

## U.S. Geological Survey



## Training the Next Generation of Geologic Mappers

Detailed geologic maps are the basis of nearly every Earth-science investigation and can be used for natural hazard mitigation, resource identification and exploration, infrastructure planning, and more. A component of the congressionally mandated National Cooperative Geologic Mapping Program (NCGMP), EDMAP is a partnership among the U.S. Geological Survey (USGS), the Association of American State Geologists, and participating colleges and universities that provides mentorship and training opportunities to geology students nationwide. Under the guidance of a faculty member, EDMAP supports upper level undergraduate and graduate students to gain meaningful experience working on 1-year geologic-mapping projects. Between 1996 and 2019, EDMAP funded research projects for more than 1,200 students at more than 160 universities. Every Federal dollar awarded through the EDMAP program is matched by the student's university.

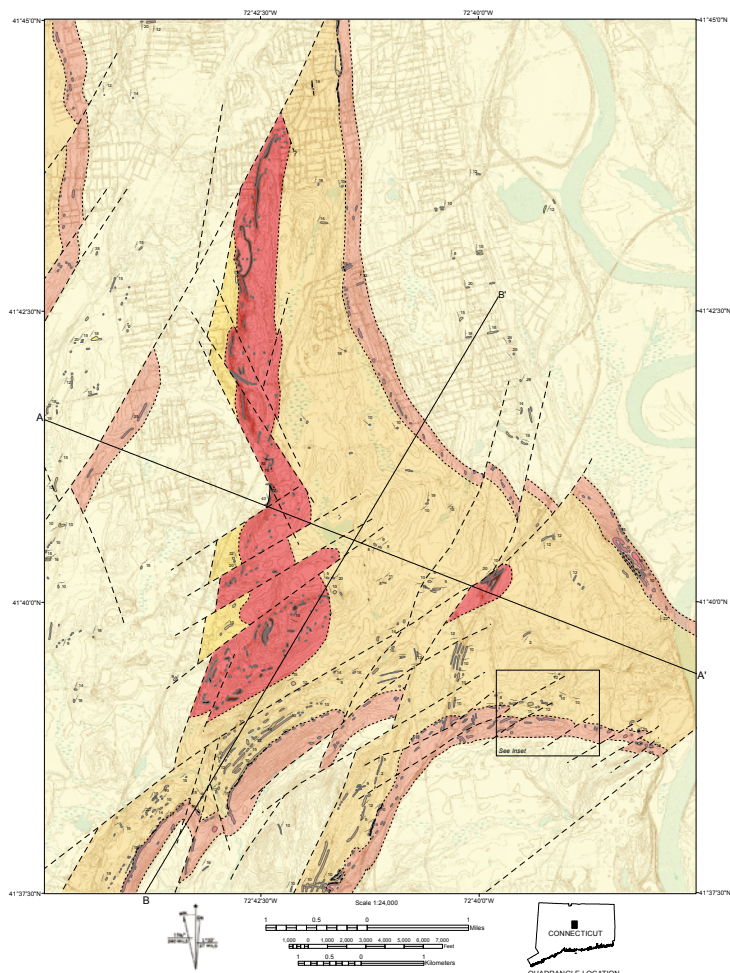
EDMAP students have found that their project provided them with quality field-based experience; it allowed them to explore new research methods, sharpened their critical thinking skills, and helped them to pursue their own research. EDMAP students gain leadership experience and build professional relationships with their fellow students, professors, and geologists from State geological surveys and the USGS.

EDMAP not only provides an opportunity for students to gain geologic-mapping experience, but also to contribute to the overall mapping efforts of the Nation. Student mapping is commonly carried out in close collaboration with STATEMAP and FEDMAP, the State and Federal components of the NCGMP. Project proposals selected for EDMAP funding typically complement the mapping priorities of the NCGMP, and make it possible for students to produce a geologic map and report with primary authorship.



# Case Study—EDMAP Supports Connecticut Wastewater Infrastructure

STATE GEOLOGICAL AND NATURAL HISTORY SURVEY OF CONNECTICUT



**Bedrock Geologic Map of the Hartford South Quadrangle, Connecticut**

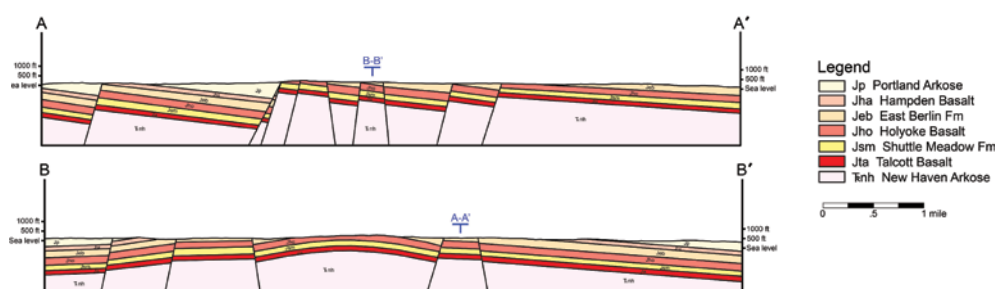
Peter A. Drzewiecki, Timothy Schroeder, Randolph P. Steinen, and Margaret A. Thomas

## Explanation

2012

- Individual outcrops shown as darker color within map unit  
Historical outcrops also shown with hatched pattern where temporarily exposed during construction
- Jp Portland Formation
  - Jha Hampden Basalt
  - Jeb East Berlin Formation
  - Jho Holyoke Basalt
  - Jsm Shuttle Meadow Formation
- Structure
- Bedding (showing strike and dip)
  - Fracture (showing strike and dip)
- Contacts
- Inferred
  - Observed
- Faults
- Inferred
  - Observed

## Structural Cross-Sections Along Lines A-A' and B-B'



Map modified from the State Geological and Natural History Survey of Connecticut Quadrangle Report no. 40, available at <https://www.ct.gov/deep/lib/deep/geology/qr40.pdf>.

EDMAP projects can yield geologic maps that inform major decisions, having the potential to affect environmental quality and human health into the future. The Clean Water Project at the Hartford Metropolitan District Commission is a \$2 billion public-works project to design and build new wastewater infrastructure in Hartford, Connecticut. Planning and construction of below-ground infrastructure relies heavily on information provided by geologic maps to identify and characterize ground conditions before and during the project. When planning the 4-mile-long South Hartford Conveyance and Storage Tunnel in 2011, the existing bedrock geologic maps were inadequate to fully understand the rock types and possible faults that could have had serious financial and structural implications during construction.

In the spring of 2012, in response to the need for better geologic maps to guide the building of the tunnel, the Connecticut Geological Survey published “Bedrock Geology of the Hartford South Quadrangle”—a map created through the EDMAP program. In collaboration with the Connecticut Geological Survey, EDMAP students and their mentors at Eastern Connecticut State University updated an unpublished 1970s-era map of bedrock in the Hartford South area, combining information from unpublished manuscripts in the Connecticut Geological Survey archives with their own extensive fieldwork and laboratory analyses. The Clean Water Project used the map to characterize the geology, identify the optimal route for the tunnel, and provide other vital information that would otherwise be unavailable or costly to duplicate.

## Past students say...

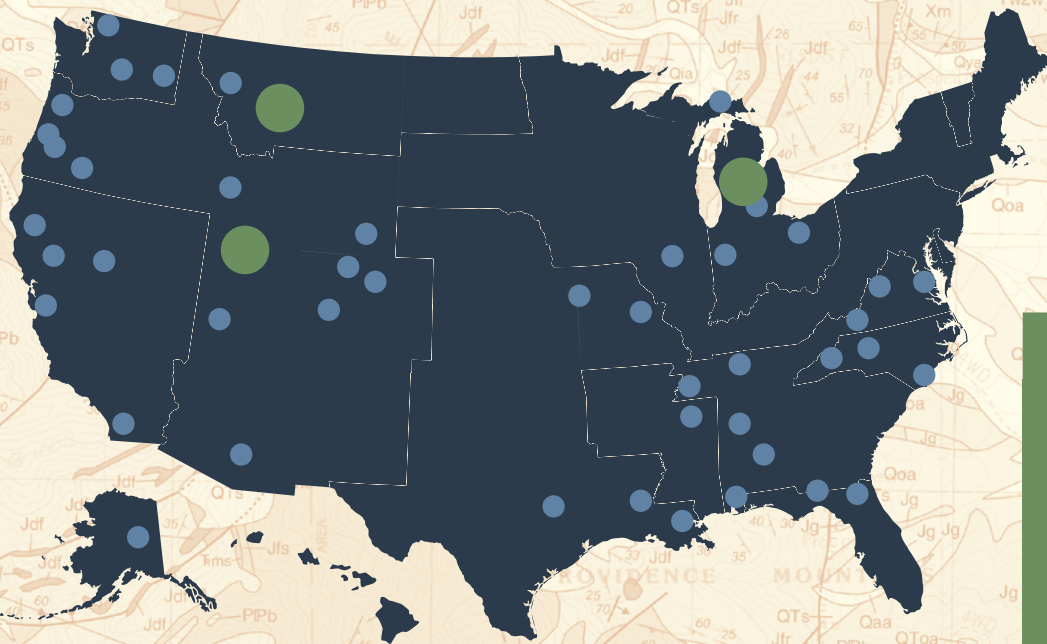


"EDMAP has put me in connection with private, State survey, and USGS researchers and has enabled me to select a non-university member for my graduate committee. The mentorship of EDMAP has extended beyond scientists directly tied to the project, introducing me to workers involved in auxiliary studies and methods which contribute to my dissertation."

### Sylvia Nicovich

Montana State University,  
2016 EDMAP student

**Project:** Geologic Mapping of the Zapata and Blanca Sections of the Northern Sangre de Cristo-Front Fault System, South-Central Colorado



Map of participating EDMAP universities in 2017, 2018, and 2019 (blue dots).



### James Mauch

Utah State University,  
2016 EDMAP student

"The most valuable part of my EDMAP experience has been working directly with geologists in the mapping program at the Utah Geological Survey (UGS). I've received one-on-one mentoring and technical support which has allowed me to use the skills, methods, and equipment that professional geologists employ to publish maps. Using the same methods and equipment as the mappers at the UGS has directly prepared me for a career as a mapping geologist—an opportunity I would not have had without the EDMAP program."

**Project:** Geologic Mapping of Southeastern Spanish Valley, Utah—Assessing Salt-Tectonic Activity



"EDMAP provided an opportunity to experience the full mapping spectrum, from field exploration and data collection to reviewing multiple datasets for mapping interpretations during digital cartography. My EDMAP experience served as an extremely important foundation for my remaining mapping project during my graduate studies, and also for my future research ambitions... I certainly plan to continue mapping as part of future employment."

### Sarah VanderMeer

Western Michigan University,  
2015 EDMAP student

**Project:** Surficial Geologic Mapping of the Indian Town and Wood Island SE 7.5 Minute Quadrangles, Pictured Rocks National Lakeshore, Michigan



## Interested in applying for EDMAP?



For more information contact:  
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PROJECT Apply

DATE Today

STATION NO.	STRUCTURE	STRIKE OR TREND	DIP OR PLUNGE	NOTES
1.	Visit <a href="https://www.grants.gov/">https://www.grants.gov/</a> . Applications period typically opens in September and closes in November each year.			
2.	Select “Grant Opportunities” in the search bar, and type in the keyword “EDMAP.”			
3.	Submit the application materials before the deadline.			
University faculty can apply to fund a student mapping project. Graduate students are eligible for \$25,000 in project funding; undergraduates are eligible for \$15,000. For more information about EDMAP and other career-building opportunities through the National Cooperative Geologic Mapping Program, visit: <a href="https://ncgmp.usgs.gov/">https://ncgmp.usgs.gov/</a> .				