Connecticut State University Outer Island Education Program Report

Submitted by:

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and

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Connecticut State University Outer Island Summer Programs

Outer Island Interns

This year (Summer 2016) three student interns were hired to staff Outer Island and to assist groups with educational programming during their visit to the island. The interns also conducted research activities, including monitoring water quality and fouling, and participated in maintenance activities on the island facilities. Rebecca Caravello returned for a second summer as an intern on Outer Island. Rebecca Caravello is a senior at Central Connecticut State University. She is majoring in elementary education with a focus in biology. She has always had a passion for marine life and the environment. Prior to working on Outer Island, she was performing research with Dr. Jeremiah Jarrett on various marine invertebrate studies. Alexis (Lexi) Tolley is a Connecticut native attending Central Connecticut State University studying Biology. She plans on continuing her schooling and using her education for research. Sarah Mangan is a Connecticut native who moved to Florida four years ago to attend Florida Institute of Technology. She graduated in the Spring of 2016 with a B.S. in Marine Biology.

This summer 2016 was the second summer where three interns were hired to provide visitor services on the island. By all measures, having three interns on the island improved visitor services and community outreach. Student interns each received a salary ($2,722.50) processed via CCSU.

Schedule of Visitors

Thirty different groups scheduled 46 visits during the summer 2016 with an estimated 800 visitors participating in education programs (see attached schedule). Both the number of scheduled groups and the total number of scheduled group visitors to Outer Island were similar to summer 2015. Many of the scheduled groups have visited the island in previous years. Some of the notable first time visitors to the island included a group from GreenWave, the award-winning organization building 3D ocean farms along the Atlantic Coast, students from the Ashford Middle School, Ashford and a SCSU School of Education Faculty Retreat.

Outer Island Schedule Summer-2016

CSU Escort	Date	Time	Size	Organization	Contact	Phone	email
FOI	21-May	9:00 am - 12:00 pm	12	Friends of Outer Island Volunteer Training	Ginny Baltay		virginia.baltay@gmail.com
Interns	31-May	9:00 am – 1:00 pm	20	St Bridget School, Cheshire	Michelle Carroll		mcarroll@stbridgetschool.org
Interns	1-Jun	10:00 am - 2:00 pm	12	SCSU School of Education Faculty Retreat	Deb Newton		newtond2@southernct.edu
Shaun Roche	6-Jun	10:00 am - 2:00 pm	25	US Fish and Wildlife School Group	Shaun Roche		shaun_roche@fws.gov
Shaun Roche	7-Jun	10:00 am - 2:00 pm	25	US Fish and Wildlife School Group	Shaun Roche		shaun_roche@fws.gov
Shaun Roche	8-Jun	10:00 am - 2:00 pm	25	US Fish and Wildlife School Group	Shaun Roche		shaun_roche@fws.gov
Shaun Roche	10-Jun	10:00 am - 2:00 pm	25	US Fish and Wildlife School Group	Shaun Roche		shaun_roche@fws.gov
Interns	11-Jun	10:00 am - 4:00 pm	20	The Graduate Institute, Bethany, CT	James Trifone		trifone@learn.edu
FOI	11-Jun	4:00 pm – 7:00 pm		Interpreting Nature through Art	James Lockhart		teach-1@sbcglobal.net
Interns	13-Jun	10:00 am - 1:00 pm	32	Ashford Middle School	Carly Imhoff		cimhoff@ashfordct.org
Interns	16-Jun	9:30 am - 1:00 pm	16	GreenWave	Emily Stengel	717-669-1666	emily@greenwave.org
Interns	6-Jul	10:00 am – 2:00 pm	7	CCSU Marine Invertebrate Biology	Jerry Jarrett		jarretti@ccsu.edu
Interns	6-Jul	10:00 am – 2:00 pm	8	SCSU - Water Based Media in Painting	Wiley Carr		carrt1@southernct.edu
Breslin - Interns	8-Jul	8:30 am – 3:30 pm	11	SCSU EVE 537	Vince Breslin		breslinv1@southernct.edu
Interns	9-Jul	11:00 am – 1:00 pm	24	Captains and Mates Yacht Club	Robin Rosenbaum	914-433-6041	rrosenbaum1202@gmail.com
Interns	12-Jul	9:30 am - 2:00 pm	20	Solar Youth	Corinne Nowell	203-387-4189	corinne@solaryouth.org
Interns	15-Jul	1:00 pm - 3:00 pm	11	Choate Rosemary Hall - Department Retreat	Richard Saltz		rsalz@choate.edu
Interns	19-Jul	10:00 am – 2:00 pm	8	SCSU - Water Based Media in Painting	Wiley Carr		carrt1@southernct.edu
Interns	19-Jul	6:00 pm - 8:00 pm		Friends of Outer Island Board Meeting	Ginny Baltay		virginia.baltay@gmail.com
Interns	23-Jul	9:30 am – 1:30 pm		Watercolor Workshop - Wiley Carr SCSU	Ginny Baltay		virginia.baltay@gmail.com
Interns	23-Jul	3:30 pm – 7:30 pm		Interpretating Nature Through Art	James Lockhart		teach-1@sbcglobal.net
Interns	24-Jul	2:00 pm – 4:00 pm	30	Kirschenbaum/Weil Gathering	Sara Kirschenbaum	503-250-2491	
Interns	26-Jul	9:30 am - 2:00 pm	15	SCSU Art Students	Wiley Carr		carrt1@southernct.edu
Interns	28-Jul	12:00 pm – 4:00 pm	15	Branford Animal Camp	Dawn Buffone	203-315-4125	dbuffone@branford-ct.gov
Bryan Yoon/FOI	29-Jul	6:30 pm – 7:30 pm		Yoga on the Island	Brian Yoon		bman2901@gmail.com
Interns	2-Aug	10:30am – 2:00pm	15	Camp Totokett	Laura Noe		noemarketing@yahoo.com

CSU Escort	Date	Time	Size	Organization	Contact	Phone	email
Interns	5-Aug	10:00am – 2:00pm	7	Fellowship Place in New Haven ArtShip group	Kyle Barreuther	860-930-6745	kbarreuther@fellowshipplace.org
FOI - Interns	6-Aug	9:00 am – 1:00 pm		Citizen Science and Research Day	Bryan Yoon and Ginny Baltay		virginia.baltay@gmail.com
Breslin - Interns	10-Aug	11:00 am – 3:00 pm	10	SCSU - Geography of Connecticut	Leon Yacher	203-392-5825	yacherl1@southernct.edu
	21-Aug	12:30 pm – 1:30 pm	25	Phil Brencher Group - Wildlife Photography	Phil Brencher	203-654-0024	pbrencher@snet.net
Chuck Booth	10-Sep	10:00 am – 4:00 pm	15	ECSU Biology	Chuck Booth	860-465-5260	booth@easternct.edu
FOI	10-Sep	3:00 pm – 6:00 pm	20	Celebration of Volunteerism	FOI and US Fish & Wildlife		virginia.balta@gmail.com
Island Keeper	12-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	13-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	14-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	15-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	16-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	19-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	20-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	21-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Island Keeper	22-Sep	9:00 am – 2:00 pm	20	Common Ground High School	Sharon Brostrom	203-389-4333	sharon.brostrom@nhep.com
Sott Graves	24-Sep	10:00 am – 4:30 pm	12	Globe-WeatherBug - Teachers Workshop	Scott Graves		gravess1@southernct.edu
Jeffrey Rizzo	26-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Jeffrey Rizzo	27-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Jeffrey Rizzo	28-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org
Jeffrey Rizzo	29-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Jeffrey Rizzo		jrizzo@branfordschools.org

Research Activities

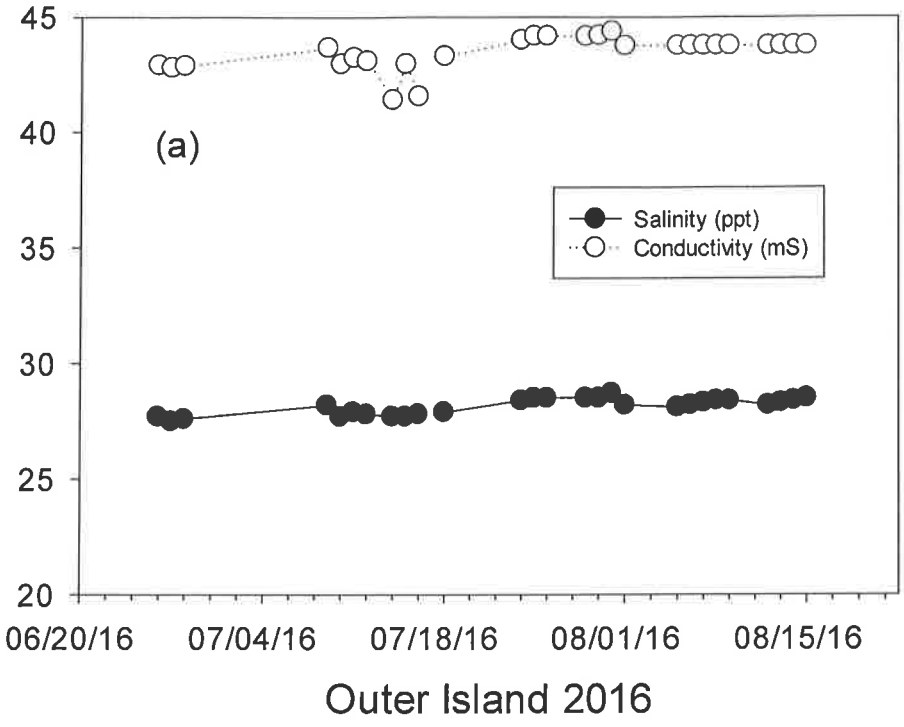
Water Quality Monitoring

Water quality parameters were monitored by the CSU interns during the Summer 2016 from June 26th to August 15th. 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, and pH. All measurements were made on water samples collected from at a depth of one meter.

Salinity showed little variability, with a range of 27.5 ppt (6/27) to 28.7 ppt (7/31), while conductivity showed a slightly larger range from 41.38 mS (7/14) to 44.38 mS (7/31) (Figure 1a). Water temperature gradually increased from the spring to the end of the summer (Figure 1b). Water temperature increased from 20.3°C (6/28) to 25.8°C (8/15). Dissolved oxygen concentrations gradually decreased as temperatures increased with a low of 5.94 mg/L on 8/15.

Temperature and dissolved oxygen varied inversely (Figure 1a). Water clarity, as measured by a Secchi disk, varied from 0.60 m (7/31) to 1.9 m (7/10) during the monitoring period (Figure 2a). pH ranged from a low of 7.84 (8/15) to a high of 8.03 (7/16) (Figure 2b).

The water quality monitoring raw data and graphs are available online in the redesigned Research section of the Outer Island website (http://outerisland.org/index.php?id=research). Foundation funds were used in 2016 to purchase a HOBO conductivity/salinity logger in support of the Outer Island water quality monitoring studies. The conductivity logger will be deployed in spring 2017 and will record real time temperature and salinity during the summer visitor season. The logger can be programmed to record temperature and salinity measurements every hour during the summer season providing greater resolution of the temperature and salinity trends in the water quality surrounding Outer Island.



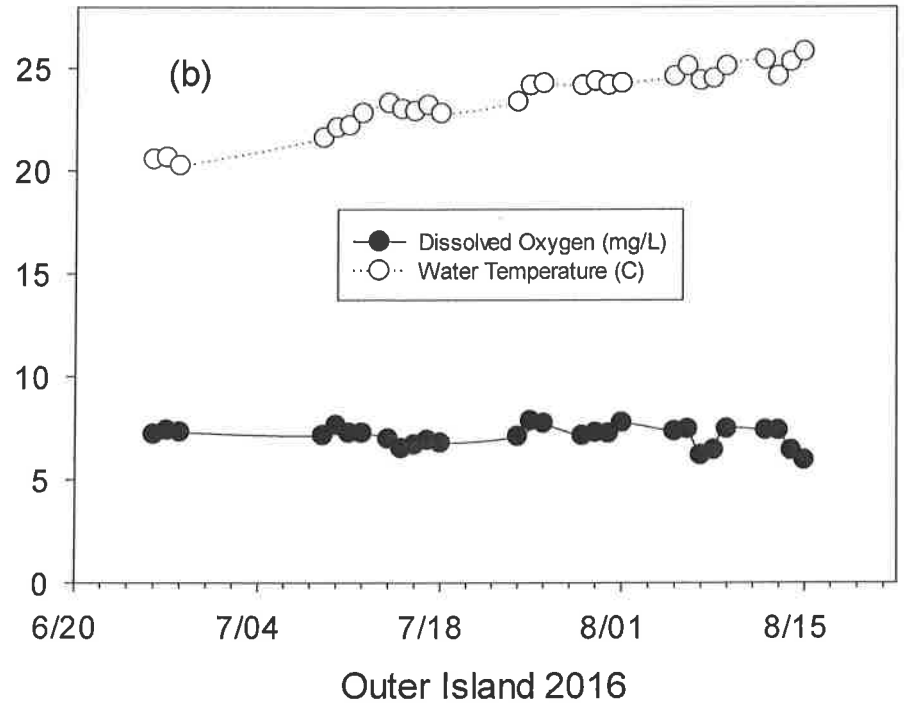
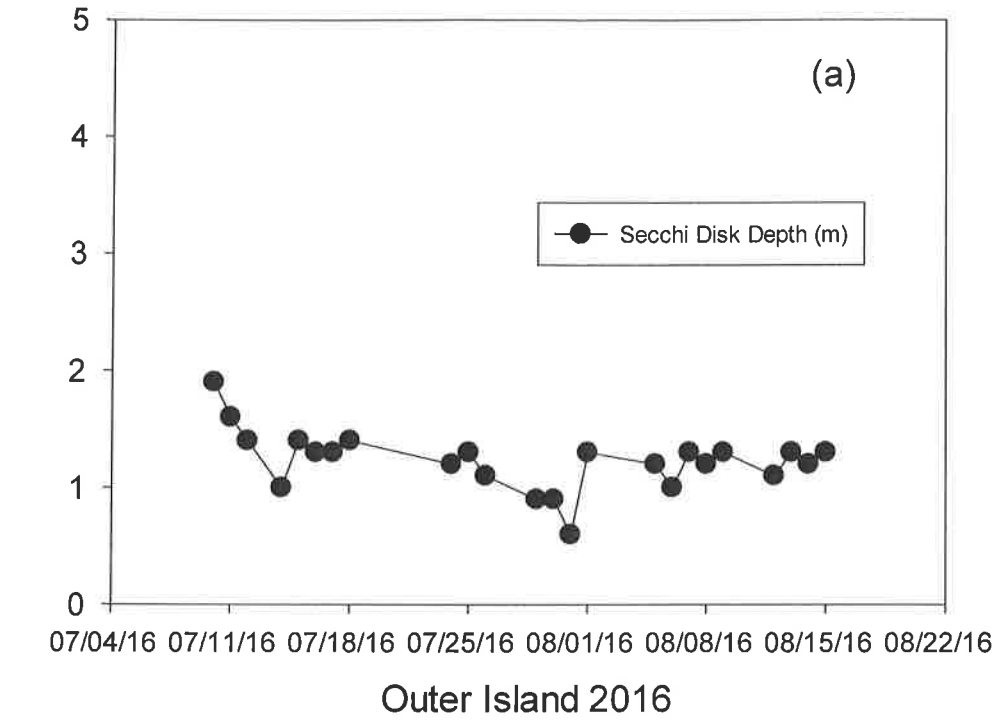


Figure 1. Outer Island 2016 water quality monitoring results: (a) salinity and conductivity; and (b) temperature and dissolved oxygen.



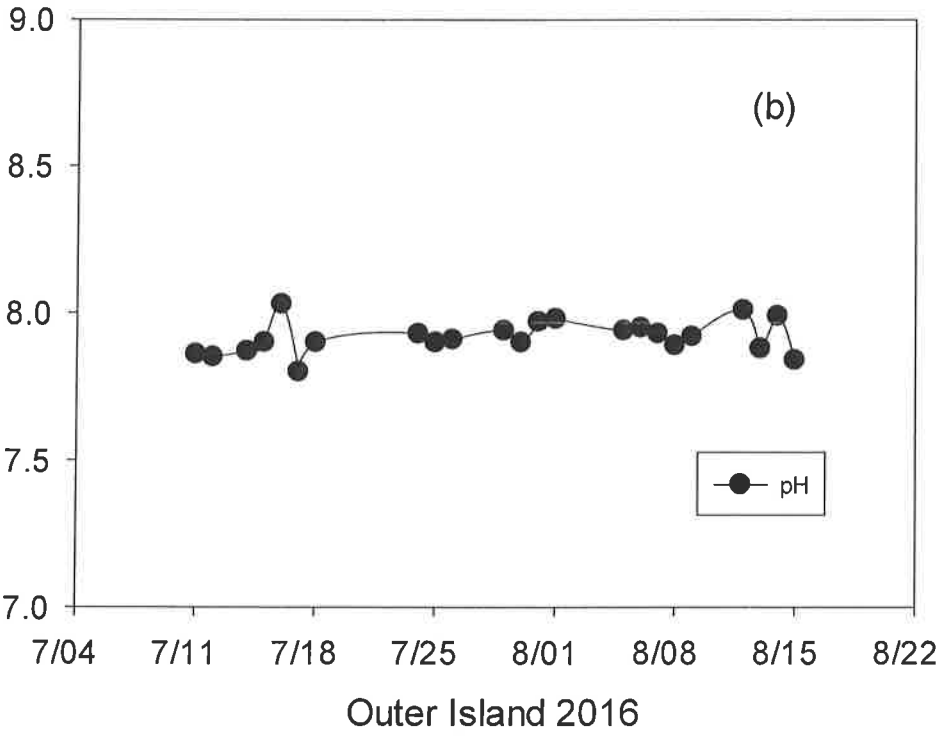


Figure 2. Outer Island 2016 water quality monitoring results: (a) Secchi disk depth; and (b) pH.

Outer Island Water Quality Summer 2016

Date	Time	Weather	Wind speed		Rel. Humidity	Air Temperature	Solar Radiation	Salinity	Conductivity	Specific Conductivity	Water temp	Oxygen	Secchi Disk	pH
			Max (mph)	Min	%	C	lux	ppt	m/s	m/s	C	mg/L	m	
26-Jun-16	2:00 PM		2.3	0.1	39.5	28.0	1025x100	27.7	42.90		20.6	7.20		
27-Jun-16	2:00 PM		6.1	1.9	59.5	79.3	963x100	27.5	42.79		20.7	7.40		
28-Jun-16	1:45 PM		3.3	0.0	26.8	72.1	51x100	27.6	42.87		20.3	7.31		
9-Jul-16	2:55 PM	overcast/rain	13.5	8.5	26.4	20.5	205x100	28.2	43.66	40.82	21.6	7.14		
10-Jul-16	2:01 PM	partly cloudy	2.4	0.0	64.4	25.8	998x100	27.7	42.95	40.63	22.1	7.63	1.9	
11-Jul-16	2:08 PM	overcast	3.5	1.3	50.6	27.8	458x100	27.9	43.23	40.92	22.2	7.26	1.6	7.86
12-Jul-16	2:40 PM	partly cloudy	0.3	0.0	68.9	29.0	903x100	27.8	43.08	41.40	22.8	7.26	1.4	7.85
14-Jul-16	2:51 PM	clear sun	3.3	2.9	82.5	28.3	777x100	27.7	41.38		23.3	6.97	1.0	7.87
15-Jul-16			1.0	0.0	60.7	34.3	446x100	27.7	42.94	41.22	23.0	6.52	1.4	7.90
16-Jul-16	1:38 PM	clear sun	3.5	1.5	62.4	32.6	1040x100	27.8	41.53	43.10	22.9	6.69	1.3	8.03
17-Jul-16	2:15 PM		1.2	0.0	74.6	31.9	925x100			41.63	23.2	6.91	1.3	7.80
18-Jul-16	2:25 PM	clear sun	0.0	0.0	67.2	30.8	946x100	27.9	43.28	41.51	22.8	6.78	1.4	7.90
24-Jul-16	2:06 PM	clear sun	0.0	0.0	64.1	30.7	670x100	28.4	43.99	42.73	23.4	7.10	1.2	7.93
25-Jul-16	2:10 PM	clear sun	0.0	0.0	71.0	32.8	905x100	28.5	44.15	43.64	24.2	7.85	1.3	7.90
26-Jul-16	2:40 PM	clear sun	1.5	0.1	70.7	29.7	905x100	28.5	44.15	43.54	24.3	7.73	1.1	7.91
29-Jul-16	2:55 PM	partly cloudy	2.7	1.3	77.8	28.0	821x100	28.5	44.17	43.48	24.2	7.13	0.9	7.94
30-Jul-16			4.3	0.5	67.5	31.2	850x100	28.5	44.20	43.71	24.4	7.28	0.9	7.90
31-Jul-16	2:40 PM	overcast	11.7	4.7	74.3	26.1	350x100	28.7	44.38	43.77	24.2	7.24	0.6	7.97
1-Aug-16	2:09 PM	overcast	2.3	0.7	75.6	25.2	275x100	28.2	43.75	73.15	24.3	7.76	1.3	7.98
5-Aug-16	2:27 PM	clear sun	2.4	0.9	70.2	29.3	880x100	28.1	43.75	43.35	24.6	7.34	1.2	7.94
6-Aug-16	1:40 PM	clear sun	0.0	0.0	71.5	21.8	1063x100	28.2	43.75	43.81	25.1	7.44	1.0	7.95
7-Aug-16			1.4	0.0	75.1	28.5	861x100	28.3	43.75	43.30	24.4	6.18	1.3	7.93
8-Aug-16		partly cloudy	2.0	1.6	69.6	27.7	913x100	28.4	43.75	43.75	24.5	6.43	1.2	7.89
9-Aug-16	2:20 PM	clear sun	3.5	1.0	58.7	31.4	840x100	28.4	43.75	44.10	25.1	7.45	1.3	7.92
12-Aug-16	2:45 PM	partly cloudy	2.4	0.1	91.8	30.1	584x100	28.2	43.75	44.12	25.4	7.39	1.1	8.01
13-Aug-16		clear sun	2.3	0.6	73.7	35.3	840x100	28.3	43.75	43.38	24.6	7.38	1.3	7.88
14-Aug-16		clear sun	0.0	0.0	81.6	31.9	880x100	28.4	43.75	43.96	25.3	6.41	1.2	7.99
15-Aug-16			1.3	0.4	79.6	29.2	620x100	28.5	43.75	43.85	25.8	5.94	1.3	7.84

Fouling Study on Outer Island

For the second year in a row, Dr. Jeremiah Jarrett (CCSU Biology Department) worked with the Outer Island interns to monitor the development of the fouling community, at Outer Island. Unfortunately, the settlement plate scaffold (Figure 3) broke loose from the dock prior to the end of the season and most settlement plates were lost or buried in mud. Dr. Jarrett plans to install a more secure settlement plate scaffold for the 2017 season.

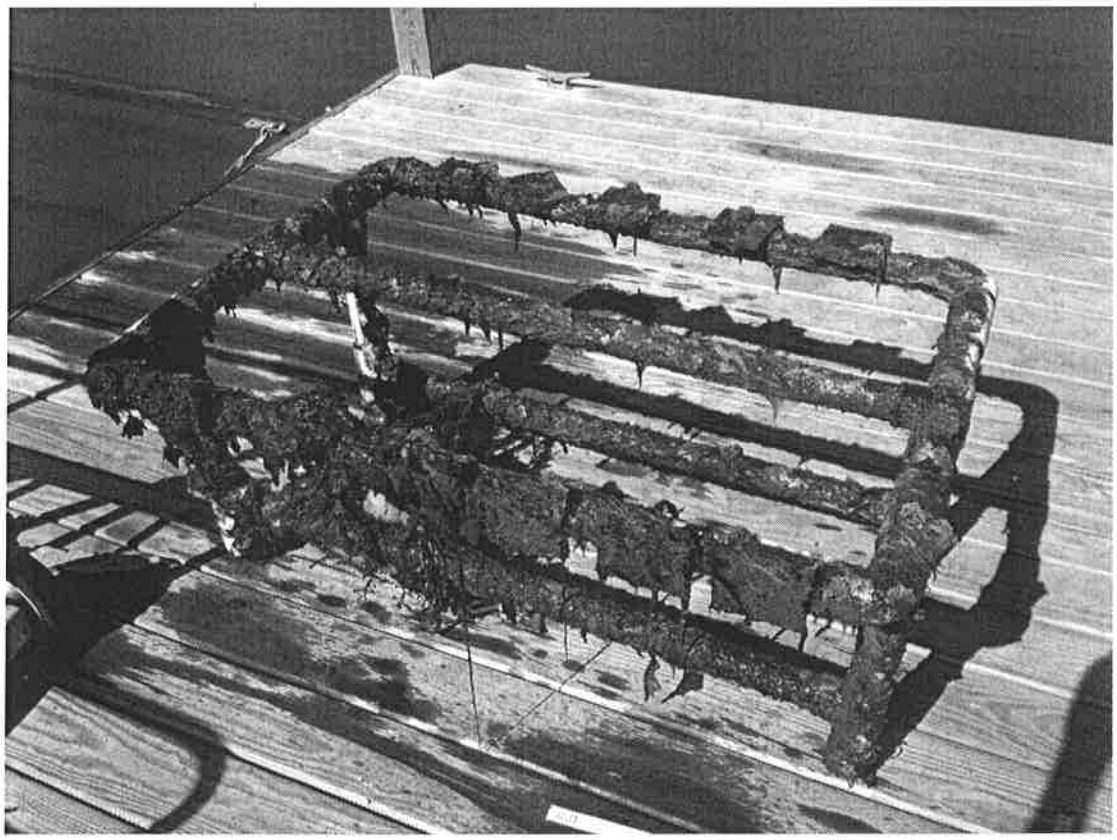


Figure 3. PVC scaffold on which settlement plates were deployed.

Thankfully, CCSU undergraduate students Jordan Gronback, Alex Manos, Adan Isa, Rutviben Patel, and Joseph Silipo worked during the Fall 2016 and Spring 2017 semesters to sort and identify Caprellid amphipods collected from the dock on Outer Island. In addition to using morphological characters to identify individuals to species level, these students also applied, and troubleshot, molecular techniques to extract DNA and amplify the mitochondrial cytochrome oxidase 1 gene (commonly used for population genetics studies). The students then analyzed the sequence data to confirm species identification of individuals and to examine the genetic

variation found within Caprellid populations on Outer Island. Two species were found in our sample: *Caprella equilibra* and *Caprella penantis*. (Figure 4).

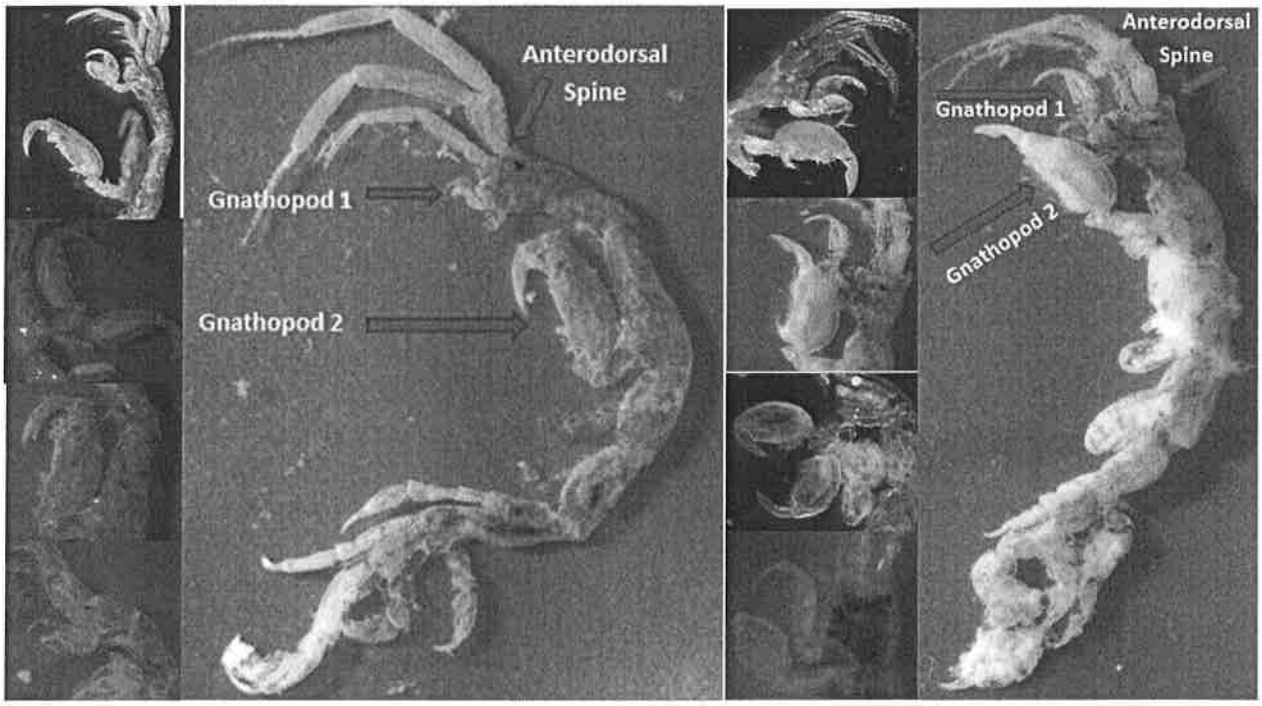


Figure 4. *Caprella equilibra* (left) and *Caprella penantis* (right).

Figure 5 shows how individuals of *C. penantis* and of *C. equilibra* group together, respectively, based on similarities in their CO1 gene sequences. Numbers at nodes indicate the average number of substitutions per site. For example, *C. equilibra* individuals group closely together with only about a 1.3% rate of nucleotide substitution per site. *C. penantis* individuals also group together with as much as a 4% rate of nucleotide substitution per site. However, comparison of these two groupings shows a 12.6% rate of nucleotide substitution per site. *Cyamus gracilis* (whale lice) was used as an outgroup for the analysis.

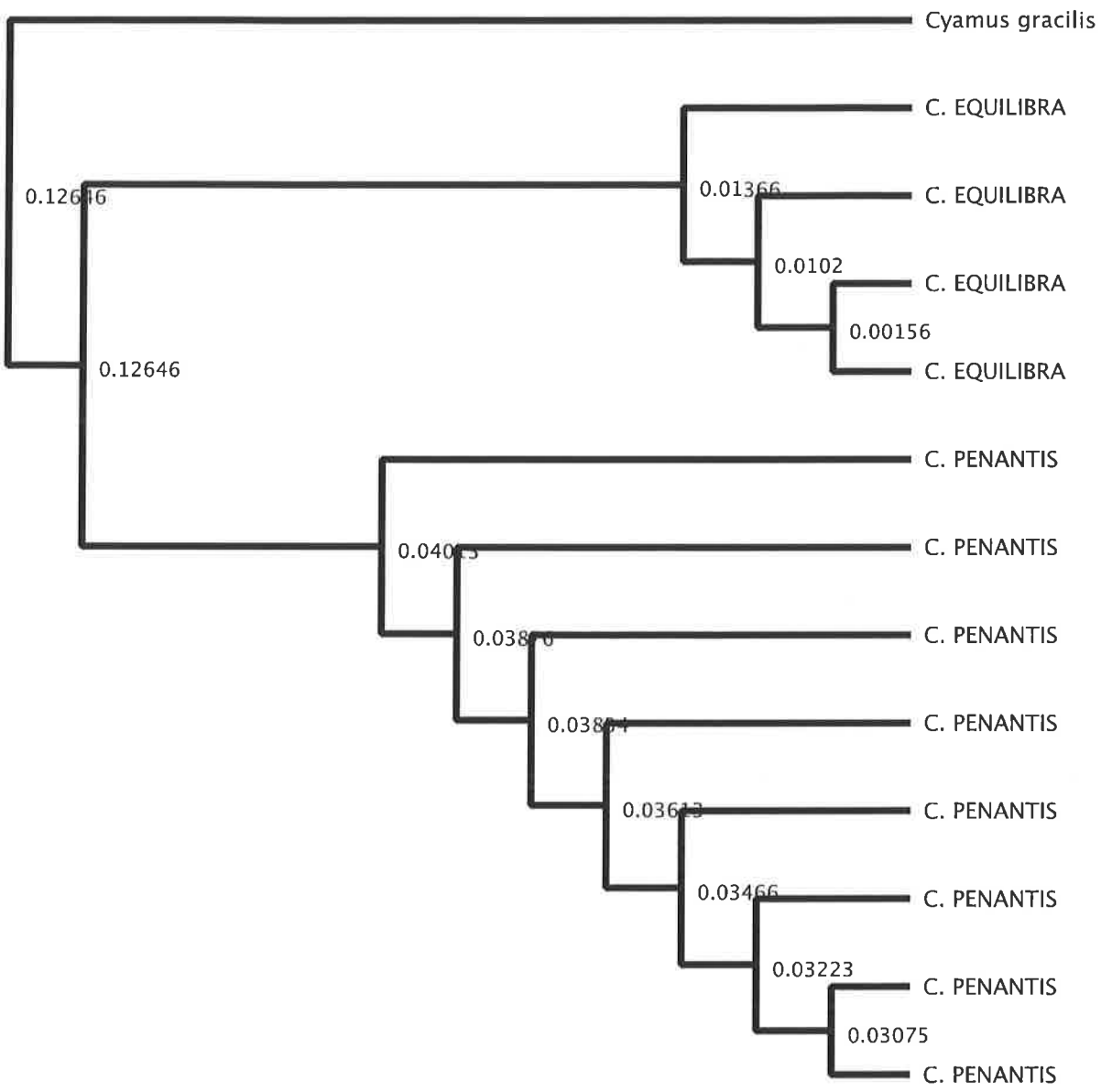


Figure 5. Nucleotide alignment tree.

Future Plans

For the 2017 season, Dr. Jarrett will deploy a new, more secure fouling plate scaffold for the fouling study as well as expand the scope of the motile invertebrates project and begin identifying and quantifying other motile species found in the fouling community. We are also interested in identifying any associations that might exist between non-motile and motile species.

Water Quality Meter Repairs for Education Programs

Research quality YSI salinity and dissolved oxygen meters and probes were purchased solely for water quality monitoring by the island interns and visiting school groups. The meters require periodic refurbishing to assure that they are functioning properly. This year two of the dissolved oxygen water quality meters were returned to YSI for recalibration and repair. Both meters required extensive rehabilitation and repair (estimated repairs exceeded $1,800). In lieu of repairing the meters, YSI offered significant credit for the return of the old meters toward the purchase of new dissolved oxygen meters ($1,620). The new dissolved oxygen meters have been calibrated and will be brought to the island for the summer 2017 water quality monitoring program. Two LaMotte turbidity meters were also out of calibration and not functioning properly. Both meters were shipped to LaMotte for repairs ($237) and are now fully calibrated and functioning properly. Photos of the meters, water bottles and manuals for their use and care are posted on the website at http://www.outerisland.org/index.php?id=water-quality-equipment-and-manuals.

Figure 6. Citizen Science water quality bucket.

Supplies and meters were purchased during the summer 2016 in support of the Friends of Outer Island citizen science buckets. The goal of this program is to facilitate citizen participation in science activities to have them more engaged in science on the island. These buckets will be placed on the island outside the lab under the pavilion to allow visitors to use the equipment to

conduct water quality measurements. Each bucket contains pH paper, a thermometer, hydrometer, pH probe and salinity/temperature probe.

Air Quality Monitoring

A PerkinElmer ELM Air Quality Monitoring System was purchased ($2,080) and installed on Outer Island in October 2015. This ELM air quality monitoring system gathers information on atmospheric temperature, humidity, volatile organic compounds (VOCs), ozone, nitrogen dioxide, particulate matter and noise (see attached brochure). ELM is designed to monitor outdoor air quality using a range of dedicated nano-technology sensors. The ELM system was installed along-side the WeatherBug weather station on the roof of the laboratory building.

Unfortunately the ELM Air Quality Monitoring System initially installed on the island did not perform well. Many of the sensors did not function well, especially during the Summer/Fall 2016. PerkinElmer was notified of the poor performance of the meter and they have supplied us with a replacement system at no charge. We will install the new system on the island this Spring 2016 and begin monitoring air quality on the island once again.

ELM measures local pollutant levels in real time, wirelessly transmitting the data to a cloud-based system for storage, analysis and processing. To access the daily air quality data use the following URL: http://elm.perkinelmer.com/map/. Zoom in on the map to locate the Outer Island station, Thimble Islands, Long Island Sound. Clicking on the station (green dot) allows access to the data. The air quality monitoring data can be directly accessed form the Outer Island website at http://outerisland.org/index.php?id=air-quality-monitoring.

WeatherBug Station, Web Cameras and Remote Video Capabilities

Overall, the WeatherBug weather station has performed well and continues to provide weather data and web camera views of the island. The island did not experience any long-term power outages during the past year and most systems appear to be performing well. The

exception is the webcamera view westward. At present, the webcamera is operating but is out of position. This webcamera was originally positioned on the pavilion with an eastward view. The camera was moved last year and was replaced by a newer model camera with an eastward view.

We have contacted the WeatherBug service personnel and they will visit the island in April 2017 to survey the condition of the weather station and examine the issues with the camera. Any malfunctioning weather station sensors will also be replaced at this time. The technicians will also explore options for the malfunctioning camera. This camera is aging and may need to be replaced. Funds will be requested ($5,600) to replace the camera during summer 2017 to assure a continuous operation and a view westward.

The AT&T wireless account used in support of the Outer Island WeatherBug station and video cameras now supports three wireless lines transmitting data and images. Two of the lines support the cameras and WeatherBug weather data and the third line supports the ELM Air Quality monitoring station. During the Summer 2017 we will continue to provide a wireless hot spot to allow internet access to the student interns.

AT&T broadband access fees for the wireless for the twelve month service period from May 2016 to March 2017 totaled $2,261.

Outer Island Website Update

We continue to revise and update 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 hosted on iPage (www.iPage.com; terms 2018). Xavier Garcia, a SCSU undergraduate computer science major with a concentration in graphic design, was paid a stipend during the Summer and Fall 2016 to continue to modify and updating the website.

The reorganized website now has a more simplified navigation and allows direct access to weather, webcameras, air quality and water quality data. We now have direct access to the WeatherBug data, Air Quality data and the views from two cameras available to visitors on the website. The inclusion of an interactive calendar in the redesigned website was initiated in 2014

summer and continues to facilitate the scheduling of groups visiting the island. The calendar allowed visitors to identify open dates and reduced scheduling conflicts experienced in past years. The calendar also allows users, including interns, CSU coordinators, Friends of Outer Island, and US Fish & Wildlife personnel to view up-to-date changes in the schedule.

Improvements to the website during 2016-2017 included:

- Posting of summer 2015 and 2016 water quality data (harbor and tide pools) and water quality equipment and manuals
- The posting of past Summer Outer Island attendance records (1998-Present)
- Posting of summer 2016 intern photos and bios, and
- Direct access to the web cameras, WeatherBug data and Air Quality Data
- Link to the FOI video of Outer Island
- Posting of past student theses and research

Updates for 2017 will include:

- Posting of the fouling study goals and outcomes
- Updates of the water quality monitoring studies
- Posting of recent year-end reports
- A photo gallery

Outer Island Watercolor Workshop/Art Experience

The 3rd Annual Outer Island Watercolor Workshop/Art Experience was held on Saturday July 23, 2016. The workshop was conducted in collaboration with the Friends of Outer Island and featured watercolor, photography, and sketching workshops. Twelve individuals participated in the event, with more than half of the participants visiting the island for the first time. By all measures the event was a success. We anticipate scheduling a similar event during summer 2017. Wiley Carr, SCSU Art Professor, sent a workshop summary (see attached document). We were able to provide art supplies for each of the 12 participants. Wiley Carr was provided a stipend ($1,000) in support of his role in organizing and watercolor instruction during the event.

Outer Island Globe Workshop

Scott Graves (Associate Professor; Environment, Geography and Marine Sciences) conducted a two-day Globe workshop for area High School teachers (announcement and agenda attached). Nine participants attended, including non-formal educators and CT middle and High School teachers. The two-day workshop (September 23rd and 24th) featured a classroom orientation program on fundamental principles of climate, weather and oceanography. The program featured Environmental Systems Science – study of Earth's atmosphere, hydrosphere, weather and climate. A visit to Outer Island (September 24th; 10 am – 2 pm) was used to provide "hands on" activities for teachers and allowed teachers opportunities for exploring the island geology and oceanography, as well as data collection in shoreline and upland habitats. These measurements also included water quality in tide pools and Branford harbor with the Island Keepers. Tapping into the automated Weather Station on Outer Island, the teachers learned how to incorporate "real time" weather data into their classroom activities. Participants were also instructed on how to utilize the Outer Island webcams to view island habitats throughout the year. Participants also discussed hurricanes, winter storm events and their impacts. Participants each received a Kestrel 3500 Pocket Wind meter.

Southern Connecticut State University
SCSU

Date: 29 July 2016

To: Vincent Breslin
Professor and Chair
Science Education and Environmental Studies
Co-Coordinator, Werth Center for Coastal and Marine Studies

From: T. Wiley Carr
Professor of Art

Re: Final Report, Outer Island Watercolor Workshop 2016

Dr. Breslin;

The Watercolor Workshop, part of the 3nd Annual "Art Day" on Outer Island, was again a great success. My workshop was enrolled to capacity, 12 participants, and remains a popular event. More than half of the participants were visiting Outer Island for the first time. Participants found the experience to be educational, enjoyable and informative. It reflected well on SCSU and our programs.

I am attaching the information distributed to participants, which outlines materials utilized. I'm also attaching one of several emails received, and promotional materials that I generated. Reusable materials remain stored on the island.

Please let me know if I can provide additional information; Similar events can continue in the future, and the grant-funding is deeply appreciated.

Respectfully,

T. Wiley Carr
Professor of Art x26636 carrt1@southernct.edu

Outer Island Watercolor Workshop
Sat, Jul 23, 2016 at 9:30 AM - Stony Creek, CT

SOLD OUT DETAILS

Explore the beauty of Outer Island in Stony Creek, Branford - while learning the basic techniques of watercolor! Conducted by Prof. T. Wiley Carr of the Southern Connecticut State University Art Department, the event is suitable for beginners and all levels of ability; all materials will be provided. The workshop is free; there is a required $15. fee which covers the cost of ferry transportation. Bring a sack lunch, (and perhaps an extra bottle of water.) Ample time for exploring, sketching and painting... in a relaxing and beautiful atmosphere.

The ferry to Outer Island will leave the Stony Creek Dock promptly at 9:30am, and return from the Island at approximately 1:30pm. Parking is available at the Town Dock, along Thimble Island Road, or in the Church of Christ parking lot. This workshop is sponsored by Connecticut State University in cooperation with the Stewart B. McKinney National Wildlife Refuge. Limited to 12 participants.

Information on Outer Island: http://outerisland.org

FAQs

Where can I contact the organizer with any questions?

SCSU Professor of Art Wiley Carr, email: carrt1@southernct.edu

WHEN
Saturday, July 23, 2016 from 9:30 AM to 1:30 PM (EDT) - Add to Calendar

Watercolor workshop Outer Island July 23 2016
Prof. T. Wiley Carr, SCSU

First and foremost, ENJOY Outer Island!

Introductions -

"Step-by-Step"

Measuring
Masking
Wet to Dry
Light to Dark - preserving lights
Graded wash
Flat wash
Layering colors and washes
Mixing neutrals ("blacks") with complementary colors

****
About your paper **today**- **Arches** (France) 140-pound *hot* press (smooth) and *cold* press (rough). Cut from full sheets of 22" x 30". 100% cotton! acid-free.
Common weights: 90# (*thinnest*) 140#, 200#, #300 and up (**thick**)
Also **Fabriano** (*Italy*), same specifications as above, lighter in value towards white

Other *good* brands include Strathmore (*USA*), Canson (*France*). Bockingford (*England*)
Available in pads, sheets and 'blocks' -

About your watercolors **today**- **Yarka** brand (*Russian*) pans, non-toxic. Yarka watercolors available in 24-color professional pan sets, 3 different sets - 72 colors total. Many other brands available in tubes, and cakes and pan sets. Look for 'shiny when dry' quality with pan sets (gum arabic).

Other *good* brands are Winsor & Newton (*England*), Daniel Smith (tubes) (*USA*),
Prang pans (*USA*)

About your brushes **today** - *Royal & Langnickel* scholastic synthetic - Synthetic vs. natural hair considerations include cost, water loading, firmness and maintenance, 'sable'/kolinsky.
Other brands - seemingly endless - I often get *Princeton* brand brushes at Ocean State Job Lot!

For art supplies I most often use *Dick Blick Art Supply* mail order.

Feel free to contact me by email at CARRT1@southernct.edu

The Center for Coastal and Marine Studies @
Southern Connecticut State University

Weather & Climate Workshop: September 23rd and 24th, 2016

Workshop summary:

This workshop included 3 hrs of in-class discussion and overview of Weather, Climate and Long Island Sound Oceanography and the Outer Island website; all resources therein, as well as a GLOBE Program "refresher" or initial training in Weather and Hydrology field protocols. 9 participants attended, including non-formal educators and CT Middle & High School Teachers.

In-class discussions covered the use of the OuterIsland.Org website for teaching and learning, strategies for using weather data downloads to build a seasonal picture of conditions on the island, as well as capturing web camera images to help visualize changing conditions on the island. GLOBE field protocols were also covered for weather and hydrology observations. Finally, we practiced using the WeatherFlow BlueTooth meters and the companion WeatherMeter App.

On-Island work (10am – 2pm) included tours of the island habitats and intertidal zone, followed by weather data collection using the WeatherFlow meters and hydrology data collected at select tide pools and the intertidal LIS waters. Numerous pictures and video were captured of the participants in action and video and spherical panorama images of various habitats. These images and video and a brief narrative can and should be posted to the OuterIsland.Org website.

All in all, another successful Outer Island Workshop.

Suggestions for next year: Advertise this workshop opportunity more broadly at Connecticut Science Teachers Association website and conference, and the COEEA conference and website.

The remainder of this document includes the original workshop flier/invitation, workshop syllabus, and SCSU catering bill.

The Center for Coastal and Marine Studies @ Southern Connecticut State University

Announces Fall 2016

Using Outer Island to teach Weather and Climate and Long Island Sound Oceanography

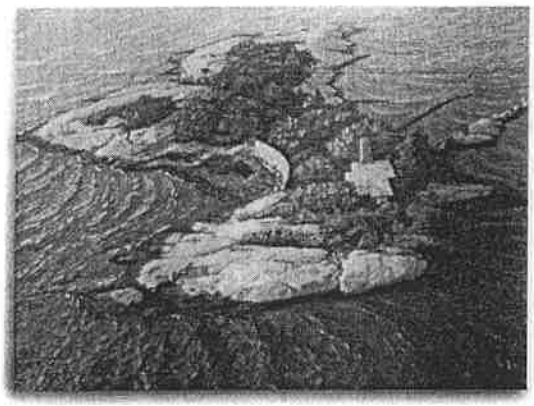
Weather & Climate Workshop

Outer Island & GLOBE Program

Invited – CT Middle & High School Teachers

Friday September 23rd 4:30pm – 7pm, SCI 103

Saturday September 24th 10:00am – 2pm, Outer Island



Join us for a GLOBE Program "Refresher" and introduction to Outer Island as a resource for teaching Weather, Climate and Long Island Sound Oceanography!

Learn to use the Resources of Outer Island as a teaching tool. Tap into the automated Weather Station on Outer Island, see weather data over time. View the island habitats over the web-cameras, any time of the year!

Inquiry into Environmental Systems Science – study of Earth's atmosphere, hydrosphere, weather and climate. Hurricanes, Winter Storm events and their impacts.

Workshop includes WeatherFlow Pocket Meter (iOS & Android)

- WeatherFlow measures Wind Direction, Wind Speed (Ave, Gust & Lull), Temperature, Barometric Pressure, Humidity, Dew Point, Wet Bulb, Dry bulb, Wind Chill, Heat Index, "Feels like", and Air Density. The device links to iOS or Android smartphones via Bluetooth, the iOS or Android App is Free!

www.outerisland.org

For information please contact
Dr. Scott M. Graves @
203-3926604 or
gravess1@southernct.edu

Fall 2016 CCMS Outer Island / GLOBE Workshop

Friday September 23rd 4:30pm – 7:00pm, SCI103

Saturday September 24th 10:00am – 2:00pm, Outer Island

Workshop

Agenda

Friday September 23rd

4:15-4:30 PM **Check in … snacks to get us started…**

4:30 **Re-Introduction to the GLOBE Program**
Weather & Climate overview
Weather & Climate – defined.
Exploring basic weather observations.
Online Resources for Weather and Climate (GLOBE, NASA, NOAA)

5:00 Snack time –discussion of ***Outer Island Resources***:
Website and on location activities.
– ***WeatherFlow Pocket Meters!***

6:00 **GLOBE Program - ATMOSPHERE**
Solar Noon/Basic Protocols (Temperature: air and soil), Precipitation—Rainfall, pH, Cloud Cover/Type.
Overview of Atmosphere data sheets.
GLOBE Program - HYDROLOGY
Temperature, Dissolved Oxygen, pH, Conductivity. Overview of Hydrology data sheets. **– Vernier or YSI probeware.**

7:00 PM Adjourn

Saturday September 24th

10:00 am **Depart from Stony Creek Docks…**

10:45 am **Basic overview of Outer Island**
Resources, Environments

11:30 am **Tour of the Island – with Hydrology monitoring**

Dock, Beach, Rocky Intertidal Zone, Tide Pools, Bedrock Geology, Marshes, Migratory Bird Nesting areas. Temperature, Dissolved Oxygen, pH, Conductivity/Salinity.

2:00 pm **Lunch**

12:30 0m **Outer Island Weather Station – online resources, weather data, web cams.**
Classroom briefing/demonstration: how to get the Outer Island Weather data. What to do with the weather data. How to use the web-cam imagery.

2:00 pm **Depart Island.**

GLOBE Protocols – covered in CCMS Weather & Climate Workshop	
☐ *Atmosphere Max/Min/Current Temperature* ☐ *Atmosphere Clouds* ☐ *Atmosphere Precipitation* ☐ *Atmosphere Relative Humidity* ☐ *Atmosphere Automated Air and Soil Temperature* ☐ *Atmosphere Surface Temperature*	☐ *Hydrology Conductivity* ☐ *Hydrology Dissolved Oxygen* ☐ *Hydrology pH* ☐ *Hydrology Salinity* ☐ *Hydrology Temperature* ☐ *Hydrology Transparency*