CLEAR**SCAPES**

A Newsletter of the Center for Land Use Education and Research at the University of Connecticut.

Outreach

Teens Master Mapping

By Cary Chadwick

The second annual **Natural Resources Conservation Academy (NRCA)** was held in early July at the University of Connecticut Storrs campus. The NRCA is an innovative program in conservation and land use planning for a select group of Connecticut high school students, run out of UConn's Department of Natural Resources and the Environment. The Academy includes a comprehensive week-long field course at UConn where students from around the state are immersed in topics focused on the study and conservation of water, forests, wildlife, soils and more. What makes NRCA unique is that in addition to field notes, sampling jars and mosquito repellent, the element that ties the week's endeavors together is the almost constant presence of geospatial technology.

CLEAR Geospatial Extension Educators Cary Chadwick and Emily Wilson teach

Smartphones and GPS

By David Dickson

Smartphones are the swiss army knife of the digital world. They have replaced countless single-function gadgets from calculators to cameras to pagers to, um, phones! But for mapping geeks, one of the gadgets they have not quite been able to shake is the handheld GPS unit—at least until now.

The Geospatial Training Program (GTP) at UConn CLEAR, in collaboration with the Connecticut Land Conservation Council, recently developed a GPS training for land trust volunteers. The one-day training teaches participants to collect data (way-points, notes, tracks) in the field using a GPS unit, download that to a computer, and then create an online map using the collected data that they can share with the public. However, there might be a new way to collect GPS data that doesn't require a handheld unit costing hundreds of dollars.

According to the Pew Research Center, **a majority of American adults (56%) now own a smartphone; this is an increase of 20% in just the last two years**. Most smart phones today are built to include a decent GPS chip that is useful for finding the nearest

David Dickson helps a participant at the GTP training *Using GPS for Monitoring and Mapping Land Trust Holdings* use his smartphone in place of a GPS unit.

Starbucks, letting the word know where you are, and tracking your run, ride, or hike. Why not geo-referenced data collection, too?

For years, we have been scouring the app stores for the perfect navigation app that does everything a handheld GPS unit can, and maybe more. Our requirements were that it is easy to use; collects tracks, way-points, notes, and photos; exports data in a wide variety of geospatial formats; requires minimal processing to create an online map; works on iPhone and Android; and is CHEAP! After many downloads and numerous fits and starts, we believe we are close. As a result, GTP is solidifying plans to develop and teach a "Smartphone GPS" course some time in 2014 (funding permitting). Set a reminder on your phone to remind you to look up the GTP course offerings in the spring!

Teens Master Mapping at UConn's
Natural Resources Conservation Academy

the first day of the field course, training students in geospatial information system technology, GPS and online mapping techniques. As an ode to technology of yesteryear, the day begins with "old fashioned" paper maps and compass skills before transitioning to "modern day" technology including GPS data collection and online mapping including CTECO and ArcGIS Online. By the end of the day, students are armed with the skills and tools to collect, compile and create informative maps. For the remainder of the week they are set loose upon the land to collect data and map their activities in the streams, forest and fields surrounding the UConn campus. These activities include a day studying water resources taught by CLEAR's Mike Dietz, and a focus on forest resources taught by CLEAR's Tom Worthley and NRE Department Head John Volin.

The last day of the field experience is devoted to project work. Students are divided into small teams and tasked with completing and presenting a comprehensive project. In 2012, students mapped out nature hikes in the UConn forest and created trail markers and interpretive signs for visitors. In 2013, NRCA team projects targeted a broader range of topics including

analysis of suitable wildlife habitat; construction of bat boxes from lumber felled and milled on site; tree inventory and forest management planning; building a rain garden from the ground up; and mapping a visitor tour of low impact development practices on the UConn campus. Students used geospatial technology in the planning and implementation of all of these projects.

But wait! That's not all. To pass muster at the Academy in the months to come, students are required to complete a natural resource project in their community, using the skills and knowledge they gained in the field course. Many will choose to incorporate geospatial technology into their project work. To complete the Academy, students will present their capstone project at the annual Connecticut Conference on Natural Resources next spring. Check out the NRCA website for a look at student community projects completed by the inaugural crop of NRCA students in 2012. Impressed yet?

Check out the NRCA's Facebook page and website, nrca.uconn.edu, for photos, stories and information about this year's crop of talented conservation ambassadors.

For more information about the Geospatial Training Program contact: Cary Chadwick, 860-345-5216, cary.chadwick@uconn.edu.

(Top) Extension Forester and CLEAR faculty Tom Worthley talks to NRCA students before getting into some serious tree management. (Bottom) CLEAR's Chet Arnold jeopardizes his hydration by demonstrating the infiltrating properties of porous concrete to a team of NRCA students.

Program Updates

Cross Section: C
Salt spray: Occurs often (property adjacent to Long Island Sound)
Shoreline: Rocky/sandy shoreline with no seawall
Slope of property: 5% (almost flat)

During high tide events and storms, areas at lower elevations may be flooded for a short period of time. If this is the case, use Zone 1 plants that can tolerate poorly drained soils (PDST). If lower elevations do not flood, use Zones 1+2 upland plants. Depending on planting scheme, some Zone 3 plants may do well if protected from salt spray.
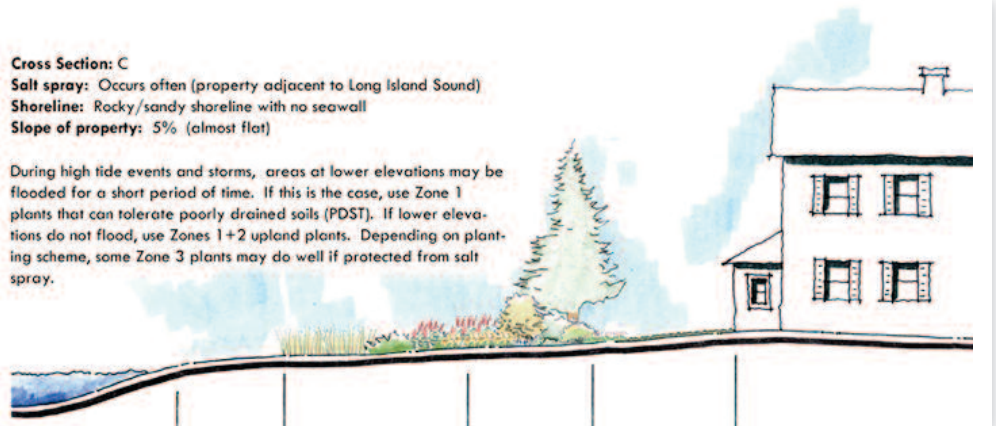
The tool section in the new *Coastal Riparian Landscaping Guide* website allows viewers to pull up a cross sectional drawing that best fits their property by providing information on local salt spray, sea wall presence/absence, and the slope of the property.

▶ **A New Online Tool for Coastal Landowners**

The new *Coastal Riparian Landscaping Guide* is a tool for homeowners and municipalities to deal with shoreline erosion and coastal storms. This guide provides information on protecting riparian areas (the intersection between land and water) and how to plant a property with native vegetation that can withstand salt spray and occasional inundation while preserving water access and views. The tool section allows viewers to pull up a cross sectional drawing that best fits their property by providing information on local salt spray, sea wall presence/absence, and the slope of their property (figure, top right). The guide is the brainchild of CLEAR/CT Sea Grant Botanist Extraordinaire Juliana Barrett, and Professor Mark Brand of the Department of Plant Science and Landscape Architecture. The website can be found at: clear.uconn.edu/crlg.
For more information contact: Juliana Barrett, 860-405-9106, juliana.barrett@uconn.edu.

▶ **GTP Partners with Land Trusts**

Land trusts are a critical component of land conservation and natural resource management in Connecticut, yet most land trusts have no staff and few resources. However, new trends in geospatial science and technology hold enormous promise for helping these critical land stewards. Working in collaboration with the Connecticut Land Conservation Council, the CLEAR Geospatial Training Program has developed *Using GPS for Monitoring and Mapping Land Trust Holdings*, a hands-on one day training that teaches participants to collect GPS data, get it onto a computer, and even boost the resultant maps up on the web (see pg 1 article)! The training has been held twice to date and has been a great success. The partners are currently on the lookout for funding support to enable continuation, and, ideally, expansion of the training.
For more information contact: Cary Chadwick, 860-345-5216, cary.chadwick@uconn.edu.

▶ **CLEAR Faculty/Staff in Evidence at Annual College Awards Ceremony**

Several CLEAR faculty and staff were recognized at the 26th annual College of Agriculture and Natural Resources Awards of Excellence dinner held in April. CLEAR Graphic Designer Kara Bonsack won the *Arland R. Meade Communications Award* for her great work designing all of CLEAR's websites and publications. Mike Dietz and Dave Dickson won the *David and Nancy Bull Extension Innovation Award* for the creation of the Rain Garden smartphone application (page 4). Congrats to Kara, Mike and Dave! Later in the evening, Chet Arnold was recognized for 25 years of service to the College and the University—which by our calculations means that, child labor laws notwithstanding, he was hired at the age of 15.

Cary Chadwick helps participants at the GTP training *Using GPS for Monitoring and Mapping Land Trust Holdings*.

Research

On the Track of Nitrogen

CLEAR is working on two very different projects focused on improving our understanding of how nitrogen moves in the aquatic environment. Nitrogen (N), although an important nutrient in appropriate amounts, is increasingly being identified as a pollutant of concern in both coastal and inland waters.

On the tech side, CLEAR has been working with our longtime partners at the University of Rhode Island to create "N-Sink," a tool that estimates N delivery from coastal watersheds to their receiving water. "N-Sink" was created to provide a useful and accessible tool for local land use managers to explore the relationship of land use in their towns to nitrogen pollution of their waters. N-Sink uses the best available science on land use/nitrogen interactions, plus widely available basic datasets for hydrography, soils and land use, to highlight major sources and sinks of nitrogen within a watershed context. N-Sink was originally designed as an ArcMap© extension for use with desktop software, but during the latest phase of the project, funded by EPA Office of Research and Development, it was redesigned as a geospatial web tool using ArcGIS Viewer for Flex that anybody can use (after a little orientation). N-Sink is still in "beta" form but will be made public this fall.

For more information contact: Chet Arnold, 860-345-5230, chester.arnold@uconn.edu.

Out in the real world, CT NEMO's Mike Dietz is measuring N inputs and outputs from a new rain garden that he designed and built on the "ag" side of the UConn Storrs campus, with funding from the Long Island Sound Study (photo, right). N is a notoriously difficult pollutant to break down, so many stormwater experts are interested in innovative management practice designs that can boost N removal rates. The early results from Mike's work are promising in this regard—we'll be reporting on this in the next issue.

For more information contact: Mike Dietz, 860-345-5225, michael.dietz@uconn.edu. ●
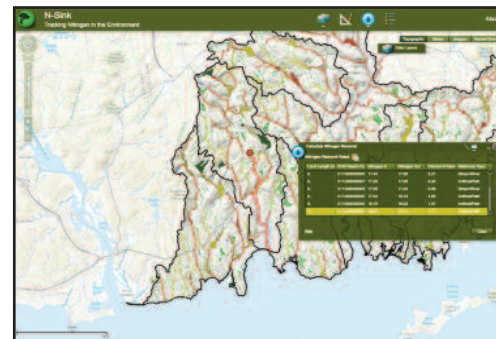
(Top) Screen capture from N-Sink in the Niantic, CT watershed. From the user-chosen location (red dot), N-Sink creates a flow path to the outlet and estimates N removal. (Bottom) NEMO's Mike Dietz emerges from the instrument bunker used to monitor his new experimental rain garden. True to form, there were 6 more weeks of winter after this picture was taken.

▶ **Rain Garden App Update**

CLEAR's wildly successful rain garden smartphone application, released in January and developed initially as an iPhone app, is **now available for Android** users at the Android App Store. Rain gardens are small vegetated gardens planted in a depression that accept stormwater runoff from rooftops, driveways or other impervious surfaces. Because of their relative low expense and ease of construction, rain gardens are an increasingly popular stormwater management alternative for homeowners, businesses, and towns alike. The app provides a mobile resource to guide the user through siting, sizing, digging, planting and maintaining a rain garden. The iPhone app has had over 2300 downloads in its first six months, and there has been a lot of interest nationally in adapting the app to other states. NEMO Appmasters Dave Dickson and Mike Dietz are busy working on a national version. Learn more about rain gardens at nemo.uconn.edu/raingardens.

For more information contact: David Dickson, 860-345-5228, david.dickson@uconn.edu. ●