



State Geological and Natural History Survey of  
Connecticut  
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**Introduction.** The Survey is responsible for coordination and implementation of statewide natural resource data collection inventories in the following areas: surficial and bedrock geology, mines and mineral resources, inventories of fauna and flora, including endangered species; and the development and operation of resource oriented data base management systems. The mission of the Connecticut Geological and Natural History Survey is defined in the Connecticut State Statutes (Ch 462, Sec 24-1 to 24-4). In the Department of Energy and Environmental Protection, the Geological Survey is within the Commissioner's Office, Office of Information Management (OIM) and the Natural History Survey is within the Bureau of Natural Resources (BNR) Wildlife Division.

**Program Trends.** The Survey's principal effort continues to involve statewide geologic and biologic inventory mapping, database enhancements, and development of derivative products for use in environmental policy and management decisions. The Survey continues to conduct resource mapping in State Parks and Forests, and make significant contributions in DEEP program areas related to water resources, aquifer protection, land use and conservation, and endangered species. During the last 20 years, the Natural History Survey has operated the CT Natural Diversity Data Base that manages information on State listed species and also deals with invasive plant species issues. Survey staff participated in the development of the CT Aquatic Nuisance Species Management Plan. The Survey has also developed basic resource data sets for Long Island Sound in cooperation with the University of Connecticut. Survey publications continue to update the selection at our DEEP Store with more than 1,000 titles available, covering the natural resources of Connecticut.

The Survey is focusing on web content and design improvements to better communicate program activities and accomplishments. Digital geologic maps, and interpretations are available through an online mapping application, produced as a cooperative with the University of Connecticut. Digital data downloads are available through the DEEP GIS data download webpage.

**Aerial Photography.** A new flight for 2012 is sponsored by the State Department of Transportation and State Department of Emergency Services and Public Protection. Images will be 1:12 scale with 4 band color (includes Infrared) to be available by the end of the calendar year. Cooperative activities involving several Federal agencies has provided high resolution LiDar imagery for approximately 60% of the State.

**Topographic Mapping.** OIM maintains statewide published topographic maps at scales of 1:24,000, 1:50,000 and 1:125,000. In cooperation with the USGS, Digital Line Graph (DLG) 7.5-minute quadrangle information and Digital Raster Graphics (DRGs) were produced for the state before the year 2000. A joint funding agreement between DEP and USGS has provided high resolution National Hydrography Data (NHD) for Connecticut.

**Geographic Information System (GIS).** The central GIS operation for the Department of Energy and Environmental Protection resides in OIM. OIM manages the DEEP/GIS database, which is accessible to all DEEP staff. DEEP utilizes the system of ESRI GIS products including ArcGIS, ArcSDE, ArcView, and ArcIMS. The primary long-term goal of the GIS program is the development of an integrated spatial information system that incorporates and regularly updates all of the basic data layers necessary to support the Department's research, planning and management activities. Surficial materials, Quaternary geology, bedrock geology, and soils are available for use in GIS. DEEP's GIS data is downloadable through the agency's web site [www.ct.gov/deep/gisdata](http://www.ct.gov/deep/gisdata).

A Web-based GIS tool, CT Environmental Conditions Online (CTECO) is available through a partnership between the DEEP and the Univ. of Connecticut. This application provides users direct access to geography-based, natural resource and environmental information such as aquifer protection areas, watersheds, flood zones, geology, soils, water supply wells, open space, and imagery. With CTECO, basic environmental conditions can be assessed anywhere in Connecticut by mapping online, without GIS experience or software. A map catalog is available to view or print pdf formatted maps of these environmental themes by Town, 7.5 minute Quadrangle, or Statewide. A variety of orthophotography (1990-2010) is also available <http://www.cteco.uconn.edu/index.htm> CTECO also provides direct connection to desktop GIS or CAD software to ArcGIS and WMS map services as an alternative to downloading GIS data files.

**Geology.** The Connecticut Survey is continuing to develop cooperative partnerships toward the goal of improved geoscience information for DEEP programs and the citizens of Connecticut. Bedrock and surficial geologic mapping, topical research projects, and educational initiatives are pursued through a combination of Federal, State, Academic, and non-profit collaborations.

Quadrangle Mapping: An educational mapping project with Eastern Connecticut State University funded through the National Cooperative Geologic Mapping Program, EDMAP, builds on Survey efforts to document multiple dinosaur trackways unearthed in the East Berlin Formation during State construction in the Hartford South Quadrangle of Central CT. This project will provide a published map for the quadrangle, supported by traditional fieldwork, geochemical analyses of the basalts, mineralogy, and facies descriptions. The CT Department of Public Works supported the preservation of dinosaur tracks unearthed.

Applied Geoscience Analyses- Water Resources: A cooperative agreement between the Connecticut Survey and the USGS Office of Ground Water, Branch of Geophysics provided support for a graduate student to use new geophysical methods to map subsurface materials and depth to bedrock. As a collaborative University of Connecticut

and CT Geological Survey project, the investigation considered geophysical techniques and UConn spatial statistical mapping to evaluate the nature of the bedrock surface of the Coventry Quadrangle in Eastern Connecticut. This project evolved from work on a previous STATEMAP cooperative that employed well log data, LiDar, and 3D surface generation in GIS to map the bedrock surface and overburden thickness of the Quadrangle. These projects are the foundation of innovative water resources investigations and doctoral research at The University of Connecticut.

Applied Geoscience Analyses-Hazards/Geophysics: Soil stability during seismic events is the focus of a supported graduate research project at the University of Connecticut. The Connecticut Survey and the USGS Branch of Geophysics are supporting geophysical studies to measure shear wave velocity characteristics of glacial deposits in Hartford County. Refinement of National Earthquake Hazard Reduction Program (NEHRP) classifications for CT soil stability will result in improved modeling of HAZUS-MH earthquake damage assessments. The results of this investigation will have implications for similar geologic areas in New England, particularly in Massachusetts.

Resource Inventory and GPS Mapping: Field mapping services are provided to units within the Department of Energy and Environmental Protection's Conservation Branch. These units include Boating, Parks, Forestry, Fisheries, Greenways, and Natural Areas. Mapping activities include: Trail mapping in Parks and Forests, Facility mapping of State Parks, Facility mapping of Public Boat Launches, Biologic and Geologic features of significance. Hard copy and digital map products are available through the DEEP store and online.

The CT Geologic Sites Database: An ongoing program of documenting institutional knowledge. Database verification and enhancements are the focus of ongoing Geological Survey field work. Recent components relative to mining activities and mineral collecting locations have contributed data to The CT Office of Legislative Research, the USGS Eastern Region Minerals Yearbook, and routine technical assistance to DEEP programs, consultants, and citizens. The geologic sites database is also a central resource for Geological Survey land acquisition reviews within the DEEP.

Geothermal Resources: Connecticut Geological Survey and The Office of The Massachusetts State Geologist are collaborating on a 2 state multiyear geothermal resources project supported by the US DOE and AASG. The project is focusing on geochemistry of granites and granitic gneisses, to derive thermal conductivity estimates and generate thermal profiles for use in mapping areas of geothermal potential. Thick glacial overburden and sedimentary cover will be used to modify the area selections, as their insulating properties may enhance subsurface heat. All geochemical analyses, mapping tools, and related data will be part of the National Geothermal Data System [www.geothermaldata.org](http://www.geothermaldata.org) with the support of AASG [www.stategeothermaldata.org](http://www.stategeothermaldata.org)

Soils: Geochemical Survey of Connecticut Soils and Water Quality Investigations are underway through a Joint Funding Agreement between the CT Survey/DEEP and the USGS. This project is utilizing soil chemistry collected by CT Survey staff and analyzed through the USGS Geochemical Landscapes Project. Soil chemistry is being compared with the USGS Lithochemical Map, NRCS soil mapping, and water quality assessments. The investigation will contribute to the understanding of natural background levels for 42 analytical constituents, many of which are environmentally important trace elements, including Iron, Arsenic, Cadmium, Cobalt, Chromium, Copper, Lithium, Manganese, Nickel, Lead, Tin, Uranium, Vanadium, and Zinc. Other elements of note include Silver, Sulfur, and Tungsten.

Collections/Data Preservation: As a participant in the National Geological and Geophysical Data Preservation Program, the Geological Survey is formalizing collections as GIS data layers and making the information available to academic researchers and the public. Geoscience data preservation efforts are ongoing for the library collection of books, manuscripts, maps, scientific specimens, and unpublished survey files. The Connecticut Rock Core Repository containing more than 7500 ft. of important core, and the Educational Hand Sample Collection have been archived and described online. A catalog describing the Survey dinosaur track collection will be published by the end of the year. Due to limited staff resources, access to the Survey library is by appointment. A shared library database enables remote collection searches.

Marine Geology: A geologic cooperative between the CT Survey and the USGS, Coastal Program of Woods Hole, Mass. supported marine geologic investigations (sediment distribution, modern processes, benthic habitats, etc.) and the interpretation of sidescan surveys from NOAA in Long Island Sound, from 1980-2010. A full catalog of this work can be found at <http://www.lisrc.uconn.edu/lisrc/about.asp>. Currently, sea floor mapping is being coordinated by the DEEP Office of Long Island Sound Programs. A group of State and Federal government, and academic cooperators from NY and CT are involved in the effort.

Outreach and Education: The CT Survey is an active participant in Earth Science Week, CT DEEP's Teach Out, and Earth Day environmental education initiatives. Survey publications, support for teacher training on the geology of Connecticut, and online geologic descriptions of CT State Parks, and Earthcache sites ([www.earthcache.org](http://www.earthcache.org)) all contribute to the agency outdoor education effort of "No Child Left Inside". A new online Garnet Trail will highlight locations of Connecticut's beautiful State Mineral on public land, and provide additional outdoor recreational opportunities.

Connecticut Interstate Fire Crew: The Connecticut Survey's GIS specialist is a 25 year veteran and active member of the CT Interstate Fire Crew coordinated by DEEP's Forestry Division. This crew provides all incident response, as part of a multi-jurisdictional incident management team including professionals from the NFS, BIA, BLM, FWS, State Governments and others. Recent wildfire suppression mobilization for Jefferson Forest, VA in Summer 2012. [www.NIFC.gov](http://www.NIFC.gov)

**Biology.** In addition to conducting basic inventories of the state's biota, the Natural History Survey maintains the Natural Diversity Data Base (NDDDB), which is an inventory of historic and current information about State and Federal listed plants, animals and significant natural communities. The Natural History Survey is a member of NatureServe's National Heritage Network and uses Biotics, a nationally accepted GIS and database application designed by NatureServe, to manage this information. The Natural History Survey coordinates the update of the State Endangered, Threatened and Special Concern Species List. Biologists provide technical assistance through the environmental review process, and are involved in identifying and protecting significant ecological areas.

**Publications.** *List of Publications*

[www.ct.gov/dep/lib/dep/geology/ct\\_survey\\_publications\\_list.pdf](http://www.ct.gov/dep/lib/dep/geology/ct_survey_publications_list.pdf)

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