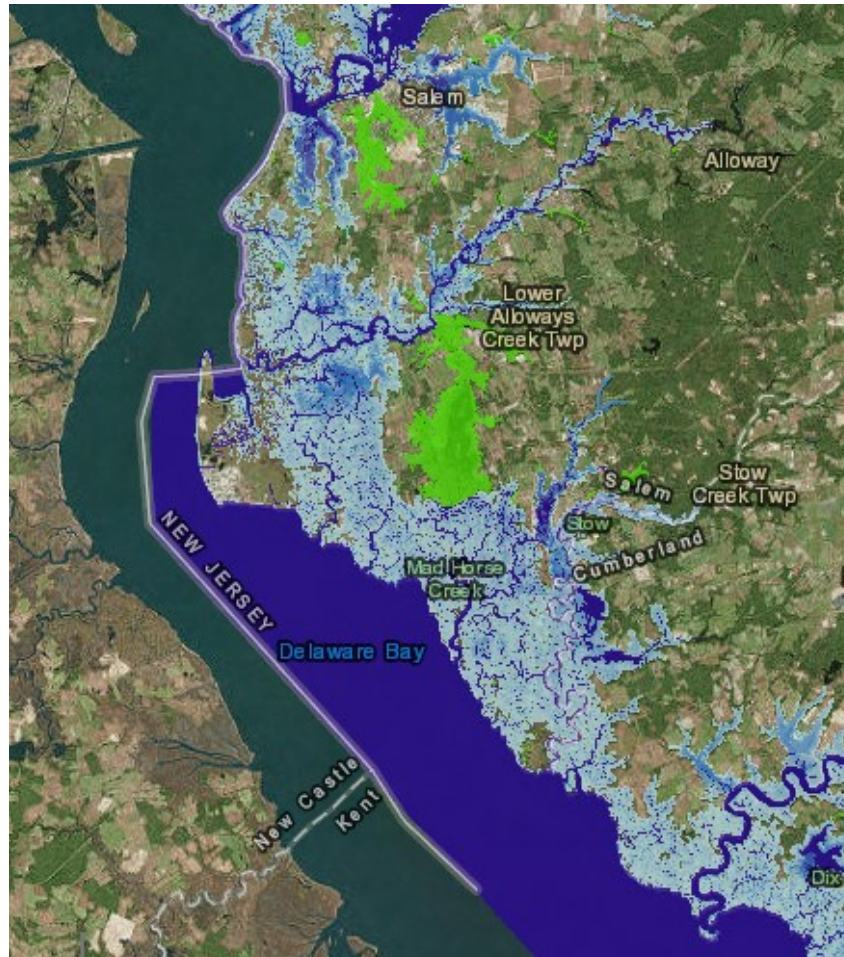


Climate Adaptation: Flooding Risk Assessment

LOWER ALLOWAYS CREEK TOWNSHIP, Salem County, NJ



DRAFT MAY 2019

BACKGROUND As natural hazards and rising seas threaten the Lower Alloways Creek wetlands and shores, local decision-makers will have the greatest capacity to influence the resiliency of their communities. Historically, coastal communities have merely responded to the impacts of natural hazards. However, as disaster response and recovery have become increasingly more expensive, federal and state policies now mandate strong coastal construction standards, flood prevention ordinances, and pre-disaster mitigation planning for local governments to secure mitigation funding. Increasingly, coastal communities are making proactive measures to improve their resilience through land use planning, public education, and disaster preparedness. LAC's western regions are in the upper Delaware Bay, somewhat protected by arrangement of the bay and yet vulnerable to higher tides, northeasters and the threat of hurricanes and the storm surge it brings.

Assessing our Flood Risk only makes sense in light of the already occurring super high tide flooded roadway and intersection. In addition the low overall elevation of 75% of the land area, being 10 feet and under, any talk of rising sea levels should cause concern.

Unfortunately, the responsibilities of limiting hazard exposure, reducing vulnerability, and responding and adapting quickly to coastal changes are dispersed among many layers of government and red tape, fortunately there are maps and tools that have been developed to assist in this endeavor.

This is how we are defining our two main terms:

Vulnerability the degree to which a human or natural system is unable to cope to the adverse effects of natural hazards.¹

Resilience is the ability of a system to respond to and recover from disasters, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure.²

1. *Worldwatch Institute. (2009).*

2. *Adapted from Cutter, S.(2009) and the Subcommittee on Disaster Reduction.(2005).*

EVALUATION TOOLS

We will be using two resources to access our vulnerability.

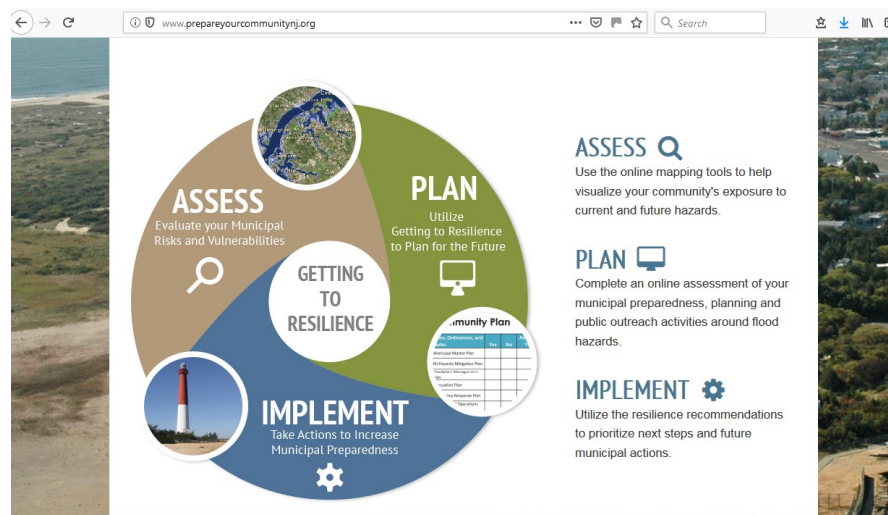
The NJ Flood Mapper Tool.



This interactive mapping website was designed and created to provide a user-friendly visualization tool that will help get information into the hands of local communities who need to make decisions concerning flooding hazards and sea level rise.

This website should be used to promote enhanced preparedness and land use planning decisions with considerations for possible future conditions.

Various maps were made of the LAC area using this tool, showing sea level rises from one foot to six feet, GIS style with various buttons and sliders to provide different scenario of sea rise (current to six feet sea rise in one foot increments) where overlays of blue and light green show water intrusion and low areas for the various sea rise predictions. In addition one can toggle surge, marsh, economic & social vulnerability and facilities. These functions form to make for a complete picture of the true impact that flooding and sea rise can have on a community.



Members of the Township Committee, Green Team, Planning Board, Police Chief, Emergency Management Coordinator, construction Code Official and Superintendent of Public Works were given these resources and asked to give their input through the Getting To Resilience (GTR) questionnaire.



LOWER ALLOWAYS CREEK TOWNSHIP

Lower Alloways Creek Township was formed on June 17, 1767, when Alloways Creek Township was subdivided and Upper Alloways Creek Township (now Alloway Township) was also formed. The township was incorporated by the New Jersey Legislature's Township Act of 1798 on February 21, 1798, as one of New Jersey's original group of 104 townships. The name Alloway is derivative of Allowas, a local Native American chief. Lower Alloways Creek Township is unique in that it is home to three nuclear generating facilities, with the second largest generating capacity in the nation.

Lower Alloways Creek Township is governed under the Township form of government. The five-member Township Committee is elected directly by the voters at-large in partisan elections to serve three-year terms of office on a staggered basis, with either one or two seats coming up for election each year as part of the November general election in a three-year cycle. At an annual reorganization meeting, the Township Committee selects one of its members to serve as Mayor and another as Deputy Mayor.

According to the United States Census Bureau, the township had a total area of 72.455 square miles (187.659 km²), including 45.230 square miles (117.146 km²) of land and 27.225 square miles (70.513 km²) of water (37.57%).

Lower Alloways Creek Township has worked to maintain its rural character and lifestyle. The goals defined within Lower Alloways Creek Township's Master Plan clearly convey its dedication to preserving the cultural and natural resources that characterize the community.

The 1992 Land Use Plan utilizes the information from the eight Master Plan elements to formulate five primary objectives for the Township. These have remained constant over the years and form the basis for planning in the Township. They are:

1. Recognizing and incorporating past planning decisions which are consistent with present local and regional needs.
2. Recognizing the physical characteristics of the Township and acknowledging the inherent capabilities of the land to host different types of community development at appropriate densities and intensities. The objective then is:
 - a. Conservation of existing natural resources as an integral part of the planning process
 - b. Preservation of open space and farmland to the maximum extent possible.
3. Maintaining the eastern section of the Township as predominately rural and agricultural to reserve forested areas.
4. Protecting agricultural land from encroachments because of its economic value.
5. Encouraging development in those areas of the community most capable of providing necessary services, i.e., within existing or proposed sewer service areas.

1. MUNICIPAL RESILIENCE TEAM

MUNICIPAL RESILIENCE TEAM MEMBERS

Mayor and Township Committee - five members

Green Team - five + members

Planning Board - 12 members

Emergency Management Office - two members

Police Chief, Fire Chief, Ambulance Squad Captain & Superintendent of Public Works

Construction Code Officer & Township Engineer

Mapping Process and Data Collection

Lower Alloways Creek Township representatives worked to identify and map significant features of the built and natural environment, in addition to social characteristics, that exist within the township. Utilizing the GTR checklist, volunteers from various Township agencies provided a list of features within the township that should be considered for vulnerability assessment, then assessed where these features intersected areas of potential inundation. Below are a compiling of the responses to the tool.

MUNICIPAL RESILIENCE STRENGTHS AND CHALLENGES

Lower Alloways Creek Township has never been directly hit by a hurricane, although it has experienced the flooding due to nor'easters and large snowfalls. A large portion of the township is susceptible to storm surge inundation of a category two hurricane. The destruction of a hurricane or major nor'easter could have an immense impact on historic resources in the township and result in short-term disruption of some agricultural production; especially if freshwater resources are impacted by salt water intrusion. Lower Alloways Creek Township dodged Hurricane Sandy and found its self on the weak back side of the fierce storm and only experienced minor flooding over and above what can happen in a spring tide event. Many responded that they are concerned about the roadways and flooding issues as one of the main evacuation route is one that floods and becomes impassable. Concern that this was a county road and a fix may be difficult considering the county has already closed two bridges in and out of LAC Twp with no money or plans for their re opening. Other concerns are the Municipal and Police Department buildings are in the 100 year flood area and the amount of tree lined roadways vulnerable to wind, which have a potential to block roads or down power lines.

Respondents consider our many emergency drills, emergency planning (nuclear plants) and short distances to higher ground a strength.

MAPS OF CURRENT AND FUTURE MUNICIPAL COASTAL HAZARD RISK AND VULNERABILITIES

Maps of various sea levels, marsh and storm surge maps were provided to the members for examination and links to their website location (<http://www.njfloodmapper.org/> & <http://www.njfloodmapper.org>) so they could view and manipulate the maps as they desired. It became apparent to all that even a one foot rise in seas would begin to effect the Village of Hancocks Bridge and roads in and out. This is where the Municipal Building and Police Station are looking at a two foot rise in seas is a good case to consider moving the location of these facilities to higher ground.

Other considerations the group was asked to examine was Hurricane events, Storm Surge, and Inundation.

Remarks in this area pointed out the potential storm surge as the most dangerous, as it could overwhelm Hancocks Bridge and the roads leading in and out. Someone did point out that hurricanes are fairly well forecasted and evacuation time can be well in advance. What was shown by Sandy was that rebuilding can be a long and difficult task and that planning for recovery needs to be done. There was an observation that the wind had down trees and clogged up a road several years ago, which could block evacuation routes.

Built Environment Vulnerability

Vulnerable places would include the municipal building and Police station, k-8 school building, historic Hancock House (NJDEP operated). There are no gas stations in LAC, but local farmers do have fuel tanks for their equipment and the township has heating oil tank at the municipal building. The sewer treatment plant in Hancocks Bridge would be vulnerable to rising seas and storm surge. The nuclear plants as a result of the Fukushima incident have done extensive modeling and preparation for such events under the NRC's mandates.

Natural Environment Vulnerability

Part of what makes LAC susceptible to flooding over half the township is the low laying marsh. Even though Hancocks Bridge is over a mile from the Delaware Bay, what does lay between is a wetlands marsh that just gently rises up to the village, which itself is about 6 foot above sea level. Northeastern winds have many times pushed the tide water up the bay causing flooded roadways. These are few and far between, but serve as a word of warning. If the sea level does rise as expected LAC could find its self with few ways in and out of the township, similar to ocean shore communities.

Social Vulnerability

Socially the impact of the above scenarios are seen as two fold, traveling and access. Flooded impassable roadways would cause residents to “go around” making any trip for groceries, goods or services miles longer. There are not many businesses or store in the township. It was brought up here and several time about how county roads are affected and that they need to be in the conversation in the future. Census data was made available, note was made that this is happening again next year and effort should be made to have it be as accurate as possible.

Conclusion and recommendations

LAC Township is definitely will have issues with any rise in sea levels and it should begin to address the issue and the municipal facilities vulnerable.

Roadways which now flood several times a year and are County roadways need a dialog with them to address a long term solution.

We feel we are ready as far as an emergency preparedness is concerned, but must remember that shore communities felt the same way prior to Sandy and now know better, especially about recovery and rebuilding.

Recommendations

One thing everyone agreed on was that more information and planning must be done.

Flooding events need to be kept track of and should be photographed and mapped to keep a record of the patterns and any changes.

The roadway flooding issues must be talked about with the County and a path forward started.

Most importantly the subject should continue to be on the front burner and not left till we have our backs to the wall.