



Town of Madison



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Community Resilience Building Workshop

Summary of Findings

July 2018

Town of Madison

Community Resilience Building Workshop

Summary of Findings

Overview

The need for municipalities, academic institutions, regional planning organizations, states and federal agencies to increase resilience and adapt to extreme weather events and a changing climate is strikingly evident amongst the communities of the state of Connecticut. Recent events such as Tropical Storm Irene and Sandy have reinforced this urgency and compelled leading communities like the Town of Madison to proactively collaborate on planning and mitigating risks. Ultimately, this type of leadership is to be commended because it will reduce the vulnerability of municipal residents, infrastructure, and ecosystems and serve as a model for other communities in Connecticut, New England, and the Nation.

In spring of 2018, the Town of Madison embarked on certification via Sustainable CT. As part of that certification, Sustainable CT and the Nature Conservancy provided the Town with a voluntary process to conduct an assessment of climate issues. In July 2018, a municipal-based core team organized a Community Resilience Building Workshop facilitated by the Nature Conservancy in partnership with Sustainable CT. The core directive of this effort was the engagement with and between community stakeholders to facilitate the assessment of climate vulnerabilities and the education, planning and ultimately implementation of priority adaptation actions for Madison. The Workshop's central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future vulnerabilities and strengths;
- Develop prioritized actions for the Town of Madison;
- Identify opportunities to collaboratively advance actions to increase resilience.



For the Workshop, the Town of Madison employed a unique “anywhere at any scale”, community-driven process known as the Community Resilience Building (CRB) Workshop (www.CommunityResilienceBuilding.org). The CRB’s Risk Matrix and various data and maps were integrated into the Workshop process to provide both decision-support and risk visualization around shared values and priorities across Madison. The principle data and maps used were previously compiled and/or generated as part of Madison’s CRB Workshop in May 2014. Using this workshop process, rich with information, experience and dialogue, the participants produced findings which are outlined in this summary report. The following report provides an overview of the top hazards, current concerns and challenges, current strengths, and proposed actions to improve Madison’s resilience to natural and climate-related hazards today and in the future.

The summary of findings transcribed in this report, like any that concern the evolving nature of risk assessment and associated action, are proffered for comments, corrections and updates from workshop attendees and additional stakeholders alike. The leadership displayed by the Town of Madison on community resilience building will benefit from the continuous and expanding participation of all those concerned.

Summary of Findings

Top Hazards and Vulnerable Areas for the Community

During the CRB Workshop, community members were asked to identify the top hazards for the Town of Madison. Extreme weather events resulting in coastal flooding along with the future prognosis of sea level rise was identified as a critical hazard. The other hazards of greatest concern to the participants included wind associated with Nor’easters and storm surge along the coast. These hazards have direct and increasing impacts on Madison’s residents and resources such as its neighborhoods, natural areas (river corridors, wetlands, watersheds, beaches, parks), roads, drinking and wastewater systems, health care facilitates, social support service to vulnerable populations, and other critical infrastructure and community assets.



Top Hazards and Areas of Concern for the Community

Top Hazards

- Coastal Flooding and Sea Level Rise
- Wind (Nor'easters, winter storms)
- Storm Surge (tropical storms, hurricanes, etc.)

Areas of Concern in Madison*

Neighborhoods: Neck Road, Garnet Park, Circle Beach, Middle Beach, Heatherwood, Green Hill Place.

Ecosystems: Fence Creek, East and Neck River Marsh, East and West Wharf, Salt Meadow Park, Neck River, Hammonasset State Park, Tuxis Pond, Surf Club Beaches, trees in the right-of-way, shellfish beds.

Transportation: State Route 1 (multiple locations including Guilford/Madison Town Line - Fence Creek), 79 and 80 Circle Beach Road, Garnet Park Road, Neck Road, Middle Beach Road, Parker Avenue, shoreline roads in general, Railroad tracks and bridges, Country Road Bridge, Heatherwood Drive Bridge, Harbor Drive, Seaside Avenue.

Infrastructure: Town Campus (EOC), Madison Hose Company No. 1, Lake Hammonasset Dam, other smaller dams, Route 1 commercial district (i.e. gas, CT Pharmacy, CVS, restaurants, groceries (Stop & Shop), etc.), East Wharf, West Wharf, Strong Field facilities, Madison Surf Club Building, North Madison commercial/rural shopping zone, nursing/assisted care homes and affordable housing (Neck Road, Madison House, The Hearth at Tuxis Pond, Mercy Center, Concord Meadows, Watrous, Legend Hill), urgent care and skilled nursing facilities, tide gate (Neck Road area), Heatherwood subdivision, electric power distribution system and substations (Green Hill Road, Bradley Road, Garnet Park), telephone land lines, private water wells, private septic systems, Middle Beach Road sea wall, Town Gym, Community Center, evacuation signage, Windemere Condos.

Vulnerable Populations: Renters or Transients, Elderly, Developmentally Disabled, Non-English Speaking, Low Income.

*Information above from workshop participants as well as from the SCRCOG Multi-Jurisdictional NHMP Update (2018).

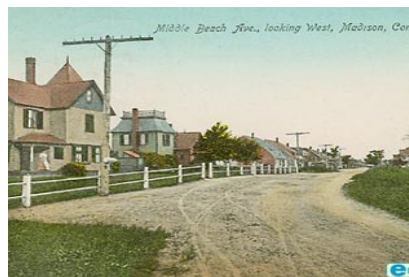


Current Concerns and Challenges Presented by Hazards

The Town of Madison has several concerns and faces multiple challenges related to the impacts of natural hazards and climate change. In recent years, Madison has experienced a series of highly disruptive and damaging weather events including Tropical Storm Irene (August 2011), Tropical Storm Sandy, (October 2012), and winter Nor'easter Nemo (February 2013). Impacts from Irene included heavy rain-induced inland flooding and wind damage. Sandy caused extensive power outages across large portions of Madison. Winter storms drop excessive snow on the Town knocking out power and isolating residents and neighborhoods. The magnitude and intensity of these events and others across Connecticut has increased awareness of natural hazards and climatic change, while motivating communities like Madison to comprehensively improve resilience.

This series of extreme weather events highlights that for Madison the impacts from hazards are diverse; they range from storm surge and flooding of surface streets and low-lying areas near the coast, rivers and wetlands during intense storms and heavy precipitation events to property damage from trees, wind, snow, and ice. Longer periods of elevated heat, particularly in July and August, have raised concerns about vulnerable segments of the population including the elderly and disabled. The combination of these issues presents a challenge to preparedness, response and mitigation priorities and requires comprehensive yet tailored actions for particular locations and/or areas across Madison.

The workshop participants were generally in agreement that Madison is experiencing more intense and frequent storms events and heat waves. The impacts have affected the daily activities of most residents. Additionally, there was a general concern about the need for and challenges of being prepared with contingency plans for worst case scenarios during different times of the year (i.e. major disasters, storms, major hurricanes (Cat-3 or above)) particularly in the fall/winter due to more intense storms.



(Credit: ePodunk)



(Credit: Esty)



(Credit: Hip Postcard)



Specific Categories of Concerns and Challenges

Dams

The Lake Hammonasset Dam, owned by the Regional Water Authority, is classified as a high hazard dam by CT Department of Energy and Environmental Protection. The participants had concerns about the safety of this Dam during and after high precipitation events. Impacts from catastrophic failure would include floodwaters reaching I-95 as well as the Town Campus which would threaten the center of Town Government operations, especially emergency management and shelters, as well as potentially compromising several bridges. Other smaller dams across Town may also be of concern given their age and increased rainfall projections in the future.

Town Road Network

One of the primary concerns expressed by participants was the vulnerability of Madison's road network during and after extreme and routine events. Road blockage prevents emergency services from reaching stricken areas and reduces public access to evacuation routes and critical facilities like gas stations, grocery stores, and pharmacies. In addition, impassable roads can limit access to sheltering facilities. There are multiple factors contributing to travel interruptions ranging from flooding due to coastal storm surge, inadequate drainage systems for current precipitation events, snow deposition, and downed trees and power lines due to wind, ice, and/or snow.

Coastal roads such as those off of Neck Road and Middle Beach Road among others flood due to storm surge, as well as routine high tides in some locations. The extent and duration of flooding is caused by inadequate drainage systems including undersized culverts (Old Farms Road along Bailey's Creek) and antiquated tide gates that restrict water conveyance and cause water to "back up". In several locations the storm water drainage infrastructure is incomplete and stressed by higher magnitude and intensity precipitation events. Choke points susceptible to flooding such as the railroad underpass along Route 1 (Mungertown Road was cited) can render the roadway impassable; effectively severing critical links between the shore communities and northern parts of Town. The vulnerability of town-owned bridges over flood-prone rivers was highlighted. The inability of Town equipment to adequately move the snow during extreme, early winter storms (wet and deep) were cited as an accessibility concern particularly for smaller roads back off of Routes 1 and 79.



Specific Categories of Concerns and Challenges continued...

Electrical Distribution Systems

Electric service outages are a concern in Madison and can be caused by all types of natural hazards. The power distribution system was cited as the most critical infrastructure in Town and can impact all residents regardless of where they live. Mature trees and limbs along roadways and other transportation corridors are a primary culprit because they can bring down power lines. Power interruptions due to winter storms cause heat loss in homes which is of particular concern for elderly and less mobile residents.

Of principal concern during the last large scale power outage was the demonstrated lack of communication and coordination between the electrical utility companies and the Town. The lack of coordination and timely response had impacts on the pace of power restoration to residents and businesses. Remarkably, there were many reports of blocked roads being cleared of downed trees by volunteer firefighters (without power company crews) not fully trained or authorized to deal with power lines. Flooding of substations on Green Hill Road, Bradley Road, and Route 1 were called out as concerns to the overall power distribution system.

Coastal Flood Damage

Coastal flooding presents a major threat to the Town's infrastructure, facilities, neighborhoods, and individual homes and property. Recent events suggested to the participants that the financial impact of significant coastal flooding could be considerable in the future and may lead some residents and businesses to reevaluate the costs of rebuilding versus relocations to less vulnerable areas. Of particular concern is that coastal flooding has and will continue to surround particular neighborhoods and cut them off from the rest of Town making it difficult for first responders and other services to access during emergencies. In addition, several individuals highlighted that household items such as unsecured propane tanks were redistributed by flood waters creating potential explosion hazards along with other household chemicals and contaminants.

Madison's main commercial zone along Route 1 was called out as vulnerable to severe flooding that would impact resident's access to gas, groceries, and the pharmacy. There are also residents that live above commercial properties within the flood zone. Another smaller commercial area on Route 1 near the town border with Guilford currently reports frequent flooding issues.



Specific Categories of Concerns and Challenges continued...

Neighborhood Isolation and At-Risk Populations

Of greatest social concern was neighborhood isolation during flooding events and loss of power during winter storms. An additional concern included public health and safety impacts due to heat waves (30+ days over 90° per year, currently) on an aging population. There are several neighborhoods at risk of being cut off from the rest of the Town due to flooding or downed trees over critical roads. This is particularly dangerous for the elderly and medically vulnerable residents who live in these areas.

Concord Meadows was singled out as an affordable housing complex with residents that require medical assistance and is entirely dependent on electrical supply. Legend Hill was also identified as a condo complex positioned on a steep hill that is difficult to access during winter storms. Several other nursing homes, rehabilitation facilities, and senior/assisted living housing were noted as susceptible to impacts from natural hazards. In addition, medical evacuation was identified as a significant challenge given the limited ambulance capacity. Neighborhoods singled out as particularly vulnerable to impacts include Neck Road, Garnet Park, Circle Beach, and Middle Beach. Participants highlighted that approximately 25% of the current population is over 65 years old with anticipation of increasing percentages in the future.

Town Campus

Madison's Town Campus is located within the Hammonasset River floodplain and is vulnerable to inland flooding. This is a concern because the Town Campus serves important functions during emergencies such as housing the municipal Emergency Operations Center. The Town Campus also serves as an emergency sheltering location, site of the Town Police Department, and the primary seat of Madison's government. This facility and its current essential functions are in jeopardy from several flooding scenarios as explored during the Workshops. Currently, there are two generators – one for the police station and the second to service the rest of Town Campus.



Specific Categories of Concerns and Challenges continued...

Communications

Madison is the longest town running north-south in the state and has several antennas along that length. Between the Dispatch Center and the Town's antennas, the communications network is vulnerable to interruption of service and currently provides inadequate coverage during storm events. There is dependence by the emergency response dispatch on landlines which become particularly vulnerable with ice, wind, and snow events. This has been recognized by the Town with the mention of an engineering study underway to improve communications via microwave transmission between towers. Commercial cellular phone coverage is weak in several areas in Town but that is a universal predicament along the coast due to an inadequate network maintained by the major carriers (i.e., ATT, Verizon).



(Credit: epodunk.com-Madison 1881)

Current Strengths and Assets

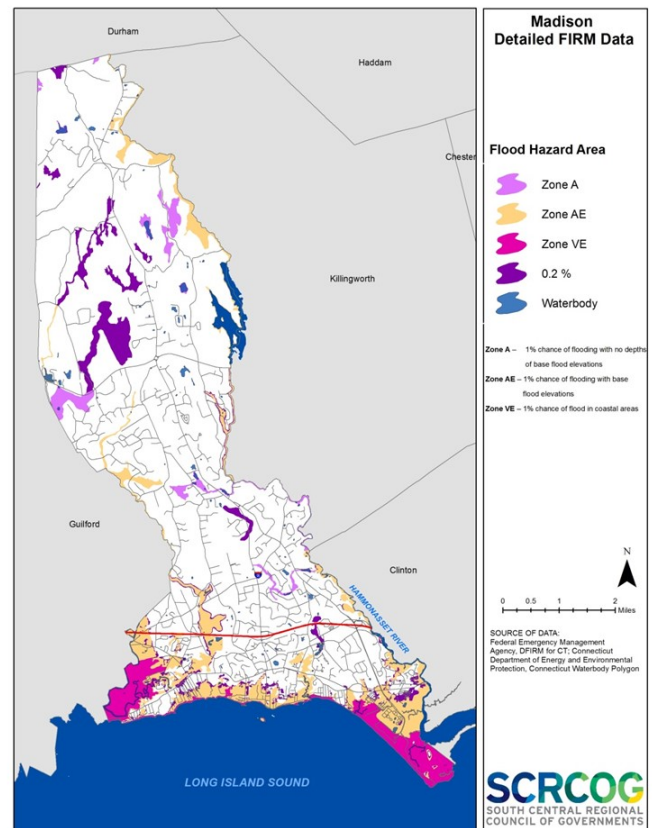
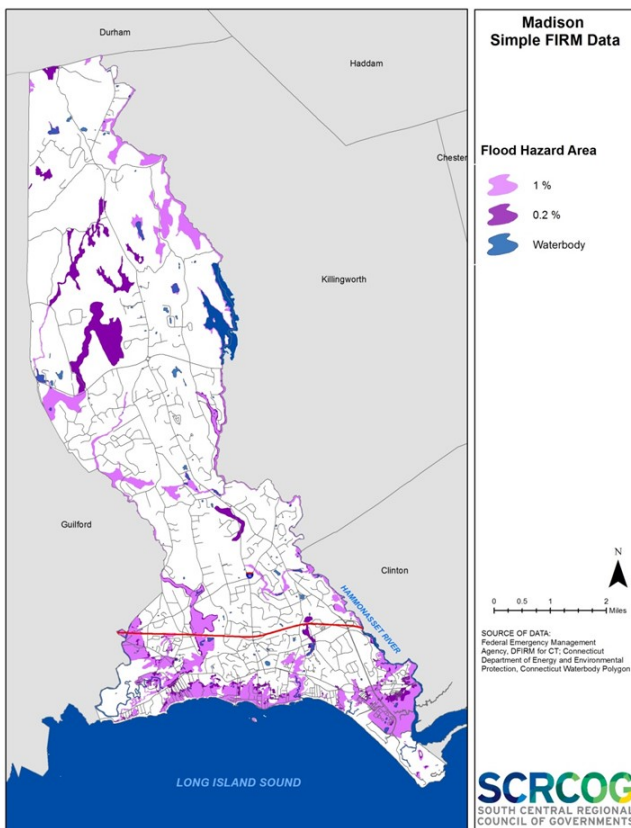
As a result of Madison's recent experiences with extreme weather, the Town is well acquainted with the existing strengths within the community. Reinforcing and expanding these supportive practices and assets will generate greater benefits to the community through increased resiliency against future storms, with greater frequencies and intensities, as well as long term impacts from the ongoing increases in air temperature, precipitation, and sea level.

- Clearly, the responsive and committed leadership by the elected officials is a very much appreciated strength in Madison. In association, regional cooperative agreements with adjoining municipalities and state entities were cited as critical and potentially cost-saving outcomes of this dedicated and ongoing leadership.
- Madison's residents have proven to be a key asset during recent natural hazards. On a neighborhood level, residents face common challenges and have demonstrated a desire to help one another recover quickly. In the aftermath of Irene, residents witnessed a heightened sense of neighborhood or community which only increased during and after Storm Sandy. Many residents had installed generators after Irene and were able to share connectivity (wi-fi) and other resources with those that did not.
- Supportive social services such as the Senior Center activities, Senior Consortium, transportation systems for seniors, youth and family services, as well as faith-based organizations were highlighted as important community assets.
- Madison's first responders are a major asset during emergency events due to their experience and knowledge with a diverse array of situations. The overarching coordination amongst various departments including Police, Fire, and EMS was cited as ongoing community strengths. Improvement to critical equipment and facilities such as the Ambulance Garage and dedicated power generation at the Town Campus's Emergency Operation Center helps to reinforce this highly important asset in Madison.
- The increase in neighborhood awareness and resiliency has helped to augment the overarching emergency management and social service provided by the Town during and after recent storm events.



Current Strengths and Assets in Madison cont...

- The marshes, beaches, and open space (including Madison Country Club) along Madison's coast offer increased defense against storms through storm surge attenuation and capture for storm runoff infiltration. Intact forested watersheds, reservoirs, and other park land provide public amenities and serve to maintain water quality and quantity for private, well-dependent residents. Without these natural resources in place, Madison's coastal and inland infrastructure and homes would suffer greater damage and higher ongoing costs to rebuild or relocate. The recent acquisition of Salt Meadow Park adds to overall benefits of natural infrastructure for residents. Also, Madison has large tracts of undeveloped upland forests which protect local water quality and also provide water storage services that replenish the local aquifers. The ability to lower reservoir levels (Lake Hammonasset Dam) in advance of major precipitation events to effectively increase upstream storage capacity was seen as an asset.



Top Recommendations to Improve Resilience

A common thread throughout the workshop discussions was the recognition that Madison needs to be better prepared through longer term community-based, contingency planning across all areas of concern. This need and additional core highlights surfaced by the Workshop participants are addressed below.

Highest Priority

- Secure funding to replace the generator in the Town Gym - principle sheltering facility in Madison (current capacity - 1% of residents). Consider ways to fund and install air conditioning options at Town Gym along with additional showering capacity.
- Explore options to switch the main sheltering facilities making Madison Community Center, middle schools, and/or the old High School (would require generator at facility) the main and Town Gym a back-up or overflow facility.
- Look to recharge partnership with Climate Corps to complete evacuation signage plan and install signs across Madison.
- Continuously look to enhance the reach of existing communications efforts for residents in Madison (Reverse 911).
- Increase tree trimming budget for work along Town-owned and maintained roadways across Madison. Town to develop a decision process or ranking checklist to help prioritize locations for tree trimming.
- Continue to support and maintain the viability of shellfish beds in Madison as a form of food and economic resilience for residents and operators.
- Further examine the longer-term needs for the Middle Beach Sea Wall.
- Town to support and advance a small business preparedness program in partnership with the Chamber of Commerce.
- Look to install dune restoration project at Madison Surf Club per the design developed as part of the Southern Connecticut Regional Framework for Coastal Resilience project.
- Expand emphasis and focus on securing additional volunteers for various critical programs such as CERT and ambulance team.



Community Resilience Building Workshop Recommendations

Highest Priority (cont'd)

- Look to increase the reach and effectiveness of the programming at the Madison Community Center to ensure a wider variety of residents are prepared and informed.
- Maintain mass vaccination PODs at Madison Community Center and High School and conduct appropriate training routinely.
- Need to identify planning and zoning best management practices to ensure risk to property, structures, and natural resources (beaches/dunes, wetlands, floodplains) is minimized during the recovery phase of future events.
- Develop detour plans for vulnerable locations during major storms and share directly with residents - particularly on coastal roads and neighborhoods - and on the Town website.
- As part of a Town Forestry Management Plan, look to advance activities that will diversify the age structure of forests across Town.
- Reexamine the TNC Salt Marsh Advancement Zone Assessment for Madison and look to integrate into open space acquisition opportunities.



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Moderate Priority

- Routinely meet and review Lake Hammonasset Dam safety plan as a precaution to help prevent catastrophic failure and impacts to Madison residents and facilities.
- Continue to advance current design and future design of two bridges on Country Road and Heatherwood Drive, respectively.
- Continue to seek opportunities and methods to source drinking water in the event that power is lost across households with private, electrified wells (70% of homeowners in Madison).
- Need to enhance communications regarding access points for drinking water for residents on non-operating private wells due to power outages.



Community Resilience Building Workshop Recommendations

Moderate Priority (cont'd)

- Consider initiating an “Oasis Program” where households with generators and operating private wells provide drinking water for neighborhoods without generators during times of crisis. This would help to reduce the logistical pressure on town services to provide drinking water to residents in need.
- Examine opportunities to install microgrid in downtown area which will include surmounting identified barriers by the Energy Committee.
- Continue to encourage through the Senior Center that neighbors get to know their neighbors and look out for one another during major events.
- Monitor extend of flooding in the Garnett Park neighborhood and offer assistance as needed for residents.
- Alert residents in advance of storm to minimize water use related to their septic systems and inspect for impacts to the systems from debris afterwards.
- Seek out opportunities to secure a portable generator and create hookups are critical locations such as the Community Center. This would allow for the continued preparation of food (Meals on Wheels) for residents as well as serve as a heating and cooling station.
- Conduct an auxiliary power needs assessment for facilities without back-up power across Town. Tie this assessment to alternative shelter plan development that should include considerations of generators, heating, cooling, and services (feed preparation, showers, water, etc.).
- Develop a forestry management plan for Madison that secure this asset for the future.
- Reach out to CT DEEP to discuss a coordinated beach management process for Hammonasset State Park.
- Advance green infrastructure options to improve stormwater management alongside the promotion of low impact development projects across Madison.
- Increase the connections between food pantries in Madison with locally grown and supported agricultural operations.



Community Resilience Building Workshop Recommendations

Moderate Priority (cont'd)

- Identify and support the acquisition of equipment needed by the Fire Department to assist further with effective safety and rescue efforts (truck for high water).
- Maintain mutual aid agreements with Clinton, Guilford, and Branford for fire service support.
- Seek to support volunteerism with the Medical Reserve Corps in Madison.
- Continue to maintain Salt Meadow Park.
- Design and install upgrades to temporary structure on Green Hill Road.
- Explore opportunities for community septic systems in flood prone locations.
- Manage long term viability of streams and rivers by assessing the impacts of septic systems across Madison.

Lower Priority

- Maximize open space acquisition to ensure ecosystem benefits are secured for the future of Madison.
- Maintain and increase as desired by residents the number and distribution of community garden areas and plots.
- Continue to coordinate with nursing homes on emergency operation plans.
- Look to strengthen the work of Neighbor to Neighbor in Madison.
- Update emergency evacuation plan on Town website.



(Credit: Estately)



(Credit: Coastal Living)



CRB Workshop Participants: Department

Town of Madison - Office of the First Selectmen
Town of Madison - Planning and Economic Development
Town of Madison - Public Works
Town of Madison - Health Department
Town of Madison - Senior Services
Town of Madison - Emergency Management Department
Town of Madison - Facilities Department

CRB Workshop Project Team: Organization and Role

Madison Core Team

David Anderson - Director of Planning & Economic Development
Woodie Weiss - Madison Energy Committee

Workshop Team

The Nature Conservancy – Adam Whelchel, PhD (Lead Facilitator)
Sustainable CT - Jessica LeClair (Support Lead)
Sustainable CT Fellows - Nat Bush, Gabrielle Gelozin, Torin Radicioni (Scribes)

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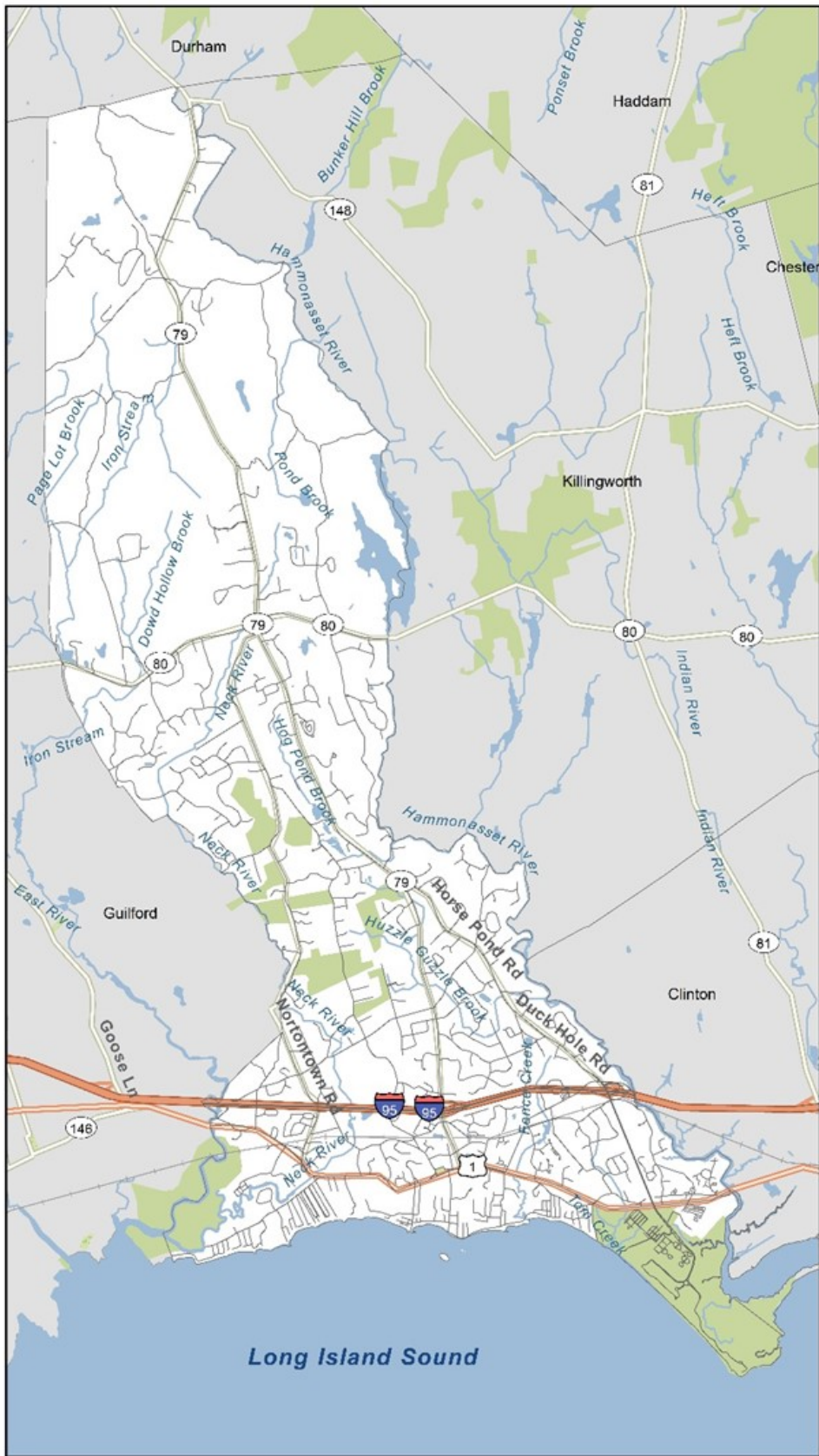
This project was made possible in part through the generous contribution of the Workshop team by The Nature Conservancy and Sustainable CT to conduct Madison's Community Resilience Building Workshop in close partnership with the Madison Core Team.



Appendix

Base Map





Madison Base Map

- Interstates
- Highways
- Major Roads
- Waterbody
- Parks and Forests



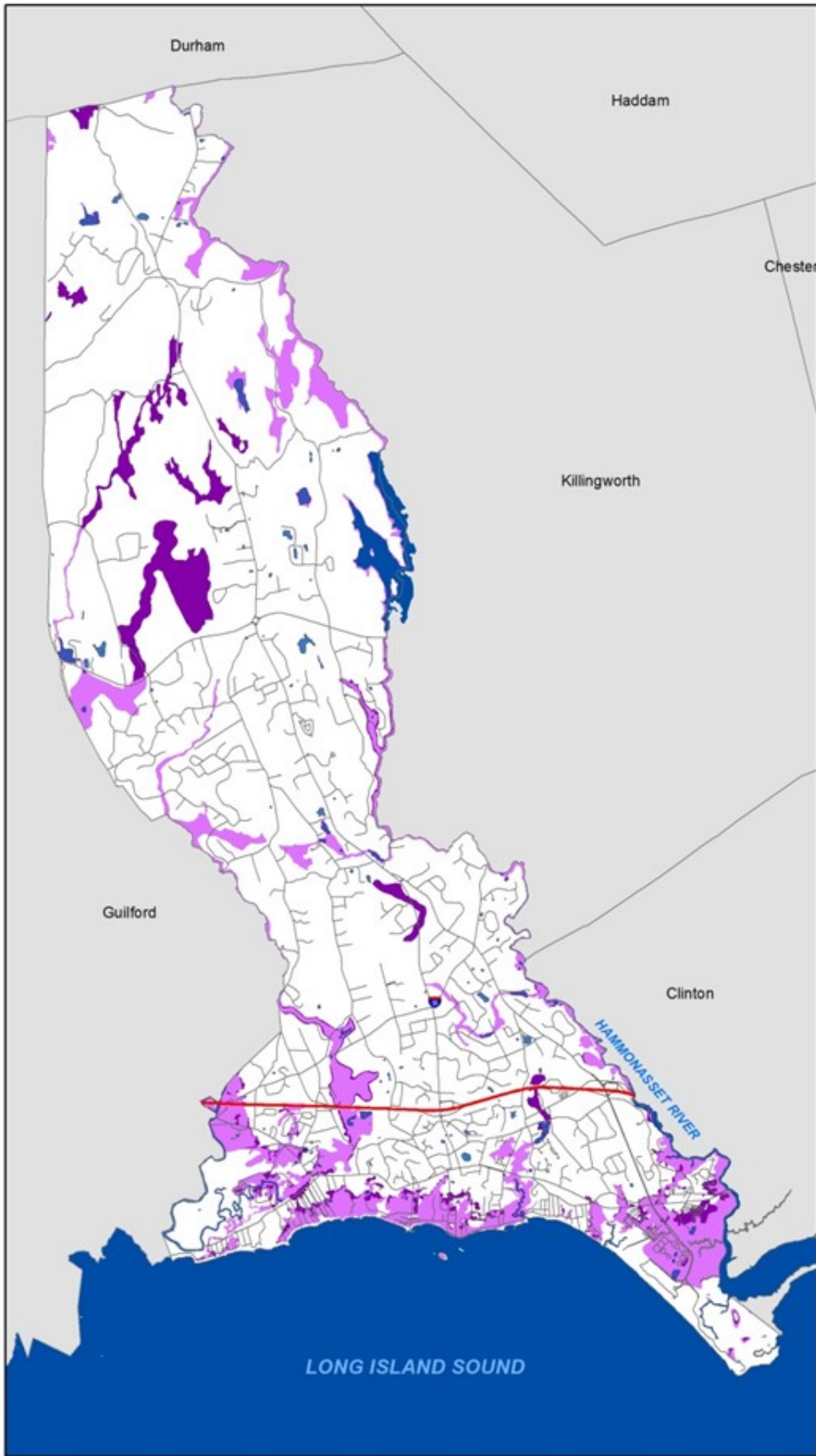
0 0.5 1 2 Miles

SOURCE OF DATA:
ESRI, StreetMap North America, 2009



Resources and Maps Used During Workshop

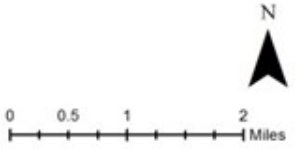




Madison Simple FIRM Data

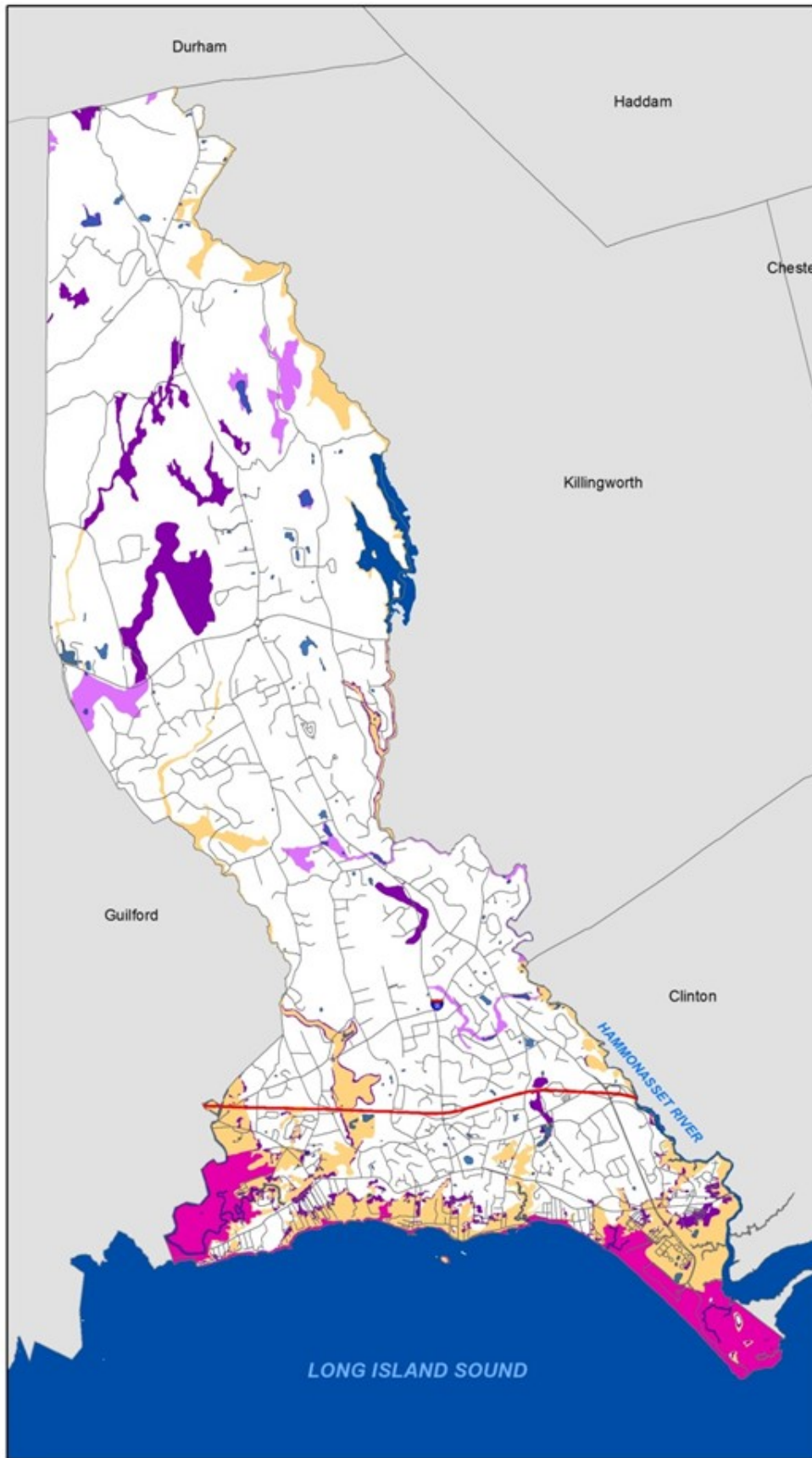
Flood Hazard Area

-  1 %
-  0.2 %
-  Waterbody



SOURCE OF DATA:
 Federal Emergency Management Agency, DFIRM for CT; Connecticut Department of Energy and Environmental Protection, Connecticut Waterbody Polygon





Madison Detailed FIRM Data

Flood Hazard Area

- Zone A
- Zone AE
- Zone VE
- 0.2 %
- Waterbody

Zone A – 1% chance of flooding with no depths of base flood elevations

Zone AE – 1% chance of flooding with base flood elevations

Zone VE – 1% chance of flood in coastal areas

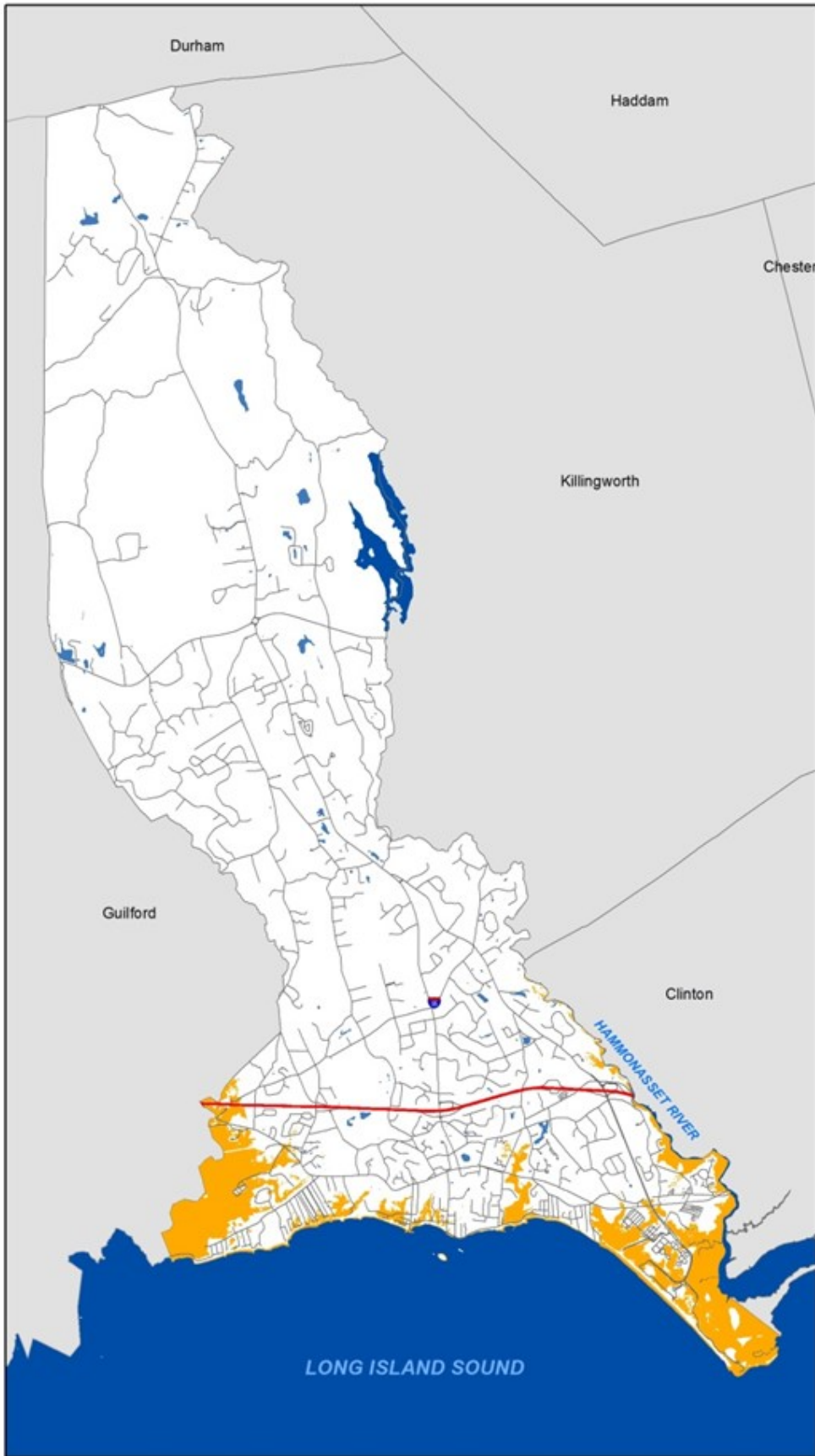
N

0 0.5 1 2 Miles



SOURCE OF DATA:
 Federal Emergency Management Agency, DFIRM for CT; Connecticut Department of Energy and Environmental Protection, Connecticut Waterbody Polygon

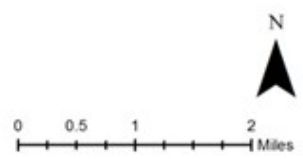
SCRCOG
 SOUTH CENTRAL REGIONAL
 COUNCIL OF GOVERNMENTS





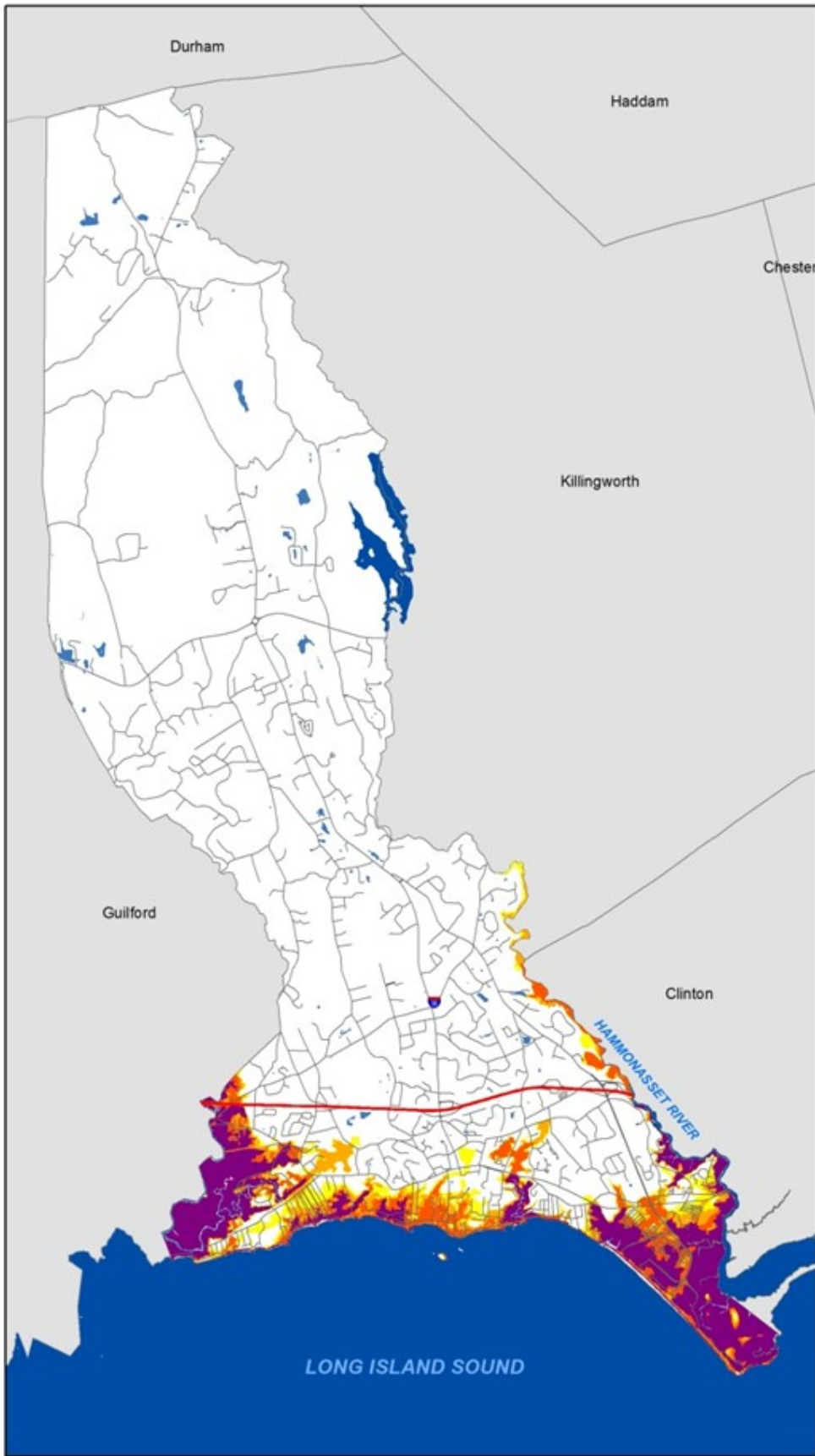
Madison Sea Level Rise Hazard Areas

-  Sea Level Rise (2080 Inundation)
-  Waterbody



SOURCE OF DATA:
The Nature Conservancy,
Sea Level Rise Projections (2080 Inundation)





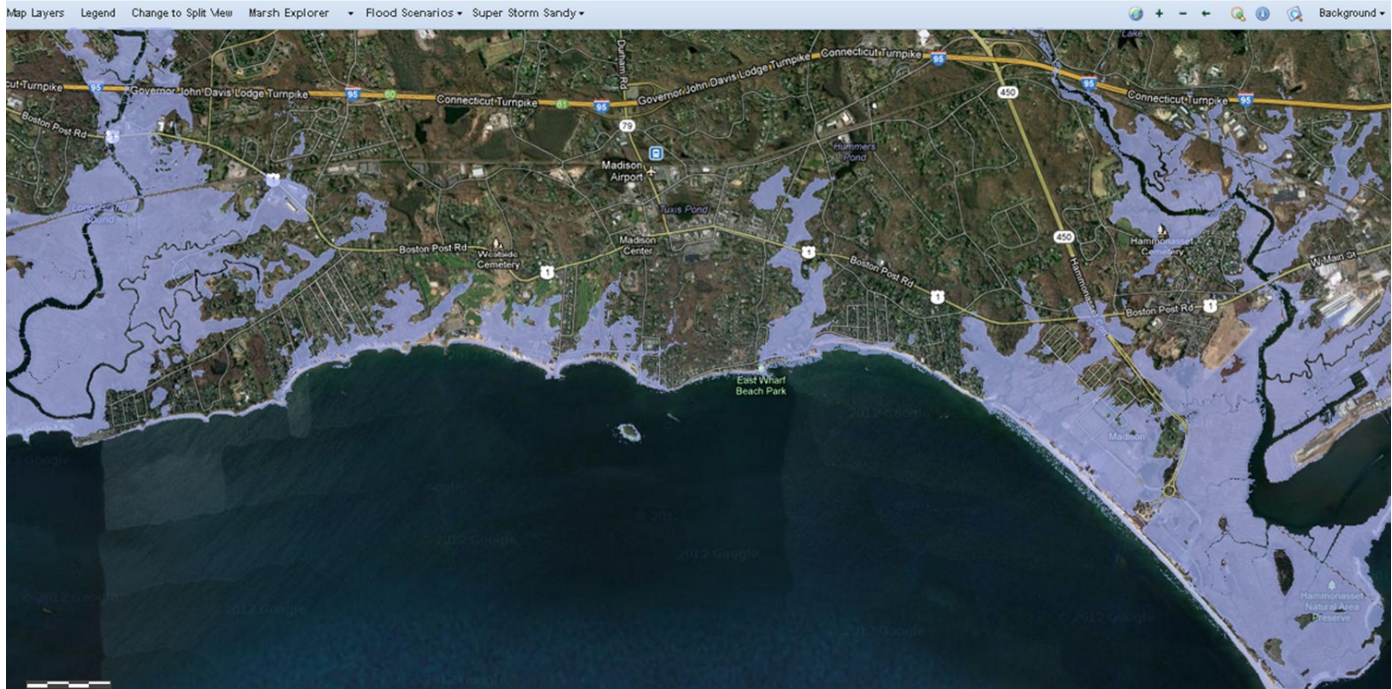
Madison Storm Surge Hazard Areas

-  Category 1 Storm Surge
-  Category 2 Storm Surge
-  Category 3 Storm Surge
-  Category 4 Storm Surge
-  Waterbody



SOURCE OF DATA:
 Connecticut Department of
 Energy and Environmental Protection,
 Worst Case Hurricane Surge Inundation for
 Connecticut (6/2008)





Flooding during Tropical Storm Sandy (Source: FEMA)



Photo Credits: Town of Madison



Photo Credits: Flickr

