Connecticut's Geospatial Newsletter

CONNECTICUT Geo-Focus

From the GeoDESK

Summer Edition 2009

Volume 2, Issue 2

Articles from the Geo Desk

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Upcoming Conferences
URISA/NENA Addressing Conference
August 4-6, 2009
Providence, Rhode Island
http://www.urisa.org/conferences/Addressing/

Newsletter Contacts
Submit letters and articles to:
beth.kelly2@us.army.mil or
peter.sandgren@ct.gov

These articles are published for the education and enjoyment of the GIS community, and may be edited to fit space available. The CT Geospatial Council does not endorse or recommend any software programs.

Searching for Lt. Bradley's Airplane Crash Using GIS

By the Office of State Archaeology, UCONN

On August 21, 1941, Second Lieutenant Eugene M. Bradley crashed his Curtiss P-40 Fighter in a wooded area north of the main hanger of the then, Windsor Air Base. According to Tom Palshaw, Assistant Curator of the New England Air Museum, the spiraling downward P-40 impacted the ground with no explosion and with no visible wreckage; the engine was found 13 to15 feet below the surface in the sandy soils (Palshaw, 2008). Presently, a search has been underway to relocate the crash site by the New England Air Museum, the Connecticut Archaeological Center, University of Connecticut, and the Friends of the State Archaeologist (FOSA). Much has changed at Bradley International Airport and this makes locating the crash site even tougher. Using eyewitness accounts and triangulation, the west side of Runway 33 at Bradley International Airport has become the primary crash site location **.**

The site is located on the west side of Runway 33 in Windsor Locks, Connecticut, in areas surrounded by Windsor loamy sandy, 0 to 3 % slopes (map unit 36A). Windsor soils are considered well suited to GPR applications. A favorable feature of GPR for archaeological investigations is its ability to detect disturbances and the intrusion of foreign materials in soils. Even under favorable site conditions the detection of a burial is never assured with GPR (Doolittle, 2004). The detection of burials is affected by (1) the electromagnetic gradient existing between the feature and the soil, (2) the size, depth, and shape of the buried feature, and (3) the presence of scattering bodies within the soil (Vickers et al., 1976). On radar records, the depth, shape, size, and location of subsurface features may be used as clues to infer buried cultural features. In the past, reflections were identified and correlated on two-dimensional radar records. Today, three-dimensional imaging techniques can be used to distinguish coherent noise components, reduce interpretation uncertainties, and aid identification of potential targets (Pipan et al., 1999). The recent development of sophisticated signal-processing software has enabled signal enhancement and improved pattern-recognition on some radar records (Doolittle, 2004).

Ground Penetrating Radar—GPR

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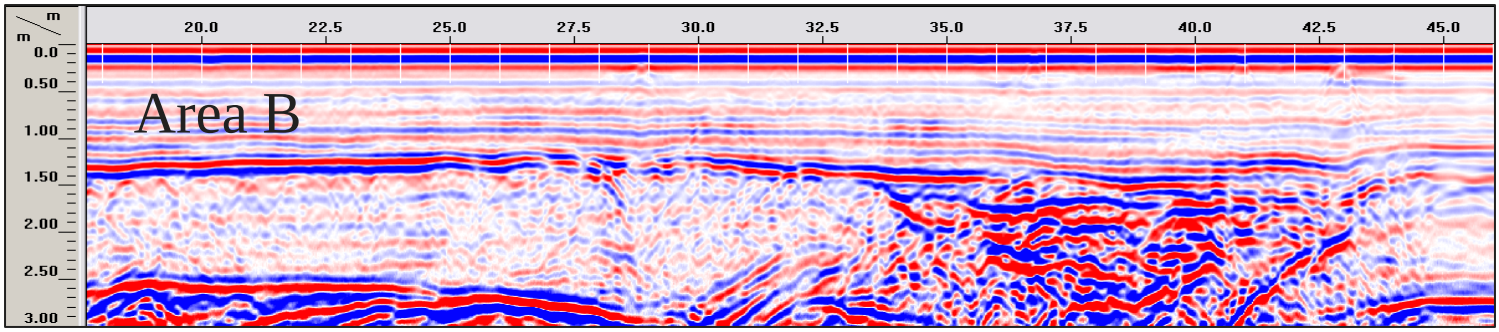
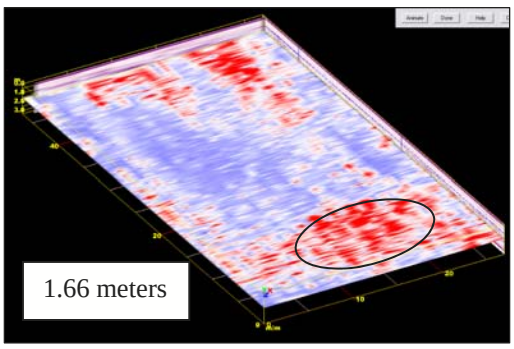
The figure below shows the location of disturbed soil layers. The sides of the pit area are triangular in shape and extend downwards indicating truncated soil layers. The pit is approximately 11 meters wide (36 feet) and 3 meters (10 feet) below the surface, indicating a fairly large disturbed area. The refilled soil materials provide reflections whose patterns contrast with the bounding undisturbed soil materials. Other high amplitude reflections seen on the radar record on the left-hand side at 2.5 meters are long, linear and variable in amplitudes. Their appearance suggests stratigraphic features in the Windsor soil. On the left-hand side of the graph, from 1.5 to 2.5 meters deep, is an area of low amplitude reflections which indicates undisturbed homogenous soil material, most likely clean sands.

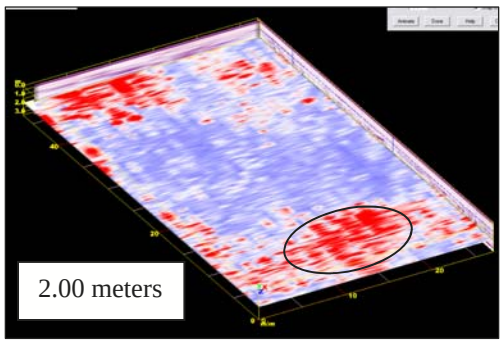


In the figure below, using triangulation, a grid was established consistent with eyewitness accounts. The west side of Runway 33 at Bradley International Airport is the primary location of the crash site.

(provided by Tom Palshaw).

The two figures below contains 3D images of *Area B.* The origin is located in the lower left-hand corner (southwest corner of grid area marked by X, Y, Z) of the image. The position of the two 3D images on the vertical axis represents a depth of **1.66 meters and 2.00 meters**. The grid size of both of the images is 33 by 47 meters. The images reveal amplitude patterns that are associated with slight differences in soil moisture and soil density. Both images contain an abundance of higher amplitude reflections at the northern portion of the survey area that are believed to represent dissimilar stratigraphic layers in the underlying outwash deposits. However, high amplitude reflections become more numerous and widespread, with a noticeable concentration near the southern portion of the survey area circled in black. This massive pattern of higher amplitude (red) features represents an area of disturbed soils that is identified in the survey lines. This area may be a plane crash site due to the fact that the area is disturbed, is potentially large enough to coincide with similar plane crash observations, and eyewitness accounts place the crash around this particular location.





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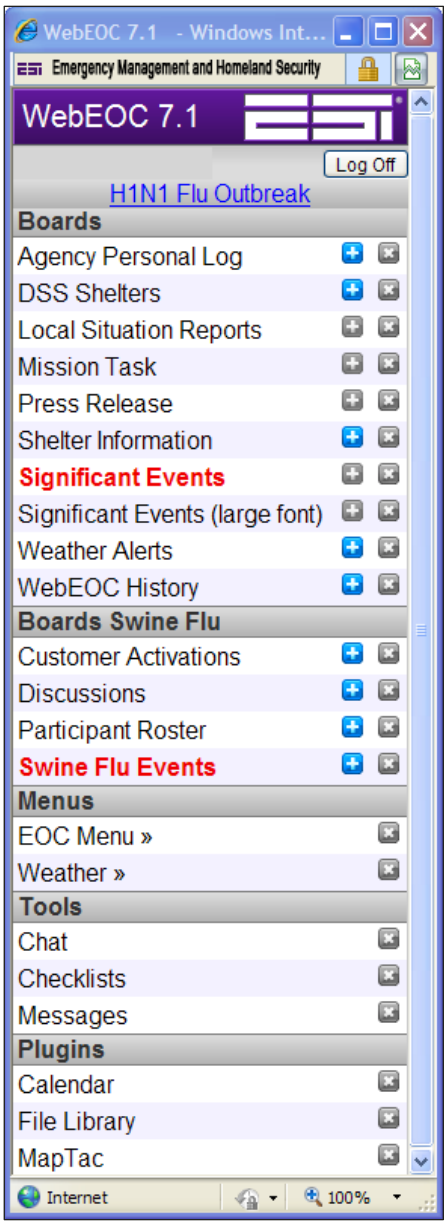
WebEOC Tracks The H1N1 Flu Outbreak

By Bernard Asimonye, DOIT

The DOIT GIS Coordinating Unit is hosting the WebEOC Crisis Information Management Software (CIMS) products which provide tools to manage crisis information and emergency response for the Department of Emergency Management and Homeland Security (DEMHS).

WebEOC allows for remote access by authorized users located within and outside the local area network. WebEOC complies with the provisions and standards of Incident Command System (ICS) as outlined in the National Incident Management System (NIMS). WebEOC also allows for the integration of Public Health, Emergency Management and other disciplines. Connecticut WebEOC is designed for state and local emergency management or other public safety officials to communicate and coordinate during an event. For purposes of the H1N1 outbreak, DEMHS has configured and customized WebEOC in accordance with Connecticut and Public Health agency unique needs.



Users access WebEOC through the WebEOC control panel (hereinafter referred to as control panel). The control panel is an intuitive user interface to status boards, Chats, Checklists, Contacts, Messages, File Library, Calendar, MapTac, WebEOC Mapper, Web FUSION and the various boards, forms and links to other systems or files. Permissions established during setup by WebEOC administrators determine which of these items are available to each user. Users are able to harness GIS-based mapping in any WebEOC status board for task tracking, inventory tracking, resource management, shelter status, etc. Using their own GIS or Microsoft MapPoint data, agencies have the ability to plot individual addresses and view those points on a browser-based map. Additionally, the map will display the locations in a status color defined by the agency. For example, a shelter board could display a map with shelters designated as either green or red symbols indicating status as open or closed.

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GeoDESK Maps & Trivia

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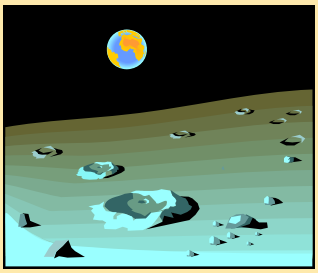
CT RECOVERY — A new interactive map of Connecticut is available to view and track the $980 million in stimulus funds that have been committed to projects and initiatives in Connecticut. You can view the Interactive map to see the allocations awarded by town and more.
www.recovery.ct.gov/recovery/site/default.asp

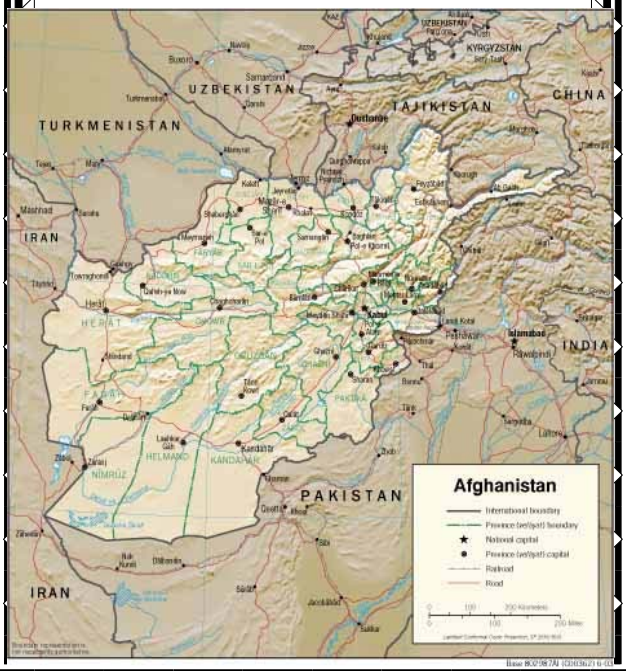
Map Trivia



Which ancient drawings are the oldest known maps of the moon's surface features, drawings that predate Leonardo da Vinci's complex lunar diagrams by millennia?

ANSWER: Astronomers and archaeologists theorize that 4,800-year-old Neolithic stone engravings found near Knowth, Ireland could possibly represent the earliest attempts at lunar cartography in human history.

For those of you who have loved ones overseas you can access maps of the Middle East and Afghanistan through the CIA World Facts reference Maps webpage.
http://www.cia.gov/library/the-world-factbook/docs/refmaps.html



GIS DAY

November 18, 2009

This year's GIS Day activities will include our most comprehensive Map Gallery in the lower concourse of the Legislative Office Building for the entire month of November.

The Education & Outreach Working group is putting great effort into planning for the this year's GIS Day.

Presenters & Maps are being requested!

2009 GIS Day is coming

Spot light *Sources of Data*

TIGER data on the MAGIC website, http://magic.lib.uconn.edu/connecticut_tiger2008.htm

USGS 2008 urban area flights on the USGS seamless server, http://seamless.usgs.gov/website/seamless/viewer.htm

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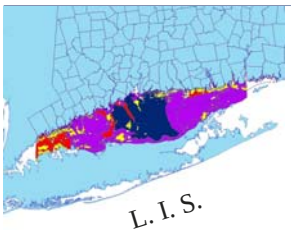

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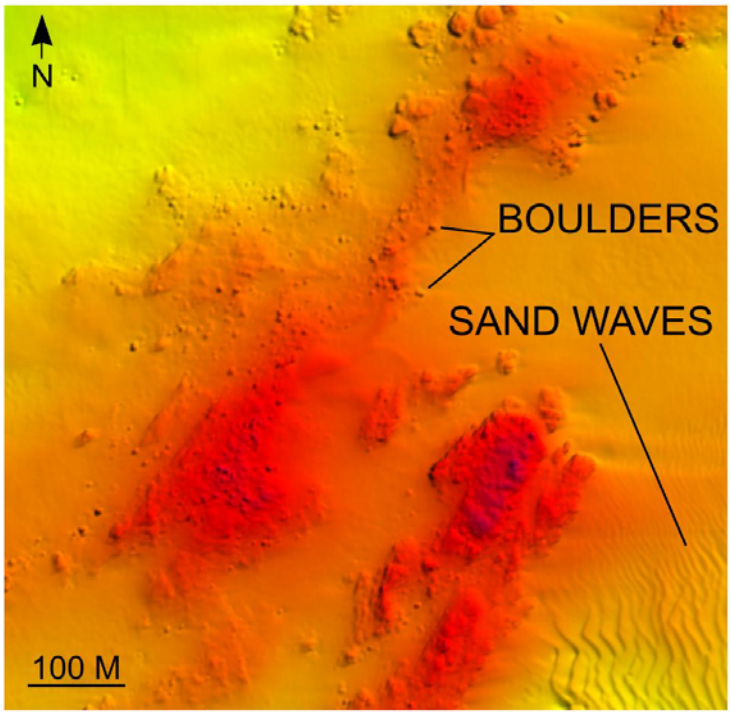
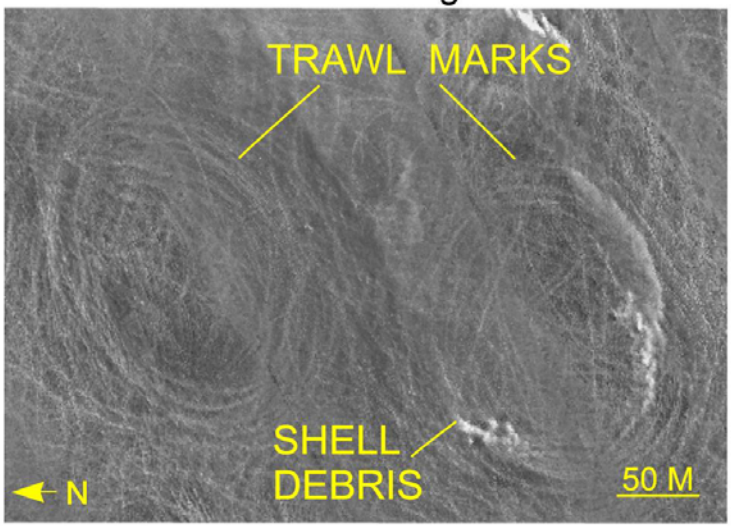
Mapping the Long Island Sound Seafloor

By Larry Poppe, U.S. Geological Survey And Beth Doran
Connecticut Department of Environmental Protection

Multibeam bathymetry of the rocky seafloor north of Six Mile Reef



Sidescan-sonar imagery showing bottom disturbance from clamming off New Haven



High-resolution, continuous-coverage maps of acoustic backscatter and bathymetry have revolutionized our perception of the seafloor. They provide detailed information on the distribution of sediments and sedimentary environments, benthic topography, contaminant transport pathways, habitats, and human-induced disturbance. Although this information is important for the Long Island Sound management and research communities, much of the Sound's seafloor remains unmapped at a large scale. To address this need, the U.S. Geological Survey and Connecticut Department of Environmental Protection have been collaboratively acquiring and interpreting sidescan-sonar imagery and multibeam bathymetric data sets.

Sidescan-sonar mosaics from 13 surveys conducted by our cooperative are provided in GeoTIFF format, 1-m ground resolution, and inverted grayscale (lighter tones correspond to higher backscatter and coarser sediments). These surveys include areas adjacent to Norwalk, Bridgeport, Milford (2), New Haven Harbor, CLIS Dumping Ground, Branford, Falkner Island, Roanoke Point, Hammonasset, Niantic, New London, and Fishers Island Sound. Digital terrain models of the multibeam bathymetry from 7 charting surveys completed by NOAA are provided in ESRI grid, ASCII grid, and full-color sun-illuminated GeoTIFF formats. Point data, such as sediment grain size, as well as polygon data, such as geological interpretations, are provided in ESRI shape file format. Data layers come complete with FGDC-compliant metadata and in UTM and geographic coordinate systems. More data sets will be added as they are completed.

Base map and interpretive data layers are available for download through an internet mapping server and data catalog from the USGS Woods Hole Science Center at: http://coastalmap.marine.usgs.gov/regional/contusa/eastcoast/midatl/lis/data.html and from the CT DEP Long Island Sound Resource Center at: http://www.lisrc.uconn.edu/.

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Instructional GIS Videos

Dr. Peggy Minnis, Ph.D. Pace University

Thank you Peggy for bringing us free GIS learning videos from Pace University on-line!

Writing up the workflow for a GIS operation is very helpful, all 55 steps to do a certain operation that takes only a few minutes to do, but a lot of explaining when you put fingers to the keyboard. A GIS practitioner may not even realize how many steps it takes to accomplish a seemingly-simple task. But, once you stop to write down what you are doing or take screen shots, it becomes evident that the sequence is critically important. Plus, screen shots are not able to capture dropdown menu contents.

Wouldn't it be easier to just *show* someone how to do it? Making a video of the screen with your narration can help. With a video, a learner can stop the video anytime and perform the steps in ArcMap at the same time. The viewer can see which windows are open and which dropdown menu gets displayed. One can also see all the options that are available on dropdown menus.

There is a GIS webpage at **Pace University** that has links to video tutorials that have been developed as newer versions of ArcProducts are introduced. The videos are short, Flash videos, produced by Camtasia screen-recording software. The website for the videos can be found at http://webpage.pace.edu/MMinnis/GIS

The site also invites other GIS practitioners to share their video tutorials with the rest of the GIS community. People who do a lot of training for their agency or organization would find it much easier to train new staff members with the videos. Besides Camtasia, there are free versions of screen-capturing software (CamStudio.org) and some that are available for little money (Super Screen Capture). Jing is offered by TechSmith, the authors of Camtasia, and records a video of five minutes maximum. That should be long enough for most operations. The students who have the option of using the printed step-by-step workflow instructions and the videos have much preferred the videos. That way, the teacher is available night and day, patiently explaining the operation. (The CT GISC does not endorse or recommend any software programs).

Topics that are available :

- Introduction To GIS
- Publishing Your Map To Use In ArcReader
- Converting Internet Interchange Files (.EOO)
- Tables In Arc
- Dot Density
- Clipping an Image
- Drawing
- ArcGIS Aerial Photos
- Photo Stitch
- Making A PDF of Your Work
- Data Manipulation
- Excel Spreadsheet to Geocoding
- Address Locators
- Clipping
- Making a Raster Catalog
- Append
- Merging Photos
- Georeferencing

And more……..

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Craig Castle Meriden

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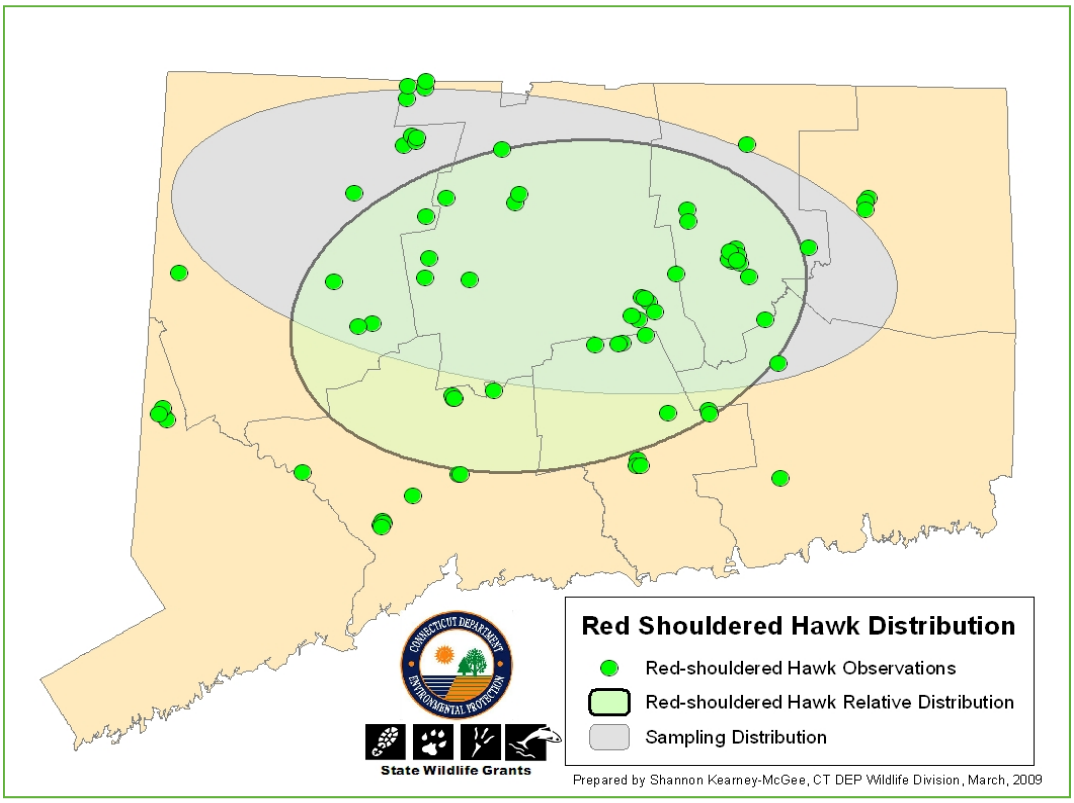
Establishing the Status of Connecticut Woodland Raptors

Shannon Kearney-McGee, CT-DEP Wildlife Division

Almost all of Connecticut's woodland raptor species are described in the Connecticut Comprehensive Wildlife Conservation Strategy as uncommon, declining, vulnerable, and in need of research and monitoring. As a top predator, raptors play a crucial role in many ecosystems, and can also be more vulnerable to environmental threats including contaminants, forest fragmentation, and disturbance. Most raptors are wide ranging, secretive, and occur at relatively low densities. As a result of these life history characteristics, breeding raptors are important environmental indicators but are difficult to monitor. There are regional efforts to monitor raptors through migration hawk watches, which are effective for tracking general and regional population trends. These migration trends, however, are not as useful in establishing management guidelines that address conservation issues specifically relevant to Connecticut's breeding raptor populations. To address this need for more localized monitoring information, efforts were focused on developing and implementing volunteer monitoring techniques that would focus on breeding raptors in Connecticut.

Using our citizen scientist efforts, we have used GIS techniques to create preliminary distribution maps for 6 targeted species in Connecticut. Citizen scientist sampling is often not spatially balanced. We corrected for this spatial imbalance by comparing the distribution of targeted species to the underlying distribution of sampling points. This example map demonstrates that red-shouldered hawks are distributed in the central and southern part of Connecticut. Similar relative distribution maps have been created for the other targeted raptor species, northern goshawk, Cooper's hawk, sharp-shinned hawk, red-tailed hawk, and broad-winged hawk.



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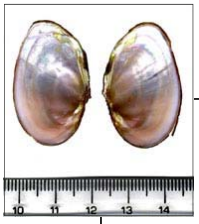

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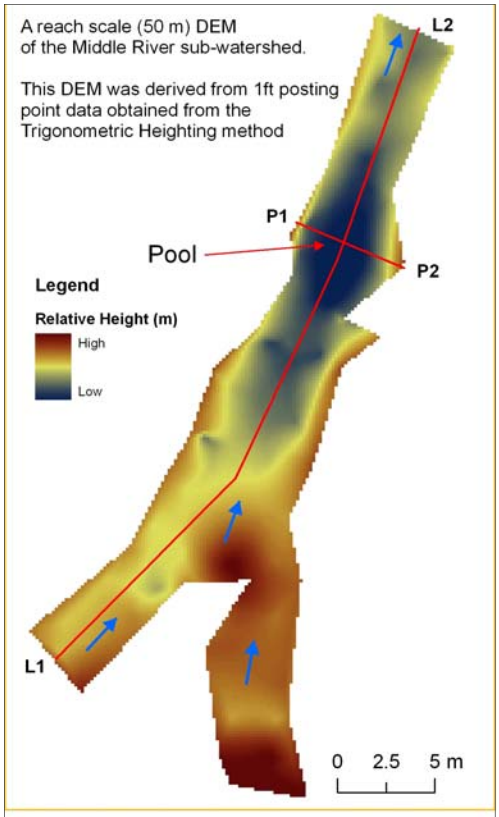
Integrating Fluvial Geomorphology and Stream Ecology: Processes Shaping the Distribution of Freshwater Mussels in Connecticut

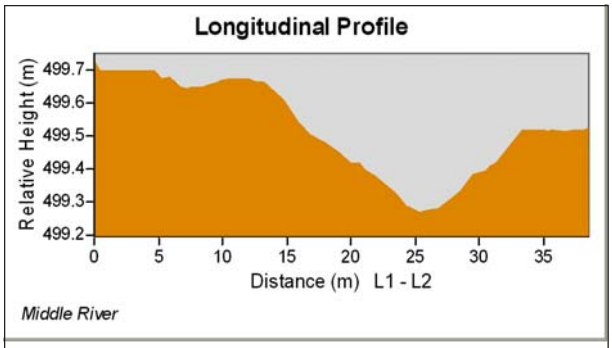
by Piyumi Obeysekara, Center for Integrative Geosciences, University of Connecticut

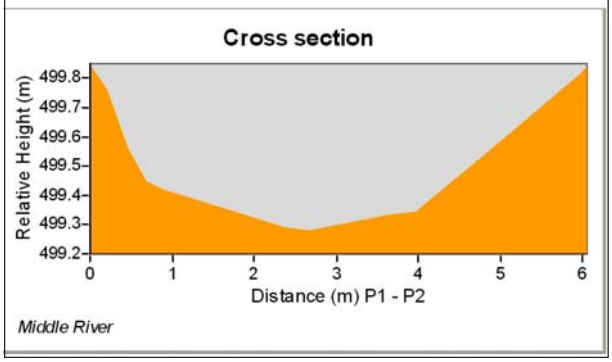
Freshwater mussels are among the most imperiled groups of animals worldwide. The maximum diversity and abundance of mussels are found in North America where 297 species have been documented. In Connecticut, six of the twelve native freshwater mussel species are listed as special concern, threatened, or endangered. Freshwater mussels provide critical ecosystem functions such as particle processing, nutrient release, and sediment mixing. Freshwater mussels serve as good indicators of ecosystem health because they remain essentially in one place for a long time and require good water and sediment quality and physical habitat. The combined effects of over-harvesting, habitat alteration, and invasive species have placed freshwater mussels among the most endangered faunal groups.

Freshwater mussels are patchily distributed, existing in aggregated multispecies groups called mussel beds, which can be a mile or more long and contain thousands of mussels. Processes that shape the distribution of mussels are not clearly understood, and previous research has not used the best tools available in mapping and predicting flow. In this study we developed a novel, highly interdisciplinary method to investigate the distribution of mussels with respect to habitat variables on multiple spatial scales. We investigated the distribution of fresh water mussels in the Willimantic River watershed by integrating different research approaches, especially mussel biology, geomorphology, channel hydrology and geospatial science. We utilized available GIS and remote sensing data to ascertain sub-watershed and watershed scale information. We used finer resolution DEMs, which were derived from using 20 ft posting LIDAR data (Light Detection and Ranging), and high resolution ortho-imageries to derive channel morphologic characteristics such as longitudinal gradient, width, sinuosity, riverine vegetation and land use/cover. We have developed Resource Selection Models (RSF) based on our multiple spatial scale data in order to delineate the predictors of mussel abundance. Such prediction models will assist in freshwater mussel conservation management practices in Connecticut. In summary, our study has proven the versatility of state-of-the-art GIS techniques in ecological applications.



Two profiles show how we delineated geomorphc untis based on the reach scale DEM. In this example we identified a "Pool".





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Ledge Light

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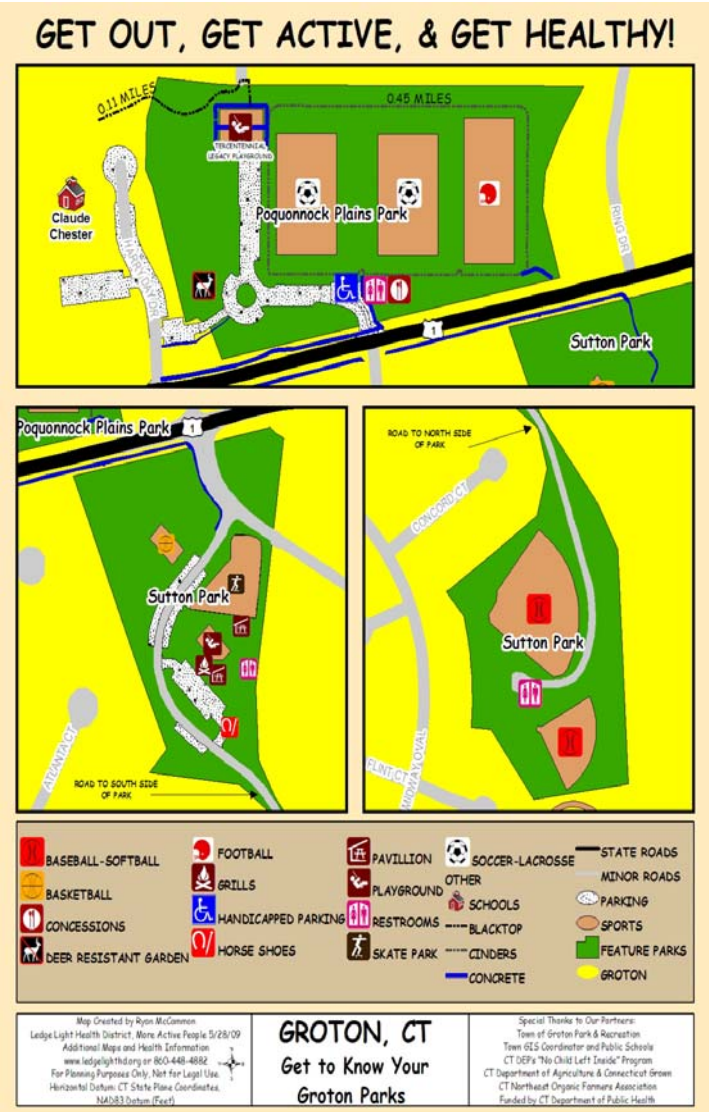
MAPS—More Active People: GIS to Fight Obesity

By Ryan McCammon

The Ledge Light Health District is a regional health department in southeastern Connecticut serving 6 municipalities (approximately 120,000 residents) and we received funding from the CT Department of Public Health to implement a program called the More Active People (MAP) Project to help reduce obesity among 8-18 year olds by encouraging physical activity and healthy food choices. The goal is to improve the likelihood that children will get the recommended 60 minutes of activity each day and make nutritious food choices by taking advantage of local farm fresh foods.

Ledge Light Health District has partnered with several organizations including the Parks & Recreation Departments of our member municipalities, state agencies, land trusts and an organic farming association to increase knowledge of local free or low cost recreation and farm fresh foods for children of all abilities. The MAP Project involved providing a significant contribution to install rubberized safety surfacing at a new all-access playground (Tercentennial Legacy Park), providing funds and GIS maps to municipalities to install park signs that promote activity and kid-friendly maps that highlight recreational facilities and farm fresh foods for each municipality.



The GIS component involved the creation of five products, including a town wide map for each municipality that highlighted all the municipal/state and land trust parks, major trails, farm fresh foods (farmers' markets, farm stands, farms, etc.) and schools for each municipality. Additional maps were created which highlighted 2-4 municipal parks with unique features (dog parks, skate parks, trails etc.). The "feature park" and "municipal" maps became the front and back covers for pocket folders that will be distributed to school children over the next two weeks. These pocket folders also contain kid friendly activities to integrate use of maps in classrooms and to encourage children to explore recreational facilities in their towns. GIS and the products of the MAP Project were also used to teach basic cartography skills to 114 middle school students (grades 6-8). Students were shown Google Maps created for the MAP Project and then instructed in how they can create simple maps with the aid of the easy to use cartography tools of Google Maps.

The products for the MAPS project will be available online at Ledge Light Health District (www.ledgelighthd.org) and municipal websites to encourage family use, and all GIS data created for the project will be provided back to the member municipalities for future use.