

Connecticut State University Outer Island Education Program Report

Submitted by:

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Southern Connecticut State University

and

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March 2016

Connecticut State University Outer Island Summer Programs

Outer Island Interns

This year (Summer 2015) 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 water quality monitoring, and participated in maintenance activities on the island facilities. Hollie Brandstatter is currently a graduate student at Southern CT State University working toward her M.S. in Environmental Education. During the past two years she has worked with Dr. Vincent Breslin conducting marine research, including water quality and metal contamination in sediment. Following her duties on Outer Island she worked on other wildlife refuge sites in Norwalk, CT doing habitat remediation. Rebecca Caravello is a senior at Central CT 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. Trisha Quinn is also a senior at Central CT State University majoring in biology. Trisha is primarily interested in marine life and also worked in Dr. Jarrett's lab at CCSU. After completing her Island Keeper duties at Outer Island, she took some time off from school to work with refugees at a camp in Uganda.

This summer 2015 was the first 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

Twenty-six different groups scheduled 50 visits during the summer 2015 with an estimated 850 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 significantly higher in summer 2015 compared to previous years. Many of the scheduled groups have visited the island in previous years. Some of the notable first time visitors to the island included an Education Connections Teachers Workshop (Torrington, CT), students from the John Winthrop School, Bridgeport and a SCSU Creative Writing Class. One of the more

Outer Island Schedule Summer-Fall 2015							
CSU Escort	Date	Time	Size	Organization	Contact	Phone	email
Lockhart	9-May	10am – 3pm	2	American Radio Relay League	Sean Kutsko		skutsko@arrl.org
Breslin	2-May	1:00 pm - 4:00 pm	14	SCSU EVE 552 Long Island Sound	Vince Breslin	203-392-5602	breslinv1@southernct.edu
Interns	5-Jun	9:00 am – 1:00 pm	16	John Winthrop School in Bridgeport (6th grade)	Will Lenz		lenzw1@owls.southernct.edu
Interns	7-Jun	9:00 am - 12:00 pm	18	Ansonia Nature Center	Alison Rubelmann		arubelmann@ansonianct.org
Interns	8-Jun	9:00 am - 12:00 pm	15	Coginchaug Regional High School	Laura Francis		lfrancis@RSD13.org
Shaun Roche	8-Jun	9:00 am – 1:00 pm	45	New Haven Elementary Students - Nature of Learning	Shaun Roche		shaun_roche@fws.gov
Interns	9-Jun	9:00 am – 1:00 pm	20	St Bridget School, Cheshire	Barbara Garmache		bgarmache@stbridgetschool.org
Shaun Roche	10-Jun	9:00 am – 1:00 pm	45	New Haven Elementary Students - Nature of Learning	Shaun Roche		shaun_roche@fws.gov
Shaun Roche	11-Jun	9:00 am – 1:00 pm	45	New Haven Elementary Students - Nature of Learning	Shaun Roche		shaun_roche@fws.gov
FOI	13-Jun	9:00 am - 12:00 pm		Friends of Outer Island Volunteer Training	Ginny Baltay		virginia.baltay@gmail.com
Interns	23-Jun	1:00 pm - 4:00 pm	8	Birthday Party	Steve Amerman	203-392-5603	amermans1@southernct.edu
Interns	25-Jun	10:00 am – 2:00 pm	30	Dan Cosgrove Animal Shelter	Kristin Judd	203-747-4772	kljudd@brantford-ct.gov
Interns	27-Jun	10:00 am – 5:00 pm	12	WeatherBug - Teachers Workshop	Scott Graves		gravess1@southernct.edu
Interns	28-Jun	2:30 pm – 6:30 pm	18	Solstice Yoga Day	Bryan Yoon		bryan.yoon@vale.edu
Interns	29-Jun	12:00 pm – 4:00 pm	10	SCSU - ISIS Program	Gerry Frumento		frumentog1@southernct.edu
Interns	30-Jun	10:00 am – 2:00 pm	8	SCSU - Water Based Media in Painting	Wiley Carr		carr1@southernct.edu
Interns	6-Jul	9:00 am – 1:00 pm	25	ACES Mill Road School, North Haven	Kerri Gilmore		kgilmore@aces.org
Breslin	7-Jul	9:00 am – 5:00 pm	11	SCSU EVE 537	Vince Breslin		breslinv1@southernct.edu
Jarrett	8-Jul	10:00 am – 2:00 pm	8	CCSU Biology Marine Invertebrate Class	Jerry Jarrett		jarrett@mail.ccsu.edu
Interns	11-Jul	10:00 am - 4:00 pm	15	SCSU Women's Studies Graduate Institute	Rosalyn Amenta		amentar1@southernct.edu
Jarrett	14-Jul	10:00 am – 2:00 pm	8	CCSU Biology Marine Invertebrate Class	Jerry Jarrett		jarrett@mail.ccsu.edu
Interns	14-Jul	10:00 am – 2:00 pm	8	SCSU - Water Based Media in Painting	Wiley Carr		carr1@southernct.edu
Interns	19-Jul	10:00 am - 4:00 pm		Art Day (Open to the Public)	Debbie Verillo		dverrillo@yahoo.com
Interns	20-Jul	10:00 am – 2:00 pm	18	Yale Staff Picnic	James Meek		james.meek@vale.edu

CSU Escort	Date	Time	Size	Organization	Contact	Phone	email
Interns	21-Jul	10:00 am – 2:00 pm	8	SCSU - Water Based Media in Painting	Wiley Carr		carrt1@southernct.edu
Jarrett	22-Jul	10:00 am – 2:00 pm		Research Day	Jerry Jarrett		jarrettj@mail.ctcsu.edu
Interns	24-Jul	9:00 am – 1:00 pm	30	Solar Youth	Gamaliel Moses	(203) 387-4189	
Breslin	28-Jul	10:00 am – 3:00 pm	12	The Graduate Institute	James Trifone		trifone@learn.edu
Interns	29-Jul	9:00 am – 1:00 pm	24	Solar Youth	Gamaliel Moses	(203) 387-4189	
Interns	30-Jul	10:00 am – 12:00 pm	10	Farmington Tour Group	Jeanne Mucci		jtmucci@comcast.net
Interns	4-Aug	10:00 am – 2:00 pm	15	Camp Totokett	Barbara Colley		barbaracolley@snet.net
Interns	6-Aug	10:00 am – 2:00 pm	10	SCSU Creative Writing Course	Dana Sonnenschein		Dana.Sonnenschein@sbcglobal.net
FOI	8-Aug	10:00 am - 4:00 pm		Natural History Workshop Day for Families	Ginny Baltay		virginia.baltay@gmail.com
Breslin	12-Aug	10:00 am - 4:00 pm	12	Education Connections Teacher Workshop	Abby Peklo		peklo@educationconnections.org
FOI	15-Aug	4:00 pm - 6:00 pm		Thimble Island Association Meeting	Bill Anthony		wanthony88@snet.net
FOI	8-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	9-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	10-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	11-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	12-Sep	11:00 am - 4:00 pm	20	Seymour Ambulance Association Picnic	Lea Zwally		lzwally@seymourfirems.org
Island Keeper	14-Sep	10:00 am – 2:00 pm	5	Lorraine D. Foster Day School	Amy Nyitray		class4@snet.net
Island Keeper	16-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	17-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	18-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
FOI	19-Sep	2:00 pm - 6:00 pm		Outer Island 20th Year Celebration	Jim Lockhart		teach-1@sbcglobal.net
Island Keeper	21-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	22-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	24-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Island Keeper	25-Sep	9:00 am – 1:00 pm	25	Walsh Intermediate School	Beth Taylor		etaylor@branfordschools.org
Interns	25-Sep	10:00 am – 2:00 pm	10	SCSU - Drawing Class	Wiley Carr		carrt1@southernct.edu

successful events conducted on the island this year was the Friends of Outer Island organized 20th Year Anniversary Celebration for Outer Island. This event was widely attended, engaging local politicians, citizens, and representatives of the partner groups in a celebration of Outer Island programs.

Research Activities

Water Quality Monitoring

Water quality parameters were monitored by the CSU interns during the Summer 2015 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.

Water temperature gradually increased from the spring to the end of the summer. Dissolved oxygen concentrations saw an early spike (10.14 mg/L) on 5/30 and showed surprisingly little variability as temperatures changed with a low of 6.98 mg/L on 8/7. Compared to previous years, temperature and dissolved oxygen showed little correlation (Figure 1a). Salinity showed little variability as well, with a range of only 28.6 ppt (7/27) to 29.1 ppt (5/31), while conductivity showed a slightly larger range from 34.86 mS (5/29) to 43.26 mS (8/2) (Figure 1b). Both parameters showed less variability than in previous years.

Water clarity, as measured by a Secchi disk, varied from 0.7 m (6/18) to 2.0 m (5/29) during the monitoring period (Figure 2a). Greater variability was measured in water turbidity, where values ranged from 1.30 NTU (5/29) to 3.97 NTU (6/18) (Figure 2a). In general, as turbidity increases water clarity, as measured by the Secchi disk should decrease. pH ranged from a low of 8.10 (8/7) to a high of 8.29 (6/24) (Figure 2b). Similar to other parameters this season, water clarity/turbidity and pH showed less variation than previous years.

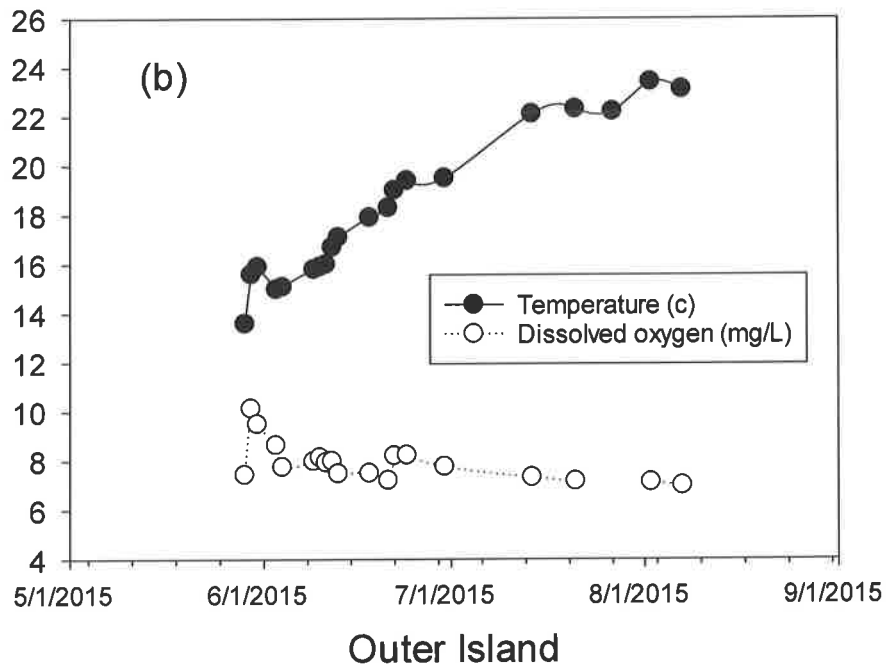
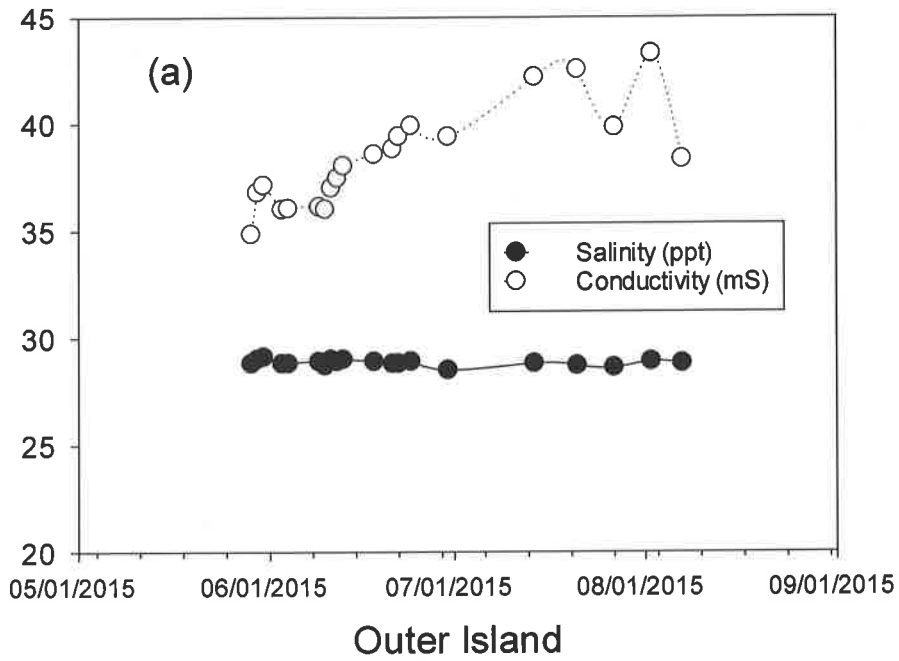


Figure 1. Outer Island 2015 water quality monitoring results: (a) salinity and conductivity and (b) temperature and dissolved oxygen.

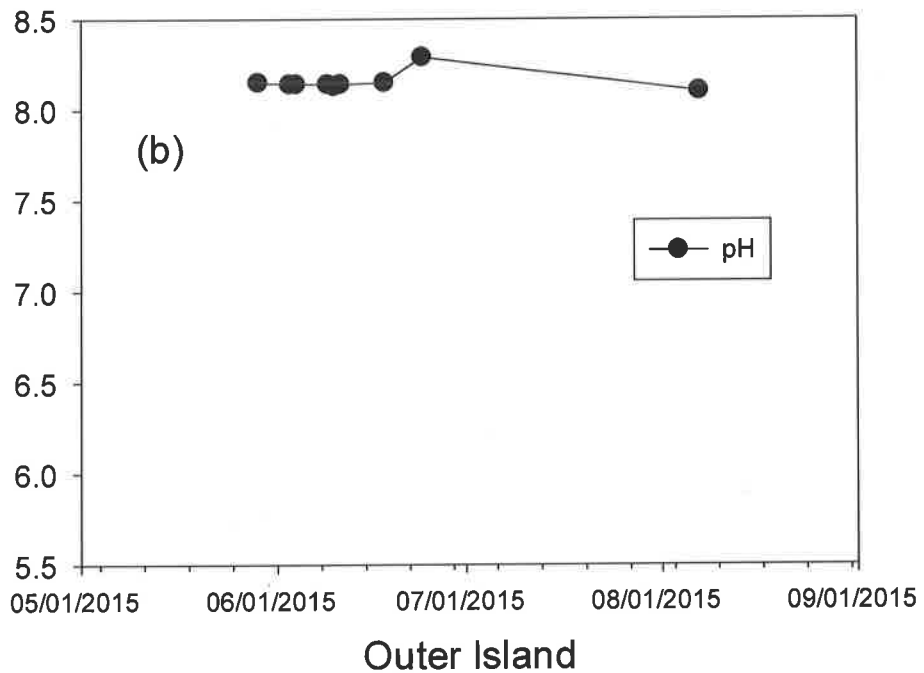
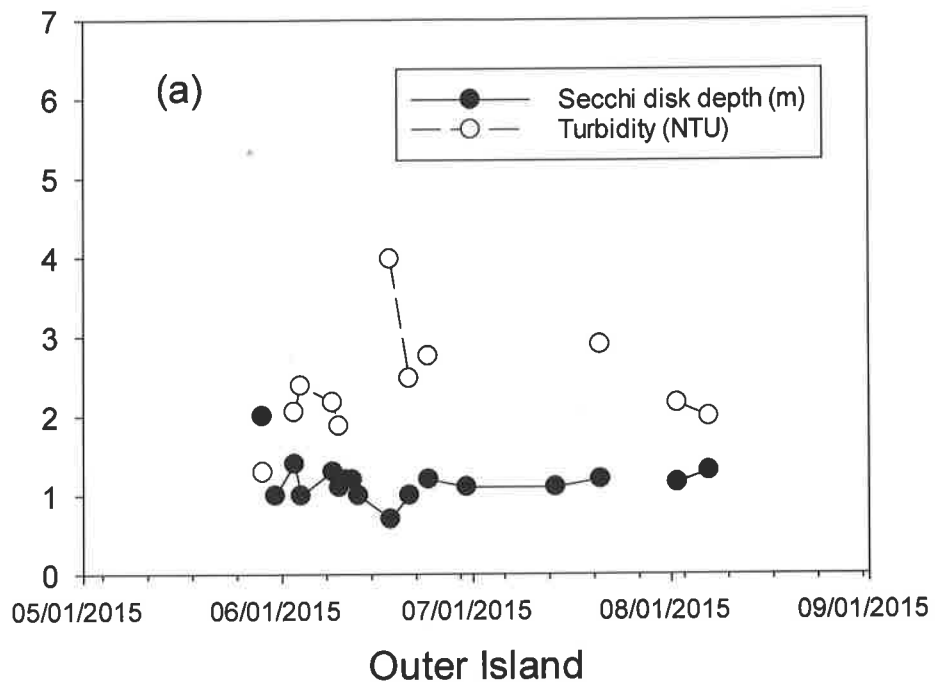


Figure 2. Outer Island 2015 water quality monitoring results: (a) turbidity and Secchi disk depth and (b) pH.

Outer Island Water Quality Monitoring 2015

Date	Sample Time	High tide	Weather	Wind speed (mph)	Relative humidity (%)	Air temperature (°C)	Solar radiation (lux)	Salinity (ppt)	Conductivity (mS)	Spec. Conductance (mS)	Temperature (°C)	Oxygen (mg/L)	Secchi Disk (m)	Turbidity (NTU)	pH
29-May	2:10pm	8:54am	clear sun					28.8	34.86	44.62	13.6	7.43	2.00	1.30	8.15
30-May	2:05pm	9:43am	clear sun					29.0	36.80	44.84	15.6	10.14			
31-May	12:50pm	10:39pm	overcast	5.0	86.0	20.6	466x100	29.1	37.14	44.94	15.9	9.50	1.00		
3-Jun	2:22pm	12:26pm	clear sun	6.6	58.5	17.0	965x100	28.8	36.02	44.50	15.0	8.64	1.40	2.05	8.14
4-Jun	2:12pm	1:20pm	partly cloudy	10.2	63.3	14.6	850x100	28.8	36.06	44.49	15.1	7.75	1.00	2.38	8.14
9-Jun	2:09pm	5:38pm	partly cloudy					28.9	36.14	45.01	15.8	7.98	1.30	2.17	8.14
10-Jun	2:25pm	6:38pm	partly cloudy					28.7	36.02	44.21	15.9	8.14	1.10	1.87	8.13
11-Jun	2:09pm	7:37pm	partly cloudy					29.0	37.01	44.92	16.0	7.99	1.20	2.34	8.14
12-Jun	2:10pm	8:09am	partly cloudy	5.3	63.5	20.0	960x100	28.9	37.47	44.70	16.7	7.99	1.20		
13-Jun	1:03pm	9:08am	clear sun					29.0	38.05	44.75	17.1	7.48	1.00		
18-Jun	2:00pm	2:04pm	clear sun	5.4	68.3	19.9		28.9	38.58	44.60	17.9	7.50	0.70	3.97	8.15
21-Jun	1:52pm	3:34pm	overcast	13.5	74.7			28.8	38.83	44.57	18.3	7.20	1.00	2.47	
22-Jun	2:29pm	4:21pm	overcast	2.4	76.9	24.2		28.8	39.01	44.49	19.0	8.20			
24-Jun	2:54pm	6:00pm	overcast	7.6	68.6	23.8		28.9	39.90	44.67	19.4	8.23	1.20	2.75	8.29
30-Jun	2:11pm	10:51pm	partly cloudy	3.5	80.3	21.5		28.5	39.39	44.03	19.5	7.76	1.10		
1-Jul	2:16pm	10:59am	cloudy					28.8	42.17	44.53	22.1	7.32	1.10		
21-Jul	2:02pm	3:41pm	clear sun	7.2	50.1	26.1	989x100	28.7	42.50	44.60	22.3	7.16	1.20	2.89	8.16
27-Jul	2:36pm	8:42pm	partly cloudy	22.2	25.7	22.2		28.6	39.81	44.74	22.2				
2-Aug	2:23pm	1:22pm	clear sun	6.9	58.2	27.2		28.9	43.26	44.39	23.4	7.12	1.15	2.15	8.15
7-Aug	2:01pm	5:57pm	clear sun	3.2	71.3	22.2		28.8	38.34	44.51	23.1	6.98	1.30	1.98	8.1

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

Water Quality Meter Repairs and iPad Purchases for Education Programs

In 2013-2014 several research quality 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 the water quality meters were returned to YSI for recalibration and repair (\$658/\$326). The repaired meters are now fully capable and calibrated and should function properly for the summer 2016 water quality monitoring program.

Several water sampling bottles were purchased (\$190) to support water sampling for educational programming. 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>.

Two Apple iPads were purchased (\$784.00) for use by the interns and for use by visiting school groups. The iPads are password protected and were equipped with several tide and weather apps. The iPads can be networked with the local ATT wifi hotspot (also password protected). The iPads can also be networked with the large television screen in the laboratory.

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. ELM measures local pollutant levels in real time, wirelessly transmitting the data to a

A photograph of a man and a baby sitting on a grassy field. The man is on the left, wearing a dark t-shirt and jeans, looking down at the baby. The baby is on the right, wearing a white lace dress and a white mesh hat, looking up at the man. The background shows trees and a bright sky.

**Better Air.
Better Life.**

Breathe easier with the Elm air sensing network


Air quality has long been known to impact the health of humans and the world we live in. In order to effectively monitor and minimize pollutants in the environment, we need to be able to detect them accurately, instantly and locally. We need to better understand their sources in order to make more informed decisions and take more effective action. And it all begins with the Elm air sensing network.

What is Elm and how does it work?

Designed to monitor outdoor air quality using a range of dedicated nano-technology sensors, Elm measures local pollutant levels in real time, wirelessly transmitting the data to a cloud-based system for storage, analysis and processing. The entire end-to-end hardware and software solution seamlessly integrates with municipal analytic platforms for fast, simple adoption and easy ongoing operation.

Empowering a world of change

Installed as a high-density network of sensors across a city, Elm makes it easy to identify sources of pollution at a hyper-local level, filling the data gap between existing air-monitoring points and traditional dispersion models. Municipalities now have a tool that offers clearer, more focused insights into air quality that can be used to empower change for the good of their citizens and the environment.

A small, grey, cylindrical air pollution sensor mounted on a thin metal pole. The sensor has a circular opening at the top and is positioned in an open field.

**Air pollution
contributes
to 2.4 million
deaths each year**



What, where, when and how?



**Pollution can
change your
DNA in 3 days**

A closer look at Elm's technology and applications

Compact, durable and weather-resistant, Elm can be easily installed virtually anywhere and requires limited or infrequent maintenance. Nodes can be placed on any mountable surface with access to electricity and provide real-time data sampling every 20 seconds, transmitting the data wirelessly (by Wi-Fi or GSM) to a secure cloud server.

Where to plant Elm

Whether you have a particular area of air quality concern in your city or simply want to gain insights for urban planning, traffic pattern, law enforcement, public health or other municipal initiatives, Elm offers the ideal monitoring solution for any location:

- Parks
- Schools
- Office parks
- Roadways
- Industrial areas
- No-idle zones

Watching over your city. Watching out for your citizens.

Elm's dedicated sensor technologies monitor and measure a wide array of environmental conditions and pollutant levels, including:

Target	Technology
Nitrogen Dioxide (NO ₂)	Metal Oxide Sensor
Ozone (O ₃)	Metal Oxide Sensor
Particulate Matter	Light Scattering
Volatile Organic Compounds (VOCs)	Metal Oxide Sensor
Noise	Microphone
Temperature	Dielectric Film
Humidity	Dielectric Film

The system provides such pinpoint, precise information that data can be easily time-stamped and overlaid on a calendar—hourly, daily, weekly or monthly—to measure and assess the impact of specific events.

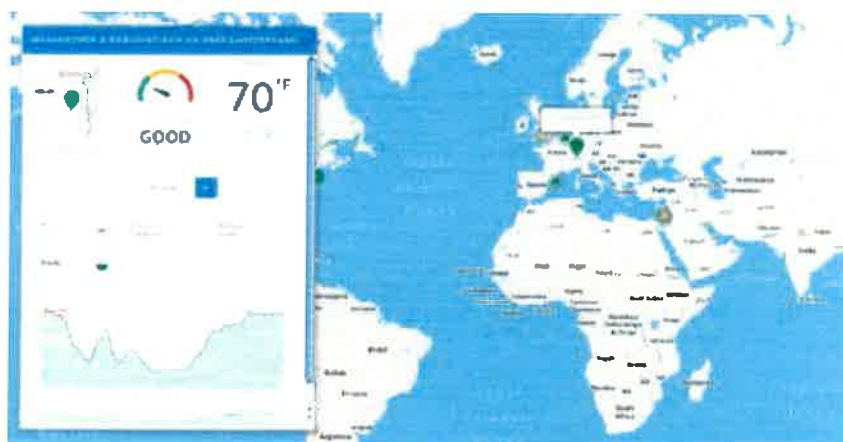
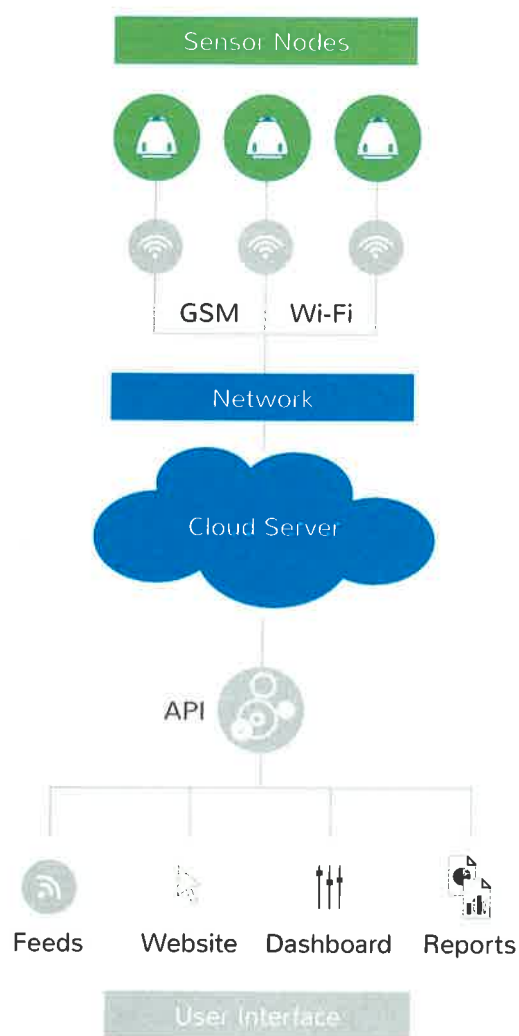
You can see the whole city from here

Intuitive software. Invaluable insights.

Every network feeds into a secure, remotely accessible cloud server that collects, stores, backs up and processes the data. From there, the information can be accessed and shared through a variety of user interfaces including an interactive map showing real-time pollutant levels at every Elm location.

From web-based data visualizations that are easy to read to complete in-depth reports of raw or processed data, Elm delivers a wealth of information that is both accessible and actionable.

The transfer of information from street to screen



Communicate with the community

Elm reports can easily be made available to the general public, giving citizens a better understanding of potential neighborhood issues and engaging them in an ongoing conversation about ways to enhance the quality of their air... and the quality of their life.

See what you're missing



Supplement and enhance your air-monitoring capabilities with Elm

No matter what systems you currently have in place to monitor your city's air, Elm promises to "fill in the gaps" and give you a more complete and detailed picture. By monitoring street-by-street, minute-to-minute, all day every day, Elm gives you insights into your environment never before possible.

Seamless integration. Better information.

Elm can integrate perfectly with your existing network of air-monitoring technologies, complementing everything from traditional reference monitoring systems to regulatory data stations. The difference with Elm is that its high-density deployment and hyper-local sensing allows you to see into specific locations, gaining insights into every corner of the community to better engage the people who live there and better define public policy.

Imagine being able to identify pollutant hotspots, to see the impact of an individual event as it happens. The spike in VOCs from chemical plant fire. The elevated levels of Nitrogen Dioxide from an idling truck. That's the breadth and depth of information at your fingertips with Elm.

Healthier cities. Healthier citizens.

Your city is a living, breathing thing. From the people in its streets, to the trees in its parks, to the water in its rivers, every urban environment is just that—an environment. It needs constant attention and protection to ensure its health, safety and sustainability.

So take your air monitoring to the next level. Look at sources of pollution more thoroughly, precisely and locally. Make a change in how you do things and see the change in your community. Make your own impact on human and environmental health.

To see Elm in action and what it could mean to you and your city, explore the live map at www.elm.perkinelmer.com/municipal.

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(+1) 203-925-4602
www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

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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 from the Outer Island website at <http://outerisland.org/index.php?id=air-quality-monitoring>.

Fouling Studies

In order to determine the diversity of non-motile fouling organisms found at Outer Island, Dr. Jeremiah Jarrett (CCSU Biology Department) worked with the Outer Island interns during the 2015 season to monitor the development of the fouling community. CCSU undergraduate students also worked during the fall semester 2015 to identify and quantify the various fouling organisms collected. Twenty settlement plates were deployed (Figure 3) and a total of thirteen were successfully retrieved at the end of the season in September 2015 (Figure 4).

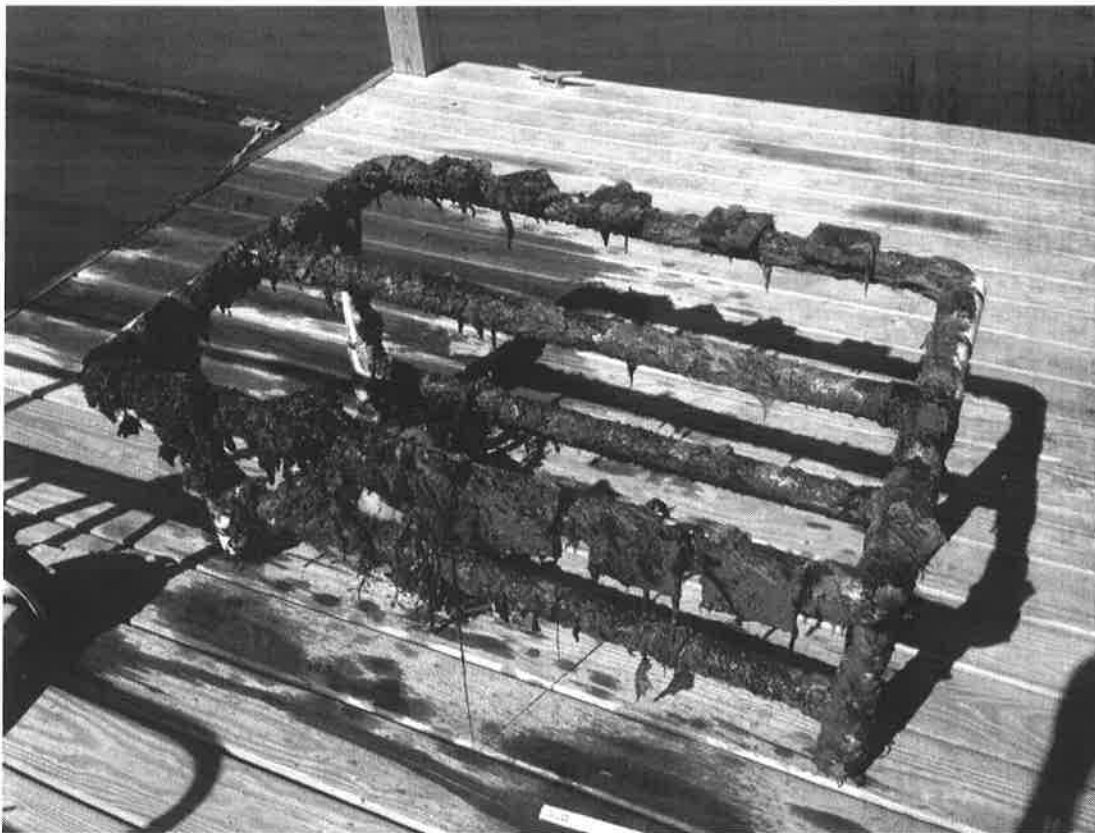


Figure 3. PVC scaffold on which settlement plates were deployed.

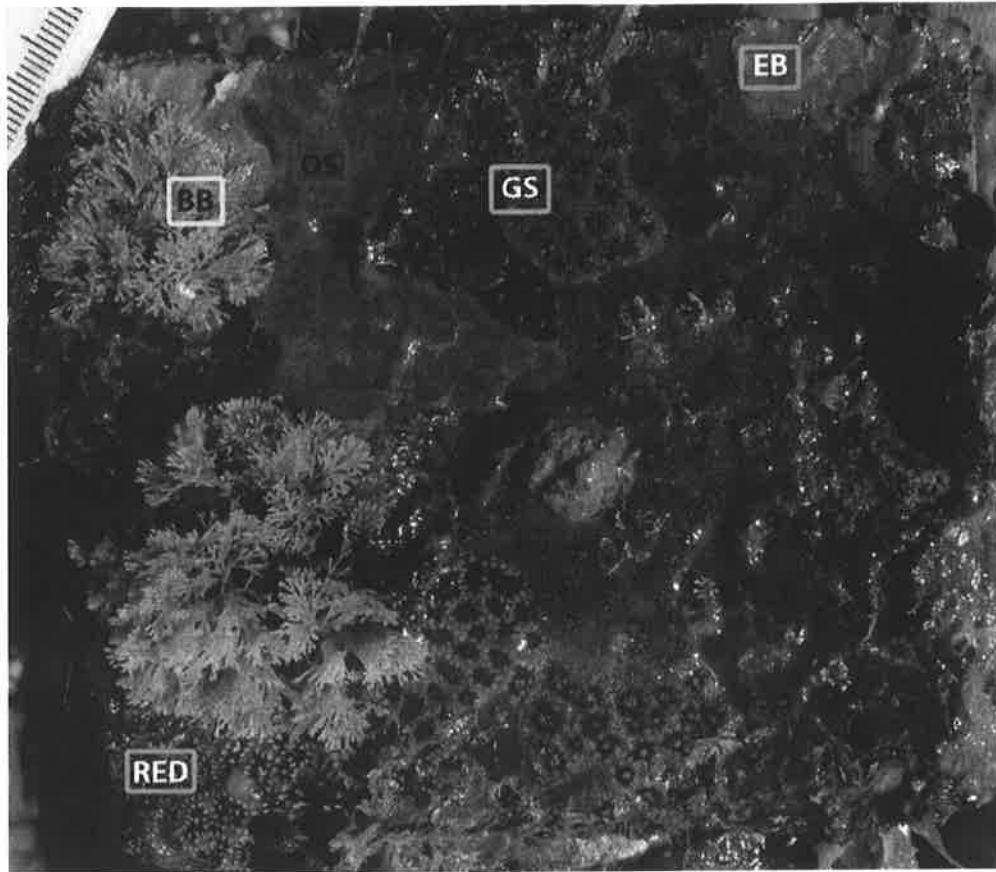


Figure 4. Representative end-of-season settlement plate. See figure 5 for explanation of labels.

Findings

To quantify species occurrence, settlement plates were first photographed. Using Adobe Photoshop®, a 20x20 grid was overlaid on the image and 10 random squares were selected and species present recorded. The data are thus expressed as percent occurrence. Although there was some variability among settlement plates in the dominant space occupier, the golden star tunicate was the most common non-motile fouling organism, occurring at least 4x more often than any other fouling organism in the study (Figure 5 and Table 1).

Future Plans

For the 2016 season we plan to expand the scope of the project and begin identifying and quantifying the motile species found in the fouling community. We are particularly interested in identifying any associations between non-motile and motile species.

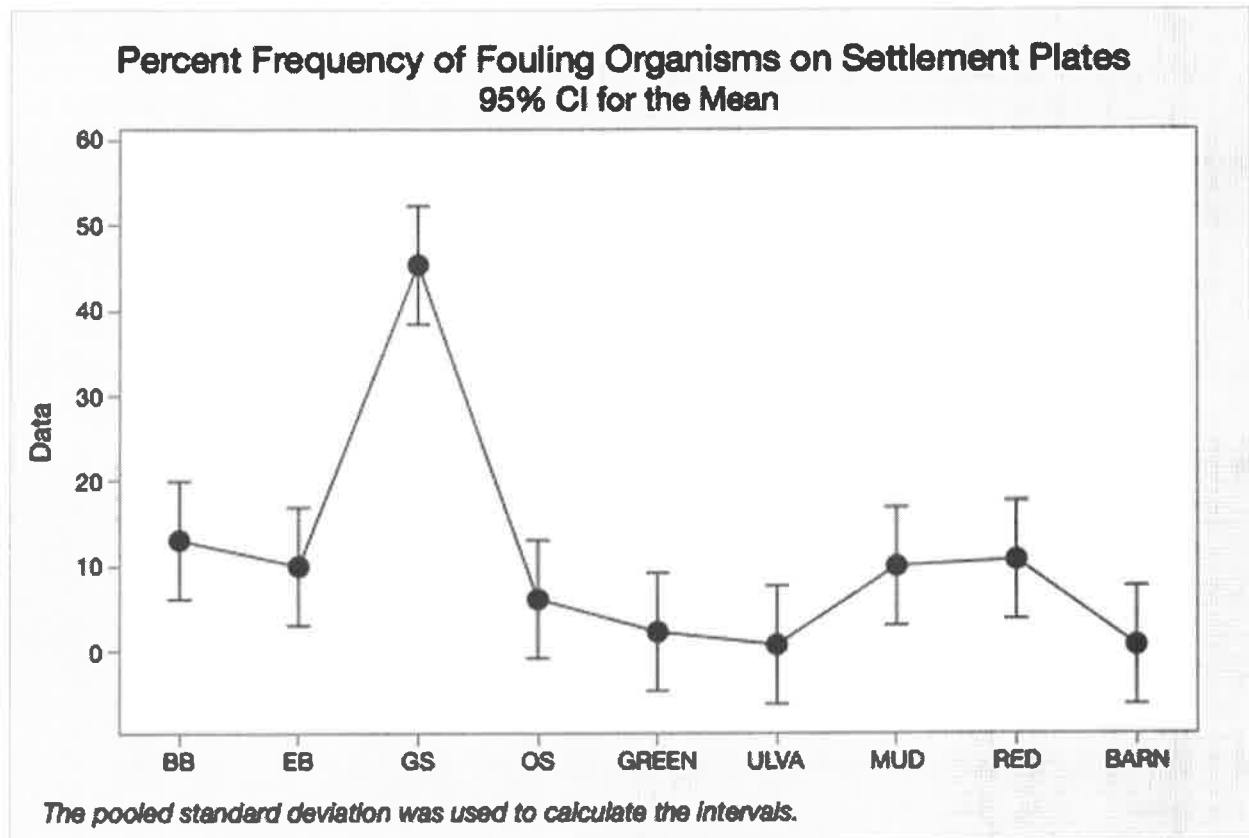


Figure 5. Frequency plot of fouling organisms on settlement plates in August, 2015 at Outer Island. N=13 settlement plates. BB=bushy bryozoan, EB=encrusting bryozoan, GS=Golden Star tunicate, OS=Orange Sheath tunicate, GREEN=filamentous green alga, MUD=mud tube amphipod, RED=filamentous red alga, BARN=barnacle.

Table 1. Analysis of Variance for Fouling Organisms on Settlement Plates

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	8	19461.5	2432.69	15.26	<0.0001
Error	108	17215.4	159.40		
Total	116	36676.9			

WeatherBug Station, Web Cameras and Remote Video Capabilities

The Outer Island WeatherBug automated weather station and online web-camera suffered from the consecutive impacts of Hurricane *Sandy* and the Winter Storm *Nemo* in 2012 and 2013 and damaged solar storage batteries in Spring 2014. With the replacement of the solar batteries and the restoration of power on the island, the WeatherBug staff installed the second WeatherBug weather camera on the island. The second camera provides a view looking west over the marsh on the western side of the island. Improvements were also made to the weather station with the replacement of the temperature/humidity sensor (\$335). The sensor was preplaced after we noticed erratic temperature and humidity data. At present, the WeatherBug weather station is working properly. Following the installation of the second camera, there have been no interruptions in the data and images from Outer Island.

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. This new ELM support line was established in 2015. During the Summer 2015 we also added a wireless hot spot to the account to allow internet access to the student interns.

AT&T broadband access fees for the wireless for the twelve month service period from January 2015 to February 2016 totaled \$2185.56.

Dr. Scott Graves has been gaining expertise with low altitude aerial photogrammetry using small Unmanned Aerial Systems (UAS quad-copter drones) as a viable and quite valuable new opportunity to enhance our educational resources on Outer Island. In the fall of 2015, Dr. Graves was able to fly a 3D Robotics Solo quadcopter with GoPro camera to collect some aerial video of select Outer Island habitats, including: dock view and small beach and marsh on the northeast side of the island, marsh and bedrock intertidal views from the southwest side of the island, and rocky/boulder intertidal zone on the north side of the island. The edited video is now available on the home page of the Outer Island website at <http://www.outerisland.org/>. In the future we intend to duplicate these overflights with the intent to provide a seasonal perspective of the island habitats over time.

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 hosted on iPage (www.iPage.com; terms 2018). Sebastian Smith continued to update the website until recently. He resigned the Outer Island webmaster position to focus on his new business. The new Outer Island webmaster is Xavier Garcia, a SCSU undergraduate computer science major with a concentration in graphic design. Xavier was recently awarded a stipend (\$800.00) to begin modifying and updating the website.

The reorganized website now has a more simplified navigation and allows direct access to weather, 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.

Other improvements to the website during 2015-2016 will include:

- Posting of summer 2015 water quality data (harbor and tide pools) and water quality equipment and manuals
- Home page drone video of Outer Island
- The posting of past Summer Outer Island attendance records (1998-Present)
- Posting of summer 2015 intern photos and bios, and
- Posted additional content on the History page
- Direct access to the web cameras and WeatherBug data
- Resources for LIS educators
- Updated water quality data
- Link to the FOI video of Outer Island

Outer Island Watercolor Workshop/Art Experience

The Outer Island Watercolor Workshop/Art Experience was held on July 19, 2015. The workshop was conducted in collaboration with the Friends of Outer Island and featured watercolor, photography, and sketching workshops. By all measures the event was a success. We anticipate scheduling a similar event during summer 2016. Wiley Carr, SCSU Art Professor, sent a workshop summary (see attached document). We were able to provide art supplies for each of the 14 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). The two-day workshop (June 26-27) 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 (June 27) 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 (\$1,639).



Southern Connecticut
State University

Date: 26 July 2015

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 2015

Dr. Breslin;

The Watercolor Workshop, part of the 2nd Annual Art Day on Outer Island, was a great success. My component was enrolled to capacity, 14 participants, and continues to grow in popularity. 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 distributed by the Friends of Outer Island organization. Many of the materials are reusable, and are now stored on the island.

Please let me know if I can provide additional information; Future workshops are certainly viable, and the grant-funding is deeply appreciated.


T. Wiley Carr
Professor of Art

Outer Island Art Day

A Wave of Workshops

On Outer Island in the Thimble Islands of Stony Creek, CT.
A Unit of the Stewart B. McKinney National Wildlife Refuge

Sunday, July 19, 2015

Choose one of the following Art Workshops

Photography

Shoreline Publishing Photographer Kelly Fryer 7:00 am – 9:30 am
*(Bring a digital camera)

Intro to Watercolor

SCSU Professor of Painting Wiley Carr 10:00 am – 2:00 pm
*(Supplies provided)

Ocean Art Activity

NBHS art teacher, Liz Caplan from 3:00 pm – 5:00 pm. A Child/Parent Program
Explore designs in nature along our coast. Supplies provided

****Space Limited**

On Line Registration Required-Donation \$10
includes ferry transportation from Stony Creek
Choose one workshop

www.friendsofouterisland.org  **EVENTS**

*Sponsored by Friends of Outer Island and the CT State University in partnership with the US Fish and Wildlife Service

Outer Island

research & education

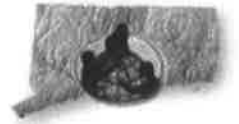
Thurble Islands, Stamford, CT

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

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

Long Island Sound Oceanography

**Announces Spring 2015
Weather & Climate Workshop**



Outer Island & GLOBE Program

Invited – CT Middle & High School Teachers

Friday June 26th 4:30pm – 7pm, JE 335

Saturday June 27th 10:00am – 4pm, 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 - KESTREL® 3500 Pocket Wind Meter (\$200 instrument)

- Kestrel 3500 measures barometric pressure, altitude, temperature, humidity, wind speed, wind chill, dew point, wet bulb, and heat index.

www.outerisland.org

For information please contact

Dr. Scott M. Graves @

203-3926604 or

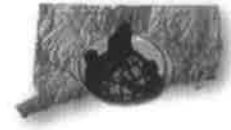
gravess1@southernct.edu



Education & Research



on Outer Island



Spring 2015 CCMS Outer Island / GLOBE Workshop

Friday June 26th 4:30pm – 7:30pm, JE 335

Saturday June 27th 10:30am – 4:30pm, Outer Island

Workshop Agenda

Friday June 26th

4:00-4:20 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.

– *Kestrel Pocket Wind Meters!*

6:00

GLOBE Program - ATMOSPHERE

Solar Noon/Basic Protocols (Temperature: air and soil, Precipitation— Rainfall/Solid/pH, Cloud Cover/Type, Instrumentation). Overview of Atmosphere data sheets.

GLOBE Program - HYDROLOGY

Temperature, Dissolved Oxygen, pH, Conductivity. Overview of Hydrology data sheets. – Vernier probeware.

7:30 PM

Adjourn

Saturday June 27th

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

2:30 am

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.

4:00 pm

Depart Island.

GLOBE Protocols – covered in CCMS Weather & Climate Workshop	
<ul style="list-style-type: none">• <i>Atmosphere Max/Min/Current Temperature</i>• <i>Atmosphere Clouds</i>• <i>Atmosphere Precipitation</i>• <i>Atmosphere Relative Humidity</i>• <i>Atmosphere Automated Air and Soil Temperature</i>• <i>Atmosphere Surface Temperature</i>	<ul style="list-style-type: none">• <i>Hydrology Conductivity</i>• <i>Hydrology Dissolved Oxygen</i>• <i>Hydrology pH</i>• <i>Hydrology Salinity</i>• <i>Hydrology Temperature</i>• <i>Hydrology Transparency</i>

Outer Island Budget 2015-2016

Category	Funds	Disbursed	
Personnel			
Student Stipend (150 hours @ \$10/hour)	1500.00	800	
Website maintenance			
Faculty Stipend Scott Graves (Summer 2015)	1000.00	1000	
Faculty Stipend T. Wiley Carr (Summer 2015)	1000.00	1000	
Fringe (18%)	360.00	360	
Total Personnel	3860.00		3160
Supplies			
Water Quality, Weather Meters and Educational Supplies	5140.00	Art 53.80	
Various laboratory and field supplies and computer software		Art 92.95	
Art Supplies and ELM air quality meter		Art 29.80	
		Art 18.96	
		Kestral Meters 745	
		Kestral Meters 894	
		iPads 69.97	
		iPads 32.44	
		(2) iPads 783.57	
		iPads 53.99	
		Weather app 1	
		ELM Air Quality 2080	
		Lab Supplies 92.75	
		Water Quality Supplies 354.96	
		Tide Staff 75.95	
		Misc Supplies 111.14	
		Books and Guides 174.67	5664.95
Equipment			
Water Quality Meters/repair	800.00	Postage 33.8	
		Meter Repair 658.71	
		Weather Temp Sensor 335	
		Water Sampler 190.15	
		Meter Repair 326.32	1543.98
Refreshments			
Chartwells Catering (Refreshments for Workshop)	600.00	Workshop food 170.55	
Travel (in State)			
Auto and Ferry Travel to Outer Island	500.00	Thimble Ferry 300	
		Thimble Ferry FOI 400	
Bus and Ferry reimbursement for Bridgeport school	1000.00	Lenz Bpt trip 411	
		Volsunga 360	1641.55
Other			
Annual Broadband Access fee for wireless service 2015-2016	2100.00	March 113.41	
		April 113.99	
		May 113.91	
		June 344.32	
		July 154	
		Aug 143.99	
		Sept 220.99	
		Oct 195.99	
		Nov 195.99	
		Dec 195.99	
		Jan 195.99	
		Feb 196.99	2185.56
Total Funds	14,000	14196.04	14,196