

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Honolulu, Hawaii 96813

May 8, 2020

Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

REQUEST FOR APPROVAL TO OUTPLANT CORAL COLONY MODULES GROWN AT ANUENUE FISHERIES RESEARCH CENTER AS PART OF ESTABLISHED AGREEMENT WITH DEPARTMENT OF TRANSPORTATION, HARBORS DIVISION, REGARDING MITIGATION FOR CORALS FROM KAPALAMA DEVELOPMENT PROJECT ONTO OUTPLANT SITE LOCATED AT THE DAMAGE SCAR OF THE USN 'PORT ROYAL' GROUNDING SITE OFF OF THE REEF RUNWAY, HONOLULU, HAWAII

Submitted for your consideration and approval is a request to outplant up to 221 large Hawaiian coral colony modules grown at the State's Hawaii Coral Restoration Nursery (or "HCRN") located at Anuenue Fisheries Research Center (or "AFRC") on Sand Island, Honolulu, Hawaii, onto damaged reef substrate located offshore of the Reef Runway, Honolulu, Hawaii. This outplanting would help restore a highly damaged reef habitat caused by the 2009 grounding of the U.S. Navy guided missile cruiser 'Port Royal' atop the fringing reef fronting the Reef Runway. This grounding was estimated to have damaged over 4 hectares (10 acres) of reef substrate including the main damage scar which measured 890 m² (9,600 ft²). Surveys conducted by the Division of Aquatic Resources (DAR) have shown that eleven years after the grounding minimal natural reef recovery has occurred. The outplanting of up to two hundred and twenty one (221) large (40 cm+) coral colony modules¹ at the site will be done using corals produced as part of the Department of Transportation Harbors Division (DOT-H) Kapalama Port Redevelopment coral mitigation project that DAR and DOT-H have undertaken through a Memorandum of Agreement (MOA) previously approved by the BLNR, and which specifically targeted outplantings of HCRN-grown coral colony modules at this site to assist in its restoration and to accelerate the return of lost ecological services and functions at the site for the people of the State of Hawaii.

The outplant site is located upon submerged land makai of the Reef Runway, Honolulu, Hawaii, offshore of Tax Map Key: 110030010000 (Figs. 1 & 2).

¹ We will substitute a number of 1 m coral colony modules in lieu of 42 cm modules where appropriate and available.

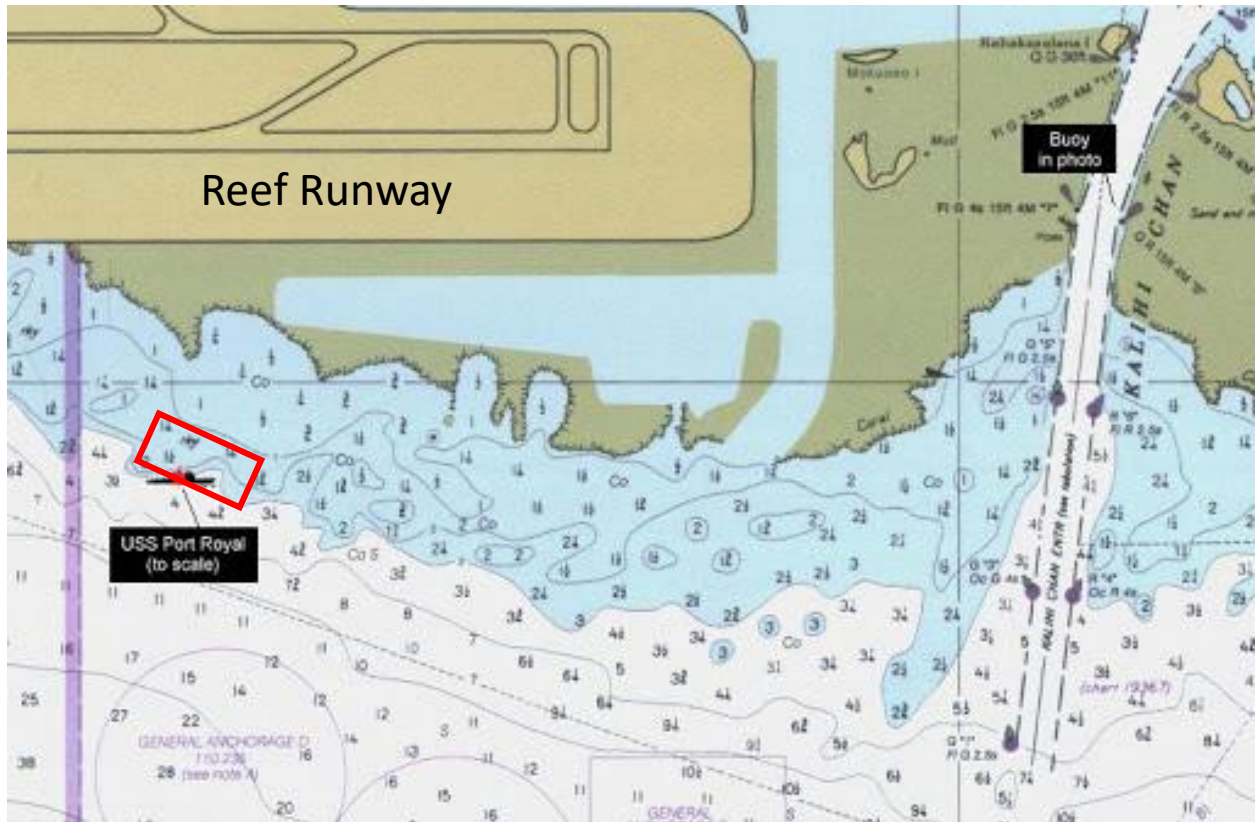


Figure 1. Proposed outplanting site at the grounding scar area from the USN ‘Port Royal’ grounding, off the Reef Runway, Honolulu. Depths shown are in fathoms, proposed outplanting of coral colony modules will occur in approximately 15 – 20’ depth.

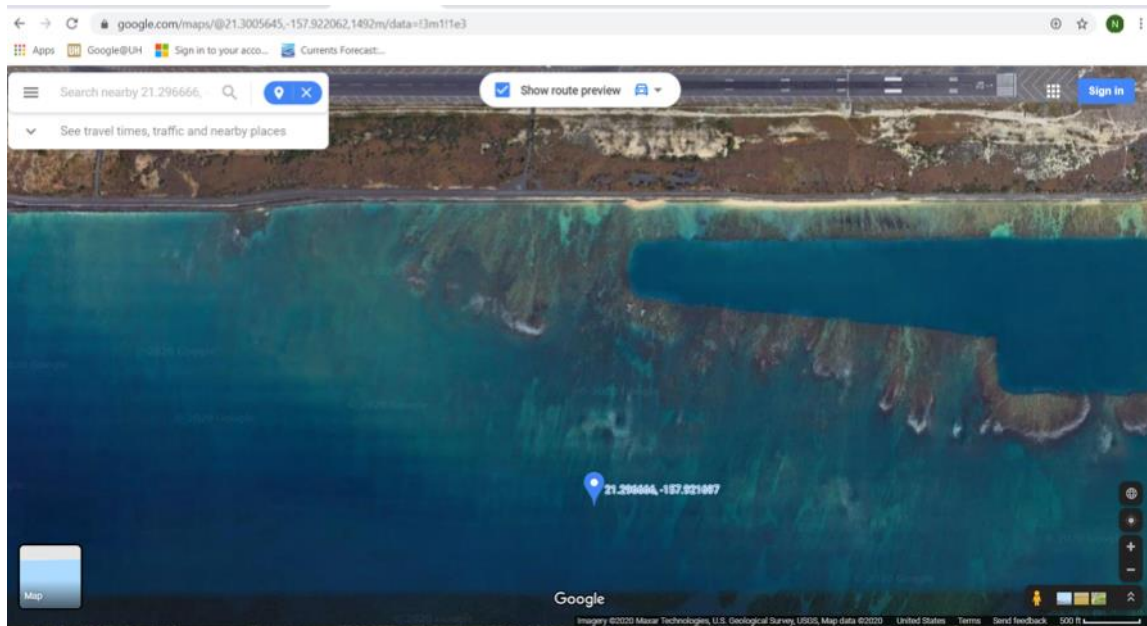


Figure 2. Satellite view of the damaged area to be restored.

Purpose and Need

The HCRN has spent the last six years developing, testing and refining both fast-growth coral nursery techniques and outplanting protocols for Hawaiian corals in order to scale-up capability for restoration of Hawaiian coral reefs and the services they provide for our people. As part of that effort we requested and received permission to use a small site off of Sand Island State Park to test outplant techniques and densities. We have since successfully outplanted numerous large modules within this site with extremely high success rates and survival (Fig. 3).



Figure 3. Example of various species of Hawaiian corals outplanted at test site off Sand Island State Park. Each module shown is 42 cm in longest diameter.

Under the BLNR-approved DOT-H Kapalama Coral Project agreements, DAR committed to outplant up to 221 live coral colonies within the next three years to offset the loss of corals within Honolulu Harbor from the DOT-H project development. The HCRN is on track growing these corals and we currently have the first 20 colony modules (out of 221) that we have been acclimating to outplant site conditions for about five months. These large modules (most of which are 42 cm wide, but one is 1 m wide (the first 1 m wide coral colony module to be produced anywhere in the world)) each represent a tremendous amount of investment of resources, time and funds which require care and planning in regards to their outplanting in order to maximize their survival. Additionally, we have additional coral colony modules for this project which are now ready to be acclimated, and we need the acclimation tank space occupied by these corals for these new colonies. Finally, waiting longer than May to begin outplanting raises considerable risks relative to the health of these corals given the difficulties of maintaining these corals in captivity during the expected high temperatures of the Summer and the need to outplant them early enough that they are stabilized prior to the increased Summer water temperatures at the site. We would like to conduct the first significant field outplantings at the identified outplant site (The USN ‘Port Royal’ grounding site off the Reef Runway, Honolulu, (figs. 1 & 2)), in the second half of May, 2020. We would plan to scale-up future outplantings after this initial one at the site.

Source Material

Source material to grow the coral colony modules mostly was derived from small coral colonies harvested from the Kapalama portion of Honolulu Harbor prior to its re-development which were then cleaned and quarantined for over a month, then micro-fragmented and attached to cured concrete forms and fast-grown into large live coral colony modules which then were slowly acclimated to outplant field parameters (Fig. 4). All corals spent at least one year within the HCRN during this process. In a few cases corals were harvested from State Small Boat Harbors on Oahu under a previous project through the Division of Boating and Ocean Recreation.



Figure 4. Coral forms with microfragments of coral attached being fast-grown into coral colony modules at the HCRN. Once 100% covered with coral, these coral colony modules will be moved to large acclimation tanks to slowly adjust them to field conditions prior to outplanting.

Transport

Coral colony modules would be transported from AFRC to the outplant site off the Reef Runway by boat under carefully controlled conditions to maintain acclimation and health of the coral colony modules during transport.



Figure 5. Example of various species of Hawaiian corals being transported to the field by boat for outplanting by HCRN staff.

Outplanting of Coral Colony Modules

The HCRN has already conducted baseline surveys of the damaged area, and defined a proposed outplant site (GPS location: 21.2969215, -157.92373481) within the damaged area that meets our requirements (large, open space with hard bottom and existing corals directly adjacent). We conducted a test outplanting of three coral modules at this site and noted no issues with their survival and health in the months since that test outplanting. Standard coral outplanting protocol includes transporting the corals in large bins with clean seawater to the outplant site, lowering of each module into the water atop floating baskets to hold the coral modules, followed by slowly lowering the modules onto the ocean bottom. Divers will prepare each outplant site with wire brushes to scrape away loose surface growth and loose material. Coral epoxy ('Splash Zone'™ 2-part epoxy) will be mixed topside and lowered down to the divers in ziplock bags, who will use it to attach the modules to the bottom in densities of no more than 1 module per m². 'Splash Zone'™ has been used by both DAR and the Maui Ocean Center for coral restoration projects throughout the State over the last decade with no observable negative impacts. Pre- and post-outplant photodocumentation will be taken along with basic data regarding bottom conditions at each outplant site. Divers will outplant up to two modules per dive team (two divers per dive team) per dive. No more than two dives per day. All divers will use gloves and follow all DAR diving regulations. Outplanted corals will be monitored for health and survival over time. The DAR Aquatic Invasive Species Field Team will conduct longer term

monitoring of the site and also assess effects of the outplanted modules on fish populations in the immediate area.

RECOMMENDATION:

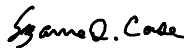
That the Board approve this request to outplant up to 221 large Hawaiian coral colony modules grown at the Anuenue Fisheries Research Center onto damaged reef substrate located offshore of the Reef Runway, Honolulu, Hawaii

Respectfully submitted,



Brian J. Neilson, Administrator
Division of Aquatic Resources

APPROVED FOR SUBMITTAL



Suzanne Case., Chairperson
Board of Land and Natural Resources