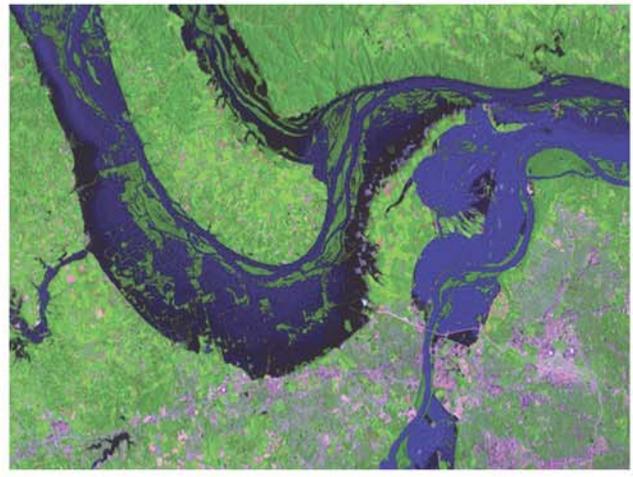


Floodplain Management Plan for Unincorporated Seminole County, Florida

March 2011



Cover photos of Seminole County flooding (background photograph and top left and right inset photographs) are used courtesy Gary Exner, Advantage Consulting LLC.

Seminole County, Florida, is subject to natural hazards that threaten life and health and that have caused extensive property damage. Floods inundated the County following Tropical Storm Fay in 2008, following Hurricane Frances in 2004, and Tropical Storm Gabrielle in 2001. Extensive flooding occurred in 1960 after Hurricane Donna brought heavy rainfall. During the summer of 1953, rainfall over the St. Johns River basin was above normal, and when a tropical storm passed nearby, bringing additional heavy rainfall, Lake Monroe flooded lakefront areas. To better understand these hazards and their impacts on people and property, and to identify ways to reduce those impacts, the County's Department of Public Safety undertook this Floodplain Management Plan as an appendix to the County's Local Multi-Hazard Mitigation (LMS) Strategy.

"Hazard mitigation" does not mean that all hazards are stopped or prevented. It does not suggest complete elimination of the damage or the disruption caused by such incidents. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long-term approach to reducing our vulnerability to these hazards.

This Floodplain Management Plan provides a framework for all interested parties to work together and reach consensus on how to move forward. A well-prepared hazard mitigation plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and activities, preventing conflicts and reducing the costs of implementing each individual activity.

This plan was developed under the guidance of a Floodplain Management Planning Committee (FMPC). The FMPC's representatives included representatives of Seminole County departments, interested municipalities, federal and state agencies, citizens, and other stakeholders. All interested parties in the County were invited to attend meetings, and the Board of County Commissioners of Seminole County reviewed and officially adopted the plan, making it a governing document for their community.

AMEC Earth & Environmental was contracted to assist in the development of the floodplain management plan and to assist the FMPC throughout the planning process. AMEC's role included facilitating all meetings of the FMPC, preparing presentations for public meetings, and instructing FMPC members about the role of mitigation in hazard preparedness. AMEC coordinated the reviews and comments of FMPC members, other state agencies, and FEMA.

This plan has been prepared in accordance with the requirements of FEMA's Community Rating System (CRS) Program and has been adopted as an appendix to the Seminole County LMS. This Floodplain Management Plan identifies activities that can be undertaken by both the public and the private sectors to reduce property damage caused by floods and to promote flood safety and flood warning measures that will protect the public and their health. This Plan fulfills the Federal mitigation planning requirements, qualifies for CRS credit, and provides the County with a blueprint for reducing the impacts of flood hazards on people and property.

By adopting this plan, Seminole County is better prepared to integrate mitigation actions into other community programs by:

- Building public support for mitigation activities,
- Developing effective public education policies regarding mitigation, and

- Obtaining disaster-related grants in the aftermath of a disaster.

The elements of this plan coincide with the primary planning tasks outlined in the CRS 10-Step Planning Process. First, the FMPC reviewed the flood hazard for Seminole County, including the causes of floods, the likelihood of floods occurring, and the impact of floods on people, property, critical facilities, and the local economy. The vulnerability of the community to flooding was examined in terms of assets at risk by dollar value, and critical facilities at risk such as police and fire stations, hospitals, and schools. The information is based on available technical studies and reports by the participating agencies and Seminole County’s past experiences. The following table represents a summary of the impact of flooding for Seminole County:

Table 1: Estimated Impact of Flood Hazard

Hazard	Annual Chance	Impact Location	Square Miles Affected	Safety Hazard	Property Damage	Vulnerable Critical Facilities	Economic Disruption
Base Flood	1%	Floodplains	89.12	Medium	Major	23 facilities	Businesses and roads damaged or closed
10-year Flood	10%	Floodways	61.94	Medium	Moderate	3 facilities*	Roads closed

* These 3 facilities are bridges.

Armed with a detailed risk assessment, the FMPC set mitigation goals to address areas where improved capabilities could reduce vulnerability to the flood hazard. The FMPC developed five major goals:

- Protect the lives, health, safety and welfare of the citizens of Seminole County from the effects of flooding
- Promote emergency management and warning system measures to provide better protection to the residents of Seminole County
- Promote a public education program to encourage self-help and self-protection measures to mitigate the effects of flood damage on private property
- Protect critical and cultural facilities and public infrastructure from flood damage
- Identify and implement specific projects to mitigate flood damage where cost-effective and affordable to include reducing the number of repetitively damaged structures.

After establishment of goals and objectives for guiding the mitigation strategy, the FMPC worked through the six major categories of mitigation measures, discussing what Seminole County is already doing toward implementing the goals and which mitigation measures Seminole County should be implementing in the future to reduce the potential impacts of flooding. The six categories discussed were:

- Preventive Measures
- Property Protection
- Resource Protection
- Emergency Services
- Structural Projects

- Public Information

After the FMPC discussed and debated the various mitigation measures within the six mitigation categories, an action plan was developed which identified the various projects that Seminole County will implement to reduce the vulnerability to the flood hazard. This action plan includes an explanation of the mitigation measure, identification of the department or agency within the County responsible for its implementation, a date when the mitigation measures will be implemented, and a description of how the mitigation measure will be funded.

It will be incumbent upon the FMPC and Seminole County to see the plan carried out successfully. Plan maintenance is an ongoing effort to monitor and evaluate the implementation of the plan, and to update the plan as progress, roadblocks, or changing circumstances are recognized. Monitoring and updating will take place through an annual review by the FMPC or similar body as required by the CRS Program. A result of this annual review will be a progress report which identifies what progress the County has made over the previous year in terms of implementing its action plan. When the plan is five years old, an update is required so that the plan meets the current requirements of Activity 510 in the CRS Program.

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1 Introduction

The Problem: Seminole County, Florida, is subject to natural hazards that threaten life and health and that have caused extensive property damage. Floods inundated the County following Tropical Storm Fay in 2008, following Hurricane Frances in 2004, and Tropical Storm Gabrielle in 2001. Extensive flooding occurred in 1960 after Hurricane Donna brought heavy rainfall. During the summer of 1953, rainfall over the St. Johns River basin was above normal, and when a tropical storm passed nearby, bringing additional heavy rainfall, Lake Monroe flooded lakefront areas. To better understand these hazards and their impacts on people and property, and to identify ways to reduce those impacts, the County’s Department of Public Safety undertook this Floodplain Management Plan as an appendix to the County’s Local Hazard Mitigation Strategy (LMS).



“Hazard mitigation” does not mean that all hazards are stopped or prevented. It does not suggest complete elimination of the damage or the disruption caused by such incidents. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long-term approach to reducing hazard vulnerability. As defined by the Federal Emergency Management Agency (FEMA), “hazard mitigation” means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event.

Why Plan: Every community faces different hazards and every community has different resources to draw upon in combating problems and different interests that influence the solutions to those problems. Because there are many ways to deal with flood hazards and many agencies that can help, there is no one solution for managing or mitigating their effects. Planning is one of the best ways to develop a customized program that will mitigate the impacts of hazards while taking into account the unique character of a community. The plan provides a framework for all interested parties to work together and reach consensus on how to move forward. A well-prepared flood mitigation plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and activities, preventing conflicts and reducing the costs of implementing each individual activity.

This Floodplain Management Plan was developed under the guidance of a Floodplain Management Planning Committee (FMPC). The Committee’s representatives included representatives of Seminole County departments, interested municipalities, federal and state agencies, citizens, and other stakeholders. All municipalities in the County were also invited to attend and participate in the planning process.

Mitigation activities require funding. A mitigation plan is now a requirement for Federal mitigation funds. Section 104 of the Disaster Mitigation Act of 2000 (42 U.S.C. 5164) states that as of November 1, 2003, local governments applying for pre-disaster mitigation funds must have

an approved local mitigation plan. Similarly, as of November 1, 2004, a plan is also needed for post-disaster mitigation funds under the Hazard Mitigation Grant Program. These requirements are detailed in 44 Code of Federal Regulations Part 201.

Thus a mitigation plan will both guide the best use of mitigation funding and meet the prerequisite for obtaining such funds from FEMA. FEMA also recognizes plans through its Community Rating System (CRS), a program that reduces flood insurance premiums in participating communities.

This Plan: This Floodplain Management Plan identifies activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage caused by floods. The Plan fulfills the federal mitigation planning requirements, qualifies for CRS credit, and provides the County with a blueprint for reducing the impacts of these flood hazards on people and property.

1.1 Planning Approach

This Floodplain Management Plan is the product of a rational thought process that reviews alternatives and selects and designs those that will work best for the situation. This process is an attempt to avoid the need to make quick decisions based on inadequate information. It provides carefully considered directions to the County government by studying the overall damage potential and ensuring that public funds are well spent.

1.1.1 Planning Committee

This Flood Hazard Mitigation Plan was developed under the guidance of the FMPC with oversight from the Department of Public Safety. The Committee includes representatives from the County and other local, state and federal agencies that serve Seminole County and private citizens and other stakeholders. The member organizations and participants who were members of the FMPC are shown in Table 5 in section 2.1.1 of this plan. The FMPC met and developed the plan from August 2010 to January 2011. Sign-in sheets from these meetings are shown in Appendices E through H. The plan development included identifying the unique flood risks that affect the County, identifying mitigation actions for these risks, and discussing how to involve the public in the development of the plan.

Technical support for the development and implementation of the Floodplain Management Plan is provided by the Seminole County Department of Emergency Management, Central Services (GIS), the Planning, Engineering and Inspections (PEI) Division, the Building and Fire Prevention Division, and the Development Review Division.

1.1.2 Planning Process

The Floodplain Management Planning Committee followed the CRS 10-Step Planning Process, based on the guidance and requirements of FEMA and the 2007 *CRS Coordinator's Manual*. The process is explained in further detail in Chapter 2 – Planning Process.

1.1.3 Public Involvement

Step 2 of the planning process was to obtain input from the public, particularly residents and businesses that have been affected by natural hazards. The public was invited to participate in the process through any or all of the following ways:

- Attending and participating in meetings of the FMPC. Four meetings were held over a six-month period.
- Contact with committee members.
- Public meetings held at the beginning of the planning process to inform the public of the planning process and obtain comments on the flood hazards and a public meeting at the end of the planning process to gain comments on the draft plan.
- A survey to assess the flood hazard was distributed at one public meeting and made available on the County's website.
- The draft plan was posted on the County website for review by the public.

Examples of these public involvement measures are included in Appendices B, D and E.

1.1.4 Coordination

Existing plans and programs were reviewed during the planning process. During the planning process, contacts were made with a variety of regional, state and federal agencies and organizations. Many of these agencies were members of the FMPC and provided review of and support for this planning effort.

State Agencies

- Florida State NFIP Coordinator
- Florida Department of Emergency Management
- St. Johns River Water Management District

Federal Agencies

- FEMA Region IV
- ISO/CRS – Insurance Services Office, Inc.
- National Weather Service (a division of NOAA)
- The American Red Cross

Seminole County also coordinated with representatives from the municipalities in the County, who were invited to participate and attend the FMPC meetings. Eight private citizens representing various areas of the County were members of the FMPC and provided valuable support. At the end of the planning process, these same agencies and organizations reviewed the draft plan and provided feedback.

1.1.5 Hazard Assessment and Problem Evaluation

The Committee addressed Steps 4 and 5 of the planning process (Assess the Hazard and Evaluate the Problem) during meetings of the Committee. The Committee's assessment and evaluation of

the flood hazard are covered in the meeting minutes of the FMPC, which can be found in Appendix B of this plan. The FMPC evaluated flooding data, including localized drainage, repetitive loss, hurricanes and tropical storms.

1.1.6 Goals

The Committee conducted goal setting exercises at one of its meetings. During the meeting, a list of potential goals was discussed and then the Committee agreed upon a final list of goals and objectives. These goals and objectives are discussed in Chapter 4 of this plan.

1.1.7 Mitigation Strategies

The FMPC considered everything that could impact the flood hazards and reviewed a wide range of possible alternatives. They are organized under six general strategies for reaching the goals. These strategies are the subject of Chapters 5 – 10 of this plan.

- Preventive Measures: zoning, building codes and other development regulations
- Property Protection Measures: relocation out of harm's way, retrofitting buildings, etc.
- Natural and Beneficial Functions: preserving natural areas to protect species and habitats or developing in ways that are more protective of species and habitats
- Emergency Services: warning, response, evacuation
- Structural Projects: levees, reservoirs, channel improvements
- Public Information: outreach projects, technical assistance to property owners, and other measures

1.1.8 Action Plan

After reviewing the various alternatives, the Committee drafted an action plan to identify recommended projects, parties responsible for each of the projects, and a schedule for project completion. The action plan is included in Chapter 11 of this document.

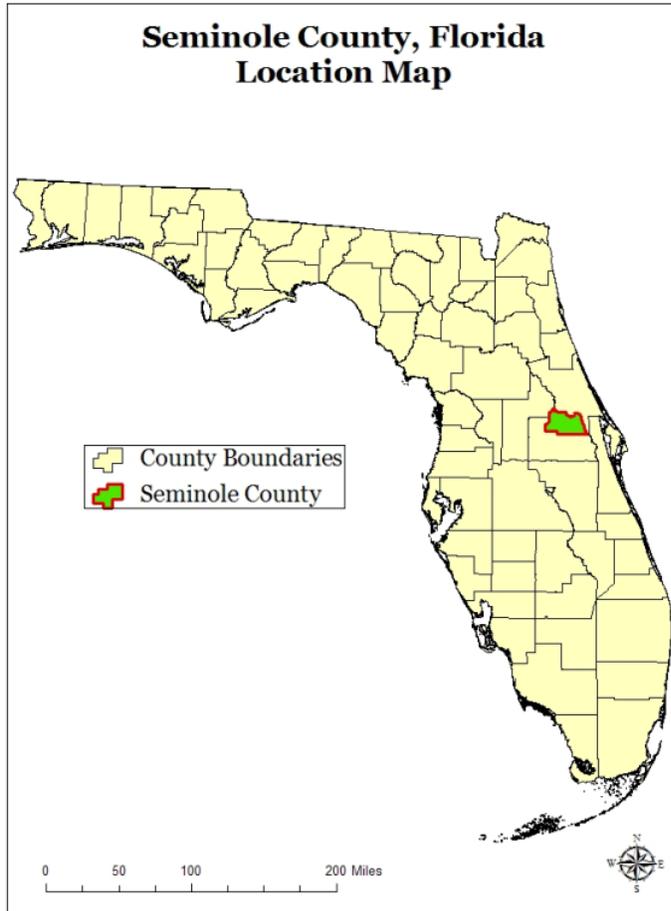
It should be noted that this Plan only serves to recommend mitigation measures. Implementation of these recommendations depends on the adoption of this Plan by the Seminole County Board of County Commissioners.

1.2 Topography and Land Use

Seminole County is located in the central part of Florida and is part of the Orlando-Kissimmee-Sanford Metropolitan Statistical Area. The City of Sanford is the county seat. Seminole County covers 345 square miles, 37 square miles of which is water. The floodplains of Seminole County consist of lowlands adjacent to streams and lakes. The topography of the County is relatively flat, with some gently rolling hills. Ground elevations in Seminole County range from less than five feet North American Vertical Datum of 1988 (NAVD) to 130 feet NAVD.

The City of Sanford, the county seat, is located on the southern shore of Lake Monroe in the northern part of the County. In the southwestern part of the County are the Cities of Longwood, Winter Springs, Casselberry and Altamonte Springs. The City of Oviedo is in the south central portion of the County. The City of Lake Mary borders Sanford, in the western part of the County.

Figure 1: Seminole County Location Map



Seminole County’s climate is characterized by long, warm summers and mild, dry winters. The average annual rainfall is about 51 inches. The majority of the rain falls from June through September and is associated with tropical storms or depressions which means that precipitation for any given month can vary greatly from year to year.

Seminole County is bounded on the north and east by the St. Johns River and on the west primarily by the Wekiva River. The St. Johns River is brackish. There are many lakes in Seminole County, and more than 120 of these are larger than five acres. Most occur in karst areas on the sand ridges. In addition to Lake Monroe which straddles the northern border of the County, Lake Jesup bisects much of the northern half of the County and Lake Harney sits along the County’s eastern border.

Seminole County’s physiography consists of alternating ridges and valleys with abundant lakes. According to the USDA’s Soil Survey of Seminole County, Florida,

“The Osceola Plain is a broad, flat area of low, local relief and is generally between 60 and 70 feet in elevation. Most of the western part of the county is made up of this plain. The Orlando Ridge is an area of higher elevation that is generally parallel to the other surrounding ridges outside of Seminole County, such as the Mount Dora Ridge to the west. It is possible that the Orlando Ridge once was part of a relic, ‘Cape Orlando,’ which resulted from progressive progradation that formed Cape Canaveral and False Cape in Brevard County from marine processes. The northern tip of the Orlando Ridge extends a few miles into Seminole County in the area of Altamonte Springs.

The Eastern Valley is generally 20 to 25 feet in elevation and is characterized by a broad, flat area through which the St. Johns River flows. Most of the eastern part of Seminole County is composed of this valley.

The Wekiva Plain is a flat area in western Seminole County dominated by the Wekiva River. In eastern Seminole County, the Geneva Hill is a high area in the Eastern Valley in the vicinity of Geneva.”

In terms of geology, Seminole County is underlain by a thick sequence of limestone and dolostones upon which a relatively thin section of sand, silt, shell material and clay was deposited.

According to the USDA’s *Soil Survey of Seminole County, Florida*, there are 10 soil map units in Seminole County, described below.

Mineral soils on the uplands:

1. *Urban Land-Pomello-Paola*. This unit is about 4% of Seminole County and consists of moderately well drained and excessively drained soils that are sandy.
2. *Urban Land-Astatula-Apopka*. This unit is about 22% of Seminole County, and is more than half urban land. The rest is excessively drained soils that are sandy and well drained sand soils that have a loamy subsoil.
3. *Urban Land-Tavares-Millhopper*. The soils in this unit are moderately well drained and sandy or have a loamy subsoil. This unit covers 23% of the County.

Mineral soils on the flatwoods and in sloughs and depressions between the upland ridges and the floodplains, depressions and swamps:

4. *Myakka-EauGalle-Urban Land*. These are poorly drained soils that are sandy or have a loamy subsoil. This unit covers 24% of the County.
5. *St. Johns-Malabar-Wabasso*. This unit makes up 8% of Seminole County. These soils in the central part of the County are poorly drained and sandy or have a loamy subsoil.
6. *Basinger-Smyrna-Delray*. These soils, covering about 7% of the County, are poorly drained and very poorly drained soils that are sandy throughout or have a loamy subsoil.

Mineral and organic soils on the floodplains and in depressions and swamps:

7. *Nittaw-Felda-Floridana*. These are very poorly drained and poorly drained mineral soils; some with a clayey subsoil and some sandy with a loamy subsoil. They exist on floodplains and in depressions and make up about 4% of the County.
8. *Nittaw-Okeelanta-Terra Cela*. The soils in this unit, which covers about 4% of the County, are on the floodplains adjacent to Lake Monroe and Lake Jesup and subject to frequent flooding. They are very poorly drained mineral and organic soils, some are mucky with a clayey subsoil, some are mucky with a sandy layer, and some are mucky throughout.
9. *Brighton-Samsula-Sanibel*. These soils are south of Lake Jesup and are ponded. They are very poorly drained organic and mineral soils. They make up about 1% of the County. Some are mucky throughout, some are mucky and have a sandy layer beneath, and some are sandy throughout. They exist in depressions and swamps.

10. *Pompano-Nittaw-Basinger*. The soils in this map unit are in floodplains adjacent to the Wekiva, St. Johns and Econlockhatchee Rivers and Lake Jesup. They make up about 3% of the county, and are poorly drained and very poorly drained mineral soils, some are sandy throughout and some are mucky with a clayey subsoil.

The Floridian Aquifer underlies all of Seminole County and supplies at least 95 percent of the County’s freshwater. Most of the County’s soils are sandy and low in natural fertility, but they support forests and wildlife. In addition, ornamental plants, vegetables and other plant products are grown in the County.

1.3 Development, Redevelopment and Population Trends

Seminole County’s convenient location between Volusia and Orange Counties has made it one of the fastest growing counties in Florida. The Seminole County 2008 Comprehensive Plan has certain goals for future development. The goals and objectives outlined in the Future Land Use Section are:

- Protection and preservation of the environment, including water resources, air quality, regionally significant natural areas, open space and recreational areas;
- Creation and support of diverse, globally competitive economic conditions favorable to higher wage jobs;
- Provision of a range of affordable housing opportunities and choices;
- Provision of adequate services and facilities, including a variety of transportation choices;
- Maintenance of established residential neighborhoods, revitalization of declining neighborhoods and creation of new energy-efficient communities with education, health care and cultural amenities;
- Protection of rural and agricultural areas; and
- Protection of property rights.

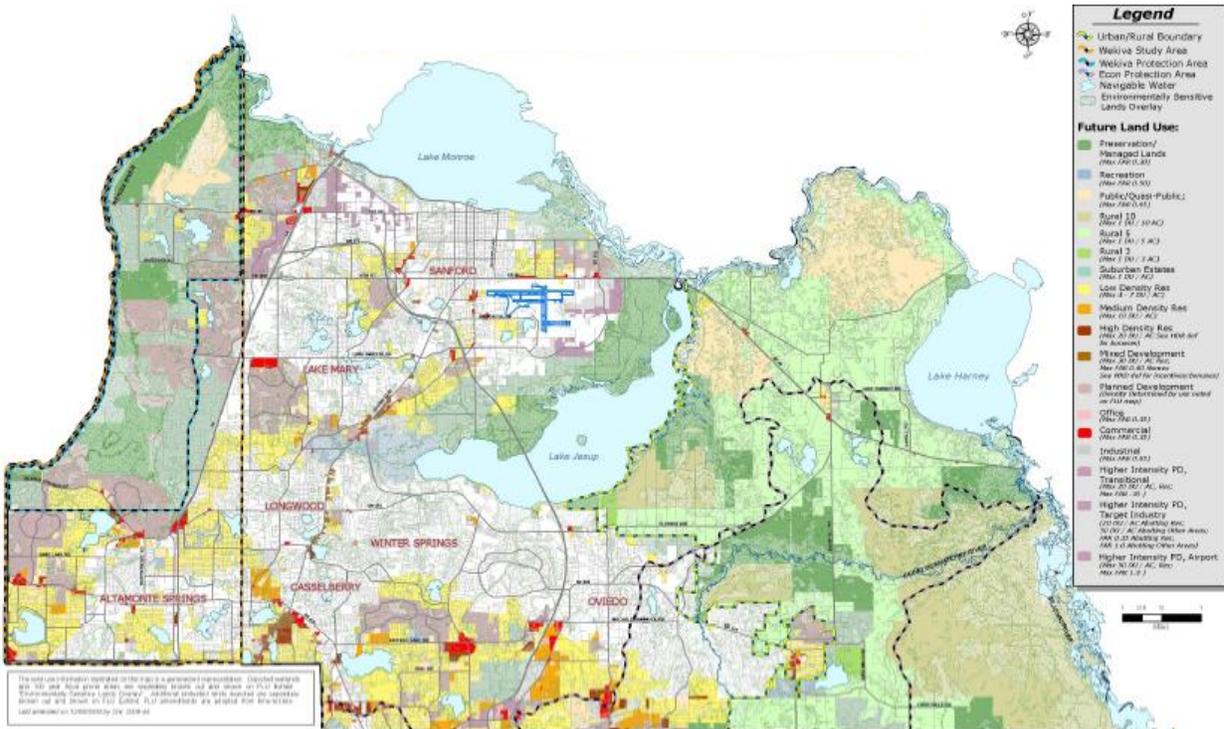
Chapter 3 provides information on the number and location of building permits issued in Seminole County between January of 2005 and September of 2010. During this time period more than 5,000 building permits were issued for single-family, multi-family, commercial and government buildings. The table to the right from the Seminole County Comprehensive Plan indicates the various land use categories and the acreage for each. The map on the following page identifies future land use proposed for Seminole County.

Table 2: Acres of Land by Land Use Category

<i>Existing Land Use Categories</i>	<i>Acres</i>	<i>Percent</i>
Residential Single Family	54,059	29%
Agriculture	30,117	16%
Managed Environmental Land	27,170	14%
Dedicated Common Open Space	13,902	7%
Vacant Other	12,877	7%
Public	11,026	6%
Public Other	4,499	2%
Residential Multifamily	4,462	2%
Residential Mobile Home	3,966	2%
Commercial	3,832	2%
Vacant Residential	3,659	2%
Vacant Commercial	2,942	2%
Transportation	2,669	1%
Industrial	2,538	1%
Institutional	2,531	1%
Recreation	2,295	1%
Education	1,906	1%
Office	1,801	1%
Vacant Industrial	1,172	1%
Hotel/Motel	143	0%
Vacant Institutional	91	0%
TOTAL (Includes city acres)	187,657	100%

There has not been a significant amount of re-development within Seminole County. All development must follow the guidance of the Comprehensive Plan and must comply with all current floodplain management regulations.

Figure 2: Seminole County Future Land Use Map



1.3.1 Population Trends

In 2009, the estimated population of Seminole County was 413,204 people, a 13% increase over the year 2000 population. According to the Orlando Economic Development Commission, the population of Seminole County is expected to increase to 458,850 people by 2014, an 11% increase in the next five years. By 2019, the population is expected to increase another 10%, to 503,018 people. These figures include both the incorporated and unincorporated areas of the County. The Seminole County Comprehensive Plan indicates the population for the unincorporated portion of the County in 2025 will be approximately 255,075.

1.4 The Community Rating System

FEMA’s National Flood Insurance Program (NFIP) administers the CRS. Under the CRS, flood insurance premiums for properties in participating communities are reduced to reflect the flood protection activities that these communities are implementing. This program can have a major influence on the design and implementation of flood mitigation activities, so a brief summary is provided here.



A community receives a CRS classification based on the credit points it receives for activities. It can undertake any mix of activities that reduce flood losses, such as enhanced mapping, regulatory changes, public information programs, flood damage reduction, or flood warning and preparedness programs. There are 10 CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction (see Table 3). A community that does not apply for the CRS or that does not obtain the minimum number of credit points is a class 10 community. Seminole County participates and has a Class 7 rating. On May 1, 2011, the County will be a Class 6 and policy holders within the SFHA will enjoy a 20 percent reduction on the cost of flood insurance.

Table 3: Community Rating System Premium Reductions

Class	Points	Premium in Floodplain	Reduction Outside Floodplain
1	4500+	45%	10%
2	4,000-4,499	40%	10%
3	3,500-3,999	35%	10%
4	3,000-3,499	30%	10%
5	2,500-2,999	25%	10%
6	2,000-2,499	20%	10%
7	1,500-1,999	15%	5%
8	1,000-1,499	10%	5%
9	500-999	5%	5%
10	0-499	0%	0%

1.4.1 Program Incentive

The CRS provides an incentive not just to start new mitigation programs, but to keep them going. There are two requirements that encourage a community to implement flood mitigation activities. First, the County will receive CRS credit for this plan, once it is adopted. To retain that credit, the County must submit an evaluation report on progress made towards implementing this plan to FEMA by October 1st of each year. That report must be made available to the media and to the public. Second, the County must annually recertify to FEMA that it is continuing to implement its CRS credited activities. Failure to maintain the same level of involvement in flood protection can result in a loss of CRS credit points and a resulting increase in flood insurance rates to residents.

It is expected that this undesirable impact of loss of CRS credit for failure to report on the plan's progress or for failure to implement flood loss reduction projects will be a strong incentive for the County to continue implementing this plan in dry years when there is less interest in flooding.

1.4.2 Benefits of CRS Participation

Table 4 below shows the direct dollar benefit to Seminole County and the County's policy holders for participation in the CRS. The savings per policy are for properties in the FEMA

mapped 100-year floodplain (“Special Flood Hazard Area”). The savings are lower for policies outside the mapped floodplain.

Table 4: Seminole County Policy Savings for CRS Participation

	Total Policies	Policies in SFHA	X-STD/AR/A99	PRP
Number of Policies	4,695	1,512	128	3,055
Total Premiums	\$1,958,017	\$850,422	\$126,595	\$981,000
Average individual annual premium	\$417	\$562	\$989	\$321
Class 9 savings per floodplain policy	\$12	33	\$52	\$0
Class 9 savings for community	\$56,687	\$50,025	\$6,663	\$0
Class 8 savings per floodplain policy	\$23	\$66	\$52	\$0
Class 8 savings for community	\$106,713	\$100,051	\$6,663	\$0
Class 7 savings per floodplain policy	\$33	\$99	\$104	\$0
Class 7 savings for community	\$156,738	\$150,075	\$13,326	\$0
Class 6 savings per floodplain policy	\$45	\$132	\$104	\$0
Class 6 savings for community	\$213,425	\$200,100	\$13,326	\$0

In addition to the direct financial reward for participation in the CRS, there are many other reasons to participate. As FEMA staff often say, “if you are only interested in saving premium dollars, you’re in the CRS for the wrong reason.” The other benefits that are more difficult to measure in dollars include:

1. The activities credited by the CRS provide direct benefits to residents, including:
 - Enhanced public safety,
 - A reduction in damage to property and public infrastructure,
 - Avoidance of economic disruption and losses,
 - Reduction of human suffering, and
 - Protection of the environment.
2. A community’s flood programs will be better organized and more formal. Ad hoc activities, such as responding to drainage complaints rather than an inspection program, will be conducted on a sounder, more equitable basis.
3. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.
4. Technical assistance in designing and implementing a number of activities is available at no charge from the Insurance Services Office.
5. The public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.
6. A community will have an added incentive to maintain its flood programs over the coming years. The fact that the community’s CRS status could be affected by the elimination of a flood-related activity or a weakening of the regulatory requirements for

new developments will be taken into account by the governing board when considering such actions.

7. Every time residents pay their insurance premiums, they are reminded that the community is working to protect them from flood losses, even during dry years.

More information on the Community Rating System can be found at <http://www.fema.gov/business/nfip/crs.shtm>.

1.5 References

1. *Community Rating System Coordinator's Manual*, FEMA, 2007.
2. *Example Plans*, FEMA/Community Rating System, 2006.
3. *Getting Started – Building Support for Mitigation Planning*, FEMA, FEMA-386-1, 2002.
4. *Local Multi-Hazard Mitigation Planning Guidance*, FEMA, 2008.
5. “Population by City,” Metro Orlando Economic Development Commission. Retrieved December 9, 2010 at http://www.businessinseminole.com/gm/ecodev/pdf/Population_by_City.pdf.
6. *Soil Survey of Seminole County, Florida*, USDA Soil Conservation Service, 1990.
7. *State and Local Plan Interim Criteria under the Disaster Mitigation Act of 2000*, FEMA, 2002.
8. *Seminole County Comprehensive Plan*, Seminole County Planning and Development Department, 2008.

2 Planning Process

2.1 Planning Approach

This Floodplain Management Plan is the product of a rational thought process that reviews alternatives and selects and designs those that will work best for the situation. This process is an attempt to avoid the need to make quick decisions based on inadequate information during an emergency. It provides carefully considered directions to the County government by studying the overall damage potential and ensuring that public funds are well spent. The development of this plan also followed FEMA’s CRS 10-Step Planning Process.

2.1.1 Planning Committee

This Flood Hazard Mitigation Plan was developed under the guidance of a Floodplain Management Planning Committee (FMPC) with oversight from the Seminole County Emergency Manager. The Committee included representatives from various County departments, other local, state and federal agencies that serve the County, and citizens from throughout the County. Some of these citizen members of the FMPC had been flooded in the past. The County department representatives, citizens and stakeholders who make up the FMPC are shown in Table 5 below.

Table 5: FMPC -- Floodplain Management Planning Committee

Position	Name	Agency
Consultant (non-voting member)	David Stroud	AMEC
Coordinator/Committee	Alan Harris	Seminole County Emergency Management
LMS Chairperson (non-voting)	Shirley Exner	Seminole County Emergency Management
FDEM Representative (non-voting)	Joy Duperault	Florida Emergency Management
Committee	J.R. Ball	Citizen
Technical Representative	Melvin Barnes	GIS
Committee	Michelle Bernstein	Citizen
Committee	Stacy Casertano	Seminole County Building Division Floodplain Administrator
Committee	Mark Flomerfelt	Seminole County Engineering Division
Committee	Bill Houston	Citizen
Committee	Ralph Johnson	Seminole County Building Division
Committee	Heidi Liles	ISO/CRS Representative
Committee	Brian Mack	Citizen
Committee	Rob McClenathan	Citizen
Committee	Gabriella Milch	Citizen
Committee	Rolando Raymundo	Seminole County Public Works Department
Committee	Owen Reagan	Seminole County Public Works Department
Technical Representative	Lakshmi Sankaran	GIS
Committee	Becky Sebren	American Red Cross
Committee	Scott Spratt	National Weather Service
Committee	Cindy Suzi	Citizen
Committee	Joe Walter	Citizen
Committee	Alan Willis	Seminole County Planning & Development
Committee	Anthony Coleman	Seminole County Building Division

The FMPC met and developed the plan from August 2010 to January 2011. The plan development included identifying the unique flood risks that affect the County, identifying mitigation actions for these risks, and discussing how to involve the public in the development of the Plan.

The Seminole County Board of County Commissioners passed Resolution Number 2010-R-202 on September 28, 2010 which established the planning process and created the FMPC (see Appendix A). The development of this Plan was facilitated by AMEC Earth and Environmental, a professional planning consulting firm.

2.1.2 Planning Process

The FMPC followed a standard 10-step process, based on the guidance and requirements of FEMA. The process is summarized in the flow chart in the figure on the right. The Committee assessed the flood hazards affecting the County, set goals, and reviewed a wide range of activities that can mitigate the adverse affects of the hazards. The FMPC met four times over the course of the planning process in development of this plan. An agenda and sign-in sheet for each of the meetings can be found in Appendices F, G, H and I. The schedule for the development of the plan is shown in Table 6 on the next page.

Figure 3: Mitigation Planning Process

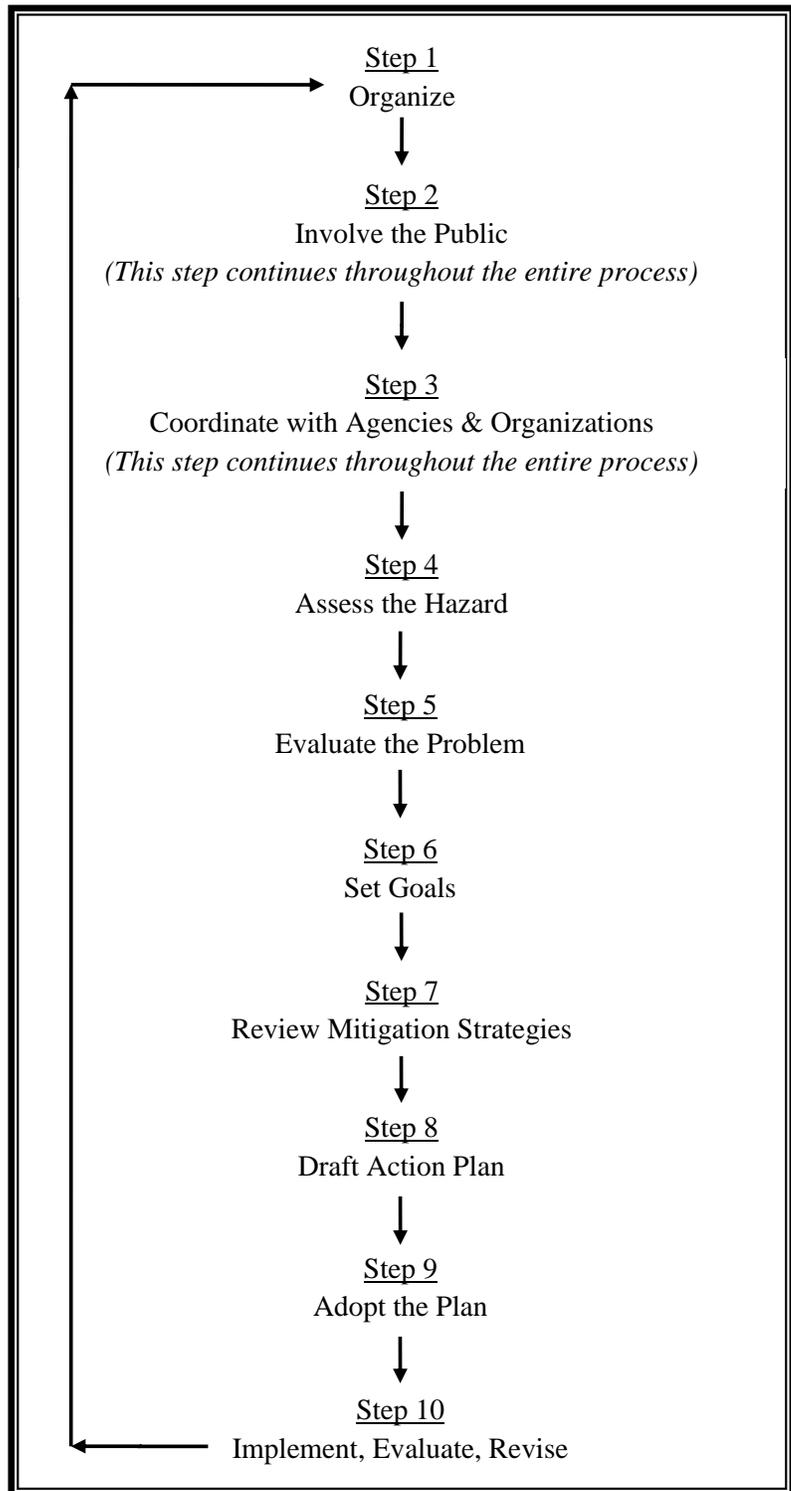


Table 6: Mitigation Planning Timetable

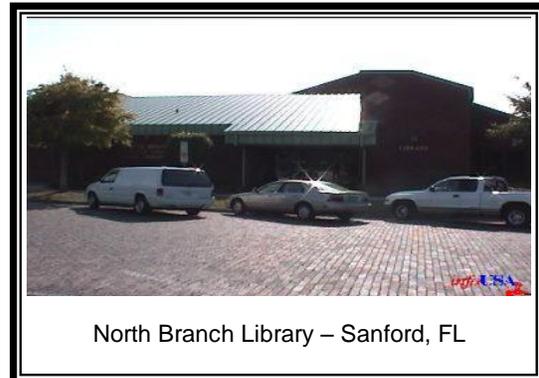
Mitigation Planning Timetable						
Task	Month					
	Aug	Sep	Oct	Nov	Dec	Jan
Task 1. Organize	M					
Task 2. Public Involvement						
Task 3. Coordination						
Task 4. Risk Assessment			M			
Task 5. Goal Setting			M			
Task 6. Mitigation Strategies				M		
Task 7. Draft Plan						M
Task 8. Final Plan						

M = Meeting of the FMPC

2.1.3 Public Involvement

Step 2 of the planning process was to obtain input from the public, particularly residents and businesses that had been affected by flooding. The public was invited to participate through:

- Attending and participating in meetings of the Floodplain Management Planning Committee. Four meetings were held over a six-month period.
- Attending a public meeting that was held at the beginning of the planning process to inform the public of the planning process and to solicit concerns over flooding.
- Contacting committee members.
- Attending a public meeting that was held on January 13th, 2011, to receive comments on the draft plan.
- Filling out a survey, which was available both online and at public meetings.
- Reviewing the draft plan, which was available on the County’s website for public review at (LINK)



North Branch Library – Sanford, FL

2.1.3.1 Public Meetings

A public meeting was held at the beginning of the planning process to inform the public of the floodplain management planning process and to solicit comments and concerns about flooding in the County. This meeting was held on August 5th, 2010, at the Seminole County North Branch Library in Sanford. The location of the meeting was central to many who were recently affected by flooding from Tropical Storm Fay. This meeting was advertised twice in the area newspaper

and also on the County’s website. The newspaper advertisement can be found in Appendix C, along with the agenda from the meeting and the sign-in sheet. No one from the public attended this meeting and it was decided that a second preliminary public meeting was not warranted.

A second public meeting was held on January 13th, 2011 to discuss and debate the draft plan. This meeting was held at the Seminole County North Branch Library in Sanford. The meeting was advertised in the area newspaper. This advertisement, along with an agenda from the meeting and a sign-in sheet, can be found in Appendix D. Appendix E shows an article in the *Sanford Herald* from January 16, 2011, describing the meeting and inviting citizens to provide comments on the plan.

2.1.3.2 Flood Information Survey

Seminole County developed a survey to gather feedback from citizens on flooding problems in the community. The survey asked questions about flooding in respondent’s homes and solicited respondents’ ideas for improving flooding problems in the County. The survey was made available at all public and Committee meetings and was also available on the County’s website. A copy of the survey is attached to this plan as Appendix F. Many of the comments received on the surveys were similar. Some of the ideas presented by survey respondents were:

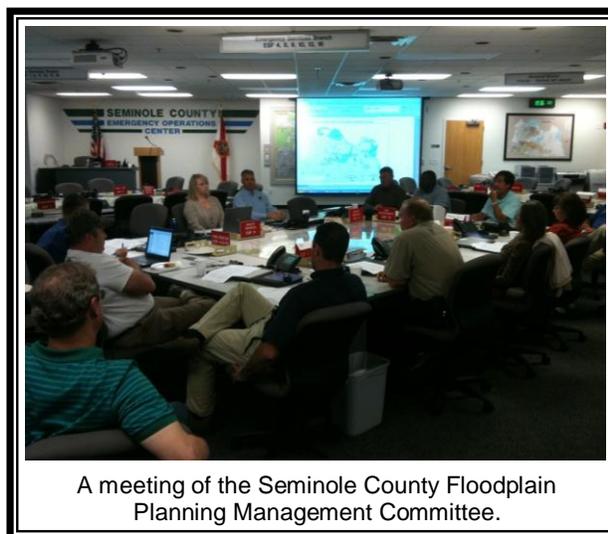
- There is a need for more education about flooding and the flood hazards affecting the County.
- The County should provide education about flood prevention and the County’s plans for improving known flood hazards by providing education through homeowners’ associations, signage in the watershed about drainage patterns, creating tax bill inserts, and adding more information to the County’s website.
- The County should prioritize CIP funding to fix known flooding problems
- The County should hold more public meetings in public places.

2.1.3.3 Other Public Involvement Methods

Seminole County promoted the floodplain management plan through its established Local Mitigation Strategy Committee, which includes members from a cross-section of the community and who represent a variety of local organizations. Additionally, the draft floodplain management plan was posted on the County’s website for public review. (LINK)

2.1.4 Coordination

Existing plans and programs were reviewed during the planning process. In addition, contacts were made with regional, state and federal agencies and organizations during the planning process. Representatives of the State



A meeting of the Seminole County Floodplain Planning Management Committee.

of Florida National Flood Insurance Program (NFIP), the State of Florida Division of Emergency Management, FEMA Region IV, ISO/CRS, the St. Johns County Water Management District, the National Weather Service and American Red Cross were invited to participate in the FMPC. A letter was also sent to a variety of stakeholder organizations and agencies to determine how their programs affect or could support the County's mitigation efforts and to request participation on the FMPC.

2.1.4.1 Solicitation of Comments

Members of the FMPC included representatives from homeowners' associations. Additionally, several stakeholder agencies, such as the National Weather Service, FEMA and the American Red Cross, provided valuable comments throughout the planning process.

2.1.4.2 Neighboring Communities

All incorporated municipalities within Seminole County were made aware of the planning process via e-mail and letters. Each incorporated municipality was invited to attend the FMPC meetings. No incorporated municipality attended any of the FMPC meetings.

2.1.4.3 Contacting Other Agencies and Meetings with Agencies

The St. Johns River Water Management District was contacted and asked to join the FMPC. The District did not attend any of the planning meetings. Because Seminole County is not a coastal county, the Florida Department of Environmental Protection's Coastal Management Program was not contacted for this planning effort.

Because the National Weather Service and the American Red Cross were members of the FMPC, a review of common problems, development policies, mitigation strategies, inconsistencies, and conflicts in policies, plans, programs and regulations took place. A meeting was also held with a representative of FEMA Region IV at the public kickoff meeting in August of 2010.

2.1.5 Hazard Assessment and Problem Evaluation

The Committee addressed Steps 4 and 5 of the planning process (Assess the Hazard and Evaluate the Problem) during the October meeting of the FMPC. The flood hazard data and vulnerability to critical facilities, buildings and infrastructure and the impact of the flood hazard on life, health and safety is covered in Chapter 3 of this document. The FMPC provided data and support for Hazard Assessment and Problem Evaluation during the first three months of the planning process. AMEC provided Seminole County with a Data Collection Workbook, which County staff used in completing the Hazard Assessment and Problem Evaluation.

2.1.6 Goals

The Committee conducted goal setting exercises at the October 2010 FMPC meeting. During this meeting, a list of potential goals was discussed and then the Committee agreed upon a final list of goals and objectives. These goals are discussed in Chapter 4 of this document.

2.1.7 Mitigation Strategies

During the November 7th, 2010 meeting of the FMPC, the Committee reviewed and debated

various mitigation measures which could help to reduce or eliminate the flood hazards. The Committee went through a comprehensive list of potential mitigation options based on the following six general categories:

- Preventive Measures
- Property Protection Measures
- Natural Resource Protection Measures
- Emergency Services Measures
- Structural Measures
- Public Information Measures

2.1.8 Action Plan

After reviewing the various alternatives, the Committee drafted an action plan to identify recommended projects, parties responsible for implementation, a schedule for project completion, and identification of funding sources. The action plan is included in Chapter 11 of this document.

Selected mitigation measures were prioritized based on benefit to the County and available funding necessary for implementation. Projects which may be eligible for FEMA grant funding were also evaluated based on benefits and cost using the “STAPLEE” criteria (see box).

This Floodplain Management Plan serves only to recommend mitigation measures. Implementation of these recommendations depends on adoption of this plan by the Seminole County Board of County Commissioners.

Figure 4: The STAPLEE Criteria



3 Flood Risk Assessment

Flooding is the deadliest and most costly storm-related natural hazard in the United States. Many deaths due to flooding can be avoided by not driving through flooded roads and paying attention to evacuation warnings.

Types of Flooding: The most common and most damaging floods occur along rivers and streams. This type of flooding is called overbank flooding. Overbank flooding of rivers and streams can be caused for any of the following reasons:

1. There is more precipitation in the watershed than the waterways and the storm system can convey;
2. There are obstructions in a channel, such as a beaver dam,
3. There is a large release of water when a dam or other obstruction fails; or
4. A combination of these factors.

Most floods are caused because of the first factor, a larger amount of precipitation than the watershed can manage. Another contributor to flooding is stormwater runoff. This problem has recently become more critical because of development in areas subject to urban flooding.

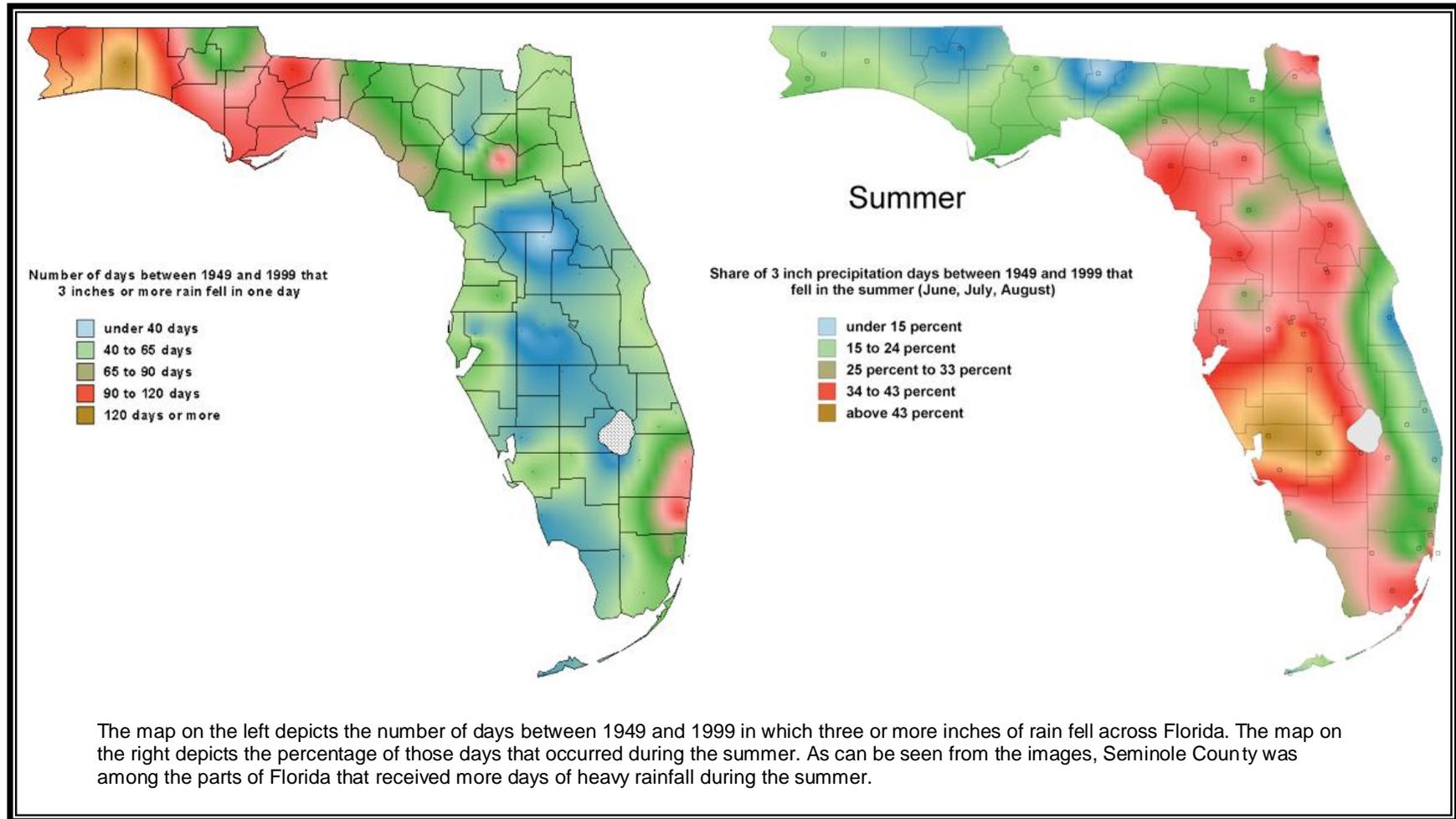
Causes of Flooding: For most of Seminole County, the primary causes of flooding are tropical systems and afternoon thunderstorms. These storms generally occur during the rainy season, from June through November. The rain associated with hurricanes and tropical storms can produce extreme amounts of rainfall in short periods of time, which can overwhelm the capacity of streams, channels, or drainage infrastructure. In addition, certain areas of Seminole County are low-lying, which makes them subject to flooding from rising water.

Historical Floods: Since 1994, Seminole County has experienced seven major floods. These floods have disrupted life for community members by closing streets and causing property damage to homes and businesses, and one of these floods even caused the death of a Seminole County resident. To address flood control and protection issues, Seminole County is developing this comprehensive flood hazard management plan.

3.1 Precipitation in Seminole County

Seminole County receives an average of 51 inches of rain each year. However, this rainfall is not spread out evenly from month to month or across all parts of the County. Most precipitation occurs during the rainy season, from June to October, as shown in the graphic on the next page.

Figure 5: Rainfall Distribution across Florida



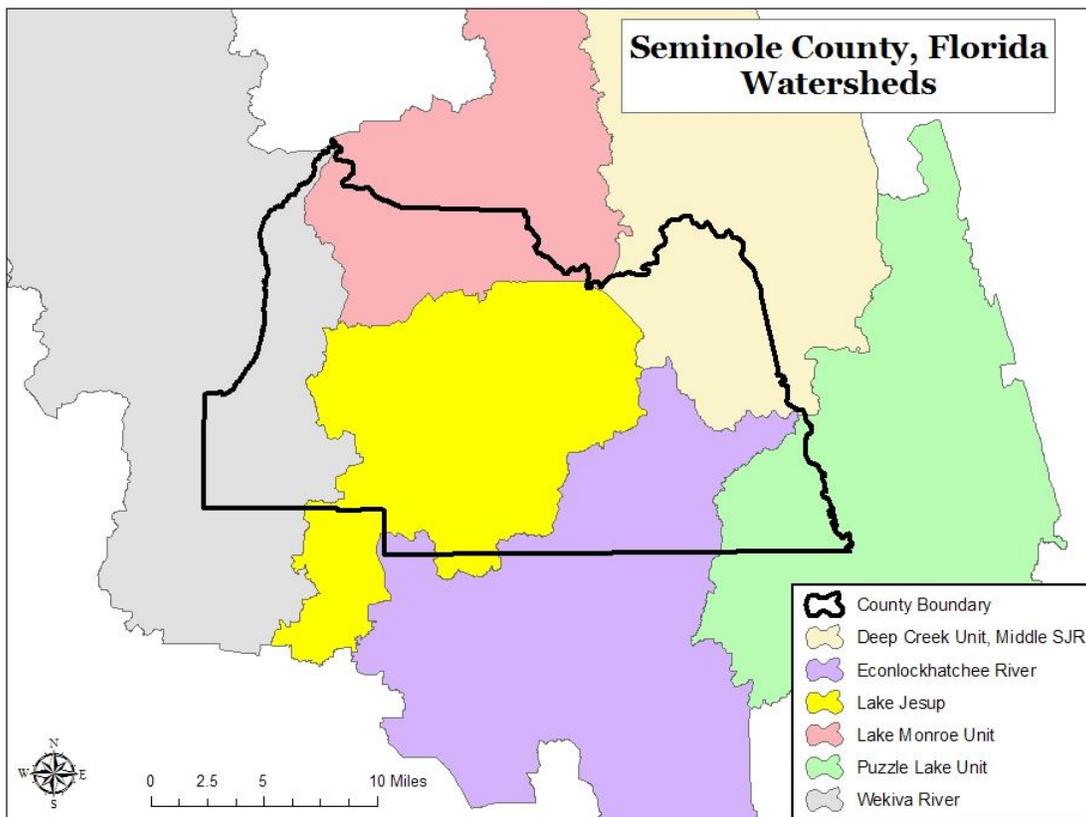
3.2 Seminole County Water Resources and Watersheds

Seminole County has an abundance of surface water resources. The St. Johns River and Econlockhatchee River as well as three large lakes – Lake Monroe, Lake Jesup and Lake Harney – fall at least partly within the County boundaries.

There are also six watersheds that fall partly within Seminole County, as shown in Figure 6. Within these six major watersheds are smaller subwatersheds that drain into the tributaries. Each of these streams has adjacent floodplains that are inundated during a flood.

The condition of the land in the watershed affects what happens when precipitation falls. For example, more rain will run off the land and into streams if the terrain is steep, if the ground is already saturated from previous rains, if the watershed is significantly covered with impervious pavement and parking lots, or if depressional storage areas (like swamps) have been filled in. Thus urban development in the watershed can contribute to flooding. Each of the watersheds in Seminole County contains urban as well as rural areas, except for Deep Creek, which is mostly rural. Watersheds that are more urbanized tend to flood more quickly than rural watersheds.

Figure 6: Watersheds within Seminole County



3.3 Flood Risks

3.3.1 Tropical Cyclones

Flooding in Seminole County is often the result of hurricanes, tropical storms, or tropical depressions, all of which are tropical cyclones. These storms bring heavy rainfalls and high winds to Seminole County, which can cause significant damage. These storms can last for several days, and therefore they have the potential to cause sustained flooding and high wind conditions. Rain combined with high winds can also create wave action on the three lakes and can damage properties adjacent to these bodies of water.

Historically, many hurricanes and tropical storms have passed near or through Seminole County, as shown in Table 7.

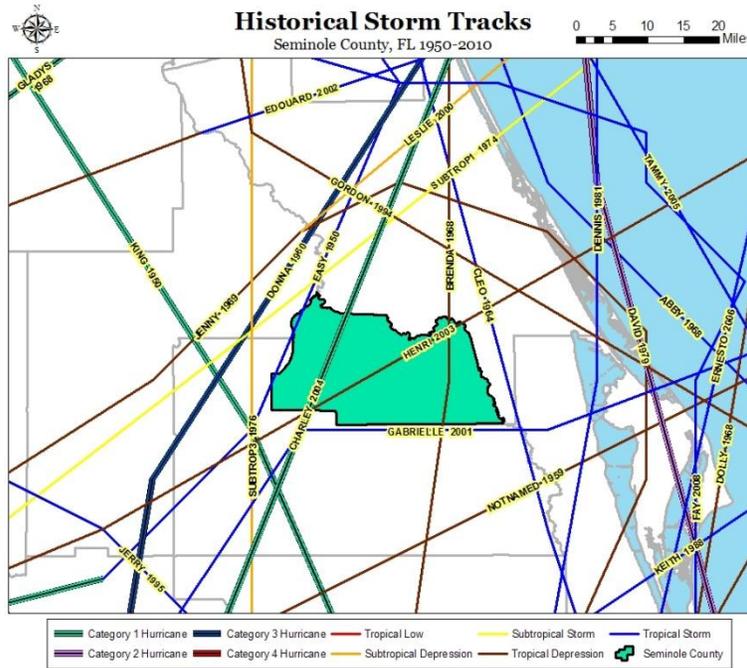
Table 7: Major Storms near Seminole County, Florida (1980 to 2010)

Date	Storm Type	Deaths (FL)	Injuries (FL)	Property Damage
8/24/2008	Tropical Storm Fay	5	0	\$390,000,000 (FL)
2/3/2007	Severe Storms and Tornadoes	0	0	\$43,000,000 (FL)
8/24/2006	Hurricane Ernesto	0	0	\$500,000,000 (US)
10/5/2005	Tropical Storm Tammy	0	0	< \$25,000,000 (US)
9/24/2004	Hurricane Jean	3	0	\$6,900,000,000 (US)
9/16/2004	Hurricane Ivan	14	0	\$8,300,000,000 (FL)
9/4/2004	Hurricane Frances	5	0	\$8,000,000,000 (FL)
8/13/2004	Hurricane Charley and Tropical Storm Bonnie	9	0	\$14,000,000,000 (FL)
9/3/2003	Tropical Storm Henri	0	2	"minor"
9/2/2002	Tropical Storm Edouard	0	0	"minor" (roadway flooding in Seminole County)
9/13/2001	Tropical Storm Gabrielle	2 (1 in Seminole)	0	\$230,000,000 (FL)
10/4/2000	Tropical Storm Leslie	3	0	\$700,000,000 (FL)
10/20/1999	Hurricane Irene	8	3	\$8,000,000 (FL)
10/22/1998	Hurricane Mitch	2	65	\$20,000,000 (FL)
9/15/1998	Hurricane Georges	0	0	\$20,000,000 (FL)
8/22/1995	Tropical Storm Jerry	0	0	\$30,000,000 (FL)
7/31/1995	Hurricane Erin	0	0	\$700,000,000 (FL)
11/8/1994	Tropical Storm Gordon	8	0	\$400,000,000 (FL)
9/28/1992	Tropical Storm Earl	0	0	
8/15/1981	Hurricane Dennis	0	0	

Sources: National Oceanic and Atmospheric Administration's National Hurricane Center and the Federal Emergency Management Agency

Of particular importance to communities susceptible to hurricane damage is the track of an approaching storm. Proximity and direction of hit are important when determining impacts and subsequent damage from the storm. Figure 7 on the next page shows the historical tracks of storms that have passed through or near Seminole County.

Figure 7: Historical Storm Tracks near Seminole County (1950 to 2010)



3.3.2 Flash Floods

A second source of flooding in Seminole County is flash flooding. Flash floods are generated by severe storms that drop a large amount of rainfall in a short period of time. Flash floods strike quickly and end quickly. Areas with steep slopes and narrow stream valleys are particularly vulnerable to flash flooding, as are the banks of small tributary streams. In hilly areas, the high velocity flows and short warning times make flash floods hazardous and destructive.

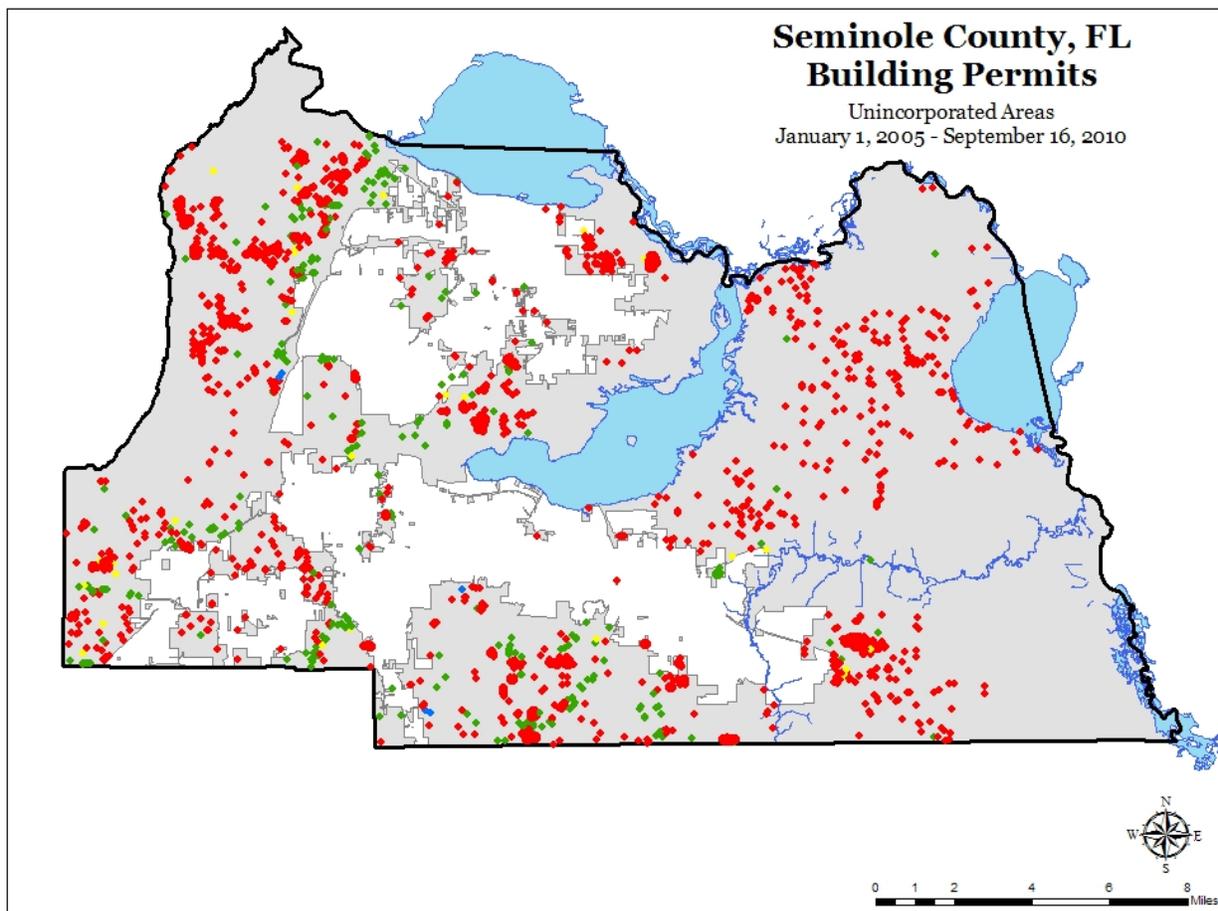
In urban areas, flash flooding can be triggered by increased stormwater runoff due to land development. When we construct buildings on open spaces, hard surfaces like parking lots and rooftops replace forests, swamps, fields, and other natural land covers. When rainfall hits these impervious surfaces, it runs off of them rather than infiltrating into the soil that was once there. Along the way, stormwater runoff picks up sediment, debris and pollutants on the hard surfaces and carries them to streams or rivers. Thus developed land absorbs less rainfall than undeveloped land, and also increases pollution in local waterways. As we develop land, the amount and speed of stormwater runoff increases. As a result, flash floods often occur in urban areas where much of the watershed is covered in impervious surfaces.

According to the U.S. Census Bureau, the population of Seminole County increased 13% between 2000 and 2009, after increasing 27% between 1990 and 2000. Land development in Seminole County has increased rapidly to accommodate this growth. As shown in Table 8 on the next page, before the economic downturn in 2009, Seminole County was permitting nearly 1,000 new buildings per year. Figure 8 shows the distribution of building permits issued from 2005 to late 2010. New development such as this can trigger more flash floods.

Table 8: Number of Permits for New Construction per Year in Seminole County

January 2005 - September 16, 2010							
	2005	2006	2007	2008	2009	2010	Total
Commercial	59	111	82	54	52	24	382
Single Family Res	1,444	789	874	634	425	380	4,546
Multi-Family Res	0	2	25	8	0	3	38
Government	9	6	10	8	11	29	73
Total	1,512	908	991	704	488	436	5,039

Figure 8: Location of Permits for New Construction from January 1, 2005 to September 16, 2010



Flash flooding can also be caused by dam failure or the collapse of debris obstructing a waterway. Flash floods often occur in smaller watersheds and are therefore not shown on most floodplain maps.

3.3.3 Dam Failure

Dams are designed to hold back large amounts of water. If they fail or are overtopped, they can produce a dangerous flood situation because of high velocities and large volumes of water released. A break in a dam can occur with little or no warning on clear days when people are not expecting rain or a flood. Breaching often occurs within hours after the first visible signs of dam failure, leaving little time for evacuation.

Figure 9: Dams in Florida, based on the 2009 National Inventory of Dams for Florida, courtesy the Association of State Dam Safety Officials



Dam failures are usually caused either by structural problems with the dam or by hydrologic problems. Structural problems include seepage, erosion, cracking, sliding and overturning resulting from the age of the dam or a lack of maintenance. Hydrologic problems typically occur when there is excessive runoff due to heavy precipitation. For example, a dam failure can occur if the dam has to impound more water than it was designed to, or if the spillway capacity is inadequate for the amount of water that needs to pass downstream.

A dam can suffer a partial failure or a complete failure, but the potential energy of the water

stored behind even a small dam can cause loss of life and great property damage downstream. There are currently no dams located within Seminole County, but there are dams located to the north, west and south of the County.

3.3.4 Obstructions

Obstructions can affect a channel, such as small bridge openings or log jams, or they can affect an entire floodplain, such as road embankments, fill and buildings. Channel obstructions will cause smaller, more frequent floods, while floodplain obstructions impact the larger, less frequent floods where most of the flow is overbank, outside the channel. Obstructions can be either natural or manmade. Natural obstructions like log jams can be washed away during larger floods. Manmade obstructions pose a more serious problem, because they tend to be more permanent.

3.4 Historical Flooding

Seminole County has experienced several flooding events in the past, including a flood on September 15, 2001 that caused one death. This occurred in the City of Winter Springs during



Flooding in Seminole County following Tropical Storm Fay in 2008 (photos courtesy Gary Exner, Advantage Consulting LLC).

the aftermath of Tropical Storm Gabrielle, which brought wind gusts to around 45 miles per hour, causing minor damage across much of east central Florida. Following the storm, a 15-year-old boy drowned while playing with friends in Gee Creek near Winter Springs after he was pulled underwater by branches and other debris in the fast-moving water. Raising awareness about the danger of currents following heavy rains, as well as the potential for debris in floodwaters, can help prevent similar accidents in the future.

In 2008, Tropical Storm Fay made four landfalls in Florida. While crossing central Florida, Fay unexpectedly strengthened over land to just under hurricane intensity with 70 mph winds. The storm caused extensive flooding in east central Florida, including historic flooding on the St. Johns River. The total rainfall in Seminole County from August 18th to August 23rd was 76.7 inches. Many roadways and about 500 homes were damaged as the river’s water level continued to climb after the storm had passed. Seminole County schools were closed due to impassable roads. The pictures in the box to the left show floods from Tropical Storm Fay in Seminole County.

In 1994, two storms brought heavy rain to most of peninsular Florida during the last half of September. Rivers and streams overflowed, flooding streets and some urban

areas. A flash flood on July 21, 2001 produced by heavy rain inundated the Tuskawilla area of Winter Springs, flooding three homes and causing \$15,000 worth of property damage. On August 19, 2002, three inches of rapidly falling rain flooded streets and six homes in Sanford. This led to \$60,000 of property damage. A thunderstorm brought rainfall and widespread flooding of major roadways in Seminole County on August 29, 2002. The roadway flooding occurred about three miles south of Oviedo. On September 5, 2004, Hurricane Frances brought eight to 10 inches of rain across much of Seminole County, flooding homes and streets. Four days later, the rain from Hurricane Frances had caused water levels to reach flood stage in the middle St. Johns River Basin. Levels continued to rise and then fell slightly until Hurricane Jeanne followed the same track across Florida as Hurricane Frances had. Significant flooding followed, and the Lake Harney gauge reached a record crest of 10.1 feet. Near Geneva, roads, nurseries and homes along Lake Harney were flooded. Water came over the seawall in Sanford and flooded numerous structures along the south shore of Lake Monroe. The total amount of property damages due to these events was \$4.8 million.

Historical occurrences of floods in the County are listed in Table 9 below.

Table 9: Notable Flood Events in Seminole County, Florida

Location	Date	Time	Type	Deaths	Injuries	Property Damages
Florida	9/15/1994	NA	Flooding	0	0	\$500,000
Winter Springs	7/21/2001	5:00 PM	Flash Flood	0	0	\$15,000
Winter Springs	9/15/2001	1:00 PM	Urban/Small Stream Flood	1	0	\$0
Sanford	8/19/2002	4:45 PM	Flash Flood	0	0	\$60,000
Oviedo	8/29/2002	4:38 PM	Flash Flood	0	0	\$0
Seminole County	9/5/2004	1:30 AM	Flash Flood	0	0	\$0
City of Geneva and City of Sanford	9/9/2004	7:00 AM	Flooding	0	0	\$4,800,000

Source: National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service and the U.S. Department of Commerce's National Climatic Data Center

3.5 Locally Identified Flood Areas

While many floodplain boundaries are mapped by NFIP, floods sometimes go beyond the mapped floodplains or change courses due to natural processes, such as erosion and sedimentation, or human development, such as filling in floodplains to build houses, increased imperviousness within the watershed from new development, or debris.

The County has approximately 5,500 homeowners and 500 businesses that could be affected by flooding during a 100-year flood. These businesses and homeowners have been identified by address and GIS mapping. In many flood prone areas, the terrain is heavily wooded with vast areas of marshlands, which receive the overflows from Lake Monroe, Lake Harney, Lake Jesup and the St. Johns River. Another problem area is U.S. Highway 17-92, where it runs parallel to Lake Monroe. According to the flood prone map, this main artery will be under water after 10 inches of rain.

3.6 The National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP), which enables property owners in participating communities to purchase insurance from the federal government against

losses due to flooding. The program is designed as an alternative to disaster assistance. Participation in the NFIP is based on an agreement between local governments and the NFIP that the local government will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, while the federal government will make flood insurance available within the community.

More properties are insured for flood damages under NFIP in Florida than in any other state. Seminole County participates in the NFIP, which means that NFIP flood insurance is available to residents living anywhere in the unincorporated area. According to the NFIP, in Seminole County there were 4,850 NFIP flood insurance policies in effect, for a total of \$1,242,102,400 in insurance, as of August 31, 2010. Single-family residences account for 91% of the 4,850 flood insurance policies in Seminole County, whereas 94 of the policies are non-residential. The remaining 358 policies are for multifamily properties. The total closed paid losses made to policy holders in Seminole County between 1978 and August 31, 2010 was \$3,640,195. More details on flood insurance policies in Seminole County are shown in section 3.8.5.

3.7 Future Flood Risk

Flooding can occur along all waterways in Seminole County, including the St. Johns River, Lake Harney, and Lake Jesup. Because there are numerous surface water bodies throughout the County, many locations in the County may be subject to flooding. Areas identified as vulnerable to flooding are depicted on FEMA’s Flood Insurance Rate Maps (FIRMs), which are developed through the NFIP and are the official floodplain maps for Seminole County. Many of the County’s floodplain management regulations are based on the floodplain limits shown in these maps. It is important to realize that on an annual basis more than 30 percent of all flood losses occur outside any mapped floodplain.

FEMA’s flood zones represent the areas of risk for flooding. These zones are based on the statistical risk of future flooding, which is extrapolated from historical records to determine the statistical potential that storms and floods of a certain magnitude will recur. Such events are measured by their “recurrence interval,” i.e., a 10-year storm or a 50-year flood. A 10-year storm means that there is a 1 in 10 chance, or 10% chance, of that storm occurring in any given year. A 50-year flood has a 1 in 50 chance, or 2% chance, of occurring in any given year. Because these identifiers are based on statistics, such a flood could occur twice in one year, or could not occur at all over the course of 100 years.

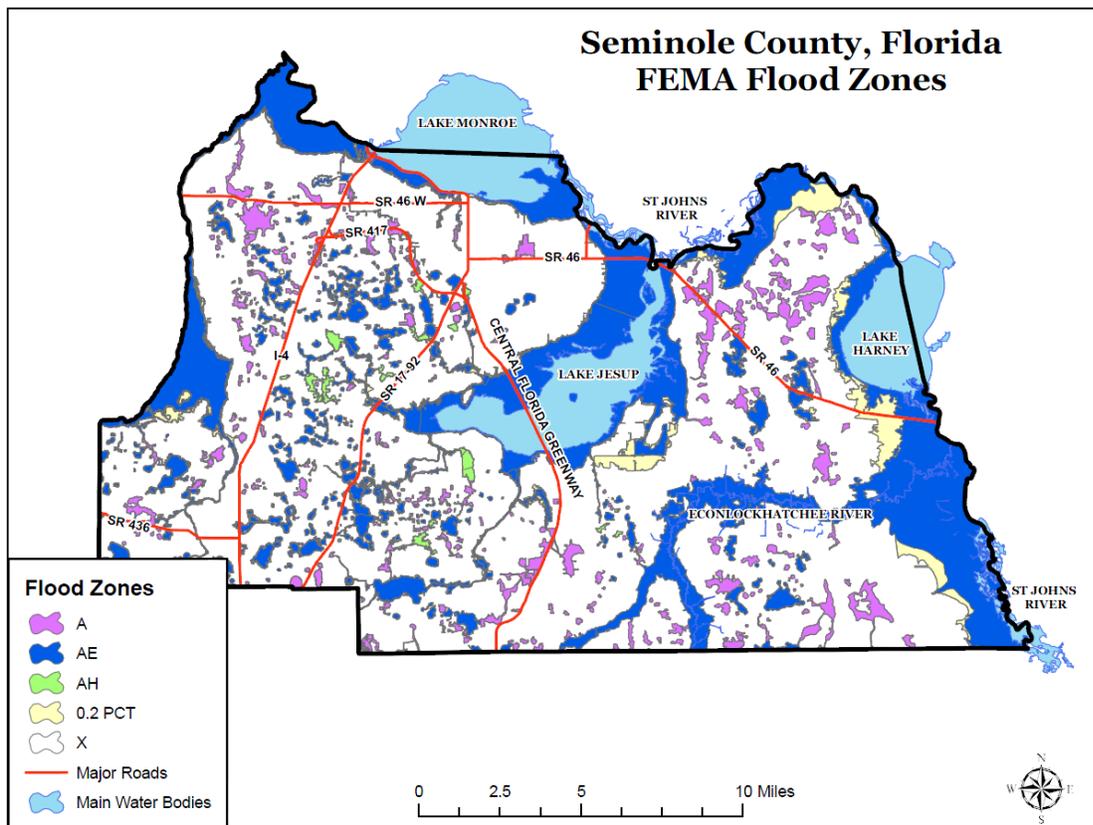
Table 10: Flood Recurrence Intervals

Time Period	Chance of Flooding over a Period of Years			
	Flood Size			
1 Year	10%	4%	2%	1%
10 Years	65%	34%	18%	10%
20 Years	88%	56%	33%	18%
30 Years	96%	71%	45%	26%
50 Years	99%	87%	64%	39%

The map below shows flood zone areas within Seminole County. Areas marked as Zone A have a 1% annual chance of flooding, which translates to a 26% chance of flooding over the life of a 30-year mortgage. This area is the base flood for Seminole County. Detailed analyses are not performed for Zone A, thus flooding depths and base flood elevations are not shown for Zone A areas. Zone AE areas have a 1% annual chance of flooding. These have been determined using detailed methods, thus base flood elevations – the level to which flood waters are expected to rise – are available in these areas. Zone AH are areas subject to 1% annual chance flooding, usually as ponding, with average depths between one and three feet.

Areas in yellow have a moderate flood hazard. These are places susceptible to a 0.2% annual chance of flooding. Zone X shows areas where flood hazards are minimal, and have a less than 0.2% annual chance of flooding.

Figure 10: FEMA Flood Zones in Seminole County



3.8 Flood Impacts

The impacts of floods affect people, buildings, and the economy. These impacts are discussed in this section.

3.8.1 Safety

Floods can be extremely dangerous, and even six inches of moving water can knock over a

person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Residents in Seminole County should be aware of the following flood safety measures:

3.8.2 Health

While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and hogs are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

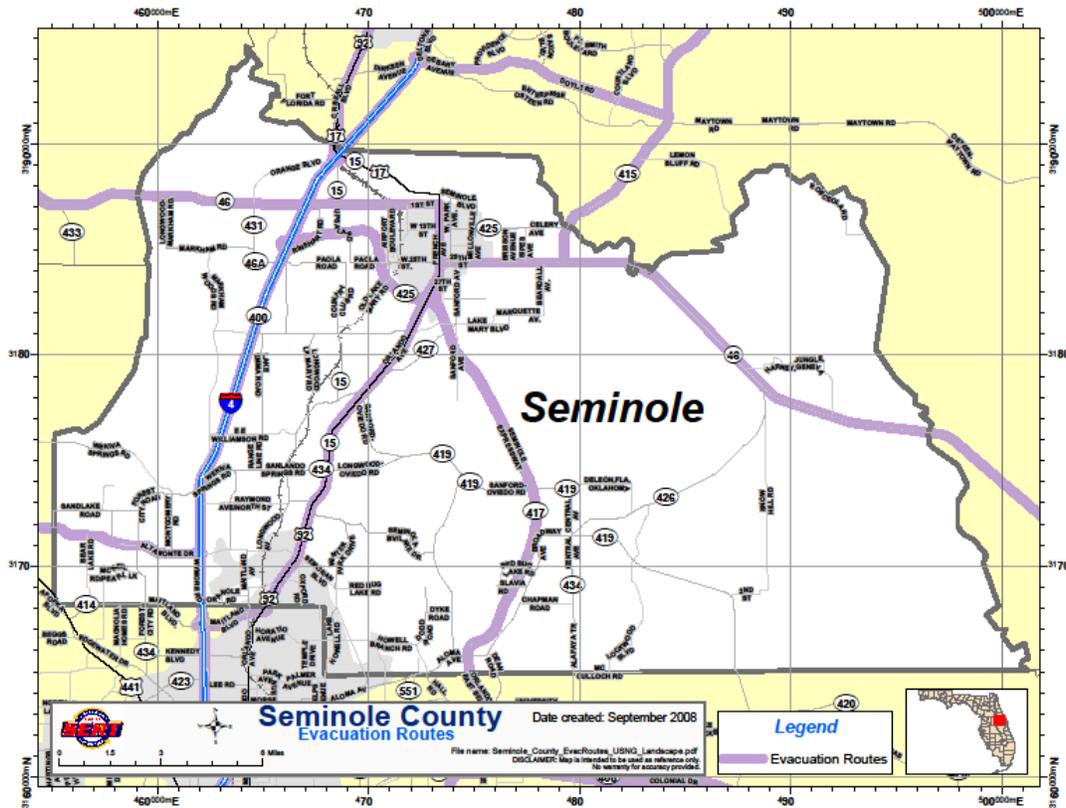
3.8.3 Evacuation of Residents and Visitors

A key evacuation and safety concern is when roads and bridges go under water. Generally, the larger the road, the less likely it is to flood, but this is not always the case. In addition, a bridge does not have to be under water to be damaged or to cut off an evacuation route. In some cases the bridge is high, but the access road may be flooded. In other cases, the bridge or culvert can be washed out. This is especially dangerous if a person drives on a flooded road and assumes that the bridge is still there.

Residents and visitors within Seminole County should be made aware of evacuation routes. It is important that the County work with both public and private entities to ensure that everyone knows which roads and thoroughfares are designated for evacuation. Below is a map from the

Florida Department of Emergency Management which indicates the designated evacuation routes for Seminole County.

Figure 11: Evacuation Routes for Seminole County



3.8.4 Critical Facilities

Seminole County’s FMPC identified several types of critical facilities including some roads and bridges. FEMA does not have a specific definition of a critical facility, but the FMPC decided that critical facilities are those facilities that provide a critical function and should be protected from flood damage. The table below indicates the various critical facilities in the unincorporated area of Seminole County and the number that are located within the 100-year floodplain.

Table 11: Critical Facilities in Unincorporated Seminole County

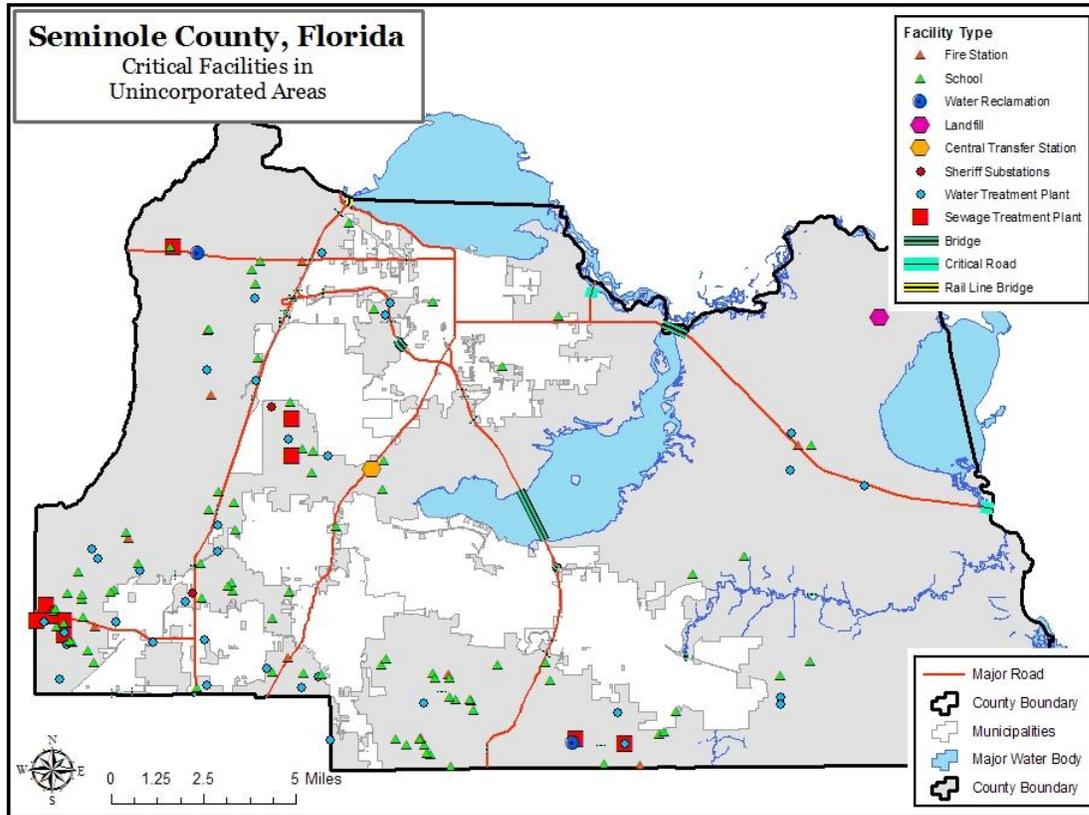
Type	Total	Total in 100-Year Floodplain	Total in Floodway
Fire Station	9	1	0
School	80	3	0
Sheriff Substation	3	0	0
Sewage Treatment Plant	10	0	0
Central Transfer Station	1	0	0
Landfill	1	0	0
Water Reclamation Facility	2	1	0
Water Treatment Plant	34	2	0
Bridge	66	13	3
Critical Road	2	2	0
Rail Line Bridge	1	1	0

Although some of the schools serve as shelters, they were all placed in the category of critical facility. The facilities which, if damaged by floods, could potentially cause the most damage to the life, health, safety and welfare of the citizens of the County are not located within the 100-year floodplain. These are the sewage treatment plants, central transfer station and landfill. As such there is no need to implement policies and plans to protect or remove them from the floodplain. To a lesser extent, there is a minor potential for the water reclamation and water treatment plants to cause damage during a flood, and there are no current plans to protect or remove these facilities.

There are sections of two roads identified as critical which often go under water during flood events and remain impassible, requiring emergency vehicles to travel further to reach victims. This also requires residents to pick alternative routes to reach their place of work following a flood.

Critical facilities throughout unincorporated Seminole County are shown in Figure 12 on the next page.

Figure 12: Critical Facilities in Unincorporated Seminole County



3.8.5 Building Damage

Floods can cause severe damage to buildings, which can be costly to repair. Although flood insurance can help pay for repairs to buildings damaged by floods, not all property owners obtain insurance. Moreover, preventing damage to buildings is less costly, less disruptive, and less dangerous than sustaining damage.

In a few situations, deep or fast moving waters will push a building off its foundation, but this is rare. More frequently, structural damage is caused by the weight of standing water, known as “hydrostatic pressure.” Basement walls and floors are particularly susceptible to damage by hydrostatic pressure. Not only is the water acting on basement walls deeper, but a basement is also subject to the combined weight of water and saturated earth. In addition, water in the ground underneath a flooded building will seek its own level, resulting in uplift forces that can break a concrete basement floor.

The most common type of property damage inflicted by a flood is soaking. When soaked, many materials change their composition or shape. Wet wood will swell and, if dried too quickly, will crack, split or warp. Plywood can fall apart. Gypsum wallboard will fall apart if it is bumped before it dries. The longer these materials remain wet, the more moisture, sediment and pollutants they will absorb.

Soaking can cause extensive damage to household goods. Wooden furniture may become so badly warped that it cannot be used. Other furnishings, such as upholstery, carpeting, mattresses, and books, are usually not worth drying out and restoring. Electrical appliances and gasoline engines will not work safely until they are professionally cleaned and dried. While a building may appear sound and unharmed after a flood, the water may have caused a lot of damage. To properly clean a flooded building, the walls and floors should be stripped, cleaned and allowed to dry before being recovered. This can take weeks and is a costly process.

Table 12 below shows the appraised value of all buildings in unincorporated Seminole County by FEMA flood zone. All of the buildings in these zones are at risk of flood damage.

Table 12: Appraised Value of Buildings in Unincorporated Seminole County by Flood Zone

Use	ZONE A		ZONE AE		0.2 PCT ZONE		ZONE AH		ZONE X	
	Number of Buildings	Appraised Value	Number of Buildings	Appraised Value	Number of Buildings	Appraised Value	Number of Buildings	Appraised Value	Number of Buildings	Appraised Value
Commercial	140	\$169,284,378	103	\$51,376,724	173	\$43,223,409	7	\$3,160,036	1,859	\$1,035,187,529
Government	129	\$7,406,593	289	\$6,928,955	145	\$1,786,056	3	\$0	765	\$31,961,557
Multi-Family Residential	22	\$147,420,844	14	\$107,730,684	5	\$759,748	1	\$28,386,178	505	\$683,545,694
Open Space/Vacant	1,443	\$9,601,110	1,835	\$7,265,852	1,018	\$2,799,286	188	\$0	9,905	\$21,175,511
Single Family Residential	2,987	\$500,069,318	4,660	\$797,500,329	2,542	\$437,224,305	367	\$42,412,990	67,648	\$9,242,808,782
TOTAL	4,721	\$833,782,243	6,901	\$970,802,544	3,883	\$485,792,804	566	\$73,959,204	80,682	\$11,014,679,073

Flood insurance claims figures do not include those items that are not covered by a flood insurance policy, like cars and landscaping, or the value of family heirlooms. They also do not include damages to uninsured or underinsured properties.

3.8.6 Economic Impacts

Although repairing structural flood damages can be costly, they can also have economic impacts beyond building repairs. Floods can close down businesses for days, weeks, or longer. Businesses can lose their inventories, customers are unable to reach them, and employees are often unable to work. Below is a table which indicates the largest employers in Seminole County which make up much of the tax base.

Table 13: Seminole County Major Employers

Employer	Number Employed
Seminole County Public Schools	9,145
Covergys Corporation	1,800
Chase	1,685
Seminole County Government	1,446
Florida Hospital - Altamonte Springs	1,400
Seminole County Community College	1,350
Sprint PCS	1,200
Central Florida Regional Hospital	878
American Automobile Association	867
Orlando Regional South - Seminole	811
Fiserv Inc.	800
Symantec	800
Cingular Wireless	600
Florida Extruders International Inc.	600
CuraScript	546
Sunguard HTE	500
The Hartford	500

As of June 2009 there were approximately 241,667 workers in the labor force for Seminole County according to the Florida Agency for Workforce Innovation, Labor Market Statistics. It is estimated that 29.7% of the workforce are employed in blue collar occupations and 70.3% are employed in white collar occupations. According to the Florida Agency Workforce for Innovation, CES, in June 2009, 19.5% of the workforce in Seminole County was employed in the leisure and hospitality industry, 15.9% in professional and business services, 10.6% in government, 11.6% in education and health care and 11% in retail. The table below indicates the taxation value from 2008 through 2010 according to the County Property Appraiser.

Table 14: Seminole County Taxable Value

Year	Value	% Change
2008	\$31,635,418,833	-5.58%
2009	\$28,061,917,002	-11.30%
2010	\$25,408,418,592	-9.46%

3.8.7 Repetitive Loss Properties

A repetitive loss property is a property that has experienced repeated flooding that caused financial losses. The National Flood Insurance Program (NFIP) is continually faced with the challenge of balancing the financial soundness of the program with the competing expectations of keeping premiums affordable. Repetitive loss properties are one of the largest obstacles to achieving financial soundness.

A repetitive loss property is defined as any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period since 1978. Two of the claims paid must be more than 10 days apart but, within 10 years of each other. A repetitive loss property may or may not be currently insured by the NFIP.

A severe repetitive loss property is defined by the Flood Insurance Reform Act of 2004 as any one- to four-family residence that has had four or more claims of more than \$5,000, or at least two claims that cumulatively exceed the building's value.

Repetitive loss properties are the biggest draw on the National Flood Insurance Fund. Repetitive loss properties are not only costly, they also disrupt and threaten residents' lives. These properties may be sponsored by state or local government programs that mitigate the flood losses or provide information on how to mitigate flood losses through such measures as elevating buildings above the level of the base flood, demolishing buildings, removing buildings from the Special Flood Hazard Area, or local drainage improvement projects.

In Seminole County, there are a total of 15 repetitive loss properties, only 12 of which are insured under the NFIP. These 15 repetitive loss properties have experienced a total of 33 losses, and 26 of those losses occurred while the building was insured under NFIP. Three of the repetitive loss properties are post-FIRM buildings, meaning that they were built after the effective date of the first Flood Insurance Rate Map for the County.

The repetitive loss properties in Seminole County are shown in Figure 13 on the next page. The map also identifies repetitive loss properties which have been mitigated and those properties

which have only had one loss since 2000. It is important to identify single loss properties as they have the potential to be the County’s next repetitive loss properties. Detailed areas of repetitive loss are shown in the following figures.

Figure 13: Countywide Repetitive Loss Properties, Mitigated Properties, and Single Loss Properties since 2000

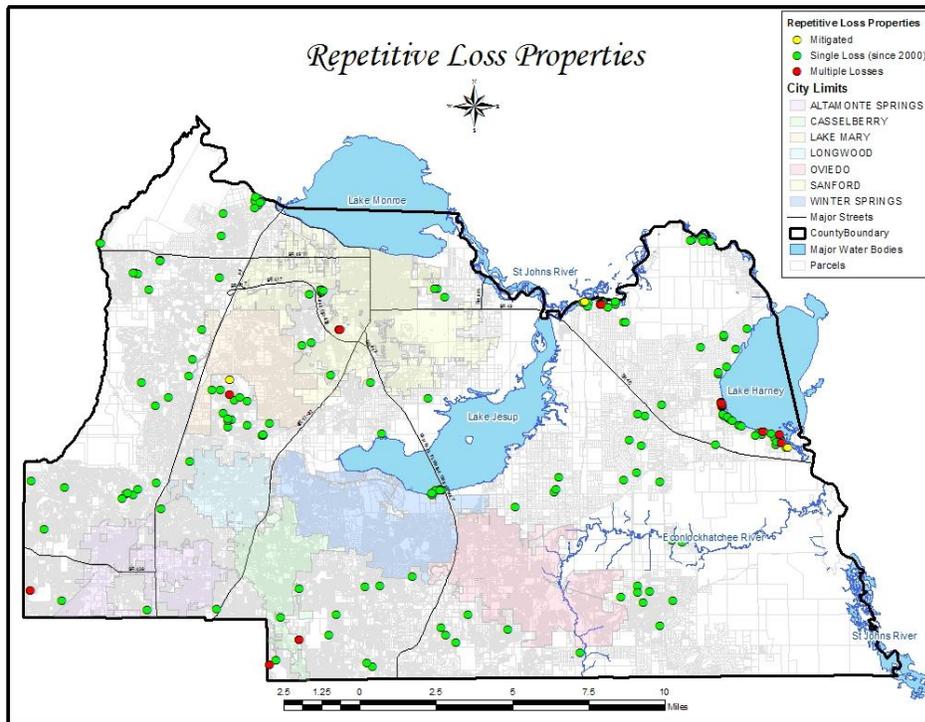


Figure 14: Repetitive Loss Properties Area 1

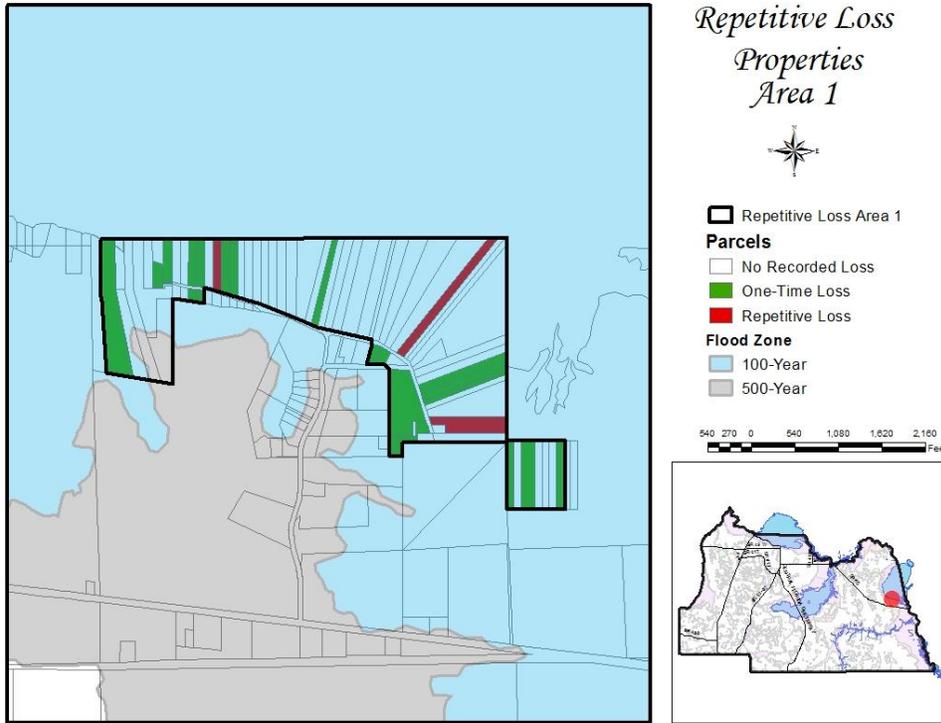


Figure 15: Repetitive Loss Properties Area 2

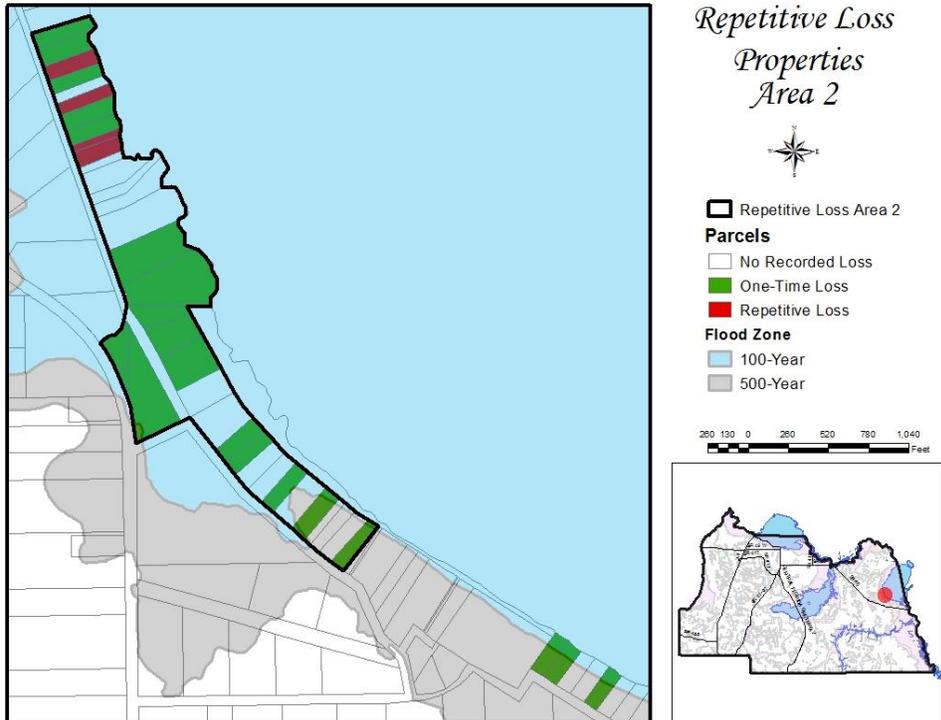


Figure 16: Repetitive Loss Properties Area 3

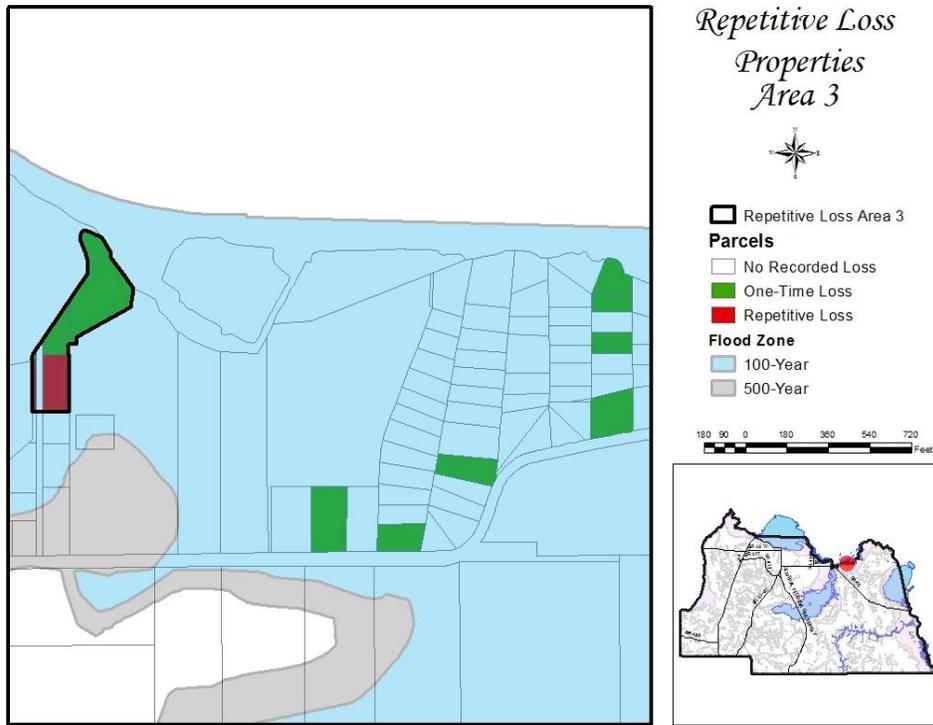


Figure 17: Repetitive Loss Properties Area 4

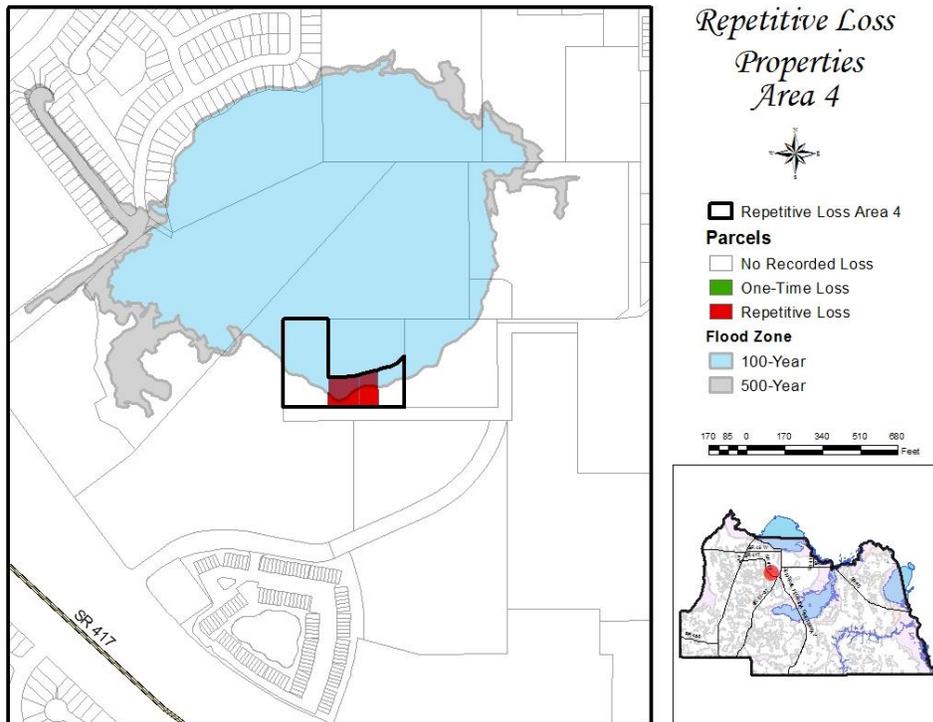


Figure 18: Repetitive Loss Properties Area 5

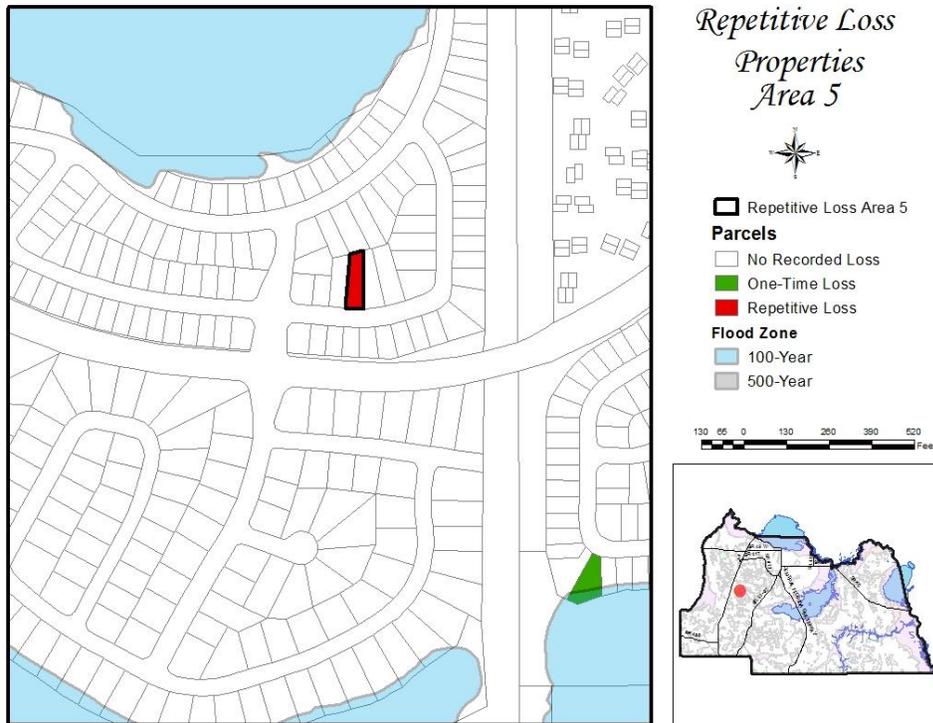


Figure 19: Repetitive Loss Properties Area 6

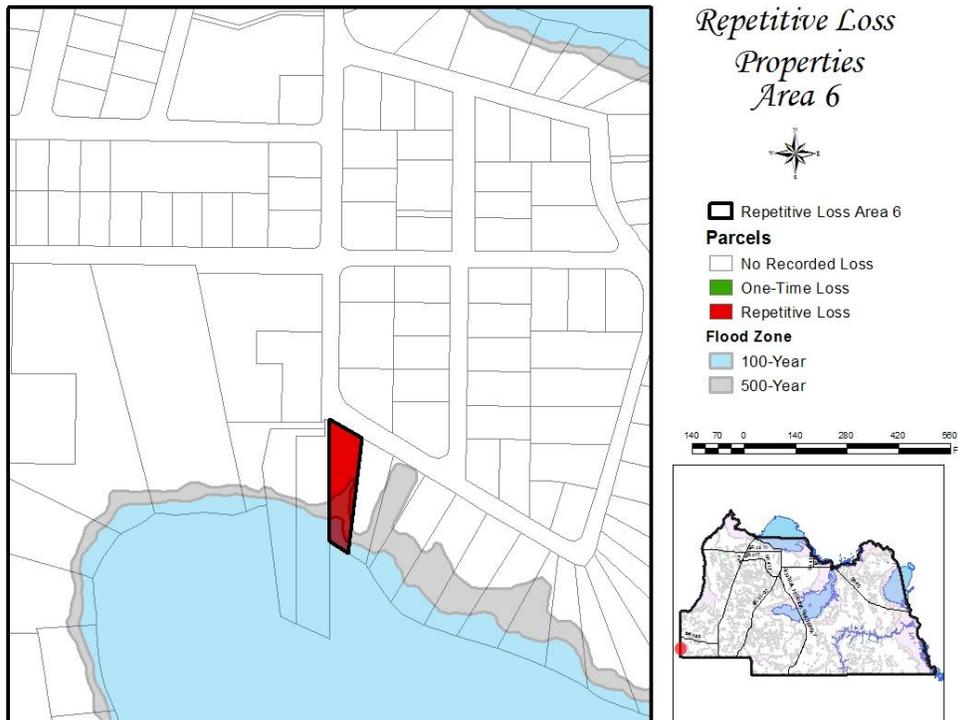


Figure 20: Repetitive Loss Properties Area 7

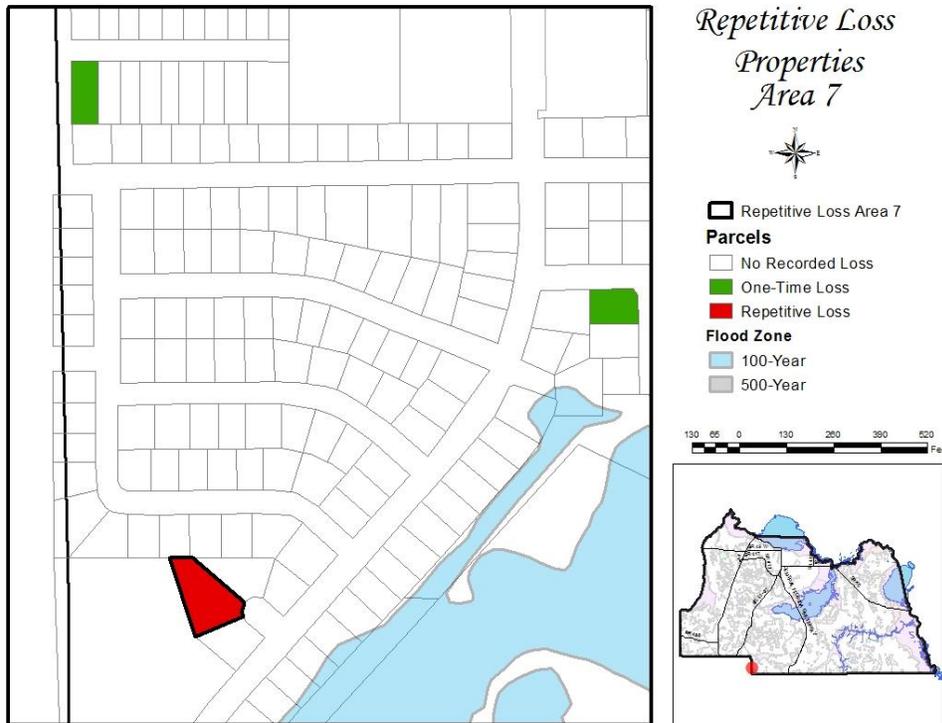
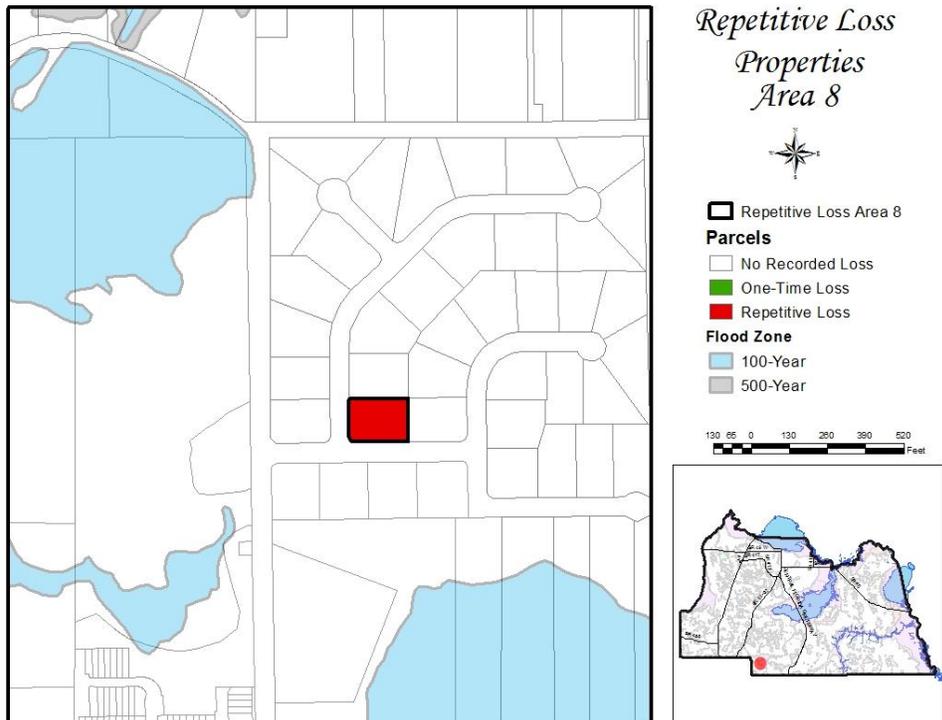


Figure 21: Repetitive Loss Properties Area 8



3.9 Flood Warning Systems

Seminole County residents can sign up for the Alert Seminole Emergency Notification System, which will contact those registered in the event of an emergency that may require evacuation. Residents can also stay prepared by listening to NOAA weather radio, particularly during hurricane season, by visiting Seminole County’s Hurricane and Storm Information website at <http://www.seminolecountyfl.gov/guide/hurricane.asp>, or by calling the citizen information hotline at (407) 665-0311.

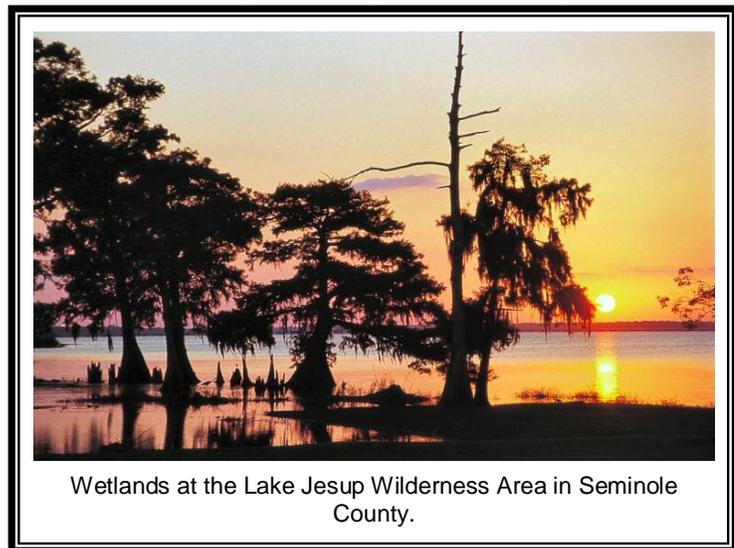
3.10 Natural and Beneficial Areas

In their natural, undeveloped state, floodplains play an important role in flooding. They allow flood waters to spread over a large area, reducing flood velocities and providing flood storage to reduce peak flows downstream. Natural floodplains reduce wind and wave impacts and their vegetation stabilizes soils. Natural cover acts as a filter for runoff and overbank flows, improving water quality and minimizing the amount of sediment transported downstream and the impurities in that sediment. Floodplains can be recharge areas for groundwater and reduce the frequency and duration of low flows of surface water. They provide habitat for diverse species of plants and animals, some of which cannot live in other habitats. Floodplains are particularly important as breeding and feeding grounds. Natural floodplains also moderate water temperature, reducing potential harm to aquatic plants and animals.

Seminole County preserves and manages several wilderness areas to protect biodiversity of species, wildlife corridors, and water resources while offering passive recreation areas for Seminole County residents.

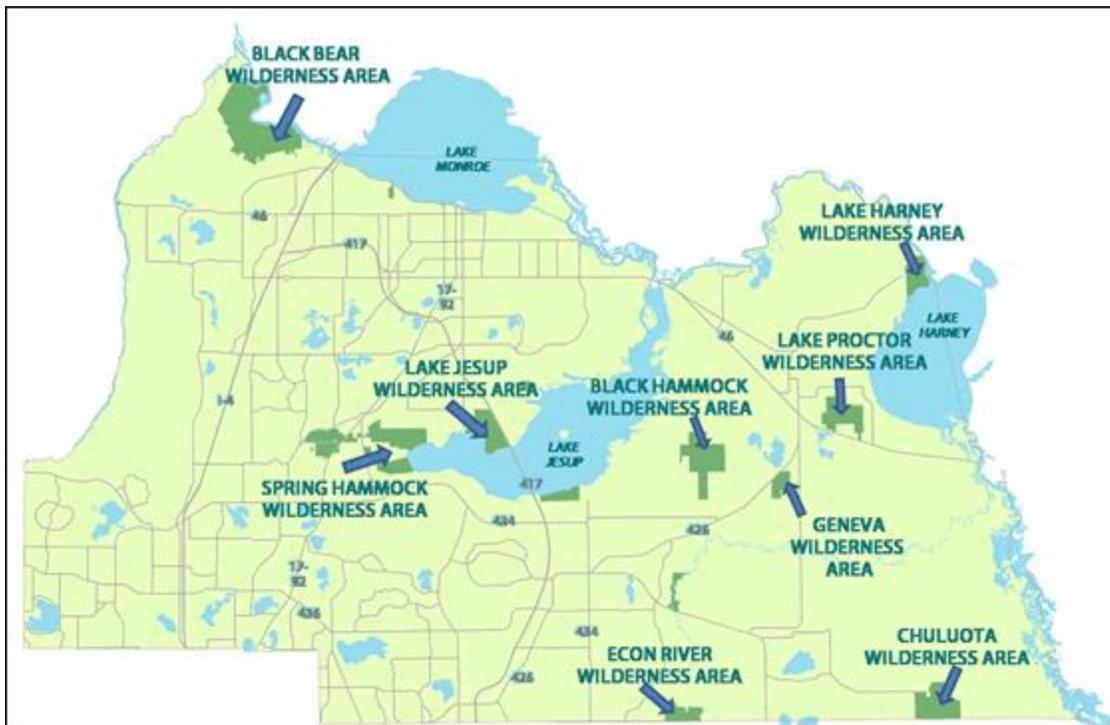
Through a voter approved referendum in 1990, a \$20 million bond was established, creating the Seminole County Natural Lands Program. The primary purpose of this program is to

systematically assess, rank and purchase environmentally significant lands throughout the County. These lands are purchased to preserve or restore their important ecological functions as well as to provide sites for passive, resource based recreational activities. Since the program’s inception, Seminole County has purchased just over 6,600 acres. Several of these sites have been opened for public access, as shown in Figure 22 on the next page.



Wetlands at the Lake Jesup Wilderness Area in Seminole County.

Figure 22: Wilderness Area Open to the Public in Seminole County



3.11 Historical Storms

In evaluating the localized threat of hurricanes and tropical storms to the City, NOAA hurricane track data from 1851 to 2009 was analyzed to identify storms that may have posed a threat to the County. Based on this data, 47 storms, including hurricanes, tropical storms, tropical depressions, extratropical storms, subtropical storms, and subtropical depressions, passed within 25 miles of Seminole County during that time period. Of these 47 storms, 16 were tropical depressions, subtropical depressions and extratropical storms (winds <39 mph), 20 were tropical storms (winds of 39-73 mph), and 11 were hurricanes. One was a Category 3 hurricane (winds of 111-130 mph), Hurricane Donna in 1960. Four were Category 2 hurricanes (winds of 96-110 mph) and six were Category 1 hurricanes (winds 74-95 mph).

3.12 References

1. Flood insurance claims records for Seminole County, FEMA.
2. *Flood Insurance Rate Map for Seminole County and Incorporated Areas*, FEMA.
3. *Local Mitigation Strategy for Seminole County and its Municipalities*, Seminole County.
4. *Seminole County Comprehensive Plan*, Seminole County, 2008.
5. “Storm Events for Florida,” NOAA. Retrieved December 13, 2010 from <http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>.

4 Goals and Objectives

Chapter 3 documents the flood risk that threatens the unincorporated areas of Seminole County, the vulnerability of structures, infrastructure, and critical facilities to floods, and the capacity the County has to reduce the flood hazard. The intent of Goal Setting is to identify areas where the County’s existing capabilities (in terms of policies and programs) can be enhanced so that the community’s overall vulnerability to flood hazards is reduced. Goals are also necessary to guide the review of possible mitigation measures. At the same time, this plan needs to ensure that recommended actions are consistent with what is appropriate for Seminole County. Mitigation goals need to reflect community priorities and be consistent with other plans for the County.

4.1 Background

4.1.1 Seminole County Local Mitigation Strategy

The goals of this plan need to be consistent with and complement the goals of other planning efforts. The primary planning document that this Floodplain Management Plan must complement and be consistent with is the Seminole County Local Mitigation Strategy. This plan will be adopted as an appendix to Seminole County Local Mitigation Strategy; therefore the goals in both planning documents should align and not conflict. The eight goals of the Seminole County Local Mitigation Strategy are:

- **Goal 1:** Local government shall make every reasonable effort to identify, develop, implement, and reduce hazard vulnerability through effective mitigation programs.
- **Goal 2:** All sectors of the community will work together to create a disaster resistant community.
- **Goal 3:** Reduce the vulnerability of critical infrastructures and public facilities from the effects of all hazards.
- **Goal 4:** Strengthen continuity planning for local government operations to avoid significant disruptions.
- **Goal 5:** Develop policies and regulation to support effective hazard mitigation programming throughout the community.
- **Goal 6:** Encourage economic vitality of the community by providing businesses continuity education, disaster planning, and diversifying employment opportunities.
- **Goal 7:** Strengthen community’s infrastructure to minimize significant disruption from a disaster.
- **Goal 8:** Develop and administer public outreach activities to members of the community in vulnerabilities and hazards, techniques to minimize vulnerability, and promote individual mitigation projects.

4.1.2 Goal Setting Exercise

On October 7th, 2010, the Floodplain Management Planning Committee conducted an exercise to outline its goals for this Floodplain Management Plan. The first part of the exercise included asking each committee member, “What would you like to see in Seminole County’s future?” Each member was given a handout (Figure 23) which appears on page 51.

Committee members wrote down their choices on post-it-cards. Each member then explained their choices. The cards were posted on the wall and then organized by similar topics. The results are listed in alphabetical order:

- Educate residents, make them more aware of the flooding risks
- Economic improvement, more job opportunities
- Housing, improved low-income housing, encouraging new development to areas already developed and encourage grant funding for purchase of repetitively flooded homes
- Preservation, protection of both historical and cultural resources
- Open space, encourage the purchase of more land in critically sensitive areas such as floodplain
- Water quality, encourage practices which protect the water quality through best management practices
- Younger people, staying or moving into the area

There was some consistency among the members’ topics. The handout for Exercise 1 has 22 possible statements, but the members’ nominations included fewer than half of them.

A second exercise was then conducted to recommend mitigation goals. Each member was given the handout (Figure 24) on page 52, which asks, “What should be the goals of the mitigation program?” Committee members wrote down their top three choices on post-it cards. After the cards were placed on the wall, they were organized by similar topics. The resulting goals are listed in alphabetical order:

- Educate public on how to protect their property
- Make sure future development doesn’t make things worse
- Mitigate repetitive loss properties through leveraging state and federal funds
- Promote emergency management and warning systems
- Protect the lives, health, safety and welfare of the citizens of Seminole County
- Protect critical and cultural facilities and public infrastructure

The goal statements selected by committee members were in line with what the topics they had discussed as desirable for Seminole County’s future. The exercise revealed important information to guide the planning effort. For example, members stressed the importance of protecting lives and property, even though improving the economy and increasing the number of jobs was an important part of their vision for the future.

4.2 Goals

Following the exercises, the FMPC agreed upon five general goals for this planning effort. The goals were refined and objectives in support of the goals were also added.

- Goal 1:** Protect the lives, health, safety and welfare of the citizens of Seminole County from the effects of flooding
 - Objective 1.1:** Focus natural hazard mitigation efforts on flooding resulting from heavy rainfall which causes runoff, overbank, backwater, and stormwater issues to keep the problem from getting worse
 - Objective 1.2:** Implement regulatory measures to encourage new development in areas that are less likely to be exposed to the effects of flood damage
 - Objective 1.3:** Preserve open space in hazardous areas, especially where there are sensitive natural areas and agricultural lands
 - Objective 1.4:** Protect the environmental integrity of the natural water systems in Seminole County by focusing on water quality and best management practices

- Goal 2:** Promote emergency management and warning system measures to provide better protection to the residents of Seminole County
 - Objective 2.1:** Leverage state and federal emergency management funding for planning, training and equipment
 - Objective 2.2:** Seek funding for the installation of stream and river gages to help provide increased flood warning capability

- Goal 3:** Promote a public education program to encourage self-help and self-protection measures to mitigate the effects of flood damage on private property
 - Objective 3.1:** Encourage residents to assume an appropriate level of responsibility for their own protection
 - Objective 3.2:** Promote flood insurance as a property protection measure against flood damage

- Goal 4:** Protect critical and cultural facilities and public infrastructure from flood damage
 - Objective 4.1:** Seek County, State and Federal support for projects
 - Objective 4.2:** Identify critical infrastructure in need of protection from flood damage

- Goal 5:** Identify and implement specific projects to mitigate flood damage where cost-effective and affordable to include reducing the number of repetitively damaged structures
 - Objective 5.1:** Leverage state and federal grant funding to facilitate buyouts, elevations and other mitigation efforts
 - Objective 5.2:** Target repetitive loss properties for implementation of mitigation projects

Figure 23: Goals Exercise 1

Goals Exercise 1.

What would you most like to see in Seminole County’s future?

Here are possible answers to this question, listed in alphabetical order. Pick three that you think are most important. You may reword them or add new ones if you want.

You have three cards. Use one card for each of your top three answers.

- **Educated children**
- **Improved air quality**
- **Improved water quality**
- **Less new development**
- **Less traffic congestion**
- **Improved/more businesses**
- **Improved/more cultural facilities**
- **Improved/more housing**
- **Improved/more public transportation**
- **Improved/more job opportunities**
- **Improved/more knowledgeable residents**
- **Improved/more open space**
- **Improved/more shopping**
- **New development confined to areas already developed**
- **Preserved historical/cultural sites**
- **Special attention given to elderly/disabled**
- **Special attention given to lower income areas**
- **Special attention given to newer shopping areas**
- **Special attention given to older business areas**
- **Younger people staying/moving into the area**
- **Other_____**

Figure 24: Goals Exercise 2

Goals Exercise 2.

What should be the goals of our mitigation program?

Here are possible answers to this question, listed in alphabetical order. Pick three that you think are most important. You may reword them or add new ones if you want.

You have three cards. Use one card for each of your top three answers.

- **Help people protect themselves**
- **Make sure future development doesn't make things worse**
- **Maximize the share paid by benefiting property owners**
- **Maximize use of state and federal funds**
- **Minimize property owner's expenditures**
- **Minimize public expenditures**
- **New developments should pay the full cost of protection measures**
- **Protect businesses from damage**
- **Protect cars and other vehicles**
- **Protect centers of employment**
- **Protect critical facilities**
- **Protect forests**
- **Protect homes**
- **Protect new/future buildings**
- **Protect people's lives**
- **Protect power stations and power lines**
- **Protect public health**
- **Protect public services (fire, police, etc.)**
- **Protect repetitively flooded areas**
- **Protect scenic areas, greenways, etc.**
- **Protect schools**
- **Protect shopping areas**
- **Protect streets**
- **Protect utilities (power, phone, water, sewer, etc.)**
- **Protect wetlands/environmentally sensitive areas**
- **Protect a particular area** _____
- **Protect a particular property** _____
- **Restrict development in hazardous areas**
- **Use public/private partnerships**
- **Other** _____

5 Preventive Measures

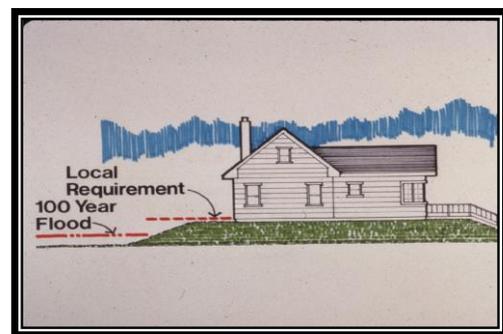
Preventive measures are designed to keep a problem such as flooding from occurring or from getting worse. The objective of preventive measures is to ensure that future development is not exposed to damage and does not cause an increase in damages to other properties. Building, zoning, planning and code enforcement offices usually administer preventive measures. Some examples of types of preventive measures include:

- Building codes
- Planning and zoning
- Open space preservation
- Floodplain regulations
- Stormwater management

5.1 Building Codes

Building codes provide one of the best methods of addressing flood hazards. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood (the flood that is expected to have a one percent chance of occurring in any given year). Building codes in Seminole County also require that driveways are sloped so as to prevent flood waters from draining into a building.

Figure 25: Elevated Home



Just as important as having code standards is the enforcement of the code. Adequate inspections are needed during the course of construction to ensure the builder understands the requirements and is following them. Making sure a structure is properly anchored requires site inspections at each step.

Seminole County’s Code of Ordinances adopts the Florida Building Code by reference, and the State of Florida has some of the most stringent building codes in the nation. Nonetheless, during planning meetings where the mitigation strategies were evaluated, the FMPC discussed possible ways to strengthen Seminole County’s building codes. There is relatively no cost involved in strengthening codes, but since the County adopts the Florida Building Code, the possibility of exceeding current code requirements is extremely slim. Another possibility discussed was to increase the number of elevation reference benchmarks available in the County. The benefit to construction and development of having more elevation reference marks is that developers are able to measure elevation more accurately for new structures, thereby ensuring that the County’s construction code requirements for structure elevations are met.

5.1.1 Manufactured Homes

Manufactured or mobile homes are usually not regulated by local building codes. They are built in a factory and out of state, and they are shipped to a site. They do have to meet construction standards set by the U.S.



Department of Housing and Urban Development. All mobile homes constructed after 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location of these structures and their on-site installation.

The NFIP allows communities to exempt mobile homes in existing mobile home parks from some of the flood protection requirements. The CRS provides up to 50 points if the community does not use this exemption. Seminole County does not use this exemption.

5.1.2 Local Implementation

Seminole County uses the 2007 Florida Building Code with the 2009 Supplements which is based on the 2006 International Building Code. The County's floodplain management ordinance requires development in areas of special flood hazard to be reasonably safe from flooding. This means that new construction and substantial improvements shall be designed or modified and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from flooding. New construction and substantial improvements must also be constructed using methods that minimize flood damage. New construction or substantial improvement of any residential structure, including manufactured homes, must have the lowest floor, including the basement, elevated to no lower than one foot above the base flood elevation. In addition, manufactured homes must be anchored to prevent flotation, collapse, or lateral movement. For commercial properties, the first floor must be elevated to one foot above the base flood or they must be flood-proofed in lieu of being elevated.

5.1.3 CRS Credit

The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. Seminole County's BCEGS rating is a Class 3 for both residential and commercial. Seminole County uses the 2007 Florida Building Code with the 2009 amendments, which is as stringent as the International Building Code, except that the 2009 International Building Code requires residential sprinklers whereas the Florida Building Code does not allow jurisdictions to require them.

The CRS also has a prerequisite for a community to attain a CRS Class 8 or better: the community must have a BCEGS class of 6 or better. To attain a CRS Class 4 or better, the community must have a BCEGS class of 5 or better. Seminole County's BCEGS class is 3/3.

5.2 Planning and Zoning

Building codes provide guidance on how to build in hazardous areas. Planning and zoning activities direct development away from these areas, especially floodplains and wetlands. They do this by designating land uses that are compatible with the natural conditions of lands prone to flooding, such as open space or recreation. Planning and zoning activities can also provide benefits simply by allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach.

5.2.1 Comprehensive Plans

These plans are the primary tools used by communities to address future development. They can reduce future flood-related damages by indicating open space or low density development within floodplains and other hazardous areas. Unfortunately, natural hazards are not always emphasized or considered in the specific land use recommendations.

Generally, a plan has limited authority. It reflects what the community would like to see happen. Its utility is that it guides other local measures, such as capital improvement programs, zoning ordinances, and subdivision regulations.

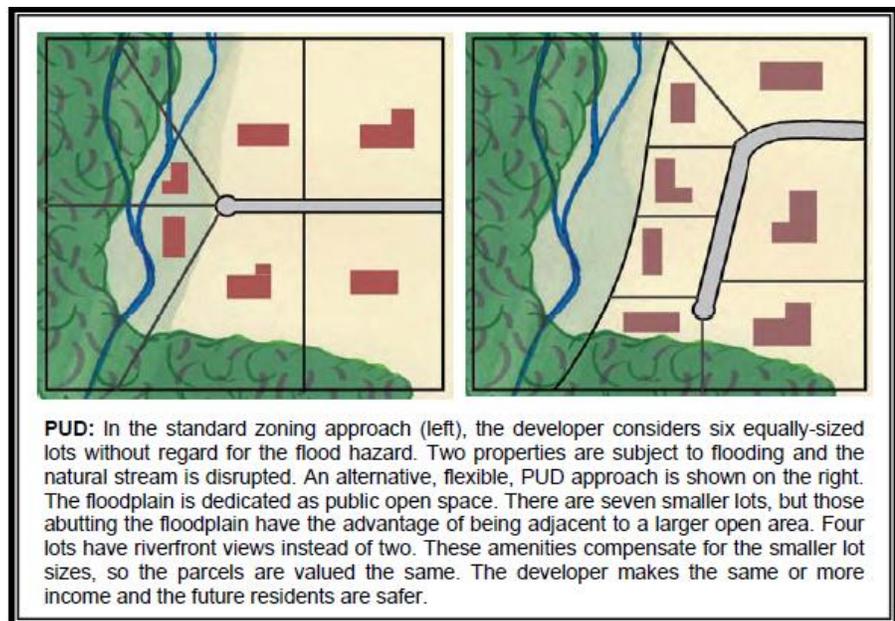
5.2.2 Zoning Regulations

A zoning ordinance regulates development by dividing a community into zones and setting development criteria for each zone. Zoning codes are considered the primary tool to implement a comprehensive plan’s guidelines for how land should be developed. Zoning ordinances can limit development in hazardous areas, such as reserving floodplain zones for agricultural uses. Often, developers will produce a standard grid layout.

The ordinance and the community can allow flexibility in lot sizes and location so developers can avoid hazardous areas.

One way to encourage such flexibility is to use a planned unit development (PUD) approach. This approach allows developers to incorporate flood hazard mitigation measures into projects. Open space or floodplain

Figure 26: Planned Unit Developments



preservation can be facilitated as site design standards and land use densities can be adjusted to fit the property’s specific characteristics, as shown in Figure 26.

5.2.3 Capital Improvement Plans

A capital improvement plan will guide a community’s major public expenditures for a five- to 20-year period. Capital expenditures may include acquisition of open space within the hazardous areas, extension of public services into hazardous areas, or retrofitting existing public structures to withstand a hazard.

5.2.4 Local Implementation

The *Seminole County Comprehensive Plan* includes conservation goals to address the long-range implementation of programs aimed at meeting environmental regulations and preserving the County’s natural amenities. Seminole County uses a multi-faceted system to direct incompatible land uses away from wetlands. To date, this system has managed to preserve most of the wetland acreage in the urban area. There are three primary methods by which the County directs incompatible land uses away from wetlands, and several secondary methods. The primary methods are:

1. **Identification of environmentally sensitive lands.** These lands are to be preserved during the development process.
2. **Land acquisition.** Seminole County also protects wetlands through land acquisition via the County’s Natural Lands Program. In combination with the efforts of the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection and the St. Johns River Water Management District, over 18,000 acres of the County’s 41,000 acres of wetlands are in public ownership. This is roughly 44% of County lands.
3. **Special areas.** The County and the State have designated areas for special consideration to protect wetlands, including the Wekiva River Protection Area, the Econlockhatchee River Protection Zone, and the East Rural Area. These three areas make up roughly 75 percent of the County’s unincorporated area. Development within these areas is managed and regulated to protect natural resources and maintain their rural character.

The secondary methods of directing incompatible uses away from wetlands are through the implementation and execution of the *Comprehensive Plan’s* Future Land Use designations and Seminole County’s Land Development Code.

1. **Special Techniques.** For example, allowing clustering of development, or planned development, in exchange for preserving open areas which protects natural resources from development.
2. **Environmentally Sensitive Land Overlay.** Seminole County maintains an Environmentally Sensitive Lands Overlay Area, as defined in the *Comprehensive Plan*. The Environmentally Sensitive Lands Overlay Area includes any areas flooded during a 100-year flood event or identified by NFIP as Zone A or Zone V, as well as wetlands as defined by the St. Johns River Water Management District. This designation is used to limit permitted uses on wetland properties and direct development away from

environmentally sensitive lands.

3. **The Urban/Rural Boundary.** This boundary forms the foundation for both wetland regulation and for the land uses that are assigned throughout the County. Having established that the East Rural Area contains a high quality mosaic of valuable wetland and upland systems, the County has adopted a limited number of land use designations of very low density in the Rural Area to protect these resources.

5.2.5 CRS Credit

The CRS provides flood insurance discounts to those communities that implement various floodplain management activities that meet certain criteria. Comparing local activities to those national criteria helps determine if local activities should be improved.

Up to 100 points are provided for regulations that encourage developers to preserve floodplains or other hazardous areas from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Up to 600 points are provided for setting aside floodplains for low density zoning, such as five acre lots or conservation.

5.3 Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

Although there are some federal programs that can help acquire or preserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes. These are usually linear areas along property lines or channels. Maintenance easements also can be donated by streamside property owners in return for a community maintenance program.

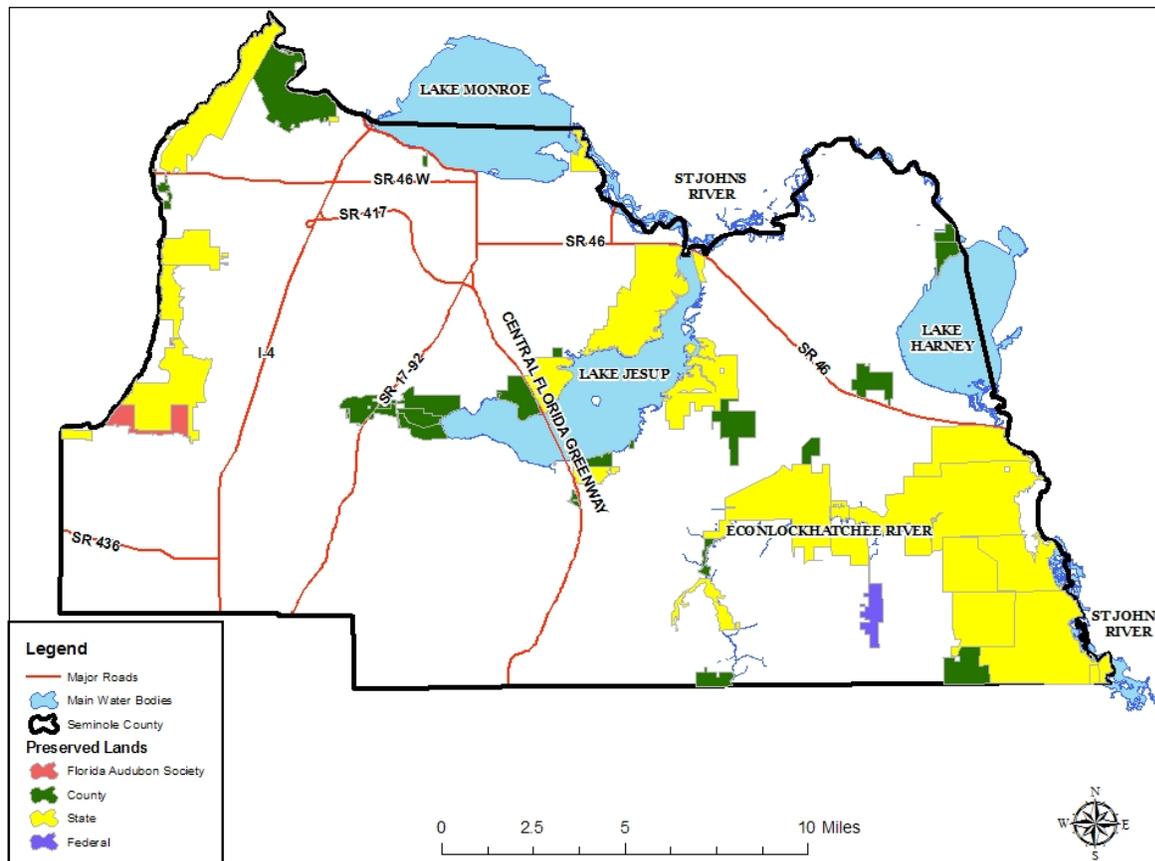
5.3.1 Local Implementation

In 1990, the voters of Seminole County approved a \$20 million dollar bond which created the Seminole County Natural Lands Program (NLP). The NLP established a system to access, rank and purchase environmentally significant lands throughout the County. In 2000, a voter-approved referendum provided for \$25 million dollars with \$20 million dollars of support of the County trails program and \$5 million dollars for natural lands. The County used these funds to purchase land to preserve or restore their important ecological functions, as well as provide sites for passive resource-based recreational activities. Since the inception of the program, Seminole County has purchased and currently manages just over 6,600 acres of land through the NLP.

The County's adoption of flood prone and wetland ordinances were critical steps in providing countywide protection of wetlands. The County's wetlands protection program has established

an extensive network of wetlands under conservation easements. Land acquisition efforts by Seminole County and the State of Florida have led to the conservation of major wetland systems in the Econlockhatchee, Wekiva, St. Johns, and Lake Jesup Basins. An ongoing focus on the conservation of intact wetland systems in the rural portion of the County supplements these acquisition programs. Preserved lands in Seminole County are shown in the figure below.

Figure 27: Preserved Lands in Seminole County



Wilderness areas and trails created from these referendums include the Black Bear, Black Hammock, Geneva, Chuluota, Lake Proctor, Econ River, Lake Jesup, and Spring Hammock Preserve. These environmental assets are open to the public for environmental education and passive recreation. The County designated these lands as “Preservation/Managed Lands” on the Future Land Use Plan Map in 2008. The County will continue to manage the more than 6,600 acres of Natural Lands acquired through these bond referendum for the preservation of significant natural habitats, open space areas and greenways.

In addition, the Comprehensive Plan states that the County shall include in its Land Development Code neighborhood performance standards for “common, liked and usable open space for active and/or passive recreation, including interconnected walkways, bikeways, trails and greenways” as well as “Preservation of onsite natural lands.” The County’s Land Development Code requires that all new development, unless otherwise specified within the Code, include a minimum amount of urban, suburban or rural open space and that open space

areas within a development be connected to each other. The amount and type of required open space varies with the character of the proposed development and surrounding land uses. For commercial developments, the open space ratio is a minimum of 25% of the parcel.

5.3.2 CRS Credit

Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Up to 700 points can be given, based on how much of the floodplain is in parks, wildlife refuges, golf courses, or other uses that can be depended on to stay open (Activity 420 – Open Space Preservation).

5.4 Subdivision Regulations

Subdivision regulations govern how land will be subdivided and set construction standards. These standards generally address roads, sidewalks, utilities, storm sewers, and drainageways. They can include the following flood protection standards:

- Requiring that the final plat show all hazardous areas
- Requiring that each lot be provided with a building site above the flood level
- Requiring that all roadways be no more than one foot below the flood elevation

5.4.1 Local Implementation

Seminole County’s subdivision regulations require:

- Final subdivision plats require the 100-year floodplain boundary to be identified.

5.5 Floodplain Regulations

Most communities with a flood problem participate in the National Flood Insurance Program (NFIP). The NFIP sets minimum requirements for the participating communities’ standards for development, subdivision of land, construction of buildings, installation of mobile homes, and improvements and repairs to buildings. These are usually spelled out in a separate ordinance.

The NFIP minimum requirements are summarized in the box on the next page. It should be stressed that these are minimum requirements. To gain credit in the CRS, communities must adopt and implement floodplain regulations that go above and beyond the minimum requirements of the NFIP.

5.5.1 Enforcement

To ensure that communities are meeting the NFIP standards, FEMA periodically conducts a Community Assessment Visit. During this visit, the maps and ordinances are reviewed, permits are checked, and issues are discussed with staff. Failure to meet all of the requirements can result in one or more consequences:

- Reclassification under the Community Rating System to a higher class
- Probation, which entails a \$50 surcharge on every flood insurance policy in the community, or

- Suspension from the NFIP.

In 2004, Lafourche Parish, Louisiana, was cited and reclassified from a CRS Class 9 to a Class 10, in effect kicking the Parish out of the CRS. Suspension is more serious. It means that the community is out of the NFIP and the following sanctions are imposed:

- Flood insurance will not be available. No resident will be able to purchase a flood insurance policy.
- Existing flood insurance policies will not be renewed.
- No direct federal grants or loans for development may be made in identified flood hazard areas under programs administered by federal agencies, such as HUD, EPA, and the Small Business Administration.
- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- No federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas. This includes policies written by FHA, VA, and others.
- Federally insured or regulated lending institutions, such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that there is a flood hazard and the property is not eligible for federal disaster relief.

These sanctions can be severe for any community with a substantial number of buildings in the floodplain. Most communities with a flood problem have joined the NFIP and are in full compliance with their regulatory obligations.

One way to assure good administration and enforcement is to have Certified Floodplain Managers on staff. The Association of State Floodplain Managers administers the national Certified Floodplain Manager (CFM[®]) program. Certification involves a three hour exam and a requirement for continuing education each year. The exam covers the regulatory standards of the National Flood Insurance Program as well as mapping, administration, enforcement and flood hazard mitigation.

5.5.2 Minimum NFIP Regulatory Requirements

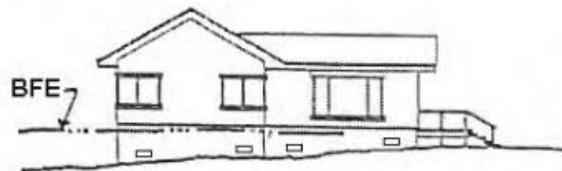
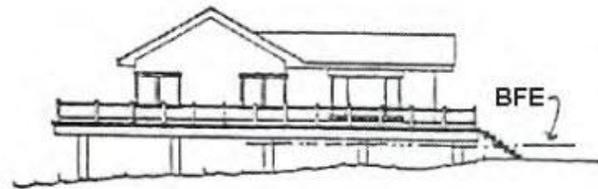
The NFIP is administered by FEMA. As a condition of making flood insurance available for their residents, communities that participate in the NFIP agree to regulate new construction in the area subject to inundation by the 100-year (base) flood. The floodplain subject to these requirements is shown as an A or V Zone on the Flood Insurance Rate Map (FIRM).

There are five major floodplain regulatory requirements. Additional floodplain regulatory requirements may be set by state and local laws.

Communities are encouraged to adopt local ordinances that are more comprehensive or provide more protection than the federal criteria. The NFIP’s Community Rating System provides insurance premium credits to recognize the additional flood protection benefit of higher regulatory standards.

5.5.3 Local Implementation

Seminole County’s Floodplain Ordinance meets all of the NFIP’s floodplain regulatory requirements. The County’s Floodplain Ordinance exceeds minimum NFIP standards for a number of elements that are credited in the CRS.



5.5.4 CRS Credit

There are many higher regulatory standards that warrant CRS credit. These standards include:

- Delineating a floodway, the area of higher hazard near the channel. This would allow development outside the floodway (called the “floodplain fringe”) without engineering studies to determine their impact on others.
- Requiring all new construction to be elevated one or two feet above the base flood elevation to provide an extra level of protection from waves and higher floods. This extra protection is reflected in a distinct reduction in flood insurance rates.
- Having all developers (not just the larger ones) provide flood data where none are available.
- Specifications to protect foundations from erosion, scour and settling.
- Prohibiting critical facilities from all or parts of the floodplain.
- Prohibiting hazardous materials.
- Requiring buffers adjacent to streams or natural areas.
- Restrictions on use of enclosures below elevated buildings.
- Flood storage lost due to filling and construction must be compensated for by removal of an equal volume of storage.
- The CRS also provides credit for having trained staff and a higher credit if the staff members are Certified Floodplain Managers.

It should be noted that one of the prerequisites for participation in the CRS is that the community be in full compliance with the minimum requirements of the NFIP. A community with a number of “potential violations” risks being removed from the CRS entirely.

Seminole County’s Floodplain Ordinance requires that residential construction is built with the lowest floor no lower than one foot above the base flood elevation, which is an extra requirement beyond NFIP’s minimum requirements. An additional requirement beyond the minimum for Seminole County is that the ordinance sets specific restrictions on the use of enclosures below elevated buildings.

The County has a total of ten Certified Floodplain Managers on staff, four of whom are in the Building Division.

Buffers are required within wetlands to protect the natural and beneficial functions of the floodplain.

Seminole County has a floodplain storage capacity requirement that requires that if fill is brought into a development, an equal amount of fill must be removed somewhere in the floodplain to maintain the floodplain storage capacity.

5.6 Stormwater Management

Development in floodplains is development in harm’s way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.

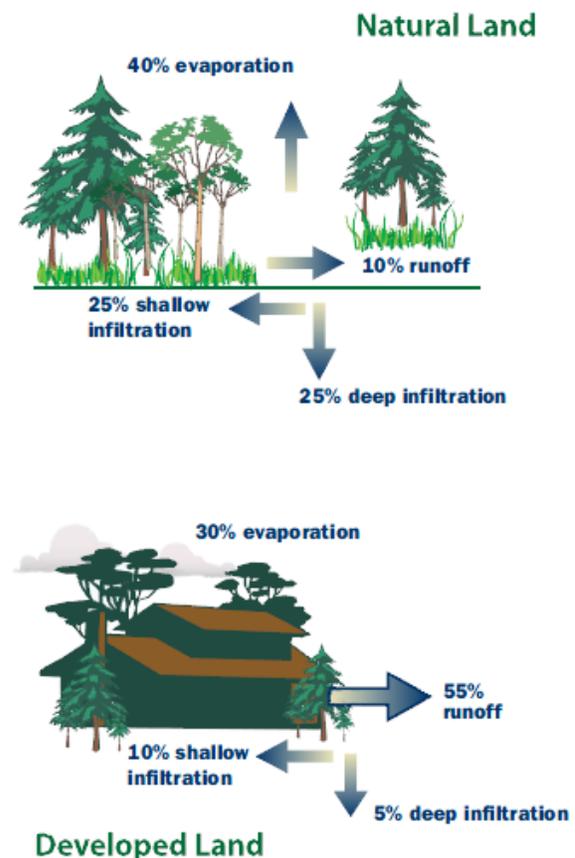
Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see graphic). Development in the watershed that drains to a river can aggravate downstream flooding, overload the community’s drainage system, cause erosion, and impair water quality.

There are three ways to prevent flooding problems caused by stormwater runoff:

1. Regulating development in the floodplain to ensure that it will be protected from flooding and that it won’t divert floodwaters onto other properties, and
2. Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions.
3. Set construction standards so buildings are protected from shallow water.

Most communities participate in the NFIP, which sets minimum requirements for regulating development in the floodplain. The State of

Figure 29: Effect of Development on Stormwater



Florida has more stringent requirements than the NFIP, including a requirement that all new buildings must be elevated to no lower than one foot above the base flood elevation.

Stormwater runoff regulations require developers to build retention or detention basins to minimize the increases in the runoff rate caused by impervious surfaces and new drainage systems. Generally, each development must not let stormwater leave at a rate higher than what existed under pre-development conditions.

Standards for drainage requirements are typical in subdivision regulations. Standards for storm sewers, ditches, culverts, etc., are best set when an area is laid out and developed. Traditionally, the national standard is to require that the local drainage system carry the 10-year storm. Recently, communities are finding that older estimates of the 10-year storm understated the true hazard, so they are addressing larger storms.

One problem with requiring the drainage system to carry water away is that runoff increases with urban development. The runoff equivalent of a 10-year storm occurs more frequently, and from smaller storms. The problem is just sent downstream onto someone else's property.

Accordingly, modern subdivision regulations require new developments to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions. This is usually done by constructing retention or detention basins to hold the runoff for a few hours or days, until flows in the system have subsided and the downstream channels can accept the water without flooding.

If the storm sewers or roadside ditches cannot handle a heavy rain, the standard subdivision design uses the streets to carry excess runoff. If the flows exceed the streets' capacity, adjacent properties will flood. Therefore, the third approach to protecting from stormwater flooding is to make sure new buildings are elevated one or two feet above the street or above adjacent grade.

5.6.1 Local Implementation

The County's surface water management standards, within the Land Development Ordinance, set requirements for managing runoff from new developments. The standards require the storage and controlled release or retention on-site and infiltration into the ground of excess stormwater runoff from any commercial, industrial, and residential developments such that runoff from the site and peak attenuation rates will not be greater post-development than they were prior to development.

The procedure for disposing of excess stormwater runoff varies depending on the Hydrologic Soil Classification of the soils within the proposed development. For pervious soils (types A and B), the required overall stormwater management strategy is on-site retention and infiltration into the ground. For impervious soils (types C and D) or high ground water table areas (types A/D, B/D and C/D) the required overall stormwater management system is providing detention basins to attenuate the peak from the contributory drainage area and to settle solids washed off or eroded.

The Land Development Ordinance also encourages the use of natural vegetative cover in controlling erosion. The ordinance provides for two overlay districts that protect the Wekiva River and the Econlockhatchee River by requiring design standards that establish high quality development that is rural, maintains existing vegetation, protects wetlands, and minimizes

disturbance to certain species and their habitats. Within the Wekiva River zoning overlay, development activity and the placement or depositing of fill is prohibited within wetlands and the 100-year floodplain. Within the Econlockhatchee zoning overlay, native plants must be used and removal of vegetation minimized in landscaping to the greatest extent practical and peak discharge rates for stormwater BMPs shall not exceed the pre-development rate for the mean annual storm event (24 hour, 2.3 year return period) and the 25-year storm. In some parts of the Econlockhatchee zoning overlay, development is prohibited within 550 feet of the stream's edge of channels of the Big Econlockhatchee River and the Little Econlockhatchee River except for the creation of wetlands and passive recreational uses.

5.6.2 CRS Credit

CRS credit is provided for both higher regulatory standards in the floodplain and stormwater management standards for new developments. Credit is based on how those standards exceed the minimum NFIP requirements.

The County's Surface Water Management Ordinance has the following provisions that would be recognized by the CRS (in addition to provisions discussed in previous sections):

- Standards for retention and detention basis
- Requirements for erosion and sedimentation control,

The County should receive at least 156 points for these provisions.

5.7 Conclusions

1. Installation of new mobile homes appears to be adequately administered to ensure proper tie downs and flood protection.
2. The majority of the comprehensive and land use plans address floodplains and the need to preserve these hazardous areas from intensive development. However, most zoning ordinances do not designate floodprone areas for any special type of land use.
3. Standards in subdivision regulations for public facilities should account for the hazards present at the site. New building sites, streets, and water systems should facilitate access and use by fire and emergency equipment.
4. A percentage of the county's floodplain is open space in public ownership. Because some of the floodplain is still undeveloped and not preserved as open space preventive measures can have a great impact on future flood damages. There are more opportunities to preserve more open space, especially when new developments are proposed.
5. The County's floodplain development and stormwater management regulations exceed minimum national and state standards, for the most part, and will be helpful in preventing flood problems from increasing.

5.8 Recommendations

1. The County planning and engineering staff should develop example subdivision ordinance language that requires new infrastructure to have hazard mitigation provisions, such as:
 - a. Buried utility lines and
 - b. Storm shelters in new mobile home parks.
2. The County should use every opportunity to preserve floodplain areas as open space or other uses compatible with the flooding hazard.
3. The County should continue to enforce its existing regulations for development and mobile homes and consider other higher standards to further protect the residents of Seminole County.

5.9 References

1. *CRS Coordinator's Manual*, FEMA, 2007.
2. *Design and Construction Guidance for Community Shelters*, FEMA, 2000.
3. *Manufactured Home Installation in Flood Hazard Areas*, FEMA, 1985.
4. *Multi-Hazard Identification and Risk Assessment*, FEMA, 1997.
5. Seminole County Code of Ordinances and Land Development Code, Seminole County.
6. *Subdivision Design in Flood Hazard Areas*, American Planning Association and FEMA, PAS Report 473, 1997.
7. *State of Florida Flood Damage Prevention Ordinance for Non-Coastal Communities with Regulatory Floodways*, Model Ordinance, 2009.

6 Property Protection Measures

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building,
- Modify the building so it can withstand the impacts of the hazard, and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency. These are discussed later in this chapter.

6.1 Keeping the Hazard Away

Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reach a house.

6.1.1 Flooding

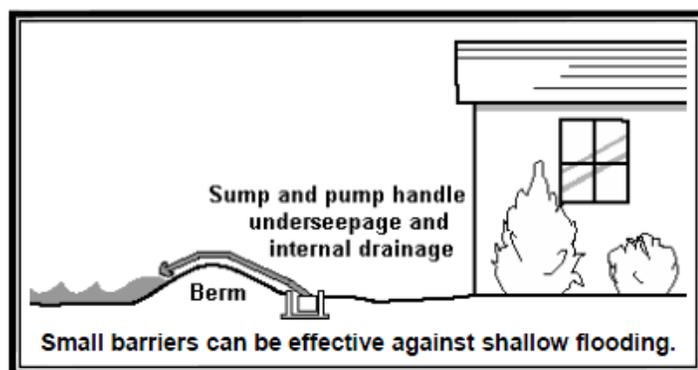
There are five common methods to keep a flood from reaching and damaging a building:

1. Erect a barrier between the building and the source of the flooding.
2. Move the building out of the floodprone area.
3. Elevate the building above the flood level.
4. Demolish the building.
5. Replace the building with a new one that is elevated above the flood level.

6.1.2 Barriers

A flood protection barrier can be built of dirt or soil (a “berm”) or concrete or steel (a “floodwall”). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall

Figure 30: Flood Protection Barrier



inside the perimeter. This is usually done with a sump or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.

Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained. A berm can also settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).



This low floodwall has landscaping to minimize the adverse impact on the property's appearance.

6.1.3 Relocation

Moving a building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. However, experienced building movers can handle any job.



Small, wood frame buildings are the easiest to relocate
Source: Kennedy House Movers, Huntsville, AL

In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

6.1.4 Building Elevation

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents.



Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

One concern with elevation is that it may expose the structure to greater impacts from other hazards. If not braced and anchored properly, an elevated building may have less resistance to the shaking of an earthquake and the pressures of high winds.

6.1.5 Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is cheaper to demolish them and either replace them with new, flood protected structures (“pilot reconstruction”), or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move – such as larger, slab foundation or masonry structures – and for dilapidated structures that are not worth protecting. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public open space use, like a park.

One problem that sometimes results from an acquisition and demolition project is a “checkerboard” pattern in which nonadjacent properties are acquired. This can occur when some owners, especially those who have and prefer a waterfront location, are reluctant to leave their homes. Creating such an acquisition pattern in a community simply adds to the maintenance costs that taxpayers must support.



6.1.6 Pilot Reconstruction

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood and wind protection codes. This was formerly known as “demo/rebuild.” FEMA funding programs refer to this approach as “pilot reconstruction.” It is still a pilot program, and not a regularly funded option.

Certain rules must be followed to qualify for federal funds for pilot reconstruction:

- Pilot reconstruction is only possible after it has been shown that acquisition or elevation are not feasible, based on the program’s criteria.
- Funds are only available to people who owned the property at the time of the event for which funding is authorized.
- It must be demonstrated that the benefits exceed the costs.
- The new building must be elevated to the advisory base flood elevation.
- The new building must not exceed more than 10% of the old building’s square footage.
- The new building must meet all flood and wind protection codes.
- There must be a deed restriction that states the owner will buy and keep a flood insurance policy.

- The maximum federal grant is 75% of the cost, up to \$150,000. FEMA is developing a detailed list of eligible costs to ensure that disaster funds are not used to upgrade homes.

6.1.7 Local Implementation

Seminole County has had experience with acquisition, demolition, or elevation to protect buildings from flooding. The County has received grants from FEMA to manage these programs. The County is currently in the process of removing structures from the floodplain.

6.1.8 CRS Credit

The CRS provides the most credit points for acquisition and relocation, because this measure permanently removes insurable buildings from the floodplain. Under Activity 520 – Acquisition and relocation, Seminole County could receive up to 100 points for Option 2.

The CRS credits barriers and elevating existing buildings (Activity 530 – Flood Protection). Elevating a building above the flood level will also reduce the flood insurance premiums on that individual building. A CRS score of up to 84 points is possible. Because barriers are less secure than elevation, not as many points are provided.

Higher scores are possible, but they are based on the number of buildings removed compared to the number remaining in the floodplain.

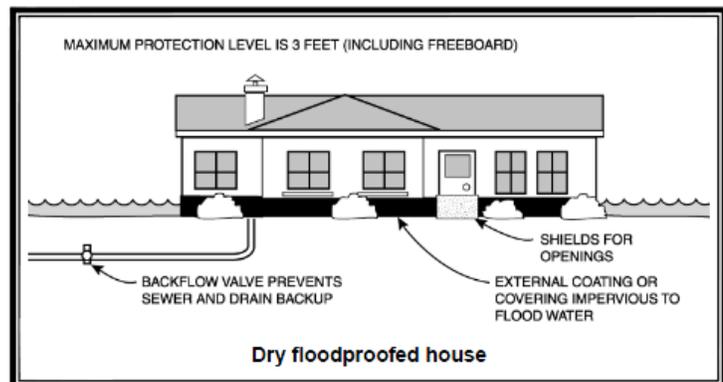
6.2 Retrofitting

An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. There are a variety of techniques to do this, as described below.

6.2.1 Dry Floodproofing

Dry floodproofing entails making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

Figure 31: Dry Floodproofing



Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

6.2.2 Wet Floodproofing

The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. This is the approach used for the first floor of the elevated homes described in the previous section.

For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms. This practice is not generally used in central and southern Florida where most structures are slab on grade.

6.2.3 Local Implementation

It is likely that some properties in Seminole County have been retrofitted to protect them from flooding. However, because these projects are often so small, they generally do not require a building permit and there are no records of them.

6.2.4 CRS Credit

Credit for dry and wet floodproofing is provided under Activity 530 – Retrofitting. Because these property protection measures are less secure than barriers and elevation, not as many points are provided.

6.3 Insurance

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures in the process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without human intervention for the measure to work.

6.3.1 Private Property

Although most homeowner’s insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and

Figure 32: Example Flood Insurance Premiums

Building Exposure	Premium
In the Special Flood Hazard Area (AE Zone)	\$1,689
Pre-FIRM ("subsidized") rate	
Post-FIRM (actuarial) rates	
2 feet above the base flood elevation	\$440
1 foot above the base flood elevation	\$643
At the base flood elevation	\$1,167
1 foot below the base flood elevation	\$4,379
Outside the Special Flood Hazard Area	\$1,029

Premiums are for \$150,000 in building coverage and \$75,000 in contents coverage for a one-story house with no basement and a \$500 deductible, using the October 2008 Flood Insurance Manual. Premiums include the 5% Community Rating System discount. Premiums are higher for local governments that do not participate in the CRS.

their contents damaged by a “general condition of surface flooding” in the area.

Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building’s structure and not the contents. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building.

6.3.2 Public Property

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government’s budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

Under Section 406(d) of the Stafford Act:

“If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] ... and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce Federal disaster assistance by the *maximum* amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard flood insurance policy. [Generally, the maximum amount of proceeds for a non-residential property is \$500,000.]

[Communities] Need to:

- Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.
- Identify all facilities that have previously received Federal disaster assistance for which insurance was required. Determine if insurance has been maintained. *A failure to maintain the required insurance for the hazard that caused the disaster will render ineligible for Public Assistance funding...*
- [Communities] *must* obtain and maintain insurance to cover [their] facility – buildings, equipment, contents and vehicles – for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met. – FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000

In other words, the law expects public agencies to be fully insured as a condition of receiving federal disaster assistance.

6.3.3 Local Implementation

Data on private insurance policies is not available. NFIP flood insurance is available in Seminole County. As of September 30, 2010, there were 4,695 flood insurance policies in

6.0 PROPERTY PROTECTION MEASURES

Seminole County. These policies are shown in Table 15 on the next page and shown by occupancy of building in Table 16.

Table 15: Flood Insurance Policies in Seminole County

	Total	Group Flood Insurance	Manufactured Homes
Number of Policies	4,695	1	51
Total Premiums	\$1,958,017	\$600	data unavailable
Insurance in Force	\$1,229,111,400	\$28,800	data unavailable
Number of Closed Paid Losses	194	0	6
\$ Value of Closed Paid Losses	\$3,640,195	\$0	\$78,449

Table 16: Flood Insurance Policies by Occupancy in Seminole County

Occupancy	Policies in Force	Insurance in Force	Number of Closed Paid Losses	Value of Closed Paid Losses
Single Family	4,356	\$1,772,549	185	\$3,423,529
2-4 Family	39	\$10,470	0	\$0
All Other Residential	205	\$38,491	0	\$0
Non-Residential	95	\$136,507	9	\$216,666
Total	4,695	\$1,958,017	194	\$3,640,195

The number of flood insurance policies by FEMA flood zone is also available, as shown in Tables Table 17: Flood Insurance Policies by Flood Zone and 18, below.

Table 17: Flood Insurance Policies by Flood Zone

Zone	Pre-Firm		Post-Firm		Total	
	Policies in Force	Insurance in Force	Policies in Force	Insurance in Force	Policies in Force	Insurance in Force
A Zones	506	\$379,797	1,005	\$470,025	1,511	\$849,822
V Zones	0	\$0	0	\$0	0	\$0
X Zones	834	\$285,649	2,349	\$821,946	3,183	\$1,107,595

Table 18: Number and Value of Losses by Flood Zone

Zone	Pre-Firm		Post-Firm		Total	
	Number of Closed Paid Losses	Value of Closed Paid Losses	Number of Closed Paid Losses	Value of Closed Paid Losses	Number of Closed Paid Losses	Value of Closed Paid Losses
A Zones	57	\$1,863,346	70	\$1,031,601	127	\$2,894,947
V Zones	0	\$0	0	\$0	0	\$0
X Zones	42	\$564,204	23	\$171,974	65	\$736,178

6.3.4 CRS Credit

There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage.

6.4 The Government's Role

Property protection measures are usually considered the responsibility of the property owner. However, local governments should be involved in all strategies that can reduce flood losses, especially acquisition and conversion of a site to public open space. There are various roles the County or a municipality can play in encouraging and supporting implementation of these measures.

6.4.1 Government Facilities

One of the first duties of a local government is to protect its own facilities. Fire stations, water treatment plants and other critical facilities should be a high priority for retrofitting projects and insurance coverage. Often public agencies discover after the disaster that their “all-hazard” insurance policies do not cover the property for the type of damage incurred. Flood insurance is even more important as a mitigation measure because of the Stafford Act provisions discussed above.

6.4.2 Public Information

Providing basic information to property owners is the first step in supporting property protection measures. Owners need general information on what can be done. They need to see examples, preferably from nearby. Public information activities that can promote and support property protection are covered in Chapter 9.

6.4.3 Financial Assistance

Communities can help owners by helping to pay for a retrofitting project. Financial assistance can range from full funding of a project to helping residents find money from other programs. Some communities assume responsibility for sewer backups, street flooding, and other problems that arise from an inadequate public sewer or public drainage system. Less expensive community programs include low interest loans, forgivable low interest loans and rebates. A forgivable loan is one that does not need to be repaid if the owner does not sell the house for a specified period, such as five years. These approaches don't fully fund the project, but they cost the community less and they increase the owner's commitment to the flood protection project. Often, small amounts of money act as a catalyst to pique the owner's interest to get a self-protection project moving.

The more common outside funding sources are listed below. Unfortunately, the last three are only available after a disaster, not before, when damage could be prevented. Following past disaster declarations, FEMA and the Florida Division of Emergency Management have provided advice on how to qualify and apply for these funds.

Pre-disaster funding sources:

- FEMA’s Pre-Disaster Mitigation (PDM) grants (administered by the Florida Division of Emergency Management)
- FEMA’s Flood Mitigation Assistance (FMA) grants (administered by the Florida Division of Emergency Management)
- Community Development Block Grants (administered by the Florida Division of Housing and Community Development)
- The Florida Department of Environmental Protection
- Conservation organizations, although generally these organizations prefer to purchase vacant land in natural areas, not properties with buildings on them.

Property Protection Rebates

The Village of South Holland, Illinois received national recognition for its rebate program to help property owners fund retrofitting projects that protect against surface and subsurface flooding. If a project is approved, installed and inspected, the Village will reimburse the owner 25% of the cost up to \$2,500. Over 450 floodproofing and sewer backup protection projects have been completed under this program. Perhaps not surprisingly, contractors have become some of the best agents to publicize this program.

Post-disaster funding sources:

- Insurance claims
- The NFIP’s Increased Cost of Compliance (ICC). This provision increases a flood insurance claim payment to help pay for a flood protection project required by code as a condition to rebuild the flooded building. It can also be used to help pay the non-federal cost-share of an elevation project.

Post-disaster funding sources, federal disaster declaration needed

- FEMA’s disaster assistance (for public properties). However, the amount of assistance will be reduced by the amount of flood insurance that the public agency should be carrying on the property. (administered by the Florida Division of Emergency Management)
- Small Business Administration disaster loans (for non-governmental properties)
- FEMA’s Hazard Mitigation Grant Program (administered by the Florida Division of Emergency Management)

6.4.4 Acquisition Agent

The community can be the focal point in an acquisition project. Most funding programs require a local public agency to sponsor the project. The local government could process the funding application, work with the owners, and provide some, or all, of the local share. In some cases, the local government would be the ultimate owner of the property, but in other cases another public agency, such as Florida State Parks, could assume ownership and the attendant maintenance responsibilities.

6.4.5 Mandates

Mandates are considered a last resort if information and incentives are insufficient to convince a property owner to take protective actions. An example of a retrofitting mandate is the requirement that communities have to disconnect downspouts from the sanitary sewer line.

There is a mandate for improvements or repairs made to a building in the mapped floodplain. If the project equals or exceeds 50% of the value of the original building, it is considered a “substantial improvement.” The building must then be elevated or otherwise brought up to current flood protection codes.

Another possible mandate is to require less expensive hazard protection steps as a condition of a building permit. For example, many communities require upgraded electrical service as a condition of a home improvement project. If a person were to apply for a permit for electrical work, the community could require that the service box be moved above the base flood elevation or the installation of a separate ground fault interrupter circuits in the basement.

6.4.6 Local Implementation

As discussed in Chapter 1, there are many critical facilities, most of which are not subject to flooding and have no requirement for protection from flooding.

There have most likely been some flood protection measures implemented by homeowners in the County. In the past there has been one demolition/rebuild project and currently Seminole County is in the process of acquiring structures through FEMA’s Hazard Mitigation Grant Program.

6.4.7 CRS Credit

Except for public information programs, the CRS does not provide credit for efforts to fund, provide incentives, or mandate property protection measures. CRS credits are provided for the actual projects after they are completed. However, to participate in CRS, a community must certify that it has adequate flood insurance on all properties that have been *required* to be insured. The minimum requirement is to insure those properties in the mapped floodplain that have received federal aid, as specified by the Flood Disaster Protection Act of 1973.

6.5 Repetitive Loss Properties and Analysis

Chapter 2 explains the criteria for designation of the County’s repetitive loss areas. These properties deserve special attention because they are more prone to damage by natural hazards than any other properties in the County. Further, protecting repetitive loss buildings is a priority with FEMA and Florida Division of Emergency Management mitigation funding programs.

Flood insurance policies and paid amounts for repetitive loss properties in Seminole County are shown in Table 19 on the next page.

Table 19: Flood Insurance for Repetitive Loss Properties

	A Zones	V Zones	X Zones	Total
RL Buildings (total)	9	0	6	15
RL Buildings (insured)	5	0	5	10
RL Losses (total)	20	0	13	33
RL Losses (insured)	11	0	0	11
RL Payments (total)	\$711,301.87	\$0.00	\$140,102.94	\$851,404.81
Buildings	\$666,441.90	\$0.00	\$115,490.42	\$781,932.32
Contents	\$44,859.97	\$0.00	\$24,612.52	\$69,472.49
RL Payments (insured)	\$211,529.05	\$0.00	\$128,390.10	\$339,919.15
Buildings	\$188,835.74	\$0.00	\$103,777.58	\$292,613.32
Contents	\$22,693.31	\$0.00	\$24,612.52	\$47,305.83

6.6 Conclusions

1. There are several ways to protect individual properties from damage by natural hazards. The advantages and disadvantages of each should be examined for each situation.
2. Property owners can implement some property protection measures at little cost, especially for sites in areas of low hazards (e.g., shallow flooding, sewer backup, and thunderstorms). For other measures, such as relocation and elevation, the owners may need financial assistance.
3. Only 9.4% of the buildings in the County’s floodplains are covered by flood insurance.
4. Local government agencies can promote and support property protection measures through several activities, ranging from public information to financial incentives to full funding.
5. It is unlikely that most government properties, including critical facilities, have any special measures to protect them from flooding.
6. Property protection measures can protect the most damage-prone buildings in the County: repetitive loss properties.

6.7 Recommendations

1. Public education materials should be developed to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available.
2. Because properties in floodplains will be damaged at some point, a special effort should be made to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas.
3. All property protection projects should be voluntary. Other than state and federally mandated regulations, local incentives should be positive as much as possible, such as providing financial assistance.

4. A standard checklist should be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the public.
5. Seminole County should evaluate its own properties using the standard checklist. A priority should be placed on determining critical facilities' vulnerability to damage and whether public properties are adequately insured.
6. Seminole County should protect its own publicly owned facilities with appropriate mitigation measures.
7. Seminole County should establish cost sharing programs, such as rebates, to encourage low cost (under \$10,000) property protection measures on private property, for example:
 - Surface and subsurface drainage improvements,
 - Berms and regrading for shallow surface flooding, and
 - Relocating heating and air conditioning units above the base flood elevation.
8. The County should seek state and federal funding support for higher cost measures, such as elevation, relocation and acquisition of high priority properties. High priority properties are:
 - Those properties in repetitive loss areas.
 - Critical facilities in the floodway or subject to flood depths of more than two feet.

6.8 References

1. *Disaster Mitigation Guide for Business and Industry*, Federal Emergency Management Agency, FEMA-190, 1990.
2. *Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings*, FEMA, FEMA-259, 1995.
3. *Flood Insurance Agent's Manual*, FEMA, 2000.
4. *Flood Proofing Techniques, Programs and References*, U.S. Army Corps of Engineers National Flood Proofing Committee, 1991.
5. *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding*. FEMA, FEMA-312, 1998.
6. *Local Flood Proofing Programs*, U.S. Army Corps of Engineers, 1994.

7 Natural Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and snow melt in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. The regulatory programs are discussed in Chapter 5 – Preventive Measures. This chapter covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Seven areas are reviewed:

- Wetland protection
- Erosion and sedimentation control
- River restoration
- Best management practices
- Dumping regulations
- Urban forestry
- Farmland protection

7.1 Wetland Protection

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants.

Wetlands that are determined to be part of the waters of the United States are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (US EPA) under

Section 404 of the Clean Water Act. Before a “404” permit is issued, the plans are reviewed by several agencies, including the Corps and the U.S. Fish and Wildlife Service. Each of these agencies must sign off on individual permits.

There are also nationwide permits that allow small projects that meet certain criteria to proceed without individual permits. Wetlands not included in the Corps’ jurisdiction or that are addressed by a nationwide permit may be regulated against by local authorities.

If a permit is issued by the Corps or the County, the impact of the development is typically required to be mitigated. Wetland mitigation can include creation, restoration, enhancement or preservation of wetlands elsewhere. Wetland mitigation is often accomplished within the development site, however, mitigation is allowed off-site and sometimes in another watershed. The appropriate type of mitigation is addressed in each permit.

Some developers and government agencies have accomplished the required mitigation by buying into a wetland bank. Wetland banks are large wetlands created for the purpose of mitigation. The banks accept money to reimburse the owner for setting the land aside from development.



Wetlands in the Lake Jesup Wilderness Area in Seminole County, Florida

When a wetland is mitigated at a separate site there are drawbacks to consider. First, it takes many years for a new wetland to approach the same quality as an existing one. Second, a new wetland in a different location (especially if it is in a different watershed) will not have the same flood damage reduction benefits as the original one did.

7.1.1 Local Implementation

Seminole County’s Land Development Code includes a “Wetlands Overlay Zoning Classification” in which all property containing a wetland of a half-acre or larger, any wetlands with a direct hydrologic connection a half-acre or larger, and their adjacent areas are included. The zoning classification strives to protect wetland functions by minimizing disruption of wetlands by development activities, regulating development activities on wetlands according to wetland significance, and providing for mitigation measures for wetlands development on a site-specific basis. Wetlands less than a half-acre may not require such mitigation, unless they are located in the Econlockhatchee River Basin Zone or the Wekiva River Protection Area. No loss of wetlands is permitted in these areas.

Wetland and surface water impacts require a state permit from the Florida Department of Environment Protection or, if the parcel is within the Wekiva River Protection Area, it is permitted through the St. Johns River Water Management District. County permits are also required.

In addition, Seminole County’s Natural Lands Program preserves and manages natural areas within Seminole County, including wetlands, to enhance or promote biodiversity, wildlife corridors, water resources, and passive resource-based recreation. Since the program began in 1990, Seminole County has purchased over 6,600 acres of natural land.

The County’s *Comprehensive Plan* adopts a policy to regulate wetlands to protect and sustain their functions and values, and states that in conjunction with the Land Development Code, the County “will evaluate the need to provide additional criteria which will allow for mitigation of impacts to wetlands caused by the development actions.” The *Comprehensive Plan* calls for the establishment of a County-run comprehensive wetland mitigation program partly funded by fees in lieu of performing mitigation.

7.1.2 CRS Credit

CRS focuses on activities that directly affect flood damage to insurable buildings. While there is no credit for relying on the Corps of Engineers’ 404 regulations, there is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations.

7.2 Erosion and Sedimentation Control

Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along streambanks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil.

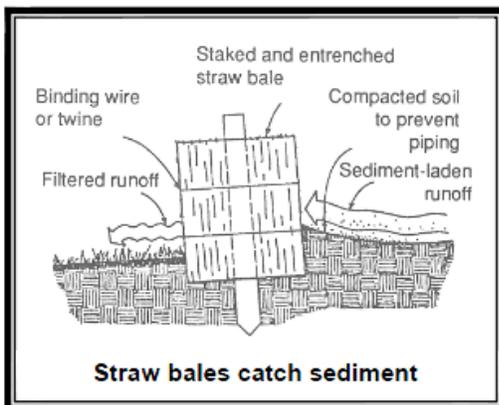
Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage

capacity of river and stream channels, lakes and wetlands. When channels are constricted and flooding cannot deposit sediment in the bottomlands, even more sediment is left in the channels. The result is either clogged streams or increased dredging costs.

Not only are the drainage channels less able to perform their job, but the sediment in the water reduces light, oxygen and water quality, and often carries chemicals, heavy metals and other pollutants. Sediment has been identified by the US EPA as the nation’s number one nonpoint source pollutant for aquatic life.

There are two principal strategies to address these

Figure 33: Straw Bales



problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

If erosion occurs, other measures are used to capture sediment before it leaves the site. Silt fences, sediment traps and vegetated filter strips are commonly used to control sediment transport. Runoff from the site can be slowed down by terraces, contour strip farming, no-till farm practices, hay or straw bales, constructed wetlands, and impoundments (e.g., sediment basins and farm ponds). Slowing surface water runoff on the way to a drainage channel increases infiltration into the soil and reduces the volume of topsoil eroded from the site.

Erosion and sedimentation control regulations mandate that these types of practices be incorporated into construction plans. They are usually oriented toward construction sites rather than farms. The most common approach is to require applicants for permits to submit an erosion and sediment control plan for the construction project. This allows the applicant to determine the best practices for the site.

7.2.1 Local Implementation

Standards for erosion and sedimentation control during and following project construction are included in the Seminole County Surface Water Management Ordinance. Erosion and sediment control planning is encouraged. The Ordinance also places an emphasis on efforts that prevent and reduce erosion rather than having to control sediments that are created due to construction.

7.2.2 CRS Credit

Seminole County’s Surface Water Management Ordinance includes erosion and sedimentation control provisions and should qualify for 45 points, the maximum credit available.

7.3 River Restoration

There is a growing movement that has several names, such as “stream conservation,” “bioengineering,” or “riparian corridor restoration.” The objective of these approaches is to return streams, streambanks and adjacent land to a more natural condition, including the natural meanders. Another term is “ecological restoration,” which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

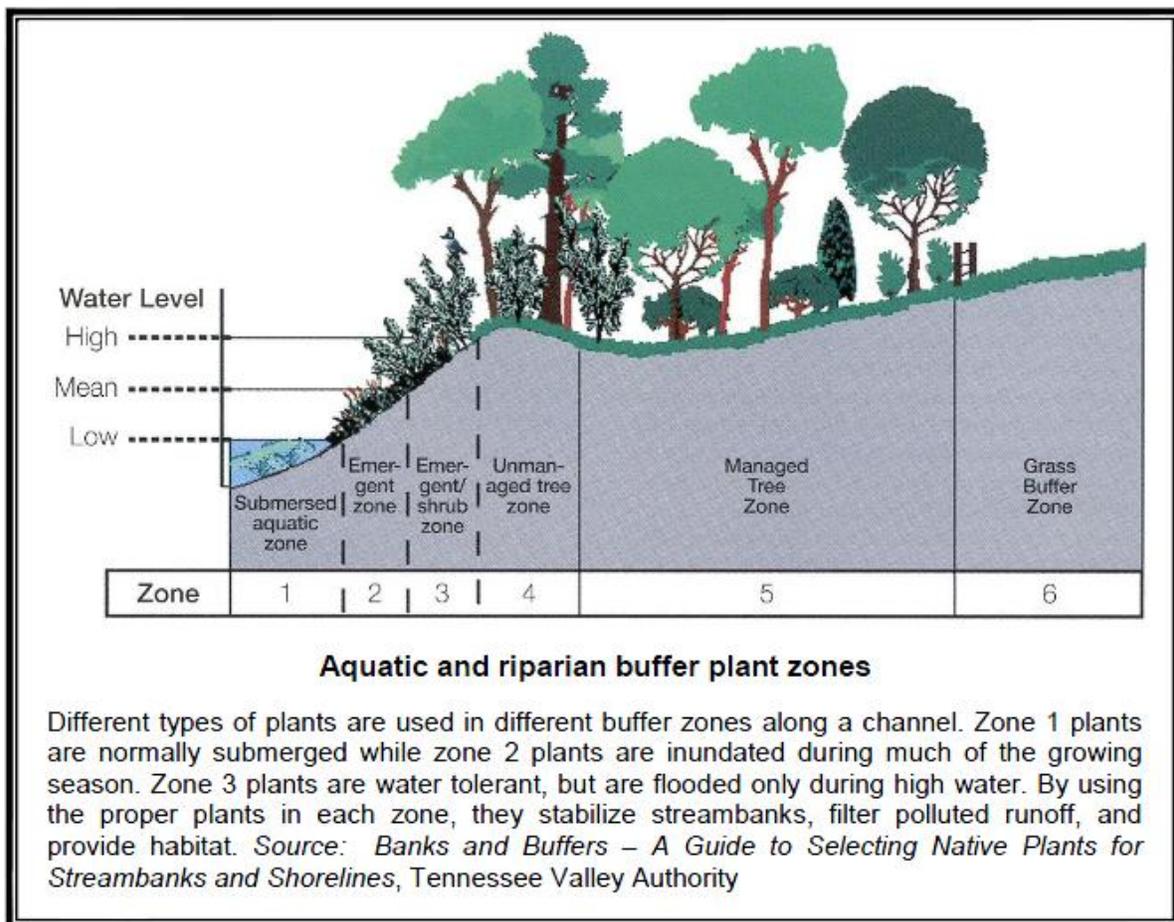
In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife

- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

The last bullet deserves special attention. Studies have shown that after establishing the right vegetation, long-term maintenance costs are lower than if the banks were concrete. The Natural Resources Conservation Service estimates that over a ten-year period, the combined costs of installation and maintenance of a natural landscape may be one-fifth of the cost for conventional landscape maintenance, e.g., mowing turf grass.

Figure 34: Aquatic and Riparian Buffer Plant Zones



7.3.1 Local Implementation

Seminole County has been active in pursuing and completing restoration projects. Volunteers have contributed over 350 hours of time to restoring Spring Lake and helped to plant the Myrtle Lake shoreline.

The Seminole County Lake Management Program offers restoration studies and other assistance for unincorporated County lakes. Community participation is an integral component of the program.

7.3.2 CRS Credit

The Community Rating System focuses on activities that directly affect flood damage to insurable buildings. However, there are credits for preserving open space in its natural condition or restored to a state approximating its natural condition. There are also credits for channel setbacks, buffers and protecting shorelines.

7.4 Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA and the Florida Department of Environmental Protection. Nonpoint source pollutants come from non-specific locations and are harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas, and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term “best management practices” (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

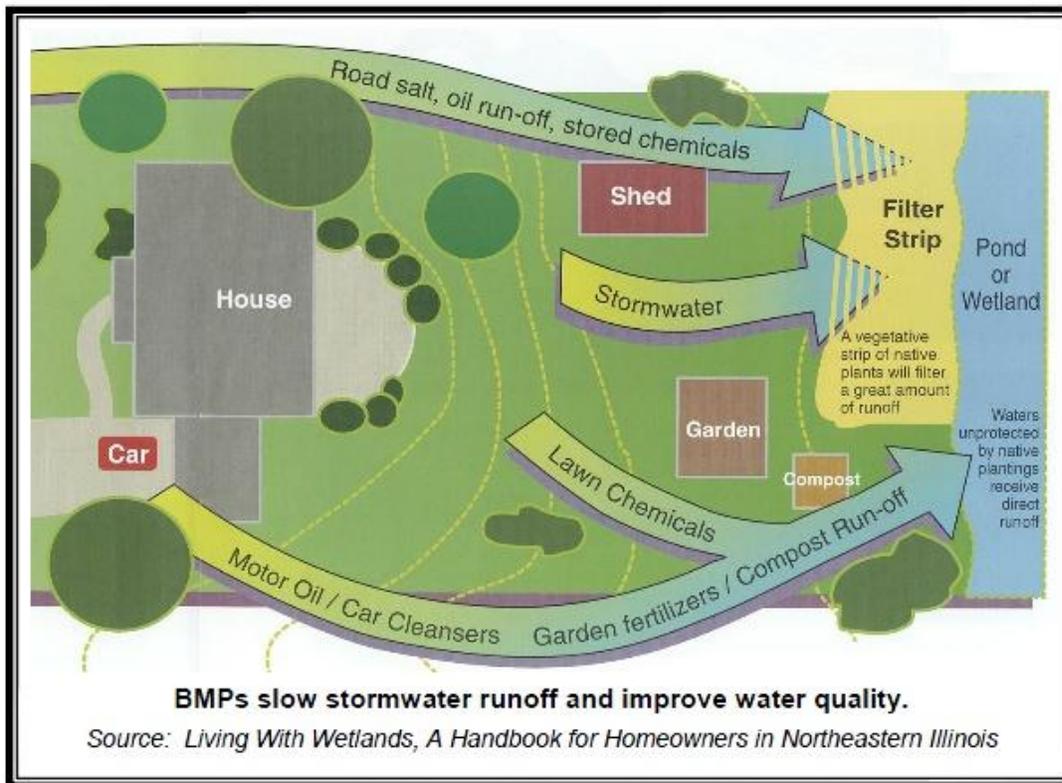
7.4.1 Local Implementation

BMPs have been incorporated throughout the Seminole County Surface Water Management Ordinance. The County also has an NPDES Phase I permit and maintains compliance with all of its requirements.

7.4.2 CRS Credit

Under Activity 450 – Stormwater Management, credit is given for both water quality and water quantity. Water quality credit under activity is given to a community who implements best management practices.

Figure 35: BMPs and Stormwater



7.5 Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many cities have nuisance ordinances that prohibit dumping garbage or other “objectionable waste” on public or private property. Waterway dumping regulations need to also apply to “nonobjectionable” materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how regrading their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

7.5.1 Local Implementation

The Seminole County Code of Ordinances makes it unlawful for anyone to dispose of waste except at a facility designated by the County. In addition, illicit discharges are also prohibited. Illicit discharges are defined as any discharge to the County’s municipal separate storm sewer system or to waters of the United States that is not entirely composed of stormwater, unless exempted pursuant to the County code. Exemptions include water line flushing, street cleaning, landscape irrigation, air conditioning condensate and others.

7.5.2 CRS Credit

The CRS provides up to 30 points for enforcing and publicizing a regulation that prohibits dumping in the drainage system. Seminole County should be eligible for this credit.

7.6 Farmland Protection

Farmland protection is quickly becoming an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can create additional stormwater runoff and emergency management difficulties.

Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture’s 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land. Eligible land includes cropland, rangeland, grassland, pastureland, or forest land that is part of an agricultural operation. Certain lands within historical or archaeological resources are also included.



The hazard mitigation benefits of farmland protection are similar to those of open space preservation, as discussed in Chapter 5 – Preventive Measures:

- Farmland is preserved for future generations,
- Farmland in the floodplain keeps damageable structures out of harm’s way,
- Farmland keeps more stormwater on site and lets less stormwater runoff downstream,
- Rural economic stability and development is sustained,
- Ecosystems are maintain, restored or enhanced, and

- The rural character and scenic beauty of the area is maintained.

7.6.1 Local Implementation

The policies of the “Future Land Use” element of the County’s *Comprehensive Plan* include “Protection and preservation of the environment and farmlands.” The “Conservation” element of the plan also emphasizes the protection and preservation of farmlands. In addition, the East Seminole County Scenic Corridor Overlay District Ordinance recognizes that “agricultural activities in East Seminole County are an important historical, cultural and economic resource.” Limited development activities are allowable in this zone, such as agricultural uses and commercial uses designated on the future land use map. Landscaping must be done using native species.

7.6.2 CRS Credit

Credit is given for preserving open space in the floodplain, regardless of why it is being preserved. Credit is also provided for density zoning of floodprone areas. Agricultural zones that require minimum 10- or 20-acre lots would qualify.

7.7 Conclusions

1. A hazard mitigation program can use resource protection programs to support protecting areas and natural features that can mitigate the impacts of natural hazards.
2. The current regulations on wetland protection, erosion and sediment control, and best management practices have effective standards.
3. There are excellent examples of wetland protection and river and shoreline restoration projects managed by Seminole County that demonstrate the benefits of these measures.
4. The County’s Code of Ordinances prohibits illicit discharges into waters of the state and into the County’s MS4.
5. Preserving farmland in the floodplain will prevent damage to homes, businesses, and other development.

7.8 Recommendations

1. Seminole County should continue to enforce the wetland protection, erosion and sediment control and BMP provisions of the Surface Water Management Ordinance.
2. The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained.
3. Seminole County should publicize its illicit discharge rules more widely.
4. The public should be informed about the need to protect streams and wetlands from dumping and inappropriate development along with the relevant codes and regulations.

7.9 References

1. *Banks and Buffers – A Guide to Selecting Native Plants for Streambanks and Shorelines*, Tennessee Valley Authority, 1997.
2. *CRS Coordinator’s Manual*, Community Rating System, FEMA, 2002.
3. *Stream Corridor Restoration Principles, Processes and Practices*, Federal Interagency Stream Restoration Working Group, 1998.

8 Emergency Services Measures

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. At the state level, emergency services programs are coordinated by the Florida Division of Emergency Management. Seminole County emergency services are coordinated through the Seminole County Division of Emergency Management.

**Seminole County Division of
Emergency Management Mission:**

Provide a resilient emergency management structure dedicated to provide for the safety and welfare of the public through the preservation of life, health, property and the environment.

This chapter reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

8.1.1 Threat Recognition

The first step in responding to a flood, storm or other natural hazard is knowing when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

Tropical Storms and Hurricanes. The National Weather Service’ National Hurricane Center in Miami monitors all tropical storm and hurricane activity. It uses computer models to estimate where the storm will make landfall, the predicted wind speeds, and the likely storm surge levels. These predictions are updated periodically and disseminated to the media and through emergency management channels.

The Hurricane Center runs the predicted storm through a computer model called SLOSH (Sea, Lake, and Overland Surges from Hurricanes). This provides information on how deep and how far inland storm surges are expected to be.

Floods. A flood recognition system predicts the time and height of the flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the National Weather Service, a part of the U.S. Department of Commerce’s National Oceanic and Atmospheric Administration (NOAA). Support for NOAA’s efforts is provided by cooperating partners from state and local agencies.

Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the National Weather Service. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio. NOAA Weather Radio is considered by the federal government as the official source for weather information.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The National Weather Service may issue a “flash flood watch.” This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These

events are so localized and so rapid that a “flash flood warning” may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Severe Weather. The National Weather Service is the prime agency for detecting meteorological threats, such as tornadoes, thunderstorms and winter storms. Severe weather warnings are transmitted through NOAA’s Weather Radio System. As with floods, federal agencies can only look at the large scale, e.g., whether conditions are appropriate for the formation of a thunderstorm. Local emergency managers can provide more site-specific and timely recognition by sending out National Weather Service trained spotters to watch the skies when the Weather Service issues a watch or a warning.

Severe snow storms can often be forecast days in advance of the expected event, which allows time for warning and preparation. Though more difficult, the National Weather Service can also forecast ice storms.

Dam Failure. A key part of a dam safety program is for the emergency management office to be in touch with the operators of upstream dams. There should be periodic communication checks and clear criteria for when a dam appears threatened and when the community should notify downstream properties.

8.1.2 Local Implementation

The Seminole County Division of Emergency Management is responsible for performing technical work in the development, implementation, and management of countywide disaster response, recovery, mitigation, risk reduction, prevention, and preparedness for the County. The Division provides countywide planning, training and exercise programs in order to be prepared for natural, technological, or man-made emergencies.

Severe Weather: Seminole County recognizes impending thunderstorms through radar and reports from the National Weather Service.

Floods: The National Weather Service monitors five stream gages in Seminole County. It issues periodic updates of current river levels. For the gages it monitors, the National Weather Service can issue a specific prediction of when and how high a river will crest. Forecasts for the St. Johns River near Sanford are issued as needed during times of high water, but are not routinely available. River gauge information is disseminated on the NOAA Weather Wire and is available to the public at www.srh.noaa.gov/lix/html/rvs.shtml.

On larger streams, the United States Geological Survey (USGS) operates stream and rain gages in

USGS Stream Gages in Seminole County
Little Econlockhatchee River near Oviedo
Econlockhatchee River near Oviedo
Econlockhatchee River near Chuluota
St. Johns River above Lark Harney near Geneva (2 gages)
St. Johns River at Osceola
Howell Creek near Altamonte Springs
Howell Creek near Slavia
Howell Creek near Oviedo
Soldier Creek near Longwood
Gee Creek near Longwood
Lake Jesup Outlet near Sanford
St. Johns River at Highway 415 near Sanford
St. Johns River near Sanford
Little Wekiva River near Altamonte Springs
Wekiva River near Sanford
Seminole 125 Well at Longwood
Lake Sylvan Park near Paola

cooperation with Seminole County and the St. Johns River Water Management District. The USGS provides stream stage and stream flow information for the 18 sites listed in the box above. Real-time stream gauge readings for these sites can be accessed on the Internet at <http://waterdata.usgs.gov/fl/nwis/rt>. This site provides the current stream conditions.

The National Weather Service is able to issue a specific prediction of when and how high a river will crest.

Dam Failure. There are no dams in Seminole County, and dam failure is not considered a likely threat.

8.1.3 CRS Credit.

Credit can be received for using National Hurricane Center warnings and river flood stage predictions for the National Weather Service's gages. The actual score is based on how much of the community's floodplain is affected by these systems. A total of 40 points is possible under Activity 610 – Flood Warning Program.

8.2 Warning

After the threat recognition system tells the emergency management office that a flood, tornado, thunderstorm, hurricane or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. The earlier and the more specific the warning, the greater the number of people that can implement protection measures.

The National Weather Service issues notices to the public using two levels of notification:

Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.

Warning: a flood, tornado, etc., has started or been observed.

A more specific warning may be disseminated to the public by the community in a variety of ways. The following are the more common methods:

- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems

- Email notifications

Multiple or redundant systems are most effective – if people do not hear one warning, they may still get the message from another part of the system. Each has advantages and disadvantages:

- Radio and television provide a lot of information, but people have to know when to turn them on. They are most appropriate for hazards that that develop over more than a day, such as a tropical storm, hurricane, or winter storm.
- NOAA Weather Radio can provide short messages of any impending weather hazard or emergency and advise people to turn on their televisions for more information, but not everyone has a Weather Radio.
- Outdoor warning sirens can reach many people quickly as long as they are outdoors. They do not reach people in tightly-insulated buildings or those around loud noise, such as at a factory, during a thunderstorm, or in air conditioned homes. They do not explain what hazard is coming, but people should know to turn on a radio or television when they hear the siren.
- Automated telephone notification services are also fast, but can be expensive and do not work when phone lines are down. Nor do they work for unlisted numbers, call screening services, or cellular service, unless people sign up for notifications.
- Where a threat has a longer lead time, going door-to-door and manual telephone trees can be effective.

NOAA Weather Radios

NOAA Weather Radio is a nationwide network of radio stations that broadcasts warnings, watches, forecasts and other hazard information 24 hours a day. For Seminole County, information comes from transmitters in Melbourne, Florida.

NOAA weather radios can be very effective for notifying people, businesses, schools, care facilities, etc. of weather threats. They have a monitoring feature that issues an alarm when activated by the Weather Service.

To program a new weather radio, the FIPS code for Seminole County is 012117. The channels that broadcast information for Seminole County are 162.4 Mhz (Channel 1) and 162.475 Mhz (Channel 4). You can also listen online, by visiting <http://www.srh.noaa.gov/mlb/?n=nwr#maps>.

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should have a public information aspect. Citizens should know the difference between a tornado warning (when they should seek shelter in a low spot), a flood warning (when they should stay out of low areas), and other appropriate warnings and responses.

8.2.1 StormReady

The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public.



To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center,

- Have more than one way to receive severe weather warnings and forecasts and to alert the public,
- Create a system that monitors weather conditions locally,
- Promote the importance of public readiness through community seminars, and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Being designated a StormReady community by the National Weather Service is a good measure of a community's emergency warning program for weather hazards. It is also credited by the CRS.

8.2.2 Local Implementation

The Division coordinates emergency warning and notifications through a multimodal approach including, but not limited to, NOAA weather radios, Civil Emergency Messages, Emergency Broadcast System, Emergency Alert System, electronic text/media notification, cable interrupt, and reverse calling systems. The Division also funds a reverse answering system to notify citizens of threats prior to a disaster. These warnings are sent via telephone to groups using GIS mapping or to the entire County.

Alert Seminole is a way for Seminole County residents to sign up for emergency notifications from the Seminole County Emergency Management Agency. Notifications can be sent to a cell phone, pager, or email address.

Officials with the National Weather Service in Melbourne, Florida awarded Seminole County the designation of "StormReady." This nationwide program assesses the capability of a community to receive and disseminate severe weather information. The designation is only granted to those communities that have established a high degree of readiness for natural disasters such as hurricanes, tornadoes and floods.

8.2.3 CRS Credit

Community Rating System points are based on the number and types of warning media that can reach the community's floodprone population. Depending on the location, communities can receive up to 25 points for the telephone calling system and more points if there are additional measures, like telephone trees. Being designated as a StormReady community can provide 25 additional points. These credits are in Activity 610 – Flood Warning Program.

8.3 Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness),

- Closing streets or bridges (sheriff or public works),
- Shutting off power to threatened areas (utility company),
- Passing out sand and sandbags (public works),
- Holding children at school/releasing children from school (school superintendent),
- Opening evacuation shelters (the American Red Cross),
- Monitoring water levels (engineering), and
- Establishing security and other protection measures (police/sheriff).

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given the various responsibilities.

Planning is best done with adequate data. One of the best tools is a map that shows which areas would be affected under different conditions. Even though Seminole County is not a coastal County, it may be beneficial to consider developing a map which directs residents to evacuate based on the different hurricane categories.

A flood stage forecast map shows areas that will be under water at various flood stages. Different flood levels are shown as color coded areas, so the emergency manager can quickly see what will be affected. Emergency management staff can identify the number of properties flooded, which roads will be under water, which critical facilities will be affected, who to warn, etc. With this information, an advance plan can be prepared that shows problem sites and determines what resources will be needed to respond to the predicted flood level.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

8.3.1 Local Implementation

The Seminole County Emergency Operations Center (EOC) is the central command and coordination point for disaster preparedness, training, response and recovery efforts for the County. The purpose of the EOC is to provide a centralized and specialized location to communicate, organize and manage natural or manmade disasters and make strategic decisions necessary to protect the residents and property of Seminole County.

The EOC is staffed with personnel and equipment necessary to properly manage significant events. The 3,525 square foot main room has two attached breakout rooms for amateur radio operations and Seminole Government Television (SGTV) communication. In addition, there are multiple EOC support rooms.

Seminole County's EOC is organized using the National Incident Management System (NIMS) guidelines, and is separated into Command and General Staff, 18 Emergency Support Functions

(ESF), and the Municipal Branch. Each ESF, municipality, utility provider, and the Orlando-Sanford International Airport provide staffing to improve communication and coordination during emergencies.

To ensure all of the available information is transmitted into the EOC, the main room is equipped with state of the art, computerized audio-visual equipment, GIS mapping software, interoperable communications, traffic monitoring, satellite technology for redundant communications, and video cameras for live EOC streaming during activations. The room is also equipped with computer software that tracks emergency management resources.

The integration of these data and communications systems provides an essential on-site decision-making platform plus an excellent training room. In the event of a large-scale disaster, the EOC is equipped with two backup generators, potable water, shower facilities, and dormitories.

8.3.2 CRS Credit

Up to 255 points of credit is available for a fully credited flood warning system. Credit is based on a variety of factors and is cumulative, which includes the previous credits mentioned.

8.4 Evacuation and Shelter

In an area subject to the tremendous forces that accompany hurricanes, evacuation is a prime life safety concern. Given the one to two days of lead time provided by the National Hurricane Center, evacuation on a large scale is a realistic lifesaving task. In other situations, such as a tornado, it is safer to keep people where they are rather than expose them to danger from an event that gives little warning.

According to *Emergency Management: Principles and Practice*, “The principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger.”

There are six key ingredients to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., handicapped, prisoners, hospital patients, and schoolchildren)



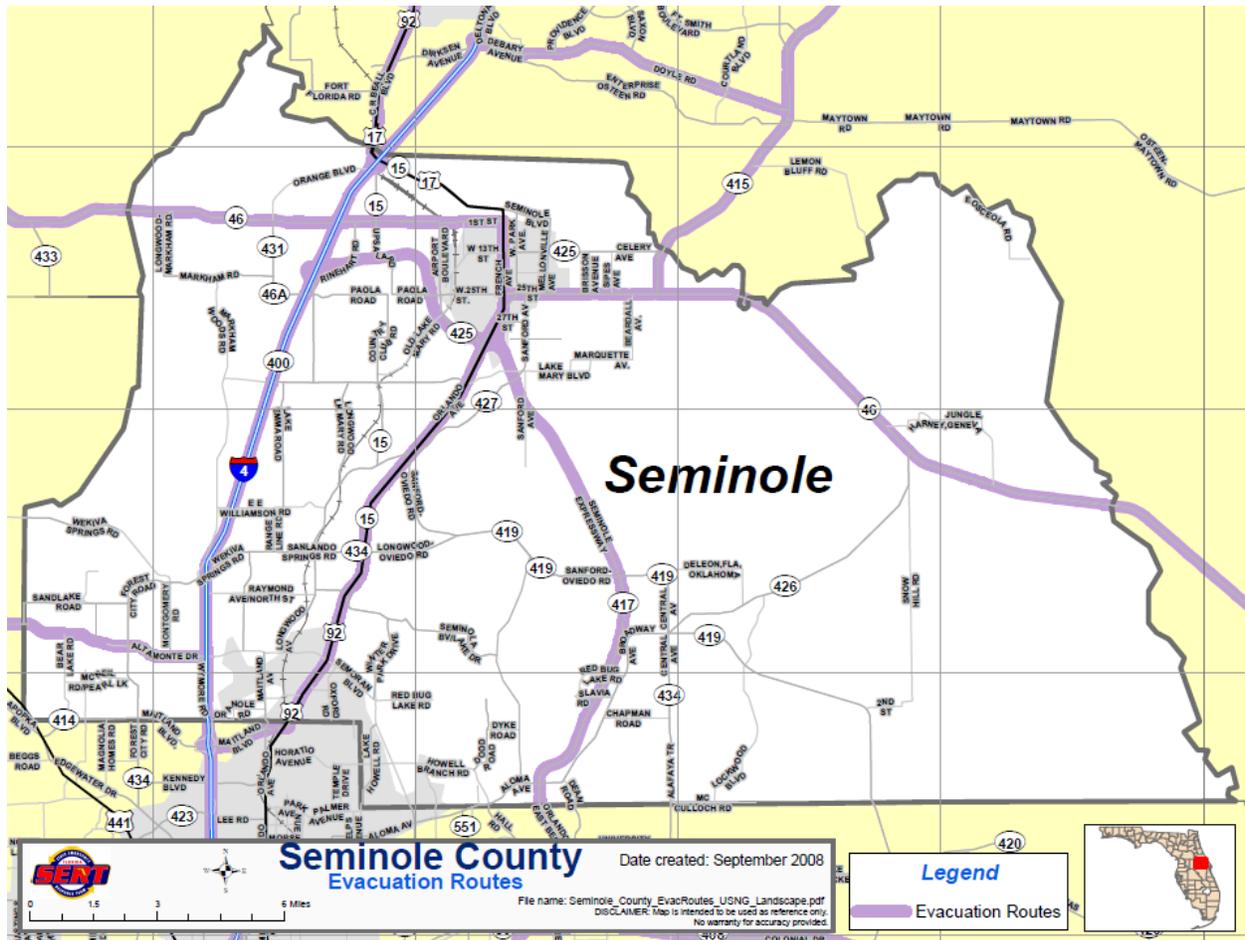
Those who cannot get out of harm’s way need shelter. For tropical storms, a stick-built house (not a mobile home) often suffices, but for hurricanes, something sturdier is required. That is why schools so often serve as shelters during a storm as well as a place for those who have lost their homes after the storm.

Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring their pets in, and the potential for an overcrowded facility.

8.4.1 Local Implementation

Evacuation routes for Seminole County are shown in the map below.

Figure 36: Seminole County Evacuation Routes



8.4.2 CRS Credit

Because it is primarily concerned with protecting insurable buildings, the CRS does not provide any special credit for evacuation or sheltering of people. It is assumed that the emergency response plan would include all necessary actions in response to a flood.

8.5 Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting,
- Providing safe drinking water,
- Monitoring for diseases,
- Vaccinating residents for tetanus and other diseases,
- Clearing streets, and
- Cleaning up debris and garbage.

Throughout the recovery phase, everyone wants to get “back to normal.” The problem is that “normal” means the way they were before the disaster, exposed to repeated damage from future disasters. There should be an effort to help prepare people and property for the next disaster. Such an effort would include:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work,
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs,
- Identifying other mitigation measures that can lessen the impact of the next disaster,
- Acquiring substantially or repeatedly damaged properties from willing sellers,
- Planning for long-term mitigation activities, and
- Applying for post-disaster mitigation funds.

8.5.1 Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building’s market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.



This requirement can be very difficult for understaffed and overworked offices following a disaster. However, if these activities are not carried out properly, not only does the community miss a tremendous opportunity to redevelop or clear out a hazardous area, it may be violating its obligations under the NFIP. The sanctions for failure to properly enforce the floodplain reconstruction regulations are spelled out in Chapter 5 – Preventive Measures. In some areas,

mutual aid agreements have been established so building inspectors from a community not affected by the disaster can work in the communities that were hit the hardest.

8.5.2 Local Implementation

The County's Floodplain Management Ordinance includes the NFIP requirements for determining if a building is substantially damaged. The County's practice is to wait until reconstruction applicants come to the County to request a permit. Repairs that are cosmetic only (for example, replacing flooring, cabinets and painting) do not need permits.

There are no special public information activities to tell people to apply for a permit. Residents interested in a mitigation project funded by the NFIP's Increased Cost of Compliance do apply and request a substantial damage determination.

These practices could permit many substantially damaged properties to be repaired without inspection. The result could jeopardize the County's standing in the NFIP. These practices also mean that the County misses opportunities to inform disaster victims about property protection measures that they can incorporate during repairs.

8.5.3 CRS Credit

Seminole County should formally establish post-disaster mitigation polices outlined in this Plan in the section above.

8.6 Conclusions

1. There are several threat recognitions systems that can provide the County with advance notice of an impending emergency.
2. Additional stream and river gauges can help protect more residents in the County.
3. The County depends on telephones and the media to warn residents. These media should reach most people who need to know of a threat.
4. The *Seminole County Emergency Operations Plan* contains general guidance on responding to many different kinds of hazards. There are additional documents, such as annexes and checklists that provide specific guidance for responding to individual natural hazards. Such guidance could be very helpful when things happen quickly and for hazards that have predictable impacts, such as tropical storms and flooding.
5. The plans and guidance documents on post-disaster inspections and capitalizing on post-disaster mitigation opportunities are lacking. In fact, current procedures do not adequately ensure that the County's obligations to the NFIP will be met. They also mean that the County could miss opportunities to advise people on property protection measures they can implement during repairs and reconstruction.

8.7 Recommendations

1. The *Seminole County Emergency Operations Plan* should be reviewed in detail to determine where improvements can be made and how to maximize credit under CRS. The *Plan* should then be submitted for credit under CRS, and CRS will provide a critique of the plan to show what further improvements are needed.
2. The County should consider all possible local, state and federal funding options for installation of additional stream and river gauges to provide a higher level of protection to its residents.
3. The County should ensure that all steps are being taken to alleviate traffic jams during an evacuation of the county.
4. The County's emergency preparedness, public information, and permits staffs should work together to develop post-disaster procedures for public information, reconstruction regulation and mitigation project identification.

8.8 References

1. *CRS Coordinator's Manual*, FEMA, 2007.
2. *CRS Credit for Flood Warning Programs*, FEMA, 2006.
3. *Emergency Management: Principles and Practice for Local Government*, International City/County Management Association, 1991.
4. *Flood Fight Operations*, FEMA, 1995.
5. *Guide for All-Hazard Emergency Operations Planning*, FEMA SLG-101, 1996.

9 Structural Project Measures

Flood control projects have traditionally been used by communities to control or manage floodwaters. They are also known as “structural” projects that keep flood waters away from an area as opposed to “non-structural” projects, like retrofitting, that do not rely on structures to control flows.

9.1 Flood Control Measures

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings,
- Many projects can be built without disrupting citizens’ homes and businesses, and
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures also have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

Pros and Cons of Structural Flood Control Projects

<u>Advantages</u>	<u>Disadvantages</u>
They may provide the greatest amount of protection for land area used.	They can disturb the land and disrupt the natural water flows, often destroying wildlife habitat.
Because of land limitations, they may be the only practical solution in some circumstances.	They require regular maintenance, which if neglected can have disastrous consequences.
They can incorporate other benefits into structural project design, such as water supply and recreational uses.	They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
Regional detention may be more cost-efficient and effective than requiring numerous small detention basins.	They can create a false sense of security, as people protected by a project often believe no flood can ever reach them.
	Although it may be unintended, in many circumstances they promote more intensive land use and development in the floodplain.

9.1.1 Levees and Floodwalls

Probably the best known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and

floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour. Key considerations when evaluating the use of a levee include:

- Design and permitting costs,
- Right of way acquisition,
- Removal of fill to compensate for the floodwater storage that will be displaced by the levee,
- Internal drainage of surface flows from the area inside the levee,
- Cost of construction,
- Cost of maintenance,
- Mitigation of adverse impacts to wetlands and other habitats,
- Loss of river access and views, and
- Creating a false sense of security, because while levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee.

Levees placed along the river or stream edge degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits, a setback levee is the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.



Floodwalls perform like levees except they are vertical-sided structures that require less surface area for construction. Floodwalls are constructed of steel sheet pile or reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances. Floodwalls also degrade adjacent habitat and can displace erosive energy to unprotected areas of shoreline downstream.

Seawalls are barriers or retaining walls that are built facing a large lake, ocean or the Gulf of Mexico. They are intended to protect the land from erosion by wave action. However, they often have an adverse impact on the shore and on neighboring properties and the movement of sand. The natural forces that transport sand and replenish beaches are disrupted by the wall, often increasing shoreline erosion on adjacent properties. Therefore, they are not encouraged and are even prohibited in many areas.

9.1.2 Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.



Retention pond

Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have to be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to be stored.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters. Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

There are several considerations when evaluating use of reservoirs and detention:

- There is the threat of flooding the protected area should the reservoir's dam fail,
- There is a constant expense for management and maintenance of the facility,
- They may fail to prevent floods that exceed their design levels,
- Sediment deposition may occur and reduce the storage capacity over time,
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrient levels, and
- If not designed correctly, in-stream reservoirs may cause backwater flooding problems upstream.

9.1.3 Diversion

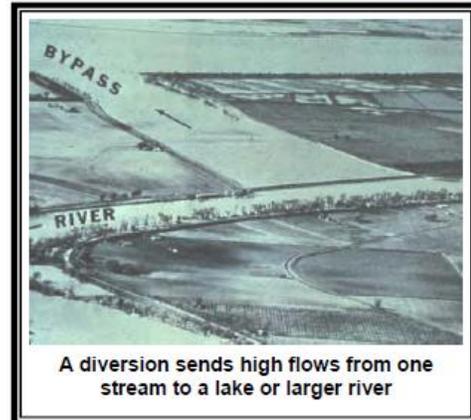
A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive.

9.1.4 Dredging

Dredging is often viewed as a form of conveyance improvement. However, it has the following problems:

- Given the large volume of water that comes downstream during a flood, removing a foot or two from the bottom of the channel will have little effect on flood heights.
- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Unless in-stream or tributary erosion are corrected upstream, the dredged areas usually fill back in within a few years, and the process and the expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.



A diversion sends high flows from one stream to a lake or larger river



Dredging

To protect the natural values of the stream, federal law requires a U.S. Army Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires a lot of advance planning and many safeguards to protect habitats, which adds to the cost of the project.

9.1.5 Channelization

Channelization has traditionally been the common method for dealing with local drainage or flooding problems. Channelization involves straightening, deepening and /or widening a stream or river channel. With this approach, there are several concerns to keep in mind:

- Channelized streams can create or worsen flood problems downstream as larger amounts of water are transported at a faster rate.

- Channelized streams rise and fall faster. During dry periods the water level in the channel is lower than it should be which creates water quality problems and degrades habitat.
- Channelized waterways tend to be unstable and experience more erosion. The need for periodic reconstruction and silt removal becomes cyclic, which makes channel maintenance very expensive.



On the other hand, properly sloped and planted channels are more aesthetically and environmentally appealing and can be cheaper to maintain.

9.1.6 CRS Credit

Structural flood control projects that provide 100-year flood protection and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS in order to avoid duplicating the larger premium reduction provided by removing properties from the mapped floodplain.

The CRS credits smaller flood control projects that meet the following criteria:

- They must provide protection to at least the 25-year flood,
- They must meet certain environmental protection criteria,
- They must meet federal, state and local regulations, such as the Corps of Engineers' 404 permit and Florida dam safety rules, and
- They must meet certain maintenance requirements.

These criteria ensure that credited projects are well-planned and permitted. Any of the measures reviewed in this section would be recognized under Activity 530 – Flood Protection, although it would be very hard to qualify a dredging project. Credit points are based on the type of project, how many buildings are protected, and the level of flood protection provided.

9.1.7 Local Implementation

The County has initiated a study on the Mullet Lake Road Stormwater Improvement Project to help provide a solution to stormwater and localized flooding in the St. Johns and Lake Harney Basins. This project in eastern Seminole County involves a drainage area of approximately 2,890 acres or 4.5 square miles. Residents within the Mullet Lake Park Road Basin experience both yard and structure flooding during greater than average rainfall events. The study defined the primary cause of flooding to be an inadequate conveyance system and accumulation of runoff from upstream areas which overload the current system. The study was completed in 2006 but construction of the project has yet to be completed.

9.2 Conclusions

1. Continue to require onsite retention and detention facilities to manage runoff from sites to avoid overloading drainage systems. There is a benefit to ensuring that post-development runoff does not exceed pre-development conditions.
2. Consider the benefits of regional upper watershed retention and detention to help mitigate the amount of conveyance of downstream flows.
3. Levees and floodwalls don't appear to be practical solutions for the County as the areas in need of protection would require these structures to be located on private property. The constant maintenance of these facilities can be quite expensive.
4. Improvement to channels should be considered in terms of the immediate benefit for increased conveyance and the long-term cost of maintaining them.
5. The Mullet Lake Park Road Stormwater Improvement Project should be given a higher priority for implementation to reduce flooding and help avoid future repetitive loss properties.

9.3 Recommendations

1. The County should continue to require developers to provide on-site detention and retention to lessen the runoff from developed sites.
2. The County should consider the benefits of upper watershed regional detention as a way to reduce downstream flow. This approach could be combined with the preservation of open space of sensitive lands.
3. The County should encourage one approach of the Mullet Lake Park Road Stormwater Improvement Project for implementation to avoid future repetitive loss properties.

9.4 References

1. *CRS Coordinator's Manual*, FEMA, 2007.
2. *CRS Credit for Drainage System Maintenance*, FEMA, 2006.
3. *Kane County, IL Natural Hazards Mitigation Plan*, January, 2009
4. *Mullet Lake Park Road Stormwater Improvement Project*, Inwood Consulting Engineers, 2006

10 Public Information Measures

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, and businesses about hazards and ways to protect people and property from these hazards. These activities can motivate people to take the steps necessary to protect themselves and others.

Information can bring about voluntary mitigation activities at little or no cost to the government. Property owners mitigated their flooding problems long before government funding programs existed. The typical approach to delivering information involves two levels of activity. The first is to broadcast a short and simple version of the message to everyone potentially affected. The second level provides more detailed information to those who respond and want to learn more.

This chapter starts with activities that reach out to people and tell them to be advised of the hazards and some of the things they can do. It then covers additional sources of information for those who want to learn more. It ends with an overall public information strategy.

10.1 Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and the concept of property protection. They are designed to encourage people to see out more information in order to take steps to protect themselves and their properties.

Research has shown that outreach projects work. However, awareness of the hazard is not enough; people need to be told what they can do about the hazard, so projects should include information on safety, health and property protection measures. Research has also shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community. In the case of floods, they can be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Press releases and story ideas may be all that's needed to whet their interest. After a flood in another community, people and the media become interested in their flood hazard and how to protect themselves and their property. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

Other approaches: Examples of other outreach projects include:

- Presentations at meetings of neighborhood, civic or business groups,
- Displays in public buildings or shopping malls,
- Signs in parks, along trails and on waterfronts that explain the natural features (such as the river) and their relation to the hazards (such as floods),
- Brochures available in municipal buildings and libraries, and
- Special meetings, workshops and seminars.

10.1.1 Local Implementation

There are several types of outreach projects implemented in Seminole County. The County’s website features a page describing flood facts and flood safety measures. The County also distributes a brochure titled “Flood Safety and Awareness” to all property owners in the County. There is also a hurricane and storm information page on the County’s website, which contains emergency information when a storm is threatening the area. In addition, news releases are posted to the County’s website, which contain safety information related to natural hazards when appropriate. The County holds a Hurricane Expo to disseminate information about hurricane safety and give residents hurricane safety kits, including a guide to hurricane safety, a flashlight, and a DVD about hurricane safety. The County also advertises safety information on local billboards.

Finally, various brochures are available in the community at various departments such as in the Building Division to provide residents with flood safety and property protection advice.

10.1.2 CRS Credit

The Community Rating System provides up to 380 points for projects on flood topics. One hundred of these points are for having a public information program strategy. This plan qualifies for the strategy credit.

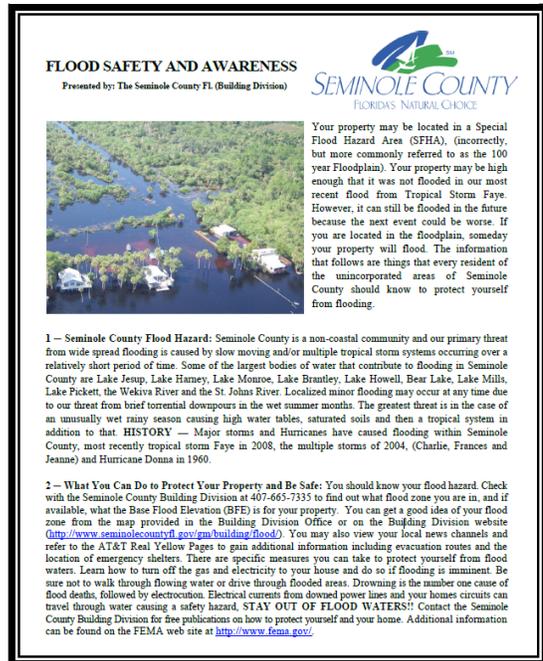
10.2 Real Estate Disclosure

Many times after a flood or other natural disaster, people say they would have taken steps to protect themselves if they had known they had purchased a property exposed to a hazard. There are some federal and state requirements about such disclosures, but they have their limits.

Federal law: Federally regulated lending institutions must advise applicants for a mortgage or other loan that is to be secured by an insurable building whether the property is in a floodplain as shown on the Flood Insurance Rate Map. If so, flood insurance is required for buildings located within the floodplain if the mortgage or loan is federally insured. However, because this requirement has to be met only 10 days before closing, the applicant is often already committed to purchasing the property when he or she first learns of the flood hazard.

State law: State laws set standards for real estate sales and licensing of agents and brokers. In addition, Florida has a natural hazards disclosure law, which requires the seller of real estate to give the buyer a document outlining whether the property is in an area prone to flooding,

Figure 37: Brochure Distributed to Floodplain Residents



hurricanes or tornadoes. The shortcoming of such a law is that because of the sporadic nature of flooding, a property owner may legitimately not be aware of past or potential flooding problems.

10.2.1 Local Implementation

The County has one additional law related to natural hazard disclosure. The final plat for development plans must include the limits of the floodplain, indicating the flood elevation for the 100-year flood. This only provides information for developments that have been platted since the requirement went into effect and then only if the title search sees it and advises the buyer. The multiple listing service does not include a listing of whether a property is in a flood zone or wetland. Disclosure practices are left up to the individual broker or agent.

10.2.2 CRS Credit

Communities in Florida should be eligible for five points under the “Other disclosure requirements” for the state law requiring sellers to notify the buyer of natural hazards. Seminole County is eligible for 5 points for including the limits of the floodplain on all final plats.

10.3 Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for tornadoes and floods or a website about floods for children. The “FEMA for Kids” website teaches children how to protect their home and what to have in a family disaster kit.

10.3.1 Local Implementation

A search of the Seminole County Library catalog on December 14, 2010 showed that the library has 38 publications about floods and 64 publications about hurricanes. The documents about floods represent a broad range of topics, from flood proofing construction guidance to a review of flood policies to a guide to reading flood maps.

The County’s website, www.seminolecountyfl.gov, is kept updated with information on the County’s activities, including the mitigation planning process. FEMA’s floodplain maps for the County are available at <http://www.seminolecountyfl.gov/gm/building/flood/firm.asp>.

10.3.2 CRS Credit

The Community Rating System provides up to 30 points for having a variety of flood references in the local public library and up to 36 more for similar material on municipal websites (Activity 350 – Flood Protection Information).

10.4 Technical Assistance

10.4.1 Hazard Information

Many benefits stem from providing map information to inquirers. Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Real estate agents and house hunters can find out if a property is floodprone and whether flood insurance may be required.

Communities can easily provide map information from FEMA’s Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the FIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never get wet.

10.4.2 Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track.

Building or public works department staffs can provide the following types of assistance:

- Visit properties and offer protection suggestions,
- Recommend or identify qualified or licensed contractors,
- Inspect homes for anchoring of roofing and the home to the foundation,
- Provide advice on protecting windows and garage doors from high winds, and
- Explain when building permits are needed for home improvements.

There is a concern that a local official might provide the wrong information and the community would be sued if a project failed. To counter this, there are guidelines for local programs and training on how to identify the right measures. FEMA conducts a free week-long course at its Emergency Management Institute on property protection measures for flooding. FEMA and the Corps of Engineers periodically conduct one- or two-day retrofitting workshops.

10.4.3 Local Implementation

FEMA floodplain maps are available on the County’s website, as described above. The Building Division will also provide maps to anyone who requests them.

10.4.4 CRS Credit

The Community Rating System provides 140 points for providing map information to inquirers. Up to 71 points are available for providing one-on-one flood protection assistance to residents and businesses and for making site visits. Both services must be publicized.

10.5 Public Information Program Strategy

A public information program strategy is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A strategy consists of the following parts, which are incorporated into this plan:

- The local flood hazard (discussed in Chapter 3 of this plan)
- The property protection measures appropriate for the flood hazard (discussed in Chapter 6)
- Flood safety measures appropriate for the local situation (flood safety measures are discussed on page 110 and hurricane safety is discussed in the phonebook and other publications)
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies (discussed above in sections 10.1 and 10.4)
- Goals for the community’s public information program (discussed in Chapter 4)
- The outreach projects that will be done each year to reach the goals (discussed in the Recommendations section of this chapter and in Chapter 11)
- The process that will be followed to monitor and evaluate the projects (discussed in Chapter 11)

10.5.1 Public Information Topics

At its November 4th, 2010, meeting, the FMPC reviewed the various public information activities currently underway with the goals of this Floodplain Management Plan in mind. The members of the FMPC discussed improving the current County website to make it easier for residents to find the information they need, using social media such as Facebook and Twitter to convey information, and using faith-based organizations and homeowners’ associations to help spread information to as many residents as possible.

Flood Safety

Pay attention to evacuation orders. Listen to local radio or TV stations for forecasts and emergency warnings. Know about evacuation routes and nearby shelters and have plans for all family members on how to evacuate and where to meet if you're split up during an emergency.

Do not drive through a flooded area. During a flood, more people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.

Do not walk through flowing water. Flash flooding is the leading cause of weather-related deaths in the U.S. Currents can be deceptive; 6 inches of moving water can knock you off your feet in a strong current. If you walk in standing water, use a stick to help you locate the ground.

Stay away from power lines and electrical wires. Electrical currents can travel through water. Report downed power lines to the police or sheriff by calling 911.

Have the power company turn off your electricity. Some appliances, like TV sets, keep electrical charges even after they've been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned and dried.

Look before you step. After a flood, the ground and floors are covered with debris like broken bottles and nails. Floors and stairs that are covered with mud can also be slippery.

Be alert for gas leaks. Use a flashlight to inspect damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been shut off and the area has been ventilated.

Look out for animals that may have been flooded out of their homes and who may seek shelter in yours. Use a pole or stick to turn things over and scare away small animals.

Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Charcoal fumes are especially deadly – cook with charcoal outdoors.

Clean everything that got wet in the flood. Floodwaters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food, and flooded cosmetics and medicines can be health hazards. When in doubt, throw it out.

Take care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit and the effects a disaster has on you and your family may last a long time.

10.5.2 CRS Credit

The CRS provides 100 points for a public information program strategy. A mass mailing to all properties can earn up to 60 more points and can meet the publicity requirements to receive credit for several other activities.

10.6 Conclusions

1. There are many ways that public information can be used so that people and businesses will be more aware of the hazards they face and how they can protect themselves.
2. Many of the public information activities can be implemented by community staff. By formalizing its activities, a community can earn nearly 500 points under the Community Rating System.
3. Outreach projects, libraries, websites and the Hurricane Expo are currently being used as public information tools in Seminole County.
4. The most important topics to cover in public information activities are:
 - Safety precautions for all types of hazards, but especially storms, floods and fog. Evacuation is recognized as the most important safety precaution for tropical storms and

hurricanes.

- Flood protection measures, including rules for new construction and insurance.
- Keeping drainageways clear and protection from local drainage problems.
- Family and emergency preparedness measures.
- What the County is doing and sources of assistance.
- Protecting water quality and wetlands and the benefits of open space.

The most appropriate ways to spread this information are:

- Websites and social media
- Mailings to everyone, in utility bills or otherwise
- News releases or newspaper articles
- Newsletters
- Displays, particularly at special events such as the Hurricane Expo
- Handouts, flyers and other materials, which can distributed at special events and presentations

10.7 Recommendations

1. The County’s website should be improved to make navigation to flood hazard and safety information more intuitive.
2. The County should increase its presence on social media, such as Facebook and Twitter, to maximize the number of people reached with flood hazard and safety information.
3. The County should continue to distribute brochures about hurricanes to those living in the mapped floodplain.
4. The County should continue to hold Hurricane Expo and give away preparedness kits at the event.
5. Staff should reach out to homeowners’ associations and faith-based organizations to help spread the word about flood hazards and safety measures.
6. The County’s website should have a mitigation page.
7. The County should consider implementation of an outreach program strategy for credit under the CRS.

10.8 References

1. *Are You Ready? A Guide to Citizen Preparedness*, FEMA, 2002.
2. *CRS Coordinator’s Manual, Community Rating System*, FEMA, 2007.

3. *CRS Credit for Outreach Projects*, FEMA, 2006.
4. “What is a Natural Hazard Disclosure?” Retrieved December 14, 2010 from <http://www.wisegeek.com/what-is-a-natural-hazard-disclosure.htm>.

11 Action Plan

The culmination of the Seminole County Floodplain Management Plan is this Action Plan which directs the County to address and reduce the flood hazard through various mitigation measures. The general direction of the overall program is outlined here. Specific activities pursuant to the general direction are detailed in Sections 11.1 through 11.3. These sections assign recommended projects and deadlines to the appropriate agencies.

The overall direction can be summarized under the five goals established in Chapter 4.0:

- Goal 1: Protect the lives, health, safety and welfare of the citizens of Seminole County from the effects of flooding.
- Goal 2: Promote emergency management and warning system measures to provide better protection to the residents of Seminole County.
- Goal 3: Promote a public education program to encourage self-help and self-protection measures to mitigate the effects of flood damage on private property.
- Goal 4: Protect critical and cultural facilities and public infrastructure from flood damage.
- Goal 5: Identify and implement specific projects to mitigate flood damage where cost-effective and affordable to include reducing the number of repetitively damaged structures.

The eight objectives below set parameters on the mitigation measures reviewed, the recommendations at the ends of Chapters 5 through 10, and the action items in this Chapter. This Chapter converts those general recommendations to specific action items, generally following the same order of mitigation strategy as Chapters 5 through 10.

- Objective 1: Focus natural hazard mitigation efforts on flooding resulting from heavy rainfall which causes runoff, overbank, backwater, and stormwater issues to keep the problem from getting worse.
- Objective 2: Implement regulatory measures to encourage new developments in areas that are less likely to be exposed to the effects of flood damage.
- Objective 3: Preserve open space in hazardous areas, especially where there are sensitive natural areas and agricultural lands.
- Objective 4: Protect the environmental integrity of the natural water systems in Seminole County by focusing on water quality and best management practices.
- Objective 5: Leverage state and federal emergency management funding for planning, training, and equipment (including stream and river gauges).
- Objective 6: Encourage residents to assume an appropriate level of responsibility for their own protection (including the purchase of flood insurance).
- Objective 7: Identify critical infrastructure in need of protection from flood damage and seek county, state and federal funding for projects.
- Objective 8: Target repetitive loss properties for implementation of mitigation projects such as buyouts, elevations and other mitigation efforts through leveraging state and federal grant funding.

Each action item starts with a short description. The following subheadings list the responsible agency, the deadline for accomplishing the action item, and the costs and benefits.

Section 11.1 addresses general program items and projects. Section 11.2 lists the public information action items and Section 11.3 reviews additional tasks needed to administer and support plan implementation. The table on the next page summarizes the 17 action items, the responsible agencies and the deadlines for implementing them.

Several action items refer to the Floodplain Management Planning Committee (FMPC). A plan is worthless unless there is an instrument for ensuring that it is carried out. Accordingly, the creation of a permanent FMPC was proposed to monitor the implementation of the plan, report to the Board of County Commissioners and recommend revisions to this plan as needed. Because this plan will be adopted as an appendix of the Seminole County Local Mitigation Strategy, the LMS Steering Committee will serve this function.

As budgets and grant funding are constantly changing, the County should identify mitigation projects even if funding is not currently available. An Annual Progress Report is required to be completed detailing the progress of implementation of these action items.

Figure 38: Action Items

Number	Action Item Description	Responsible Agency	Deadline	Budget
1	Subdivision ordinance improvements	Planning and Engineering Departments	12/1/2011	Staff time
2	Preserve open space	Planning and Development Department	1/1/2016	Staff time
3	Evaluate increasing higher standards	Building Department	12/1/2013	Staff time
4	Develop property evaluation checklist	Emergency Management and Building Departments	12/1/2012	Staff time
5	Evaluation of cost sharing programs	Emergency Management and Building Departments	1/1/2014	Staff time
6	Seek funding for repetitive loss properties and critical facilities	Emergency Management and Building Departments	1/1/2016	Staff time
7	Enforcement of Surface Water Management Ordinance	Planning and Engineering Departments	Ongoing	Staff time and operating budget
8	Review and update Emergency Operations Plan	Emergency Management Department	12/31/2011	Staff time and operating budget
9	Installation of stream and river gauges	Emergency Management Department	1/1/2016	\$35,000 per gauge, plus \$18,000/year in operating costs
10	Evaluate evacuation routes	Emergency Management Department	1/1/2014	Staff time and operating budget
11	Post-disaster procedures and policies	Emergency Management and Building Departments	1/1/2014	\$10,000 - \$12,000
12	Continued on-site detention and retention and evaluation of County maintenance of facilities	Engineering and Public Works Departments	Ongoing, 1/1/2014	Staff time
13	Regional detention	Engineering and Public Works Departments	Ongoing, 1/1/2016	Staff time
14	Mullet Lake Park Road stormwater project	Engineering and Public Works Departments	Ongoing, 1/1/2016	\$400,000 - \$900,000
15	Outreach projects for natural areas	Planning, Building and Public Works Departments	Ongoing, 1/1/2016	Staff time and operating budget
16	Outreach projects for property protection	Emergency Management and Building Departments	Ongoing, 1/1/2016	Staff time and operating budget
17	Public information outreach strategy	Emergency Management and Building Departments	1/1/2014	\$10,000 - \$15,000

11.1 Program Action Items

After discussing all possible measures for the six mitigation categories, the FMPC decided upon the following action items:

Action Item 1. Subdivision Ordinance Improvements

The County staff should explore development of example subdivision ordinance language that requires new infrastructure to have hazard mitigation provisions, such as:

- a. Buried utility lines and
- b. Storm shelters in new mobile home parks.

Responsible Agency: Seminole County Planning and Engineering Departments

Deadline: December 1, 2011

Cost: Staff Time

Benefits: This will improve the hazard protection standards for new construction and will ensure less damage to utility lines and help protect vulnerable structures.

Action Item 2. Preserve Open Space

The County should use every opportunity to encourage preservation of floodplain areas as open space or other uses compatible with the flooding hazard to preserve floodplain storage capacity and reduce the potential for damage to structures.

Responsible Agency: Seminole County Planning and Development Department

Deadline: January 2016

Cost: Staff Time

Benefits: Preservation of floodplain areas as open space will help to maintain floodplain storage capacity and help to reduce potential flood damage to structures. This also meets a goal in the Seminole County Comprehensive Plan.

Action Item 3. Evaluate Increasing Higher Standards

The County should continue to enforce its existing regulations for development and mobile homes and consider the cost and benefits of other higher standards to further protect the residents of Seminole County, such as a higher freeboard requirements.

Responsible Agency: Seminole County Building Department

Deadline: December 1, 2013

Cost: Staff Time

Benefits: Higher flood protection measures can reduce damage to structures and have the potential to reduce the cost of flood insurance premiums.

Action Item 4. Develop Property Evaluation Checklist

A standard checklist should be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the public. This checklist should also be applied to Seminole County's own properties. A priority should be placed on those critical facilities in the floodplain and whether public properties are adequately insured.

Responsible Agency: Seminole County Emergency Management and Building Departments

Deadline: December 1, 2012

Cost: Staff Time

Benefits: Identifies buildings' vulnerability to flood damage and reviews the flood insurance coverage. It should help identify what property protection measures should be used to protect the building.

Action Item 5. Evaluation of Cost Sharing Programs

Seminole County should evaluate establishment of cost sharing programs, such as rebates, to encourage low cost (under \$10,000) property protection measures on private property. For example:

- Surface and subsurface drainage improvements,
- Berms and regrading for shallow surface flooding, and
- Relocating heating and air conditioning units above the base flood elevation.

Responsible Agency: Seminole County Emergency Management and Building Departments

Deadline: January 1, 2014

Cost: Staff Time

Benefits: A revolving loan or rebate program would allow property owners to fund low cost mitigation to protect their structure from flood damage. This has the potential to reduce repetitive loss flooding.

Action Item 6. Seek Funding for Repetitive Loss Properties and Critical Facilities

The County should seek state and federal funding support for higher cost measures, such as elevation, relocation and acquisition of high priority properties. The Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, Pre-Disaster Mitigation Program, Repetitive Flood Claims and Severe Repetitive Loss Grant Programs should be investigated for all eligible properties. High priority properties are:

- Those properties in repetitive loss areas.
- Critical facilities in the floodway or subject to flood depths of more than two feet.

Responsible Agency: Seminole County Emergency Management and Building Departments

Deadline: January 1, 2016

Cost: Staff Time

Benefits: Elevation, relocation and acquisition of repetitive loss properties is effective mitigation. At the time of consideration for each structure, FEMA Benefit-Cost Software must be used to determine if the project meets eligibility requirements. If so, reducing repetitive damage to a structure will have a positive impact on the Flood Insurance Fund.

Action Item 7. Enforcement of Surface Water Management Ordinance

Seminole County should continue to enforce the wetland protection, erosion and sediment control and BMP provisions of the Surface Water Management Ordinance. With three large lakes and almost 90 square miles of floodplain, to remain “Florida’s Natural Choice,” rigorous enforcement of the Surface Water Management Ordinance is necessary.

Responsible Agency: Planning and Engineering Departments

Deadline: Ongoing

Cost: Staff Time and Operating Budget

Benefits: Preserving the natural and beneficial functions of the floodplain provides multiple positive benefits for Seminole County, including recharging the aquifer, maintaining species of flora and fauna, and providing for recreational activities for both residents and visitors to Seminole County.

Action Item 8. Review and Update Emergency Operations Plan

The *Seminole County Emergency Operations Plan* should be reviewed in detail on an annual basis to determine where updates and improvements can be made and how to maximize credit under CRS. The *Plan* should then be submitted periodically for credit under CRS, and CRS will provide a critique of the plan to show what further improvements are needed.

Responsible Agency: Seminole County Emergency Management Department

Deadline: December 31, 2011

Cost: Staff Time and Operating Budget

Benefit: An outdated Emergency Operations Plan will put both people’s health and lives at risk. Making sure that phone numbers, communication, etc. are updated and new facilities and populations are added is crucial to response and recovery in Seminole County.

Action Item 9. Installation of Stream and River Gauges

The County should consider all possible local, state and federal funding options for installation of additional stream and river gauges to provide a higher level of protection to its residents. The investigation of additional gauging stations should be done in cooperation with the National

Weather Service, St. Johns River Water Management District, the United States Geological Survey and FEMA.

Responsible Agency: Seminole County Emergency Management Department

Deadline: January 1, 2016

Cost: Estimated at \$35,000 for one gauging station with annual operating costs of approximately \$18,000.

Benefit: Additional gauging stations will allow for more accurate forecasting of floods and help to provide better warning information to the residents of Seminole County.

Action Item 10. Evaluate Evacuation Routes

The County should ensure that all steps are being taken to alleviate traffic jams during an evacuation of the County. Hurricane warnings versus toxic fumes may require different routes to be used for evacuation. Based on current and future population projections, the County should ensure that there is adequate roadway to carry residents to safety.

Responsible Agency: Seminole County Emergency Management Department

Deadline: January 1, 2014

Cost: Staff Time and Operating Budget

Benefit: Proper safe evacuation is a benefit to the security of the residents of Seminole County.

Action Item 11. Post-Disaster Procedures and Policies

The County's emergency preparedness, public information, and permits staffs should work together to formalize the post-disaster procedures for public information, reconstruction regulation and mitigation project identification which are outlined in Chapter 8. Those ideas should be expanded, further developed and expanded on and adopted as a clear set of policies and procedures.

Responsible Agency: Seminole County Emergency Management and Building Departments

Deadline: January 1, 2014

Cost: Estimated \$10,000 to \$12,000

Benefit: Established formal post-disaster policies and procedures ensure that public information going out to the public is accurate and originates from a single source, that reconstruction regulation occurs systematically with safety in mind, and that a clear set of mitigation projects are defined after damage assessment records have been finalized.

Action Item 12. Continued On-Site Detention and Retention and Evaluation of County Maintenance of Facilities

The County should continue to require developers to provide on-site detention and retention to lessen the volume and rate of runoff from developed sites. The County should evaluate the

inspection and maintenance of these facilities to ensure that the designed storage is maintained and outfalls and piping remain in good condition.

Responsible Agency: Seminole County Engineering and Public Works Departments

Deadline: Ongoing/January 1, 2014

Cost: Staff Time

Benefit: Reduction in the volume and rate of post-development runoff and immediate increases to flow in stream and channels, reducing the potential for building damage and saving lives from faster flowing currents in those systems.

Action Item 13. Regional Detention

The County should consider the benefits of upper watershed regional detention as a way to reduce downstream flow. This approach could be combined with the preservation of open space of sensitive lands.

Responsible Agency: Seminole County Engineering and Public Works Departments

Deadline: Ongoing/January 1, 2016

Cost: Staff Time

Benefit: Regional detention is a benefit to piecemeal construction of individual on-site detention and retention facilities. By looking at the entire watershed, a holistic approach to watershed management is achieved. An additional benefit could be combining this effort with the preservation of floodprone land.

Action Item 14. Mullet Lake Park Road Stormwater Project

The County should encourage one approach of the Mullet Lake Park Road Stormwater Improvement Project for implementation to reduce flooding and avoid future repetitive loss properties. This project is already recognized on the Seminole County Capital Improvement Plan.

Responsible Agency: Seminole County Engineering and Public Works Departments

Deadline: Ongoing/January 1, 2016

Cost: Estimated \$400,000 to \$900,000

Benefit: Completion of this capital improvement project will benefit many properties in the eastern section of Seminole County through reduced flow and flood conditions. By implementing this project, the County can reduce repetitive flooding and protect residents from future flooding.

11.1.1 Public Information Strategy

The following action items from the six mitigation categories encompass Seminole County's approach to informing the public of flood protection and safety measures, including the promotion of measures of how residents can protect their own property.

Action Item 15 Outreach Projects for Natural Areas

The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained. This should include publicizing illicit discharge rules to a wider audience and the need to protect lakes, streams, rivers and wetlands from illegal dumping and inappropriate development. This campaign can be conducted through direct mail, website development, and/or neighborhood meetings.

Responsible Agency: Seminole County Planning, Building and Public Works Departments

Deadline: Ongoing/January 1, 2016

Cost: Staff Time and Operating Budget

Benefit: Increasing the public's awareness of the benefits of the natural and beneficial functions of the floodplain will help to reduce actions by the public which degrade the wetlands and water systems in the County.

Action Item 16 Outreach Projects for Property Protection

Public education materials should be developed to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available. Because properties in floodplains will be damaged at some point, a special effort should be made to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas. All property protection projects should be voluntary. Other than state and federally mandated regulations, local incentives should be positive as much as possible, such as providing financial assistance. This can be accomplished through the following techniques:

- The County's website should be improved to make navigation to flood hazard and safety information more intuitive.
- The County should increase its presence on social media, such as Facebook and Twitter, to maximize the number of people reached with flood hazard and safety information.
- The County should continue to distribute brochures about hurricanes to those living in the mapped floodplain.
- The County should continue to hold the Hurricane Expo and give away preparedness kits at the event.
- Staff should reach out to homeowners' associations and faith-based organizations to help spread the word about flood hazards and protection and safety measures.
- The County's website should have a dedicated mitigation page.

Responsible Agency: Seminole County Emergency Management and Building Departments

Deadline: Ongoing/January 1, 2016

Cost: Staff Time and Operating Budget

Benefit: A more educated population will enable residents to help protect themselves from flood

damage and reduce the cost of future flood disasters. Education will also be valuable for new residents who may be moving to Seminole County from other parts of Florida or other parts of the country.

Action Item 17 Public Information Outreach Strategy

The County should consider implementation of a public information outreach program strategy for credit under the CRS and to prepare a program that seriously thinks about and considers the County's current outreach program in terms of what is currently working and what is not working. A committee would be established to undertake this process and set in motion a realistic and implementable public information program. This is extremely important since the County is currently without a dedicated Public Information Officer and the CRS will be adding more credit to this activity and reducing credit in other outreach measures.

Responsible Agency: Seminole County Emergency Management and Building Departments

Deadline: January 1, 2014

Cost: Estimated \$10,000 to \$15,000

Benefit: A public information outreach strategy will set forth a well organized and proactive outreach program that provides the residents and businesses in Seminole County with the information they need to protect themselves and will help to reduce the overall damage in future flood disasters.

11.1.2 Administrative Action Items

This section reviews the additional action items that are needed to administer and support the recommendations of the two previous sections. These action items will not be included in the table (figure 38) on page 115.

Action Item 18 Plan Adoption

The Seminole County Board of Commissioners should adopt this Floodplain Management Plan as an appendix to the Local Mitigation Strategy through a formal resolution.

Responsible Agency: Seminole County Emergency Manager and Board of County Commissioners

Deadline: February 15, 2010

Cost: Staff Time

Benefit: A public which is better protected from flood damage and reduced cost of repairs after flood events.

Action Item 19 Floodplain Management Planning Committee – LMS Working Group

With the adoption of this Plan as an appendix to the Seminole County Local Mitigation Strategy, the Floodplain Management Planning Committee will be converted to the permanent LMS Working Group to ensure the mitigation measures are implemented.

Responsible Agency: Seminole County Department of Public Safety – County Emergency

Manager

Deadline: Ongoing

Cost: Staff Time

Benefit: A single plan which carries out the objectives of protecting residents and businesses within Seminole County from all natural disasters.

12 Plan Implementation and Maintenance

12.1 Plan Implementation

Implementation implies two concepts: action and priority. While this plan presents many worthwhile recommendations, the decision of which action to undertake first will be the initial issue the FMPC faces. The FMPC should not only account for priority when considering which task should be addressed first, the FMPC should also consider the issue of funding. Low or no-cost recommendations have the greatest likelihood of succeeding. An example would be updating the County's Floodplain Management Ordinance to mandate two feet of freeboard (the current standard is one foot). These efforts would lead to long-standing changes in vulnerability and could be initiated at very little cost, while simultaneously reducing flood insurance premiums.

Another important implementation mechanism that is highly effective but low-cost is taking steps to incorporate the recommendations, and equally important, the underlying principles of this Floodplain Management Plan, into other community plans, such as the County's *Comprehensive Plan*, capital improvement budgeting, economic development goals and incentives, and the County's *Local Mitigation Strategy*, since this plan will be adopted as an appendix to it. Mitigation is most successful when it is incorporated within the day-to-day functions and priorities of government and development. This integration is accomplished by a constant, pervasive and energetic effort to network, identify and highlight the multi-objective, "win-win" benefits to each program, the community and the constituents. This effort is achieved through monitoring agendas, attending meetings, sending memos, and promoting a safe, sustainable community.

Monitoring funding opportunities should be done simultaneously with the integration effort. Funding can be leveraged to implement some of the more costly recommendations. A bank of ideas on how any required local match or participation requirements can be met should be created and maintained. Being aware of when funding becomes available will allow the FMPC to capitalize upon important opportunities. Funding opportunities that can be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal earmarked funds, and grant programs, including those that can serve or support multi-objective applications.

With the adoption of this plan, the Committee will be converted to a permanent advisory body and integrated into the Seminole County Local Mitigation Strategy (LMS) Working Group and led by the Department of Public Safety and the Emergency Manager. It is recognized that this LMS Work Group may change membership from time to time, but the Group agrees and commits to:

- Act as a forum for flood mitigation issues,
- Disseminate flood mitigation ideas and activities to all participants,
- Pursue the implementation of the high priority, low/no-cost Recommended Actions,
- Keep the concept of Mitigation in the forefront of community decision-making by identifying the recommendations of this plan when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to

disasters,

- Maintain a vigilant monitoring of multi-objective cost-share opportunities to assist the community in implementing the Recommended Actions of this plan for which no current funding or support exists,
- Monitor implementation of this plan,
- Report on progress and recommended changes to the Board of County Commissioners, and
- Inform and solicit input from the public.

The Committee will not have any powers over County staff; it will be purely an advisory body. Its primary duty is to see this plan successfully carried out and to report to the County Board of Commissioners and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about flood mitigation, passing these concerns on to the appropriate entities, and posting relevant information on the County’s website.

12.2 Plan Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate the implementation of the plan, and to update the plan as progress, roadblocks, or changing circumstances are recognized. This monitoring and updating will take place through an annual review by the LMS Work Group prior to CRS annual recertification, and a five-year written update to be submitted to the state and FEMA Region IV, unless disaster or other circumstances (e.g. changing regulations) lead to a different timeframe.

When the LMS Work Group convenes for the review, they will coordinate with all stakeholders that either participated in the original planning process or have joined the Committee since the inception of the planning process. The goal will be to update and revise the plan. Public notice will be given and public participation will be encouraged. The invitation to participate will be extended via web postings and press releases to the local media outlets.

The evaluation of progress can be achieved by monitoring changes in the vulnerability identified in the plan. Changes in vulnerability can be identified by noting:

- Lessened vulnerability as a result of implementing Recommended Actions
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability because of new development.

The updating of the plan will be accomplished through written changes and submissions as the LMS Working Group deems necessary, and as approved by the County.

Appendix A: Resolution Creating Floodplain Management Planning Committee

RESOLUTION NO. 2010-R-202

SEMINOLE COUNTY, FLORIDA

THE FOLLOWING RESOLUTION WAS ADOPTED BY THE BOARD OF COUNTY COMMISSIONERS OF SEMINOLE COUNTY, FLORIDA, AT THEIR REGULARLY SCHEDULED MEETING ON THE 28 DAY OF Sept., 2010.

WHEREAS, Seminole County Ordinance No. 89-28 created the Seminole County Administrative Code; and

WHEREAS, Seminole County Resolution Numbers 89-R-438 and 05-R-151 adopted the Seminole County Administrative Code; and

WHEREAS, the Seminole County Administrative Code needs to be amended from time to time to reflect changes in the administration of County government; and

WHEREAS, Seminole County has exposure to flood hazards that increase the vulnerability of life, property, environment and the County's economy; and

WHEREAS, Seminole County  participates in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) Program to reduce the cost of flood insurance to County residents; and

WHEREAS, Seminole County is currently a CRS Classification 7 saving residents within the 100-year FEMA mapped floodplain fifteen percent (15%) on the cost of flood insurance and those outside the mapped floodplain ten percent (10%) on the cost of flood insurance; and

WHEREAS, the CRS Program requires the County to adopt a Floodplain Management Plan because of the number of repetitively flooded properties in the County; and

WHEREAS, FEMA and the CRS Program encourage public participation and involvement from other stakeholders throughout the planning process; and

Seminole County Floodplain Management Planning Committee

Page 1 of 2

CERTIFIED COPY
MARYANNE MORSE
CLERK OF CIRCUIT COURT
SEMINOLE COUNTY, FLORIDA
BY 
DEPUTY CLERK

WHEREAS, the Floodplain Management Planning Committee (FMPC) will be involved in the development of the floodplain management plan through assessment of the flooding problems in the County, development of goals that address the identified flood hazards, and creation of various mitigation strategies that will be implemented to reduce damage to insurable structures and help protect lives; and

WHEREAS, the Floodplain Management Planning Committee has the responsibility to meet and fulfill the obligations of the CRS Program floodplain management planning requirements; and

WHEREAS, the Board of County Commissioners desires to amend sections of the Seminole County Administrative Code to establish the duties, responsibilities and membership structure for the Seminole County Floodplain Management Planning Committee,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF SEMINOLE COUNTY, FLORIDA THAT,

The Seminole County Administrative Code is hereby amended by the addition of Section 4.12, "Seminole County Floodplain Management Planning Committee", as more particularly described in the attachment hereto.

ADOPTED this 28th day of Sept., 2010.

ATTEST:

MARYANNE MORSE
Chief Deputy
Clerk to the Board of
County Commissioners of
Seminole County, Florida.

BOARD OF COUNTY COMMISSIONERS
SEMINOLE COUNTY, FLORIDA

By: BOB DALLARI, Chairman

Date: Sept. 30, 2010

Attachment:
Section 4.12 - Seminole County Floodplain Management Planning Committee

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 **SEMINOLE COUNTY ADMINISTRATIVE CODE**

SECTION 4. BOARDS, COMMISSIONS, COUNCILS AND COMMITTEES

4.12 SEMINOLE COUNTY FLOODPLAIN MANAGEMENT PLANNING COMMITTEE

A. PURPOSE. Pursuant to the requirements of the National Flood Insurance Program's Community Rating System, the Committee will provide assistance in the development of the floodplain management plan through assessment of the flooding problems in the County. The Seminole County Floodplain Management Planning Committee will assist in the development of goals that address the identified flood hazards and in the creation of various mitigation strategies that will be implemented to reduce damage to insurable structures and help protect lives, which will also reduce the cost of flood insurance to County residents.

B. DUTIES/RESPONSIBILITIES. The Seminole County Floodplain Management Planning Committee will meet and fulfill the obligations of the Community Rating System Program floodplain management planning requirements.

C. MEMBERSHIP STRUCTURE.

(1) Requirements. The Seminole County Floodplain Management Planning Committee shall have twenty-two (22) members consisting of representatives of the groups listed below:

(a) Two (2) employees of the Planning and Development Division of the County Growth Management Department, to be appointed by the Director of Growth Management.

(b) Three (3) employees of the Building Division of the County Growth Management Department, to be appointed by the Director of Growth Management.

(c) Five (5) interested non-County employee citizens of Seminole County, to be appointed by the Director of Growth Management. For the purposes of this Section 4.12, "interested citizens" include floodplain residents, the owners or managers of floodprone properties, business leaders, members of civic groups, farmers, landowners, developers, and employees of government agencies other than the County.

(d) Two (2) employees from the Emergency Management Division of the County Public Safety Department, to be appointed by the Director of Public Safety. These two (2) individuals shall serve as Chair and Vice-Chair of the Committee, with the Director of Public Safety to designate which employee shall serve in each position.

(e) Two (2) interested citizens, to be appointed by the Director of Public Safety.

 **SEMINOLE COUNTY ADMINISTRATIVE CODE**

(f) Two (2) employees of the Roads/Stormwater Division of the County Public Works Department, to be appointed by the Director of Public Works.

(g) Two (2) employees of the Engineering Division of the County Public Works Department, to be appointed by the Director of Public Works.

(h) Four (4) interested citizens, to be appointed by the Director of Public Works.

(2) Committee meetings shall take place once monthly beginning in October 2010.

(3) The Emergency Management Division of the Public Safety Department shall provide administrative support to the Committee and shall serve as the Committee's liaison to the Seminole County Board of County Commissioners.

(4) Upon appointment, members of the Committee shall serve until completion of the County's Floodplain Management Plan or one year, whichever is less. Upon adoption of the Floodplain Management Plan by the Board of County Commissioners, this Committee shall dissolve, its purpose having been fulfilled and completed.

(5) At all times interested citizens shall constitute a minimum of fifty percent (50%) of the Committee's membership, and shall be replaced as necessary by Department Directors.

D. LEGAL ISSUES.

(1) Financial Disclosure is not required to serve on the Seminole County Floodplain Management Planning Committee.

(2) The Loyalty Oath is not required of representatives on the Seminole County Floodplain Management Planning Committee.

(3) Sunshine and Public Records laws apply to the meetings and records of the Seminole County Floodplain Management Planning Committee.

(4) Membership on the Committee does not constitute an office for purposes of constitutional prohibition on dual office holding.

E. AUTHORITY. Resolution # _____ adopted _____

Appendix B: Minutes from Meetings of the Floodplain Management Planning Committee

Minutes from the meetings of the FMPC are provided in this appendix. However, no meeting minutes were taken at the first meeting of the FMPC, held August 5, 2010, because under the Florida Commission on Ethics' 2010 *Guide to the Sunshine Amendment and Code of Ethics for Public Officers and Employees*, Seminole County was not required to disclose information about meetings of the FMPC until the Seminole County Board of Commissioners passed a resolution authorizing the FMPC on September 28th, 2010 (see Appendix A).

Seminole County Department of Public Safety

Emergency Management

Community Rating System – Floodplain Management Planning Committee

	Minutes	
Thursday, October 7 th , 2010	6:30PM	Emergency Operations Center

CONVENE: Emergency Operations Center – 6:30 PM

PRESENT: Alan S. Harris – SC Emergency Manager, Shirley Exner- SC Emergency Management, Melvin Barnes – SC Central Services IT, Bill Houston – Citizen of SC, Brian Mack, Citizen of SC, Michelle Bernstein – Citizen of SC, Jeff Johnson – SC Building Department, Becky Sebren- American Red Cross, Stacy Casertano – SC Building Department, Owen Reagan- SC Public Works, Heidi Liles – ISO, Roland Raymundo – SC Public Works, Tony Coleman – SC Building Department, Mark Flomerfelt – SC Stormwater, Jen Fleischmon – SC Emergency Management, Scott Spratt – NOAA National Weather Service, Joe Walter – SC Citizen, David Stroud (AMEC) – Consultant to SC.

Alan Harris began the meeting by welcoming everyone who attended and indicated that food and drink is available for the meeting (donations accepted, but not required – no County funds were used to purchase food). He gave an update of current Florida Sunshine regulations. Since the committee has formally been recognized by the Board of County Commissioners – all decisions, sign-in sheets, and minutes will be filed with the Clerk of the Court. Persons should not discuss voting topics outside of the public meetings which will be held each month until the project is complete. Voting is limited to committee members only, but the public will be invited to attend each meeting to provide input into the plan. Once the plan is written it will go before the Board of County Commission for approval as an Annex to the Local Mitigation Strategy. Alan then

introduced David Stroud with AMEC Earth and Environmental to proceed with tonight's agenda.

Mr. Stroud asked the committee to provide consensus on Worksheet # 1 from the Seminole County Data Collection Guide to determine the frequency of occurrence, spatial extent, potential magnitude and significance of general flooding and hurricane and tropical storms affecting Seminole County. This will be used in the plan document to gauge the impact of flooding on the community.

The committee concluded that the frequency of occurrence for both general flooding and hurricane and tropical storms is "likely." Likely is defined as having a 10% to 100% probability of occurring in the next year or at least one chance in 10 years.

The committee concluded that the spatial extent of general flooding and hurricane and tropical storms is "extensive." Extensive is defined as covering 50 to 100 percent of the unincorporated area of Seminole County.

The committee concluded the potential magnitude of general flooding is "negligible." Negligible is defined as contributing to minor injuries, minimal quality-of-life impact, shutdown of critical facilities and services for 24 hours or less, and less than 10 percent of property is severely damaged. For hurricane and tropical storms, the committee concluded that the potential magnitude would be "limited." Limited is defined as some injuries, complete shutdown of critical facilities for more than a week, and more than 10 percent of property is severely damaged.

Finally the committee was asked to reach consensus on the significance of generally flooding and hurricane and tropical storms. The committee concluded that the significance of flooding is medium and the significance of hurricane and tropical storms is high.

There was good discussion and debate on each of these categories before the committee reached consensus on each.

Mr. Stroud next presented the risk assessment for flooding to the committee which will be the foundation for the floodplain management plan. Mr. Stroud went through a variety of maps and tables. The maps that were discussed and presented included: Flood Zones, Critical Facilities, Repetitive Loss, Historical Storm Tracks, and Building Permits Issued.

There were questions about additional critical facilities and if they could be added to the current map. Mr. Stroud indicated that if the committee deemed a facility to be "critical" it could be added to the map. As a result of the discussion, it was decided that the following facilities would be added: Sewage Treatment Plants, Sherriff's Sub-Stations, Rail Line Bridge on I-4 near St. John's River, and two low portions of roadways. One is State Road 46 before bridge over St. John's River in the far eastern portion of the

county and Highway 415 just before the bridge at the county line in the north central portion of the county.

There were questions on the single repetitive loss properties identified on the overall Repetitive Loss Map. A property which has only sustained one loss or paid claim against the National Flood Insurance Program has the potential to become a repetitive loss property. The Seminole County Building Department asked Mr. Stroud to look at the data to see if any of the single-loss properties were older than 10 years. If so, they can be removed from the map as a repetitive loss properties is defined as any property which has had two claims paid against the National Flood Insurance Program in any given 10 year period.

Mr. Stroud also presented tables which will be used in the risk assessment section of the floodplain management plan. The first table presented discussed the number of buildings by type in each flood zone. The second table presented the acreage of floodplain for each specific flood zone. And finally the last tables presented indicated the history of general flooding and a history of major hurricanes and tropical storms that have affected the county.

A short break was taken.

Mr. Stroud described a process for developing goals to support the floodplain management plan. Mr. Stroud provided a list of possible ideas that each committee member could consider to decide what they like to see in Seminole County's future. Each committee member wrote down their 3 most important ideas about what they would like to see in Seminole County's future. A majority of the committee came up with an economic theme of more job opportunities. Others came up educating the public, improved housing opportunities, controlled development, protecting historic and cultural resources, purchasing housing in the floodplain, leveraging federal funding, water quality, etc.

After everyone on the committee presented their thoughts on what they would like to see in Seminole County's future, the committee then wrote down their 3 most important goals. Each member was asked to consider their choice for goals based on what they indicated in the first exercise. Each committee member was asked to talk about their 3 goals and why they thought they were important. The committee came up with the following general goal ideas:

Mr. Stroud will take the groups generalized goals and refine them for incorporation into the floodplain management plan.

Mr. Stroud asked the committee to evaluate the six categories of mitigation measures that he passed out at the end of the meeting and for each member to come up with one potential mitigation project to discuss at the next committee meeting on November 4th,

2010.

Alan Harris asked about a date for the next floodplain management planning committee meeting and it was decided that the meeting would be on November 4th, 2010 at 6:00 PM.

The meeting ended at 8:45 PM.

Seminole County Department of Public Safety

Emergency Management

Community Rating System – Floodplain Management Planning Committee

“Draft” Minutes

Thursday, November 4th, 2010

6:00PM

Emergency Operations Center

CONVENE: Emergency Operations Center – 6:00 PM

PRESENT: Alan S. Harris – SC Emergency Manager, Shirley Exner- SC Emergency Management, Melvin Barnes – SC Central Services IT, Bill Houston – Citizen of SC, Brian Mack, Citizen of SC, Michelle Bernstein – Citizen of SC, Gabriella Milch – Citizen of SC, Jeff Johnson – SC Building Department, Stacy Casertano – SC Building Department, Roland Raymundo – SC Public Works, Tony Coleman – SC Building Department, Mark Flomerfelt – SC Public Works, Scott Spratt – NOAA National Weather Service, David Stroud (AMEC) – Consultant to SC.

Alan Harris began the meeting by welcoming everyone to the meeting and offered a light dinner. Mr. Harris gave a recap of adjustments he made to the October 7th draft version of the minutes which included that voting is limited to members of the committee and the State of Florida Sunshine Law which means that persons should not discuss voting topics outside of the public meetings until the project is complete. Alan then introduced David Stroud with AMEC Earth and Environmental to proceed with tonight’s agenda.

Mr. Stroud asked the committee to provide any additional changes October 7th Draft minutes. Rolando Raymundo indicated that Brian Mack’s first name was misspelled and should be corrected from Brain to Brian. Mr. Harris made a motion to accept the revised October 7th draft minutes as final with a second from Tony Coleman. A voice vote of all in favor followed. The motion carried approving the October 7th Minutes as final.

Mr. Stroud discussed the four goals and objectives with the group. There was discussion and debate on each of the specific goals and objects with suggestions for changing the wording to adding new or different objectives to support the goals. Some of the major changes included adding “safety and welfare” to Goal 1 and adding an additional objective under Goal 1 to include “protection of the natural water systems by focusing on water quality and best management practices.” A new Goal was added to “promote emergency management and warning systems to better protect the citizens of Seminole County.” Under this goal two objectives were created to support implementation by leveraging state and federal emergency management funding and to implement additional stream and river gauges. The first objective under Goal 2 was

revised to eliminate the word “some” and replace it with “appropriate level.” Goal 4 was revised to include the word “implement” and remove the word “existing.” The goal now reads “Identify and Implement specific projects to mitigate flood damage where cost-effective and affordable to include reducing the number of repetitively damaged structures.” The first objective under this goal was revised to include the word “state.” The objective now reads “Leverage state and federal grant funding to facilitate buyouts, elevations and other mitigation efforts.” A second objective was also added under this goal to specifically target repetitive loss properties for implementation of mitigation projects.

Mr. Stroud indicated that he would revise the goals and objectives based on the comments from the comment and submit an updated version to Mr. Harris for distribution to the Floodplain Management Committee.

Mr. Stroud led the next work element for the committee which included reviewing all possible mitigation measures both structural and non-structural that might be considered for implementation to help reduce flood damage in Seminole County. At the October meeting and again at the November meeting, Mr. Stroud passed out a list of 6 major mitigation categories with various mitigation measures listed under each. This will serve as a guide to develop mitigation strategies for the floodplain management plan. There was lengthy discussion and debate among the various options in each of the 6 major mitigation categories.

Under the Preventative Category, the following types of possible mitigation measures were considered: Land use planning in terms of open space, conservation and other public easements such as greenways and rails to trails, etc., focusing on the Seminole County Preservation 2000 Program, stormwater master planning regulations and the stormwater utility, drainage system maintenance and increasing the number of elevation reference bench marks available in the county and additional considerations for improvement to the building codes and floodplain management ordinance

The following types of mitigation measures were discussed under the Property Protection Category: Encouraging additional retrofitting, elevation and/or acquisition projects especially on the repetitive loss properties in the county. This would include a more aggressive approach in seeking grant funding through the various FEMA programs (HMGP, FMA, RFC and SRL). Finally, flood insurance was considered as an appropriate measure to help protect both the structure and contents of both residents and businesses in Seminole County.

Protection of wetland areas of the County was considered as one major component to the Natural and Beneficial Functions Category. The committee discussed the current erosion and sediment control requirements. There was also discussion on water quality and how best management practices can lead to cleaner water and more robust environment. It was mentioned that beyond the Seminole County wilderness and wetlands areas that the State of Florida owns a large tract of protected land in the

western part of the County. Once again the Seminole County Preservation 2000 Program was mentioned here.

Under the Emergency Services Category a variety of response and recovery measures were considered. Seminole County is a StormReady community and will continue to focus efforts to maintain that recognition. The Alert Seminole Program provides the options to be notified of emergencies in the County by registering your phone number. Seminole County staff is trained on NOAA's Emergency Alert System HazCollect system which provides a national framework by which local jurisdictions are able to assist NOAA with pre and post disaster alerts and warnings. There was discussion of NOAA weather radios being made available to the public. The County has a reverse 911 system for notifications. There was discussion on road access to important critical facilities during flooding events so that equipment can get out and respond to need. The committee concluded that there were no critical facilities which required protection from flood damage as most were in areas that are free from flood damage. A discussion was also held on protecting future critical facilities from the 500-year flood as a way to limit future damage and protect important critical facilities. The committee discussed that the County should consider ways to fund installation of additional stream and river gauges as a way to provide real time river flood forecasting. Finally, the County has purchased additional sand bagger equipment which will allow sand bags to be filled at a much faster rate than by hand.

For the Structural Projects Category a number of mitigation measures were considered including: Protection and improvement of the seawall along the County portion just outside the City of Sanford. The committee discussed the County's Capital Improvement Program with its limited budget and concern over studies already completed such as the Mullet Lake Road Stormwater Improvement Project. The idea of a regional reservoir was discounted to improve stormwater conditions in the County. A discussion was also held on the process and method for improvements to various channel and tributaries and how projects are prioritized.

The final mitigation category of Public Information focused primarily on the best way to get messages out to the public on ways they can protect their property and prevent future flood damage. The major way to do this is through improvement to the current County website to make it easy for residents to find the information they need. Other forms of social media was discussed such as the value of using Twitter and Facebook, MySpace, etc. to communicate necessary information. Utilization of the faith-based organizations that are currently involved in the Seminole County Local Mitigation Strategy is a way to leverage assistance in this effort. Leveraging public/private partnerships with various businesses such as Lowes and Home Depot can be a benefit to educating the public. The County currently has a Hurricane Expo and advertises on billboards, which are also effective ways to communicate. It was also mentioned that e-mails is how we communicate today and the committee should consider the value of e-mails in getting messages out to the public. Other considerations for communicating to the public were targeting Home Owners Associations and utilization of Alert Seminole.

Mr. Stroud next mentioned the sequence for completing the draft floodplain management plan. Mr. Stroud explained that it was his hope to have a draft plan completed by December 20th, 2010. Mr. Stroud indicated that it would be much more productive to have a meeting on the draft plan in early January, 2011 as many are on vacation and away from work toward the end of the year.

Mr. Harris asked the group about a date for the next committee meeting. It was agreed that the next committee meeting would be on Thursday evening January 13th at one of the public libraries in the County. This will be a combined public committee meeting. It would be beneficial to have to committee to meet at 6:00 P.M to conduct business and approve the November minutes etc. The public should be encouraged to arrive at 6:30 PM. The separation of these meeting times will help to qualify for the CRS requirement of having committee and public meetings separate.

The meeting ended at 8:40 PM.

Appendix C: Newspaper Advertisement, Agenda, and Sign-In Sheet for August 5, 2010 Public Meeting

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 OrlandoSentinel.com
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 ATLANTA GA 30384-0608
 TEL: 866/536-2725 FED ID # 59-1103775
 EMAIL: OSCCUSTSERV1@TRIBUNE.COM

1	BILLING PERIOD	2	ADVERTISER/CLIENT NAME
	08/01/10 - 08/31/10		
20	TOTAL AMOUNT DUE	UNAPPLIED AMOUNT	TERMS OF PAYMENT
	185.06	0.00	DUE 15 DAYS AFTER BILLING DATE
21	CURRENT NET AMOUNT	30 DAYS	60 DAYS
	185.06	0.00	0.00
		90 DAYS	OVER 90 DAYS
			0.00

PAGE #	5	BILLING DATE	8	BILLED ACCOUNT NAME AND ADDRESS	9	REMITTANCE ADDRESS
1		08/31/10		SEM. CO. DEPT PUBLIC SAFETY 150 BUSH BLVD SANFORD FL 32773 6706		FOR REMITTANCE ADDRESS SEE REVERSE SIDE.

05451451500000000041921385001 00018506 00018506 6

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DATE	11	NEWSPAPER REFERENCE	12	13	14	DESCRIPTION-OTHER COMMENTS/CHARGES	15	16	17	18	19	20	21
							SAU SIZE BILLED UNITS		TIMES RUN RATE		GROSS AMOUNT		NET AMOUNT
08/30		00804065				BALANCE FORWARD PAYMENT <i>08/29/10</i> BALANCE							185.06 185.06- 0.00
						ZONED DISPLAY							
08/01		WO# 069182702 INV#921385001				FLOOD PLAIN <i>Aug 1-5/10</i> ZSE TOTAL ADVERTISING	EPG 15.75		1X 11.75		185.06 <i>Price is ok Per Perry, 08/1 Sentinel 8-7-10</i>		185.06 185.06

STATEMENT OF ACCOUNT							AGING OF PAST DUE AMOUNTS			S&I™		
CURRENT NET AMOUNT		30 DAYS		60 DAYS		OVER 90 DAYS		UNAPPLIED AMOUNT		TOTAL AMOUNT DUE		
185.06		0.00		0.00		0.00		0.00		185.06		

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108 (11/07) S108

SEMINOLE COUNTY FLOODPLAIN MANAGEMENT PLAN***KICKOFF MEETING*****Thursday, August 5th, 2010****7:00 PM****Seminole County North Branch Library
150 North Palmetto Avenue, Sanford, FL 32771**

- ❖ **Introductions**
- ❖ **Mitigation, Mitigation Planning, & the Disaster Mitigation Act Requirements**
- ❖ **The Role of the Hazard Mitigation Planning Committee**
- ❖ **Discussion of Objectives and Schedule for Plan Development**
- ❖ **Review of Identified Hazards**
- ❖ **Coordinating with Other Agencies/Related Planning Efforts**
- ❖ **Planning for Public Involvement**
- ❖ **Questions and Answers/Adjourn**

Appendix D: Newspaper Advertisement, Agenda, and Sign-In Sheet for January 13, 2011 Public Meeting

Members of the legacy of Dr. Martin Luther King Jr. on Wednesday. Dr. Perry, founder of Capitol Preparatory Magnet School, has directed a grass-roots organization in Chester, Pa., operated a homeless shelter, run for state representative, and published four books. The event begins at 8:30 p.m. in the Student Union Pegasus Ballroom.

Christina Grace-Beverly is a LCF graphic designer. She can be contacted at csg0325@aol.com.

this year

Something about the Annual Geneva Historical Bus Tour and Pancake Breakfast. This is one of the signature events of Geneva and a must-do if you've never been before. The date is Feb. 15 but the time is now to sign up for the tour as the bus seating is limited and fills up quickly. There are two tours on Saturday morning one at 9:30 a.m. and one at 11:30 a.m. Call 407-947-4412 or email (fargieL@aol.com) and leave your name, phone number, number of people and preferred tour time. The tour is only a \$9 donation and it is well worth the money. You will learn all about Geneva and the history that not only formed our village but surrounds us still. More to come in the following weeks about this great event.

If health is on your resolution list consider attending the new Herb Society meeting at the Rural Heritage Center Wednesday from 6:30 to 8:30 p.m. The first session will feature Healing with Herbs and the cost is only \$6 going to the RHC and the Herb Society. Call Susan Kairyza-Courech at 407-687-4192 for more details.

Movie night at the Geneva Bijous Theatre (at the Rural Heritage Center) features the Pink Panther Saturday night 7 p.m. at the Rural Heritage Center for a \$5 donation, \$3 for kids under 16. Come early for locally crafted pizza at 6:30 p.m. Bring your kids to enjoy this comedy classic.

Seminole County seeks public input for new flood plan

Seminole County officials are seeking public input Thursday as they try to put together a new flood-management and protection plan.

Seminole experienced its worst recorded flooding during Tropical Storm Fay in 2008 when major damage occurred throughout the county and along the St. Johns River.

To deal with these types of disasters, Seminole has been working on a comprehensive flood-hazard management plan to address flood mitigation and protection issues.

This plan will incorporate a variety of engineering, environmental protection and planning measures to include floodplain planning, water-maintenance activities, stormwater management and other issues.

The final planning meeting for the committee will be at the county library's Sanford branch, 150 N. Palmetto Ave., at 6 p.m. Thursday. Public comments will be taken during the evening. The draft plan is available at www.prepareseminole.org.

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WEDNESDAY, JANUARY 9, 2011

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**SEMINOLE COUNTY FLOODPLAIN MANAGEMENT
PLAN**

Public MEETING

Thursday, January 13th, 2011

6:30 PM

**Seminole County North Branch Library
150 North Palmetto Avenue, Sanford, FL 32771**

- ❖ **Introductions**
- ❖ **Discussion and overview of the Draft Floodplain Management Plan**
- ❖ **Detail Discussion of Mitigation Strategies**
- ❖ **Questions and Answers/Adjourn**

Floodplain Management Planning Public Meeting
Seminole County North Branch Library
Thursday, January 13th 2011 (6:00 PM – 8:00PM)

Sign-In Sheet

NAME	Department/Citizen/Organization	E-Mail
DAVID STRAU	AMEC	david.strau@amec.com
Jeff Johnson	Semin. Co. Building	RJohnsonD2@seminolecountyfl.gov
Tony Colchak	Sem. Co. Bldg	ACOLEMAN@seminolecountyfl.gov
Mark Flomenfeld	Sem Co Env	MFlomenfeld@seminolecountyfl.gov
Owen Reagan	Seminole Co. Rds. Storm.	oreagan@seminolecountyfl.gov
Cindy SISI	Citizen	cindywaterski@aol.com
Michelle Bernstein	CITIZEN	shelltravel@hotmail.com
Paul Ribbel	CITIZEN	RIBBEL@AOL.COM
Bill Houston	CITIZEN	bill@familymg.com
BECKY SEBEN	ARC	Beekys@MIDFLORIDAREGIONS.ORG
Stacy Casertano	Sem. Co. Building Division	scasertano@seminolecountyfl.gov
Melvin Barnes	Sem. IT (GIS)	mbarnes@seminolecountyfl.gov
Alan Harris	Seminole County Env Mgmt	aharris@seminolecountyfl.gov
HEIDI LILES	ISO	hliles@iso.com
Shirley Exler	SC. Emergency Mgmt	exner@seminolecountyfl.gov
Ragya DiTto	NWS	ragya.ditto@noaa.gov
SCOTT SPRATT	NWS	SCOTT.SPRATT@NOAA.GOV
Roland Raymundo	SC Public Works	rroland@seminolecountyfl.gov
Alan Willis	S.C. Planning & Development	awillis@seminolecountyfl.gov
BRIAN MACK	CITIZEN (FMPC)	BMACK@CFL.RR.COM

Appendix E: Newspaper Article about January 13, 2011 Public Meeting

sioners, many expressed doubts. "No one will show up on Saturday morning," was a common refrain.

Not only did people show up, but attendance far exceeded my expectations. The meeting had to be moved to the city commission chambers to accommodate everyone.

"Thank you to all the citizens who showed up and thanks to the commissioners and city staff for including me on this out-of-the-box idea."

The purpose of the meeting was to give commissioners a chance to share their ideas and initiatives for the city of Sanford. Regular city commission meetings are usually very structured so that the business can be done in an orderly fashion. I wanted an unstructured forum for commissioners to be able to share their thoughts about how we can improve Sanford without worrying about taking time away from scheduled agenda items.

I also hoped that citizens would provide us with their ideas about how to make a better Sanford. The city commission ultimately will fail in its duties if it does not listen to the needs of Sanford's citizens.



Jeff Triplett

See MAYOR, Page 7

County hopes projects can reduce flooding

By Gary Roberts
Herald Staff

Michelle Bernstein and Phil Reibel are neighbors in the Mullet Lake area in unincorporated eastern Seminole County. Since most homeowners out this way have at least five acres around them, the neighbors see more turkey and deer than each other. But they do share a common cause.

When it rains hard, their dirt roads are washed away. Because they live in the hinterlands, these few connections to the outside world, such as Mullet Lake Park and Retreat roads, are privately maintained. When the rains come, then it's up to Bernstein, Reibel and their other neighbors to pool their money and have the roads restored.

As Tropical Storm Fay slowly rolled through the area in 2008, dropping more than 15 inches of rain and bestowing Seminole County with its worst recorded flooding in history, the roads disappeared. But Reibel had bigger worries.

"When Fay hit, the river came within 50 feet of my place," he said. "I was chasing fish out in my yard."

See FLOODING, Page 5

public trust.

He terms the new approach "community policing," placing a greater emphasis on communication, crime prevention and mutual understanding.

"Community policing is a model," he said. "It's a philosophy; it's a mindset. It's a way of doing business day in and day out."

Seminole County Chief Deputy Harriett, temporarily at the helm of the Sanford Police Department, said the SPD does a good job of responding to the volume of calls it receives, which last year topped 100,000. But this is not enough.

"We change lives one call at a time," he said. "We need to solve the problem

serve.

"We have to set a new said.

A big part of improving with the community, linking better outreach strategies.

"We need to develop relationships with the community," said Harriett, a law-enforcement careerist from 1974 and served as SP from 1985-1992.

This essential interaction occurs during informal community cookouts, course of official duties.

Or it can take place Citizen's Advisory Bo

CHILLY NIGHT FOR CHILI



The Rodeo Rhythm Kings perform on a cold Thursday night at a warm as they cruised from vendor to vendor during the monthly

For more A

FLOODING

Continued from Page 1

Thankfully, neither of their homes has ever flooded, but the bills for fixing up the roads can inundate them nonetheless. During a tough year—such as 2010, or the storied hurricane season of 2004, or 2001 with Tropical Storm Gabrielle—the costs can be as much as \$8,000 per household.

Having lived for 26 years in his home, which he had the foresight to elevate, Reibel estimates he has spent up to \$40,000 on road maintenance.

But this flood of expenses may be drying up.

At Thursday's final planning meeting of the county's Floodplain Management Planning Committee, the finishing touches were made to the annual update of the flood-management and protection plan. To the delight of Bernstein and Reibel, who attended the session at the county library branch in Sanford, a stormwater project for their area was added to the action plan. Although the project isn't scheduled for completion until 2016, the neighbors rejoiced.

"I'm thrilled," Bernstein said.

"Since 2006, this project has been shelved every year, and every year I go back to the county. It's a matter of getting funding by being on the list."

The project, which will replace stormwater culverts with those of a much larger capacity, is estimated to cost \$10,000 to \$20,000.

The Floodplain Management Plan, covering unincorporated Seminole County, provides a framework for all parties to work together and reach consensus on how to move forward. A well-prepared hazard-mitigation plan will ensure that all possible activities are reviewed and implemented so the problem is addressed by the most appropriate and efficient solutions, said David Stroed, regional emergency and hazard mitigation director for AMEC, an engineering and project-management consulting firm.

Natural forces are powerful and most natural hazards are well beyond anyone's ability to control. Mitigation is not a quick fix, but a long-term approach to reducing property owner's vulnerability to these hazards.

"The main purpose is to protect our citizens," said Alan Harris, emergency manager, Seminole County Department of Public Safety. "People have built on the lake and rivers, so they tend to get flooded over and over again."

The county is trying to buy out some of these properties to save money in the long run, he said. Once these homes are purchased, the county owns them in perpetuity. But again, the problem with flooding will never be completely solved.

In Seminole County, there are 90 square miles of floodplain.

"That's a heck of a lot of floodplain," Stroed said. "Where does the floodwater go?"

But the management committee is charged with developing an effective mitigation plan.

First, the committee reviews the flood hazard for Seminole County including the causes and impact of floods on people, property, critical facilities and the local economy.

Armed with a detailed risk assessment, the committee then sets mitigation goals to address areas whose improved capabilities could reduce vulnerability to the flood hazard.

Improvements can also lower the cost of individual flood-insurance programs.

"That's a significant savings and a big selling point," Stroed said.

Monitoring, updating and identifying progress take place through an annual review by the committee, including a number of public hearings. When the plan is five years old, a new plan is required.

"We've made a big attempt to get public input," he said. "What generally drives this input are recent flood events."

It's been quiet the last couple of years, with drought conditions prevailing. But that doesn't mean residents should relax.

It is estimated that during a 100-year flood, an event so devastating that it occurs only once a century, almost 7,000 buildings, with an assessed value of \$970 million, could be lost in Seminole County.

Fay was the closest thing to a 100-year flood in Sanford, causing Lake Monroe to spill over its shores, flooding homes and businesses. Areas in Goldsboro and off West Airport Road also received heavy damage.

Since Fay, the Cloud Branch stormwater project has been completed in Goldsboro, improving drainage in the area, but county officials say flood-prevention efforts must continue.

Final comments on the updated flood-management plan are due by Feb. 15. To participate, citizens should contact the Seminole County Department of Public Safety or visit prepareseminole.org.

Fundraiser to benefit lung transplant

Sweet Harmony Chapter 388 and the Sanford community are sponsoring a musical benefit fund-raiser for Audrey Stallworth Bly, who has been diagnosed with idiopathic pulmonary fibrosis, a life-threatening disease that will require her to have a lung transplant. She is the daughter of Lemuel & the late Sylvia Stallworth.

By supporting this fundraiser, the community can come together once again to show an awareness of caring for our neighbor.

The Audrey Bly-Stallworth Musical Benefit will be held Jan. 21 at 6 p.m., at the historical St. James AME Church, with Pastor Sedric E. Culbert at 819 Cypress Ave. This event is being sponsored by the Sweet Harmony Chapter of the Order of Eastern Star.

Funds will assist Bly in covering her healthcare expenses, post-transplant medications, cardiopulmonary rehabilitation services, traveling expenses for evaluation and other expenses associated with the surgery and c in Jacksonville. To contribute, make checks payable to NIAF Southeast Lung Transplant Fund in honor of Audrey Bly. Mail to: NIAF, 150 N. Radnor Chester Road, Suite F-120, Rudock, Pa. 19067. Credit card contributions call: 1-800-642-8339 or visit www.niaf.org and insert Audrey Bly in the "find a patient" box on homepage.

For questions or information call: Eustha D. Melton, worth matron, at 407-323-7732.

By supporting this fundraiser, the community can come together once again to show an awareness of care for our neighbor.

POLICE

Continued from Page 1

have a duty in crime prevention," Harrett said. Professionalism is yet another critical component of effective police work.

"I can't underscore that enough," he said. "The police department should be a highly trained, highly skilled, highly competent law-enforcement agency that gives you confidence in your community."

"Our ultimate goal is to reduce crime and the fear of crime. If you don't feel safe, then perhaps you're not."

Citizen concerns

The Citizens Advisory Board also opened up the discussion to the 30 members of the public who attended this week's meeting. Not surprisingly, many of the comments concerned the current upheaval in the SPD following a bungled investigation into the beating of a homeless man by a Sanford police officer's son.

A witness captured on camera the Dec. 4 incident that occurred outside a downtown Sanford bar. The video showed the Justin Collier, 21, striking up from behind and cold-cocking Sherman Ware, who was trying to break up a fight.

Although responding officers viewed the tape that night, it took the SPD a month to make an arrest, bringing allegations of special treatment.

An administrative investigation is underway, looking into the conduct of Sanford police officers involved in the case, which resulted in the early retirement of Police Chief Brian Tooley. The Professional Standards Division of the Seminole County Sheriff's Office is conducting the official inquiry into this and other SPD issues to ensure the findings are fair and objective, he said.

"We are conducting an independent, external investigation into these matters. All of that will be done with the community and appropriate action will be taken," he said.

In addition, Harrett said the inquiry is trying to uncover the source within the department that has leaked information to the media. Several news reports recently named names of officers targeted in the investigation.

"We have a lot of individuals releasing information to the media," Harrett said. "We need a central conduit of information."

While it is a second-degree misdemeanor to publicly reveal the names of officers who are purportedly the subjects of a confidential police investigation, Harrett stopped short of saying charges would be filed against media members. Tawetta Foster, Ware's sister, was in the crowd and ques-

tioned the response of the SPD in her brother's case, and general.

"I need to make sure that when officers don't do their job they will be held accountable," she said. "If I call and an officer comes out, he's there to do his job."

"I'm not saying it's everybody, but you might have the percent who are lollygagging around."

Acting chief Harrett agreed that officers must be held accountable for their actions.

"The focus here is changing any kind of behavior that is not desired by the community," he said.

Another Sanford resident asked if there are regulations place that restrict the loud, drunken behavior that occurs during the night of the bar fights that spilled outside.

Harrett responded that bar patrons, in most cases, are prohibited from carrying alcohol outside, and that noise restrictions set a 65-decibel limit within 50 feet of an establishment. Those constraints can be enforced, he said.

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Police chief search extended

Sanford acting city manager Tom George also was in the audience offering an update on the national search for a police chief.

"In order to let the selection surrounding the police chief search proceed smoothly, it was decided to extend the search period according to applicable laws," he said.

"We are going to take some time to evaluate the best person to lead our police department," he said.

George also jumped on board Harrett's call for transparency within the department.

"The transparency of an investigation in community relations," he said.

Mayor Sherman City Commissioner Mike McCarty, chairman of the citizen emergency fund-raiser, also echoed the need for transparency in the department through a public hearing.

"We're going to honor this thing," he said.

In addition, the acting city manager asked about the search to fill his position. On the November ballot, residents voted that the city manager must live in Sanford. Because George doesn't reside in the city, a new manager of day-to-day operations will soon be appointed.

George acknowledged that, in the interest of "harmony," might be best to have the new city manager be involved in selecting the next police chief.

"I'm optimistic that we may have a new city manager before we hire a police chief," he said.

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Appendix F: Survey

SEMINOLE COUNTY PUBLIC SAFETY
OFFICE OF EMERGENCY MANAGEMENT



August 5, 2010

Dear Resident:

Seminole County is currently developing a Floodplain Management Plan (FMP) to help reduce or eliminate flooding problems. The Plan will support the County's participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) Program. Participating in the NFIP's CRS Program reduces the cost of flood insurance for residents and businesses in the unincorporated areas of Seminole County.

As a resident in or near a floodplain in Seminole County, the Department of Public Safety – Division of Emergency Management would like to receive your input regard flood problems and flood related hazards on your property and in your neighborhood.

You are invited to participate in the development of the Floodplain Management Plan by sharing information about flooding and flood hazards within the County. This can be done in one of two ways:

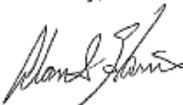
1. Complete the attached survey form and return it to the County (copies can also be downloaded from the County's website at www.prepareseminole.org)
2. Attend one of two future public meetings where the flood risk assessment and various mitigation strategies for reducing or eliminated the flood hazards will be discussed. Please see the Department of Public Safety's website www.prepareseminole.org for dates and times of these upcoming meetings.

The Floodplain Management Plan will be strengthened by your input. Please plan to attend a future public meeting and/or complete the attached survey form and return it to:

Seminole County
Department of Public Safety
Division of Emergency Management
Attn: Alan Harris
150 Bush Boulevard
Sanford, FL 32773

If you have questions on the NFIP or CRS Program please contact Tom Helle at (407) 665-7338

Sincerely,



Alan Harris
Seminole County Emergency Manager

Seminole County Floodplain Management Plan Survey

1. Do you find that there are flooding problems to your property or in your neighborhood after a significant rainfall event?

Yes No Sometimes

Explain:

2. Has water from a flood event ever entered your home (business)?

Yes No

3. Do you know the source of flooding on your property?

River Stream/Canal Inadequate Drainage

Don't Know Other

Explain:

4. Do you currently have a Flood Insurance Policy on your home or business?

Yes No Don't Know

5. What ideas do you have for Seminole County that could help reduce flooding in your neighborhood or on your property?

6. What recommendations do you have for Seminole County to increase public awareness and understanding of the hazards of flooding?

7. Have you ever contacted Seminole County in reference to flooding or drainage concerns?

**Appendix G: Agenda and Sign-In Sheet from August 5th, 2010
Meeting of the Floodplain Management Planning Committee**

**SEMINOLE COUNTY FLOODPLAIN MANAGEMENT
PLAN**

KICKOFF MEETING

Thursday, August 5th, 2010

2:00 to 3:30 pm

Seminole County EOC

- ❖ **Introductions**
- ❖ **Mitigation, Mitigation Planning, & the Disaster Mitigation Act Requirements**
- ❖ **The Role of the Hazard Mitigation Planning Committee**
- ❖ **Discussion of Objectives and Schedule for Plan Development**
- ❖ **Review of the flood Hazards**
- ❖ **Coordinating with Other Agencies/Related Planning Efforts**
- ❖ **Planning for Public Involvement**
- ❖ **Data Collection Needs**
- ❖ **Questions and Answers/Adjourn**

**Appendix H: Agenda and Sign-In Sheet from October 7th,
2010 Floodplain Management Planning Committee Meeting**

**SEMINOLE COUNTY FLOODPLAIN MANAGEMENT
PLAN**

Floodplain Management Planning Committee

Thursday, October 7th, 2010

6:30 to 8:30 pm

Seminole County EOC

- ❖ **Introductions**
- ❖ **Discussion of Objectives and Schedule for Plan Development**
- ❖ **Data Collection Guide – Results further needs**
- ❖ **Review of the flood Hazards – Risk Assessment**
- ❖ **Work Element - Creating Goals**
- ❖ **Work Element – Mitigation Strategies**
- ❖ **Questions and Answers/Adjourn**

**Appendix I: Agenda and Sign-In Sheet from November 4th,
2010 Floodplain Management Planning Committee Meeting**

**SEMINOLE COUNTY FLOODPLAIN MANAGEMENT
PLAN**

Floodplain Management Planning Committee

Thursday, November 4th, 2010

6:00 to 8:30 pm

Seminole County EOC

- ❖ Introductions
- ❖ Approval of October 7th FMPC Meeting Minutes
- ❖ Approval of Goal Statements
- ❖ Work Element - Mitigation Strategies
- ❖ Questions and Answers/Adjourn

**Appendix J: Agenda and Sign-In Sheet from January 13th,
2010 Floodplain Management Planning Committee Meeting**

**SEMINOLE COUNTY FLOODPLAIN MANAGEMENT
PLAN**

Floodplain Management Planning Committee

Thursday, January 13th, 2011

6:00 to 6:30 pm

Seminole County North Branch Library

- ❖ **Introductions**
- ❖ **Discussion and Approval of November 4th Minutes**
- ❖ **Discussion of Draft Floodplain Management Plan**
- ❖ **Questions and Answers/Adjourn**

Floodplain Management Planning Committee (FMPC) Meeting
 Seminole County North Branch Library
 Thursday, January 13th 2011

Sign-In Sheet

NAME	Department/Citizen/Organization	E-Mail
DAVID STROUD	AMEC	david.stroud@amec.com
Jeff Johnson	Semin. Co. Building	RJohnsonD2@seminolecountyfl.gov
Tony Coleman	Sem. Co. Bldg	ACOLEMAN@seminolecountyfl.gov
Mark Flowers	Sem Co Env	MFlowers@seminolecountyfl.gov
Owen Reagan	Seminole Co. Rds. Storm.	oreagan@seminolecountyfl.gov
Cindy SOSI	Citizen	cindy.waterski@aol.com
Michelle Bernstein	Citizen	shelltravel@hotmail.com
Paul Riebel	CITIZEN	RIBPA@AOL.COM
Bill Houston	CITIZEN	bill@familymg.com
BECKY SEBREN	ARC	BECKYS@MIDFLORIDIANBORDERSON.ORG
Stacy Casertano	Sem. Co. Building Division	scasertano@seminolecountyfl.gov
Melvin Barnes	Dem. IT (GW)	mbarnes@seminolecountyfl.gov
Alan Harris	Seminole County Env Mgmt	aharris@seminolecountyfl.gov
Heidi Liles	ISO	hliles@iso.com
Shirley Enler	SC. Emergency Mgmt	shirley.enler@seminolecountyfl.gov
Ray Spratt	NWS	ray.spratt@noaa.gov
SCOTT SPRATT	NWS	SCOTT.SPRATT@NOAA.GOV
Roland Raymundo	SC Public Works	rroland@seminolecountyfl.gov
Alan Willis	S.C. Planning & Development	awillis@seminolecountyfl.gov
Brian Mack	CITIZEN (FMPC)	BMACK@CFL.EDU.COM