Fish Indicator Species of Koh Tao and the Gulf of Thailand

CONSERVATION DiVER

2022

SUBPHYLUM: Vertebrata
CLASS: Elasmobranchii

Sharks

Characteristics

Sharks have a very streamlined, fast body (called fusiform), which is true of most predatory fish. They hunt using 6 senses; smell, sound, sight, touch (they sense vibrations in the water with their lateral line), electroreception, and lastly taste. Sharks, like humans, are late to reach sexual maturity and have very few, but well developed, offspring. In most cases, male sharks can be identified by claspers located in the pelvic region (like small 'arms' used for holding onto a female during mating).

Importance

Sharks are rightfully called the 'kings of the sea', because in most marine food chains they are the top predator, and thus are a top-down control on the entire eco-system. Sharks maintain the ecosystem balance and they play a big role in nutrient cycling and export from reefs. The most common species of sharks you are likely to see are those associated with a coral reef environment such as Black Tip Reef sharks.

Notes

It is estimated that over 100 million sharks are killed by humans each year, and populations of most species of sharks are in sharp decline. Contrary to popular belief, sharks are not very dangerous to humans, especially in coral reef areas. The chances of seeing a shark during the EMP are not high, but you may be lucky enough to see them in the deeper dive sites you might visit between surveys.

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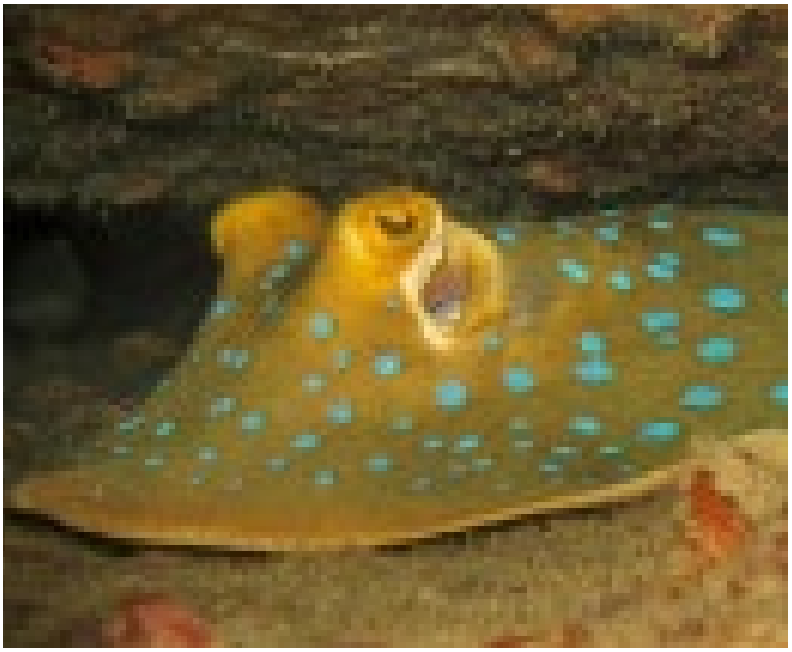

SUBPHYLUM: Vertebrata
CLASS: Elasmobranchii
ORDER: Myliobatiformes

Rays

Characteristics

Sting Rays and Ribbon Rays feed primarily on benthic invertebrates such as crabs and shrimps. They are primarily nocturnal hunters, and will usually be found under coral heads or buried partially in the sand during the day. The Blue Spotted Ribbon Ray has a rounded body, and is easily recognized by its bright blue spots.

Importance

Rays are considered to be meso-predators (in the middle of the trophic structure), and so thus an important link between the top and bottom of the food chain. They are important in controlling populations of invertebrates, but are also a food source for higher order predators such as sharks. They are sensitive to changes in the environment, and also allow us to gain information on the abundance of crustaceans and bivalves on the reef.

Notes

Be sure to look well under the rock overhangs and coral heads for the rays during the fish survey of the EMP

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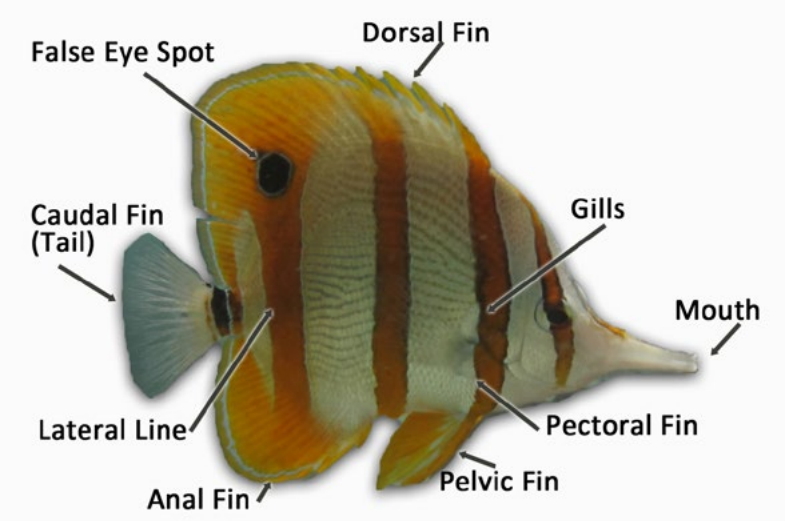

CLASS: Actinopterygii
ORDER: Perciformes
FAMILY: Chaetodontidae

Butterflyfish

Characteristics

Butterflyfishes are thin, tall, and plate-like (laterally compressed) to avoid predation. To further avoid predation, the tail of most butterfly fish looks just like the head, and often they have a line over their eye for disguise. Together these confuse predators, who don't know which direction to sneak up on the fish, or which way the fish is going to swim to get away.

Importance

Butterflyfish only live in healthy reefs, graphs of coral abundance and butterfly fish abundance tend to be very closely correlated, and you can use one to estimate the other. Economically speaking, they are important for reef tourism, as they are a favorite of SCUBA divers and snorkelers. Although they are fished in some areas, they do not provide a good source of protein. In many areas they are a prized fish for the aquarium trade due to their bright colors, and are threatened by overcollection. Often times, cyanide or other poisons are used to stun and collect them, leading to the death of corals and many other reef animals.

Notes

The following are the 5 most common buttefly fish for this region. While the common names may vary from person to person, we have used the ones we are most familiar with.

Weibels Butterfly Fish
Chaetodon wiebeli
Bright to dull orange with diagonal black stripes, it is one of the larger butterflyfish species. Note the black stripe over the eye and the similarity between the head and tail. This species is a true omnivore, feeding on a diverse diet of algae, zooplankton, coral polyps, small invertebrates, clams (including Tridacna species), and tubeworms. In some regions, it is also referred to as

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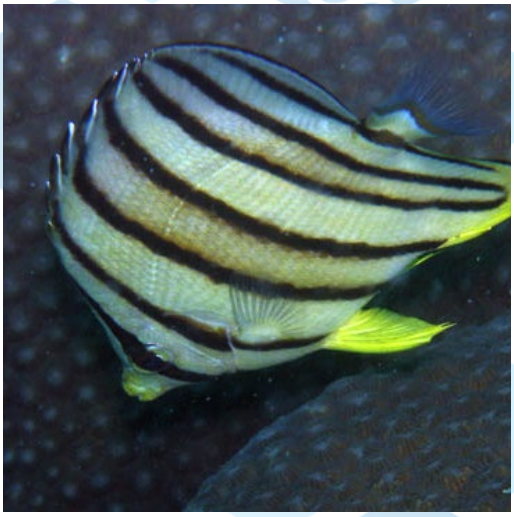
8 Banded Butterflyfish
Chaetodon octofasciatus
Yellowish white with black vertical bands, it is one of the smaller butterflyfish species. The juvenile and adult fish are nearly identical in coloration and shape. Juveniles will most often be found in table corals, and adults roam the reef to feed on coral polyps (this species is an obligate corallivore.)



Lined Butterfly Fish
Chaetodon lineolatus
White body with yellow tail, thin blue-black stripes running vertically down the body (looks like lined paper turned sideways). One of the largest butterflyfish species, they have a diverse diet of coral polyps, algae, and small invertebrates.

Copper Banded Butterfly Fish
Chelmon rostratus
Another of the larger species included in our surveys, has a white-gold body with copper colored vertical stripes. Extended mouth facilitates a diverse diet of small invertebrates including worms, mollusks, and crustaceans. Note false eye (black spot) on tail for fooling predators. In some areas, referred to as the Beaked Coral Fish.

Long-Fin Banner Fish
Heniochus acuminatus
White body with two vertical stripes and yellow tail. Easy identified by long white 'banner' and large pectoral fins. Feeds primarily on zooplankton, but also small reef invertebrates. In some areas they are called the Pennant Coralfish, and can sometimes be confused with the Moorish idol.

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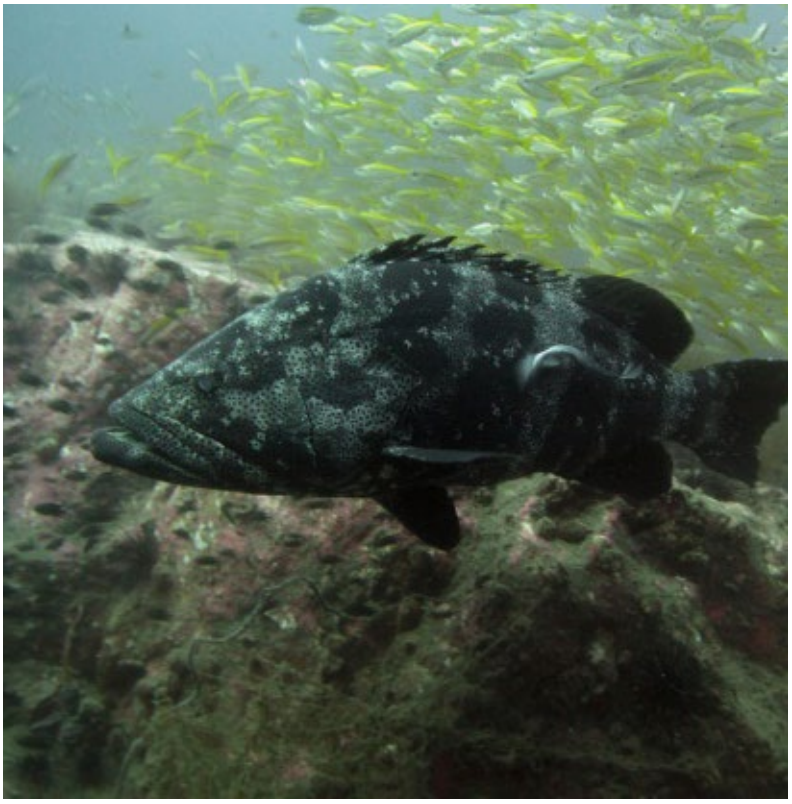

CLASS: Actinopterygii
ORDER: Perciformes
FAMILY: Serranidae

Groupers

Characteristics

Groupers are ambush predators; comparing them to the butterfly fish, they appear stronger, more streamlined, and faster. Groupers are generally demersal (live along the bottom) and can be found on top or under rocks and corals. They lie and wait for small fish or invertebrates to come close and then use their draw-bridge like mouth to suck the prey in. Their lower jaw is spring loaded and opens and closes in a fraction of a second, but in doing so increases the volume of the mouth up to 500%, creating a current that few prey species can escape.

Importance

Groupers are predators, but are also a prey species for larger fish (mesopredators). They are a prized fish for human consumption, and are thus threatened by overfishing (especially the large species). Because of their behavior, they are one of the primary species caught through spearfishing.

Notes

Although there are generally several species of grouper on any particular reef, you will not need to differentiate them by species. Instead, you will differentiate the groupers by size; larger or smaller than 30 centimeters. Your instructor will show you what 30 cm looks like underwater; also it is the same as the length of a standard EMP slate. The reason this is done, is like in many other fish species, they are protogynous, meaning that they change sex as they mature. All immature groupers are female, and only change to male in their adult life stage.

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CLASS: Actinopterygii
ORDER: Labriformes
FAMILY: Scaridae

Parrotfishes

Characteristics

Parrot fish have a very fitting name for many reasons; they tend to be brightly colored, have fused teeth which form a parrot like beak, and swim with their pectoral fins in a bird-like fashion. Many species have the ability to secrete a mucus 'cocoon' while sleeping, which protects them from predation by electro-sensory abled elasmobranch species.

Importance

Parrot fish are one of the most abundant and effective fish grazers of micro- and macro-algae. They use their beak to scrape algae from rocks and dead coral which prevents it from overtaking the corals, opens up clean areas for settlement of coral larvae, and regulates nutrient levels in the reef. In some areas of the world, parrot fish can grow quite large and will actually use their beak to bite chunks off of the coral. This has given them the reputation as contributing greatly to bioerosion of the reef, however in those species (primarily Humphead Parrotfish) coral is not their primary food source.

Notes

During the EMP you will differentiate the parrot fish in two groups, small (less than 20 cm) and large (greater than 20 cm). This is because, like the groupers, they all start of as females, and become males after developing to a certain age/size. Juvenile parrot fish tend be a duller green color, and are sometimes confused for the moon wrasse by beginning students. Often, in shallow reef areas, mixed schools of juvenile parrot fish and rabbit fish can be found. These are generally harems of females presided over by a single large male. During the EMP you should try to estimate the number of fishes in the school, but be sure to also differentiate between the parrot fish and rabbit fish.

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CLASS: Actinopterygii
ORDER: Perciformes
FAMILY: Siganidae

Rabbitfish

Characteristics

Rabbitfish are a common reef fish, and resemble the simple fish profile that everyone can recognize. They have a nose (rostrum) which resembles a rabbit's, and also play a very similar ecological role to rabbits; being prolific herbivores grazers. Their dorsal fin is composed of 13 spines, which are venomous. Being stung is painful, but not actually life threatening for humans. Some of the more common rabbitfishes include: the Double Barred Rabbit fish, the Java Rabbit Fish (Top), and the Gold Saddle Rabbit fish. Rabbit fish can be found solitarily, but more commonly will be observed in schools.

Importance

Rabbit fish are important reef herbivores feeding on benthic algae and biofilm. On many reefs in the Indo-Pacific they are one of the most abundant and important fish grazers. They are also an important prey species for many predatory fish including sharks, groupers, and barracudas. They are an important food source in many developing countries, and are threatened by over-fishing.

Notes

You do not need to differentiate rabbit fish by species or size for the EMP.
At night rabbit fish can be found sleeping with their dorsal and anal fin spines extended, making them a more difficult meal for nocturnal predators.

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CLASS: Actinopterygii
ORDER: Perciformes
FAMILY: Lutjanidae

Snappers

Characteristics

Snappers are predatory fish with a perciform shape. They appear strong and streamlined when compared to the herbivorous fishes. There are several species of snapper in the Indo-Pacific, the most common in reef areas are of the genera Lutjanus such as the Russel's Snapper, the Spanish flag Snapper, and the Blackspot Snapper.

Importance

Snappers are secondary or meso-predators which feed on crustaceans and other fish. Some species also eat zooplankton, and are thought to be an important control on larval supply to the reef (Including COTs and Drupella). They are also a favorite of the fishing industry, and can be used to assess fishing related threats.

Notes

Snappers can be solitary or in schools, and are usually quick to flee from divers. They generally average 20-30cm, but occasionally much larger ones can be found on the reef.

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CLASS: Actinopterygii
ORDER: Acanthuriformes
FAMILY: Acanthuridae

Surgeonfish

Characteristics

Surgeonfish (also known as Unicorn fish) are mostly herbivores fishes, and derive their name by the very sharp spines protruding from the tail, which look like a surgeon's scalpel. They can be easily identified by their unique body shape and colorful spine (usually orange or yellow).

Importance

In some areas they tend to exist in large schools where they play an important role as a reef herbivore, often competing with damsel fishes for food. They are also prized in the aquarium industry and can be a victim of over-collection.

Notes

In many areas of the Indo-Pacific, Surgeonfish can exist in large schools, but in other areas they can be quite rare. In areas where they are rare, please record any Surgeon Fish outside the survey area into the notes section of your slate.

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CLASS: Actinopterygii
ORDER: Perciformes
FAMILY: Haemulidae

Sweetlips

Characteristics

Sweetlips are part of the Emperor fish family, which can grow quite large. Their body shape appears like a mix between the groupers and snappers. Adults are generally white or dull colored with black spots, while juveniles are brightly colored and very ornate.

Importance

Sweetlips are important predatory fishes that feed on crustaceans and other benthic invertebrates. They are a favored fish by the fishing industry, and are indicators of fishing pressure on the reefs.

Notes

Some species, such as the Titan Triggerfish, often attack when a diver enters their territory, especially during mating seasons. To avoid problems, do not swim directly towards or over them, but instead remain calm, lay low, and wait for the fish to move away from you. Some species, such as the Titan Triggerfish, often attack when a diver enters their territory, especially during mating seasons. To avoid problems, do not swim directly towards or over them, but instead remain calm, lay low, and

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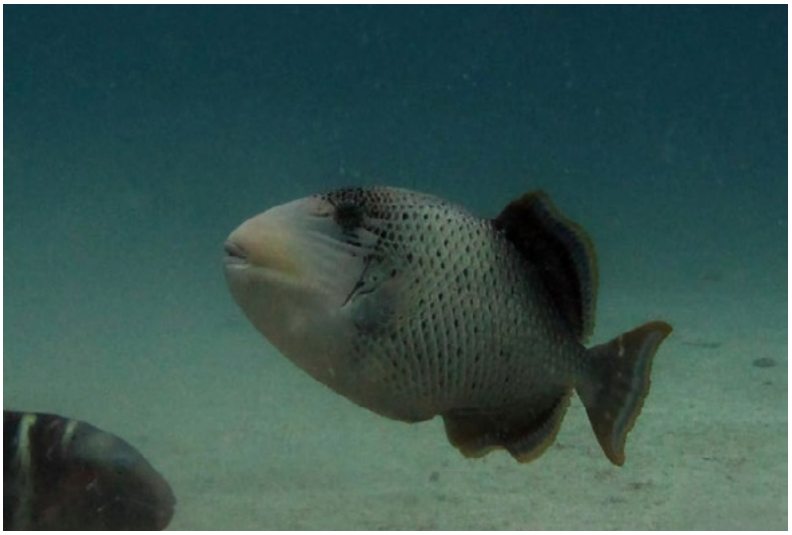

CLASS: Actinopterygii
ORDER: Tetraodontiformes
FAMILY: Balistidae

Triggerfish

Characteristics

Triggerfish are large reef fishes with an oval body and a strong mouth. They swim using their dorsal and anal fins in an undulating motion. Many of the larger species are notoriously territorial, and can be quite aggressive (In particular the Titan and Yellow Margin Triggerfishes). However, some of the smaller species are herbivories, and are much more docile. They have two 'Triggers' which are used to warn intruders and lock themselves into cracks in the reef while sleeping.

Importance

Large Trigger fish are important top predators on the reef. They help to control the populations of coralivorous gastropods, mollusks, bivalves, and echinoderms (feeding on both Drupella and COTs). They are very intelligent fishes and often use tools such as rocks to break open clams or other shelled organisms.

Notes

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CLASS: Actinopterygii
ORDER: Labriformes
FAMILY: Labridae

Red Breasted Wrasse

Cheilinus fasciatus

Characteristics

Moray eels are actually a type of bony fish, they are not related to snakes as some may infer. There are over 200 species of moray eels worldwide. They have poor eyesight, but that is made up for by a highly acute sense of smell. They have two sets of jaws, oral and

Importance

Red Breasted Wrasse (also called Red Breasted Maori Wrasse) are large fish which require a high abundance of marine invertebrates to survive. Like the Triggerfish, they have a diverse diet and are able to feed on hard shelled invertebrates and sea urchins.

Notes

The Red Breasted Wrasse is often found in fishing cages, and is not easily frightened away by divers.

BLUESTREAK CLEANER WRASSE

Characteristics

The Bluestreak Cleaner Wrasse is a small (less than 10 cm) fish that generally stays in one place on the reef, its cleaning station. When potential 'clients' pass by, the fish will perform a sort of dance to indicate that it is open for business. If the client agrees, it will take on a passive body position (usually the head elevated and the mouth open. The cleaner wrasse will then remove ectoparasites from the client fish's body.

Importance

Cleaner wrasse are important to the health and longevity of many other species of fish on the reef. Since they generally stay in the same area, we can accurately track their populations over time.

Notes

There are several species of fang blennies which have evolved to imitate the cleaner wrasse, please learn the difference between the two so that you only count the wrasse.

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CLASS: Actinopterygii
ORDER: Anguilliformes
FAMILY: Muraenidae

Moray Eels

Characteristics

Moray eels have a serpentine shape, and live in burrows in the sand, or crevices and holes in corals and rocks. They feed on crustaceans, mollusks, and small fish. Most species are mesopredators, and sometimes become prey for barracuda, large groupers or sea snakes. Although species like the Giant Moray can be considered an apex predator.

Importance

As predators, eels are important in regulating the balance of the reef. They are also sensitive to habitat destruction and declines in water quality. Some of the more rare and ornate Morays are also threatened by the aquarium trade, and can be sold for a high market price.

Notes

They generally will not be found during very bright days, but can readily be found on deeper sites, when visibility is poor, or when it is overcast. This is one of the reasons why it is important to record the weather when conducting the EMP.

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PHYLUM: Chordata
CLASS: Reptilia
ORDER: Testudines

Sea Turtles

Characteristics

Of the 7 species of sea turtles, 5 can be found throughout the Indo-Pacific: the Hawksbill, Olive Ridley, Green, Leatherback, and the Loggerhead Sea Turtles. The Flat back is only found around the North coast of Australia, and the Kemp's Ridley is only found around the Gulf of Mexico.

Importance

Turtles are an indicator of biodiversity and anthropogenic pressures. Sea Turtles have lived in the sea since the time of the dinosaurs, but today are faced with extinction due to human activities (primarily by marine debris, fishing, by-catch, and habitat destruction). As turtles migrate over great distances and through both national and international waters making their protection very difficult.

Notes

If you are interested in learning more about Sea Turtles, Conservation Diver offers the 'Sea Turtle Ecology and Monitoring' course.

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PHYLUM: Chordata
CLASS: Reptilia
ORDER: Squamata
FAMILY: Elapidae

Sea Snakes

Characteristics

There are about 69 species of sea snakes, all within the Indo-Pacific, some of which are the most venomous snakes in the world. The have a paddle-like tail, and their lungs extend most of the length of their bodies so that they can hold air for dives. They are generally found in shallow, warm tropical seas in sheltered areas or around islands. They generally feed on small fish, using chemosensory to detect prey as their vision is limited.

Importance

Sea snakes are subject to overfishing and by-catch, with four species listed by the IUCN, 1 as vulnerable, 1 as endangered, and 2 as critically endangered.

Notes

Although some of the most poisonous species of snakes on earth, Sea Snakes and Sea Kraits are generally not a threat to divers unless they are provoked. They are much more dangerous when on land (Sea Kraits) or when caught in a fishing net.

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