Common corals of American Samoa

A Guide

Douglas Fenner and Mareike Sudek

2016

The Coral Reef Advisory Group (CRAG) coordinates American Samoa's coral reef management efforts and activities. The group is a collaboration of local agencies working together by mutual consensus to manage coral reefs with the mission "to protect and conserve reefs for the benefit of the people of American Samoa, the United States, and the world". The group works toward this vision by implementing strategies to address various areas of coral reef conservation: from education and outreach, policy and enforcement, to scientific research and monitoring. CRAG is located within the Division of Marine and Wildlife Resources (DMWR) and is supported by funding from the NOAA Coral Reef Conservation program (CRCP).

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For further information on coral visit:
http://oceanservice.noaa.gov/education/tutorial_corals/welcome.html

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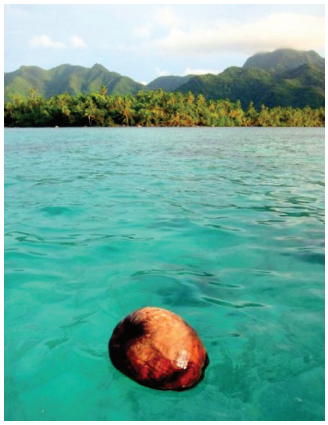


Introduction

American Samoa is part of the Samoan Archipelago in the South Pacific Ocean, 2500 miles south of Hawaii. It consists of seven islands, five of which are high, volcanic islands, and two are small atolls. American Samoa is lined with fringing coral reefs that harbor a multitude of the marine life.

Coral reefs are geological structures composed of calcium carbonate rock made by living organisms. Corals are a major contributor of the calcium carbonate that builds the reef, and they form the hard framework that holds it together. Reefs provide habitat for an estimated million different species, and are therefore considered the most diverse marine ecosystem known in the world. Major groups of organisms living on reefs include corals, fish, algae, and many different kinds of invertebrate animals.

Coral reefs are very valuable because they reduce the strength of waves and so protecting tropical shorelines from being eroded away. They also provide high-protein food for millions of people around the world. Additionally, because of warm, clear water, and a kaleidoscope of colorful animals, reefs are ideal for snorkeling and diving; this makes reef tourism an important part of the economy in many parts of the world.

Reef structure

In American Samoa the fringing reefs lining the shoreline are divided into different zones (Fig. 1). In a few areas, pools can be found near the shore that are up to 25 feet deep and called "**backreef pools**." However, along most of the shoreline, there is hard, nearly flat reef that begins right at the low tide line, called "**reef flat**." People often walk out on it at low tide and it can be snorkeled at mid to high tide. The outer edge of the reef flat, where the waves break, is called the "**reef crest**." Beyond the reef crest, the reef slopes down into deep water, hence called "**reef slope**" or fore reef. It extends from the edge of the shallow reef crest down to as much as 100 feet deep. At the bottom of the reef slope, it often reaches a nearly flat shelf, most of which is covered with sand or rubble and has little or no coral on it. Deeper down, reefs between 100ft to around 500ft are referred to as "mesophotic" reefs. Further offshore the ocean floor occasionally becomes shallower again, this phenomenon is called an "offshore bank."

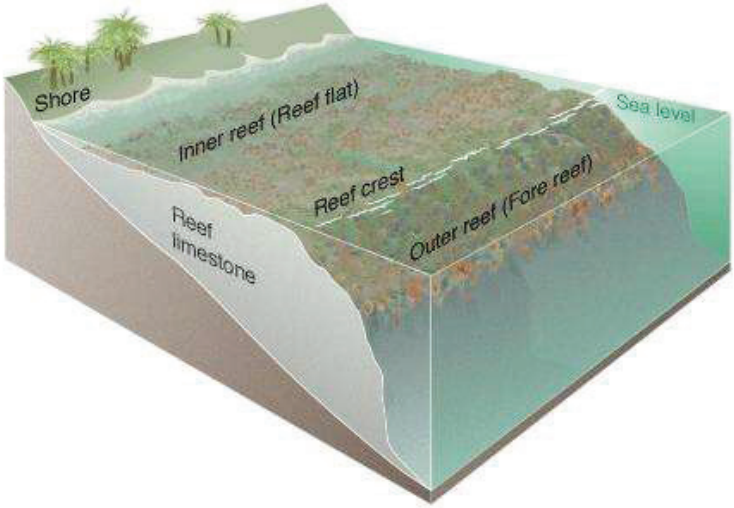


Fig. 1: The coral reef profile. In some places, a backreef pool can be found in the reef flat zone (Image: http://web.stanford.edu)

The coral animal

Corals are animals that are closely related to sea anemones, and more distantly related to jellyfish. The basic unit of the body of a coral is called a polyp, which is a hollow bag filled with sea water, with finger-like structures called tentacles in a circle on the top (Fig. 2). In the center of the ring of tentacles is a mouth. Corals, like anemones and jellyfish, are predators. They have stingers (called nematocysts) on their tentacles that can stun small organisms, which are then moved to the mouth and digested in their gut. Each polyp sits in its own shallow "cup" called a **corallite** which can vary in size and shape depending on the species. Corals are unusual animals because they are modular, meaning they are made up of thousands of repeating units, the polyps, each connected to one another. Hence, corals are also referred to as "coral colonies."

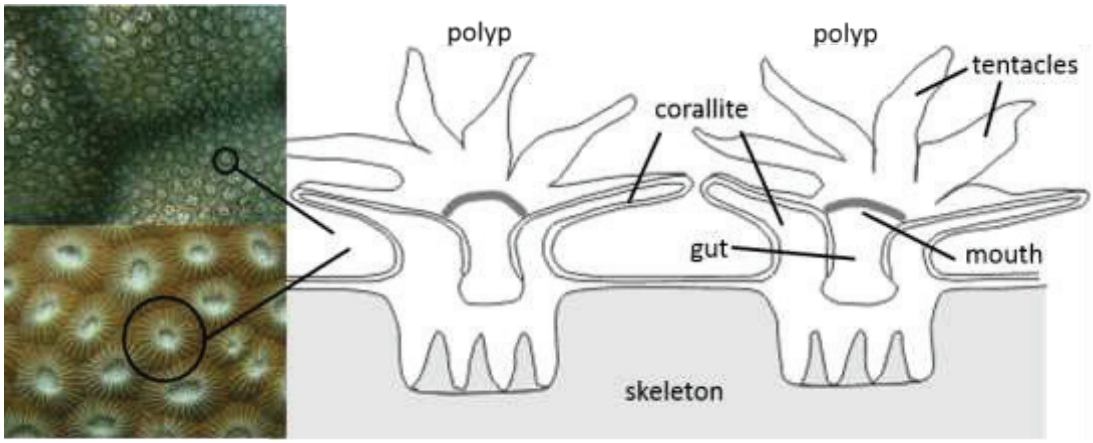


Fig. 2: Anatomy of coral polyps (Polyp image: http://web.stanford.edu).

Zooxanthellae

Corals contain tiny, single-celled algae, called "zooxanthellae" in their tissues (Fig. 3). When sunlight strikes these tiny algae cells, they convert it into food (nutrients), just like the leaves of plants. The algae cells leak most of that food out, which is taken up by the coral polyp, helping the coral to grow. As a result, reef building corals live only in sun-lit, relatively shallow waters, less than 300 feet deep.

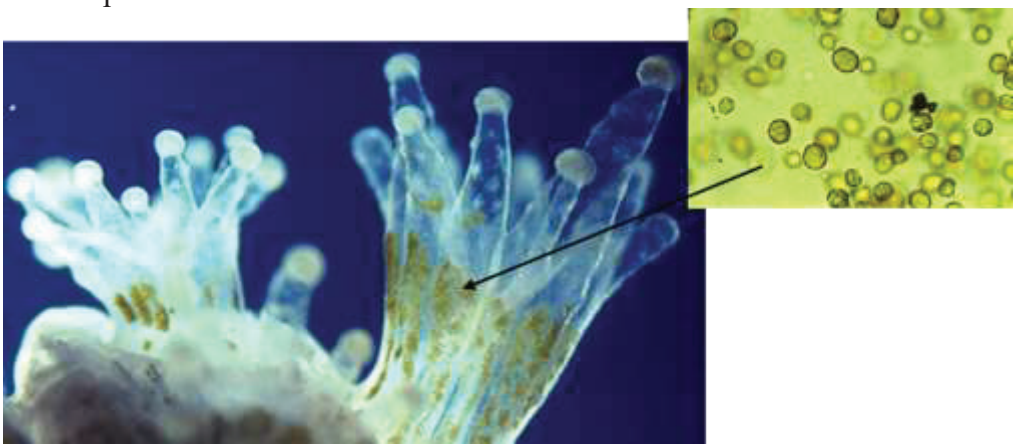


Fig. 3: Magnification of coral polyps (Image: ocean.si.edu) showing algae cells within the tissue (greenish flecks). The inset shows a magnification of those single-celled algae (Image: www.captivereefs.com).

The coral skeleton

Many corals build a hard calcium carbonate skeleton, and are therefore referred to as hard or stony coral. Their skeleton is all one piece, unlike our skeleton. They add to it continually throughout their life, so coral reefs are constantly growing. However, that growth is slow in many species, ranging from 0.1 to 4 inches per year. The shape of the skeleton is also very different in different coral species. Some species produce a branching skeleton, others have a single, mound-like (massive) shape, and still others grow in a very thin layer that covers the bottom resembling layer of paint (encrusting) (Fig. 4); some species even produce a table-shaped skeleton (a flat surface sitting on a stalk). The shape of the coral is very important in identifying different species. The details of the corallite (the cup that the polyp sits in) are used to further distinguish between species. The color of the coral is usually not very helpful as it can be quite variable within a species.

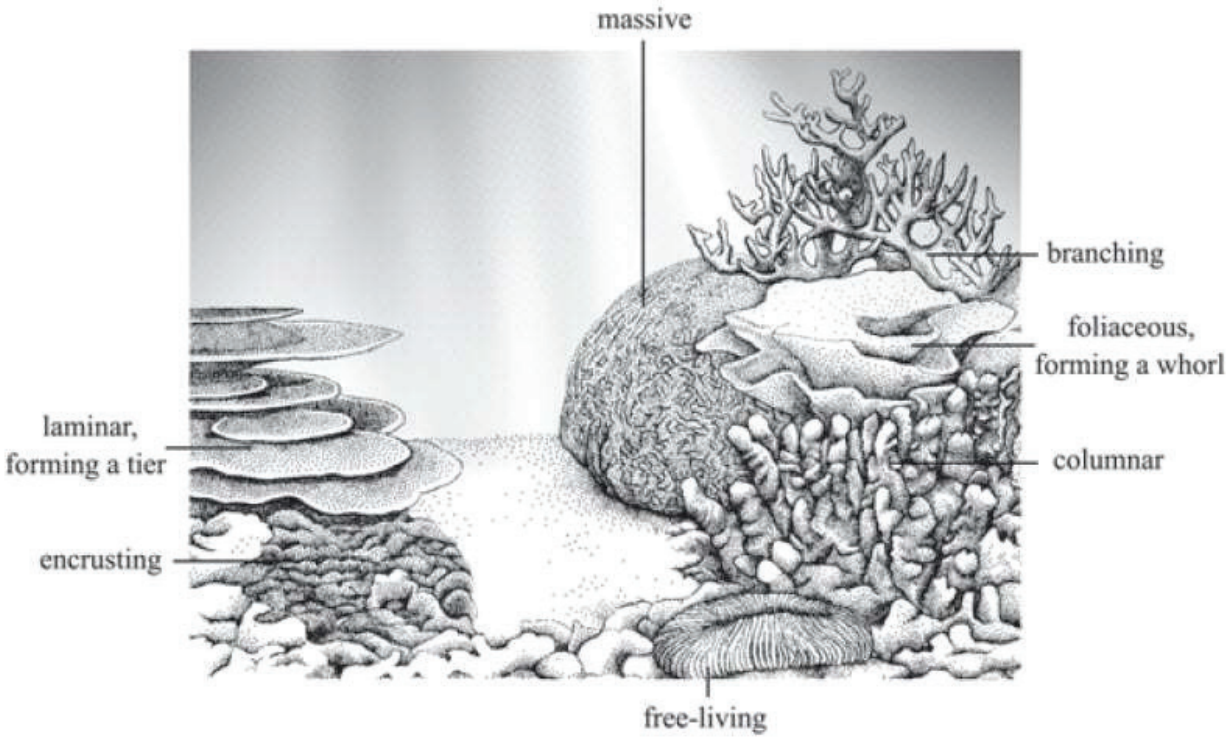


Fig. 4: Different shapes (growth forms) of coral colonies (Image: coral.biota.biodiv.tw).

Different types of coral

There are three different groups of coral: hard coral, soft coral, and fire coral. They all have polyps containing zooxanthellae as well as stinging cells (nematocysts). However, there are different defining characteristics separating these three coral types from each other.
As the name suggests, a major difference between hard coral and soft coral is the skeleton. In contrast to hard coral, soft coral do not produce a hard calcium carbonate skeleton, and so their body remains soft, flexible, and fleshy. Instead, soft coral contain small, spiny skeletal elements, called sclerites which give the colony some degree of support. Another main difference is that the polyps of soft coral have eight tentacles while the polyps of hard corals have six tentacles (or

multiples of six). Soft coral are not very common, nor diverse in American Samoa, and most have a knobby, finger-like appearance (Fig 5).

Fig. 5: Two different species of soft coral in American Samoa.

In contrast to hard and soft coral, fire coral are hydrozoans (all belonging to the genus, *Millepora*) but they superficially resemble hard coral. They have a calcareous skeleton with a smooth surface covered in tiny pinholes, or pores. Not surprisingly, *Millepora* means "many pores." A visible structure of fire corals are the long, thin polyps that look like fine transparent hairs covering the surface (Fig 6). The tentacles of these polyps are laden with very potent stinging cells (nematocysts) that can produce a fiery sting, giving fire coral its name.

Fig. 6: The hair-like stinging polyps on the surface of fire coral (Image: http://scuba.about.com).

Overview

There are over 250 coral species found in American Samoa. Even within a species, different coral colonies can be variable in their appearance depending on the surrounding environmental conditions. The species composition in the different reef zones, as well as between different geographic locations, is also often variable. However, some common species are relatively easy to distinguish. This guide presents 24 common coral species found in American Samoa.

Acropora clathrata (Table coral)

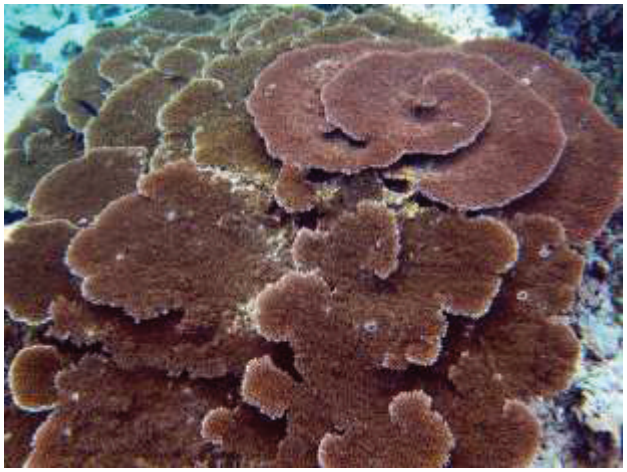
Acropora clathrata forms large table corals with a flat surface composed of little branchlets that grow nearly horizontal, pointing outward and slightly upward. The branchlets are often fused to each other on their sides and retain a uniform thickness throughout the table. Colonies are typically cream to grey in color. It is especially common on offshore banks but also present on the reef slope and, occasionally, in backreef pools.

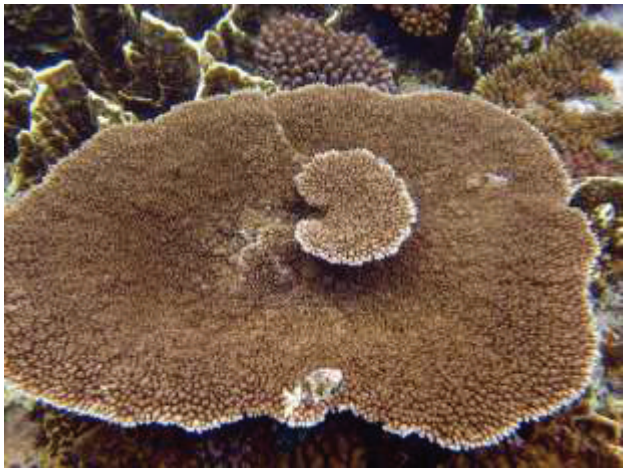
Acropora globiceps (ESA species)

Acropora globiceps forms digitate colonies with thick, finger shaped, vertical or radiating branches. It has a big corallite on each branch tip (called axial corallite) which is a short, raised tube. Corallites on the side of the branches are cylindrical, may have upward facing openings, are nearly uniform in size, and are often arranged in rows. Colonies are brown or fluorescent green and are most common on upper reef slopes, but can also be found in other zones. This species has recently been listed under the Endangered Species Act (ESA).

Acropora hyacinthus (Table coral)

Acropora hyacinthus forms large table corals that in some cases can have multiple tiers. In contrast to *A. clathrata*, the upper surface is composed of small vertical branchlets that taper strongly. Branchlets are lined with corallites that have a projecting lower lip. It is usually brown or reddish brown, but some colonies have a slight greenish tint. This species is most common on upper reef slopes but also occurs on reef flats.





Acropora muricata (Staghorn coral)

Acropora muricata forms staghorn colonies with branches about ½ inch thick that are covered in corallites shaped like small thin tubes that are sticking out from the branches. It is tan to brown, and it has a purple tip on the end of every branch. The purple tip is a very good distinguishing feature of this species in American Samoa. *A. muricata* is by far the **most common** staghorn coral in the backreef pools, but it does not occur on reef slopes.

Acropora nana

Acropora nana forms small branching colonies. It has a bushy appearance with radiating thin branches that are about ¼ inch thick. Branches are about the thickness of a pencil and usually are vertical or radiate from the center. Corallites lining the branches point toward the tip, though some are tubular and project. It is commonly reddish-brown. This species is usually the most common species on reef crests.

Acropora pulchra (Staghorn coral)

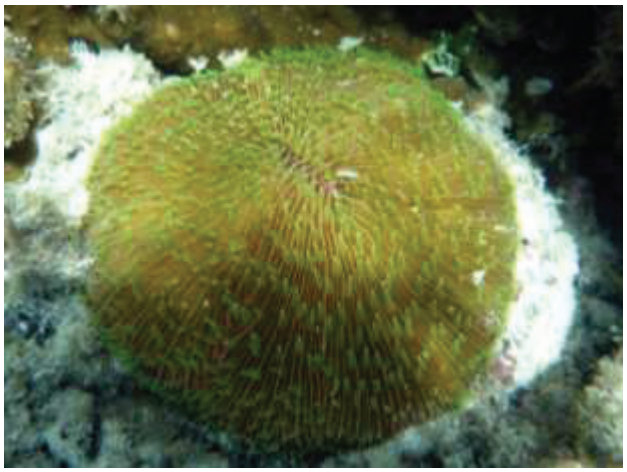
Acropora pulchra forms staghorn colonies with branches about ½ inch thick. Its tentacles are usually extended during the day, giving it a smooth look from a distance and a fuzzy look closer up. The corallites are ear-shaped and sticking out between the tentacles. It is usually reddish-brown in color with white branch tips. *A. pulchra* is the second most common staghorn coral found in the backreef pools but it does not occur on reef slopes.

Diploastrea heliopora

Diploastrea heliopora colonies are among the largest coral colonies found in American Samoa. It forms large encrusting sheets on steep slopes with thick, overhanging lower edges. The corallites are very large, about ½ inch in diameter, and resemble little volcanoes with ridges running down their side. They are dull green or sometimes grey in color with light centers. They only occur on deeper reef slopes.

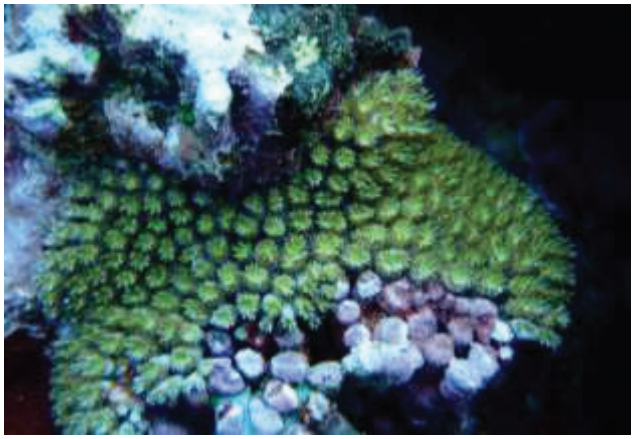
Fungia fungites (Mushroom coral)

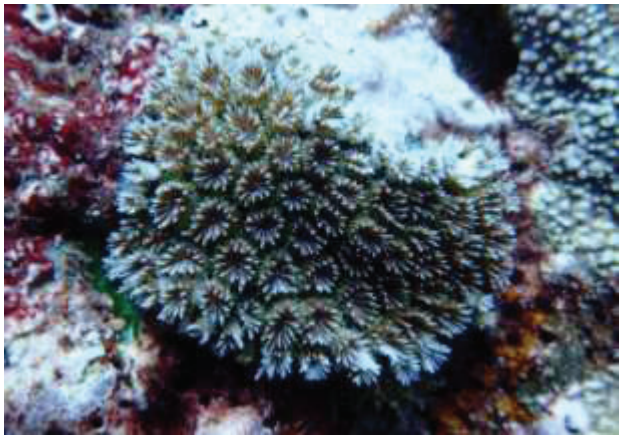
Fungia fungites forms discs that are composed of a single polyp (in contrast to most other corals found on the reef). The slit in the center is where the mouth is located. It is "free-living," meaning it is not attached to the substrate, unlike most other corals. It has radiating teeth-like ridges that are close together with small green tentacles that are often extended from between the ridges. It can reach up to 1 foot in diameter. It is commonly referred to as "mushroom coral" for their resemblance to an overturned mushroom cap. It is most often yellow-green and rarely purple in color. It is common in backreef pools and on reef slopes.



Galaxea fascicularis

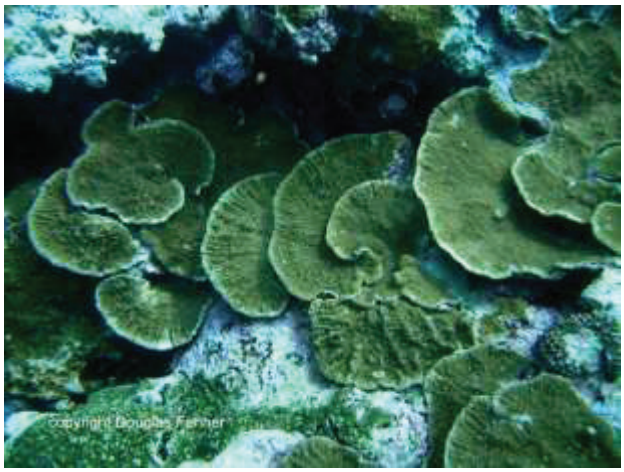
Galaxea fascicularis forms small encrusting colonies that are often hidden in crevices and between indentations in the reef. The surface is covered with circular, long tube-shaped corallites that are less than 1/2 inch in diameter. The corallites have a wide space in between them and are lined with long spines, making the surface look spiky. Protruding around the spines are tentacles that are a light contrasting color with a white tip. Colonies are usually dark green or brown and are fairly common on reef slopes.

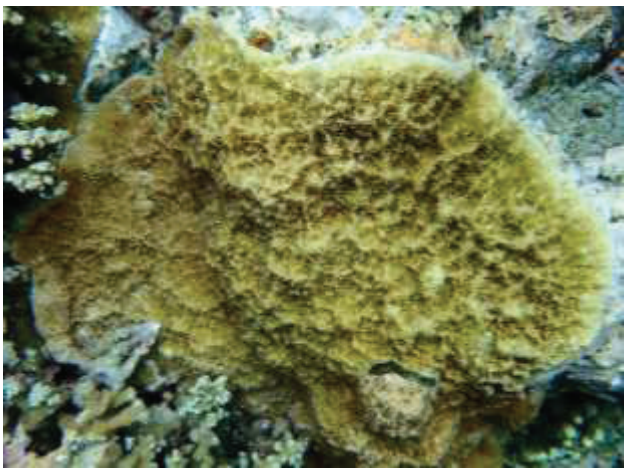


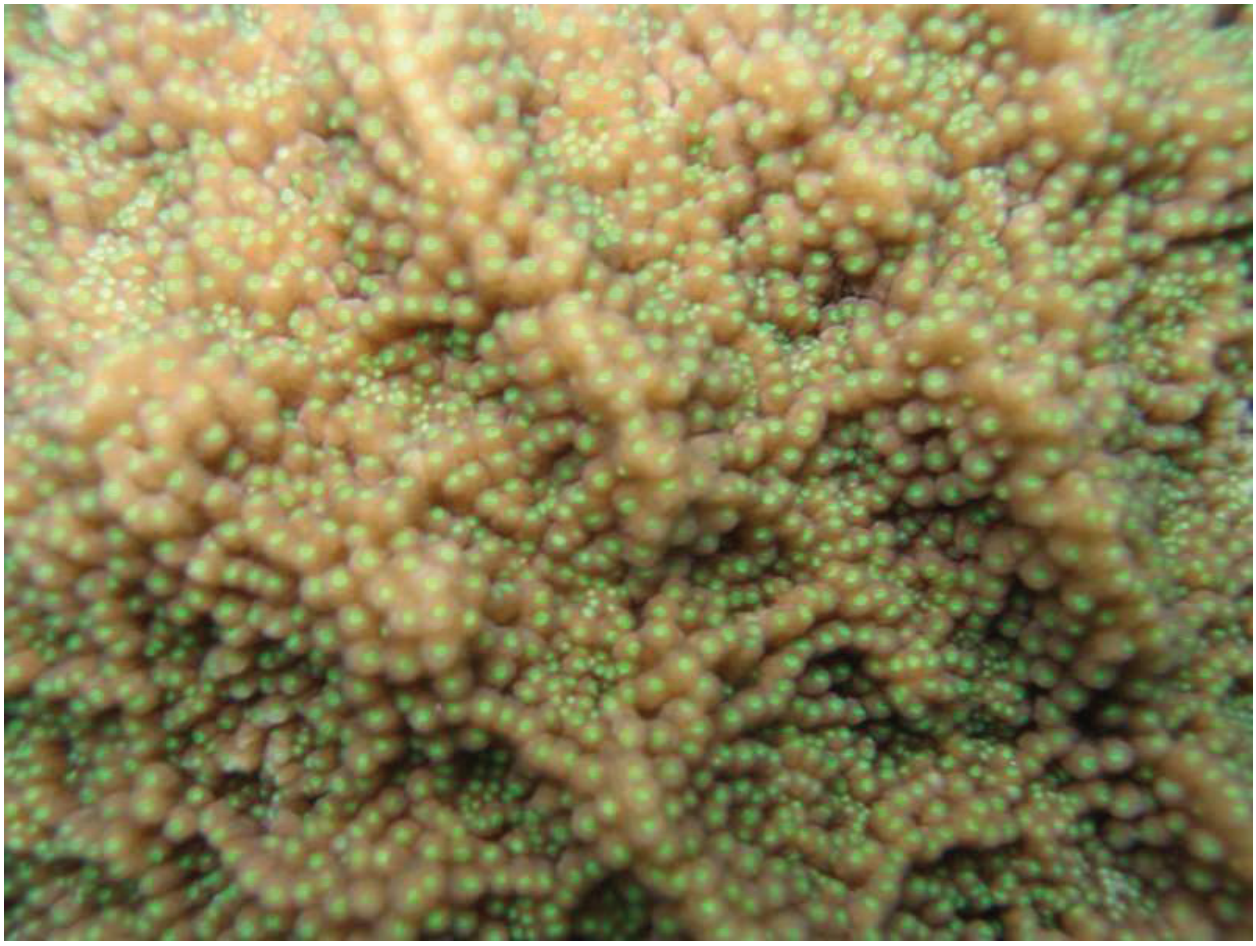


Isopora crateriformis (ESA species)

Isopora crateriformis forms encrusting colonies that can have a plate lower edge. The surface often has an irregular network of thin ridges and is covered with small round tubular corallites that sit very close together. Colonies are about a foot in diameter and are reddish-brown. Sometimes the center of the corallites are green. It is most common on upper reef slopes, especially in the SW of Tutuila. This species has recently been listed under the Endangered Species Act (ESA).







Leptoria phrygia (Brain coral)

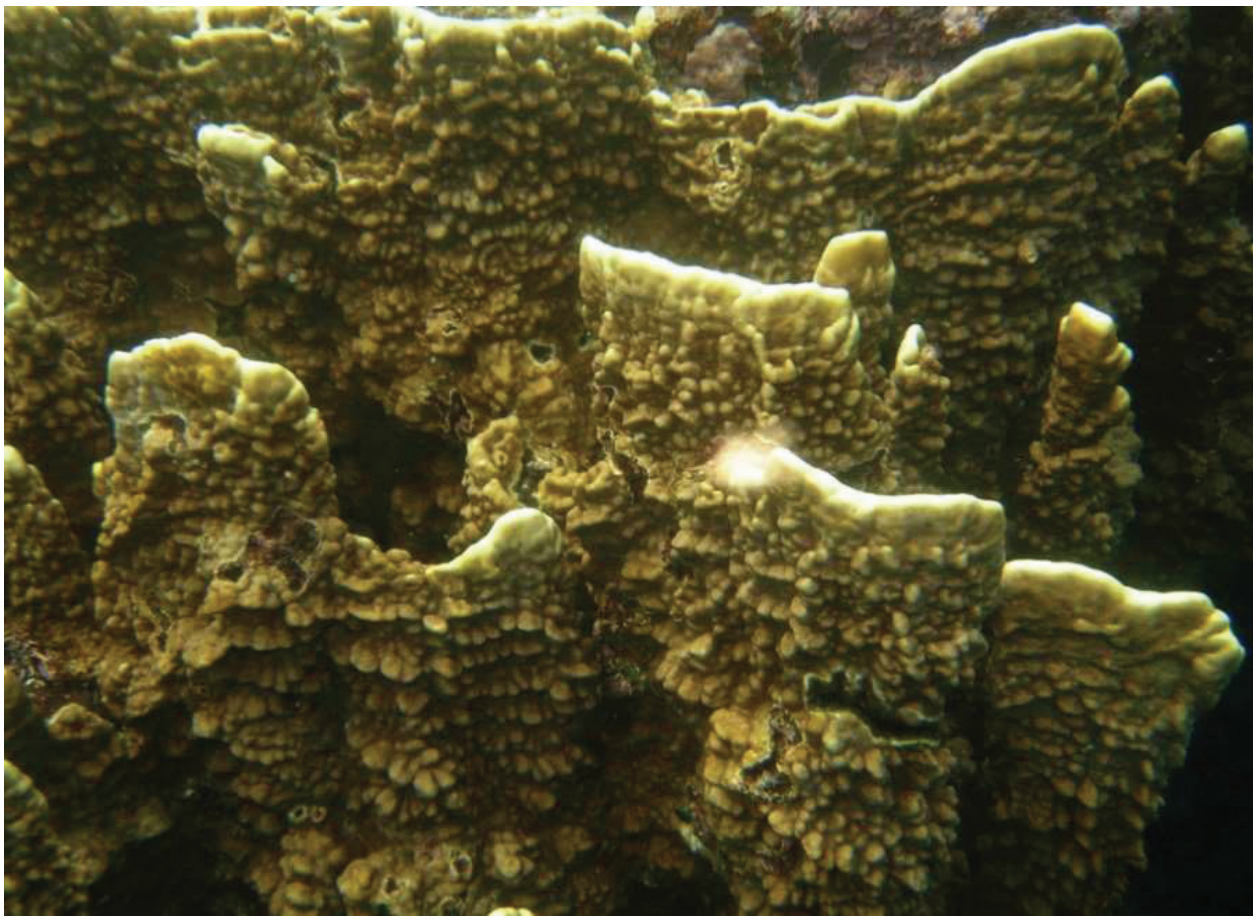
Leptoria phrygia forms massive, lumpy or even encrusting colonies that have small, winding, uniform ridges on the surface. On a closer look, these ridges have small teeth on their sides making the ridges resemble a zipper. It is most often brown or cream, but sometimes it has a fluorescent green color between the ridges. It is commonly referred to as “brain coral” due to its resemblance to a brain. It is most common on reef slopes but can occasionally be seen on reef flats.

Lobophyllia hemprichii

Lobophyllia hemprichii forms very large mounding colonies. The surface is composed of large oval corallites that are about 2 inches in diameter. There is a very thin crack between adjacent polyps which can go several feet down into the colony because each polyp actually sits on the end of a branch. However, the branches can only be seen if the colony is broken. It is brown and most common on medium depth reef slopes.

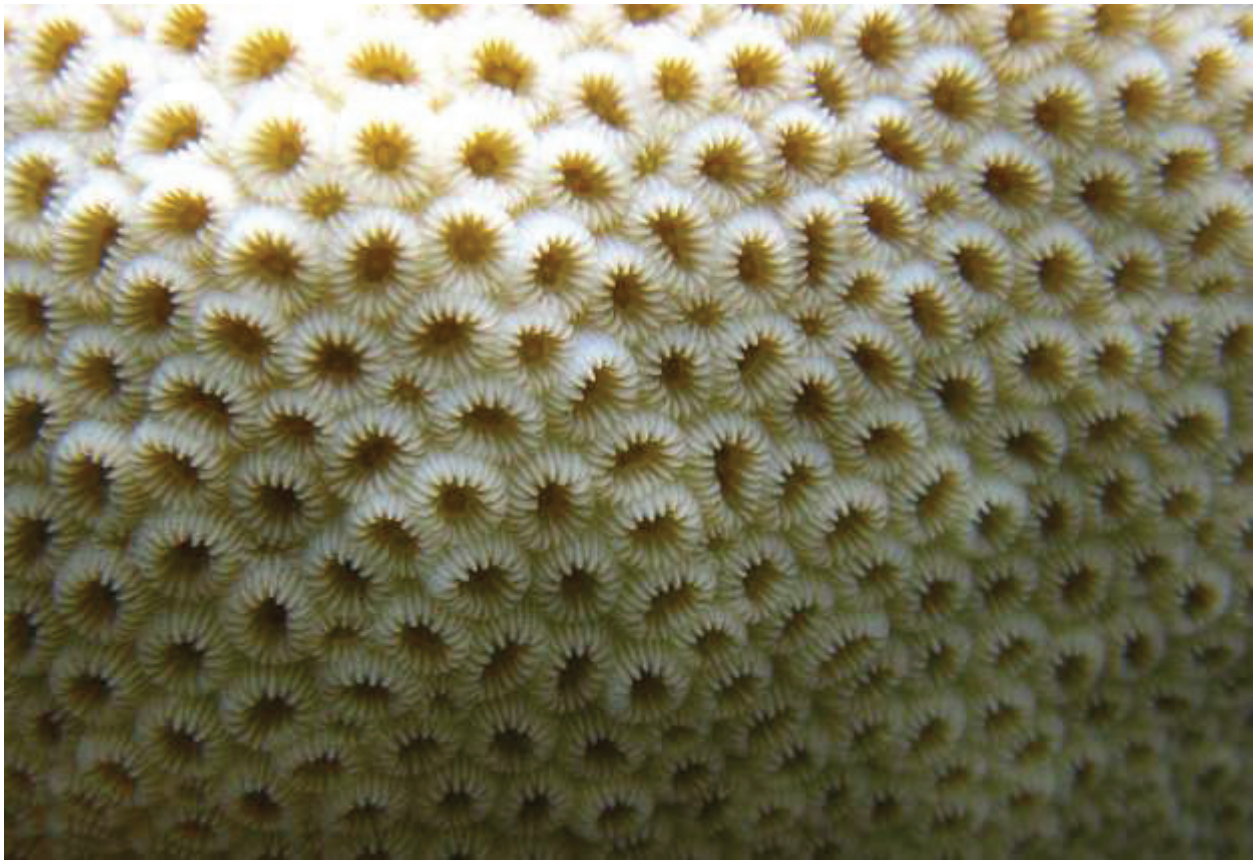
Millepora platyphylla (Fire coral)

Millepora platyphylla forms colonies with thick paddle-shaped columns growing upwards that are about ½ inch thick. The upper edges of the paddles are flat or rounded, and the sides are usually bumpy. It is brown or yellow-brown in color. It has hair-like polyps on the surface that have very potent stinging cells which can produce a fiery burn on tender skin, giving fire coral its name. Their stings are not dangerous and only cause light pain for a short period of time. It can be common on outer reef flats and reef crests and moderately common on reef slopes.



Montastrea curta

Montastrea curta forms small mounding or encrusting colonies. The corallites are about ¼ inch in diameter, circular and relatively uniform. A narrow groove separates the corallites from each other. Smaller, 'daughter' corallites that appear as though they have been squeezed into the available space can be observed. This process is called "extra-tentacular budding" which is an asexual form of reproduction where a new polyp forms on the side of the parent polyp. This process gives the surface of the colony a crowded appearance. It is cream to white in color and very common on reef slopes.



Montipora (encrusting)

A variety of different species of encrusting *Montipora* coral occur on the reefs, but they are very difficult to identify to species level as they all have very similar appearances. They form thin encrusting colonies that are covered in tiny polyps with tiny bumps or spines in between the polyps giving it the look of coarse sandpaper. Most commonly, it is a shade of brown, but sometimes you can find green or purple colonies. It is by far the **most common** coral on reef slopes.

Pavona chiriquensis

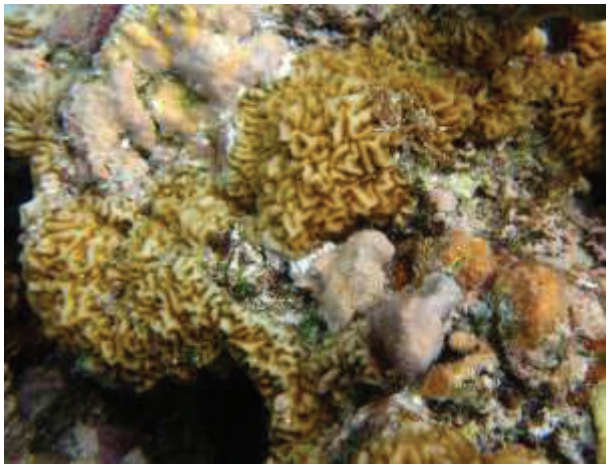
Pavona chiriquensis forms small encrusting colonies with tiny, irregular, widely spaced bumps. Corallites are small and irregularly spaced between the bumps. The bumps have small ridges running up the side. It is generally a shade of brown or grey and it is often found a bit recessed, in cracks, or between other reef substrate. It is most common on reef slopes and sometimes also found on reef flats.

Pavona frondifera

Pavona frondifera forms very crinkly colonies with small vertical plates that have many ridges running down the sides. The ridges grow until they themselves become small plates. Plates turn and twist in many directions and are densely packed together. Corallites are very small and look like little pin holes on the surface. It is yellow-brown and most common on reef flats and the edges of backreef pools.

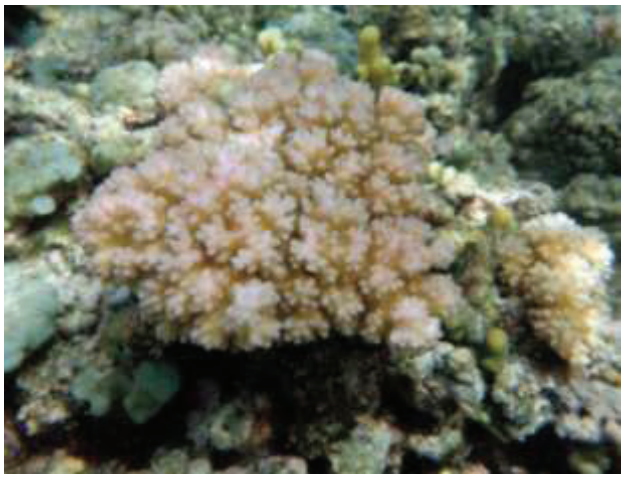
Pavona varians

Pavona varians forms small encrusting colonies that have small winding ridges covering the surface. Corallites are very small and barely visible between the ridges. This species is often found a bit recessed, in cracks, or between other reef substrate. It is generally a shade of brown and very common on the reef slopes.



Pocillopora damicornis (Cauliflower coral)

Pocillopora damicornis forms small branching colonies that have a bushy appearance. It has thin branches less than ¼ inch thick that are packed close together and are covered with little bumps making it appear very irregular and knobby. The tentacles of polyps are often extended giving it a fuzzy look. Branch tips are round and usually a shade of cream to light brown. Colonies are relatively common in pools and on the reef crest and can also be found on the reef slope.



Pocillopora verrucosa (Cauliflower coral)

Pocillopora verrucosa forms small branching colonies with thick branches that are about ½ inch thick. The branches have rounded tips and are covered with little bumps. Corallites are small and look like brown dots covering the surface. Colonies are usually light brown or cream. It is particularly common on the reef crest but also found on the reef flat and the reef slope.

Porites cylindrica (Finger coral)

Porites cylindrica forms branching colonies that can create coral "fields" in which it is difficult to distinguish between individual colonies. The branches are about ½ inch thick, finger-like, and have rounded tips. Corallites are small and the tentacles of polyps are often extended giving it a fuzzy look. It is most commonly grey-brown, but some colonies are yellow-green. It dominates backreef pools and it can also be found on the reef slope.

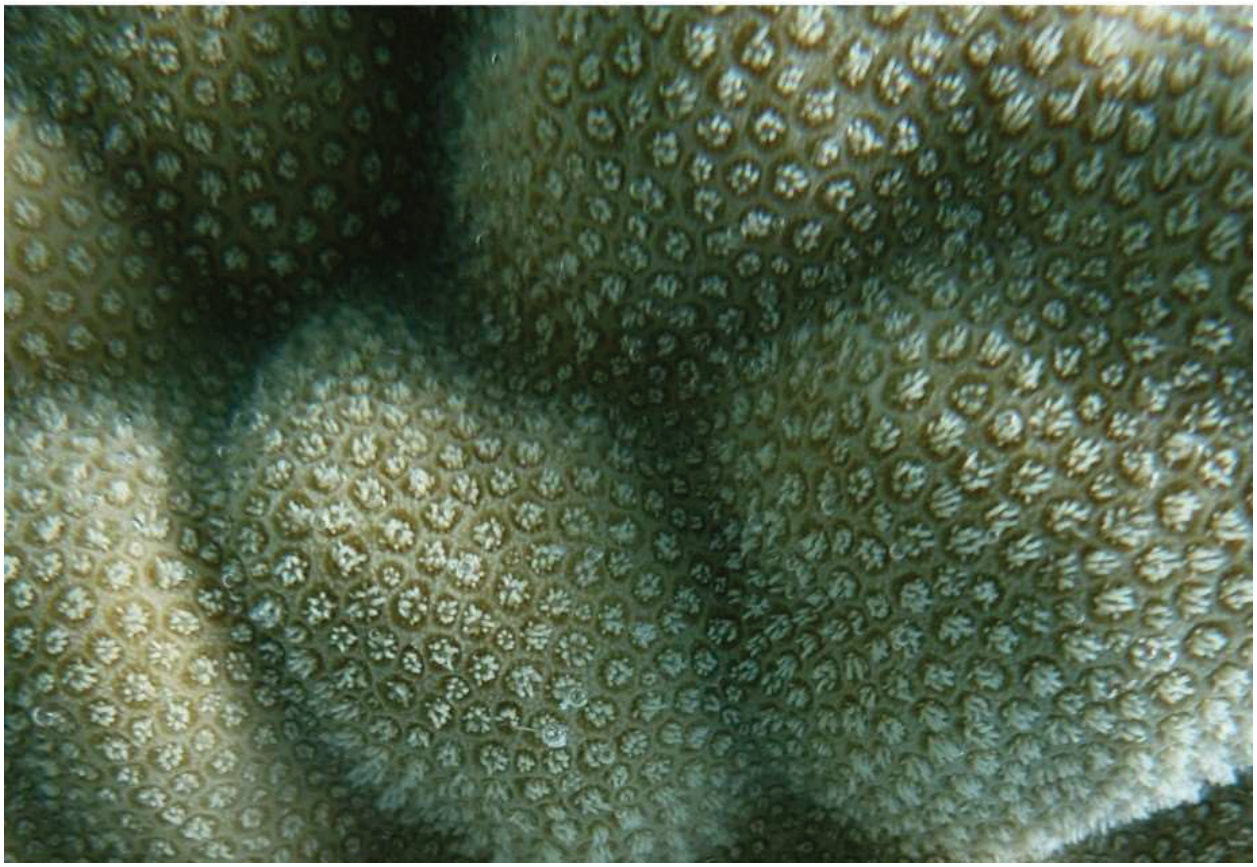
Porites rus

Porites rus colonies form a combination of thin, nearly horizontal plates and vertical columns that are irregular and slightly bumpy. In some cases the columns can be fused together and may not have any plates. A distinctive pattern of little white ridges can be seen on the tops of columns. Colonies can get very large and are commonly brown or rarely blue-grey. It is very common on the reef slope and it is occasionally also found in backreef pools.

Porites (mound)

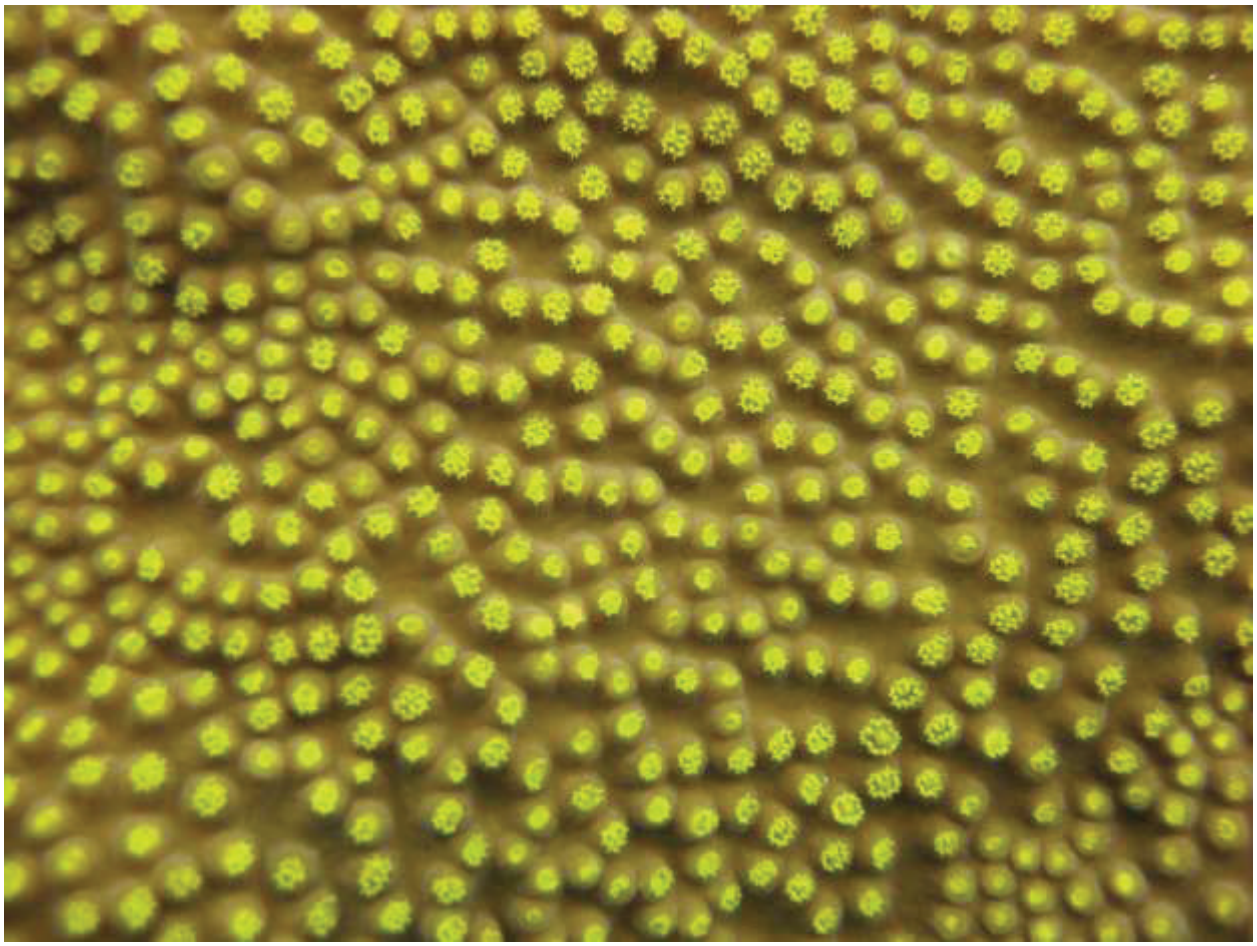
There are several species of *Porites* that form mounding (also referred to as massive) colonies which are difficult to distinguish. Mounding *Porites* form rounded, solid colonies that can be very large. Corallites are tiny and the surface of the colony is often slightly bumpy. They are commonly yellow-brown or green, sometimes brown, and rarely purple. They are very common on reef slopes but also found on inner reef flats and in backreef pools.

Fun fact: The southwest coast of Ta'u contains multiple giant *Porites* colonies which are among the biggest in the world. The largest of these colonies was named "Big Momma," with a circumference of 135 feet and a height of 20 feet! It was estimated to be over 500 years old.



Turbinaria reniformis

Turbinaria reniformis forms thin plates which may have whorls. Corallites are small, round projections about 1/8 inch in diameter. The distance between corallites is uneven, ranging from tightly packed to relatively widely spaced. The space between the corallites is smooth and the tentacles of the polyps are typically extended. Colonies are usually yellow or brown-green with yellow polyps. It is fairly common on some slopes and very common in the Ofu pools.

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