5.0 Description of the Project

5.01 Proposed Time Frame

When permit is granted, Dependable Maritime can then purchase US Army Corps of Engineers approved reef ball molds at a then discounted price from the Reefball Foundation. The two sites (Coki pt. and UVI) are to be done first and completed with volunteer labor and donated supplies.

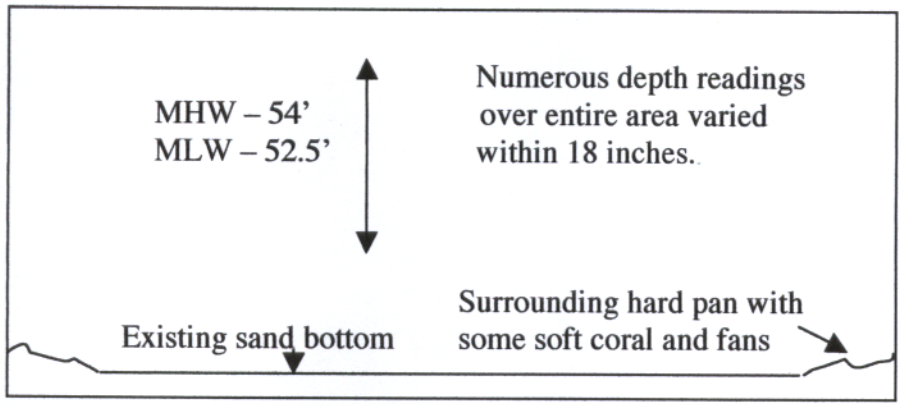
3 balls a week can be deployed from the beach with a small group of people or students and no impact to the beach as the ball can be safely rolled into the sea. The reef balls can be built off site so as not to visually impact any shoreline assets. Total deployment time – 2 months per site.

The cloudbreak site would have to wait completion of the other two sites, and monitoring has begun, then the business of a memorial funded ecosystem can begin.

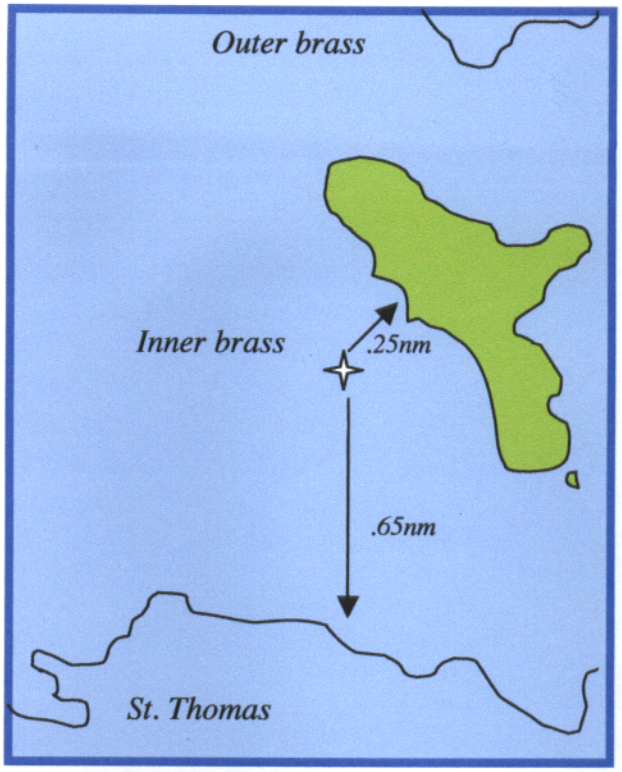
5.02 Drawings and Maps

Please refer to Figures 4, 5, 6.

CLOUD BREAK REEF CREATION – INNER BRASS ISLAND
Large sand bottom area approximately 300yds from shore in 50'+ Water, surrounded by hard pan.



Observed while diving: jellyfish, sea cucumber, blue fry, rock hind, wrasse, grunt, jacks



Sand bottom area – star marks center point of location.

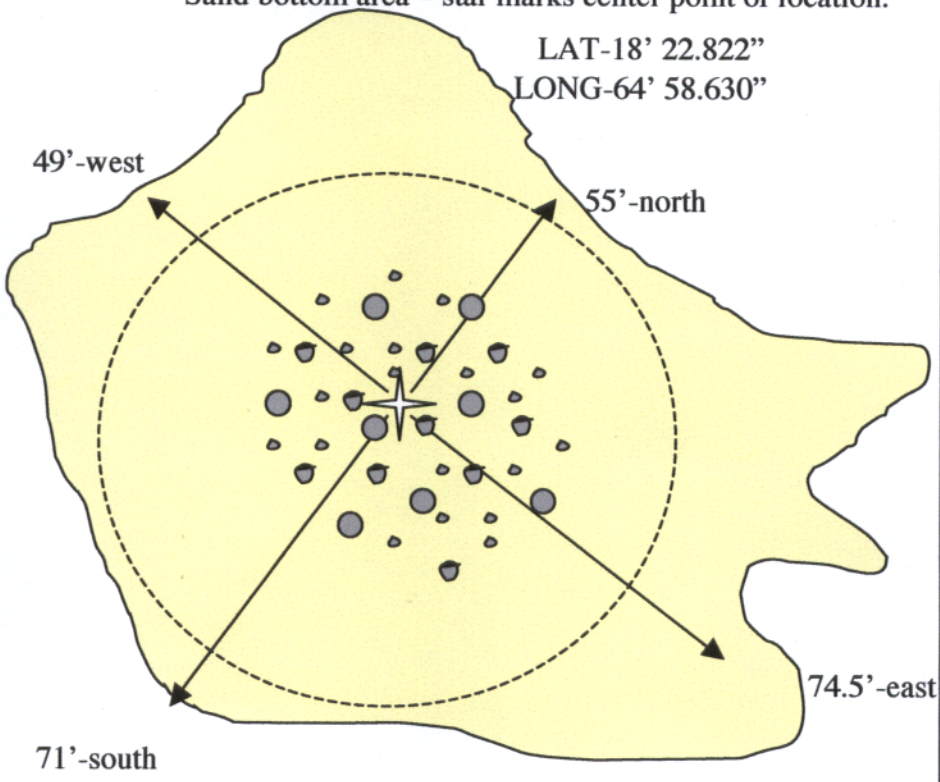


Figure 4

Coordinates of four corners:

EAST-	18' 22.822" N
	64' 58.623" W
SOUTH-	18' 22.815" N
	64' 58.630" W
WEST-	18' 22.822" N
	64' 58.635" W
NORTH-	18' 22.827" N
	64' 58.630" W

Proposed area of reef ball site is round in shape and 100' in diameter occupying 7850 sq. ft. of sand bottom.

To be used: 38 reef balls in total, broken down this way; 8-reef balls (226.08sq.ft.), 10-pallet balls (125.6sq.ft.), 20-bay balls (141.3sq.ft.).

Total combined square footage of surface area – 492.98

Proposal; To place 38 reef balls of 3 sizes in a random and natural configuration, 3-4' apart on and around center point. Site is not in proximity of any navigational channels and there will be no marker buoys. Reef balls will be deployed individually. Material to be used is PH adjusted concrete and non-ferrous reinforcement.

	Reef ball	pallet ball	bay ball
Height:	48"	36"	24"
Diameter:	72"	48"	36"
Weight:	3 – 6000 lbs.	15 – 2200 lbs.	375 –750 lbs.
Surface area:	28.26 sq.ft.	12.56 sq.ft.	7.065 sq.ft.

BREWER'S BAY / UVI REEF BALL STUDY SITE

Area selected for its easy swim in access from the UVI dock. Its shallow waters make it an easy site to monitor by students. This site is primarily sandy bottom and algal plain with sporadic coral growth to the south and a vast bed of grasses to the north and east. All in in shallow water from 13 to 18 feet.

Proposal: To place 12 reef balls of 3 sizes in a natural setting on and around centerpoint. Dependable Maritime will photographically monitor site on a bi- annual basis as well as help remove the light debris around the site.

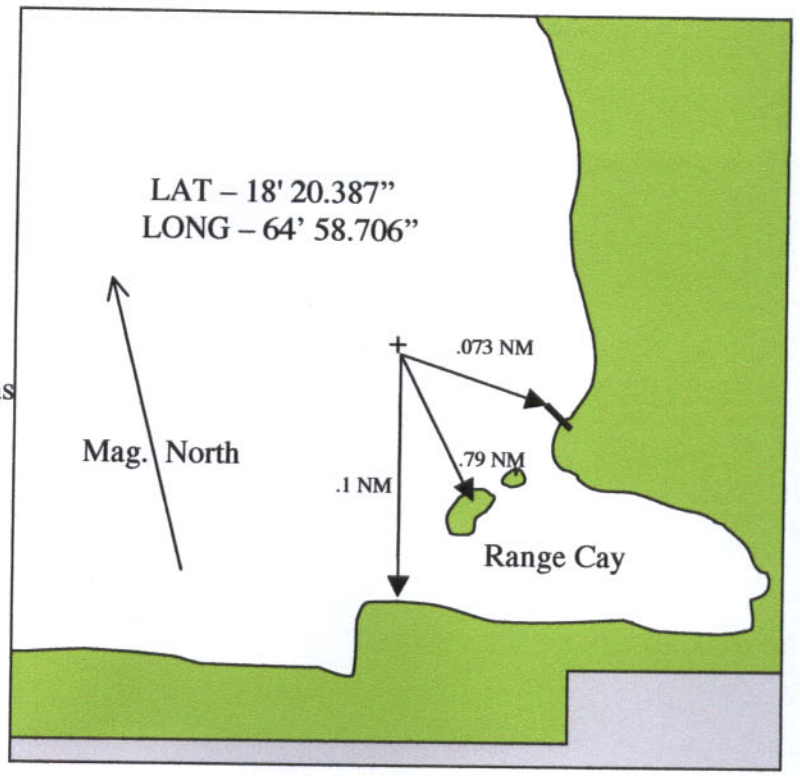
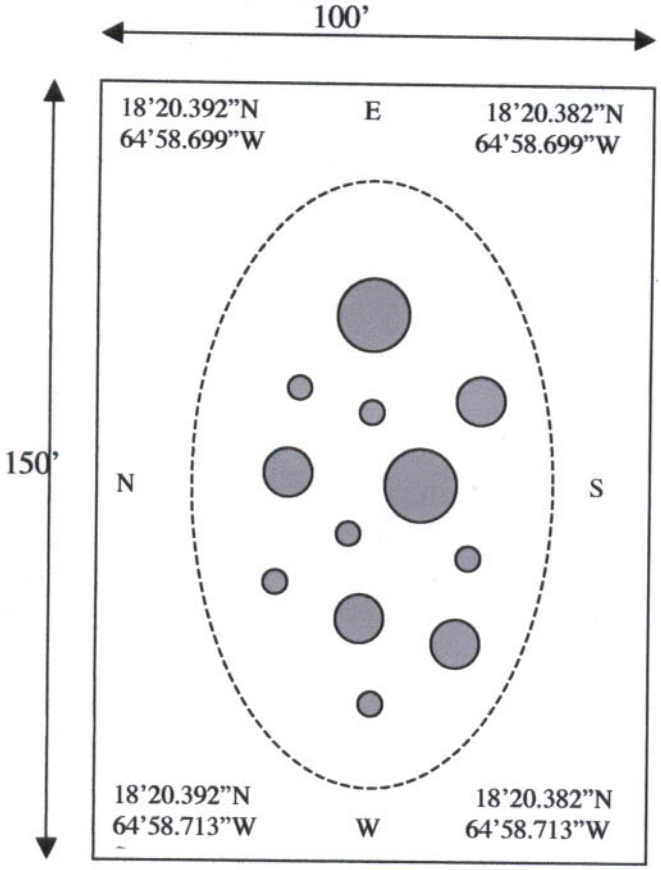


Figure 5



Ghost trap found on the same site.

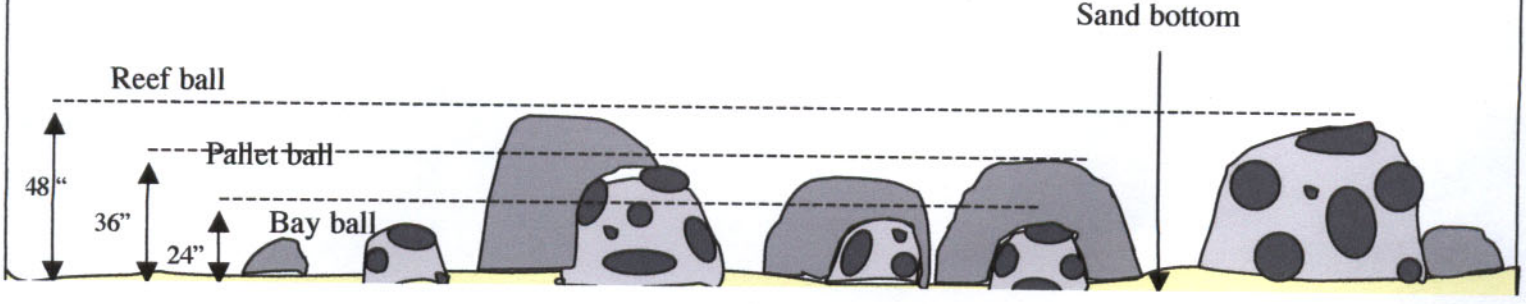
WATER DEPTH: 13 ft. sloping westward to 18 ft. MLW

.Proposed site will occupy an area of approximately 3000 sq. ft. and utilize a total of 12 reef balls consisting of: 6 bay balls – (1.5'dia. / 7.06 sq.ft.)

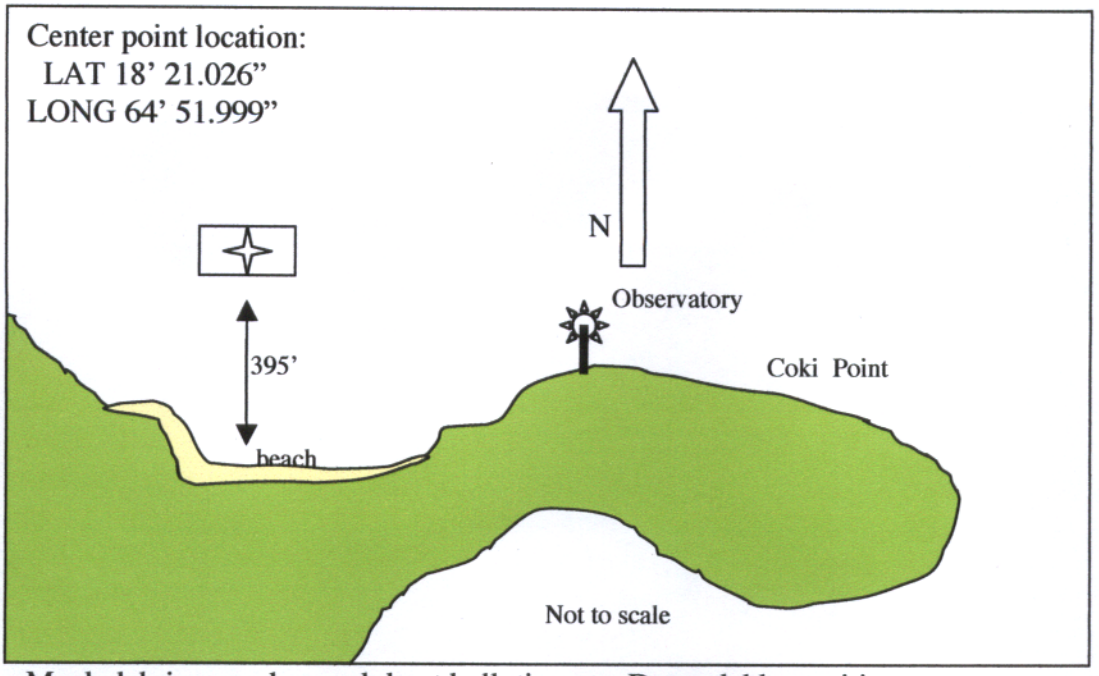
4 pallet balls – (4'dia. / 12.56 sq.ft.)

2 reef balls – (6'dia. / 28.26 sq.ft.)

Combined surface area of all 12 reef balls (bases) – 149.12 sq. ft.

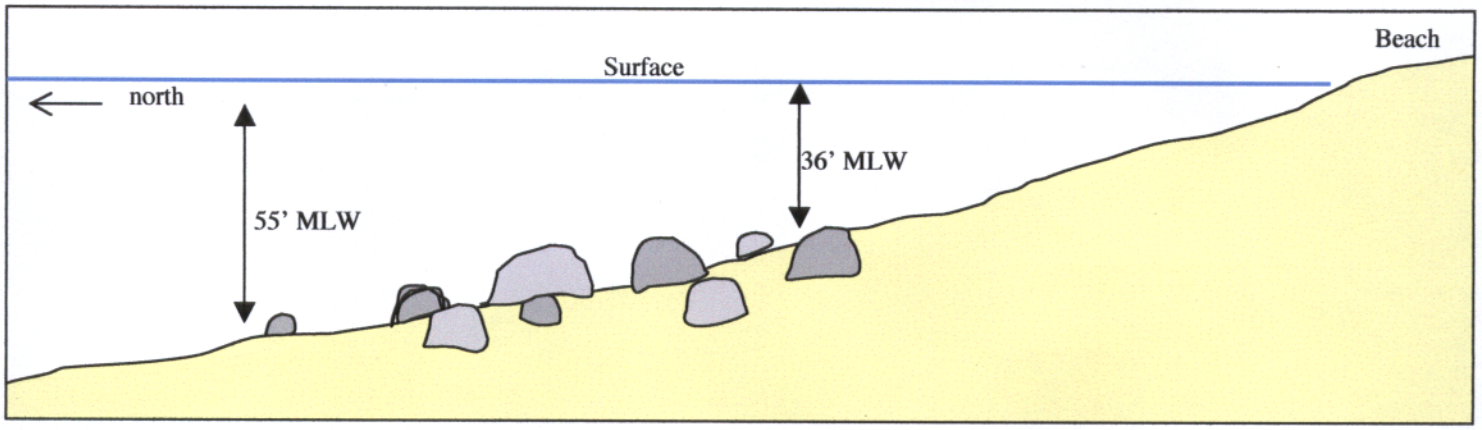


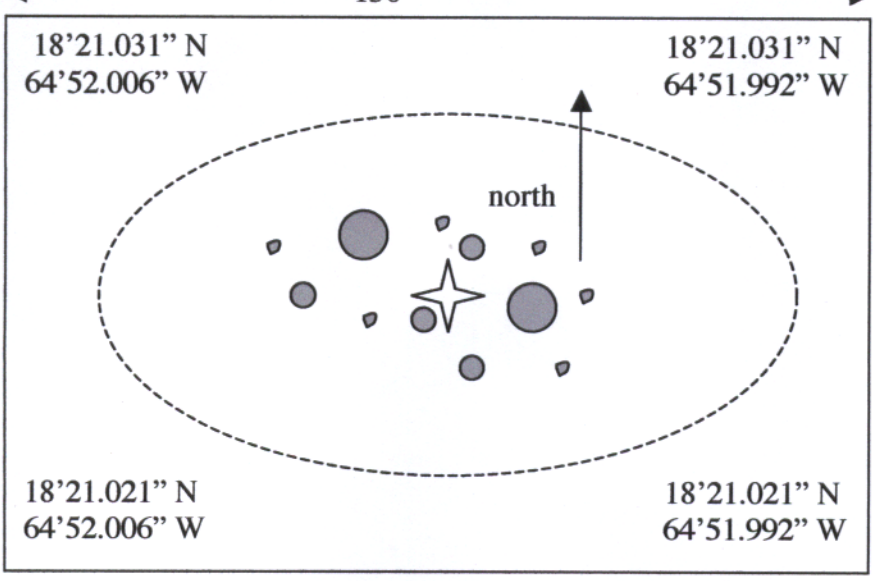
COKI POINT BEACH
Sandy bottom area approx. 50' to the north and outside of swim buoys. Although this is a grassy region, we have selected an area void of grass in any direction for at least 100'. The site lies in 45 – 50 ft. of water, is easily accessible by the public and is frequented by many recreational divers and snorkelers each year. The proximity of grasses and the observatory will likely enhance the progress of an artificial reef system.



Much debris was observed: boat hull, tire, etc. Dependable maritime will remove what is possible with light equipment. Reefcreations VI is dedicated to bi-annual monitoring.

Figure 6





Breakdown of plan: to occupy an area of sand approx. 3000 sq.ft. and oval in shape. 3 size reef balls will be used:
6-bay balls (1.5'dia. / 7.06 sq.ft.)
4-pallet balls (4'dia. / 12.56 sq.ft.)
2-reef balls (6'dia. / 28.26 sq.ft.)

12 reef balls in total with a total combined surface area of 149.12 sq.ft.
note: surface area is the area of sand that the reef ball actually rests on, not the ball's entire surface.

Coordinates of the four corners of the perimeter to be occupied by the proposed reef ball site.

6.0 Environmental Setting and Probable Project Impacts on the Environment.

6.01 Climate / Weather

These reef ball sites are submerged and are little effected by climatic change on the surface. The sites are well off shore, so there is no reason to believe abnormal rainfall or dislodged sediment would impact these areas.

A. Wind and Wave Impact.

Brewer's Bay – Site is tucked well up inside airport runway, even large swells from the south are unable to " wrap " all the way inside the corner of the bay. Wind is generally out of ESE 4-5 mph.

Coki Pt. - This site is protected from the winter's large northerly swells by the proximity of Thatch Cay Island. Any smaller wind driven wave action seen on the beach will not be enough to effect the site. Reef balls are designed and approved for shallower depths in severely swell impacted sites. See figure 10. Wind is usually out of the ENE 4 – 5 mph.

Cloudbreak/Inner Brass – Wind is primarily out of the NE –SE quadrant. Site is protected from large northerly swells by the Brasses (Inner and Outer). Occasionally a 5 – 8' swell from the West is possible, but it has a very narrow "window" to get through to the site, this coupled with the fact that the site is in very deep water, no wave impact is anticipated.

B. Impact on Recreational Water Users.

Brewer's Bay – Although this site was chosen partly for its close proximity to the UVI dock for its students to study and monitor, it is also fairly close to Brewer's Bay Beach, offering a snorkeling destination for the public as well.

Coki Pt. – Coki Pt. is already a diving destination for tourists visiting St. Thomas, so there would not be much added impact on water users other than improving on the underwater vista in the immediate area, perhaps an underwater rendevous spot for diver classes, thus improving safety? And, of course, an increase in sealife to look at.

Cloudbreak/Inner Brass – This site is a spot people seldom visit, it is in deep water far from shore. Its coordinates will be made public, its expected impact will be that of snorkelers, spearfishermen, and loved ones visiting memorialized reef balls.

U

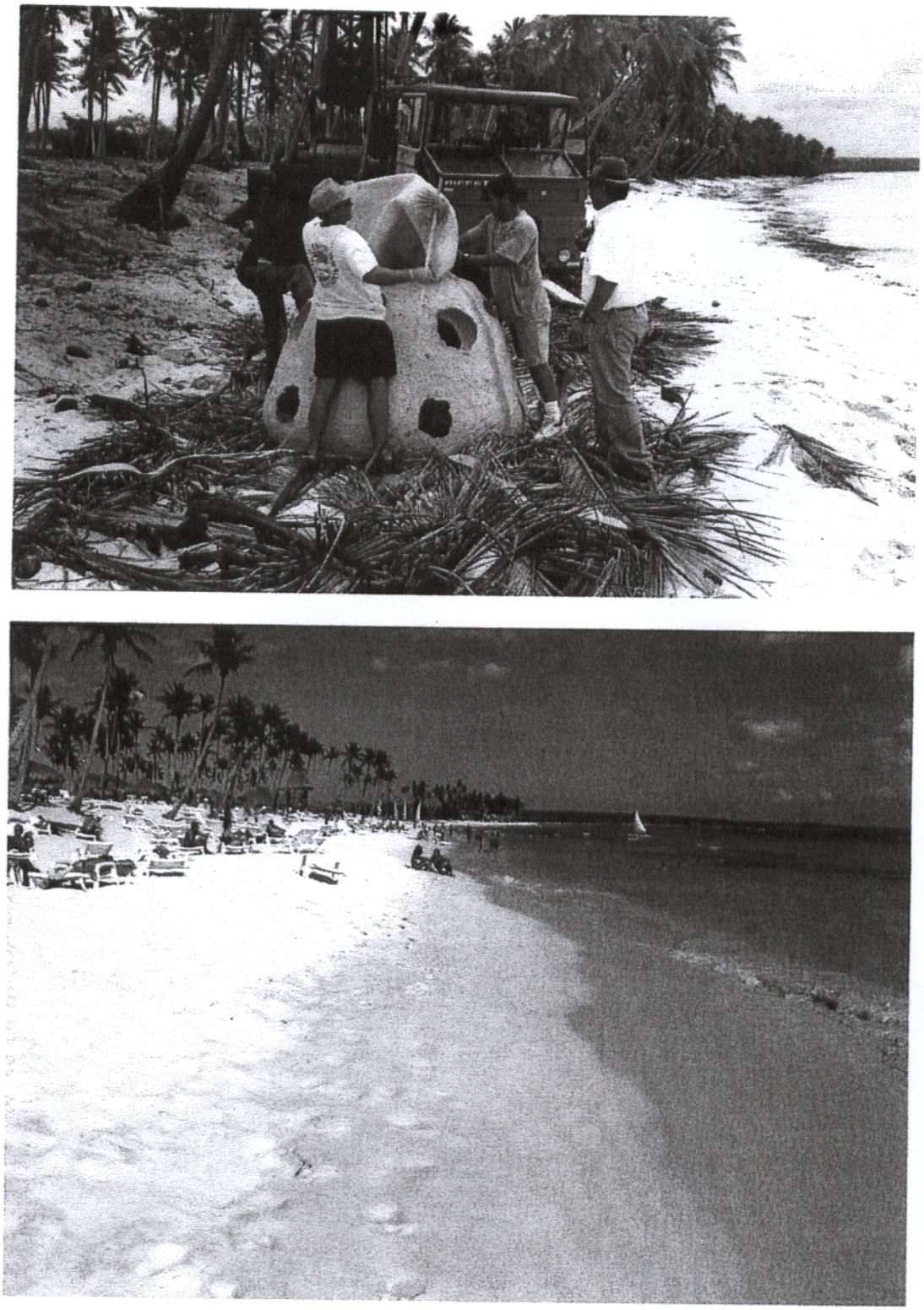


Figure 10. Increased Beach Width at Gran Dominicus - looking east.
Summer 1998 (top photo) compared with April 2001 (lower photo)

6.02 Landform Geology and Soils.

Reef ball deployment is located off shore, and there will be no manmade current, change to shoreline stabilization or structure, and no loss of vegetation.

6.03 Erosion Control.

There is no shoreline alteration in the proposed project therefore, a shoreline stabilization measure will not be needed.

6.04 Fresh Water Resources.

The proposed project has no relationship with any existing ground water resources in the areas.

6.05 Oceanography. Please refer to Figs. 13 & 14

Tidal change in the Virgin Islands averages less than 1 foot, the result is a slow exchange of water at these sites, therefore the current is not a hindrance but a life supporting flow of nutrients. Excellent water clarity at all 3 sites.
Please refer to bathymetric survey – following page.

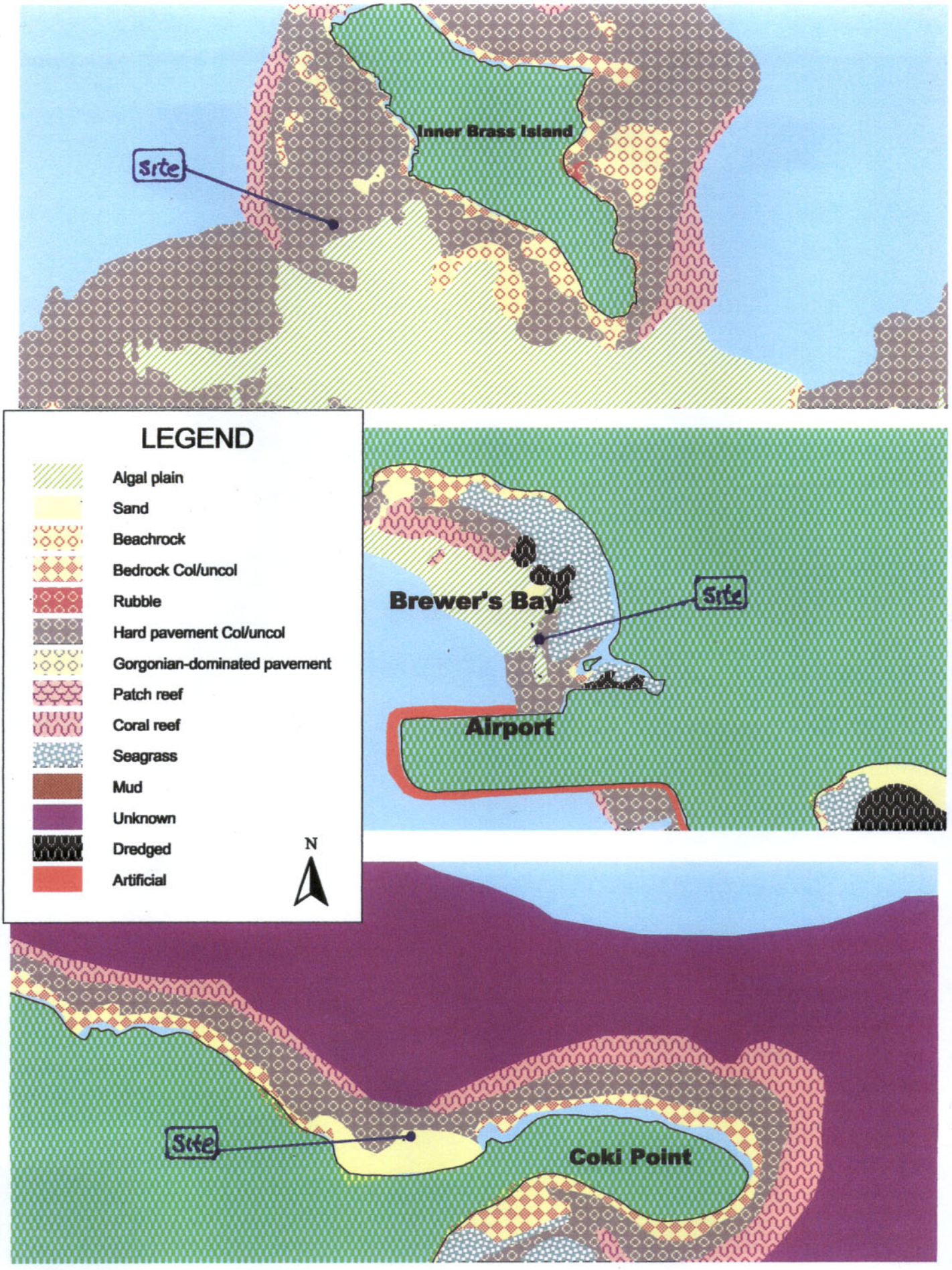
6.06 Marine Resources and Habitats Assessment.

Our goal is to promote the attraction and growth of fishes and organisms in and around the reef ball habitats. Please see figures 11 & 12.
While collecting data on each site, divers recorded any sealife with relative abundance, although these sites are barren sand bottom areas, they are not devoid of resources.

Brewer's Bay – Large schools of baitfish, barracuda, squid, turtle and a huge bed of grass lies to the north and east of the site.

Coki Pt. – Jacks, Blue Tang, Squid, Sergeant Major, Humans, and Jellyfish.

Cloudbreak/Inner Brass – Tarpon, Jellyfish, Sea Cucumber, Blue Frye, Rock Hind, Wrasse, Grunt, and Jacks. Surrounding the perimeter were soft corals and fans.


Inner Brass Island
Srte
Brewer's Bay
Srte
Airport
Srte
Coki Point
LEGEND
Algal plain
Sand
Beachrock
Bedrock Col/uncol
Rubble
Hard pavement Col/uncol
Gorgonian-dominated pavement
Patch reef
Coral reef
Seagrass
Mud
Unknown
Dredged
Artificial
N

Within weeks of being built, the pinnacle is hosting a documented spawning event of over 100 large Gray Snappers (*Lutjanus griseus*). This is the first documented formation of a new spawning event. "Starting about two hours after sunset these fish hover near the ocean bottom. A dominant fish (in this case a very large Gray Snapper) appears to entice this group into making rapid ascents to the surface. The fast and spectacular ascents occur almost daily and are oftentimes accompanied by an explosion of eggs and milt. " (Spawning information from *AquatechGroup*).

Figure 11

Reef Squid (Sepioteuthis sepioidea) laid eggs on the Reef Balls soon after being deployed. The volunteers observed many squid over several days and most were displaying mating colors. Above: The male (left) is displaying a white strip whereas the female (right) is displaying a partial saddle pattern.

The Reef Ball pictured above has three rescued and transplanted soft corals colonies (Gorgonians, large plant looking ones), two rescued and transplanted Mustard Hill coral colonies (Porites astreoides, the yellow to brown hard coral in the upper right and at the base behind it), one stabilized piece of live rock (in the front hole) and four propagated coral fragments (Acropora spp., top of the Reef Ball). The inch-sized depressions in the Reef Ball are used for transplanting additional corals or left to serve as protected resting place for sea urchins.

Figure 12