



MICHAEL McANDREWS Hartford Courant October 30, 2012

Town of Fairfield

Hazards and Community Resilience Workshops

Summary of Findings

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Overview

The need for municipalities, regional planning organizations, the state and federal agencies to increase resilience and adapt to extreme weather events and mounting natural hazards is strikingly evident along the coast of Connecticut. Recent events such as Tropical Storm Irene, Storm Sandy, and winter nor'easter Nemo have reinforced this urgency and compelled leading communities like the Town of Fairfield to proactively plan and mitigate potential risks through a comprehensive community -driven process. Ultimately, this type of leadership is to be commended because it will reduce the exposure of Fairfield's citizens, infrastructure and ecosystems and serve as a model for communities across Connecticut, the Atlantic seaboard and the Nation.

In the fall of 2012, a partnership formed between the Town of Fairfield, Greater Bridgeport Regional Council and The Nature Conservancy. The partnership has focused on increasing awareness of risks associated with natural and climate-related hazards and to assessing the strengths and vulnerabilities within the Town of Fairfield. This focus was actualized through a series of initial presentations, individual interviews and outreach to build community willingness followed by a series of Hazards and Community Resilience Workshops in June of 2013. The core directive of this effort has been to foster discussion between community stakeholders in order to facilitate the education, planning and implementation of priority adaptation action. The Workshops had several central objectives including:

- Define extreme weather and local natural and climate-related hazards;
- Identify existing and future vulnerabilities & strengths;
- Develop and prioritize actions for the Town and broader stakeholder network;
- Identify opportunities for the community to advance actions to reduce risk and increase resilience.



The Town of Fairfield's Hazards and Community Resilience Workshops utilized the National Oceanic and Atmospheric Administration Coastal Services Center's "Roadmap for Adapting to Coastal Risk" as the framework coupled with decision-support and risk visualization provided by The Nature Conservancy's Risk Matrix and Coastal Resilience Tool (www.coastalresilience.org). Through 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 assets, and recommendations to improve the Town of Fairfield's resilience to natural and climate-related hazards today and in the future.

The summary of finding 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 Town of Fairfield's exemplary leadership on hazards and resilience will benefit from the continuous and expanding participation of all those vested in the future of this community.

Summary of Findings

Top Hazards and Vulnerable Areas for Town of Fairfield

During the Hazards and Community Resilience Workshops (June 2013), participants from the community were asked to identify the top hazards for the Town of Fairfield. Coastal and inland flooding in the form of storm surge, riverine flooding, and standing water were identified as the top hazards by the majority of participants. Sea level rise and increased precipitation intensity and frequency were identified as the anticipated effects of climate change resulting in exacerbated flooding beyond what Fairfield currently experiences. Extreme snow, ice, wind, and rain events along with periods of excessive heat or cold were also listed as priority hazards by the participants. These events have direct and severe impacts on the neighborhoods, natural areas (streams, wetlands, beaches, and parks), roads, and critical infrastructure across the Town of Fairfield.

Top Hazards and Vulnerable Areas for Town of Fairfield

Top Hazards for Fairfield

- Coastal Flooding
- Inland Flooding
- Storms (including wind, rain, ice, and snow)
- Sea Level Rise
- Extreme Precipitation Events
- Extreme Temperature Events (heat and cold)

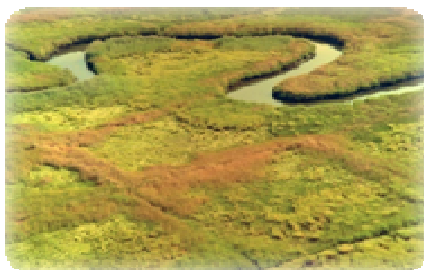
Vulnerable Areas in Fairfield

Neighborhoods: Pine Creek Area, Black Rock, Commerce Center, Greenfield Hill (cul-de-sacs), Gould Manor, Mill River, Fairfield Beach Road.

Ecosystems: Pine Creek Marsh, Sasco Creek, Mill River, Rooster River, Fairfield Beach, Great Brook, Brown's Brook, other tidal wetlands and beach/dune communities.

Roads/Rail: Old Post Road to South Pine Creek, Black Rock Turnpike, Kings Highway, Center Street, Brookside Avenue, Brooklawn Parkway, Algonquin Road, Metro North lines, Round Hill – North Benson – Mill Plain, Governor's Lane, Quaker Lane – Barton Road, Robin Lane, south of Cross Highway, Sturgess Road, Reef Road to Beach Road.

Facilities: Trinity Church, Senior Centers/Housing, Metro North, Schools, Universities, Shelters and Low Income Housing, Gas Stations, Grocery Stores, Power Poles and Lines, Libraries, Transportation Hubs, Country Club, Pequot Yacht Club, Animal Shelters, Harbors and Marinas, Dikes, Dams, Sewage Treatment, Parks, YMCA, multiple bridges, culverts, and tide gates.



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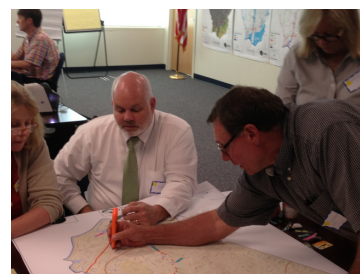
Current Concerns and Challenges Presented by Hazards:

The Town of Fairfield has multiple concerns and challenges related to impacts from hazards in the community. Recently, the Town of Fairfield has experienced a series of highly impactful events ranging from Tropical Storm Irene (August, 2011) and Storm Sandy (October, 2012) to winter nor'easter Nemo (February, 2013). Irene brought coastal flooding, heavy-rain induced inland flooding, and wind damage. Sandy brought extensive coastal flooding and wind damage. Nemo dropped more than 3 feet of snow. The combined magnitude of each of these events within a very short time frame (August 2011 – February 2013) has resulted in greater awareness and engagement directed at comprehensively reducing risk and improving resilience within the community as well as in the larger context of greater Bridgeport area, Fairfield County and the state of Connecticut.

This series of extreme weather events highlighted for the Town of Fairfield that impacts from hazards are different across the community; north to south. As expressed during the Hazard and Community Resilience Workshops, Fairfield's hazards tell a "tale of two towns." The southern part of the town along Long Island Sound is exposed to damage from coastal flooding during storm events. The heavily forested northern part of town experiences inland flooding during heavy precipitation events and considerable damage from falling trees during wind and snow/ice events. This presents a challenge to preparedness, response, and mitigation priorities and requires comprehensive yet tailored actions for specific locations or areas in Town.

One of the key concerns identified in the Workshops was access via the exiting road transportation system both during and after extreme weather events. In several locations, roads are made impassable due to temporary flooding or fallen trees. The Town of Fairfield has more non-state owed roads than most municipalities in Connecticut resulting in increased demand on local resources to maintain access during and after events. In certain cases, this has prevented emergency management services from reaching stricken areas and has also preventing residents from getting out for supplies, services, and/or shelter. Single choke points such as railroad underpasses can block access to entire neighborhoods. Of particular concern to the Town is lack of mobility during an emergency of elderly and low income populations. A need was expressed for emergency shelters during and after an event that can handle overnight stays for special-needs populations.

Coastal flooding presents a major risk to the Town's infrastructure, facilities, and neighborhoods. The waste water treatment, police, fire, and the Department of Public Works facilities are all threatened by coastal flooding during extreme weather events. The concern is that these facilities are located in low-lying areas and may lack adequate protection currently. In particular, the Pine Creek Dike is lower than the 100-year flood elevation and was overtopped during Sandy. In addition, tide gates and culverts are at risk of becoming clogged with debris during an event, reducing their effectiveness in draining floodwater afterward and redirecting flood waters elsewhere. The need for better pre- and post-storm coordination and maintenance to prevent debris build-up behind the 31 tide gates in Town was highlighted. At least four neighborhoods south of I-95 were impacted due to flooding. Coastal flooding also impacts a substantial number of the residential population across the Town.



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There was near unanimous agreement at the Workshops that a priority need for the Town is to address the vulnerability of the wastewater treatment facility. The primary concern is inundation by storm surge which could result in equipment damage and extended interruption of service to the community after an extreme weather event. The secondary concern is that the facility's capacity to process sewer inflows is periodically exceeded during heavy precipitation events. In both cases, the result is that sewage bypasses the facility and is discharged untreated into Town and State waters of Long Island Sound.

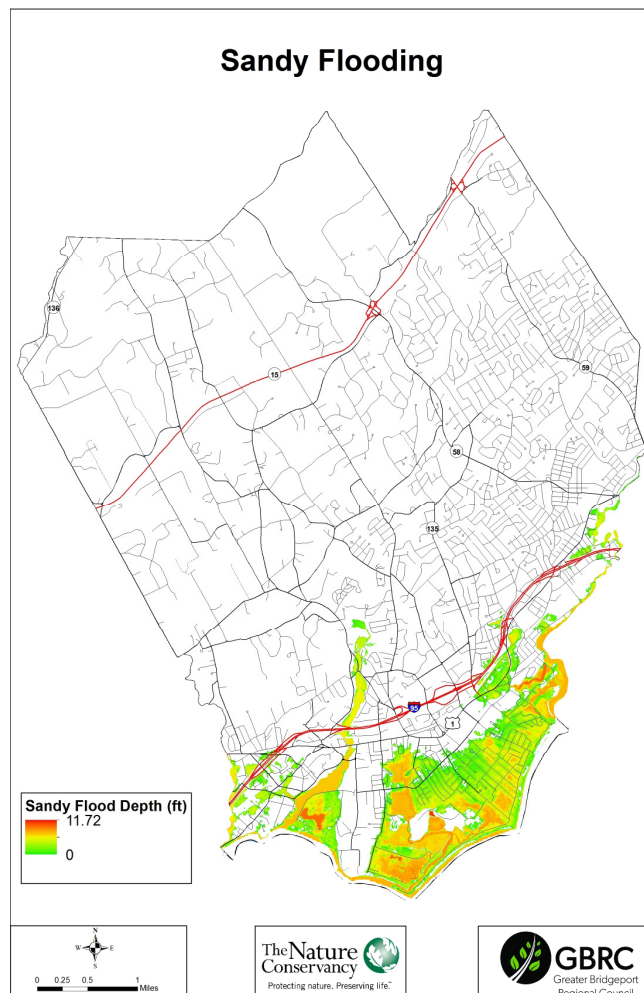
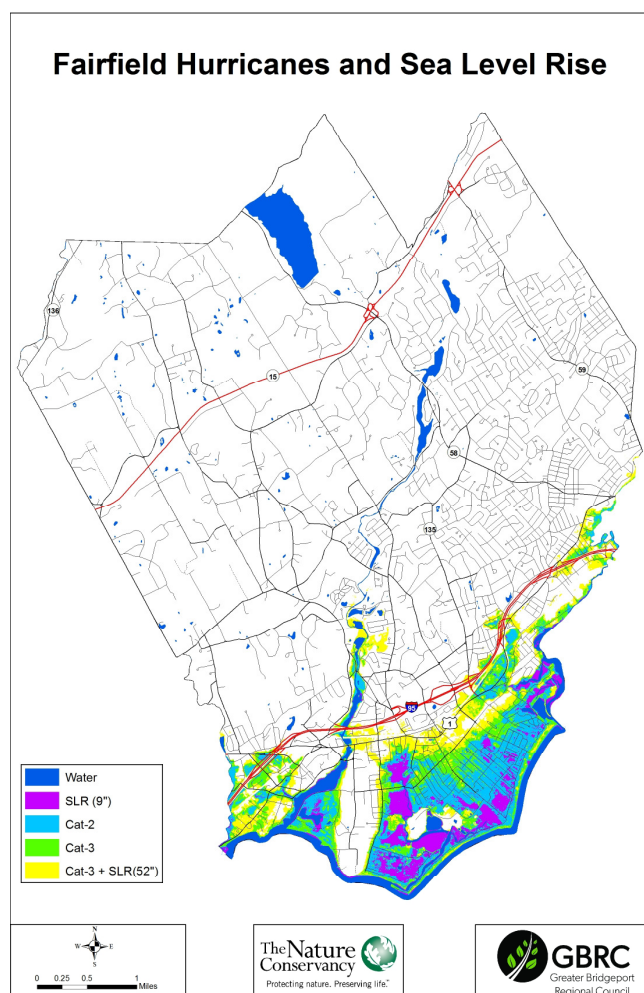
Inland flooding was also a major concern that has been exacerbated by an increase in impervious surface in the Town's watersheds in recent decades. It was reported that streams have become "flashier" resulting in more frequent flooding of inland neighborhoods under both routine and extreme rain events. It was called out that the Town's computer servers are located in the main library's basement which experiences water damage in extreme rain events. The condition of dams in Fairfield and upstream of the Town was also identified as a concern to those living in and adjoining the floodplains below.



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Coastal marshes, beaches, and dunes, and inland floodplains were identified as being ecologically important and serve to defend the Town against floods and storm surge. However, it was identified that these natural resources are vulnerable to ongoing sea level rise which could reduce the protective services for adjoining critical facilities, neighborhoods, roads and public amenities (i.e., Town beaches for recreation). Forward looking resource management actions coupled with identification of additional areas to support the inland advancement of salt marsh and beaches was called out as a priority. Trees along travel corridors were called out as a particular threat to power lines. Public and private tree maintenance was cited as critical with the current level of maintenance deemed inadequate.

Additional concerns included communication with utility providers, the scarcity of gasoline for generators after extreme weather events, and the impact of coastal property losses on the Town's tax base.



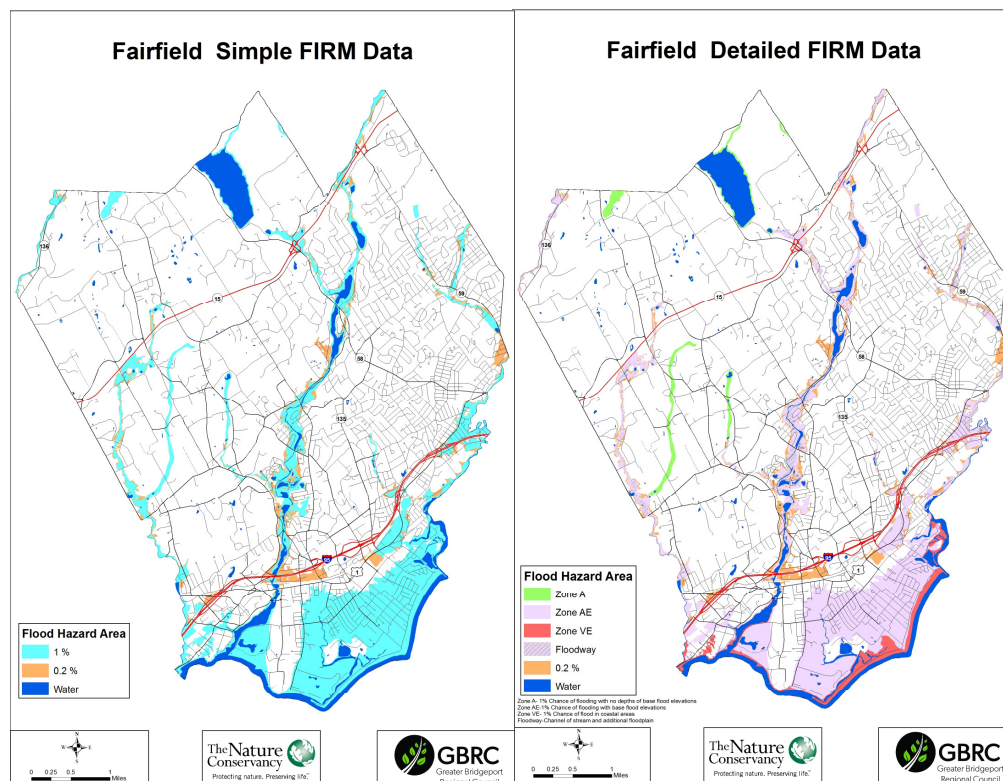
Current Strengths and Assets in Fairfield:

Given the experiences with extreme weather events in the last several years, the Town of Fairfield has been able to determine existing strengths and assets within the community. Reinforcing and expanding upon these community benefits will improve the Town's resilience to future storms, with greater frequency and intensity, as well as longer-term impacts from the ongoing rise in sea level.

- A strong sense of community and volunteerism has aided recovery following recent events. Shelter and services were provided by church groups, senior and convalescent homes, and other community organizations. The Library's inland location, safe from inundation, makes it an ideal location as a shelter, cooling center, or mobile phone charging location. Trinity Church, although flooded during Sandy, could serve as a supplemental shelter because it has kitchen facilities.
- Fairfield is fortunate to be located along the northeast transportation corridor. The Merritt Parkway, I-95, and the Metro North rail line increase the ability to move people, services, and supplies before and following a major event. Also, the commerce center of Fairfield is in a resilient location, allowing residents to get supplies and exchange information with neighbors, community leaders and emergency management personnel.
- Marshes, beaches/dunes, floodplains, reservoirs, and open space (including the Country Club of Fairfield) have capacity to store floodwaters and attenuate wave energy that would otherwise increase the impact and cost of hazards in Fairfield. When storm conditions are anticipated, there is the option to lower reservoir levels to increase upstream storage capacity. Furthermore, drinking water quality has been maintained throughout previous emergencies but, additional planning is needed for "well-water neighborhoods" (Greenfield Hill).

Current Strengths and Assets in Fairfield cont...

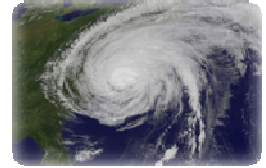
- Existing flood control infrastructure, such as the Pine Creek berm and multiple tide gates, has generally protected property in the coastal area in most locations. Jet-ties on the shoreline protect some properties by deflecting wave energy but, harm others by increasing erosion and loss of natural infrastructure (currently uneven benefits and costs along coastline).
- A full-time fire department, police department, and robust town and emergency services are important assets. The Code Red reverse 911 system allows emergency management officials to inform residents before, during, and after an event. Responsive and committed leadership by the elected officials is a very much appreciated strength in the Town of Fairfield.
- In previous events, the Town has anticipated some of its needs and had generators or snow removal equipment and contracts in place prior to the storm. This has improved the respond and recovery time and scope of efforts following disasters.



Top Recommendations to Improve Fairfield's Resilience to Hazards:

The workshop participants' prioritized recommendations fall into three categories: 1) Mobility, Communications and Preparedness; 2) Planning, Maintenance, and Mitigation; and 3) Improvements to the Wastewater Treatment Facility. The following are recommendations developed by the participants during the Workshops.

A common theme throughout the Workshop discussions was the recognition that the mobility of residents and emergency services is limited by downed trees and standing floodwater during and after an extreme weather event. The recommendations focus on ways to limit flooding and tree damage, to improve the delivery of emergency and relief services, and to restore critical community functions.



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Communication before and during an event is a critical area for additional attention. Alternative backup locations for the Emergency Operations Center (EOC) and Emergency Communications Center (ECC) will ensure continuity of communications if the primary location is compromised. In addition to relying on the Code Red reverse-911 system, the Town can make greater and systematic use of community groups. The Town should create a network of neighborhood emergency teams that educate residents about specific local hazards, procedures, and neighborhood support services. Additional efforts should be made to station supplies and generators in these neighborhoods prior to the arrival of an event so that the teams can be effective and, to some degree, self-reliant in the first hours after an event. Lastly, communications with utility providers need to be improved before, during, and after an event.

Pre-disaster planning, maintenance, and mitigation were key areas of focus during the Workshops. Conserved open space, public amenities (Town beaches), and privately undeveloped properties should be further protected and managed to improve the overall flood buffering and storm defense capacity provided by these natural-infrastructure features across the Town. Stricter building codes (such as building elevation; coastal A zones treated as coastal V zones) in the floodplain should be implemented to improve building survivability and limit longer-term costs. More robust maintenance plans for public and private trees should be undertaken to reduce the number of downed trees that block roads and bring down power poles and lines.

Top Recommendations to Improve Fairfield's Resilience to Hazards cont...

Likewise, it was suggested that the Town should adopt an improved maintenance and upgrading plan for tide gates, culverts, and dikes to protect against storm surge and allow floodwaters to recede quickly after an event. Pump stations or other means of drainage should be explored for the Metro North underpasses which are critical links to neighborhoods south of the rail line. Lastly, the participants recommended raising the Pine Creek berm to at least the 100-year flood level and closing any existing gaps.

The wastewater treatment facility was deemed in need of further protection. Three major recommendations were put forward. The first recommendation is to raise the berm that surrounds the facility to improve protection against storm surge and sea level rise. The second recommendation is to waterproof the manhole covers in key places around town where runoff currently enters the sewer network and contributes to overwhelming the treatment system's capacity. Third, in the days and hours prior to a storm, the facility should be "dewatered" in order to increase its capacity during major precipitation event.

Workshop's Top Recommendations for Fairfield

Disaster Preparedness, Response, and Recovery

- Build redundancies into EOC/EEC emergency communications systems and networks to ensure continuity of communications between town emergency services and residents. Utilize existing community networks (churches, etc.) as supplements to "technological" methods of communication.
- Train and equip neighborhood storm response teams (i.e., CERT), especially in neighborhoods that have in the past been cut off from emergency services by floodwaters or downed trees.
- Reassess needs and capacity for shelters, warming/cooling centers, and charging stations. Ensure that residents are aware of these facilities and procedures for their use via routine notifications.

Workshop's Top Recommendations for Fairfield

Disaster Preparedness, Response, and Recovery

- Conduct a study to identify the highest risk locations for prioritized mitigation and emergency response efforts before, during and/or after an extreme event during a variety of hazard scenarios.
- Implement a comprehensive tree health, maintenance, and removal plan to reduce the number of downed trees and limbs during a storm event.
- Identify and harden vulnerable neighborhood egress chokepoints. Plan and identify alternate access routes and/or methods to neighborhoods and facilities when those chokepoints are not passable.

Development and Infrastructure

- Reassess long-term viability of the wastewater treatment facility. In particular, weigh protecting the existing structure versus siting a new facility in a lower risk area.
- Explore building modifications, road materials (i.e., pervious/porous materials), and green infrastructure designs (e.g., detention ponds, rain gardens, bio-swales) to improve on-site stormwater retention and reduce stormwater inflows into Fairfield's wastewater treatment system.
- Reassess the capacity of existing flood control structures (berms/dikes, tide gates, culverts, dams, reservoirs) in light of accelerating rates of sea level rise and likelihood of more significant precipitation events.
- Assess and develop better debris management plan with designated lead for flood control structures before and after extreme events – particularly the 28 town and 3 state tide gates in Fairfield.

Workshop's Top Recommendations for Fairfield

Climate Change Adaptation and Resilience

- Reassess the viability and cost-benefit of directing future capital investment in the coastal floodplain as an immediate and longer-term, proactive risk reduction action.
- Update Town's Conservation and Development Plan to include riparian corridor restoration as well as acquisitions of open space and marsh advancement zones for storm surge defense and floodwater storage.
- Consider expanding town-wide energy efficiency policies and building codes with the goal of substantially reducing Fairfield's carbon footprint.

Recommended Report Citation

Town of Fairfield Hazards and Community Resilience Workshops Summary of Findings. The Nature Conservancy and Greater Bridgeport Regional Council. July 2013.



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Workshop Participants: Departments, Organizations and Other Entities

American Red Cross	Town of Fairfield Board of Education *
Ash Creek Association *	Town of Fairfield Board of Finance
Beachside Deli *	Town of Fairfield Board of Health
CERT / Citizen Corps	Town of Fairfield Board of Selectmen
Connecticut Audubon Society *	Town of Fairfield Building Department *
Conscious Decisions *	Town of Fairfield Office of Community & Econ. Development
Fair Acres Association *	Town of Fairfield Conservation Department
Fairfield Beach Club *	Town of Fairfield Department of Public Works
Fairfield Beach Residents Association	Town of Fairfield Engineering Department
Fairfield Chamber of Commerce *	Town of Fairfield Fire Department
Fairfield Clergy Association	Town of Fairfield Flood and Erosion Control
Fairfield Country Club *	Town of Fairfield Forestry Committee
Fairfield Museum and History Center	Town of Fairfield Harbor Management Commission
Fairfield University *	Town of Fairfield Health Department
Fairfield YMCA	Town of Fairfield Historic District Commission *
Greater Fairfield Board of Realtors *	Town of Fairfield Information Technology Department *
Meadow Condo Association	Town of Fairfield Parks & Recreation *
Old Post Road Association *	Town of Fairfield Planning and Zoning Commission *
Operation Hope *	Town of Fairfield Police Department
Pequot Yacht Club	Town of Fairfield Public Library
Pine Creek Association	Town of Fairfield Representative Town Meeting
Sacred Heart University	Town of Fairfield Senior and Social Services
Sasquanaug Association *	Town of Fairfield Town Plan & Zoning
Seagrape Cafe *	Town of Fairfield Zoning Board of Appeals *
Southport Conservancy *	Trinity Episcopal Church
That's The Spirit Shoppe *	Water Pollution Control Authority *
The Inn at Fairfield Beach *	* invited but unable to attend workshops

Workshop Project Team: Organizations and Principal Contacts

The Nature Conservancy – Adam Whelchel, Ph.D. (Project Lead) awhelchel@tnc.org

Greater Bridgeport Regional Council — Brian Bidolli (GBRC Contact) bbidolli@gbrc.org

Acknowledgement:

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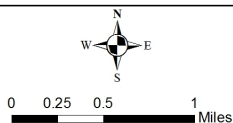
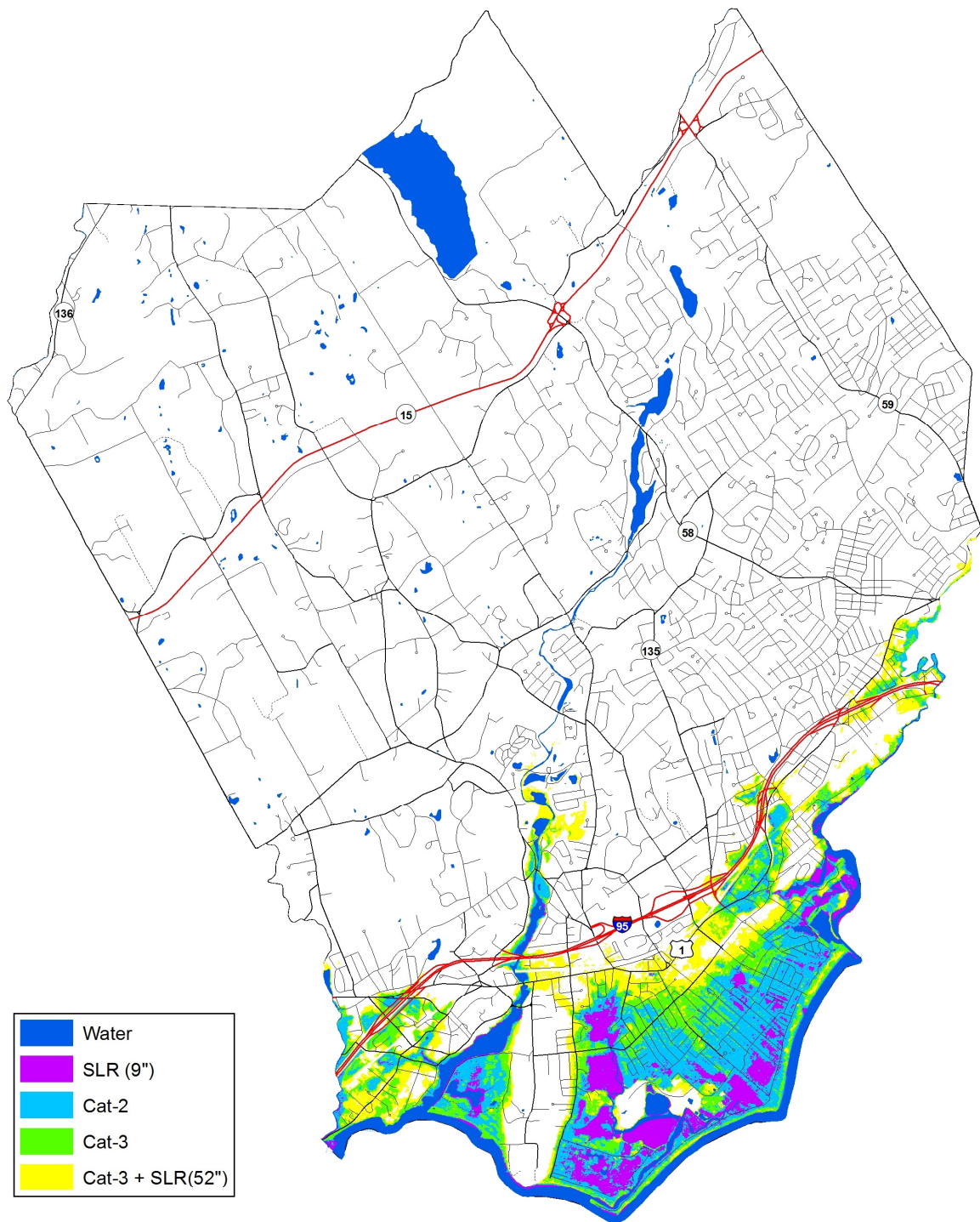
This effort was made possible through partial funding by the Horizon Foundation, Anne S. Richardson Fund and the McCance Foundation Trust.



Appendix

Maps of Fairfield Used During Workshops

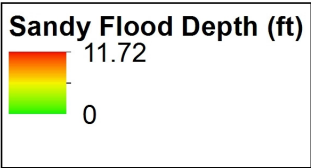
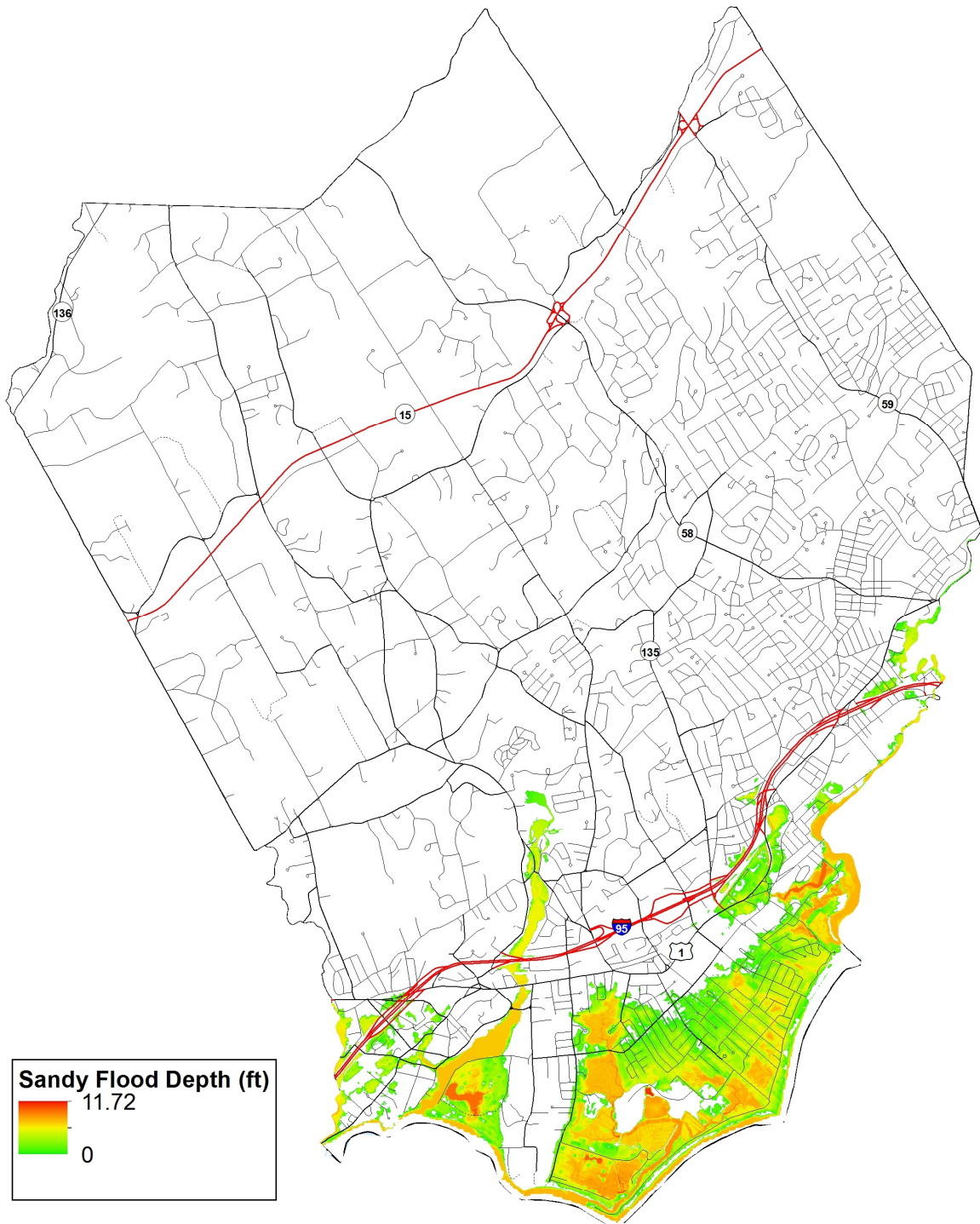
Fairfield Hurricanes and Sea Level Rise



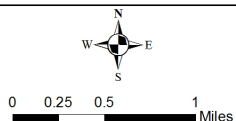
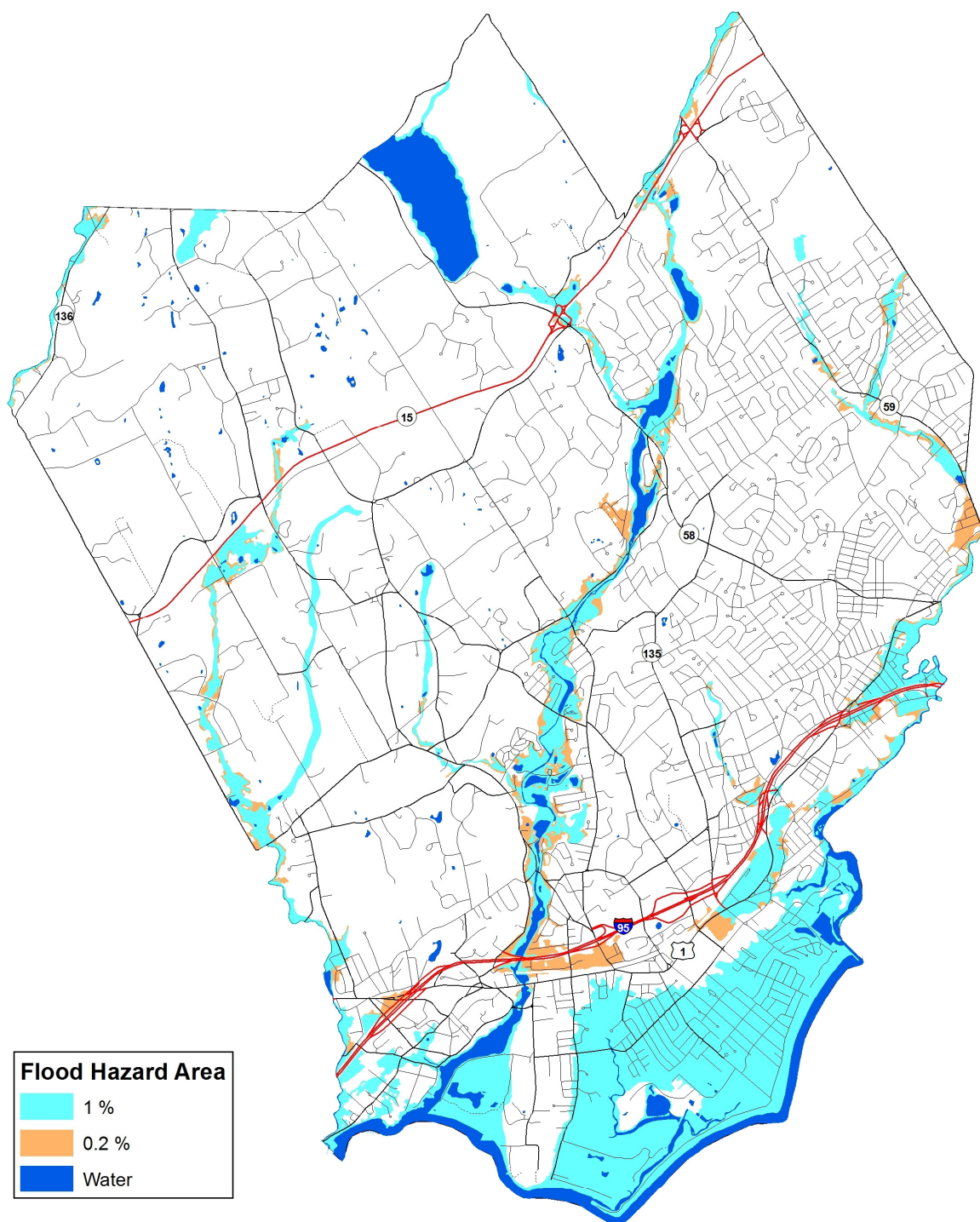
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Sandy Flooding



Fairfield Simple FIRM Data

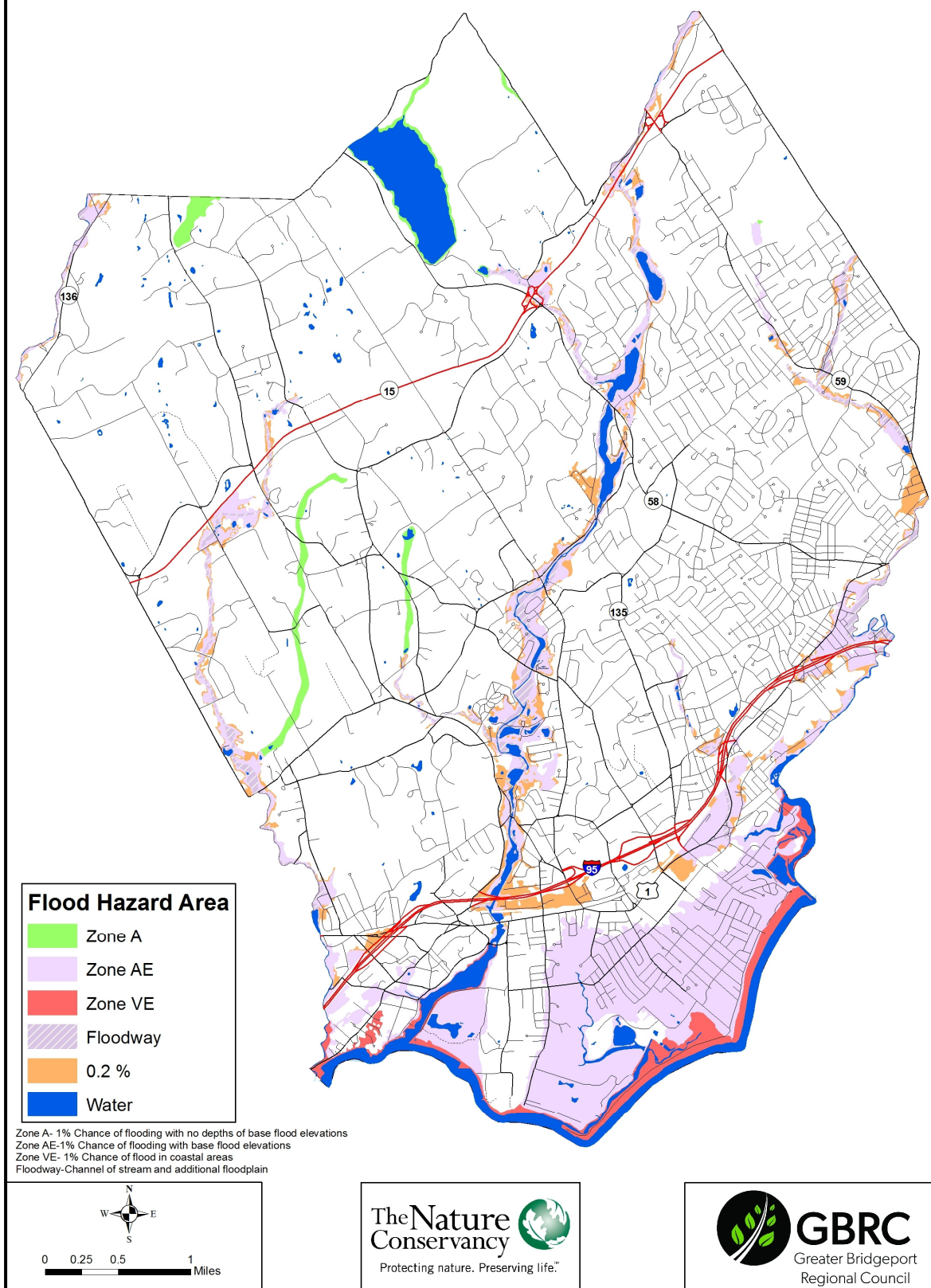


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Fairfield Detailed FIRM Data



Cat 3 Hurricane- Flooded Roads

