

Equipment required for ARMS deployment

Item	Purpose	For 1 ARMS	Per additional ARMS
Sledge Hammers	Pound in the ARMS	2-3	
Stakes	Secure the ARMS	4	4
Heavy duty zipties 36"	Secure the ARMS to the Stakes	4	4
Heavy duty zipties 24"	Secure the weights to the stakes	4	4
Sturdy Gear bag	Hold all equipment	1-2	
PVC cylindrical pipe that fits 1½" and end caps	Place weight within to help secure the ARMS	2	2
40 m polypro line	Lowering ARMS	1	
Carabineers	Clipping gear and ARMS to line	4	
Pan Float	To mark location of lowered gear	1	
Drill with 7/16 th socket	To construct ARMS		
Aqualube	Grease bolts for jam nuts		

ARMS Parts	Quantity per ARMS unit
Base plate	1
Plates	9
Long cross bars	4
Short cross bars	8
Bolts	4
Nylon spacers	16
Jam nuts	8

ARMS Deployment

ARMS Deployment Equipment



Figure 1: ARMS deployment gear

QTY Description

- 1 (3)* ARMS with Base Plate attached
- 4 (12) Heavy Duty 14" Cable Ties
- 4 (12) Heavy Duty 36" Cable Ties
- 2 (6) Weights (Capped PVC Pipe with Lead inside)
- 4 (12) 3/8" x 24" Stainless Steel Threaded Rods, one end chisel point
- 1 Sledge Hammer per diver
- 1 Gear Bag
- 1 Drop Line with Buoy

*(#s) for one survey site of 3 ARMS.

Weight Attachment

Prior to deployment, attach one PVC pipe weight to each ARMS handle using two 24" zip ties per side. Thread each 24" zip tie through the handle space twice such that each zip tie forms two loops around the PVC weight. Ensure that the zip ties are tightened around each end of the PVC pipe weight so that the weights are securely attached to the ARMS.

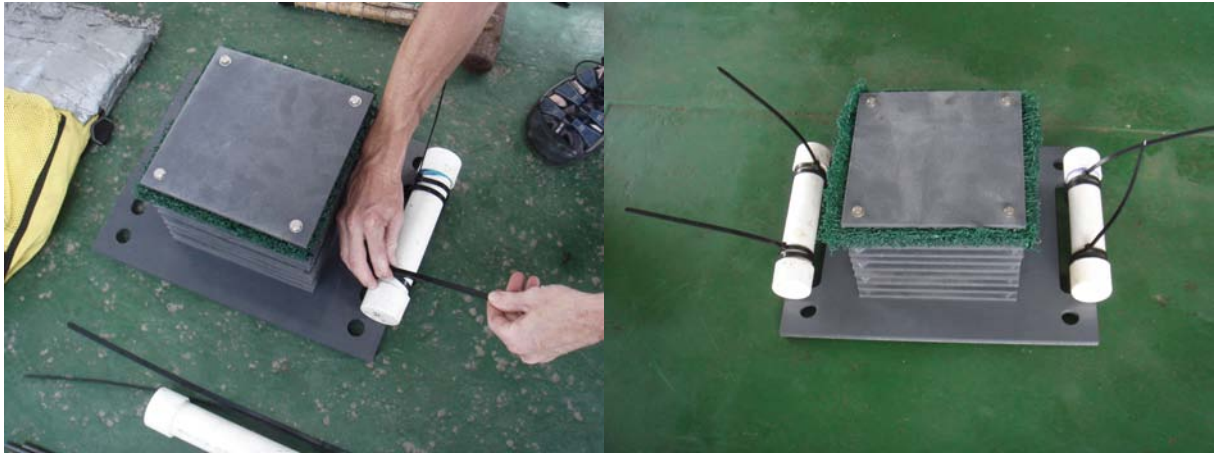


Figure 2: Zip tying the weights to the ARMS unit

ARMS Deployment

ARMS are generally deployed in sets of three, in forereef habitats at a depth of 10-15 meters. The distance between the three individual ARMS units within the survey site should be approximately 2-5 meters.

Lowering the Equipment

In order to minimize adverse impacts to the coral reef habitat, all ARMS equipment is carefully lowered to the bottom using the buoyed drop line. The bitter end of the line is run through one handle of each of the 3 ARMS and clipped back to itself. The tool bag is clipped to the line just above the ARMS.

A free-diver briefly surveys the desired survey area for an appropriate sandy / rubble location into which the equipment can be lowered from the support boat. Once the free diver finds a suitable location, hand signals and/or voice commands are used to direct the support vessel over the appropriate location in which to lower the equipment.

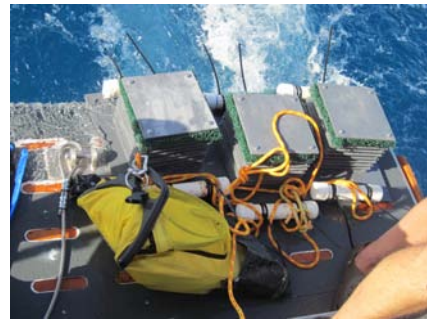


Figure 3: ARMS equipment ready for lowering off of the small boat

Once the equipment is lowered, the surface buoy attached to the drop line marks the dive location. Divers need only follow the drop line down to the equipment to begin ARMS installation.

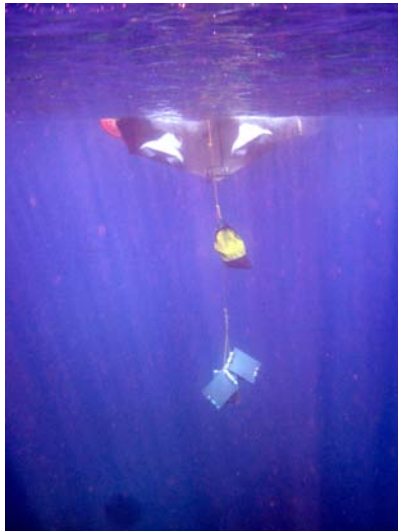


Figure 4: ARMS being lowered off of the small boat



Figure 5: ARMS lowered into a rubble patch

Installation

Divers look for rubble or bare patches of substrate in which to install the ARMS so as to minimize any collateral damage to the coral reef habitat. ARMS are installed approximately 2 to 5 meters apart as the topography allows.

To install an ARMS unit, a stainless steel stake is driven through each corner hole of the base plate. If possible, stakes should be installed perpendicular to the substrate to facilitate ARMS removal at a later date by simply

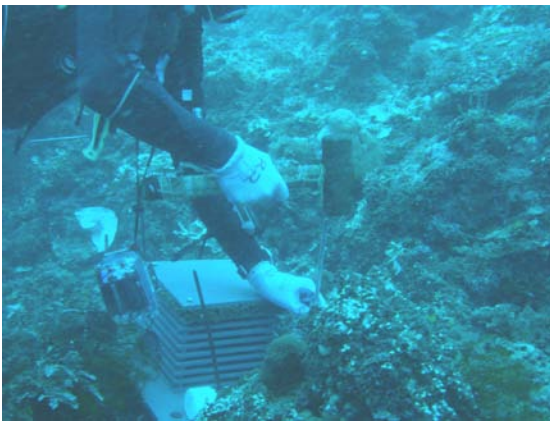


Figure 7: Using a sledgehammer to pound in the stakes

lifting it vertically off the stakes.

However, sometimes it is not possible to achieve a perpendicular orientation of the stakes. This is not a problem. Just be sure to hammer in the stakes to at least half of their length in whatever orientation allows this. Stability of the ARMS base plate is ultimately more important than stake orientation.

Once the stakes are driven into the substrate through the holes in the base plate, use the 36" heavy duty zip ties to secure the base plate to the stakes.

Thread a zip tie through a corner of the base plate and take multiple wraps around the stake before securing. Repeat for the remaining corners. A correctly installed ARMS unit should feel securely attached to the substrate with very little play (lateral or vertical) when manipulated by the diver.

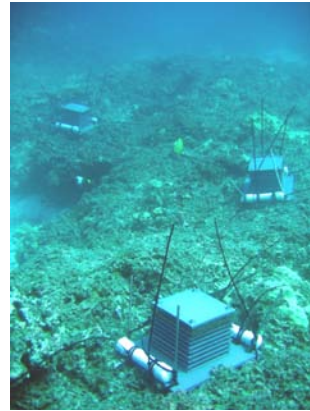


Figure 6: Three installed ARMS units at a site

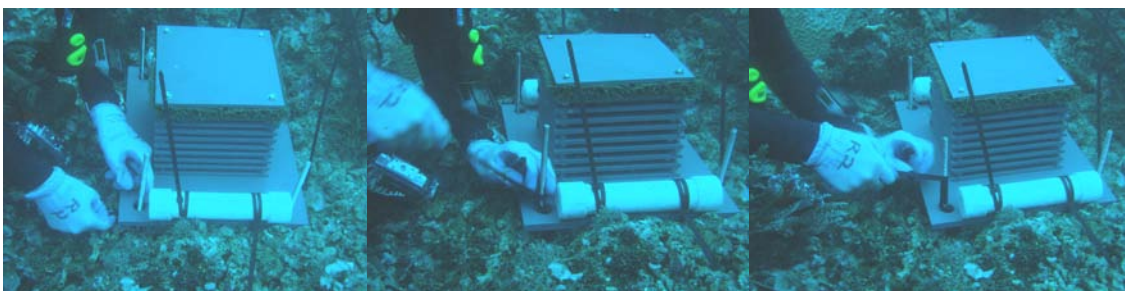


Figure 8: Zip tying the stakes to the ARMS unit.

If for some reason the stakes cannot be installed through the corner holes of the base plate, they may be installed through the handles at opposing angles (crossed). Similarly, use the 36" heavy duty zip ties to secure the base plate to the stakes.

Photograph

Document the site with photos of the surrounding habitat as well as the deployed ARMS. If there is a particular sponge, algae, tunicate, bryozoans etc that is prevalent at the site, take a close-up image to document.

GPS

Mark a GPS point of the site. Make sure to swim over the spot and get the point directly above the ARMS.

Gear Check

1. 3 ARMS, with weights attached
2. 12 stakes, plus a couple extra (if they bend you need a new one)
3. 1 sledgehammer for each diver
4. At least 15 zip ties
5. Camera
6. GPS

