CALCIFICATION ACCRETION UNIT (CAU)
ASSEMBLY, DEPLOYMENT, & RECOVERY

Section 1: CAU assembly list and preparation of field gear

Assembly—CAUs are deployed in groups of 5 units, as outlined in **Figure 1/NCRMP Overview_Instrumentation and Water Sampling_CRED SOP_2015.doc**. The CAU assembly diagram (Figure 1) outlines the supplies needed for 1 CAU, and provides views of the assembled unit.

#/CAU
2 - PVC plates
3 - hex jam nut, 1/4"-20, Stainless Steel (SS), regular
2 - washers, flat, 1/4", SS
3 - nylon spacers (1/2'' tall, 1/4" ID, 1/2'' OD)
1 - CAU SN tags, pigeon leg bands (https://nationalband.com/products/seamless-pigeon-bands-2408-2/)
1 - lock washer, 1/4", SS
1 - stud, full thread, 1/4"-20 x 6 in., SS
1 - 3/8",T316 SS All Thread (cut into 12" length stainless steel stakes and ground to a pencil tip on one side for reef penetration)
1 - wire rope clip, 3/8'', 11/16" with nuts, SS T316

Other supplies for CAU assembly and field deployment
1-2/survey site - Aquamend (4 oz., 7” stick to aid in securing stainless steel stake into reef: http://www.jdindustrialsupply.com/aq7epst.html)
1 tube for assembly of all CAUs - Loctite thread locker (http://www.grainger.com/category/threadlockers/thread-and-gasket-sealants/adhesives-sealants-and-tape/ecatalog/N-85jZ1z0qyxd)
1 tube for assembly of all CAUs - Aqualube saltwater grease to ease removing nuts after long-term deployments (http://www.aqualubeky.com/grease/)
1 – Heavy Duty Dive Bag, Underwater Kinetics (http://www.uwkinetics.com/products/uk-game-bag#.Vc5h5vlVhBc)
2 – Sledge Hammer, 4 lbs
2-3 – Nut driver with 11/16" socket attached

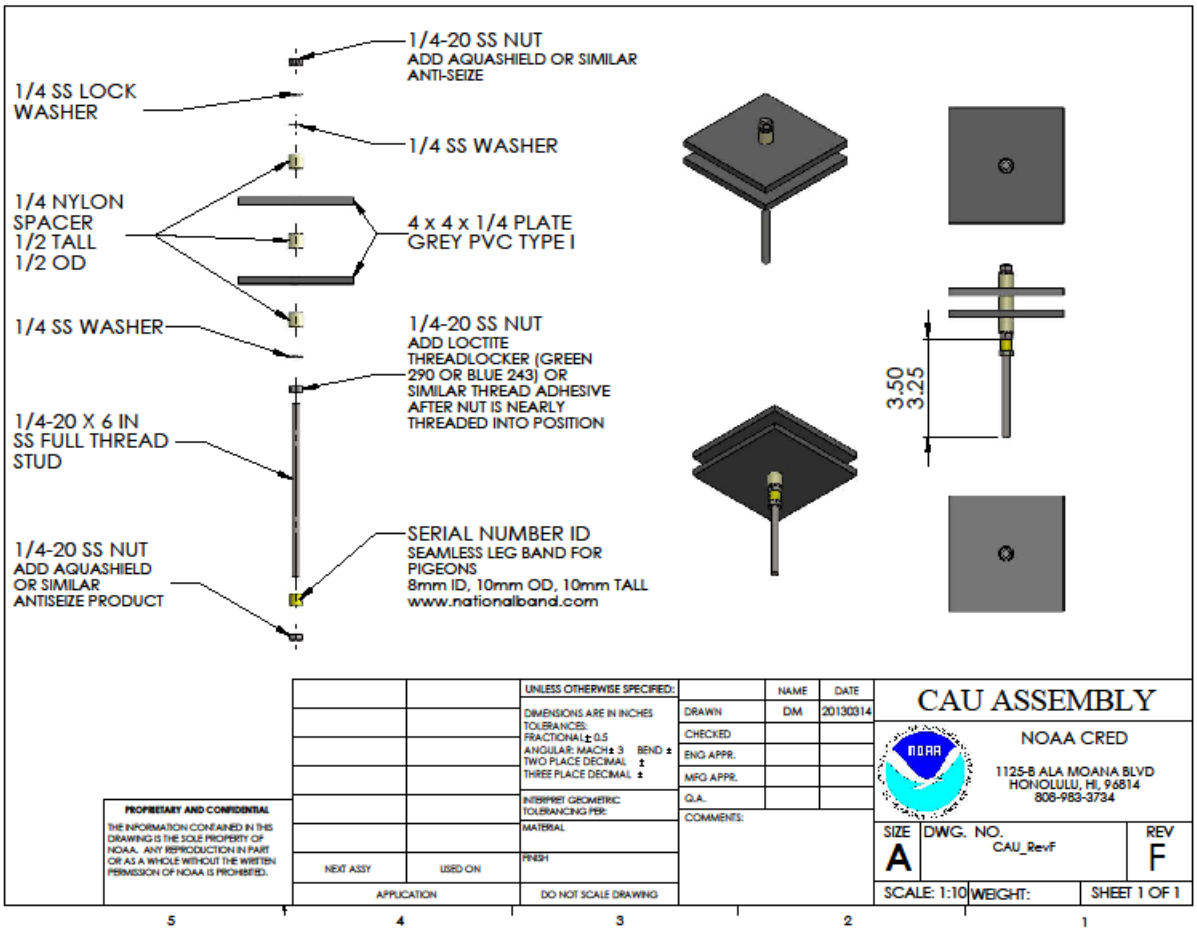

Figure 1: CAU assembly.

Field gear preparation—5 CAUs (and 5 BMUs if applicable), 5-6 stainless steel stakes (bring extra in case a stake bends while driving it into the reef (stakes must be straight for proper CAU deployment), 2 sledge hammers, 5 wire rope clips (10 if deploying BMUs), 2 nut drivers, and 1 Aquamend epoxy stick (2 sticks if deploying BMUs).

Section 2: CAU/BMU deployment

Deployment of CAUs and BMUs at 15 m survey site—A team of 2-3 SCUBA divers install 5 CAUs (and 5 BMUs***) in 30-40 min. The 5 CAUs, and tools needed for their deployment, should be carried in a dive bag to avoid loss of gear and tools while underwater. CAUs are deployed at 5 m spacing, along the perimeter of the 15 m survey site (see Figure 1/NCRMP Overview_Instrumentation and Water Sampling_CRED SOP_2015.doc). The order of deployment for CAUs **ONLY** is:

1. Prepare log sheets with CAU serial numbers, location, depth, and other relevant notes prior to diving.
2. Drive stainless steel stakes into reef at appropriate intervals. Stakes must be vertical, so that when the CAU is attached that the plates of the unit are parallel to the sea surface, creating a flat surface for future marine organism recruitment.
3. Attach CAU to stake using a wire rope clip, tightened down with nut driver (effort should be made to deploy CAU plates parallel to the surface).
4. Apply 1/5 of the stick of Aquamend epoxy to aid in holding the stake to the reef (once the 2-part Aquamend is mixed, it is pliable for approx. 30 min).

***If BMUs are deployed with CAUs at the 15 m survey site—**Additional gear is needed for the deployment of BMUs with CAUs. BMUs should be carried in a small Pelican case (or similar, http://www.pelican-case.com/1050-clear-black.html) to protect the BMU/coral blocks from damage. Each BMU is precisely measured for size and density and unaccounted for loss of coral material from the BMU due to damage would result in inaccurate bioerosion results.

BMUs are deployed onto the **SAME** stainless steel stake as the CAUs are mounted. BMUs are deployed flush to the reef surface.

The order of deployment for **CAUs and BMUs** is:

1. Prepare log sheets with CAU and BMU serial numbers, location, depth, and other relevant notes prior to diving.
2. Drive stainless steel stakes into reef at appropriate intervals. Stakes must be vertical, so that when the CAU is attached that the plates of the unit are parallel to the sea surface, creating a flat surface for future marine organism recruitment. ALSO, note that the stake placement in the reef should be in an area that allows for the BMU to be installed flat on the benthos.
3. Apply 1/5 of the stick of Aquamend epoxy to aid in holding the stake to the reef (at sites where BMUs are **NOT** deployed, the Aquamend epoxy is added last, after CAUs are attached to the stake. Because of the design of the BMU baseplate, when BMUs are deployed, the Aquamend used to secure the stainless steel stake to the reef must be placed prior to the BMU being secured to the stake. This allows for the BMU to be secured flush to the benthos, as well as allows for the epoxy to be used to secure the stainless steel stake into the reef. The BMU is “seated” into the epoxy and then secured in place with a wire rope clip.
4. Slide the BMU baseplate hole over the stainless steel stake, seating the BMU into the Aquamend, ensuring the BMU is flush with the seafloor.
5. Secure BMU to stake using a wire rope clip, tightened down with nut driver (ensure BMU doesn’t move/rattle loosely after wire rope clip is tightened).
6. Attach CAU to stake using a wire rope clip, tightened down with nut driver (effort should be made to deploy CAU plates parallel to the surface).
7. Apply more Aquamend, if needed, to further secure the stake into the reef.

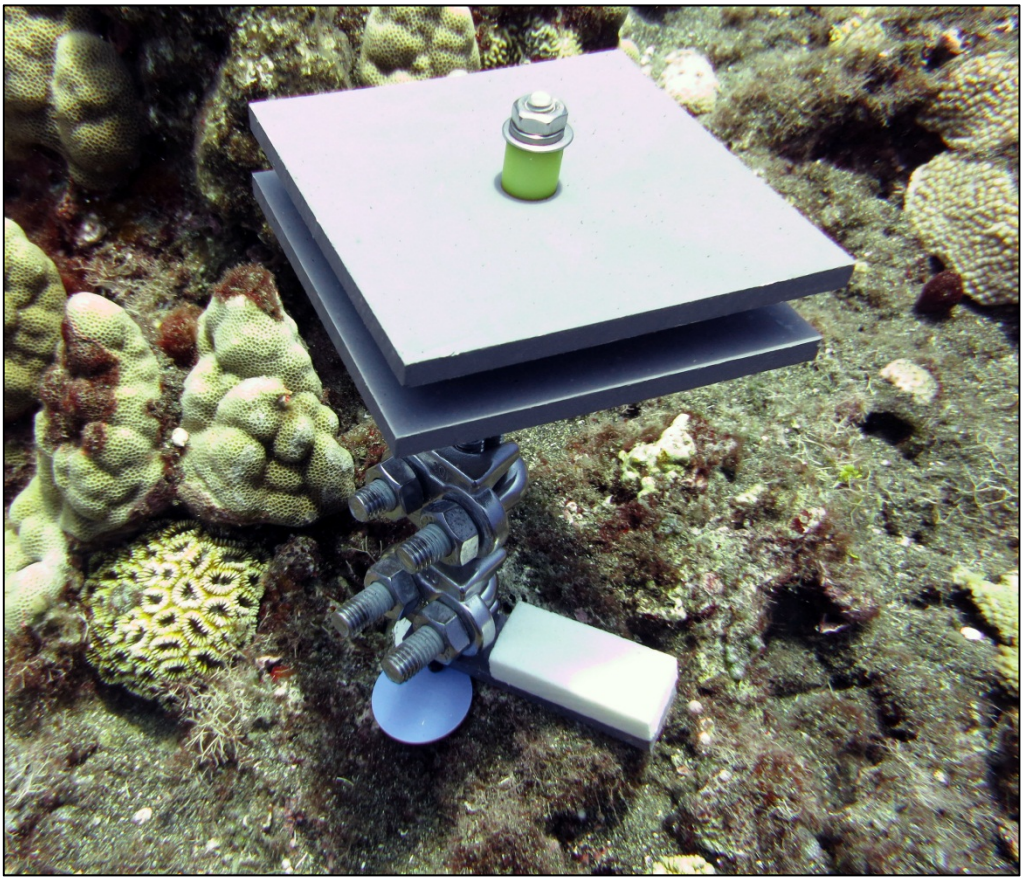

Figure 1: CAU with BMU deployed. CAU = instrument with 2 grey PVC plates; BMU = white coral block mounted on PVC baseplate with blue serial number tag attached. Bottom wire rope clip secures the BMU to the stainless steel stake onto the benthos. Top wire rope clip secures the CAU to the stainless steel stake, with the plates squared up on-top of each other and situated parallel with the ocean surface.

Section 3: CAU/BMU recovery

CAU and BMU recovery/exchange—CAUs/BMUs are deployed on stakes secured in the reef by epoxy for long-term monitoring studies. By loosening the wire rope clips, both CAU and BMU can be removed from the stake, leaving the stake in place for use again. Both CAUs and BMUs are individually bagged by SCUBA divers in a plastic bag (to ensure no loss of material during transportation to the laboratory from the field) and returned to the lab for processing. The new CAU and BMU can be reinstalled on the stake with a wire rope clip. Adding more epoxy may also make the stake deployment more secure.

Refer to CAU (CAU Sample Processing_CRED SOP 2015.doc) and BMU laboratory processing SOPs once out of the field.