Flood Risk Report

Levy County, Florida Coastal Study

Levy County (Unincorporated Areas)*, City of Cedar Key, City of Fanning Springs*, Town of Inglis*, Town of Yankeetown

Florida

*This report only covers the area within the coastal region of this county.

Report Number 01

06/03/2016

Final
Preface

The Department of Homeland Security (DHS), Federal Emergency Management Agency’s (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) program provides states, tribes, and local communities with flood risk information and tools that they can use to increase their resilience to flooding and better protect their citizens. By pairing accurate floodplain maps with risk assessment tools and planning and outreach support, Risk MAP has transformed traditional flood mapping efforts into an integrated process of identifying, assessing, communicating, planning for, and mitigating flood-related risks.

This Flood Risk Report (FRR) provides non-regulatory information to help local or tribal officials, floodplain managers, planners, emergency managers, and others better understand their flood risk, take steps to mitigate those risks, and communicate those risks to their citizens and local businesses.

Because flood risk often extends beyond community limits, the FRR provides flood risk data for the entire Flood Risk Project as well as for each individual community. This also emphasizes that flood risk reduction activities may impact areas beyond jurisdictional boundaries.

Flood risk is always changing, and there may be other studies, reports, or sources of information available that provide more comprehensive information. The FRR is not intended to be regulatory or the final authoritative source of all flood risk data in the project area. Rather, it should be used in conjunction with other data sources to provide a comprehensive picture of flood risk within the project area.
# Table of Contents

1. Introduction .................................................................................................................. 1  
   1.1 About Flood Risk .................................................................................................. 1  
      1.1.1 Calculating Flood Risk ................................................................................. 1  
      1.1.2 Flood Risk Products .................................................................................... 2  
   1.2 Uses of this Report ............................................................................................... 2  
   1.3 Sources of Flood Risk Assessment Data Used ..................................................... 4  
   1.4 Related Resources .............................................................................................. 4  

2. Flood Risk Analysis ....................................................................................................... 6  
   2.1 Overview .............................................................................................................. 6  
   2.2 Analysis of Risk ................................................................................................... 6  
      2.2.1 Changes Since Last FIRM ............................................................................ 7  
      2.2.2 Flood Depth and Analysis Grids ................................................................. 7  
      2.2.3 Flood Risk Assessments ............................................................................. 9  
      2.2.4 Areas of Mitigation Interest ...................................................................... 11  
      2.2.5 Coastal-Specific Datasets ....................................................................... 19  

3. Flood Risk Analysis Results ......................................................................................... 20  
   3.1 Flood Risk Map .................................................................................................... 21  
   3.2 Levy County, Florida Coastal Study Summary .................................................... 23  
      3.2.1 Overview ...................................................................................................... 23  
      3.2.2 Flood Risk Datasets ................................................................................... 24  
   3.3 Communities ........................................................................................................ 29  
      3.3.1 City of Cedar Key (CID 120373) ................................................................. 29  
      3.3.2 City of Fanning Springs Summary (CID 120146) ........................................ 35  
      3.3.3 Town of Inglis Summary (CID 120586) ..................................................... 40  
      3.3.4 Town of Yankeetown Summary (CID 120147) ......................................... 45  
      3.3.5 Levy County (Unincorporated Areas) Summary (CID 120145) ................. 50  

4. Actions to Reduce Flood Risk ....................................................................................... 55  
   4.1 Types of Mitigation Actions ............................................................................... 55  
      4.1.1 Preventative Measures ................................................................................. 55  
      4.1.2 Property Protection Measures .................................................................... 56
4.1.3 Natural Resource Protection Activities .......................................................... 56
4.1.4 Structural Mitigation Projects ................................................................. 56
4.1.5 Public Education and Awareness Activities ........................................... 57
4.1.6 Emergency Service Measures ............................................................... 57

4.2 Identifying Specific Actions for Your Community ............................................ 57

4.3 Mitigation Programs and Assistance .......................................................... 58

4.3.1 FEMA Mitigation Programs and Assistance ........................................... 59
4.3.2 Additional Mitigation Programs and Assistance ...................................... 60

5 Acronyms and Definitions ..................................................................................... 61

5.1 Acronyms ........................................................................................................ 61
5.2 Definitions ........................................................................................................ 62

6 Additional Resources .......................................................................................... 67

7 Data Used to Develop Flood Risk Products ....................................................... 71

List of Tables
Table 3-1: Levy County (Total Project Area): Estimated Potential Losses for Flood Event Scenarios ................................................................. 27
Table 3-2: City of Cedar Key (120373): Estimated Potential Losses for Flood Event Scenarios ................................................................. 33
Table 3-3: City of Fanning Springs (120146): Estimated Potential Losses for Flood Event Scenarios ................................................................. 38
Table 3-4: Town of Inglis (120586): Estimated Potential Losses for Flood Event Scenarios ................................................................. 43
Table 3-5: Town of Yankeetown (120147): Estimated Potential Losses for Flood Event Scenarios ................................................................. 48
Table 3-6: Levy County (Unincorporated Areas) (120145): Estimated Potential Losses for Flood Event Scenarios ................................................................. 53
Table 4-1: FEMA Hazard Mitigation Assistance Programs .................................. 59
FLOOD RISK REPORT

1 Introduction

1.1 About Flood Risk

Floods are naturally occurring phenomena that can and do happen almost anywhere. In its most basic form, a flood is an accumulation of water over normally dry areas. Floods become hazardous to people and property when they inundate an area where development has occurred, causing losses. Mild flood losses may have little impact on people or property, such as damage to landscaping or the generation of unwanted debris. Severe flooding can destroy buildings, ruin crops, and cause critical injuries or death.

1.1.1 Calculating Flood Risk

It is not enough to simply identify where flooding may occur. Just because one knows where a flood occurs does not mean they know the risk of flooding. The most common method for determining flood risk, also referred to as vulnerability, is to identify the probability of flooding and the consequences of flooding. In other words:

\[
\text{Flood Risk} = \text{Probability} \times \text{Consequences}; \text{ where}
\]

- **Probability** = the likelihood of occurrence
- **Consequences** = the estimated impacts associated with the occurrence

The probability of a flood is the likelihood that a flood will occur. The probability of flooding can change based on physical, environmental, and/or contributing engineering factors. Factors affecting the probability that a flood will impact an area range from changing weather patterns to the existence of mitigation projects. The ability to assess the probability of a flood and the level of accuracy for that assessment are also influenced by modeling methodology advancements, better knowledge, and longer periods of record for the water body in question.

The consequences of a flood are the estimated impacts associated with the flood occurrence. Consequences relate to...
humans’ activities within an area and how a flood impacts the natural and built environments.

### 1.1.2 Flood Risk Products

Through Risk MAP, FEMA provides communities with updated Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) Reports that focus on the probability of floods and that show where flooding may occur as well as the calculated 1-percent-annual-chance flood elevation. The 1-percent-annual-chance flood, also known as the base flood, has a 1% chance of being equaled or exceeded in any given year. FEMA understands that flood risk is dynamic—that flooding does not stop at a line on a map—and as such, provides the following flood risk products:

- **Flood Risk Report (FRR)**: The FRR presents key risk analysis data for the Flood Risk Project.

- **Flood Risk Map (FRM)**: Like the example found in Section 3.1 of this document, the FRM shows a variety of flood risk information in the project area. More information about the data shown on the FRM may be found in Section 2 of this report.

- **Flood Risk Database (FRD)**: The FRD is in Geographic Information System (GIS) format and houses the flood risk data developed during the course of the flood risk analysis that can be used and updated by the community. After the Flood Risk Project is complete, this data can be used in many ways to visualize and communicate flood risk within the Flood Risk Project.

These Flood Risk Products provide flood risk information at both the Flood Risk Project level and community level (for those portions of each community within the Flood Risk Project). They demonstrate how decisions made within a Flood Risk Project can impact properties downstream, upstream, or both. Community-level information is particularly useful for mitigation planning and emergency management activities, which often occur at a local jurisdiction level.

### 1.2 Uses of this Report

The goal of this report is to help inform and enable communities and tribes to take action to reduce flood risk. Possible users of this report include:

- Local elected officials
- Floodplain managers
- Community planners
- Emergency managers
- Public works officials
- Other special interests (e.g., watershed conservation

Vulnerability of infrastructure is another important consideration.
groups, environmental awareness organizations, etc.)

State, local, and tribal officials can use the summary information provided in this report, in conjunction with the data in the FRD, to:

- **Update local hazard mitigation plans.** As required by the 2000 Federal Stafford Act, local hazard mitigation plans must be updated at least every five (5) years. Summary information presented in Section 3 of this report and the FRM can be used to identify areas that may need additional focus when updating the risk assessment section of a local hazard mitigation plan. Information found in Section 4 pertains to the different mitigation techniques and programs and can be used to inform decisions related to the mitigation strategy of local plans.

- **Update community comprehensive plans.** Planners can use flood risk information in the development and/or update of comprehensive plans, future land use maps, and zoning regulations. For example, zoning codes may be changed to better provide for appropriate land uses in high-hazard areas.

- **Update emergency operations and response plans.** Emergency managers can identify low-risk areas for potential evacuation and sheltering and can help first responders avoid areas of high-depth flood water. Risk assessment results may reveal vulnerable areas, facilities, and infrastructure for which planning for continuity of operations plans (COOP), continuity of government (COG) plans, and emergency operations plans (EOP) would be essential.

- **Develop hazard mitigation projects.** Local officials (e.g., planners and public works officials) can use flood risk information to re-evaluate and prioritize mitigation actions in local hazard mitigation plans.

- **Communicate flood risk.** Local officials can use the information in this report to communicate with property owners, business owners, and other citizens about flood risks, changes since the last FIRM, and areas of mitigation interest. The report layout allows community information to be extracted in a fact sheet format.

- **Inform the modification of development standards.** Floodplain managers, planners, and public works officials can use information in this report to support the adjustment of development standards for certain locations. For example, heavily developed areas tend to increase floodwater runoff because paved surfaces cannot absorb water, indicating a need to adopt or revise standards that provide for appropriate stormwater retention.

The Flood Risk Database, Flood Risk Map, and Flood Risk Report are “non-regulatory” products. They are available and intended for community use but are neither mandatory nor tied to the regulatory development and insurance requirements of the National Flood Insurance Program (NFIP). They may be used as regulatory products by communities if authorized by state and local enabling authorities.
1.3 Sources of Flood Risk Assessment Data Used

To assess potential community losses, or the consequences portion of the “risk” equation, the following data is typically collected for analysis and inclusion in a Flood Risk Project:

- Information about local assets or resources at risk of flooding
- Information about the physical features and human activities that contribute to that risk
- Information about where the risk is most severe

For most Flood Risk Projects, FEMA uses the following sources of flood risk information to develop this report:

- Hazus-estimated flood loss information
- New engineering analyses (e.g., coastal, hydrologic, and/or hydraulic modeling) to develop new flood boundaries
- Locally supplied data (see Section 7 for a description)
- Sources identified during the Discovery process

1.4 Related Resources

For a more comprehensive picture of flood risk, FEMA recommends that state and local officials use the information provided in this report in conjunction with other sources of flood risk data, such as those listed below.

- **FIRMs and FIS Reports.** This information indicates areas with specific flood hazards by identifying the limit and extent of the 1-percent-annual-chance floodplain and the 0.2-percent-annual-chance floodplain. FIRMs and FIS Reports do not identify all floodplains in a Flood Risk Project. The FIS Report includes summary information regarding other frequencies of flooding, as well as flood profiles for riverine sources of flooding. In rural areas and areas for which flood hazard data are not available, the 1-percent-annual-chance floodplain may not be identified. In addition, the 1-percent-annual-chance floodplain may not be identified for flooding sources with very small drainage areas (less than 1 square mile).

- **Hazus Flood Loss Estimation Reports.** Hazus can be used to generate reports, maps and tables on potential flood damage that can occur based on new/proposed mitigation projects or future development patterns and practices. Hazus can also run specialized risk assessments, such as what happens when a dam or levee fails. Flood
risk assessment tools are available through other agencies as well, including the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Army Corps of Engineers (USACE). Other existing watershed reports may have a different focus, such as water quality, but may also contain flood risk and risk assessment information. See Section 6 for additional resources.

- **Flood or multi-hazard mitigation plans.** Local hazard mitigation plans include risk assessments that contain flood risk information and mitigation strategies that identify community priorities and actions to reduce flood risk. This report was informed by any existing mitigation plans in the Flood Risk Project.

- **Hurricane Evacuation Studies.** Produced through a joint effort by FEMA, NOAA, and USACE, Hurricane Evacuation Studies provide tools and information to the state and county emergency management offices to help determine who should evacuate during hurricane threats, and when those evacuations should occur. The information can be used to supplement or update hurricane evacuation plans and operational procedures for responding to hurricane threats.

- **FEMA Map Service Center (MSC).** The MSC has useful information, including planning resources, phone numbers, data, etc. Letters of Map Change are also available through the MSC. The user can view FIRM databases and the National Flood Hazard Layer (NFHL) Database.
2 Flood Risk Analysis

2.1 Overview

Flood hazard identification uses FIRMs and FIS Reports to identify where flooding can occur along with the probability and depth of that flooding. Flood risk assessment is the systematic approach to identifying how flooding impacts the environment. In hazard mitigation planning, flood risk assessments serve as the basis for mitigation strategies and actions by defining the hazard and enabling informed decision making. Fully assessing flood risk requires the following:

- Identifying the flooding source and determining the flood hazard occurrence probability
- Developing a complete profile of the flood hazard including historical occurrence and previous impacts
- Inventorying assets located in the identified flood hazard area
- Estimating potential future flood losses caused by exposure to the flood hazard area

Flood risk analyses are different methods used in flood risk assessment to help quantify and communicate flood risk. Flood risk analysis can be performed on a large scale (state, community) level and on a very small scale (parcel, census block). Advantages of large-scale flood risk analysis, especially at the watershed level, include identifying how actions and development in one community can affect areas up- and downstream. On the parcel or census block level, flood risk analysis can provide actionable data to individual property owners so they can take appropriate mitigation steps.

2.2 Analysis of Risk

The FRR, FRM, and FRD contain a variety of flood risk analysis information and data to help describe and visualize flood risk within the project area. Depending on the scope of the Flood Risk Project for this project area, this information may include some or all of the following elements:

- Changes Since Last FIRM
- Flood Depth and Analysis Grids
- Flood Risk Assessments

State and Local Hazard Mitigation Plans are required to have a comprehensive all-hazard risk assessment. The flood risk analyses in the FRR, FRM, and FRD can inform the flood hazard portion of a community's or state's risk assessment. Further, data in the FRD can be used to develop information that meets the requirements for risk assessments as it relates to the hazard of flood in hazard mitigation plans.
2.2.1 Changes Since Last FIRM

The Changes Since Last FIRM (CSLF) dataset, stored in the FRD and shown in Section 3 of this report, illustrates where changes to flood risk may have occurred since the last FIRM was published for the subject area. Communities can use this information to update their mitigation plans, specifically quantifying “what is at risk” and identifying possible mitigation activities.

The CSLF dataset identifies changes in the Special Flood Hazard Area (SFHA) and floodway boundary changes since the previous FIRM was developed. These datasets quantify land area increases and decreases to the SFHA and floodway, as well as areas where the flood zone designation has changed (e.g., Zone A to AE, AE to VE, shaded Zone X protected by levee to Zone AE for de-accredited levees).

The CSLF dataset is created in areas that were previously mapped using digital FIRMs. The CSLF dataset for this project area includes:

- **Floodplain and/or Floodway Boundary Changes:** Any changes to the existing floodplain or floodway boundaries are depicted in this dataset.
- **Floodplain Designation Changes:** This includes changed floodplain designations (e.g., Zone A to Zone AE).

2.2.2 Flood Depth and Analysis Grids

Grids are FEMA datasets provided in the FRD to better describe the risk of the flood hazard. Much like the pixels in a photo or graphic, a grid is made up of square cells, where each grid cell stores a value representing a particular flood characteristic (elevation, depth, velocity, etc.). While the FIRM and FIS Report describe “what” is at risk by identifying the hazard areas, water surface, flood depth, and other analysis grids can help define “how bad” the risk is within those identified areas. These grids are intended to be used by communities for additional analysis, enhanced visualization, and communication of flood risks for hazard mitigation.
planning and emergency management. The Flood Depth and Analysis Grids provide an alternative way to visualize how a particular flood characteristic (depth, velocity, etc.) vary within the floodplain. Since they are derived from the engineering modeling results, they are typically associated with a particular frequency-based flooding event (e.g., 1-percent-annual-chance event). Grids provided in the FRD for this project area include the following:

- **Water Surface Elevation Grid:**
  
  This dataset represents the flood elevations calculated for the 1-percent-annual-chance flood event.

- **Flood Depth Grid:** Flood Depth Grids are created for each flood frequency calculated during the course of a Flood Risk Project. These grids communicate flood depth as a function of the difference between the calculated water surface elevation and the ground. Five grids will normally be delivered for riverine areas for the standard flood frequencies (10-, 4-, 2-, 1-, and 0.2-percent-annual-chance).

  Coastal flood depth grids are created for areas where the dominant wave hazard is overland wave propagation. The grid depicts the difference in elevation between the wave crest elevation, or BFE, and the ground. Coastal areas will typically only receive a depth grid for the 1-percent-annual-chance (base) flood for which overland wave propagation results are produced as a part of the FIS; however, approximate methods may be used to estimate wave crest elevations for other flood frequencies, if desired.

  Depth grids form the basis for refined flood risk assessments (as presented in a table in Section 3 of this report) and are used to calculate potential flood losses for display on the FRM and for tabular presentation in this report. Depth grids may also be used for a variety of ad-hoc risk visualization and mitigation initiatives.

- **Depth Grids Based on Additional Flood Frequencies:** In addition to the standard flood frequencies referenced above, this dataset is

Grid data can make flood mapping more informative. The top image is a flood depth grid showing relative depths of water in a scenario flood event. The bottom image is a percent annual chance of flooding grid, which shows inundation areas of various frequency floods.
provided when additional flood frequencies are calculated, such as a 20-percent-annual-chance (5-year) and 50-percent-annual-chance (2-year) event.

2.2.3 Flood Risk Assessments

Flood risk assessment results reported in the FRR were developed using a FEMA flood loss estimation tool, Hazus. Hazus (www.fema.gov/Hazus) is a nationally-applicable and standardized risk assessment tool that estimates potential losses from earthquakes, floods, and hurricanes. It uses GIS technology to estimate physical, economic, and social impacts of disasters, Hazus can be used to help individuals and communities graphically visualize the areas where flood risk is highest. Some benefits of using Hazus include the following:

- Outputs that can enhance state and local mitigation plans and help screen for cost-effectiveness in FEMA mitigation grant programs
- Analysis refinement through updating inventory data and integrating data produced using other flood models
- Widely available support documents and networks (Hazus Users Groups)

Files from the FRD can be imported into Hazus to develop other risk assessment information including:

- Debris generated after a flood event
- Dollar loss of the agricultural products in a study region
- Utility system damages in the region
- Vehicle loss in the study region
- Damages and functionality of lifelines such as highway and rail bridges, potable water, and wastewater facilities

Scenario-Based Flood Loss Estimates:

For the Average Annualized Loss (AAL) study, scenario-based flood losses have been calculated using Hazus (Version 2.1) for the 2-, 1-, 0.5-, and 0.2 percent-annual-chance flood events. For the ‘refined’ study, Hazus (Version 2.2) was used to calculate coastal flood losses for the 1-percent-annual-chance flood event. In this report, these losses are expressed in dollar amounts and are provided for the Coastal Flood Risk Project area only, even though results are shown at the local jurisdiction level.
Loss estimates are based on best available data, and the methodologies applied result in an approximation of risk. These estimates should be used to understand relative risk from flood and potential losses. Uncertainties are inherent in any loss estimation methodology, arising in part from approximations and simplifications that are necessary for a comprehensive analysis (e.g., incomplete inventories, demographics, or economic parameters).

Flood loss estimates in this report are being provided at the project and community levels for multiple flood frequencies, and include the following:

- **Residential Asset Loss**: These include direct building losses (estimated costs to repair or replace the damage caused to the building) for all classes of residential structures including single family, multi-family, manufactured housing, group housing, and nursing homes. This value also includes content losses.

- **Commercial Asset Loss**: These include direct building losses for all classes of commercial buildings including retail, wholesale, repair, professional services, banks, hospitals, entertainment, and parking facilities. This value also includes content and inventory losses.

- **Other Asset Loss**: This includes losses for facilities categorized as industrial, agricultural, religious, government, and educational. This value also includes content and inventory losses.

- **Business Disruption**: This includes the losses associated with the inability to operate a business due to the damage sustained during the flood. Losses include inventory, income, rental income, wage, and direct output losses, as well as relocation costs.

- **Annualized Losses**: Annualized losses are calculated using Hazus by taking losses from multiple events over different frequencies and expressing the long-term average by year. This factors in historic patterns of frequent smaller floods with infrequent but larger events to provide a balanced presentation of flood damage.

- **Loss Ratio**: The loss ratio expresses the scenario losses divided by the total building value for a local jurisdiction and can be a gage to determine overall community resilience as a result of a scenario event. For example, a loss ratio of 5 percent for a given scenario would indicate that a local jurisdiction would be more resilient and recover more easily from a given event, versus a loss ratio of 75 percent which would indicate widespread losses. An annualized loss ratio uses the annualized loss data as a basis for computing the ratio. Loss ratios are not computed for business disruption. These data are presented in the FRR.
• **Hazus Flood Risk Value**: On the FRM, flood risk is expressed in the following five categories: very low, low, medium, high, and very high for census blocks that have flood risk. It is based on the 1-percent-annual-chance total asset loss by census block.

• **Annualized Losses**: Annualized losses are calculated using Hazus by taking losses from multiple events over different frequencies and expressing the long-term average by year. This factors in historic patterns of frequent smaller floods with infrequent but larger events to provide a balanced presentation of flood damage.

### 2.2.4 Areas of Mitigation Interest

Many factors contribute to flooding and flood losses. Some are natural, and some are not. In response to these risks, there has been a focus by the Federal government, State agencies, and local jurisdictions to mitigate properties against the impacts of flood hazards so that future losses and impacts can be reduced. An area identified as an Area of Mitigation Interest (AoMI) is an important element of defining a more comprehensive picture of flood risk and mitigation activity in a watershed, identifying target areas and potential projects for flood hazard mitigation, encouraging local collaboration, and communicating how various mitigation activities can successfully reduce flood risk.

AoMIs are identified through coordination with local stakeholders; through revised hydrologic and hydraulic and/or coastal analyses; by leveraging other studies or previous flood studies; from community mitigation plans, floodplain management plans, and local surveys; and from the mining of federal government databases (e.g., flood claims, disaster grants, and data from other agencies). Below is a list of the types of Areas of Mitigation Interest, however specific AoMIs were not identified as part of this project.

- **Dams**

  A dam is a barrier built across a waterway for impounding water. Dams vary from impoundments that are hundreds of feet tall and contain thousands of acre-feet of water (e.g., Hoover Dam) to small dams that are a few feet high and contain only a few acre-feet of water (e.g., small residential pond). “Dry dams,” which are designed to contain water only during floods and do not impound water except for the purposes of flood control, include otherwise dry land behind the dam.

  While most modern, large dams are highly engineered structures with components such as impervious cores and emergency spillways, most smaller and older dams are not. State dam safety programs emerged in the 1960s, and the first Federal Guidelines for Dam Safety were not prepared until 1979. By this time, the vast majority of dams in the United States had already been constructed.

Dams vary in size and shape, the amount of water they impound, and their assigned hazard classification.
Reasons dams are considered AoMIs:

- Many older dams were not built to any particular standard and thus may not withstand extreme rainfall events. Older dams in some parts of the country are made out of an assortment of materials. These structures may not have any capacity to release water and could be overtopped, which could result in catastrophic failure.

- Dams may not always be regulated, given that the downstream risk may have changed since the dam was constructed or since the hazard classification was determined. Years after a dam is built, a house, subdivision, or other development may be constructed in the dam failure inundation zone downstream of the dam. Thus, a subsequent dam failure could result in downstream consequences, including property damage and the potential loss of life. Since these dams are not regulated, it is impossible to predict how safe they are.

- A significant dam failure risk is structural deficiencies associated with older dams that are not being adequately addressed today through needed inspection/maintenance practices.

- For larger dams a flood easement may have been obtained on a property upstream or downstream of the dam. However, there may have been buildings constructed in violation of the flood easement.

- When a new dam is constructed, the placement of such a large volume of material in a floodplain area (if that is the dam location) will displace flood waters and can alter how the watercourse flows. This can result in flooding upstream, downstream, or both.

- For many dams, the dam failure inundation zone is not known. Not having knowledge of these risk areas could lead to unprotected development in these zones.

Levees

FEMA defines a levee as “a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.” Levees are sometimes referred to as dikes. Soil used to construct a levee is compacted to make the levee as strong and stable as possible. To protect against erosion and scouring, levees can be covered with everything from grass and gravel to harder surfaces like stone (riprap), asphalt, or concrete.
Similar to dams, levees have not been regulated in terms of safety and design standards until relatively recently. Many older levees were constructed in a variety of ways, from a farmer piling dirt along a stream to prevent nuisance flooding to levees made out of old mining spoil material. As engineered structures, levees are designed to a certain height and can fail if a flood event is greater than anticipated.

A floodwall is a vertical wall that is built to reduce the flood hazard in a similar manner as a levee. Typically made of concrete or steel, floodwalls often are erected in urban locations where there is not enough room for a levee. Floodwalls are sometimes constructed on a levee crown to increase the levee’s height.

Most new dams and levees are engineered to a certain design standard. If that design is exceeded, they could be overtopped and fail catastrophically, causing more damage than if the levee was not there in the first place. Few levees anywhere in the nation are built to more than a 1-percent-annual-chance flood, and the areas behind them are still at some risk for flooding. In some states, the flooding threat can extend up to 15 miles from a riverbank. Although the probability of flooding may be lower because a levee exists, risk is nonetheless still present. The American Society of Civil Engineers’ publication “So, You Live Behind a Levee!” provides an in-depth explanation of levee and residual risk.

Reasons levees are considered AoMIs:

- Like dams, many levees in the United States were constructed using unknown techniques and materials. These levees have a higher failure rate than those that have been designed to today’s standards.

- A levee might not provide the flood risk reduction it once did as a result of flood risk changes over time. Flood risk can change due to a number of factors, including increased flood levels due to climate change or better estimates of flooding, development in the watershed increasing flood levels and settlement of the levee or floodwall, and sedimentation in the levee channel. Increased flood levels mean decreased reduction of the flood hazard. The lack of adequate maintenance over time will also
reduce the capability of a levee to contain the flood levels for which it was originally designed.

- Given enough time, any levee will eventually be overtopped or damaged by a flood that exceeds the levee’s capacity. Still, a widespread public perception of levees is that they will always provide protection. This perception may lead to not taking mitigation actions such as purchasing flood insurance.

- A levee is a system that can fail due to its weakest point, and therefore maintenance is critical. Many levees in the United States are poorly maintained or not maintained at all. Maintenance also includes maintaining the drainage systems behind the levees so they can keep the protected area dry.

- **Coastal Structures**

  Coastal structures, such as seawalls and revetments, are typically used to stabilize the shoreline to mitigate or prevent flood and/or erosion losses. Structures, such as jetties, groins and breakwaters, are constructed along naturally dynamic shorelines to alter the physical processes (e.g. sediment transport) for purposes that include reduction of long-term erosion rates, improvements to safe navigation (e.g., into ports), and reduction of erosive wave forces impacting a coast.

  - **Reasons coastal structures are considered AoMIs:**

    - Coastal structures may provide flood or erosion protection for one site. However, they may also interrupt the sediment transport process, resulting in accelerated coastal erosion downdrift of the structure.

    - Coastal structures are typically designed to withstand the forces associated with extreme design conditions of waves and water levels. Adequate protection may not be provided if these conditions are exceeded.

    - As with other infrastructure such as roads, bridges, and utilities, regular maintenance of shoreline protection structures is essential to ensure that they continue to provide the intended protection from flooding and erosion.

- **Stream Flow Constrictions**

  A stream flow constriction occurs when a human-made structure, such as a culvert or bridge, constricts the flow of a river or stream. The results of this constriction can be increased damage potential to the structure, an increase in velocity of flow through the structure, and the creation of significant ponding or backwater upstream of the structure. Regulatory standards regarding the proper opening size for a structure spanning a river or stream are not consistent and may be non-existent. Some local regulations require structures to pass a volume of water that corresponds to a certain size rain event; however, under sizing, these openings can result in flood damage to the structure itself. After a large flood event, it is not uncommon to have numerous bridges and culverts “washed out.”
o Reasons stream flow constrictions are considered AoMIs:
   - Stream flow constrictions can back water up on property upstream of the structure if not designed properly.
   - These structures can accelerate the flow through the structure causing downstream erosion if not properly mitigated. This erosion can affect the structure itself, causing undermining and failure.
   - If the constriction is a bridge or culvert, it can get washed out causing an area to become isolated and potentially more difficult to evacuate.
   - Washed-out culverts and associated debris can wash downstream and cause additional constrictions.

- At-Risk Essential Facilities

   Essential facilities, sometimes called “critical facilities,” are those whose impairment during a flood could cause significant problems to individuals or communities. For example, when a community’s wastewater treatment is flooded and shut down, not only do contaminants escape and flow into the floodwaters, but backflows of sewage can contaminate basements or other areas of the community. Similarly, when a facility such as a hospital is flooded, it can result in a significant hardship on the community not only during the event but long afterwards as well.

o Reasons at-risk essential facilities are considered AoMIs:
   - Costly and specialized equipment may be damaged and need to be replaced.
   - Impairments to facilities such as fire stations may result in lengthy delays in responding and a focus on evacuating the facility itself.
   - Critical records and information stored at these facilities may be lost.

- Past Flood Insurance Claims and Individual Assistance/Public Assistance Hotspots

   Assistance provided after flood events (flood insurance in any event and Individual Assistance [IA] or Public Assistance [PA] after declared disasters) occurs in flood affected areas. Understanding geographically where this assistance is being provided may indicate unique flood problems.

   Flood insurance claims are not always equally distributed in a community. Although estimates indicate that 20 to 50 percent of structures in identified flood hazard areas have flood insurance, clusters of past claims may indicate where there is a flood problem. However, clusters of past claims and/or areas where there are high payments under FEMA’s IA or PA Programs may indicate areas of significant flood hazard.
Reasons past claim hotspots are considered AoMIs:

- A past claim hotspot may reflect an area of recent construction (large numbers of flood insurance policies as a result of a large number of mortgages) and an area where the as-built construction is not in accordance with local floodplain management regulations.

- Sometimes clusters of past claims occur in subdivisions that were constructed before flood protection standards were in place, places with inadequate stormwater management systems, or in areas that may not have been identified as SFHAs.

- Clusters of IA or PA claims may indicate areas where high flood insurance coverage or other mitigation actions are needed.

Areas of Significant Land Use Change

Development, whether it is a 100-lot subdivision or a single lot big box commercial outlet, can result in large amounts of fill and other material being deposited in flood storage areas, thereby increasing flood hazards downstream.

Additionally, when development occurs, hard surfaces such as parking lots, buildings and driveways do not allow water to absorb into the ground, and more of the rainwater becomes runoff flowing directly into streams. As a result, the “peak flow” in a stream after a storm event will be higher and will occur faster. Without careful planning, major land use changes can affect the impervious area of a site and result in a significant increase in flood risk caused by streams that cannot handle the extra storm water runoff.

Changes in land use in areas vulnerable to coastal flooding may affect the severity of wave hazards. Wave energy dissipates as waves propagate through forested areas or areas with dense development while wave energy can increase in open areas such as agricultural fields or parking lots. Changes in land use can affect wave hazards beyond the immediate area of land use change.

Reasons Areas of Significant Land Use Change are considered AoMIs:

- Development in areas mapped SFHA reduces flood storage areas, which can make flooding worse at the development site and downstream of it.

- Impervious surfaces speed up the water flowing in the streams, which can increase erosion and
the danger that fast-flowing floodwaters pose to people and buildings.

- Open areas can allow wave energy to increase while densely developed areas and dense vegetation cover often obstruct waves. These obstructions diminish the wave’s potentially destructive forces in areas inland of the obstructions.
- Rezoning flood-prone areas to high densities and/or higher intensity uses can result in more people and property at risk of flooding and flood damage.

**Key Emergency Routes Overtopped During Frequent Flooding Events**

Roads are not always elevated above estimated flood levels, and present a significant flood risk to motorists during flooding events. When alternate routes are available, risks may be reduced, including risks to life and economic loss.

- **Reasons overtopped roads are considered AoMIs:**
  - Such areas, when identified, can be accounted for and incorporated into Emergency Action Plans.
  - Roads may be elevated or reinforced to reduce the risk of overtopping during flood events.

**Drainage or Stormwater-Based Flood Hazard Areas, or Areas Not Identified as Floodprone on the FIRM But Known to Be Inundated**

Flood hazard areas exist everywhere. While FEMA maps many of these, others are not identified. Many of these areas may be located in communities with existing, older, and often inadequate stormwater management systems or in very rural areas. Other similar areas could be a result of complex or unique drainage characteristics. Even though they are not mapped, awareness of these areas is important so adequate planning and mitigation actions can be performed.

- **Reasons drainage or stormwater-based flood hazard areas or unidentified floodprone locations are considered AoMIs:**
  - So further investigation of such areas can occur and, based on scientific data, appropriate mitigation actions can result (i.e., land use and building standards).
  - To create viable mitigation project applications in order to reduce flood losses.

**Areas of Mitigation Success**

Flood mitigation projects are powerful tools to communicate the concepts of mitigation and result in more resilient communities. Multiple agencies have undertaken flood hazard mitigation actions for decades. Both structural measures—those that result in flood control structures—and non-structural measures have been implemented in...
thousands of communities. An extensive list of mitigation actions can be found in Section 4.

- Reasons areas of mitigation success are considered AoMIs:
  - Mitigation successes identify those areas within the community that have experienced a reduction or elimination of flood risk.
  - Such areas are essential in demonstrating successful loss reduction measures and in educating citizens and officials on available flood hazard mitigation techniques.
  - Avoided losses can be calculated and shown.

- Areas of Significant Riverine or Coastal Erosion
  Stream channels are shaped by a number of factors, including: degradation, aggradation, general scour, local scour, deposition, and lateral migration. Streams are constantly progressing towards a state of dynamic equilibrium involving water and sediment.

  Coastal shorelines erode in response to wave and water level conditions and other factors. As sea levels rise, erosion is typically exasperated.

- Reasons why areas of significant riverine or coastal erosion are considered AoMIs:
  - Riverine flood damage assessments generally consider inundation alone
  - Bank erosion caused by within channel flows is not recognized as a significant hazard in Federal floodplain management regulations
  - Riverine and coastal erosion can undercut structures and roads, causing instability and possible collapse.
  - Landslides and mudslides are a result of erosion
  - Approximately one-third of the nation’s streams experience severe erosion problems
  - Erosion of coastal barrier islands can result in breaches, washing out roads and cutting off access routes
  - Erosion often occurs along beaches during storms, especially severe storms that stay offshore for long durations and result in ongoing “battering” of the shoreline from high winds and waves. As the beach erodes, vulnerable properties are placed at even greater risk to coastal flooding from later storm surge, high tides, and wave action.

- Other
  Other types of flood risk areas include drainage or stormwater-based flood hazard areas, or areas known to be inundated during storm events.
2.2.5 Coastal-Specific Datasets

Unique hazards are present in communities and locations along the coast. Because of low and mildly sloping topography, some coastal communities may be exposed to large increases in inundated areas from only minor increases in water levels. Certain areas along the coast may also be more vulnerable to storm-induced coastal erosion, depending on the size and condition of coastal dunes. The following datasets provide information that help communicate some of these coastal-specific risks.

- **Increased Flooding Scenarios**

  The increased flooding scenarios dataset, stored in the FRD, helps identify the areas that would be exposed to flooding by hypothetical increases in coastal flood levels. The polygon dataset depicts areas that would be flooded by additional 1, 2, or 3 feet of flooding above the total water level elevation (stillwater plus waves) for a specified flood frequency. By highlighting the areas that would be inundated if flood levels increased, this product helps to communicate “what if” scenarios, such as “what if a flood event exceeds the 1-percent-annual-chance level by 2-feet?”, or, “what if sea level rise causes flood levels to increase for the 1-percent-annual-chance level?”

- **Simplified Coastal Zones (or Wave Hazard Severity)**

  As its name implies, the Simplified Coastal Zones is a polygon dataset that depicts the wave hazards in simplified terms of High, Moderate, or Low Wave Action. It provides a way to visualize the areas where wave heights are greater than 3 ft (High), between 1.5 and 3 feet (Moderate), and less than 1.5 feet (Low). This dataset helps spatially identify the Coastal A Zone, where the implementation of higher building standards can be used as an effective mitigation strategy.
3 Flood Risk Analysis Results

The following pages provide summary flood risk results for the Flood Risk Project as follows:

- **Flood Risk Map (FRM).** Within the Flood Risk Project the FRM displays base data reflecting community boundaries, major roads, and stream lines; potential losses for the refined 1-percent-annual-chance Coastal Flood Risk Study; new Flood Risk Project areas; and graphics and text that promote access and usage of additional data available through the FRD, FIRM, and National Flood Hazard Layer and viewers (desktop or FEMA website, etc.). This information can be used to assist in Flood Risk Project-level planning as well as for developing mitigation actions within each jurisdiction located within the Flood Risk Project.

- **Flood Risk Project Summary.** Within the Flood Risk Project area, summary data for some or all of the following datasets are provided for the entire project area and also on a jurisdiction by jurisdiction basis:
  - **Changes Since Last FIRM (CSLF).** This is a summary of where the floodplain and flood zones have increased or decreased (only analyzed for areas that were previously mapped using digital FIRMs).
  - **Flood Depth and Analysis Grids.** A general discussion of the data provided in the FRD, including coastal analysis grids if furnished as part of the project.
  - **Flood Risk Assessments.** A loss estimation of potential flood damages from the 1-percent-annual-chance flood scenario.
  - **Coastal-Specific Datasets.** A description of additional information provided for coastal communities to help communicate hazards and risk unique to them.
  - **Areas of Mitigation Interest.** A description of areas that may benefit from mitigation or additional risk analysis.

The FRM provides a graphical overview of the Flood Risk Project which highlights areas of risk that should be noted, based on potential losses, exposed facilities, etc., based on data found in the FRD. Refer to the data in the FRD to conduct additional analyses.
3.1 Flood Risk Map

The Flood Risk Map for this Flood Risk Project is shown below. In addition to this reduced version of the map, a full size version is available within the FRD.

**Flood Risk Map: Levy County Coastal Project Area**
This page left intentionally blank.
3.2 Levy County, Florida Coastal Study Summary

Located in North Central Florida, Levy County is bordered on the northwest by Dixie County and the Suwannee River; on the north by Gilchrist County; on the east by Alachua County and on the east and southeast by Marion County; on the south by Citrus County and the Withlacoochee River and on the west by the Gulf of Mexico. This general area has several regional labels such as the “Big Bend Area” or the “Nature Coast.” Levy County is also a part of the Withlacoochee Region.

From west to east Levy County begins as a marshy coastal wetlands area with swampy hammocks drained by the Suwannee, Waccasassa and Withlacoochee Rivers. Central forested flatlands rise to rolling hills and pasture. An inland ridge known as the Brooksville Ridge runs in a generally north and south direction through the eastern part of the County.

The elevation of the County’s topography generally increases from west to east. The area from the Gulf of Mexico to U.S. 19 is typically less than 50 feet above sea level. The majority of the remaining land mass is 50 to 70 feet above sea level. The highest elevations exist around the community of Morriston, approximately 100 feet.

Land use in Levy County is largely agricultural with mixed land uses that include residential, commercial and light industrial areas. Coastal areas also include increased recreational and tourism uses.

3.2.1 Overview

Levy County, located in Florida, includes the following communities within the coastal region:

<table>
<thead>
<tr>
<th>Community Name</th>
<th>CID</th>
<th>Total Community Population</th>
<th>Percent of Population in County (Coastal)</th>
<th>Total Community Land Area (sq mi)</th>
<th>Percent of Land Area in County (Coastal)</th>
<th>NFIP</th>
<th>CRS Rating</th>
<th>Local Mitigation Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Cedar Key</td>
<td>120373</td>
<td>695</td>
<td>100</td>
<td>2.8</td>
<td>100</td>
<td>Y</td>
<td>10</td>
<td>Y</td>
</tr>
<tr>
<td>City of Fanning Springs</td>
<td>120146</td>
<td>424</td>
<td>0.5</td>
<td>1.9</td>
<td>9</td>
<td>Y</td>
<td>8</td>
<td>Y</td>
</tr>
<tr>
<td>Town of Inglis</td>
<td>120586</td>
<td>1316</td>
<td>56</td>
<td>3.7</td>
<td>47</td>
<td>Y</td>
<td>10</td>
<td>Y</td>
</tr>
<tr>
<td>Town of Yankeetown</td>
<td>120147</td>
<td>527</td>
<td>100</td>
<td>21.3</td>
<td>100</td>
<td>Y</td>
<td>6</td>
<td>Y</td>
</tr>
<tr>
<td>Levy County (Unincorporated Areas)</td>
<td>120145</td>
<td>31654</td>
<td>6</td>
<td>1160.2</td>
<td>30</td>
<td>Y</td>
<td>9</td>
<td>Y</td>
</tr>
</tbody>
</table>

1Population according to 2010 U.S. Census
2A value of “10” indicates that the community does not participate in CRS
Community-specific results are provided on subsequent pages. Data provided below and on subsequent pages only includes areas located within the Levy County, Florida Coastal Flood Risk Project and do not necessarily represent community-wide totals.

Section 2 of the FRR provides more information regarding the source and methodology used to develop the information presented below. Datasets used toward the generation of results of this project are described in Section 7 of the FRR and are found in the FRD.

### 3.2.2 Flood Risk Datasets

As a part of this Flood Risk Project, flood risk datasets were created for inclusion in the Flood Risk Database. Those datasets are summarized for this Flood Risk Project below:

- **Changes Since Last FIRM**
  - Special Flood Hazard Area (SFHA) boundaries within Levy County were updated due to new engineering analysis performed within the Flood Risk Project. The updated modeling produced new flood zone areas and new base flood elevations in coastal areas. The data in this section reflects a comparison between the preliminary FIRM and the coastal work maps. The effective FIRM, preliminary firm, and coastal work map dates are listed below:
    - Currently Effective FIRM date: November 2, 2012
    - Preliminary FIRM date: March 3, 2015
    - Updated Coastal Flooding date: January 24, 2016
  - The CSLF dataset includes the following information for areas within the Coastal Flood Risk Study:
    - Increase: new area in the current effective FIRM compared to the previous effective FIRM.
    - Decrease: loss of area in the current effective FIRM compared to the previous effective FIRM.
    - Net Change: calculated as ‘Increase’ minus ‘Decrease’.

The table below summarizes the increases, decreases, and net change of SFHAs, Floodways, and Coastal High Hazard Areas (CHHAs) for the county.

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Total Area (mi²)</th>
<th>Increase (mi²)</th>
<th>Decrease (mi²)</th>
<th>Net Change (mi²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>320.2</td>
<td>1.9</td>
<td>-3.2</td>
<td>-1.3</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>4.4</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>107.9</td>
<td>1.3</td>
<td>-34.5</td>
<td>-33.2</td>
</tr>
</tbody>
</table>
Section 2 of the FRR provides more information regarding the source and methodology used to develop this table.

- Evidence of actual flood losses can be one of the most compelling factors for increasing a community’s flood risk awareness. Specific areas within each jurisdiction are detailed within the individual community summaries.

**Flood Depth and Analysis Grids**

- The FRD contains datasets in the form of depth grids for the entire Flood Risk Project that can be used for additional analysis, enhanced visualization, and communication of flood risks for hazard mitigation planning and emergency management. The data provided within the FRD should be used to further isolate areas where flood mitigation potential is high and may be helpful in planning and implementing mitigation strategies. Properties located in areas expected to experience some depth of water should seriously consider mitigation options for implementation. Section 2 of the FRR provides general information regarding the development of and potential uses for this data. See the FRD for the following depth grid data:
  - Flood depth grid (1-percent-annual-chance coastal flood event)
  - Flood depth grid (0.2-percent-annual-chance coastal stillwater event)
  - Flood depth grid (1-percent-annual-chance coastal stillwater event)
  - Flood depth grid (2-percent-annual-chance coastal stillwater event)
  - Flood depth grid (4-percent-annual-chance coastal stillwater event)
  - Flood depth grid (10-percent-annual-chance coastal stillwater event)
  - Flood depth grid (20-percent-annual-chance coastal stillwater event)
  - Flood depth grid (50-percent-annual-chance coastal stillwater event)
  - 1% controlling wave height (Hc) grid
  - 0.2% controlling wave height (Hc) grid
  - Vel_Cstl01pct (Velocity) grid

Final three items listed above are discussed further in the sub-section Coastal Specific Flood Risk Datasets.

- Additional information and data layers provided within the FRD should be used to further isolate these and other areas where flood mitigation potential is high. The FRD includes data which may be helpful in planning and implementing mitigation strategies. Properties located in areas expected to experience some depth of water should seriously consider mitigation options for implementation.

**Flood Risk Results Information**

- Levy County, Florida’s coastal flood risk analysis uses results from a FEMA-performed Hazus analysis (Version 2.2 for Flood Risk Project Refined Data), which
accounts for newly modeled areas in the Flood Risk Project and newly modeled depths for the 10-, 4-, 2-, 1- and 0.2-percent-annual-chance flood events. The 50- and 20-percent-annual-chance flood events are not shown in this report. Additional information and data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

- The following data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

**Flood Risk Project - Refined Data**

This set of feature classes and tables in the FRD stores the updated Hazus (Version 2.2) General Building Stock (GBS) inventory data (2010 Census) and resulting losses for this refined study. Hazus loss estimates using the refined data are summarized by 2010 Census block boundaries.

- **S_CenBlk_Ar** – This feature class contains 2010 Census block geometries and population counts. It can be used to examine Hazus flood losses that are summarized in the L_RA_Refined table.

- **L_Exposure** – This table contains a summary of values (building + contents value) by political area. It is broken down by occupancy type (residential, commercial, and other).

- **L_RA_Refined** – This table contains the results (by 2010 Census block) of this flood risk study. Engineering models were used to generate depth grids for the 50-, 20-, 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance return periods. The loss analysis was completed for all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.

- **L_RA_Summary** – This table contains a summary of the L_RA_Refined losses by political area for 10-, 4-, all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
Table 3-1: Levy County (Total Project Area): Estimated Potential Losses for Flood Event Scenarios

Flood Risk Project Refined Losses (Coastal Stillwater)\(^6\)

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses(^1)</th>
<th>10% Loss Ratio(^2)</th>
<th>4% (25-yr) Dollar Losses(^1)</th>
<th>4% Loss Ratio(^2)</th>
<th>2% (50-yr) Dollar Losses(^1)</th>
<th>2% Loss Ratio(^2)</th>
<th>1% (100-yr) Dollar Losses(^1)</th>
<th>1% Loss Ratio(^2)</th>
<th>0.2% (500-yr) Dollar Losses(^1)</th>
<th>0.2% Loss Ratio(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$535,300,000</td>
<td>72%</td>
<td>$55,900,000</td>
<td>10%</td>
<td>$90,200,000</td>
<td>17%</td>
<td>$128,000,000</td>
<td>24%</td>
<td>$162,200,000</td>
<td>30%</td>
<td>$223,600,000</td>
<td>42%</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$105,200,000</td>
<td>14%</td>
<td>$13,400,000</td>
<td>13%</td>
<td>$21,700,000</td>
<td>21%</td>
<td>$30,500,000</td>
<td>29%</td>
<td>$38,300,000</td>
<td>36%</td>
<td>$52,800,000</td>
<td>50%</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$102,700,000</td>
<td>14%</td>
<td>$10,100,000</td>
<td>10%</td>
<td>$22,500,000</td>
<td>22%</td>
<td>$32,400,000</td>
<td>32%</td>
<td>$39,000,000</td>
<td>38%</td>
<td>$51,500,000</td>
<td>50%</td>
</tr>
<tr>
<td>Total Building &amp; Contents(^3)</td>
<td>$743,200,000</td>
<td>100%</td>
<td>$79,400,000</td>
<td>11%</td>
<td>$134,500,000</td>
<td>18%</td>
<td>$190,800,000</td>
<td>26%</td>
<td>$239,400,000</td>
<td>32%</td>
<td>$327,900,000</td>
<td>44%</td>
</tr>
<tr>
<td>Business Disruption(^4)</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL(^5)</td>
<td>$743,200,000</td>
<td></td>
<td>$80,100,000</td>
<td>11%</td>
<td>$135,900,000</td>
<td>18%</td>
<td>$192,500,000</td>
<td>26%</td>
<td>$241,500,000</td>
<td>33%</td>
<td>$330,600,000</td>
<td>44%</td>
</tr>
</tbody>
</table>

Flood Risk Project Refined Losses (Coastal Static BFE)\(^6\)

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses(^1)</th>
<th>10% Loss Ratio(^2)</th>
<th>4% (25-yr) Dollar Losses(^1)</th>
<th>4% Loss Ratio(^2)</th>
<th>2% (50-yr) Dollar Losses(^1)</th>
<th>2% Loss Ratio(^2)</th>
<th>1% (100-yr) Dollar Losses(^1)</th>
<th>1% Loss Ratio(^2)</th>
<th>0.2% (500-yr) Dollar Losses(^1)</th>
<th>0.2% Loss Ratio(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$535,300,000</td>
<td>72%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$174,600,000</td>
<td>33%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$105,200,000</td>
<td>14%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$42,400,000</td>
<td>40%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$102,700,000</td>
<td>14%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$41,200,000</td>
<td>40%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Building &amp; Contents(^3)</td>
<td>$743,200,000</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$258,100,000</td>
<td>35%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Business Disruption(^4)</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$2,100,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL(^5)</td>
<td>$743,200,000</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$260,100,000</td>
<td>35%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

\(^1\) Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

\(^2\) Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.

\(^3\) Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

\(^4\) Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

\(^5\) Total = Total Building and Contents + Business Disruption

\(^6\) Flood Risk Project Refined losses calculated using Hazus Version 2.2.

The figures in this table only represent information within the Levy County, Florida Coastal Study.
- **Coastal-Specific Flood Risk Datasets**
  
  o The following are enhanced datasets and rasters required to be specifically included as a part of the Flood Risk Project scope.

  - Increased Flooding Scenarios is an enhanced dataset that represents the additional areas that would be flooded by hypothetical increases of 1, 2 or 3 feet (or other user-defined values) above the base flood elevation level.
  
  - Simplified Flooding Scenarios is an enhanced dataset that represents the relative level of wave action within the coastal 1% annual chance floodplain. The wave action level classification includes: High (areas designated as coastal high hazard areas – V or VE, including the primary frontal dune if present), Moderate (Coastal A Zone areas with wave heights between 1.5 and 3 feet), and Minimal (A Zone areas with wave heights less than 1.5 feet).
  
  - 1% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 1-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
  
  - 0.2% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 0.2-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
  
  - Vel_Cstl01pct (Velocity) grid is an enhanced raster that represents the velocity severity (feet/second) for the coastal 01-percent-annual-chance flood event.

- **Areas of Mitigation Interest**
  
  o Section 2.2.4 of the FRR provides more information regarding areas of mitigation interest, how they are defined for this analysis, and potential mitigation actions that could be considered for each type. The table below summarizes the number of areas of mitigation interest by type.

<table>
<thead>
<tr>
<th>Type of Mitigation Interest</th>
<th>Number of Occurrences</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Claims Hot Spot</td>
<td>74</td>
<td>Repetitive Loss</td>
</tr>
<tr>
<td>Key Emergency Routes Overtopped</td>
<td>3</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>At-Risk Critical Facilities</td>
<td>13</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
</tbody>
</table>
3.3 Communities

The following sections provide an overview of the community’s floodplain management program as of the date of this publication, as well as summarize the flood risk analysis performed for each project area in Levy County, Florida.

3.3.1 City of Cedar Key (CID 120373)

The following pages include Flood Risk data for the City of Cedar Key.

3.3.1.1 Overview

The City of Cedar Key is located directly on the Gulf of Mexico. The 2010 population was 695 people (U.S. Census Bureau, 2015). Note that Cedar Key also has a significant seasonal population based on tourism.

The information below provides an overview of the community’s floodplain management program information as of the date of this publication.

<table>
<thead>
<tr>
<th>Community Name</th>
<th>CID</th>
<th>Total Community Population</th>
<th>Percent of Population in County (Coastal)</th>
<th>Total Community Land Area (sq mi)</th>
<th>Percent of Land Area in County (Coastal)</th>
<th>NFIP</th>
<th>CRS Rating</th>
<th>Local Mitigation Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Cedar Key</td>
<td>120373</td>
<td>695</td>
<td>100</td>
<td>2.8</td>
<td>100</td>
<td>Y</td>
<td>10</td>
<td>Y</td>
</tr>
</tbody>
</table>

• Participating in the Levy County, Florida 2012 Hazard Mitigation Plan Update which expires December 3, 2017
• Past Federal Disaster Declarations for flooding through November 2015 (all of Levy County) = 4
• National Flood Insurance Program (NFIP) policy coverage (policies/value) = 441 policies totaling approximately $58,124,600.

Data provided below only includes areas in the City of Cedar Key that are located within the Levy County, Florida Coastal Study Flood Risk Project, and do not necessarily represent community-wide totals. Section 2 of the FRR provides more information regarding the source and methodology used to develop the information presented below. Datasets used toward the generation of results of this project are described in Section 7 of the FRR and are found in the FRD.

3.3.1.2 Community Analyses and Results

• Changes Since Last FIRM
  • Special Flood Hazard Area (SFHA) boundaries within the City of Cedar Key were updated due to new engineering analysis performed within the Flood Risk Project. The updated modeling produced new flood zone areas and new base flood
elevations in some areas and leveraged recently developed LiDAR-based topographic data. The data in this section reflects a comparison between the previous effective FIRM and the preliminary FIRM. The previously effective FIRM, preliminary firm, and current effective FIRM dates are listed below:

- Currently Effective FIRM date: November 2, 2012
- Preliminary FIRM date: March 3, 2015
- Updated Coastal Flooding date: January 24, 2016

The CSLF dataset includes the following information for areas within the Coastal Flood Risk Study:

- Increase: new area in the current effective FIRM compared to the previous effective FIRM.
- Decrease: loss of area in the current effective FIRM compared to the previous effective FIRM.
- Net Change: calculated as ‘Increase’ minus ‘Decrease’.

The table below summarizes the increases, decreases, and net change of SFHAs, Floodways, and Coastal High Hazard Areas (CHHAs) for the City of Cedar Key.

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Total Area (mi²)</th>
<th>Increase (mi²)</th>
<th>Decrease (mi²)</th>
<th>Net Change (mi²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>2.3</td>
<td>&lt;0.1</td>
<td>-0.04</td>
<td>-0.04</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>2.0</td>
<td>0</td>
<td>-0.4</td>
<td>-0.4</td>
</tr>
</tbody>
</table>

Section 2 of the FRR provides more information regarding the source and methodology used to develop this table.

**Flood Depth and Analysis Grids**

- See the FRD for the following depth and analysis grid data (Section 2 of the FRR provides general information regarding the development of and potential uses for this data):
  - Flood depth grid (1-percent-annual-chance coastal flood event)
  - Flood depth grid (0.2-percent-annual-chance coastal flood event)
  - Flood depth grid (1-percent-annual-chance coastal stillwater event)
  - Flood depth grid (2-percent-annual-chance coastal flood event)
  - Flood depth grid (4-percent-annual-chance coastal flood event)
  - Flood depth grid (10-percent-annual-chance coastal flood event)
Final three items listed above are discussed further in the sub-section Coastal Specific Flood Risk Datasets.

- Additional information and data layers provided within the FRD should be used to further isolate these and other areas where flood mitigation potential is high. The FRD includes data which may be helpful in planning and implementing mitigation strategies. Properties located in areas expected to experience some depth of water should seriously consider mitigation options for implementation.

**Flood Risk Results Information**

- The City of Cedar Key’s coastal flood risk analysis uses results from a FEMA-performed Hazus analysis (Version 2.2 for Flood Risk Project Refined Data), which accounts for newly modeled areas in the Flood Risk Project and newly modeled depths for the 10-, 4-, 2-, 1- and 0.2-percent-annual-chance flood events. The 50- and 20-percent-annual-chance flood events are not shown in this report. Additional information and data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

- The following data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

**Flood Risk Project - Refined Data**

This set of feature classes and tables in the FRD stores the updated Hazus (Version 2.2) General Building Stock (GBS) inventory data (2010 Census) and resulting losses for this refined study. Hazus loss estimates using the refined data are summarized by 2010 Census block boundaries.

- **S_CenBlk_Ar** – This feature class contains 2010 Census block geometries and population counts. It can be used to examine Hazus flood losses that are summarized in the L_RA_Refined table.

- **L_Exposure** – This table contains a summary of values (building + contents value) by political area. It is broken down by occupancy type (residential, commercial, and other).

- **L_RA_Refined** – This table contains the results (by 2010 Census block) of this flood risk study. Engineering models were used to generate depth grids for the 50-, 20-, 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance return periods. The loss analysis was completed for all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
- **L_RA_Summary** – This table contains a summary of the L_RA_Refined losses by political area for 10-, 4-, all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
Table 3-2: City of Cedar Key (120373): Estimated Potential Losses for Flood Event Scenarios

Flood Risk Project Refined Losses (Coastal Stillwater)  

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses$</th>
<th>10% Loss Ratio$</th>
<th>4% (25-yr) Dollar Losses$</th>
<th>4% Loss Ratio$</th>
<th>2% (50-yr) Dollar Losses$</th>
<th>2% Loss Ratio$</th>
<th>1% (100-yr) Dollar Losses$</th>
<th>1% Loss Ratio$</th>
<th>0.2% (500-yr) Dollar Losses$</th>
<th>0.2% Loss Ratio$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$140,900,000</td>
<td>74%</td>
<td>$17,100,000</td>
<td>12%</td>
<td>$27,300,000</td>
<td>19%</td>
<td>$36,600,000</td>
<td>26%</td>
<td>$45,900,000</td>
<td>33%</td>
<td>$59,300,000</td>
<td>42%</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$34,400,000</td>
<td>18%</td>
<td>$6,500,000</td>
<td>19%</td>
<td>$9,600,000</td>
<td>28%</td>
<td>$13,100,000</td>
<td>38%</td>
<td>$15,900,000</td>
<td>46%</td>
<td>$20,200,000</td>
<td>59%</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$15,900,000</td>
<td>8%</td>
<td>$2,200,000</td>
<td>14%</td>
<td>$3,500,000</td>
<td>22%</td>
<td>$4,800,000</td>
<td>30%</td>
<td>$6,000,000</td>
<td>38%</td>
<td>$8,200,000</td>
<td>52%</td>
</tr>
<tr>
<td>Total Building &amp; Contents</td>
<td>$191,200,000</td>
<td>100%</td>
<td>$25,900,000</td>
<td>14%</td>
<td>$40,000,000</td>
<td>21%</td>
<td>$54,400,000</td>
<td>28%</td>
<td>$67,700,000</td>
<td>35%</td>
<td>$87,700,000</td>
<td>46%</td>
</tr>
<tr>
<td>Business Disruption</td>
<td>N/A</td>
<td>N/A</td>
<td>$200,000</td>
<td>N/A</td>
<td>$400,000</td>
<td>N/A</td>
<td>$500,000</td>
<td>N/A</td>
<td>$600,000</td>
<td>N/A</td>
<td>$700,000</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$191,200,000</td>
<td>N/A</td>
<td>$26,100,000</td>
<td>14%</td>
<td>$40,900,000</td>
<td>21%</td>
<td>$54,900,000</td>
<td>29%</td>
<td>$68,300,000</td>
<td>36%</td>
<td>$88,400,000</td>
<td>46%</td>
</tr>
</tbody>
</table>

Flood Risk Project Refined Losses (Coastal Static BFE)  

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses$</th>
<th>10% Loss Ratio$</th>
<th>4% (25-yr) Dollar Losses$</th>
<th>4% Loss Ratio$</th>
<th>2% (50-yr) Dollar Losses$</th>
<th>2% Loss Ratio$</th>
<th>1% (100-yr) Dollar Losses$</th>
<th>1% Loss Ratio$</th>
<th>0.2% (500-yr) Dollar Losses$</th>
<th>0.2% Loss Ratio$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$140,900,000</td>
<td>74%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$52,200,000</td>
<td>37%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$34,400,000</td>
<td>18%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$18,400,000</td>
<td>53%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$15,900,000</td>
<td>8%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$7,300,000</td>
<td>46%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Building &amp; Contents</td>
<td>$191,200,000</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$77,800,000</td>
<td>41%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Business Disruption</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$600,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$191,200,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$78,500,000</td>
<td>41%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
2Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
3Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
4Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
5Total = Total Building and Contents + Business Disruption
6Flood Risk Project Refined losses calculated using Hazus Version 2.2.
The figures in this table only represent information within the Levy County, Florida Coastal Study
Coastal-Specific Flood Risk Datasets

- The following are enhanced datasets and rasters required to be specifically included as a part of the Flood Risk Project scope.
  - Increased Flooding Scenarios is an enhanced dataset that represents the additional areas that would be flooded by hypothetical increases of 1, 2 or 3 feet (or other user-defined values) above the base flood elevation level.
  - Simplified Flooding Scenarios is an enhanced dataset that represents the relative level of wave action within the coastal 1% annual chance floodplain. The wave action level classification includes: High (areas designated as coastal high hazard areas – V or VE, including the primary frontal dune if present), Moderate (Coastal A Zone areas with wave heights between 1.5 and 3 feet), and Minimal (A Zone areas with wave heights less than 1.5 feet).
  - 1% controlling wave height (Hc) grid is an enhanced raster that represents the controlling wave height distribution throughout the floodplain for the 1-percent-annual-chance flood event (not including wave setup or storm tide). The controlling wave height contributes to the Zone VE delineation and therefore should be expected to align with the Zone VE delineation.
  - 0.2% controlling wave height (Hc) grid is an enhanced raster that represents the controlling wave height distribution throughout the floodplain for the 0.2-percent-annual-chance flood event (not including wave setup or storm tide).
  - Vel_Cstl01pct (Velocity) grid is a representation of the average flood velocity distribution throughout the floodplain for the 1-percent-annual-chance flood event. This data is not sued in the delineation of the regulatory Zone VE.

- Areas of Mitigation Interest

- Section 2.2.4 of the FRR provides more information regarding areas of mitigation interest, how they are defined for this analysis, and potential mitigation actions that could be considered for each type. The table below summarizes the number of areas of mitigation interest by type.

<table>
<thead>
<tr>
<th>Type of Mitigation Interest</th>
<th>Number of Occurrences</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Claims Hot Spot</td>
<td>38</td>
<td>Repetitive Loss</td>
</tr>
<tr>
<td>Key Emergency Routes Overtopped</td>
<td>0</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>At-Risk Critical Facilities</td>
<td>6</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
</tbody>
</table>
### 3.3.2 City of Fanning Springs Summary (CID 120146)

The following pages include Flood Risk data for the City of Fanning Springs.

#### 3.3.2.1 Overview

Fanning Springs is a small town in Gilchrist and Levy counties along the Suwannee River. The 2010 population was 424 people (U.S. Census Bureau, 2015).

The information below provides an overview of the community’s floodplain management program information as of the date of this publication.

<table>
<thead>
<tr>
<th>Community Name</th>
<th>CID</th>
<th>Total Community Population</th>
<th>Percent of Population in County (Coastal)</th>
<th>Total Community Land Area (sq mi)</th>
<th>Percent of Land Area in County (Coastal)</th>
<th>NFIP</th>
<th>CRS Rating</th>
<th>Mitigation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Fanning Springs</td>
<td>120146</td>
<td>424</td>
<td>0.5</td>
<td>1.9</td>
<td>9</td>
<td>Y</td>
<td>8</td>
<td>Y</td>
</tr>
</tbody>
</table>

- Participating in the Levy County, Florida 2012 Hazard Mitigation Plan Update which expires December 3, 2017
- Past Federal Disaster Declarations for flooding = 4
- National Flood Insurance Program (NFIP) policy coverage (policies/value) = 9 policies totaling approximately $1,419,300.

Data provided below only includes areas in the City of Fanning Springs that are located within the Levy County, Florida Coastal Study Flood Risk Project, and do not necessarily represent community-wide totals. Section 2 of the FRR provides more information regarding the source and methodology used to develop the information presented below. Datasets used toward the generation of results of this project are described in Section 7 of the FRR and are found in the FRD.

#### 3.3.2.2 Community Analyses and Results

- **Changes Since Last FIRM**
  - Special Flood Hazard Area (SFHA) boundaries within the City of Fanning Springs were updated due to new engineering analysis performed within the Flood Risk Project. The updated modeling produced new flood zone areas and new base flood elevations in some areas and leveraged recently developed LiDAR-based topographic data. The data in this section reflects a comparison between the previous effective FIRM and the preliminary FIRM. The previously effective FIRM, preliminary firm, and current effective FIRM dates are listed below:
    - Previous FIRM effective date: November 2, 2012
    - Preliminary FIRM date: March 3, 2015
    - Updated Coastal Flooding date: January 24, 2016
  - The CSLF dataset includes the following information for areas within the Coastal Flood Risk Study:
    - Increase: new area in the current effective FIRM compared to the previous effective FIRM.
• Decrease: loss of area in the current effective FIRM compared to the previous effective FIRM.
• Net Change: calculated as 'Increase' minus 'Decrease'.

The table below summarizes the increases, decreases, and net change of SFHAs, Floodways, and Coastal High Hazard Areas (CHHAs) for the City of Fanning Springs.

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Total Area (mi²)</th>
<th>Increase (mi²)</th>
<th>Decrease (mi²)</th>
<th>Net Change (mi²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Section 2 of the FRR provides more information regarding the source and methodology used to develop this table.

• Flood Depth and Analysis Grids
  • See the FRD for the following depth and analysis grid data (Section 2 of the FRR provides general information regarding the development of and potential uses for this data):
    ➢ Flood depth grid (1-percent-annual-chance coastal flood event)
    ➢ Flood depth grid (0.2-percent-annual-chance coastal flood event)
    ➢ Flood depth grid (1-percent-annual-chance coastal stillwater event)
    ➢ Flood depth grid (2-percent-annual-chance coastal flood event)
    ➢ Flood depth grid (4-percent-annual-chance coastal flood event)
    ➢ Flood depth grid (10-percent-annual-chance coastal flood event)
    ➢ Flood depth grid (20-percent-annual-chance coastal flood event)
    ➢ Flood depth grid (50-percent-annual-chance coastal flood event)
    ➢ 1% controlling wave height (Hc) grid
    ➢ 0.2% controlling wave height (Hc) grid
    ➢ Vel_Cstl01pct (Velocity) grid

Final three items listed above are discussed further in the sub-section Coastal Specific Flood Risk Datasets.
  • Additional information and data layers provided within the FRD should be used to further isolate these and other areas where flood mitigation potential is high. The FRD includes data which may be helpful in planning and implementing mitigation strategies. Properties located in areas expected to experience some depth of water should seriously consider mitigation options for implementation.

• Flood Risk Results Information
  • The City of Fanning Springs’ coastal flood risk analysis uses results from a FEMA-performed Hazus analysis (Version 2.2 for Flood Risk Project Refined Data), which accounts for newly modeled areas...
in the Flood Risk Project and newly modeled depths for the 10-, 4-, 2-, 1- and 0.2-percent-annual-chance flood events. The 50- and 20-percent-annual-chance flood events are not shown in this report. Additional information and data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

- The following data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

**Flood Risk Project - Refined Data**

This set of feature classes and tables in the FRD stores the updated Hazus (Version 2.2) General Building Stock (GBS) inventory data (2010 Census) and resulting losses for this refined study. Hazus loss estimates using the refined data are summarized by 2010 Census block boundaries.

- **S_CenBlk_Ar** – This feature class contains 2010 Census block geometries and population counts. It can be used to examine Hazus flood losses that are summarized in the L_RA_Refined table.
- **L_Exposure** – This table contains a summary of values (building + contents value) by political area. It is broken down by occupancy type (residential, commercial, and other).
- **L_RA_Refined** – This table contains the results (by 2010 Census block) of this flood risk study. Engineering models were used to generate depth grids for the 50-, 20-, 10-, 4-, 2, 1, and 0.2-percent-annual-chance return periods. The loss analysis was completed for all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
- **L_RA_Summary** – This table contains a summary of the L_RA_Refined losses by political area for 10-, 4-, all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
### Table 3-3: City of Fanning Springs (120146): Estimated Potential Losses for Flood Event Scenarios

**Flood Risk Project Refined Losses (Coastal Stillwater)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses</th>
<th>10% Loss Ratio</th>
<th>4% (25-Yr) Dollar Losses</th>
<th>4% Loss Ratio</th>
<th>2% (50-Yr) Dollar Losses</th>
<th>2% Loss Ratio</th>
<th>1% (100-Yr) Dollar Losses</th>
<th>1% Loss Ratio</th>
<th>0.2% (500-Yr) Dollar Losses</th>
<th>0.2% Loss Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$100,000</td>
<td>100%</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Building &amp; Contents</td>
<td>$100,000</td>
<td>100%</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
</tr>
<tr>
<td>Business Disruption</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$100,000</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

**Flood Risk Project Refined Losses (Coastal Stillwater)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses</th>
<th>10% Loss Ratio</th>
<th>4% (25-Yr) Dollar Losses</th>
<th>4% Loss Ratio</th>
<th>2% (50-Yr) Dollar Losses</th>
<th>2% Loss Ratio</th>
<th>1% (100-Yr) Dollar Losses</th>
<th>1% Loss Ratio</th>
<th>0.2% (500-Yr) Dollar Losses</th>
<th>0.2% Loss Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$100,000</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$0</td>
<td>0%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$0</td>
<td>0%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Building &amp; Contents</td>
<td>$100,000</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Business Disruption</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$100,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

1. Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
2. Loss ratio = Dollar Losses / Estimated Value. Loss Ratios are rounded to the nearest integer percent.
5. Total = Total Building and Contents + Business Disruption

*The figures in this table only represent information within the Levy County, Florida Coastal Study.*
• Coastal-Specific Flood Risk Datasets
  o The following are enhanced datasets and rasters required to be specifically included as a part of the Flood Risk Project scope.
    ➢ Increased Flooding Scenarios is an enhanced dataset that represents the additional areas that would be flooded by hypothetical increases of 1, 2 or 3 feet (or other user-defined values) above the base flood elevation level.
    ➢ Simplified Flooding Scenarios is an enhanced dataset that represents the relative level of wave action within the coastal 1% annual chance floodplain. The wave action level classification includes: High (areas designated as coastal high hazard areas – V or VE, including the primary frontal dune if present), Moderate (Coastal A Zone areas with wave heights between 1.5 and 3 feet), and Minimal (A Zone areas with wave heights less than 1.5 feet).
    ➢ 1% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 1-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
    ➢ 0.2% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 0.2-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
    ➢ Vel_Cstl01pct (Velocity) grid is an enhanced raster that represents the velocity severity (feet/second) for the coastal 01-percent-annual-chance flood event.

• Areas of Mitigation Interest
  o Section 2.2.4 of the FRR provides more information regarding areas of mitigation interest, how they are defined for this analysis, and potential mitigation actions that could be considered for each type. The table below summarizes the number of areas of mitigation interest by type.

<table>
<thead>
<tr>
<th>Type of Mitigation Interest</th>
<th>Number of Occurrences</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Claims Hot Spot</td>
<td>0</td>
<td>Repetitive Loss</td>
</tr>
<tr>
<td>Key Emergency Routes Overtopped</td>
<td>0</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>At-Risk Critical Facilities</td>
<td>0</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
</tbody>
</table>
3.3.3 Town of Inglis Summary (CID 120586)

The following pages include Flood Risk data for the Town of Inglis.

3.3.3.1 Overview

Inglis is a small town on the Withlacoochee River several miles upstream on the confluence with the Gulf of Mexico. The 2010 population was 1,316 people (U.S. Census Bureau, 2015).

The information below provides an overview of the community’s floodplain management program information as of the date of this publication.

<table>
<thead>
<tr>
<th>Community Name</th>
<th>CID</th>
<th>Total Community Population</th>
<th>Percent of Population in County (Coastal)</th>
<th>Total Community Land Area (sq mi)</th>
<th>Percent of Land Area in County (Coastal)</th>
<th>NFIP</th>
<th>CRS Rating</th>
<th>Mitigation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town of Inglis</td>
<td>120586</td>
<td>1316</td>
<td>56</td>
<td>3.7</td>
<td>47</td>
<td>Y</td>
<td>10</td>
<td>Y</td>
</tr>
</tbody>
</table>

- Participating in the Levy County, Florida 2011 Local Mitigation Strategy which expires June 28, 2016
- Past Federal Disaster Declarations for flooding = 4
- National Flood Insurance Program (NFIP) policy coverage (policies/value) = 119 policies totaling approximately $23,935,300.

Data provided below only includes areas in the Town of Inglis that are located within the Levy County, Florida Coastal Study Flood Risk Project, and do not necessarily represent community-wide totals. Section 2 of the FRR provides more information regarding the source and methodology used to develop the information presented below. Datasets used toward the generation of results of this project are described in Section 7 of the FRR and are found in the FRD.

3.3.3.2 Community Analyses and Results

- Changes Since Last FIRM
  - Special Flood Hazard Area (SFHA) boundaries within the Town of Inglis were updated due to new engineering analysis performed within the Flood Risk Project. The updated modeling produced new flood zone areas and new base flood elevations in some areas and leveraged recently developed LiDAR-based topographic data. The data in this section reflects a comparison between the previous effective FIRM and the preliminary FIRM. The previously effective FIRM, preliminary firm, and current effective FIRM dates are listed below:
    - Previous FIRM effective date: November 2, 2012
    - Preliminary FIRM date: March 3, 2015
    - Updated Coastal Flooding date: January 24, 2016
The CSLF dataset includes the following information for areas within the Coastal Flood Risk Study:

- Increase: new area in the current effective FIRM compared to the previous effective FIRM.
- Decrease: loss of area in the current effective FIRM compared to the previous effective FIRM.
- Net Change: calculated as ‘Increase’ minus ‘Decrease’.

The table below summarizes the increases, decreases, and net change of SFHAs, Floodways, and Coastal High Hazard Areas (CHHAs) for the Town of Inglis.

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Total Area (mi^2)</th>
<th>Increase (mi^2)</th>
<th>Decrease (mi^2)</th>
<th>Net Change (mi^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>1.1</td>
<td>0.1</td>
<td>&lt; -0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Within CHHA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(Zone VE or V)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section 2 of the FRR provides more information regarding the source and methodology used to develop this table.

- **Flood Depth and Analysis Grids**
  - See the FRD for the following depth and analysis grid data (Section 2 of the FRR provides general information regarding the development of and potential uses for this data):
    - Flood depth grid (1-percent-annual-chance coastal flood event)
    - Flood depth grid (0.2-percent-annual-chance coastal flood event)
    - Flood depth grid (1-percent-annual-chance coastal stillwater event)
    - Flood depth grid (2-percent-annual-chance coastal flood event)
    - Flood depth grid (4-percent-annual-chance coastal flood event)
    - Flood depth grid (10-percent-annual-chance coastal flood event)
    - Flood depth grid (20-percent-annual-chance coastal flood event)
    - Flood depth grid (50-percent-annual-chance coastal flood event)
    - 1% controlling wave height (Hc) grid
    - 0.2% controlling wave height (Hc) grid
    - Vel_Cstl01pct (Velocity) grid
Final three items listed above are discussed further in the sub-section Coastal Specific Flood Risk Datasets.

- Additional information and data layers provided within the FRD should be used to further isolate these and other areas where flood mitigation potential is high. The FRD includes data which may be helpful in planning and implementing mitigation strategies. Properties located in areas expected to experience some depth of water should seriously consider mitigation options for implementation.

- **Flood Risk Results Information**
  - The Town of Inglis’s coastal flood risk analysis uses results from a FEMA-performed Hazus analysis (Version 2.2 for Flood Risk Project Refined Data), which accounts for newly modeled areas in the Flood Risk Project and newly modeled depths for the 10-, 4-, 2-, 1- and 0.2-percent-annual-chance flood events. The 50- and 20-percent-annual-chance flood events are not shown in this report. Additional information and data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.
  - The following data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

**Flood Risk Project - Refined Data**

This set of feature classes and tables in the FRD stores the updated Hazus (Version 2.2) General Building Stock (GBS) inventory data (2010 Census) and resulting losses for this refined study. Hazus loss estimates using the refined data are summarized by 2010 Census block boundaries.

- **S_CenBlk_Ar** – This feature class contains 2010 Census block geometries and population counts. It can be used to examine Hazus flood losses that are summarized in the L_RA_Refined table.
- **L_Exposure** – This table contains a summary of values (building + contents value) by political area. It is broken down by occupancy type (residential, commercial, and other).
- **L_RA_Refined** – This table contains the results (by 2010 Census block) of this flood risk study. Engineering models were used to generate depth grids for the 50-, 20-, 10-, 4-, 2, 1, and 0.2-percent-annual-chance return periods. The loss analysis was completed for all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
- **L_RA_Summary** – This table contains a summary of the L_RA_Refined losses by political area for 10-, 4-, all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
Table 3-4: Town of Inglis (120596): Estimated Potential Losses for Flood Event Scenarios

### Flood Risk Project Refined Losses (Coastal Stillwater)⁶

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses¹</th>
<th>10% Loss Ratio²</th>
<th>4% (25-yr) Dollar Losses¹</th>
<th>4% Loss Ratio²</th>
<th>2% (50-yr) Dollar Losses¹</th>
<th>2% Loss Ratio²</th>
<th>1% (100-yr) Dollar Losses¹</th>
<th>1% Loss Ratio²</th>
<th>0.2% (500-yr) Dollar Losses¹</th>
<th>0.2% Loss Ratio²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$74,200,000</td>
<td>72%</td>
<td>$1,800,000</td>
<td>2%</td>
<td>$2,800,000</td>
<td>4%</td>
<td>$5,600,000</td>
<td>8%</td>
<td>$10,100,000</td>
<td>14%</td>
<td>$21,800,000</td>
<td>29%</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$14,700,000</td>
<td>15%</td>
<td>$200,000</td>
<td>1%</td>
<td>$300,000</td>
<td>2%</td>
<td>$900,000</td>
<td>6%</td>
<td>$2,200,000</td>
<td>15%</td>
<td>$4,700,000</td>
<td>32%</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$13,800,000</td>
<td>13%</td>
<td>$300,000</td>
<td>2%</td>
<td>$400,000</td>
<td>3%</td>
<td>$1,200,000</td>
<td>9%</td>
<td>$2,200,000</td>
<td>16%</td>
<td>$4,500,000</td>
<td>33%</td>
</tr>
<tr>
<td>Total Building &amp; Contents³</td>
<td>$102,600,000</td>
<td>100%</td>
<td>$2,200,000</td>
<td>2%</td>
<td>$3,500,000</td>
<td>3%</td>
<td>$7,700,000</td>
<td>8%</td>
<td>$14,500,000</td>
<td>14%</td>
<td>$30,900,000</td>
<td>30%</td>
</tr>
<tr>
<td>Business Disruption⁴</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL³</td>
<td>$102,600,000</td>
<td>N/A</td>
<td>$2,200,000</td>
<td>2%</td>
<td>$3,600,000</td>
<td>4%</td>
<td>$7,800,000</td>
<td>8%</td>
<td>$14,800,000</td>
<td>14%</td>
<td>$31,300,000</td>
<td>30%</td>
</tr>
</tbody>
</table>

### Flood Risk Project Refined Losses (Coastal Static BFE)⁶

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses¹</th>
<th>10% Loss Ratio²</th>
<th>4% (25-yr) Dollar Losses¹</th>
<th>4% Loss Ratio²</th>
<th>2% (50-yr) Dollar Losses¹</th>
<th>2% Loss Ratio²</th>
<th>1% (100-yr) Dollar Losses¹</th>
<th>1% Loss Ratio²</th>
<th>0.2% (500-yr) Dollar Losses¹</th>
<th>0.2% Loss Ratio²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$74,200,000</td>
<td>72%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$10,800,000</td>
<td>15%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$14,700,000</td>
<td>15%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$2,300,000</td>
<td>16%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$13,800,000</td>
<td>13%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$2,300,000</td>
<td>17%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Building &amp; Contents³</td>
<td>$102,600,000</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$15,300,000</td>
<td>15%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Business Disruption⁴</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$200,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL³</td>
<td>$102,600,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$15,500,000</td>
<td>15%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

¹Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
²Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
³Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
⁴Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
⁵Total = Total Building and Contents + Business Disruption.
⁶Flood Risk Project Refined losses calculated using Hazus Version 2.2.

The figures in this table only represent information within the Levy County, Florida Coastal Study.
• Coastal-Specific Flood Risk Datasets
  o The following are enhanced datasets and rasters required to be specifically included as a part of the Flood Risk Project scope.
    ✓ Increased Flooding Scenarios is an enhanced dataset that represents the additional areas that would be flooded by hypothetical increases of 1, 2 or 3 feet (or other user-defined values) above the base flood elevation level.
    ✓ Simplified Flooding Scenarios is an enhanced dataset that represents the relative level of wave action within the coastal 1% annual chance floodplain. The wave action level classification includes: High (areas designated as coastal high hazard areas – V or VE, including the primary frontal dune if present), Moderate (Coastal A Zone areas with wave heights between 1.5 and 3 feet), and Minimal (A Zone areas with wave heights less than 1.5 feet).
    ✓ 1% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 1-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
    ✓ 0.2% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 0.2-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
    ✓ Vel_Cstl01pct (Velocity) grid is an enhanced raster that represents the velocity severity (feet/second) for the coastal 01-percent-annual-chance flood event.

• Areas of Mitigation Interest
  o Section 2.2.4 of the FRR provides more information regarding areas of mitigation interest, how they are defined for this analysis, and potential mitigation actions that could be considered for each type. The table below summarizes the number of areas of mitigation interest by type.

<table>
<thead>
<tr>
<th>Type of Mitigation Interest</th>
<th>Number of Occurrences</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Claims Hot Spot</td>
<td>5</td>
<td>Repetitive Loss</td>
</tr>
<tr>
<td>Key Emergency Routes Overtopped</td>
<td>3</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>At-Risk Critical Facilities</td>
<td>0</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
</tbody>
</table>
### 3.3.4 Town of Yankeetown Summary (CID 120147)

The following pages include Flood Risk data for the Town of Yankeetown.

Yankeetown is a small town directly on the Gulf of Mexico. The 2010 population was 527 people (U.S. Census Bureau, 2015).

#### 3.3.4.1 Overview

The information below provides an overview of the community’s floodplain management program information as of the date of this publication.

<table>
<thead>
<tr>
<th>Community Name</th>
<th>CID</th>
<th>Total Community Population</th>
<th>Percent of Population in County (Coastal)</th>
<th>Total Community Land Area (sq mi)</th>
<th>Percent of Land Area in County (Coastal)</th>
<th>NFIP</th>
<th>CRS Rating</th>
<th>Mitigation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town of Yankeetown</td>
<td>120147</td>
<td>527</td>
<td>100</td>
<td>21.3</td>
<td>100</td>
<td>Y</td>
<td>6</td>
<td>Y</td>
</tr>
</tbody>
</table>

- Participating in the Levy County, Florida 2012 Hazard Mitigation Plan Update which expires December 3, 2017
- Past Federal Disaster Declarations for flooding = 4
- National Flood Insurance Program (NFIP) policy coverage (policies/value) = 164 policies totaling approximately $33,554,900.00.

Data provided below only includes areas in Town of Yankeetown that are located within the Levy County, Florida Coastal Study Flood Risk Project, and do not necessarily represent community-wide totals. Section 2 of the FRR provides more information regarding the source and methodology used to develop the information presented below. Datasets used toward the generation of results of this project are described in Section 7 of the FRR and are found in the FRD.

#### 3.3.4.2 Community Analyses and Results

- **Changes Since Last FIRM**
  - Special Flood Hazard Area (SFHA) boundaries within the Town of Yankeetown were updated due to new engineering analysis performed within the Flood Risk Project. The updated modeling produced new flood zone areas and new base flood elevations in some areas and leveraged recently developed LiDAR-based topographic data. The data in this section reflects a comparison between the previous effective FIRM and the preliminary FIRM. The previously effective FIRM, preliminary firm, and current effective FIRM dates are listed below:
    - Previous FIRM effective date: November 2, 2012
    - Preliminary FIRM date: March 3, 2015
    - Updated Coastal Flooding date: January 24, 2016
Levy County, Florida Coastal Study – FLOOD RISK REPORT

The CSLF dataset includes the following information for areas within the Coastal Flood Risk Study:

- Increase: new area in the current effective FIRM compared to the previous effective FIRM.
- Decrease: loss of area in the current effective FIRM compared to the previous effective FIRM.
- Net Change: calculated as ‘Increase’ minus ‘Decrease’.

The table below summarizes the increases, decreases, and net change of SFHAs, Floodways, and Coastal High Hazard Areas (CHHAs) for the Town of Yankeetown.

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Total Area (mi²)</th>
<th>Increase (mi²)</th>
<th>Decrease (mi²)</th>
<th>Net Change (mi²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>12.1</td>
<td>0.02</td>
<td>-0.04</td>
<td>-0.02</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>9.1</td>
<td>0.01</td>
<td>-0.9</td>
<td>-0.9</td>
</tr>
</tbody>
</table>

Section 2 of the FRR provides more information regarding the source and methodology used to develop this table.

- **Flood Depth and Analysis Grids**
  - See the FRD for the following depth and analysis grid data (Section 2 of the FRR provides general information regarding the development of and potential uses for this data):
    - Flood depth grid (1-percent-annual-chance coastal flood event)
    - Flood depth grid (0.2-percent-annual-chance coastal flood event)
    - Flood depth grid (1-percent-annual-chance coastal stillwater event)
    - Flood depth grid (2-percent-annual-chance coastal flood event)
    - Flood depth grid (4-percent-annual-chance coastal flood event)
    - Flood depth grid (10-percent-annual-chance coastal flood event)
    - Flood depth grid (20-percent-annual-chance coastal flood event)
    - Flood depth grid (50-percent-annual-chance coastal flood event)
    - 1% controlling wave height (Hc) grid
    - 0.2% controlling wave height (Hc) grid
    - Vel_Cstl01pct (Velocity) grid
Final three items listed above are discussed further in the sub-section Coastal Specific Flood Risk Datasets.

- Additional information and data layers provided within the FRD should be used to further isolate these and other areas where flood mitigation potential is high. The FRD includes data which may be helpful in planning and implementing mitigation strategies. Properties located in areas expected to experience some depth of water should seriously consider mitigation options for implementation.

- Flood Risk Results Information
  - The Town of Yankeetown coastal flood risk analysis uses results from a FEMA-performed Hazus analysis (Version 2.2 for Flood Risk Project Refined Data), which accounts for newly modeled areas in the Flood Risk Project and newly modeled depths for the 10-, 4-, 2-, 1- and 0.2-percent-annual-chance flood events. The 50- and 20-percent-annual-chance flood events are not shown in this report. Additional information and data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

  - The following data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.

**Flood Risk Project - Refined Data**

This set of feature classes and tables in the FRD stores the updated Hazus (Version 2.2) General Building Stock (GBS) inventory data (2010 Census) and resulting losses for this refined study. Hazus loss estimates using the refined data are summarized by 2010 Census block boundaries.

- **S_CenBlk_Ar** – This feature class contains 2010 Census block geometries and population counts. It can be used to examine Hazus flood losses that are summarized in the L_RA_Refined table.

- **L_Exposure** – This table contains a summary of values (building + contents value) by political area. It is broken down by occupancy type (residential, commercial, and other).

- **L_RA_Refined** – This table contains the results (by 2010 Census block) of this flood risk study. Engineering models were used to generate depth grids for the 50-, 20-, 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance return periods. The loss analysis was completed for all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.

- **L_RA_Summary** – This table contains a summary of the L_RA_Refined losses by political area for 10-, 4-, all return periods using the Hazus General Building Stock (GBS) inventory data by 2010 Census block.
Table 3-5: Town of Yankeetown (120147): Estimated Potential Losses for Flood Event Scenarios

Flood Risk Project Refined Losses (Coastal Stillwater) 6

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses1</th>
<th>10% Loss Ratio2</th>
<th>4% (25-yr) Dollar Losses1</th>
<th>4% Loss Ratio2</th>
<th>2% (50-yr) Dollar Losses1</th>
<th>2% Loss Ratio2</th>
<th>1% (100-yr) Dollar Losses1</th>
<th>1% Loss Ratio2</th>
<th>0.2% (500-yr) Dollar Losses1</th>
<th>0.2% Loss Ratio2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$90,600,000</td>
<td>62%</td>
<td>$19,000,000</td>
<td>21%</td>
<td>$29,400,000</td>
<td>32%</td>
<td>$38,600,000</td>
<td>43%</td>
<td>$44,900,000</td>
<td>50%</td>
<td>$51,400,000</td>
<td>57%</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$19,300,000</td>
<td>13%</td>
<td>$3,800,000</td>
<td>25%</td>
<td>$7,400,000</td>
<td>38%</td>
<td>$9,400,000</td>
<td>49%</td>
<td>$10,800,000</td>
<td>56%</td>
<td>$12,800,000</td>
<td>66%</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$36,700,000</td>
<td>25%</td>
<td>$5,500,000</td>
<td>15%</td>
<td>$14,100,000</td>
<td>38%</td>
<td>$18,400,000</td>
<td>50%</td>
<td>$20,100,000</td>
<td>55%</td>
<td>$22,400,000</td>
<td>61%</td>
</tr>
<tr>
<td><strong>Total Building &amp; Contents</strong></td>
<td><strong>$146,600,000</strong></td>
<td>100%</td>
<td><strong>$29,500,000</strong></td>
<td>20%</td>
<td><strong>$51,400,000</strong></td>
<td>35%</td>
<td><strong>$66,400,000</strong></td>
<td>45%</td>
<td><strong>$75,700,000</strong></td>
<td>52%</td>
<td><strong>$86,700,000</strong></td>
<td>59%</td>
</tr>
<tr>
<td>Business Disruption3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$600,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>TOTAL3</strong></td>
<td><strong>$146,600,000</strong></td>
<td>N/A</td>
<td><strong>$29,500,000</strong></td>
<td>20%</td>
<td><strong>$51,400,000</strong></td>
<td>35%</td>
<td><strong>$66,900,000</strong></td>
<td>46%</td>
<td><strong>$76,300,000</strong></td>
<td>52%</td>
<td><strong>$87,300,000</strong></td>
<td>60%</td>
</tr>
</tbody>
</table>

Flood Risk Project Refined Losses (Coastal Static BFE) 6

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses1</th>
<th>10% Loss Ratio2</th>
<th>4% (25-yr) Dollar Losses1</th>
<th>4% Loss Ratio2</th>
<th>2% (50-yr) Dollar Losses1</th>
<th>2% Loss Ratio2</th>
<th>1% (100-yr) Dollar Losses1</th>
<th>1% Loss Ratio2</th>
<th>0.2% (500-yr) Dollar Losses1</th>
<th>0.2% Loss Ratio2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$90,600,000</td>
<td>62%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$46,500,000</td>
<td>51%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$19,300,000</td>
<td>13%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$11,500,000</td>
<td>59%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$36,700,000</td>
<td>25%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$20,500,000</td>
<td>56%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total Building &amp; Contents</strong></td>
<td><strong>$146,600,000</strong></td>
<td>100%</td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>$78,500,000</strong></td>
<td>54%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Business Disruption4</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$600,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>TOTAL4</strong></td>
<td><strong>$146,600,000</strong></td>
<td>N/A</td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>N/A</strong></td>
<td><strong>$79,100,000</strong></td>
<td>54%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
2Loss ratio = Dollar Losses / Estimated Value. Loss Ratios are rounded to the nearest integer percent.
3Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
4Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
5Total = Total Building and Contents + Business Disruption
6Flood Risk Project Refined losses calculated using Hazus Version 2.2.

The figures in this table only represent information within the Levy County, Florida Coastal Study

Levy County, Florida Coastal Study – FLOOD RISK REPORT 48
• Coastal-Specific Flood Risk Datasets
  
  o The following are enhanced datasets and rasters required to be specifically included as a part of the Flood Risk Project scope.
    
    ➢ Increased Flooding Scenarios is an enhanced dataset that represents the additional areas that would be flooded by hypothetical increases of 1, 2 or 3 feet (or other user-defined values) above the base flood elevation level.
    
    ➢ Simplified Flooding Scenarios is an enhanced dataset that represents the relative level of wave action within the coastal 1% annual chance floodplain. The wave action level classification includes: High (areas designated as coastal high hazard areas – V or VE, including the primary frontal dune if present), Moderate (Coastal A Zone areas with wave heights between 1.5 and 3 feet), and Minimal (A Zone areas with wave heights less than 1.5 feet).
    
    ➢ 1% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 1-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
    
    ➢ 0.2% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 0.2-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
    
    ➢ Vel_Cstl01pct (Velocity) grid is an enhanced raster that represents the velocity severity (feet/second) for the coastal 01-percent-annual-chance flood event.

• Areas of Mitigation Interest
  
  o Section 2.2.4 of the FRR provides more information regarding areas of mitigation interest, how they are defined for this analysis, and potential mitigation actions that could be considered for each type. The table below summarizes the number of areas of mitigation interest by type.

<table>
<thead>
<tr>
<th>Type of Mitigation Interest</th>
<th>Number of Occurrences</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Claims Hot Spot</td>
<td>31</td>
<td>Repetitive Loss</td>
</tr>
<tr>
<td>Key Emergency Routes Overtopped</td>
<td>0</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>At-Risk Critical Facilities</td>
<td>7</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
</tbody>
</table>
3.3.5 Levy County (Unincorporated Areas) Summary (CID 120145)

The following pages include Flood Risk data for Levy County (Unincorporated Areas).

3.3.5.1 Overview

Located in North Central Florida, Levy County is bordered on the northwest by Dixie County and the Suwannee River; on the north by Gilchrist County; on the east by Alachua County and on the east and southeast by Marion County; on the south by Citrus County and the Withlacoochee River and on the west by the Gulf of Mexico. This general area has several regional labels such as the “Big Bend Area” or the “Nature Coast.” Levy County is also a part of the Withlacoochee Region.

From west to east Levy County begins as a marshy coastal wetlands area with swampy hammocks drained by the Suwannee, Waccasassa and Withlacoochee Rivers. Central forested flatlands rise to rolling hills and pasture. An inland ridge known as the Brooksville Ridge runs in a generally north and south direction through the eastern part of the County.

The elevation of the County’s topography generally increases from west to east. The area from the Gulf of Mexico to U.S. 19 is typically less than 50 feet above sea level. The majority of the remaining land mass is 50 to 70 feet above sea level. The highest elevations exist around the community of Morriston, approximately 100 feet.

Land use in Levy County is largely agricultural with mixed land uses that include residential, commercial and light industrial areas. Coastal areas also include increased recreational and tourism uses.

Temperatures range from an average high of 89°F in summer to an average low of 24°F in the winter. Historically, flooding problems in the county are largely a result of impacts from major thunderstorms, hurricanes, or tropical storms during the summer and fall (FEMA, 2015a; U.S. Census Bureau, 2015; Levy County Government, 2015).

The information below provides an overview of the community’s floodplain management program information as of the date of this publication.

<table>
<thead>
<tr>
<th>Community Name</th>
<th>CID</th>
<th>Total Community Population</th>
<th>Percent of Population in County (Coastal)</th>
<th>Total Community Land Area (sq mi)</th>
<th>Percent of Land Area in County (Coastal)</th>
<th>NFIP</th>
<th>CRS Rating</th>
<th>Mitigation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levy County (Unincorporated Areas)</td>
<td>120145</td>
<td>31,654</td>
<td>6</td>
<td>1160.2</td>
<td>30</td>
<td>Y</td>
<td>9</td>
<td>Y</td>
</tr>
</tbody>
</table>

- Participating in the Levy County, Florida 2012 Hazard Mitigation Plan Update which expires December 3, 2017
- Past Federal Disaster Declarations for flooding = 4
- National Flood Insurance Program (NFIP) policy coverage (policies/value) = 378 policies totaling approximately $66,280,100.

Data provided below only includes areas in Levy County (Unincorporated Areas) that are located within the Levy County, Florida Coastal Study Flood Risk Project, and do not necessarily represent community-wide totals. Section 2 of the FRR provides more information regarding the source and methodology used to develop the information presented below. Datasets used toward the generation of results of this project are described in Section 7 of the FRR and are found in the FRD.

3.3.5.2 Community Analyses and Results

- Changes Since Last FIRM
  - Special Flood Hazard Area (SFHA) boundaries within Levy County (Unincorporated Areas) were updated due to new engineering analysis performed within the Flood Risk Project. The updated modeling produced new flood zone areas and new base flood elevations in some areas and leveraged recently developed LiDAR-based topographic data. The data in this section reflects a comparison between the previous effective FIRM and the preliminary FIRM. The previously effective FIRM, preliminary firm, and current effective FIRM dates are listed below:
    - Previous FIRM effective date: November 2, 2012
    - Preliminary FIRM date: March 3, 2015
    - Updated Coastal Flooding date: January 24, 2016
  - The CSLF dataset includes the following information for areas within the Coastal Flood Risk Study:
    - Increase: new area in the current effective FIRM compared to the previous effective FIRM.
    - Decrease: loss of area in the current effective FIRM compared to the previous effective FIRM.
    - Net Change: calculated as ‘Increase’ minus ‘Decrease’.

The table below summarizes the increases, decreases, and net change of SFHAs, Floodways, and Coastal High Hazard Areas (CHHAs) for Levy County (Unincorporated Areas).

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Total Area (mi$^2$)</th>
<th>Increase (mi$^2$)</th>
<th>Decrease (mi$^2$)</th>
<th>Net Change (mi$^2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within SFHA</td>
<td>304.6</td>
<td>1.7</td>
<td>-3.1</td>
<td>-1.4</td>
</tr>
<tr>
<td>Within Floodway</td>
<td>4.4</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Within CHHA (Zone VE or V)</td>
<td>96.8</td>
<td>1.3</td>
<td>33.2</td>
<td>31.9</td>
</tr>
</tbody>
</table>
Section 2 of the FRR provides more information regarding the source and methodology used to develop this table.

- **Flood Depth and Analysis Grids**
  - See the FRD for the following depth and analysis grid data (Section 2 of the FRR provides general information regarding the development of and potential uses for this data):
    - Flood depth grid (1-percent-annual-chance coastal static base flood event)
    - Flood depth grid (0.2-percent-annual-chance coastal flood event)
    - Flood depth grid (1-percent-annual-chance coastal stillwater event)
    - Flood depth grid (2-percent-annual-chance coastal flood event)
    - Flood depth grid (4-percent-annual-chance coastal flood event)
    - Flood depth grid (10-percent-annual-chance coastal flood event)
    - Flood depth grid (20-percent-annual-chance coastal flood event)
    - Flood depth grid (50-percent-annual-chance coastal flood event)
    - 1% controlling wave height (Hc) grid
    - 0.2% controlling wave height (Hc) grid
    - Vel_Cstl01pct (Velocity) grid

  Final three items listed above are discussed further in the sub-section Coastal Specific Flood Risk Datasets.

  - Additional information and data layers provided within the FRD should be used to further isolate these and other areas where flood mitigation potential is high. The FRD includes data which may be helpful in planning and implementing mitigation strategies. Properties located in areas expected to experience some depth of water should seriously consider mitigation options for implementation.

- **Flood Risk Results Information**
  - Levy County’s (Unincorporated Areas) coastal flood risk analysis uses results from a FEMA-performed Hazus analysis which accounts for newly modeled areas in the Flood Risk Project and newly modeled depths for certain flood events. Additional information and data layers provided within the FRD should be used to further analyze potential losses and areas where they are likely to occur.
Table 3-6: Levy County (Unincorporated Areas)(120145): Summary of Potential Flood Losses

### Flood Risk Project Refined Losses (Coastal Stillwater) \(^6\)

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses (^1)</th>
<th>10% Loss Ratio (^2)</th>
<th>4% (25-yr) Dollar Losses (^3)</th>
<th>4% Loss Ratio (^2)</th>
<th>2% (50-yr) Dollar Losses (^3)</th>
<th>2% Loss Ratio (^2)</th>
<th>1% (100-yr) Dollar Losses (^3)</th>
<th>1% Loss Ratio (^2)</th>
<th>0.2% (500-yr) Dollar Losses (^3)</th>
<th>0.2% Loss Ratio (^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$229,600,000</td>
<td>76%</td>
<td>$18,000,000</td>
<td>8%</td>
<td>$30,700,000</td>
<td>13%</td>
<td>$47,200,000</td>
<td>21%</td>
<td>$61,300,000</td>
<td>27%</td>
<td>$91,100,000</td>
<td>40%</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$36,700,000</td>
<td>12%</td>
<td>$1,900,000</td>
<td>5%</td>
<td>$4,400,000</td>
<td>12%</td>
<td>$7,100,000</td>
<td>19%</td>
<td>$9,400,000</td>
<td>26%</td>
<td>$15,100,000</td>
<td>41%</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$36,400,000</td>
<td>12%</td>
<td>$2,100,000</td>
<td>6%</td>
<td>$4,500,000</td>
<td>12%</td>
<td>$8,000,000</td>
<td>22%</td>
<td>$10,800,000</td>
<td>30%</td>
<td>$16,400,000</td>
<td>45%</td>
</tr>
<tr>
<td>Total Building &amp; Contents (^3)</td>
<td>$302,700,000</td>
<td>100%</td>
<td>$22,000,000</td>
<td>7%</td>
<td>$39,600,000</td>
<td>13%</td>
<td>$62,300,000</td>
<td>21%</td>
<td>$81,400,000</td>
<td>27%</td>
<td>$122,600,000</td>
<td>41%</td>
</tr>
<tr>
<td>Business Disruption (^4)</td>
<td>N/A</td>
<td>N/A</td>
<td>$300,000</td>
<td>N/A</td>
<td>$400,000</td>
<td>N/A</td>
<td>$600,000</td>
<td>N/A</td>
<td>$800,000</td>
<td>N/A</td>
<td>$1,000,000</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL (^5)</td>
<td>$302,700,000</td>
<td>N/A</td>
<td>$22,300,000</td>
<td>7%</td>
<td>$40,000,000</td>
<td>13%</td>
<td>$62,900,000</td>
<td>21%</td>
<td>$82,200,000</td>
<td>27%</td>
<td>$123,600,000</td>
<td>41%</td>
</tr>
</tbody>
</table>

### Flood Risk Project Refined Losses (Coastal Static BFE) \(^6\)

<table>
<thead>
<tr>
<th>Type</th>
<th>Inventory Estimated Value</th>
<th>% of Total</th>
<th>10% (10-Yr) Dollar Losses (^1)</th>
<th>10% Loss Ratio (^2)</th>
<th>4% (25-yr) Dollar Losses (^3)</th>
<th>4% Loss Ratio (^2)</th>
<th>2% (50-yr) Dollar Losses (^3)</th>
<th>2% Loss Ratio (^2)</th>
<th>1% (100-yr) Dollar Losses (^3)</th>
<th>1% Loss Ratio (^2)</th>
<th>0.2% (500-yr) Dollar Losses (^3)</th>
<th>0.2% Loss Ratio (^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building &amp; Contents</td>
<td>$229,600,000</td>
<td>76%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$65,100,000</td>
<td>28%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Commercial Building &amp; Contents</td>
<td>$36,700,000</td>
<td>12%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$10,200,000</td>
<td>28%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Other Building &amp; Contents</td>
<td>$36,400,000</td>
<td>12%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$11,100,000</td>
<td>30%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Building &amp; Contents (^3)</td>
<td>$302,700,000</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$86,400,000</td>
<td>29%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Business Disruption (^4)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$700,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL (^5)</td>
<td>$302,700,000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>$87,100,000</td>
<td>29%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

\(^1\) Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

\(^2\) Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.

\(^3\) Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

\(^4\) Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

\(^5\) Total = Total Building and Contents + Business Disruption

\(^6\) Flood Risk Project Refined losses calculated using Hazus Version 2.2.

*The figures in this table only represent information within the Levy County, Florida Coastal Study.*
• Coastal-Specific Flood Risk Datasets
  o The following are enhanced datasets and rasters required to be specifically included as a part of the Flood Risk Project scope.
  
  ➢ Increased Flooding Scenarios is an enhanced dataset that represents the additional areas that would be flooded by hypothetical increases of 1, 2 or 3 feet (or other user-defined values) above the base flood elevation level.
  
  ➢ Simplified Flooding Scenarios is an enhanced dataset that represents the relative level of wave action within the coastal 1% annual chance floodplain. The wave action level classification includes: High (areas designated as coastal high hazard areas – V or VE, including the primary frontal dune if present), Moderate (Coastal A Zone areas with wave heights between 1.5 and 3 feet), and Minimal (A Zone areas with wave heights less than 1.5 feet).
  
  ➢ 1% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 1-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
  
  ➢ 0.2% controlling wave height (Hc) grid is an enhanced raster that represents the total water level (combination of wave setup, stillwater, and wave height elevations) for the 0.2-percent-annual-chance coastal stillwater event, as opposed to only the stillwater elevation.
  
  ➢ Vel_Cstl01pct (Velocity) grid is an enhanced raster that represents the velocity severity (feet/second) for the coastal 01-percent-annual-chance flood event.

• Areas of Mitigation Interest
  o Section 2.2.4 of the FRR provides more information regarding areas of mitigation interest, how they are defined for this analysis, and potential mitigation actions that could be considered for each type. The table below summarizes the number of areas of mitigation interest by type.

<table>
<thead>
<tr>
<th>Type of Mitigation Interest</th>
<th>Number of Occurrences</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Claims Hot Spot</td>
<td>31</td>
<td>Repetitive Loss</td>
</tr>
<tr>
<td>Key Emergency Routes Overtopped</td>
<td>0</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>At-Risk Critical Facilities</td>
<td>7</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>Levy County Local Mitigation Strategy</td>
</tr>
</tbody>
</table>
4 Actions to Reduce Flood Risk

In order to fully leverage the Flood Risk Datasets and Products created for this Flood Risk Project, local stakeholders should consider many different flood risk mitigation tactics, including, but not limited to, the items shown in the sub-sections below.

4.1 Types of Mitigation Actions

Mitigation provides a critical foundation on which to reduce loss of life and property by avoiding or lessening the impact of hazard events. This creates safer communities and facilitates resiliency by enabling communities to return to normal function as quickly as possible after a hazard event. Once a community understands its flood risk, it is in a better position to identify potential mitigation actions that can reduce the risk to its people and property.

The mitigation plan requirements in 44 CFR Part 201 encourage communities to understand their vulnerability to hazards and take actions to minimize vulnerability and promote resilience. Flood mitigation actions generally fall into the following categories:

4.1.1 Preventative Measures

Preventative measures are intended to keep flood hazards from getting worse. They can reduce future vulnerability to flooding, especially in areas where development has not yet occurred or where capital improvements have not been substantial. Examples include:

- Comprehensive land use planning
- Zoning regulations
- Subdivision regulations
- Open space preservation
- Building codes
- Floodplain development regulations
- Stormwater management
- Purchase development rights or conservation

NFIP’s CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from community actions meeting the three goals of the CRS: to reduce flood losses, to facilitate accurate insurance rating, and to promote the awareness of flood insurance.

For CRS participating communities, flood insurance premium rates are discounted in increments of 5%; i.e., a Class 1 community would receive a 45% premium discount, while a Class 9 community would receive a 5% discount. (A Class 10 is not participating in the CRS and receives no discount.)
easements

- Participation in the NFIP Community Rating System (CRS)

### 4.1.2 Property Protection Measures

Property protection measures protect existing buildings by modifying the building to withstand floods, erosion, and waves or by removing buildings from hazardous locations. Examples include:

- Building relocation
- Acquisition and clearance
- Building elevation
- Barrier installation
- Building retrofit

### 4.1.3 Natural Resource Protection Activities

Natural resource protection activities reduce the impact of floods by preserving or restoring natural areas such as floodplains, wetlands, and dunes and their natural functions. Examples include:

- Wetland protection
- Habitat protection
- Erosion and sedimentation control
- Best management practices (BMP)
- Prevention of stream dumping activities (anti-litter campaigns)
- Improved forestry practices such as reforesting or selective timbering (extraction)
- Beach Nourishment
- Dune Construction
- Dune protection measures such as walkovers, sand fencing, and vegetation

### 4.1.4 Structural Mitigation Projects

Structural mitigation projects lessen the impact of floods by modifying the environmental natural progression of the flooding event. Structural protection such as upgrading dams/levees for already existing development and critical facilities may be a realistic alternative. However, citizens should be made aware of their residual risk. Examples include:

- Reservoirs, retention, and detention basins
4.1.5 Public Education and Awareness Activities

Public education and awareness activities advise residents, business owners, potential property buyers, and visitors about floods, hazardous areas, and mitigation techniques they can use to reduce the flood risk to themselves and their property. Examples include:

- Readily available and readable updated maps
- Outreach projects
- Libraries
- Technical assistance
- Real estate disclosure
- Environmental education
- Risk information via the nightly news

4.1.6 Emergency Service Measures

Although not typically considered a mitigation technique, emergency service measures minimize the impact of flooding on people and property. These are actions commonly taken immediately prior to, during, or in response to a hazard event. Examples include:

- Hazard warning system
- Emergency response plan
- COOP and COG planning
- Critical facilities protection
- Health and safety maintenance
- Post flood recovery planning

4.2 Identifying Specific Actions for Your Community

As many mitigation actions are possible to lessen the impact of floods, how can a community decide which ones are appropriate to implement? There are many ways to identify specific actions most appropriate for a community. Some factors to consider may include the following:
• **Site characteristics.** Does the site present unique challenges (e.g., significant slopes or erosion potential)?

• **Flood characteristics.** Are the flood waters affecting the site fast or slow moving? Are there wave hazards? Is there debris associated with the flow? How deep is the flooding?

• **Social acceptance.** Will the mitigation action be acceptable to the public? Does it cause social or cultural problems?

• **Technical feasibility.** Is the mitigation action technically feasible (e.g., making a building watertight to a reasonable depth)?

• **Administrative feasibility.** Is there administrative capability to implement the mitigation action?

• **Legal.** Does the mitigation action meet all applicable codes, regulations, and laws? Public officials may have a legal responsibility to act and inform citizens if a known hazard has been identified.

• **Economic.** Is the mitigation action affordable? Is it eligible under grant or other funding programs? Can it be completed within existing budgets?

• **Environmental.** Does the mitigation action cause adverse impacts on the environment or can they be mitigated? Is it the most appropriate action among the possible alternatives?

Your local Hazard Mitigation Plan is a valuable place to identify and prioritize possible mitigation actions. The plan includes a mitigation strategy with mitigation actions that were developed through a public and open process. You can then add to or modify those actions based on what is learned during the course of the Risk MAP project and the information provided within this FRR.

### 4.3 Mitigation Programs and Assistance

Not all mitigation activities require funding (e.g., local policy actions such as strengthening a flood damage prevention ordinance), and those that do are not limited to outside funding sources (e.g., inclusion in local capital improvements plan, etc.). For those mitigation actions that require assistance through funding or technical expertise, several State and Federal agencies have flood hazard mitigation grant programs and offer technical assistance. These programs may be funded at different levels over time or may be activated under special circumstances such as after a presidential disaster declaration.

---

FEMA in collaboration with the American Planning Association has released the publication, “Integrating Hazard Mitigation into Local Planning.” This guide explains how hazard mitigation can be incorporated into several different types of local planning programs. For more information, go to [www.planning.org](http://www.planning.org) or [http://www.fema.gov/library](http://www.fema.gov/library).

Communities can link hazard mitigation plans and actions to the right FEMA grant programs to fund flood risk reduction. More information about FEMA HMA programs can be found at [http://www.fema.gov/government/grant/hma/index.shtm](http://www.fema.gov/government/grant/hma/index.shtm).
4.3.1 FEMA Mitigation Programs and Assistance

FEMA awards many mitigation grants each year to states and communities to undertake mitigation projects to prevent future loss of life and property resulting from hazard impacts, including flooding. The FEMA Hazard Mitigation Assistance (HMA) programs provide grants for mitigation through the programs listed in Table 4.1 below.

Table 4-1: FEMA Hazard Mitigation Assistance Programs

<table>
<thead>
<tr>
<th>Mitigation Grant Program</th>
<th>Authorization</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Mitigation Grant Program (HMGP)</td>
<td>Robert T. Stafford Disaster Relief and Emergency Assistance Act</td>
<td>Activated after a presidential disaster declaration; provides funds on a sliding scale formula based on a percentage of the total federal assistance for a disaster for long-term mitigation measures to reduce vulnerability to natural hazards</td>
</tr>
<tr>
<td>Flood Mitigation Assistance (FMA)</td>
<td>National Flood Insurance Reform Act</td>
<td>Reduce or eliminate claims against the NFIP</td>
</tr>
<tr>
<td>Pre-Disaster Mitigation (PDM)</td>
<td>Disaster Mitigation Act</td>
<td>National competitive program focused on mitigation project and planning activities that address multiple natural hazards</td>
</tr>
<tr>
<td>Repetitive Flood Claims (RFC)</td>
<td>Bunning-Bereuter-Blumenauer Flood Insurance Reform Act</td>
<td>Reduce flood claims against the NFIP through flood mitigation; properties must be currently NFIP insured and have had at least one NFIP claim</td>
</tr>
<tr>
<td>Severe Repetitive Loss (SRL)</td>
<td>Bunning-Bereuter-Blumenauer Flood Insurance Reform Act</td>
<td>Reduce or eliminate the long-term risk of flood damage to SRL residential structures currently insured under the NFIP</td>
</tr>
</tbody>
</table>

The HMGP and PDM programs offer funding for mitigation planning and project activities that address multiple natural hazard events. The FMA, RFC, and SRL programs focus funding efforts on reducing claims against the NFIP. Funding under the HMA programs is subject to availability of annual appropriations, and HMGP funding is also subject to the amount of FEMA disaster recovery assistance provided under a presidential major disaster declaration.

FEMA’s HMA grants are awarded to eligible states, tribes, and territories (applicant) that, in turn, provide sub-grants to local governments and communities (sub-applicant). The applicant selects and prioritizes sub-applications developed and submitted to them by sub-applicants and submits them to FEMA for funding consideration. Prospective sub-applicants should consult the office designated as their applicant for further information regarding specific program and application requirements. Contact information for the FEMA Regional Offices and State Hazard Mitigation Officers (SHMO) is available on the FEMA website (www.fema.gov).
4.3.2 Additional Mitigation Programs and Assistance

Several additional agencies including USACE, Natural Resource Conservation Service (NRCS), U.S. Geological Survey (USGS), NOAA, and others have specialists on staff and can offer further information on flood hazard mitigation. The State NFIP Coordinator and SHMO are state-level sources of information and assistance, which vary among different states.

The Silver Jackets program, active in several states, is a partnership of USACE, FEMA, and state agencies. The Silver Jackets program provides a state-based strategy for an interagency approach to planning and implementing measures for risk reduction.
5  Acronyms and Definitions

5.1  Acronyms

A
AAL  Average Annualized Loss
ALR  Annualized Loss Ratio
AoMI  Areas of Mitigation Interest

B
BCA  Benefit-Cost Analysis
BFE  Base Flood Elevation
BMP  Best Management Practices

C
CFR  Code of Federal Regulations
CHHA  Coastal High Hazard Areas
COG  Continuity of Government Plan
COOP  Continuity of Operations Plan
CRS  Community Rating System
CSLF  Changes Since Last FIRM

D
DHS  Department of Homeland Security
DMA 2000  Disaster Mitigation Act of 2000

E
EOP  Emergency Operations Plan

F
FEMA  Federal Emergency Management Agency
FIRM  Flood Insurance Rate Map
FIS  Flood Insurance Study
FLDWAY  Floodway
FMA  Flood Mitigation Assistance
FRD  Flood Risk Database
FRM  Flood Risk Map
FRR  Flood Risk Report
FY  Fiscal Year

G
GBS  General Building Stock
GIS  Geographic Information System

H
HMA  Hazard Mitigation Assistance
HMGP  Hazard Mitigation Grant Program

I
IA  Individual Assistance
5.2 Definitions

0.2-percent-annual-chance flood – The flood elevation that has a 0.2-percent chance of being equaled or exceeded each year. Sometimes referred to as the 500-year flood.

1-percent-annual-chance flood – The flood elevation that has a 1-percent chance of being equaled or exceeded each year. Sometimes referred to as the 100-year flood.

Annualized Loss Ratio (ALR) – Expresses the annualized loss as a fraction of the value of the local inventory (total value/annualized loss).

Average Annualized Loss (AAL) – The estimated long-term weighted average value of losses to property in any single year in a specified geographic area.
**Base Flood Elevation (BFE)** – Elevation of the 1-percent-annual-chance flood. This elevation is the basis of the insurance and floodplain management requirements of the NFIP.

**Berm** – A small levee, typically built from earth.

**Cfs** – Cubic feet per second, the unit by which discharges are measured (a cubic foot of water is about 7.5 gallons).

**Coastal High Hazard Area (CHHA)** – Portion of the floodplain subject to inundation by the 1-percent-annual or base flood and wave effects 3 feet or greater (mapped as VE Zones).

**Consequence (of flood)** – The estimated damages associated with a given flood occurrence.

**Crest** – The peak stage or elevation reached or expected to be reached by the floodwaters of a specific flood at a given location.

**Dam** – An artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water.

**Design flood event** – The greater of the following two flood events: (1) the base flood, affecting those areas identified as SFHAs on a community’s FIRM; or (2) the flood corresponding to the area designated as a flood hazard area on a community’s flood hazard map or otherwise legally designated.

**Erosion** – Process by which floodwaters lower the ground surface in an area by removing upper layers of soil.

**Essential facilities** – Facilities that, if damaged, would present an immediate threat to life, public health, and safety. As categorized in Hazus, essential facilities include hospitals, emergency operations centers, police stations, fire stations, and schools.

**Flood** – A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters or (2) the unusual and rapid accumulation or runoff of surface waters from any source.
**Flood Insurance Rate Map (FIRM)** – An official map of a community, on which FEMA has delineated both the SFHAs and the risk premium zones applicable to the community. See also Digital Flood Insurance Rate Map.

**Flood Insurance Study (FIS) Report** – Contains an examination, evaluation, and determination of the flood hazards of a community, and if appropriate, the corresponding water-surface elevations.

**Flood risk** – Probability multiplied by consequence; the degree of probability that a loss or injury may occur as a result of flooding. Sometimes referred to as flood vulnerability.

**Flood vulnerability** – Probability multiplied by consequence; the degree of probability that a loss or injury may occur as a result of flooding. Sometimes referred to as flood risk.

**Floodborne debris impact** – Floodwater moving at a moderate or high velocity can carry floodborne debris that can impact buildings and damage walls and foundations.

**Floodwall** – A long, narrow concrete or masonry wall built to protect land from flooding.

**Floodway (regulatory)** – The channel of a river or other watercourse and that portion of the adjacent floodplain that must remain unobstructed to permit passage of the base flood without cumulatively increasing the water surface elevation more than a designated height (usually 1 foot).

**Floodway fringe** – The portion of the SFHA that is outside of the floodway.

**Freeboard** – A factor of safety usually expressed in feet above a flood level for purposes of flood plain management. “Freeboard” tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed (44CFR§59.1).

**Hazus** – A GIS-based risk assessment methodology and software application created by FEMA and the National Institute of Building Sciences for analyzing potential losses from floods, hurricane winds and storm surge, and earthquakes.
**High velocity flow** – Typically comprised of floodwaters moving faster than 5 feet per second.

**Levee** – A human-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding. (44CFR§59.1)

**Loss ratio** – Expresses loss as a fraction of the value of the local inventory (total value/loss).

**Mudflow** – Mudslide (i.e., mudflow) describes a condition where there is a river, flow or inundation of liquid mud down a hillside usually as a result of a dual condition of loss of brush cover, and the subsequent accumulation of water on the ground preceded by a period of unusually heavy or sustained rain. A mudslide (i.e., mudflow) may occur as a distinct phenomenon while a landslide is in progress, and will be recognized as such by the Administrator only if the mudflow, and not the landslide, is the proximate cause of damage that occurs. (44CFR§59.1)

**Primary frontal dune (PFD)**—A continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

**Probability (of flood)** – The likelihood that a flood will occur in a given area.

**Risk MAP** – Risk Mapping, Assessment, and Planning, a FEMA strategy to work collaboratively with state, local, and tribal entities to deliver quality flood data that increases public awareness and leads to action that reduces risk to life and property.

**Riverine** – Of or produced by a river. Riverine floodplains have readily identifiable channels.

**Special Flood Hazard Area (SFHA)** – Portion of the floodplain subject to inundation by the 1-percent-annual or base flood.

**Stafford Act** – Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707, signed into law November 23, 1988; amended the Disaster Relief Act of 1974, PL 93-288. This Act constitutes the statutory authority for most federal disaster response activities especially as they pertain to FEMA and FEMA programs.
**Stillwater** – Projected elevation that flood waters would assume, referenced to National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or other datum, in the absence of waves resulting from wind or seismic effects.

**Stream Flow Constrictions** – A point where a human-made structure constricts the flow of a river or stream.
6 Additional Resources

ASCE 7 – National design standard issued by the American Society of Civil Engineers (ASCE), *Minimum Design Loads for Buildings and Other Structures*, which gives current requirements for dead, live, soil, flood, wind, snow, rain, ice, and earthquake loads, and their combinations, suitable for inclusion in building codes and other documents.

ASCE 24-05 – National design standard issued by the ASCE, *Flood Resistant Design and Construction*, which outlines the requirements for flood resistant design and construction of structures in flood hazard areas.


FEMA

www.fema.gov

National Flood Insurance Program (NFIP), Federal Emergency Management Agency (FEMA)

www.floodsmart.gov

USGS National Assessment of Shoreline Change Project

http://coastal.er.usgs.gov/shoreline-change

FEMA Publications – available at www.fema.gov


Community Websites


**Local Government Websites**

Florida Environmental Service (MES), 2015.
259 Najoles Road, Millersville, MD 21108
http://www.menv.com

Florida Department of the Environment (MDE), 2015.
1800 Washington Boulevard, Baltimore, MD 21230
http://www.mde.state.md.us/Pages/Home.aspx
7 Data Used to Develop Flood Risk Products

GIS base map information was acquired from the following sources:

Engineering study information was leveraged from RAMPP with coordination from FEMA Region IV and the United States Army Corps of Engineers (USACE).

GIS basemap information was acquired from the DFIRM database, effective November 2, 2012. This dataset is available for download from the MSC.
https://msc.fema.gov

Additional datasets utilized in the project include the following:

- FEMA National 2010 Hazus Level 1 AAL Study Limited Distribution; database available upon request
- National Hydrography Dataset http://nhd.usgs.gov/
- U.S. Census Bureau, 2000 Hazus Dataset incorporated with Hazus-MH Version 2.1 software