NYSERDA-Funded Projects Related to Climate Adaptation

December 2015

Marsh Migration Modeling with SLAMM (Sea Level Affecting Marshes Model)
PROJECT COMPLETE

- Final report
- Technical data (Warren Pinnacle website)
- View the maps: www.slammview.org or http://maps.CoastalResilience.org/newyork (Future Habitat tab)

Principle Investigator: Jonathan Clough, Warren Pinnacle Consulting

This project used models to estimate how wetlands along New York State's coastlines may move and change because of future sea-level rise. Tidal marshes are among the most susceptible ecosystems to climate change, especially to accelerated sea-level rise. Rising sea levels may result in tidal marsh submergence and habitat migration as salt marshes transgress landward and replace tidal freshwater and irregularly flooded marshes. This project provided map-based projections of the potential effects of sea-level rise on the wetland communities of Long Island and New York City. The results will help land-use planners identify appropriate adaptation strategies for these marshes and nearby areas.

Floodplain Mapping with Sea Level Rise
Estimated completion: End 2015
Principle Investigator: Brian Batten, Dewberry Engineers

This project will study potential flood zones in the Hudson Valley and on Long Island, using a different modeling method than the Columbia/Stevens project (Flood Mapping Visualization Tool for Planners and Storm Surge Modeling). The two projects will allow a comparison of modeling methods to better inform future assessments. In addition to the 1% and 0.2% annual chance floodplains (100-year and 500-year floodplains), this project will also delineate the limit of moderate wave action (LiMWA) under future sea level rise scenarios and provide a land-loss estimation tool.

Climate Change and Water Quality: Impacts and Adaptation Strategies for NYS Water-Treatment Utilities
Estimated completion: End 2015
Principle Investigator: Benjamin Wright, Hazen and Sawyer

This project will study the impact of climate on turbidity, natural organic matter, and algae in drinking water sources located throughout New York State. Rising temperatures and extreme weather events can alter levels of these constituents, which can lead to increases in water treatment costs, energy use, and hazardous disinfection byproducts. Results will help water treatment centers prepare for future water quality issues as a result of climate change.

Delineation of Coastal Erosion Hazard Areas (CEHAs)
Estimated completion: End 2015
Principle Investigator: Henry Bokuniewicz, Stony Brook University

This project will update a number of New York State's Coastal Erosion Hazard Area (CEHA) maps, which delineate property and buildings at risk from future erosion in the coastal regions of NYS. The CEHA maps have not been updated since the late 1980s. Much erosion has occurred on NYS coastlines in the last 30 years and mapping technologies have greatly advanced, making this mapping project very important to the protection of NYS' coastlines. Using updated CEHA maps, more effective management will be possible of these coastal areas that are subject to coastal storm damage and sea level rise impacts. Erosion trends are expected to accelerate due to climate change, so having the maps can help minimize risk associated with future development in these areas.

Capturing Waste Heat from Biogas-Powered Generators for Cooling Dairy Cows
Estimated completion: End 2015
Principle Investigator: Lars Angenent, Cornell University

This research aims to develop a novel conductive cooling system to reduce heat stress in dairy cattle. The cooling system being demonstrated would be powered by waste heat produced by a combined heat and power engine burning digester biogas (CHP-DG). Work also includes assessing and optimizing the use of absorption chilling technology to capture waste heat from combined heat and power engines with digester biogas as the fuel; modeling a conductive cooling system; and conducting an economic analysis and lifecycle assessment of the novel cooling system for NYS farms.

Heat-Related Vulnerability and Cooling Center Assessment
Estimated completion: End 2015
Principle Investigator: Shao Lin, NYS Department of Health

This project will characterize current and future vulnerability to extreme heat in NYS, including extreme heat events or heat thresholds in different geographic areas, population sensitivity to heat, and community adaptive capacity using geographic information system (GIS) tools. Climate change will lead to warmer temperatures and to more extreme weather events such as heat waves, which have been found to be associated with both increased mortality and morbidity in sensitive populations. The project will identify segments of New York's population, such as the elderly, who will be facing health risks due to the projected increased intensity and duration of heat waves. The study also aims to assess the effectiveness of current programs, such as heat warning systems and cooling centers in NYS.

Flood Mapping Visualization Tool for Planners and Storm Surge Modeling
Estimated completion: End 2015
Principle Investigator: Kytt MacManus, Columbia University/CIESIN; Philip Orton, Stevens Institute of Technology

The project will map potential flood zones along the Hudson Valley from Westchester to Troy under future sea level rise and storm surge scenarios. It is expected that, due to rising sea levels and more significant rain, these areas close to the Hudson River could be at increased risk of flooding. Innovative modeling of future flood potential will incorporate tributary flows into the Hudson from rainfall events to the north, rather than only surge coming from the mouth of the river. The team will create a free, publically available online tool to help coastal communities understand their potential risk. Critical infrastructure as well as natural systems will be incorporated into the geographic information system (GIS) tool.

Toolkit for Spatial Prioritization of Conservation Investments
Estimated completion: End 2015
Principle Investigator: Kristin France, The Nature Conservancy

The project will map impacts of climate and land use change on New York State's natural resources and wildlife. The project will integrate extensive species and habitat information with decision-support tools and guidance to create a single toolkit to support identification of climate adaptation strategies for a range of conservation objectives. The toolkit will help natural resource managers adapt to the coming changes and maintain the benefits these resources currently provide to communities and future generations of New Yorkers. Rapid change will create a bottleneck for plants and animals, which may need to adapt or move to survive. Finding ways to maximize the diversity of plants and animals surviving this bottleneck will help protect species diversity and help ensure that ecosystem services that people need continue to be provided. This effort will focus on dominant terrestrial habitats and freshwater river, small lake, and wetland systems across NYS.

Downscaled Projections of Extreme Rainfall in NYS (IDF Curves)
Estimated completion: End 2015
Principle Investigator: Art DeGaetano, Cornell University

This project will provide more accurate models of estimated increases in rainfall intensities across New York State. An increase in the frequency of extreme-rainfall events is perhaps one of the most pronounced changes observed in the recent climate record of the Northeast, and such events are likely to continue to increase under future climate change. Estimates of future changes in local and regional extreme precipitation are valuable for informing local policy decisions and estimating potential impacts on transportation and other infrastructure. For example, NYS transportation infrastructure design standards to withstand severe weather have not been updated since the 1960s, yet climate change forecasts call for increased periods of heavy rain with more flood potential. The results of this project, including intensity/duration/frequency (IDF) curves, will help engineers design infrastructure with better capacity to withstand future rainfall.

New York Climate Change Science Clearinghouse
Estimated completion: Summer 2016
Principle Investigator: Lisa Rector, NESCAUM

The New York Climate Change Science Clearinghouse (NYCCSC) will provide an objective, user-friendly, Web-based repository of data and literature for climate change science. The NYCCSC's team comprises the Northeast States for Coordinated Air Use Management (NESCAUM), Cornell University, State University of New York College of Environmental Science and Forestry (SUNY-ESF), and the National Oceanic and Atmospheric Administration (NOAA). NYCCSC will help educate policymakers, provide practitioners the specific climate information they need, help identify data gaps, and promote information sharing across scientific and engineering disciplines. Information flow will be bi-directional, with users providing data, documents and other content that will be reviewed and approved prior to publication on the NYCCSC. The site will both leverage and improve upon the capabilities of existing climate-related sites at state, regional, and federal levels. This effort will establish a foundation for climate change information and data sharing via the Web that can be tailored to other states in the region.

Climate Change Impacts on New York State's Buildings Sector
Estimated completion: End 2016
Principle Investigator: Nicholas Rajkovich, SUNY Buffalo

This project will investigate the impacts of climate change on the buildings sector in NYS, as well as explore potential adaptation strategies. The project will fill an identified gap in the ClimAID project. The research will include an integrated assessment of the influence of climate change on the building stock in New York State, economic modeling to determine statewide direct and indirect impacts on economic output and employment, and identification of potential adaptation and response strategies. This project will help the buildings sector increase its resilience to the effects of climate change by identifying impacts, vulnerabilities, and potential adaptation strategies for the sector.

Sea Level Affecting Marshes Model (SLAMM): Refining Marsh Adaptation Strategies
Estimated completion: End 2016
Principle Investigator: Jonathan Clough, Warren Pinnacle Consulting

This project will develop flexible tools for policymakers to assist them in achieving resilience, conservation, and management goals for coastal marsh areas. Building on the previous SLAMM project, this project will better incorporate roads and infrastructure into the model analysis, better visualize marsh migration pathways, and develop a decision-support tool that will assist decision makers in planning adaptation strategies for marsh conservation and coastal community resiliency. The study area will consist of NYC, Westchester County, and Nassau County. In addition to providing data for environmental resource managers, this work will benefit policymakers in the energy, transportation, and drinking water infrastructure sectors.

Shoreline Resilience Planning Pilot for East Hampton
Estimated completion: End 2016
Principle Investigator: Brian Batten, Dewberry Engineers

This project will serve as a demonstration on how to inform resilient coastal policy, permitting, and management practice through improved data resources and understanding of short- and long-term coastal processes. The project will create a shoreline-structure inventory, analyze shoreline change and sediment processes, and work with the Town of East Hampton to develop adaptation recommendations with respect to sea level rise. As a pilot, the process will aim to be transferrable to other coastal communities.

Transportation Infrastructure Vulnerability
Estimated completion: End 2016
Principle Investigator: Mathew Mampara, Dewberry Engineers

This project will develop a criticality assessment approach for transportation that would address the diversity of the state, reducing the "urban bias" of the existing methodology. The project will also identify transportation infrastructure at risk from increasing debris-load impacts, and design guidance to reduce the risk. The results will support the NYS Department of Transportation's efforts to build infrastructure resilience to climate change and will be essential to informing transportation adaptation decision making in addressing climate vulnerabilities to NYS's infrastructure.

Impact of Weather-Related Power Outages on Health & Assessment of Climate Adaptation Strategies
Estimated completion: Mid 2017
Principle Investigator: Thomas Matte, Fund for Public Health in New York

This project will assess the relationship of power outages and energy-infrastructure disruptions to public health, as well as the relationship of food-borne illnesses to climate change. The research will identify vulnerable populations and assess and develop appropriate response strategies. The project will better identify the link between the energy and health sectors, and will help inform short- and long-term climate adaptation measures for outages under future climate.

Using Remote Sensing to Evaluate Current and Future Vulnerability to Eutrophication and Algal Blooms
Estimated completion: End 2017
Principle Investigator: Benjamin Wright, Hazen and Sawyer

This project will create publically available tools for water utilities, water resource agencies and non-profits, regulators, recreational water managers, and the broader research community to track watershed conditions that lead to harmful algal blooms, using NASA-provided satellite data. The project will also provide an analysis of adaptation options to target the primary watershed processes that drive harmful algal blooms under current and future climate conditions. The tools developed could be used to provide both near-term and long-term predictions of harmful algal blooms, which can then be used to determine appropriate adaptation actions for controlling nutrients and managing watersheds under current and future climate.

Building Footprint Data for Climate Change Adaptation
Estimated completion: Mid 2018
Principle Investigator: Greg Yetman, Columbia University/CIESIN

This project will compile a complete set of building footprint and critical infrastructure data for Long Island and all counties adjacent to the Hudson River from the southern border of Westchester County to the Federal Dam at Troy, as well as complete an impact damage assessment. The team will create building footprint data when existing data is not available. By allowing local and regional decision-makers and property owners, to easily access information about the risk of their properties, the results will help address concerns related to structure vulnerability over the most densely developed areas of the State. The results could help decision makers with policy decisions, impact assessments, planning efforts, and potential adjustments to local codes.