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A SKIN DIVER'S GUIDE
TO THE MARKED PATCH REEFS
IN BISCAYNE NATIONAL MONUMENT, FLORIDA

Coral reefs are some of the most beautiful and interesting of all living communities. We hope this guide will help you find and safely enjoy a few typical coral reefs in Biscayne National Monument.

The only living coral reefs in the continental United States are found along the scimitar-shaped arc of the Florida Keys. The Upper Keys themselves were once coral reefs, over 100,000 years ago when sea level was much higher than it is today. Now shallower portions of that ancient reef form the limestone foundations of the Keys, while deeper parts of the old reef provide the hard bottom needed as a foothold by today's living coral reef. With a sunny place to stand, and the warm clear waters of the northward flowing Florida current bringing them food and oxygen, colonies of tiny coral animals, called polyps, create massive, intricate, limestone condominiums that are used by thousands of plants and animals as shelter.

The ancient reef forms a shallow curved shelf. On the eastern edge of the shelf, the outer reef drops off to depths greater than 100 feet (30 m). Behind the outer reef, in sheltered lagoon-like waters, small reef patches rise to the surface in a complex irregular pattern. It is on these shallow patch reefs where novice and intermediate skin divers can easily get acquainted with Florida's coral reefs.

The patch reefs described in this guide are marked by small blue and white mooring buoys and are typical of nearly a hundred such reefs in the monument. They are located two to three miles (3-5 km) east of Old Rhodes and Elliott Keys, as shown on the chart. They can be easily reached by boat from Caesar's Creek. Bearings from the marker buoys to prominent landmarks and navigational aids are indicated on the individual reef maps. These maps show the outlines of the reefs and the general locations of different types of corals. One patch reef includes an adjacent schooner wreck. Water depths are also indicated for your convenience. A careful lookout must be kept for shallow coral heads that seem to pop up everywhere when operating boats in this area. Remember that the reefs are here because they need sunlight and flowing water, so don't get sunburned and always swim with a buddy up current from your boat. Tie to the buoy to prevent damaging the reef with your anchor, and have fun.

SAFETY TIPS TO REMEMBER

1. Always swim in pairs; use the buddy system.
2. Be aware of tidal currents; stay upstream of the boat.
3. Coral is sharp and will cause painful, easily infected cuts.
4. Beware of sunburn, even when you are in the water.
5. Sea urchins have sharp spines.
6. Most animals bite; leave them alone.
7. Display a dive flag.

This booklet was prepared for your enjoyment by the staff of Biscayne National Monument, National Park Service., U. S. Department of the Interior. The Superintendent of Biscayne National Monument, whose address is P.O. Box 1369, Homestead, Fl., 33030, is in immediate charge.

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National Park Service
U.S. Department of the Interior

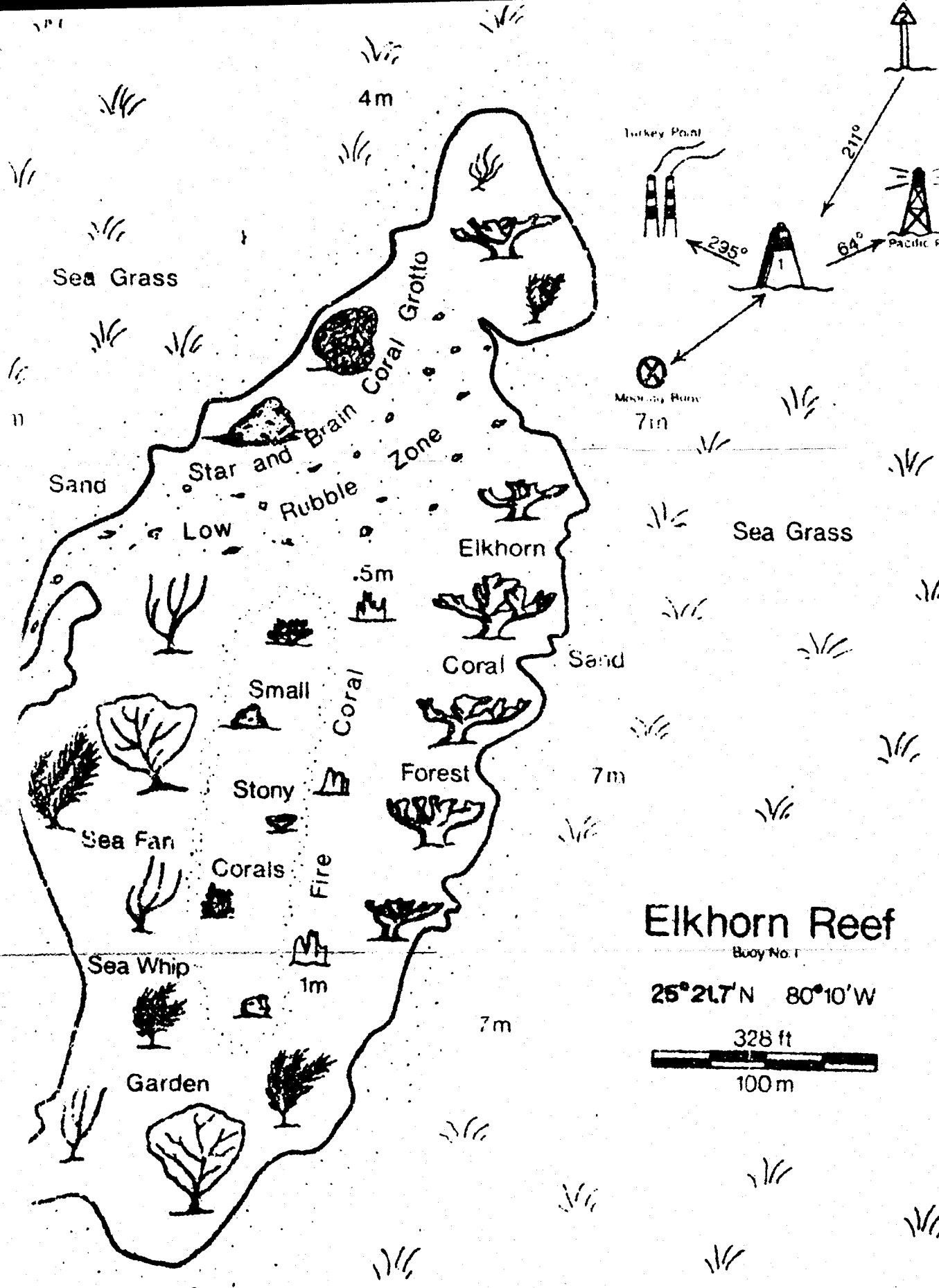
ELKHORN REEF (Buoy No. 1)*

Named for the large branching colonies of elk, or moose, horn coral that dominate its northern and eastern flanks, Elkhorn Reef is a shallow, small scale piece of the deeper offshore reef. It is approximately 1600 feet (500 m) long, from north to south, and 640 feet (200 m) wide, from east to west. Even though the deepest water near the reef is less than 25 feet (7.5m), much of the biological zonation typical of deeper, offshore reefs is present.

From a seagrass and sand bottom to the east, the reef rises abruptly as small finger-like ridges alternate with sand bottomed ravines. The tops of the ridges are covered with elkhorn coral, which absorbs the energy of the gentle summer waves from the southeast, and filters the plankton from the open sea. Behind these front line defenders, is a shallow fire coral and rubble zone where the turbulence and sand from spent waves prevents all but the most hardy reef dwellers from living. As the water deepens slightly to the west, sea fans and sea whips wave and bend before the currents, and low profile brain and starlet corals hug the bottom. In the quieter waters of the back reef, small thickets of delicate finger coral and patches of lettuce coral are common. At the northwest corner of the reef, which receives the brunt of the winter storms, several large heads of common star coral and brain corals provide shelter for reef fishes.

Just as the corals on the reef are found in zones or patterns, the fishes that seemingly flit all over the reef can also be found in specific places. A few minutes of careful observation will reveal that some of the fishes, particularly the damsels, seldom leave the small areas of the reef they call home. The sponge eating queen angelfish, and their photogenic cousins, the French and gray angelfish, are typically found swimming amongst the elkhorn coral and crevasses on the eastern front of the reef. Others, like the grunts and black margates, select favorite resting places where they spend the daylight hours waiting to feed in the surrounding area at night. Groupers and barracudas also patrol certain portions of the reef, and can be predictably found, once you get to know the reef community and its various neighborhoods. On the other hand, some fish, like the blue tangs, ocean surgeons, wrasses, and parrotfish, are citizens-at-large and wander about the reef all day. Wander with them and enjoy the beauty and grace of the reef.

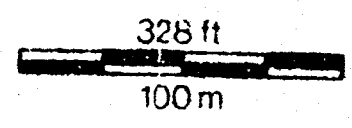
*25°21.7'N, 80°10'W



Elkhorn Reef

Buoy No. 1

25°21.7'N 80°10'W



INTERPRETIVE
REEF

Schooner Wreck (Buoy No. 2)*

For centuries the Gulf Stream along Florida's east coast has formed an important shipping lane for vessels of both the new and old worlds. In the early 1700's, Spanish galleons laden with silver, gold and riches were sailing from the harbor of San Cristobal de la Habana (Havana) northward along the curving arc of the Florida Keys enroute to Spain's ports. In later years, sleek fast schooners engaged in inter-island and coastal trade, transited these waters.

The journey through the straits of Florida held many unpleasant possibilities. To the west, the great line of Florida reefs fringed the Keys and eastward were the shoals of the Bahama banks. Both coasts converge to a passage only fifty miles wide. With scarcely twenty five miles of water off either bow, early sailing ships blown only a little off course by storm winds or caught in a hurricane stood a high chance of running aground. In addition, strong currents of the Gulf Stream and prevailing southeasterly winds reduced the accuracy of navigation.

In 1733, a Spanish Armada of over twenty ships, each laden with riches, was caught in a hurricane in the straits. Nineteen of the galleons were washed onto the reefs and sunk during the storm. For centuries the lower coast of Florida became the graveyard of storm wrecked galleons and schooners. During the 1800's, coastal schooners carrying commercial trade goods frequently ran aground and salvaging wrecks became a profitable business for many residents along the Keys. With the development of steam engines, the construction of lighthouses to warn ships of danger, and weather services to forecast storms, passage through the straits of Florida became safer and the profits of salvaging died.

The name and fate of the ship sunk at this site is unknown, but it is believed to be a late 18th century schooner. A short swim over the remains of this schooner is a direct link to the great sailing days of the past. Typical of most wrecks, all that remains today are the piles of ballast rock which served to weight the hull of the ship, and a few scraps of coral encrusted iron. The wooden hull has long ago rotted away. Careful observation will reveal the original position of the keel left lying between the two piles of ballast rock. On the north side of the largest ballast pile, a large iron gear box (encrusted with fire coral) remains. White sand outlines the original extent of the wreckage.

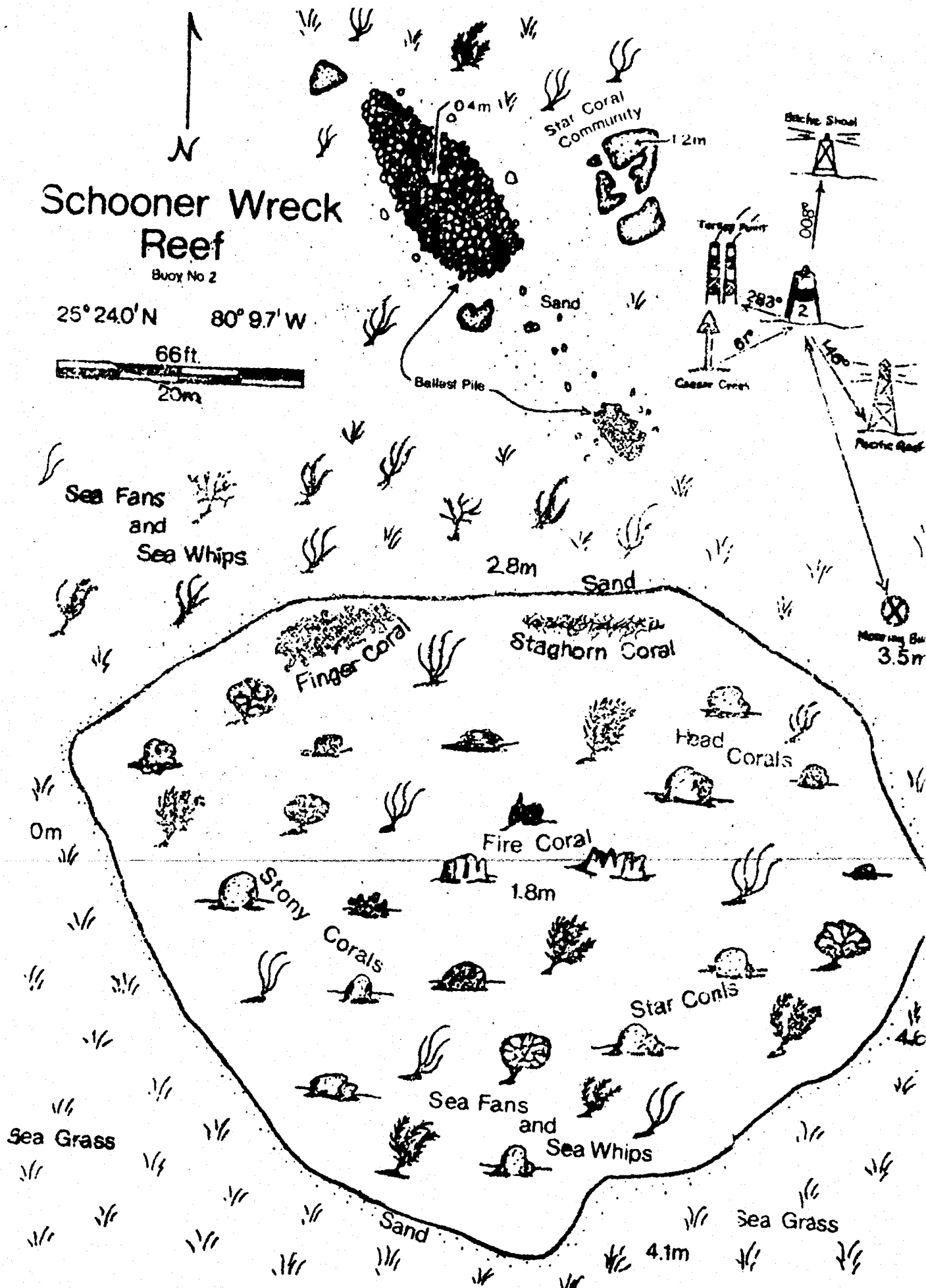
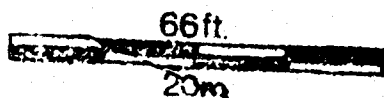
Numerous species of tropical reef fish can be seen darting in and out of the mounds of ballast. A survey to the north will reveal three large beautiful star coral heads with several grouper and large snapper lying in holes underneath. To the south a short distance is a patch reef rising to within a few feet of the surface. Perhaps it was this reef that dealt the final blow to the ill-fated schooner. This small reef has an interesting variety of corals, sea fans, whips and plumes.

*25°24.0'N, 80°09.7'W

Schooner Wreck Reef

Buoy No 2

25° 24.0' N 80° 9.7' W



STAR CORAL REEF (Buoy No. 3)*

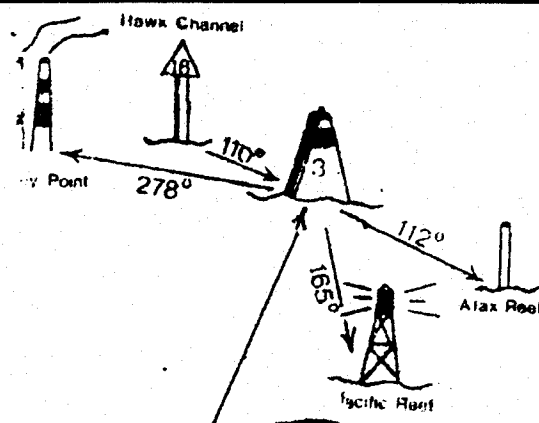
This small patch reef is very similar to the reefs that built the Florida Keys 100,000 years ago. The bulk of the reef is made up of limestone skeletons from corals cemented together with a mortar of algae, broken shells and sea water. The huge, golden brown, living coral colonies along the western edge of the reef are common star coral, Montastrea annularis. This coral is the chief architect of most patch reefs in the monument.

The shallow center of the reef, only 8 feet (2.5 m) from the surface, is cluttered with purple sea fans and other soft corals. A quick swim around the reef reveals nearly half of the 50 kinds of stony corals found in Florida. Large spherical starlet and brain corals are readily apparent. The small and delicate cactus, flower, and leaf corals can be found by the careful observer on the edge of the reef where they are not exposed to storm waves that pound the flexible sea ships and sea feathers that occupy the top. Small clumps of staghorn coral are found on the southeastern, windward, edge, where they can take advantage of the turbulent water that the other stony corals dislike.

Over 50 kinds of tropical fish call this reef home, and many more can be seen just paying an occasional visit. A large school of hatchet-shaped glassy sweepers usually seeks shelter under the massive star coral heads on the northwest corner of the reef. Coppery reef croakers, with a black spot at base of each pectoral fin, are also commonly seen hiding behind the larger corals. The bolder damsel fishes like the sergeant major and dusky damsel hover over the corals, rise slightly to greet swimmers, and then dart back to their homes. Generally indifferent to human intruders, the colorful parrot fishes chew away at the stony corals with their bird-like beaks. If you listen carefully, you can hear each bite as they make sand out of the coral. The sand fills the crevasses in the reef, is cemented into rock, and more reef is built

Spiny lobsters hide in holes in the reef during the day, and range out onto the surrounding sea grass flats at night in search of sea biscuits, young conchs, and other favorite foods. Heavy fishing pressure has severely reduced the number of lobsters found on this reef in recent years, so you will have to look hard to find the waving antennae that give them away as they sit far back in their lairs.

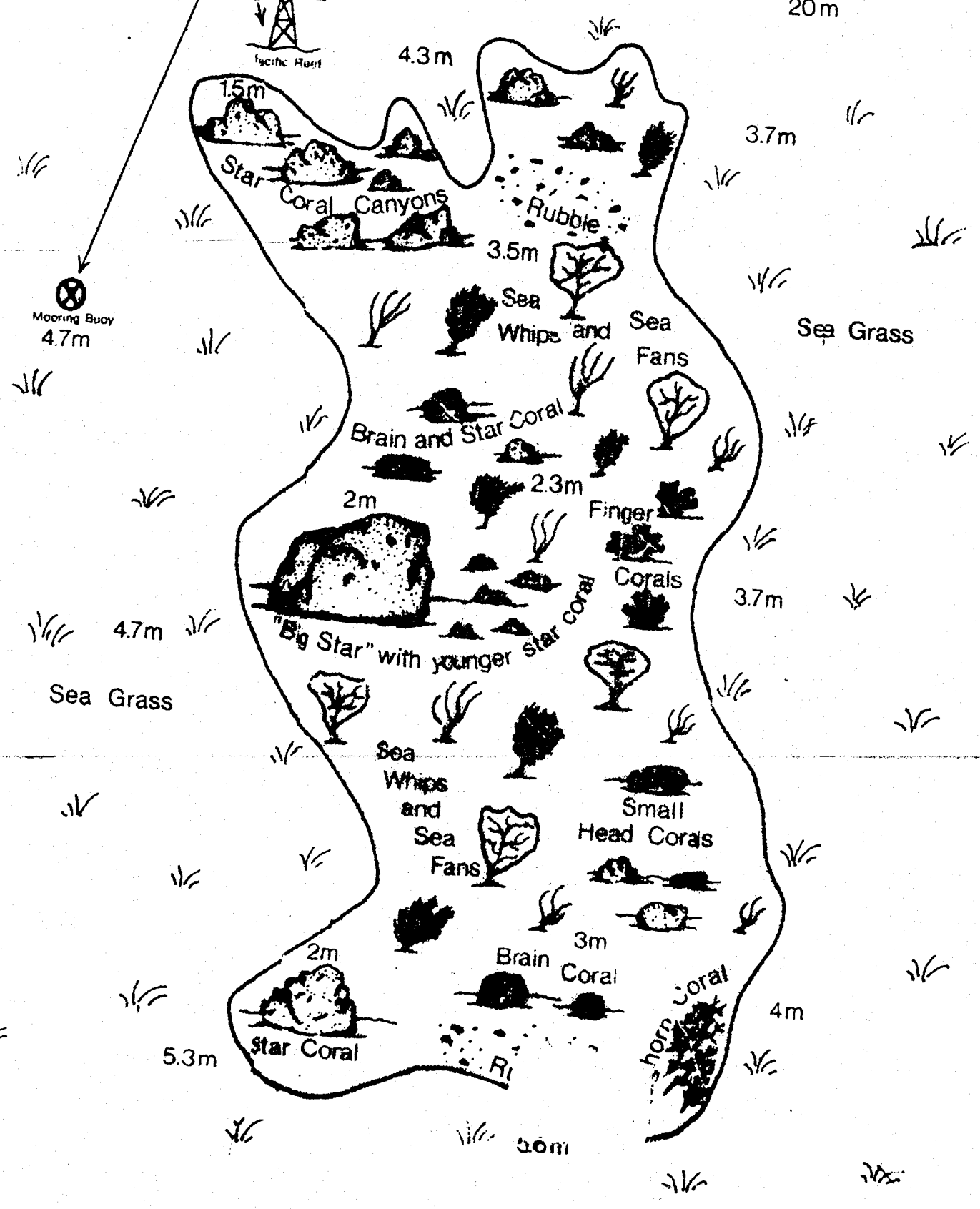
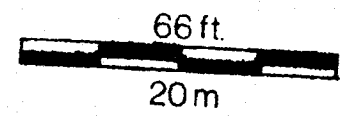
*25°24.6'N, 80°09.2'W



Star Coral Ree

Buoy No. 3

25° 24.6' N 80° 09.2' W



Just east of turbid Hawk Channel, northeast of Margot Fish Shoal, this small patch of large coral heads demonstrates some corals' ability to withstand the cloudy water spilling out of the channel displacing the clearer reef tract waters. Although not as conspicuous as coral on this reef, algae are very important to reef growth and development. The decomposed skeletons of calcareous algae, like the bright green fingernail-sized plates of Halimeda growing amongst the corals, make up a significant portion of the sand that helps cement the reef structures together.

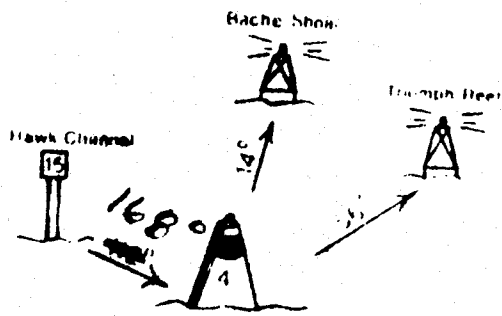
Another important non-coral reef builder is also common on this reef. More closely related to the dangerous stinging Portuguese Man-of-War than to the reef corals, the mustard colored Fire Coral encrusts the upper surfaces of many of the large coral heads along the western edge of the reef. All corals are sharp and can cause painful easily infected, cuts if touched. Fire Coral adds the sting of its microscopic harpoons to the problem. "Look; don't touch" is the slogan for the safe reef browser.

Other members of the reef community to watch from afar are the walking pincushions, or sea urchins. Scientists call the large black spiny urchin Diadema for the jewel like spots nestled amongst its spines like a crown, or diadem. These urchins seek the shelter of the reef during the day, and graze on the sea grasses nearby at night, maintaining the sandy halo common around most patch reefs.

Brilliant colors and bizarre shapes identify yet another unsung group of reef builders, the sponges. They filter hundreds of gallons of sea water a day for food and oxygen, taking the water in through tiny holes all over their bodies, and pumping it out with their wastes through a few large holes on their upper sides. Their semi-rigid bodies contain thousands of intricate brittle spicules, shaped like children's jacks, dumb-bells, and other geometric designs. Released by the death of sponge, these spicules also add to the mortar of the reef.

The fish of Dome reef are typical of many patch reefs in this part of the Monument. Juvenile and adult parrotfish are especially common. The striped Tom Tate grunts school, while school master snappers hide between the corals, and daring seargeant major damsels challenge the swimmers to their piece of the rock. Many juvenile reef fishes use the patch reefs as nursery areas, or way stations on their journey to the outer reefs. It is a good place to look for the brilliantly colored juvenile angelfishes, porkfish, and several damsel fish that will display completely different color patterns as adults.

*25°26.8'N, 80°9.5'W



Dome Reef

Buoy No 4

25° 26.8' N 80° 9.5' W

