

Connecticut State University Outer Island Education Program Report

Submitted by:

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January 2014

Connecticut State University Outer Island Summer Programs

Outer Island Interns

Two interns were hired by CSU to staff the island for the Summer 2013. Leo Rode was an undergraduate Biology major at Western Connecticut State University, Danbury, CT. Meagan Beley-Finnemore was an undergraduate student at the University of Saint Joseph majoring in Chemistry with minors in Mathematics, Biology and English. Both student interns came to the position with experience working with the public in educational settings. All solicited and unsolicited feedback concerning the performance of their duties indicated that both interns were exemplary employees. Student interns each received a salary (\$2,722.50).

Schedule of Visitors

Twenty four group visits were scheduled during the summer 2013 with an estimated 400 visitors participating in education programs. Many of the scheduled groups have visited the island in previous years. Some of the notable first time visitors to the island included students from the Bridge Academy, Bridgeport, and an English literature class from SCSU. The complete schedule of groups is included in Table 1.

Professional Development Activities

A professional development workshop “Outer Island/GLOBE” was conducted Summer 2013 on Thursday & Friday June 27th & 28th on the SCSU campus and Saturday June 29th on Outer Island. The workshop was conducted by SCSU Associate Professor Scott Graves and featured seven attendees – all CT Middle and High School Science Teachers. The workshop activities covered the following.

- Thimble Islands Geology and Long Island Sound Pleistocene and Holocene history,
- Outer Island History (E. Hird family legacy),
- US fish & Wildlife and CSU collaborative,
- Outer Island Weather & Climate, Habitats and Ecology,
- Outer Island Weather Station, Online weather data, archives & data graphing,
- Outer Island Web-camera use for teaching and learning,
- On-Island tour of research and teaching facilities,
- Island tour of habitats and ecology,
- On-Island teaching and learning activities and opportunities (intertidal habitats, species, water quality data measures),
- GLOBE Program Science & Education collaborative,
- GLOBE Program Atmospheric data collection protocols,
- Kestrel 3500 Pocket Weather/Wind Meter use for teaching and learning

The workshop outcomes included the following:

- Teacher use of Outer Island as an exemplar locale for teaching and learning about LIS and CT coastal ecology,
- Teacher and student use of Outer Island website for educational enrichment in their coursework,
- Teacher and student use of Outer Island website weather data (archives & data graphing) and web-cam imagery for educational enrichment in their coursework,
- Teacher use of Outer Island as a field trip locale for enrichment in science teaching & learning

Refreshments (\$338) were provided to workshop participants and each participant was given a Kestral Weather Meter (13 meters @ \$186.67/meter = \$2,426.71) for training and to encourage the participants to utilize the Weatherbug data in their curriculum. Dr. Graves will offer another SCSU/Outer Island professional development workshop in Summer 2014. We anticipate offering another Outer Island Teacher Workshop employing similar strategies and activities. Dates have yet to be established, but the workshop agenda, timeline and activities will be similar to last summer. We hope to have teachers make more use of the Outer Island website and online weather data and imagery. The anticipated 2014 Workshop Agenda and schedule of activities is attached for reference.

Research Activities

Water Quality Monitoring

Water quality parameters were monitored by the CSU interns during the Summer 2013 from May 31st to August 6th. Water quality monitoring occurred each day at 2:00 pm from the end of the floating dock. Water quality parameters monitored included: water temperature, salinity, conductivity, specific conductance, dissolved oxygen, Secchi disk depth, turbidity, and pH. All measurements were made on water samples collected from at a depth of one meter.

Salinity ranged from a low of 24.3 ppt (7/20) to a high of 28.6 ppt (8/5) with a mean value of 26.6 ppt (Figure 1a). Water temperature varied from a low of 16.7°C on May 31st and increased to the maximum temperature of 25.3°C on July 18th (Figure 1b) Water temperature gradually increased from the spring to the end of the summer. Dissolved oxygen concentrations were highest initially (8.4 mg/L) and gradually decreased to a low of 4.05 mg/L on August 5th (Figure 1b) Water temperature and dissolved oxygen concentrations are inversely related, with oxygen solubility decreasing in warmer water.

Water clarity, as measured by a Secchi disk, varied from 0.75 m (5/31) to 1.5 m (7/14) during the monitoring period (Figure 2a). Greater variability was measured in water turbidity where values ranged from 1.17 NTU (6/1) to 6.00 NTU (6/14) (Figure 2a). In general, as

turbidity increases water quality as measured by the Secchi disk should decrease. pH ranged from a low of 8.01 (5/31) to a high of 8.93 (7/24) (Figure 2b).

We recently purchased a Turner Designs handheld fluorometer (\$2,314.20) for chlorophyll *a* measurements in support of the water quality measurements. Chlorophyll *a* is the green pigment in plants that allows them to photosynthesize. The fluorometer induces chlorophyll to fluoresce by shining a beam of light of the proper wavelength into the sample, and then measuring the higher wavelength light which is emitted as a result of the fluorescence process. The intensity of the fluorescence is proportional to phytoplankton biomass. By measuring chlorophyll *a*, we will be indirectly measuring plankton biomass in the water column.

The water quality monitoring raw data and graphs will be available online in the redesigned Research section of the Outer Island website.

Fouling Studies

A floating station for suspending slate fouling plates was designed, built, and deployed during the summer 2013 season (see Figure 3). Eleven plates were successfully retrieved



Figure 3. Floating station with attached fouling plates.

and during the spring 2014 semester two CCSU students will complete their independent study assignments assessing the biodiversity of fouling organisms on these plates (Figure 4). These students will also create a type-specimen library and photo guide to be used on Outer Island during the 2014 season. Also in the Spring 2014 semester, one CCSU student will work on developing species-specific primers for the cytochrome oxidase 1a gene so that species identifications can be made and so we can begin assessing genetic diversity within fouling populations. \$565 was spent on field guides, equipment, and materials for the fouling study and \$610 was spent on molecular kits for the genetics work. For the 2014 season, Dr. Jarrett will train the interns so that they can begin weekly biodiversity monitoring of the fouling plates

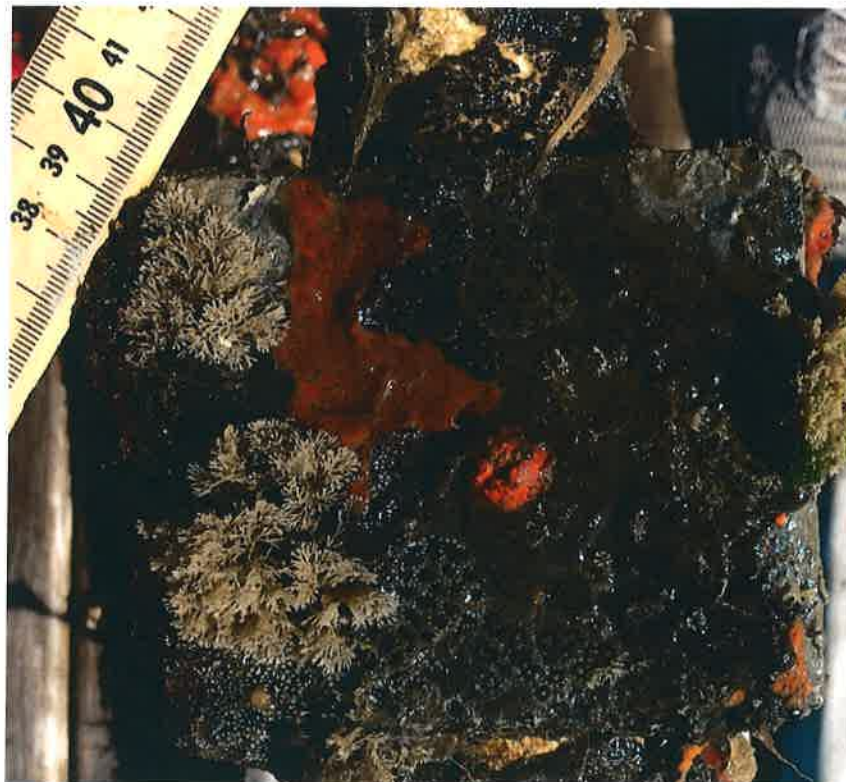


Figure 4. Slate fouling plate with attached organisms.

WeatherBug Station, Web Cameras and Remote Video Capabilities

The Outer Island WeatherBug automated weather station and online web-cameras suffered from the consecutive impacts of Hurricane *Sandy* and the Winter Storm *Nemo* in 2012 and 2013. Power on the Island was shutdown in anticipation of these events, and although the weather station and camera systems survived intact, consistently retrieving data and imagery from the island has been problematic over the last few seasons. Although the weather station will automatically reboot anytime the power on the island cycles up, the posted data archives (hosted by WeatherBug @ <http://weather.weatherbug.com/weather-safety/online-weather-center/OnlineWeatherCenter.aspx?aid=3346>) is intermittent. We continue to download the monthly weather data and will be compiling a long-term data set (downloadable spreadsheet for

use by researchers and educators) that will be posted on the OuterIsland.Org website. We look forward to visiting the island early this Spring to work on the Weather Station and web-camera systems, updating software and finding a solution to the intermittent data delivery challenges.

The 2nd Outer Island WeatherBug online web-camera (\$9,995) we hoped to install during the Fall 2013 (viewing the island southwest shoreline – marsh area) was significantly delayed in its delivery to us, due to changes in the CT State purchase/contract authorizations. We worked with SCSU grants compliance officer and with WeatherBug to come to an agreement on the “contract” for support of the web-camera, but there were significant delays in this process. We finally received the equipment in late December of 2013. We anticipate visiting the island in early Spring 2014 for siting the installation locale and for planning the actual installation. As soon as a 2nd camera site is agreed upon, we will visit again for the actual installation. We have 2 sites that could work for the 2nd camera (one is the planned site overlooking the southwest marsh area, but if that site is too far distant from the power source we may choose – with F&WS approval – an alternative location on the south end of the island overlooking the bedrock intertidal area and offshore rock outcrops.

The existing web-camera system suffered from intermittent power cycling that has been a common occurrence since the impacts of Hurricane *Sandy* and Winter Storm *Nemo*. Although the weather station will automatically reboot anytime the power on the island cycles up, web-camera in-place currently relies upon a desktop computer interface that does not automatically cycle up when power returns. We plan on replacing the current camera system (with the island dock and entrance view) with the newer camera system that does not require a computer interface – it will reboot as does the weather station anytime the power cycled up. The existing camera would then be re-installed at one of the secondary site locations. The upshot of this is that we would have ongoing and continuous camera views whenever there is power on the island, just as we have ongoing weather data. The secondary camera would give us alternative views of the island, but would still be susceptible to outages if the power on-island is lost. We hope to work with WeatherBug to solve this issue and will explore means of updating the camera system so that it is not reliant on a computer that will not reboot automatically.

The AT&T account used in support of the Outer Island Weatherbug station and video cameras was transferred during the Summer 2013 from the Community Foundation for Greater New Haven to SCSU. A second line was added to the account in October to support the second video camera installation. AT&T broadband access fees for the wireless service totaled \$485.32.

The “Aquacopter” (\$1,598) equipped with a Go-Pro Camera (\$425) purchased for outer island research and education was received in the fall of early fall of 2013. Initially there were problems with the battery charging system, but after working with the manufacturer those have been worked out. The bigger challenge has been learning to actually fly the system using the RC controller. We are currently waiting for better weather to move ahead with the testing of the flight systems and onboard camera. We anticipate testing the Aquacopter system later this spring

and then using it to gather imagery and video of the island habitats from the unique vantage point offered by this camera platform.

Outer Island Website Update

We continue to revise the Outer Island website (www.outerisland.org) to create a more informative, user friendly interface for Outer Island information and educational programming. The Outer Island website is currently hosted on iPage (www.iPage.com) and the hosting contract extends until 2017. We have contracted an undergraduate student (Sebastian Smith; 150 hours @ \$10/hour = \$1,500) at SCSU to assist us with redesigning the website. We are in the process of moving the Outer Island website content (information, i.e.: text and images) to a new format, GetSimple CMS. GetSimple is an XML based, stand-a-alone, fully independent Content Management System with multiuser capabilities. We have reached consensus on the reorganization and simplification of access to information on the Outer Island website. The end product, which seems to be in sight, will be an improved experience for the website's end-users, as well as an extremely simple process for website updates by almost anyone—even not-so or not-at-all tech-savvy individuals. The reorganized website will have a more simplified navigation and allow direct access to weather and water quality data. The inclusion of an interactive calendar in the redesigned website will also facilitate the scheduling of groups visiting the island and allow groups to identify available dates on the schedule. We anticipate the reorganized and redesigned website to be live before the end of February 2014.

SCSU Outer Island Budget 2013

Category	Requested Funds	Category	Expenditures
Personnel			
Student Stipend	\$1,000.00	100 hours @ \$10/hour	\$1,000
		50 hours @ \$10/hour	\$500
Supplies			
Water Quality, Weather Meters and Educational Supplies	\$5,200.00		5,592.28
Various laboratory and field supplies and computer software		13 Kestral Weather meters	2,426.71
		Hand Held Fluorometer	2,314.20
		KR2 Mobile Router	62.18
		GoPro Camera	425.39
		200ft Ethernet cable	84.95
		Kestral Impellers	86.2
		Flash drives 64 GB	69.98
		ScanDisc memory card	98.68
		Battery charger	23.99
Equipment			
Webcamera #2 + Installation	\$10,300.00		\$9,995.00
Remote Automated camera	\$1,500.00		\$1,598.00
Refreshments			
Chartwells Catering (Refreshments for Workshop)	\$700.00		\$338
Travel			
Auto and Ferry Travel to Outer Island	\$500.00		0
Other			
Annual Broadband Access fee for wireless service	\$800.00		485.32
		Data Plan	50
		ATT Beam	21.26
		August	60.68
		September	63.33
		October	78.01
		November	70.68
		December	70.68
		January	70.68
Total Funds	\$20,000.00		\$19,509