species. Bonefish have very good eyesight and smell and are very alert in their environment. When they sense danger they regroup in schools and can swim away quickly. They resist strongly when hooked by fishermen (Crabtree et al., 1998).

APPLIED ECOLOGY. Bonefish are listed by the IUCN as a Near Threatened species since population sizes are decreasing (Adams et al., 2012). Global warming and anthropogenic activities are threatening the existence and degrading vulnerable shallow coastal habitats. Bonefish are an important game fish however, they may be used to supply minor commercial fisheries. Bonefish can also be used as bait to catch larger fishes. They are not typically caught for their flesh which is full of fine bones, thus resulting in the use of capture-and-release practices by recreational fisheries (Fig. 6). Fish can suffer from post-release mortality if injury is inflicted upon landing, and post-release predation. There are regulations existing which limit fishing to one fish per day for anglers. Bonefish can also be contaminated by ciguatera toxin through their diet and can consequently lead to poisoning in humans if consumed.

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Fig. 2. Geographic distribution of the bonefish species group. The western Atlantic bonefish *Albula vulpes* occurs from North Carolina, USA, to Brazil, including the Caribbean.

[http://media.eol.org/content/2011/11/08/16/38962_orig.jpg, downloaded 8 March 2016]



Fig. 3. Bonefish caudal and dorsal fins showing as they feed in very shallow waters.

[<https://www.flmnh.ufl.edu/fish/discover/species-profiles/albula-vulpes> , downloaded 10 March 2016]



Fig. 4. Bonefish feeding by digging on the bottom.

[<https://s-media-cache-ak0.pinimg.com/736x/97/44/62/974462021da8acecb3591819abfa34e.jpg>, downloaded 10 March 2016]

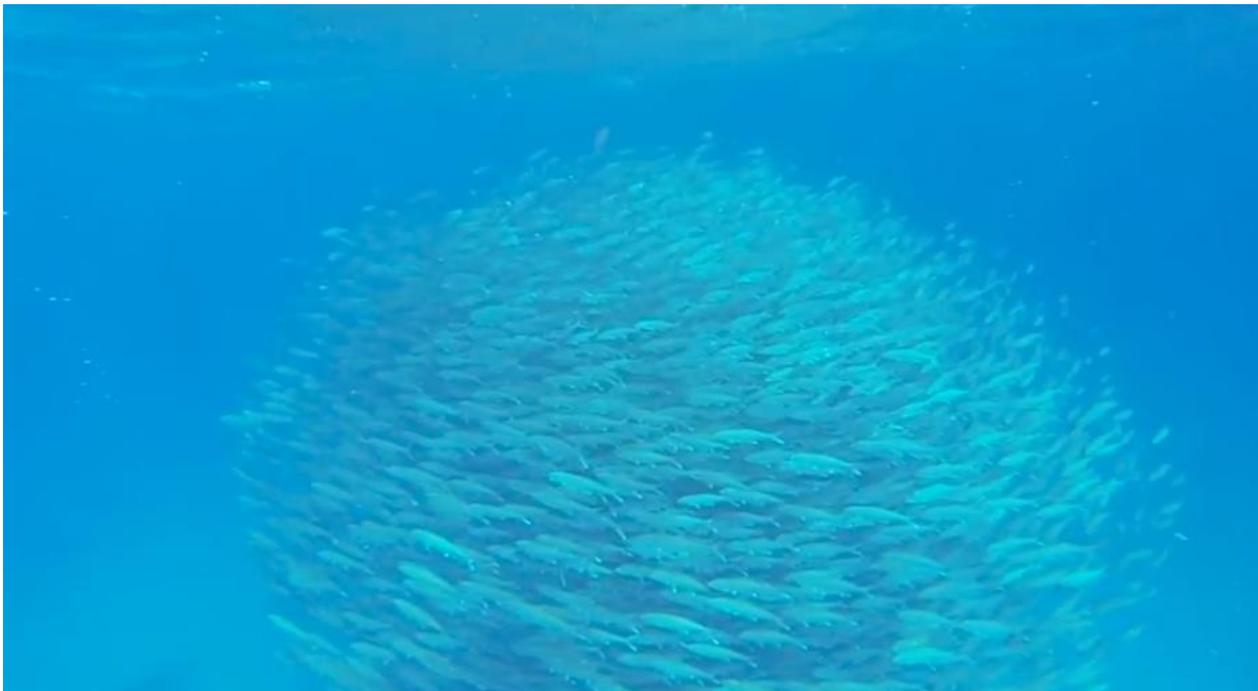


Fig. 5. Spawning aggregation of bonefish.

[<http://blog.ceibahamas.org/files/2014/07/Bonefish-Spawning-Aggregation.png> , downloaded 10 March 2016]



Fig. 6. Bonefish released after being captured.

[<http://blog.bonefishtarpontrust.org/wp-content/uploads/2014/01/CK-070825-100.jpg>, downloaded 10 March 2016]

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