Thunnus obesus (Bigeye Tuna)

Family: Scombridae (Mackerel, Tunas and Bonitos)
Order: Perciformes (Perch and Cichlids)
Class: Actinopterygii (Ray-finned Fish)

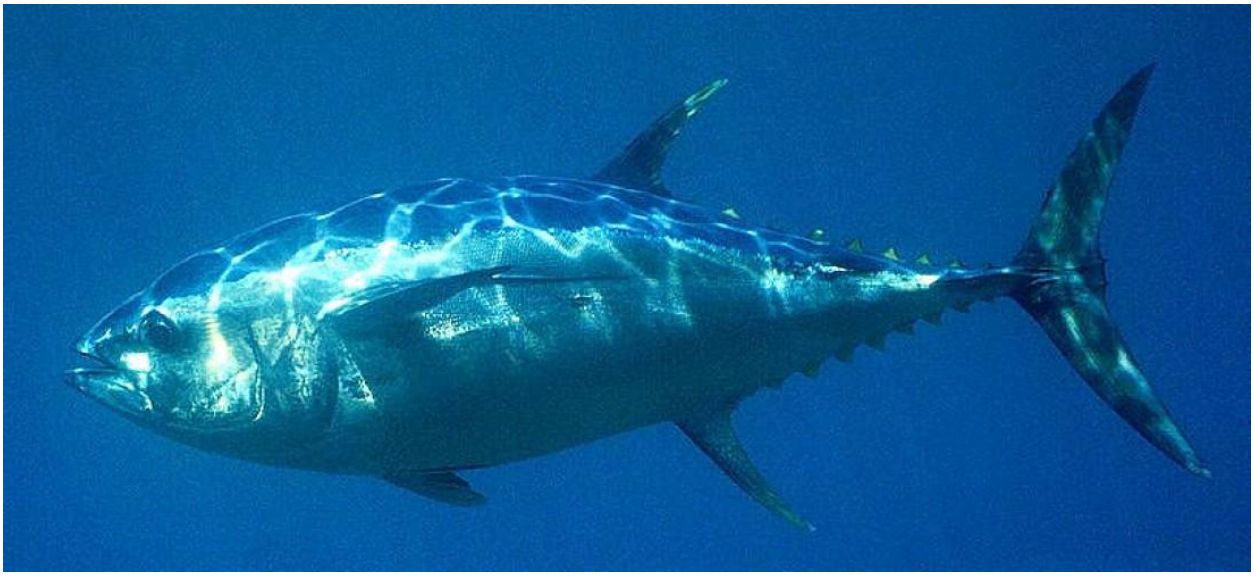

Fig. 1. Bigeye tuna, *Thunnus obesus.*

[http://wtfrly.com/2014/02/23/scientists-discover-crude-oil-cardiotoxicity-mechanism-in-fish/, downloaded 29 May 2015]

TRAITS. This species of tuna is numerous and they inhabit the tropical waters of all oceans. The pectoral fins are longer than other species and its eye is relatively large, hence its name the bigeye tuna. Colour: dark metallic blue on the back, white undersides, dorsal and anal fins yellow, iridescent blue lateral lines that run along the sides (Fig. 1). The sexes are separate and indistinguishable in appearance, although the males generally have a longer fork length than the females. The length and the weight is dependent upon its location.

DISTRIBUTION. The bigeye tuna is a widely distributed species (Fig. 2) compared to the other species of tuna. They are found in tropical areas of the Atlantic Ocean, Pacific Ocean, and Indian Ocean.

HABITAT AND ACTIVITY. *Tunnus obesus* is a diurnal species in which they are seen in deeper water during the day and at the surface at night. They are located in tropical and sub-tropical waters throughout the oceans. They prefer warm waters where they can feed and reproduce. This species regulates its temperature by interchanging from the colder waters to the warmer waters. The juveniles stay in the more shallow areas where it is warmer while the adults go to the deeper areas in search for food. Migration of the species is dependent upon the availably of food. Wherever this species is located it is always disrupted by fisheries, where they are caught and sold. The adults are caught by the long liners and the juveniles are caught by purse seine.

FOOD AND FEEDING. The bigeye tuna diet consists of other fishes, cephalopods such as the squid, and crustaceans. They feed all the time where during the day they swim more in deep waters and at night they swim at the surface. The tuna swims or moves vertically through the water to catch their prey. This strategy allows them to swim further into the water to catch their prey. They feed mostly in the deeper waters during the day and feed more to the surface of the water at night. They have specific features that allows them to swim in deep waters and which makes them distinctive from the other tuna species. They have a good heart rate, better vision, high tolerance for the lack of oxygen, low temperatures and they can adapt to light conditions. These features assist them in catching prey that are located in both the surface and deep waters.

POPULATION ECOLOGY. They form schools of varying sizes which is located at the surface of the water (Fig. 3). They sometimes have floating objects such as a piece of log of debris while others do not associate with floating objects. They also mix the schools with other types of tunas and it is these schools that are caught by longliners.

REPRODUCTION. Reproduction occurs in warm tropical waters where the conditions are suitable enough for spawning. They find a safe area sometimes called a nursery spot or ground and the female and males releases their eggs and sperm respectively into the water to be fertilized. Multiple spawns are released seasonally about once or twice throughout the year from February to September. The main spawning season is from April to September. Spawning seasons vary depending on the location. After hatching the larva stage is initiated where the larva is about 3.0mm (Fig. 4). Juveniles remain in the warm waters so they can grow to an adult. Some of the juveniles form schools and are associated with other species of tuna as well as larger fish such as the whale shark or sea mounts or floating objects (Sun et al., 2013). The adolescent phase is between the juvenile and a mature adult; they are slightly smaller in size to an adult and their pectoral fins is larger than that of the adult. The final stage is the adult stage where they are an average of 150cm in length and they live up to 14 years.

BEHAVIOUR. Juvenile behaviour: other than the fact that they are smaller in size compared to the adults. They are reproduced in tropical and subtropical waters where they form schools with other species of tuna and floating objects such as sea mounts, whale sharks and debris. They stay in the warmer and shallow waters until they are an adult. The mortality rate is dependent upon the location and the season. Feeding of the juveniles improves its survival.

Anti-predator behaviour: predators of the bigeye tuna include large fishes such as the billfish and toothed whales as well as humans. These predators mostly feed on the larger tuna or the adults. For the juveniles other larger tuna may feed on them as well as sharks, dolphins, spearfish and individuals that can catch and feed upon them.

APPLIED ECOLOGY. *Thunnus obesus* is listed in the IUCN and it is considered a vulnerable species. The population has declined over the years from the treat of overfishing from longliners and purse seine for fisheries and for recreational fishing (Fig. 5). Countries located around the Pacific Ocean have developed closure for the species for its conservation. Industrial fishing can only be done in a specific areas and in the U.S. the fisheries are only allowed only 4,181 tons to prevent overfishing and the decline in the population.

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Zhu, G., Dai. X., Xu, L. and Zhou, Y. (2010). Reproductive biology of Bigeye Tuna, Thunnus obesus, (Scombridae) in the eastern and central tropical Pacific Ocean. *Environ Biol Fish* **88**:253–260.

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Figure 1: Distribution of Bigeye Tuna

Fig. 2. Bigeye tuna (*Thunnus obesus*) geographic distribution.

[http://www.global-greenhouse-warming.com/Bigeye-Tuna.html, downloaded 31 March 2015]

Fig. 3. Bigeye tuna swimming in a school in tropical waters.

[https://www.worldwildlife.org/species/bigeye-tuna, download 31 March 2015]

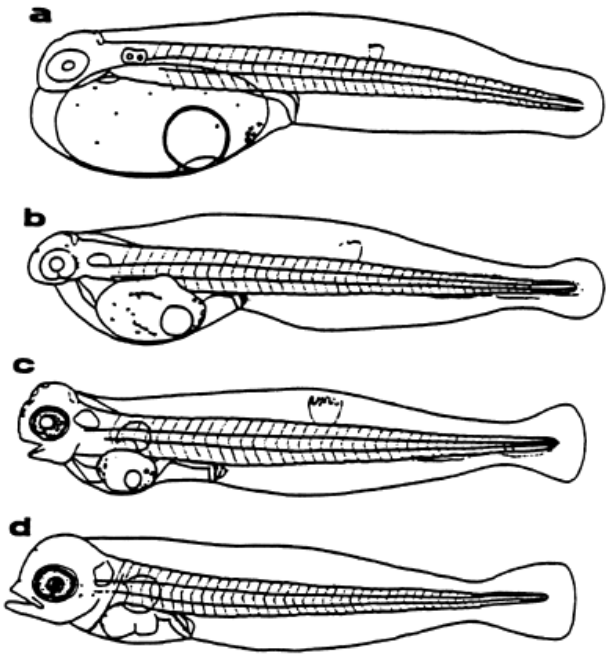

Fig. 4. The development of a bigeye tuna larva.

[http://www.fao.org/docrep/005/t1817e/t1817e11.htm, downloaded 31 March 2015]

Fig. 5. Bigeye tuna being captured by fishing net.

[http://thegreentimes.co.za/the-terrible-tale-of-tuna/, downloaded 1 April 2015]