

Report on how the Accel Grant for the Niceville High School  
NaGISA/ARMS Projects was used Fall 2020-Spring 2021

Since the fall of 2003, the Niceville High School Gifted Education Program has been involved with the Natural Geography In-Shore Area (NaGISA) project. The NaGISA project is a fifty year comprehensive global marine environmental project designed to establish a baseline study of biodiversity along the world's coastline and monitoring of any subsequent changes. One of the most unique aspects of the NaGISA NW Florida branch of the NaGISA project is that it is designed to give students the greatest possible hands-on experience in a real world scientific study. The students, under faculty supervision, are totally responsible for all aspects of the program. This includes logistics planning, training of new students, conducting collection of marine specimens from the shoreline and at depths of 1, 5, 10, 15 and 20 meters using rigorous adherence to the collection protocol and processing of all specimens within a 24 hour period. The processing and analysis phase of the project requires students to study all animal life within the samples, down to and including the microscopic level, both qualitatively and quantitatively. The university graduate school level abilities of our students has been recognized by participation in two international scientific conferences and work on or establishment of seven international sites.

Although our academic year was delayed due to the COVID 19 pandemic, we were able to do our Fall 2020 Collection/Analysis in November. It was plenty cold, but our dive team was able to do an excellent job with the collection and analysis. We were able to process two ARMS units from the 15 and 20 meter depths. We are still working on finding a more effective methods of installing the 10 meter unit. This summer we will install the mounting devices and then do the actual installation during the Fall 2021 Collection. We did our Spring 2021 Collection/Analysis in early April. It was cold then as well!



Dive boat with 5 meter divers



Divers preparing to conduct NaGISA  
collection at 15 meter depth

For the seventh year, the Niceville High School Gifted Program has included the Autonomous Reef Monitoring Structure (ARMS) program as another research opportunity to supplement NaGISA. In conjunction with doctoral level researchers from the University of Florida, NHS Gifted constructed and deployed three NOAA (National Oceanic and Atmospheric Administration) ARMS units off the coast of Henderson Beach State Park. The importance of the ARMS units is that they give students the chance to study a much wider variety of sea creatures since these units do actually serve as miniature artificial reefs. The equipment is heavy and the deployment and retrieval requires highly training scuba divers and a large boat to accommodate the ARMS

units, anchoring systems and scuba gear. This is very expensive and the NDIA Accel Grant has been absolute critical to the ability to fund this aspect of the collection effort. Even though we have been fortunate to receive this grant, it still does not totally cover the cost of the scuba operation. Consequently, the students (and their parents) are forced to off-set approximately 50% of the dive cost. The good news is that with the NDIA Accel Grant, those students that are not as well off financially as others now have a chance to participate in this expensive occupation. We at the Niceville High School Gifted Program are eternally grateful for the continuing support of the NDIA and its members.

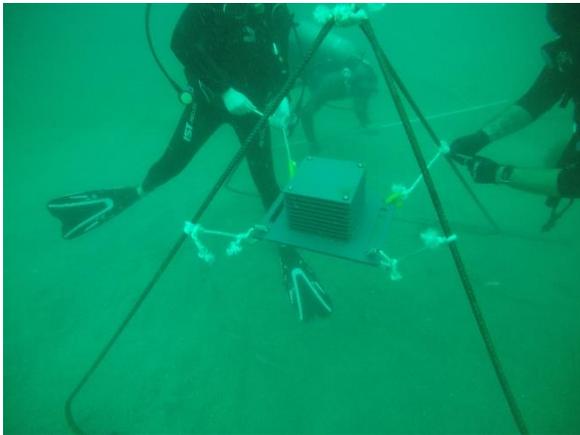


ARMS unit in early stage of original mounting system

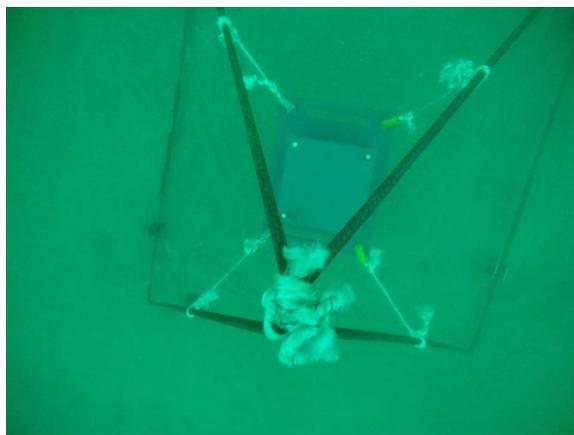


ARMS unit in final stage of original mounting system suspended in water column by 5 gal bucket filled with air

In our previous year of deployment, we decided to use a different approach to anchoring the units to the ocean floor. For the four previous years, we have lost between one and two \$500 units each year due to a failure of the anchoring system. Since they cannot be monitored every day, it is impossible to know exactly why the failure is happening. However, in order to solve what we think might be the major problem, a new anchoring system was developed by the Captain of the dive boat we use. This system uses rebar as the mounting frame. This year we proved the system worked. However, we have still be losing the ten-meter unit consistently.



New mounting system for ARMS unit using the rebar approach



Top view of ARMS unit in new rebar anchoring mounts

During the summer of 2021, we will be experimenting with a more robust anchoring system that will employ four very large augers and four smaller counter balance augers to attempt to find a way to mount the ten-meter ARMS unit in a way that will keep it from disappearing in what we

presume is during bad weather/hurricanes. We believe the shallower depth has greater currents under these conditions and has caused our other mounting methods to fail.

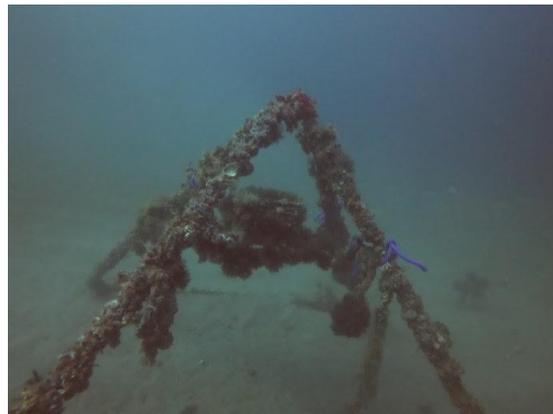


ARMS unit using current mounting system with 9 months growth at 20-meters depth



Close-up of ARMS unit in place at 20-meters depth with diver nearby

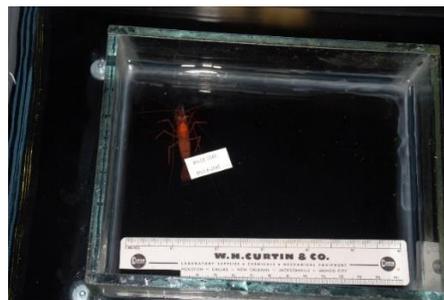
The current mounting system appears to work satisfactorily at 15 and 20 meter depths. As you can see above and below, a great deal of growth is visible in just a few short months.



Below can be seen the ARMS units as they would look during the Analysis Phase.



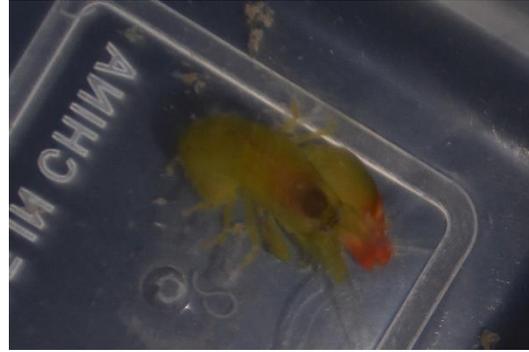
Plate from ARMS unit at 15 meters



Specimen from ARMS unit



ARMS Specimen



ARMS Specimen



Processing samples from ARMS



NaGISA Collection specimen photography

## Microplastics

Starting with the Spring 2018 NaGISA collection, the Niceville High School Gifted Program added another new research opportunity to our existing studies. In partnership with the University of Florida Sea Grant Program, our students are joining the Microplastics Analysis study. Unlike the rest of the program, our students are not only collecting specimens at the surface of our beach collection area, we are tasking our NaGISA divers to collect specimens at their collection depths to see the extent of which microplastics are mixing in the water column below the surface of the ocean. Microplastics are very dangerous for sea life in many ways. We will see how widespread the danger has become in our local area. This microplastics research was continued in the Fall of 2019. No collection occurred in the Spring of 2020 due to the COVID 19 Pandemic. However, microplastics continued in Fall 2020 and Spring 2021.



Processing Microplastics samples from the various collection depths



One more way to get students interested in real world science research