Indian River County

Repetitive Loss Area Analysis Report

Final Draft August 2025

Submitted by

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Section 1 Repetitive Loss Area Analysis Report

Background

Flooding is the most common natural hazard in the United States and caused more damage and deaths than most other natural hazards combined. When you think about floods, the larger ones that result from hurricanes or the overflow of major rivers are the ones that tend to be remembered – such as that from Hurricanes Jeanne and Frances in 2004, Katrina in 2005, most recently Milton and Helene in 2024, and record rainfalls associated with these and other storm events.

However, smaller floods also contribute to the nation's repetitive flood problem. Often called "nuisance flooding", these low-level floods can be the result of inadequate drainage or localized stormwater problems such as ponding of water, clogged culverts or drains, obstructed drainageways, sewer backup, overbank flow from ditch or even from a homeowner's filling in a drainage swale. For many repetitively flooded properties, these smaller floods represent most, or all of the flood insurance claims paid on a building, especially for buildings located in the low-risk flood zones (B, C and X zones).

Indian River County experiences not only localized flooding but storm surge and stormwater runoff. Most of the repetitive loss properties in unincorporated Indian River County date back to Hurricanes Frances and Jeanne, which hit Indian River County in August and September 2004. Both hurricanes impacted the County with significant force, causing $3+ billion in damage (combined) countywide. Indian River County was declared an area of national disaster as a result of these two hurricanes that impacted the County within three weeks of each other.

Purpose

A repetitive loss area analysis (RLAA) is a mitigation plan for areas that have or are expected to experience repetitive losses from flooding. During this analysis, detailed building information was collected through field visits to develop an understanding of the exact causes of repetitive flood damage at those sites. The purpose of the RLAA is to generate mitigation solutions for individual buildings or areas, in contrast to a hazard mitigation or

floodplain management plan, which examines community-wide flooding problems and solutions.

Even though the purpose of a RLAA is to bring about mitigation on individual building sites within the community, it sometimes takes a collective effort from local, state, and federal agencies to implement certain mitigation measures. This is particularly true for many techniques like elevation or acquisition of structures, if Federal Emergency Management Agency (FEMA) grant funding is utilized.

As with a floodplain management plan prepared for FMP (floodplain management planning) credit under the Community Rating System (CRS), a RLAA requires that the community follow a standard planning process. The RLAA process has five planning steps as compared to a more detailed 10-step process for a floodplain management plan. Depending on the number of repetitive loss properties, a RLAA will require more data-specific detail about buildings within the defined areas subject to repetitive losses.

The community can receive CRS credit for both a floodplain management plan and a repetitive loss area analysis (FMP and RLAA credit, respectively). The two can be prepared at the same time, since some of the planning steps overlap; however, the two planning documents should remain separate and not be combined (as annexes or subsections for example) because of the annual progress reports and update requirements of CRS.

Definition of Repetitive Loss

For CRS purposes, a repetitive loss property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period since 1978 (the year at which consistent claims data collection began). Therefore, a building with paid NFIP claims of more than $1,000 in 1979 and again in 1980 is considered a repetitive loss property until that building's flood problem is mitigated. On the other hand, a building with paid NFIP claims of more than $1,000 in 1994 and again in 2013 would not be a repetitive loss property since more than 10 years elapsed between the first and second losses.

TERMINOLOGY

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

SEVERE REPETITIVE LOSS: As defined by the Flood Insurance Reform Act of 2004, SRLs are 1-4 family residences that have had four or more claims of more than $5,000 or at least two claims that cumulatively exceed the building's value. The Act creates new funding mechanisms to help mitigate flood damage for these properties.

Severe repetitive loss (SRL) properties are another class of repetitive loss. These properties, defined under the 2004 Flood Insurance Reform Act, are those buildings that either have four or more claims of $5,000 or more, or have at least two claims that cumulatively exceed the building's value.

FEMA is required by the Act to define SRL properties for multi-family buildings. This subset of SRL properties also include non-residential buildings that meet the same criteria as for 1-4 family properties. The flood insurance on these properties is serviced by FEMA through a Special Direct Facility and not by individual Write Your Own insurance companies.

A repetitive loss designation runs with a building even if ownership of the building changes. The repetitive loss designation of a building will remain on the community's list even after the insurance policy has lapsed, has been terminated, or the building's risk has been mitigated. More information about the repetitive loss list is discussed in **Section 2. The Repetitive Loss List.**

[1] Building Value: This value is calculated using the Actual Cash Value (in-kind replacement cost depreciated for age, wear and tear, neglected and quality of construction), determined by a qualified independent appraiser, or tax assessment value adjusted to approximate value.

Addressing Repetitive Loss and Severe Repetitive Loss Properties

There are more than 5.3 million NIFP policies across the United States in more than 22,000 communities. About 160,000 of these properties have suffered repetitive losses as of 2015. Since 1978, approximately $9 billion has been paid to these properties, which represents about one-quarter of all flood insurance claim payments. Many of these buildings are uninsured today, even though they remain on a community's repetitive loss list.

It is the responsibility of every community that participates in the CRS program to address its entire repetitive loss problem (those buildings on FEMA's Repetitive Loss List and those adjacent buildings with the same or similar flood condition). Through RLAA, the community develops a better understanding of the source of its flood damage and can provide more meaningful mitigation solutions to those property owners.

Benefits of a Repetitive Loss Area Analysis

Homeowners often want a solution to their repetitive flood problems because they must continually clean up and repair their homes and can even be displaced for a period of time. In response, communities usually provide advice and assistance to property owners who have been flooded or have drainage problems.

From a state and national perspective, mitigating repetitive loss properties makes economic sense and reduces the financial burden on the National Flood Insurance Fund (NFIF). Reducing repetitive flood claims can help strengthen the solvency of the NFIF. But more importantly, reducing damage to repetitively flooded buildings make communities safer.

By participating in the CRS program, the RLAA can help increase mitigation opportunities on repetitively flooded buildings in the community, reduce future damage to them, and also provide up to 140 points of credit under Activity 510 of the CRS program.

The Repetitive Loss List

To participate in the CRS program, a community must maintain and update its repetitive loss data. Maintaining this data also helps a community accurately identify its repetitive flooding problems and appropriate mitigation measures.

Each year, FEMA generates a list of repetitive loss properties for all communities that participate in the CRS program and those who are interested in applying to CRS. At minimum, these data include the property address, dates of claims, amount of each claim, and the

current insured and/or previous owner's name.

Communities are required to provide updates to their repetitive loss list when preparing the RLAA to disclose when properties have been mitigated, protected, or are not located in the community's jurisdiction.

The Privacy Act

Flood Insurance and repetitive loss data are protected by the Privacy Act of 1974. The data included personally identifiable information (PII), such as the addresses of insured properties. This information must not be made available to the public. The data should be kept in a safe place and marked "For Internal Use Only. Protected by the Privacy Act". FEMA will assign a password to access digital files that contain flood insurance data or PII. (5USC.§552a).

Any time updates are made to a community's repetitive loss list, the total number of repetitive loss properties change. When that number is adjusted, a community's repetitive loss category can also change. For CRS communities, the number of unmitigated properties left on the updated list determines the community's additional requirements. A community will fall into one of these three categories:

Category A: A community with no unmitigated repetitive loss properties. No special requirements for CRS program purposes.

Category B: A community with at least one, but fewer than 50, unmitigated repetitive loss properties. Category B communities are required by CRS to research and describe the repetitive loss problem, create a map showing the location of all repetitive loss properties (areas) and complete an annual outreach activity directed to repetitive loss properties.

Category C: A community with 50 or more unmitigated repetitive loss properties. Category C communities are required to do everything in Category B and prepare either a floodplain management plan that covers all repetitive loss properties (areas) or prepare a RLAA for all repetitive loss areas.

Mapping Repetitive Loss Areas

It is important to distinguish between a repetitive loss property and a repetitive loss area. A repetitive loss property was defined earlier in **Section 1**. There are several reasons why a property might be subject to repetitive flooding but may not appear on a FEMA's repetitive loss list for that community, so it is important to examine ALL of the repetitive flooding problems. If only the properties on the list are examined, then only part of the entire problem is addressed. Therefore, it is important that all buildings with the same exposure to repetitive

flooding be identified in an “area”. This is what is meant by “map a repetitive loss area”.

For purposes of this RLAA, each unmitigated repetitive loss and severe repetitive loss property was located on a map. Lines were drawn around those areas with similarly situated properties, such as being subject to flooding or being lower-lying than surrounding properties. Other RLAA areas were mapped by drawing lines around properties with the same or similar flood condition as the repetitive loss property.

Section 2 RLAA Five-Step Planning Process

Criteria

Indian River County (CID 120119) has been a regular participant in the NFIP since July 3, 1978. In addition to meeting the basic requirement of the NFIP, Indian River County has completed additional floodplain management activities to participate in the Community Rating System (CRS) program, which rewards local communities with insurance premium discounts for taking actions to reduce flood risk and vulnerability. Indian River County entered the CRS Program on October 1, 1992. Indian River County is currently a CRS Class 5 community which rewards all policy holders with a 25 percent reduction in their flood insurance premiums.

As defined in **Section 1 The Repetitive Loss List,** any community with 50 or more repetitive loss properties – considered a “Category C community” – must map repetitive loss areas, describe its repetitive loss problem, undertake outreach to all addresses in the repetitive loss areas that have insurable buildings, and prepare and adopt a repetitive loss area analysis (RLAA) for all repetitive loss areas.

As of April 2025, Indian River County has 110 unmitigated repetitive loss properties. Of these 100 unmitigated properties 10 are in other Indian River County municipalities and are excluded from this RLAA. To date Indian River County has not mitigated any properties on this list.

Mapping Repetitive Loss Areas for Indian River County

For purposes of this RLAA report Indian River County has mapped repetitive loss areas where buildings are similarly constructed, and flooding characteristics and mitigation measures are uniform. Indian River County has identified 34 repetitive loss areas, in accordance with the principles outlined in the 2017 CRS Coordinators Manual and as described above in **Section 1 Mapping Repetitive Loss Areas**.

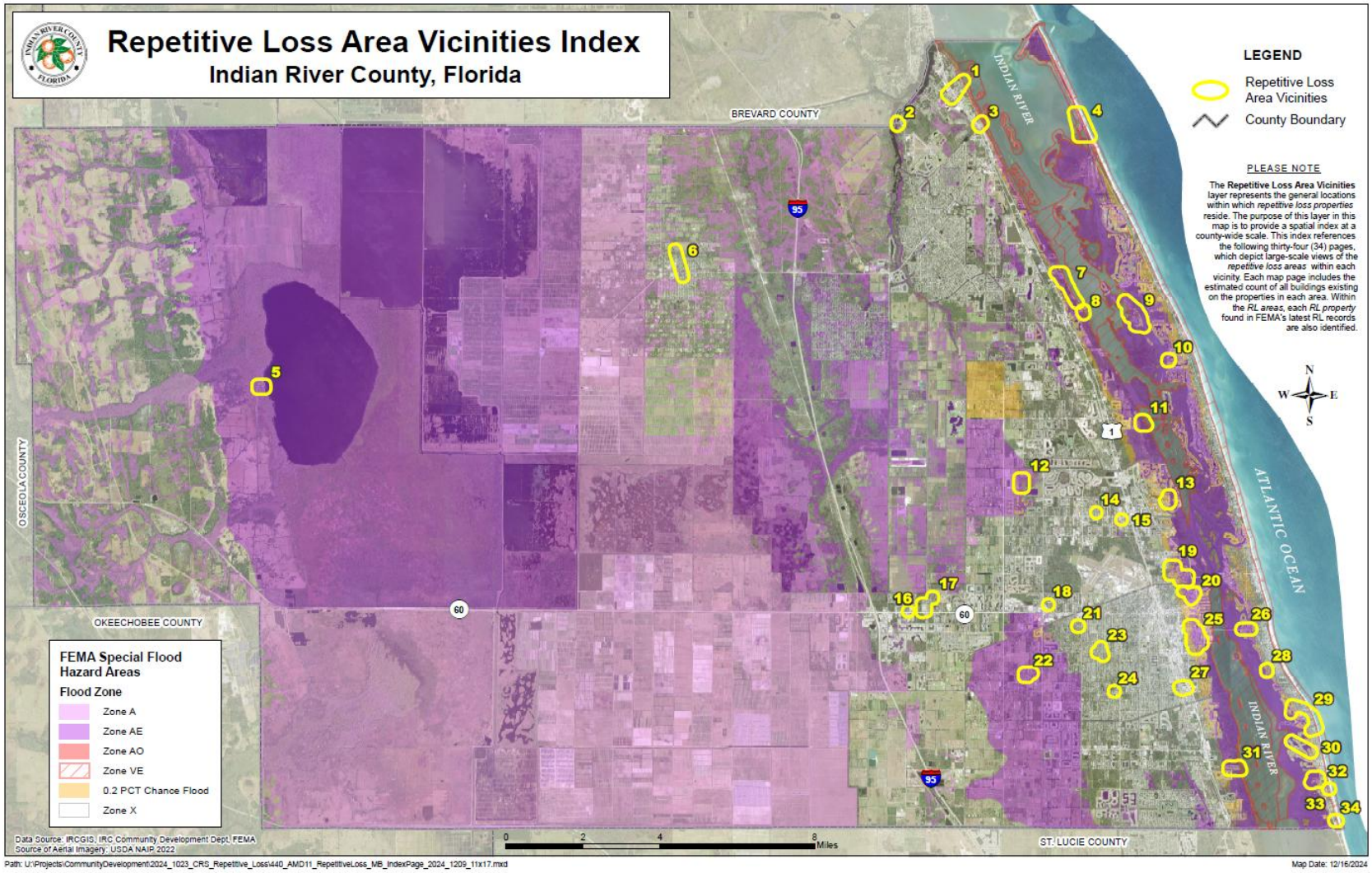

Figure 1.1 – Indian River County Repetitive Loss Areas and Flood Zones

Step 1 Contact Property Owners

Before field work began on the RLAA, individual letters were mailed to property owners within the 34 identified repetitive loss areas. Figure 2.2 on the following page shows an example of the property owner notification letter. Letters were mailed to properties within each area, including repetitive loss properties and additional properties with similar flooding conditions but which have no claims paid against the NFIP. On March 3, 2025 Indian River County mailed approximately 900 letters to property owners. A copy of the letter mailed is on file with the Indian River County Engineering Division. In accordance with the Privacy Act of 1974, the mailing list will not be shared with the general public.

As part of the Step 1 planning process and notifying the property owners, the participation of the property owners is requested as well. For this purpose, a questionnaire was included with each letter. The questionnaire asks about the foundation type of the property, type and cause of flooding (if applicable) and flood protection measures. The Flood Protection Questionnaire is depicted in Figure 1.3.

3/3/2025

[redacted]
VERO BEACH, FL 32960

Property Address: [redacted]

Dear Property Owner:

As part of the Indian River County's participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS), the Planning Department is evaluating properties that may have experienced repetitive flood damage. This analysis will include the review of all previous flood data and studies conducted in these locations.

The repetitive loss analysis involves the collection of the following property level data elements:

- Building permit records (including application and associated records)
- Structure and site elevation information (elevation certificate if available)
- Tax ID and lot and parcel number
- Building property value on record (assessed value, replacement value or both)
- Land property value on record
- Building codes/floodplain development regulations exceeding minimum standards
- Historical flood event information (when events occurred, amount of damage to property, etc.)

In addition, Indian River County and its contractor may visit each property to survey the flood risk and to take photographs. Property owners are encouraged to provide any relevant flooding information. The survey crews will be looking at the type and condition of the foundation, drainage patterns on the lot and whether outside mechanical equipment is elevated.

The results of the repetitive loss area analysis will include a review of alternative approaches of property protection measures or drainage improvements where feasible. Once the analysis is complete, a copy of the report can be obtained from the Planning Department or by calling (772) 226-1590.

You can help us perform this analysis by completing and returning this questionnaire by **3/24/2025** to Indian River County, Attn. Kari Cundiff, 1801 27th Street, Vero Beach, Fl. 32960.

Sincerely,

Kari Cundiff

Figure 1.2 Property Owner Notification Letter

Flood Protection Questionnaire

Name _____

Property Address _____

1. How many years have you lived in the home/building at this address? _____
2. Do you rent or own this home/building _____
3. What type of foundation does the home/building have? _____

   Slab Crawl Space Other _____
4. Has this home/building or property ever been flooded or had a water problem?

   Yes No ~~(if no, please complete only item 8-11)~~
5. In what year(s) did it flood? _____
6. Where did you get water and how deep did it get?

   In Crawlspace _____ deep Over first flood _____deep Yard only _____deep

   _____Water kept out of house by sandbagging, sewer valve, or other protective measure
7. What was the longest time that water stayed in the house/building ___ hours or days___
8. What do you feel was the cause of the flooding? Check all that affect your home/building

   ___Storm sewer backup ____ sanitary sewer backup ___ standing water next to house

   ___ drainage from nearby properties ____ overbank flooding from: _____ Other_____
9. Have you installed any flood protection measures on your property?

   ___ sump pump ____waterproof outside walls ____re-graded yard to keep water away

   ___backup power system/generator ___ sandbagged _____Other

Figure 1.3 Flood Protection Questionnaire

Statistics of Property Owner Flood Protection Questionnaire

Of the 900 notification letters along with the Flood Protection Questionnaire mailed, Indian River County only received 29 responses which corresponds to a response rate of merely 3.2 percent. The questionnaire responses are summarized below.
Note: Respondents may have skipped questions and/or provided more than one response to a question.

Q1. How many years have you occupied the building at this address?

Answer Choices	Percentage	Number Responding
Less than 1 or no response	14	4
1-5	10	3
5-10	24	7
10+	52	15
Total		**29**

Q2. Do you rent or own this building?

Answer Choices	Percentage	Number Responding
Rent	7	2
Own	93	27
Total		**29**

Q3. What type of foundation does the building have?

Answer Choices	Percentage	Number Responding
Slab	97	28
Crawlspace	0	0
Basement	0	0
Other	0.3	1
Total		**29**

Other: Posts/Piles/Piers

Q4. Has this building ever been flooded or had a water problem?

Answer Choices	Percentage	Number Responding
Yes	48	14
No	52	15
Total		**29**

Q5. If your home flooded in what year(s) did it flood?

Answer Choices	Percentage	Responded Yes
2003 or earlier	10	2
2004	35	7
2005		
2006		
2007		
2008		
2009		
2010		
2011	5	1
2012		
2013		
2014		
2015	5	1
2016	5	1
2017		
2018	5	1
2019		
2020		
2021		
2022		
2023	5	1
2024	30	6
TOTAL		**20**

Note: Of the 13 properties that flooded in the past, 4 properties flooded multiple times

Q6. Where did you get the water and how deep did it get?

Answer Choices	Flood Depth	Percentage	Number Responding
Garage or Crawl space	2" +	22	2
Over 1st Floor	4 - 6"	55	5
In Yard only	>12"	11.5	1
Water kept out of house by sandbagging, sewer valve, or other protective measure		11.5	1
Total		**100**	**9**

Q7. What was the longest time that water stayed in the house/building?

Responses Received	Percentage	Number Responding
1-2 hours		
3-4 hours	11	1
5-6 hours	11	1
7-8 hours		
9-10 hours	11	1
11-13 hours	11	1
24 hours	33.5	3
1-2 days	22.5	2
3-4 days		0
Total	**100**	**9**

Q8. What do you feel was the cause of the flooding?

Answer Choices	Percentage	Number Responding
Storm sewer backup	36	5
Sanitary sewer backup	15	2
Standing water next to house/saturated ground	7	1
Drainage from nearby properties	21	3
Overbank flooding	21	3
Other		
Total	**100**	**14**

Q9. Have you installed any flood protection measures?

Answer Choices	Percentage	Number Responding
Sump pump		
Waterproof outside walls		
Re-graded yard	14	2
Backup generator	29	4
Sandbagged	14	2
None	43	6
Other		
Total	**100**	**14**

Summary

We analyzed the data from the responses we received and found the following:

1. Of the homes that responded to the survey only 2 homes were also on the FEMA repetitive loss list. All the other homes were not on the FEMA repetitive loss list, which would lead us to believe that either these homes did not have flood insurance and/or did not file a flood insurance claim.
2. 35% of those who responded experienced flooding in 2004 from the Jeanne and Frances hurricanes. Another 30% experienced flooding from hurricane Milton in 2024.
3. 55% of those property owners that experienced flooding had flood waters reach above the 1st floor height and 22% experienced flooding in their yard.
4. Of those property owners that experienced flooding, 36% had storm sewer backup, while 15% had sanitary sewer backup and 21% experienced flooding due to drainage from nearby properties and overbank flooding.
5. 43% of the homeowners who experienced flooding did nothing, while 29% installed a backup generator and 14% re-graded the yard or sandbagged.

Step 2 Contact Other Agencies

Indian River County contacted external agencies and internal departments that have plans or studies that could affect the cause or impacts of flooding within the identified repetitive loss areas. The data collected was used to analyze the problems further and to help identify potential solutions and mitigation measures for property owners. The reports utilized and reviewed included:

- Indian River County Unified Local Mitigation Strategy – updated 2020
- Indian River County Code of Ordinances – *Stormwater Management and Flood Protection Ordinance*
- Indian River County Climate Vulnerability Assessment – March 2025
- FEMA Flood Insurance Study (FIS)
- FEMA – Currently FEMA is not able to provide and repetitive loss data including claims data

Summaries of Studies and Reports

Indian River County Unified Local Mitigation Strategy, Updated 2020

The purpose of the Indian River County Unified Local Mitigation Strategy (LMS) is to develop a unified approach among County and municipal governments for dealing with identified hazards and hazard management problems in the Indian River County area. The strategy will serve as a tool to direct the County and municipal governments in their ongoing efforts to reduce their vulnerabilities to impacts produced by both natural, technological, and societal hazards to which Florida is exposed. The strategy will also help establish funding priorities for currently proposed mitigation projects and for such disaster assistance funds as may be made available for disaster activities. The ultimate objective of the LMS process is to improve the total communities' resistance to damage from known natural, technological and societal hazards; place Indian River County in a position to compete more effectively for pre- and post-disaster funding; reduce the cost of disasters at all levels; speed community recovery from disasters that occur. The Indian River County Unified Local Mitigation Strategy is currently going through its 5-year update. It is expected to be completed by August 2025.

Indian River County Code of Ordinances – Stormwater Management and Flood Protection

The Indian River County Code of Ordinances establishes provision for flood hazard reduction. Specific standards include requiring that new construction be elevated to the base flood elevation plus 1.5 foot, tracking substantial improvements over a 10- year period, that enclosures below the lowest floor cannot be used for living space.

Indian River County Stormwater Management Plan – May 2025

The 2025 Stormwater Management Plan (SMP) focuses on providing Indian River County an initial framework for allocating resources related to stormwater improvement projects. The primary objectives of the SMP are improving water quality in the Indian River Lagoon and improving flooding and resilience throughout Indian River County.

The SMP aims to mitigate the adverse effects of flooding specifically in nine (9) priority areas identified by Indian River County as being particularly prone to flooding.

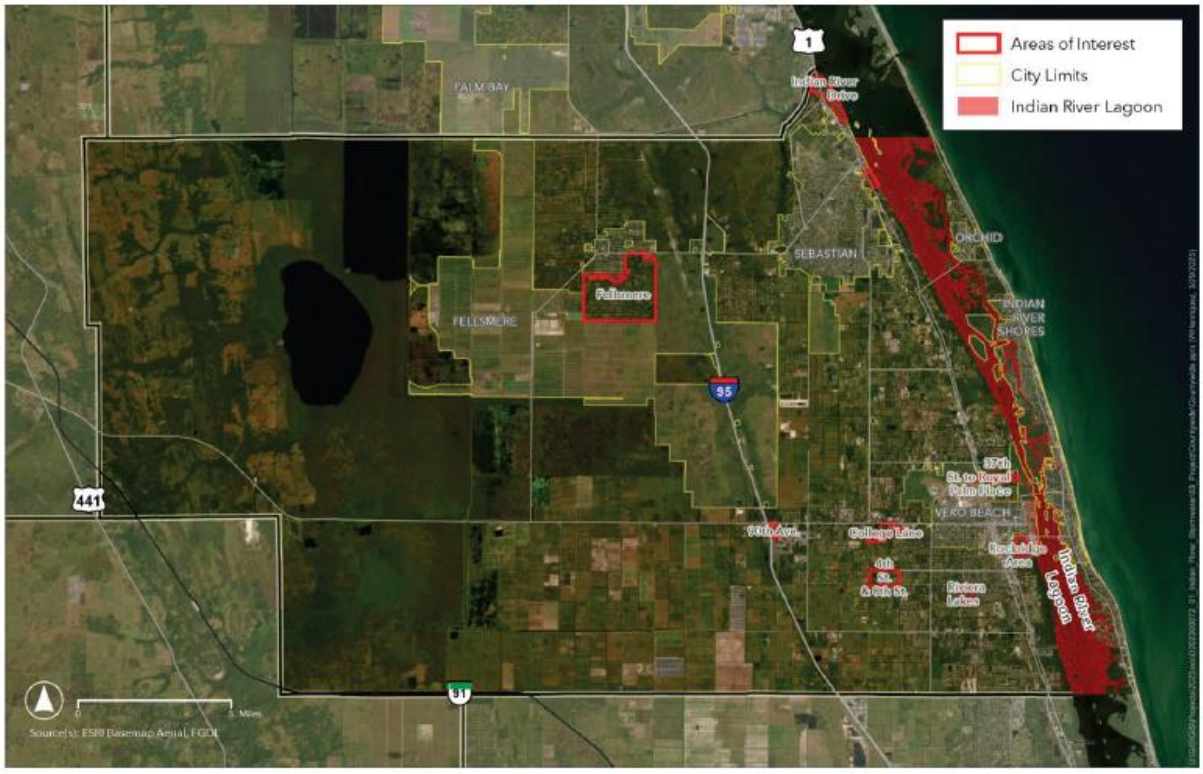

Figure 1
Priority Areas Identified by IRC

IRC identified 9 priority areas based on previous flooding concerns. The SMP analysis examined existing stormwater systems, their capacity to handle various storm events, and limitations that may contribute to flooding. Many of the residential areas contain older homes with outdated drainage infrastructure, or none at all. The Fellsmere Priority Area is the largest of the Priority Areas, followed by 4th Street and 8th Street and then Rockridge. Larger areas will require a significant investment to alleviate flooding concerns compared to areas like 90th Avenue for example, which is limited to a specific corridor where localized conceptual improvements can be implemented.

FEMA Flood Insurance Study, Effective January 26, 2023

FEMA's Effective FIS for Indian River County, FL is dated January 26, 2023. The FIS revised and updated information on the existence and severity of flood hazards within Indian River County. The FIS also includes revised digital Flood Insurance Maps which reflect updated Special Flood Hazard Areas (SFHA) and flood zones for the county.

Indian River County Climate Vulnerability Assessment, March 2025

In 2025, Indian River County finalized its Comprehensive Vulnerability Assessment, evaluating various flood scenarios, ranging from typical rainfall events to extreme compound flooding, integrating storm surge with projected sea level rise. The vulnerability assessment identified 10 focus areas where vulnerability was found to be higher than average while hosting a higher concentration of critical assets. The term “critical asset” encompasses a wide range of essential infrastructure, facilities, and resources, categorized into transportation, critical infrastructure, emergency facilities, and natural/cultural assets. These focus areas host assets such as schools, power plants, evacuation zones and emergency operation centers.
As some of these focus areas encompass, or reside near identified repetitive loss areas, it is possible that implementation projects aiming to resolve infrastructure vulnerabilities may benefit the nearby repetitive loss area as well.

FEMA Repetitive Loss and Flood Insurance Claims Data

The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of flood insurance policy and claims data to the public. This information can only be released to state and local governments for use in floodplain management related activities. Therefore, all claims data in this report are only discussed in general terms.

Step 3 Building Data Collection

Each building in the repetitive loss area must be visited to collect data and make a preliminary determination of repetitive flooding and appropriate mitigation measures. The on-site field surveys investigated numerous factors including, but not limited to, drainage patterns around the building, location and elevation of HVAC units, the condition of the structure, the foundation, gutters and downspouts, nearby drainage ditches and storm drains.

Other data incorporated from off-site research included a review of the FEMA Flood Insurance maps, the location of the repetitive loss areas in relation to FEMA flood zones and the Property Appraiser website, and the vulnerable areas identified in the Indian River County Vulnerability Analysis.

FEMA has developed the National Flood Mitigation Data Collection Tool to assemble information related to risk, building construction, and costs of mitigation measures. This tool was not utilized for this effort.

Indian River County has identified 34 repetitive loss areas as follows:

Repetitive Loss Areas 1, 3 and 4

This area is located on the Indian River Lagoon and subject to riverine flood hazards. The majority of homes in this area are located in Flood Zone AE with a base flood elevation of 5 to 6 feet. Repetitive Loss Area 4 has parcels on the Lagoon and Ocean side that are located in a CBRS[2] zone. Of the repetitive loss properties in this area only 2 properties are in Zone X. Many of the homes in this area were developed between 1965 to 1974 and many of the existing homes remain from that time. The area was developed prior to the creation of the St. Johns Water Management District and current stormwater management regulatory requirements, as such the community is not served by any stormwater management facilities that would provide flood control, stormwater discharge attenuation or water quality treatment. Site visits showed many homes slab on grade and and not having elevated HVAC systems.

[2] CBRS – Coastal Barrier Resource System are areas that include ocean-front land and other Other Protected Areas. Coastal barriers serve as important buffers between coastal storms and inland areas, often protecting properties on land from serious flood damage. Properties in CBRS areas are not eligible for federally regulated flood insurance.

Repetitive Loss Area 2

Repetitive Loss Area 2 is located at the border of Brevard County near a riverine floodway and subject to increased flooding. A number of the homes in this area are in a designated floodway, built in the last 70s. However, most of the homes in this repetitive loss area are in Zone X and only a few structures with HVAC systems are elevated.

Repetitive Loss Area 5

Repetitive Loss Area 5 is nestled in the Blue Cypress Fish Camp in the western most part of Indian River County. This area is in a Flood Zone AE with a Base Flood Elevation of 26 feet. The homes in this segment are all mobile homes that have been there since the 50's and 60's. In addition to being located at a main flooding source, Blue Cypress Lake, these mobile homes have been there for a long time and have not been substantially improved and/or elevated.

Repetitive Loss Area 6

Repetitive Loss Area 6 is located west of I95, north of County Road 512. The structures in this repetitive loss area are all in Zone X and are comprised of mostly commercial buildings and some single-family homes.

Repetitive Loss Areas 7, 8, 9, 10 and 11

These repetitive loss areas are primarily located in Northeast Indian River County. The properties here are facing the Indian River Lagoon. Each property in this group is within the LiMWA[3] line in Zone AE with base flood elevations of 6.0 to 7.0 feet. In addition to being in low-lying areas, the majority of homes were constructed in the 1920s to 1950s and as such have not been elevated. Only two homes in this area have recently been demolished and are currently being rebuilt. Flooding in this area is known to occur during most rain events with significant impacts during hurricanes. There is no established drainage receiving system other than the Indian River Lagoon, which is tidally influence.

[3] LiMWA is the Limit of Moderate Wave Action shown on the Flood Insurance Maps as areas that are subject to storm damage from wave heights between 1.5 and 3 feet.

Repetitive Loss Area 12

This area is west of the barrier island near 66th Avenue. There are currently very few homes in the AE zone with base flood elevations between 20 to 21 feet. The low marshy areas surrounding this group indicates a potential for saturated soils that may not drain adequately during a rain event. The few homes located in this area are older homes that were built in the late 1960s.

Repetitive Loss Area 13

Most of the structures in this area are in Zone X with only a few of them in Flood Zone AE with a base flood elevation of 5.0 feet. Repetitive Loss Area 13 is located west of the Indian River lagoon, which homes built in the 1980's. This neighborhood was constructed with less than effective drainage systems that ties into a tidally influenced retention area.

Repetitive Loss Areas 14, 15, 16, 17 and 18

The repetitive loss areas 14 and 15 are near each other West of Old Dixie Highway located in Zone X. Repetitive Loss Areas 16 and 17 are located even further West on SR 60 near 82nd Avenue. Repetitive Loss Area 18 is also located on SR 60 towards 58th Avenue. These areas have been grouped together as the entire area is located in Zone X. All these areas have older, poorly maintained drainage swales in common. Furthermore, the majority of homes in this area were constructed in the 1950s to late 1970s. The grading in this area does not meet the current building code requirements, which would explain the area being inundated during normal rain events.

Repetitive Loss Area 19 and 20

Repetitive Loss Areas 19 and 20 are very close to each other. This area is located on a small canal system in central Indian River County. The area is mostly AE with a base flood elevation of 4.0. The drainage system in this area is known for struggling during the rainy season. The canal outflow is tidally influenced and does not work as effectively as desired. Additionally, the homes in this area were constructed as early as the 1950s and are slab on grade. This area was also heavily impacted by hurricanes Jean and France in 2004.

Repetitive Loss Areas 21, 22, 23 and 24

In this repetitive loss area only area 22 has homes located in a special flood hazard area; Zone AE with a BFEs ranging between 20 to 21 feet. The homes in this area are also older home

constructed in the 1950s to 1980s as slabs on grade. Notably this area has poor drainage, it does not have a designated drainage receiving system. Therefore this area experiences much ponding after a normal rain event.

Repetitive Loss Area 25

This repetitive loss area is located in eastern central Indian River County between Highway US1 and the Indian River lagoon. The drainage improvement projects completed in 2008 did not provide the flooding relief that was hoped for. The canal system that meanders through the subdivisions is directly connected to the Indian River lagoon and is heavily affected by the tides. The homes in this area were constructed in the 1930's to 1980s and are built slab on grade. The necessary slope away from the structure that is currently required by the Florida Building Code was not applicable at the time of construction that would protect the foundations from inundation.

Repetitive Loss Areas 27, 28, 29, 30, 31, 32, 33 and 34

These areas are grouped together as they are all located on the barrier island and share the same flooding source, the Indian River Lagoon. While some of these properties are in Zone X (repetitive loss area 27), the majority of the homes are in Zone AE. This area is not only affected by rain events but is also tidally influenced.

Many of the repetitive loss areas drainage systems are outdated, in disrepair or undersized and not well interconnected. As existing infrastructure struggles to cope with increased volumes of runoff, localized flooding has worsened in these areas.

Step 4 Mitigation Alternatives

According to the 2017 CRS Coordinator's Manual, mitigation measures should fall into one of the following floodplain management categories:

- Prevention
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information and Outreach

Property protection is essential to mitigating repetitive loss properties and reducing future flood losses. There are many ways to protect a property from flood damage. Property protection measures recognized in the 2017 CRS Coordinator's Manual include relocation, acquisition, building elevation, retrofitting, sewer backup protection, and insurance. Different measures are appropriate for different flood hazards, building types and building conditions. Below lists typical property protection measures:

- Demolish the building or relocate it out of harm's way.
- Elevate the building above the flood level.
- Elevate damage-prone components, such as the furnace or air conditioning unit.
- Dry floodproof the building so water cannot enter.
- Wet floodproof portions of the building so water won't cause damage.
- Construct a berm or redirect drainage away from the building.
- Maintain nearby streams, ditches, and storm drains so debris does not obstruct them.
- Correct sewer backup problems.

Source: 2017 CRS Coordinators Manual

Improving the stormwater drainage system and storage capacity throughout the County can eliminate some building damage and road closures in these areas. Similarly, improving drainage outfalls can reduce stormwater flooding from heavy rains. These structural methods require large capital expenditures and cooperation from private property owners. Promoting floodproofing techniques and flood insurance and increasing public education and awareness of the flood hazards can be the next best alternative for property owners in this area. The County's websites, e-mail distribution lists, press releases and variable message boards can help get these messages out to business owners and residents.

Mitigation Funding

There are several types of mitigation measures, listed in Table 2.4, which can be considered for each repetitive loss property. Each mitigation measure qualifies for one or more grant programs. Depending on the type of structure, severity of flooding and proximity to additional structures with similar flooding conditions, the most appropriate measure can be determined. In addition to these grant funded projects, several mitigations measures can be taken by the homeowner to protect their home. Please note, the Biggert-Waters 2012 National Flood Insurance Reform Act eliminated the previously available Repetitive Flood Claims grant program.

Table 4.1 Mitigation Measures

Types of Projects Funded	HMGP	FMA	PDM	SRL	ICC	SBA
Acquisition of the entire property by a gov't	X	X	X	X		
Relocation of the building to a flood free site	X	X	X	X	X	X
Demolition of the structure	X	X	X	X	X	X
Elevation of the structure above flood levels	X	X	X	X	X	X
Replacing the old building with a new elevated structure	X			X	X	X
Local drainage and small flood control projects	X			X		
Dry floodproofing (non-residential only)		X	X	X	X	X
Percent paid by Federal Program	75%	75%	76%	75%	100%	0
Application Notes	1, 2	1	1	1	3	2, 4

Application notes:

1. Requires a grant application from your local government.
2. Only available after a Federal disaster declaration.
3. Requires the building to have a flood insurance policy and to have been flooded to such an extent that the local government declares it to be substantially damaged. Pays 100% up to $30,000.
4. This is a low interest loan that must be paid back.

Potential Mitigation Measures

Structural Alternatives	Non-Structural Alternatives
Dry floodproofing: Commercial structures and even residential structures are eligible for dry floodproofing; however, in many instances this requires human intervention to complete the measure and ensure success. For example, installing watertight shields over doors or windows requires timely action by the homeowner; especially in a heavy rainfall event.	Provide public education through posting information about local flood hazards on municipal websites, posting signs at various locations in neighborhoods or discussing flood protection measures at local neighborhood association meetings.
Wet floodproofing: Wet floodproofing a structure involves making the uninhabited portions of the structure resistant to flood damage and allowing water to enter during flooding. For example, in a basement or crawl space, mechanical equipment and ductwork would not be damaged.	Implement volume control and runoff reduction measures in the Municipal Stormwater Management Ordinance
For basements, especially with combined storm sewer and sewer systems, backflow preventer valves can prevent storm water and sewer from entering crawlspaces and basements.	Consider expanding riparian impervious surface setbacks.
Acquire and/or relocate properties/target abandoned properties.	Relocate internal supplies, products/goods above the flooding depth.
Elevate structures and damage-prone components, such as the furnace or air conditioning unit, above the BFE	Promote the purchase of flood insurance.
Construct engineered structural barriers, berms, and floodwalls (Note: Assuming lot has required space for a structural addition).	Improve the Municipal floodplain and zoning ordinances
Increase road elevations above the BFE of the 100-year floodplain	Preserving natural areas or restoring areas to a natural state
Implement drainage improvements such as increasing capacity in the system (up-sizing pipes) and provide additional inlets to receive more stormwater.	Protection of wetlands to allow additional storage of floodwaters.
Improve stormwater system maintenance program to ensure inlets and canals are free of clogging debris.	Protecting the coastline by preserving natural habitat and allowing setback for construction

Current Mitigation Projects

From the above list of structural and non-structural mitigation alternatives, the Indian river County has and is currently implementing the following:

Structural alternatives:

1. Wet floodproofing - requiring attached garages to install flood vents if finished floor of garage is below BFE. Elevating machinery and equipment to min. BFE+1 foot.
2. Implement drainage improvements and improve stormwater system maintenance program (see below projects)

Non-structural alternatives:

1. Annual outreach projects
2. Regulation in City's Stormwater Management Plan
3. Encouraging the purchase of flood insurance

The most recent 2025 Stormwater Management Plan proposes some remedies, including expanding the coastal buffer areas – natural, undeveloped, pervious areas along the Indian River Lagoon – this would increase the ability to capture and treat stormwater during times of lower water levels and absorb the effects of storm surge, king tides and alleviate sunny date flooding. The Stormwater Management Plan addresses the top priority areas for improving the drainage system. These top priority areas include the repetitive loss areas.

Advantages and Disadvantages of Mitigation Measures

Seven primary mitigation measures are discussed here: acquisition, relocation, barriers, floodproofing, drainage, elevation, and insurance. In general, the cost of acquisition and relocation will be higher than other mitigation measures but can completely mitigate risk of any future flood damage. Building small barriers to protect single structures is a lower cost solution, but it may not be able to offer complete protection from large flood events and may impact flood risk on other properties. Where drainage issues are the source of repetitive flooding, drainage improvements can provide flood mitigation benefits to multiple properties. Each of these solutions is discussed in greater detail as follows:

Acquisition:

Property acquisition and/or relocation are complex processes requiring transferring private property to property owned by the local government for open space purposes. Acquisition is a relatively expensive mitigation measure, but it provides the greatest benefit in the lives and property. The major cost for the acquisition method is for purchasing the structure and land. The total estimated cost for acquisition should be based on the following:

- Purchase of Structure and land
- Demolition
- Debris removal, including any landfill processing fees
- Grading and stabilizing the property site
- Permits and plan review

Advantages	Disadvantages
Permanently removes problem since the structure no longer exists	Cost may be prohibitive
Allows a substantially damaged or substantially improved structure to be brought into compliance with the community's floodplain management ordinance or law	Resistance may be encountered by local communities due to loss of tax base, maintenance of empty lots, and liability for injuries on empty community-owned lots
Expands open space and enhances natural and beneficial functions	
May be fundable under FEMA mitigation grant programs	

There are 3 criteria that must be met for FEMA to fund an acquisition project:

- The local community must inform the property owners interested in the acquisition program that the community will not use condemnation authority to purchase their property and that the participation in the program is strictly voluntary,
- The subsequent deed to the property to be acquired will be amended such that the landowner will be restricted from receiving any further Federal disaster assistance grants, the property shall remain in open space in perpetuity, and the property will be retained in ownership by a public entity, and,
- Any replacement housing or relocated structures will be located outside the 100-year floodplain.

Relocation:

Relocation involves lifting and placing a structure on a wheeled vehicle and transporting that structure to a site outside the 100-year floodplain and placed on a new permanent foundation. Like acquisition, this is one of the most effective mitigation measures.

Advantages	Disadvantages
Removes flood problem since the structure is relocated out of the flood-prone area	Cost may be prohibitive
Allows a substantially damaged or substantially improved structure to be brought into compliance with a community's floodplain management ordinance	Additional costs are likely if the structure must be brought into compliance with current code requirements for plumbing, electrical, and energy systems
May be fundable under FEMA mitigation grant programs	

The cost for relocation will vary based on the type of structure and the condition of the structure. It is considerably less expensive to relocate a home that is built on a basement or crawl space as opposed to a structure that is a slab on grade. Additionally, wood sided structures are less expensive to relocate than structures with brick veneer. Items to consider in estimating cost for relocation include the following:

- Site selection and analysis and design of the new location
- Analysis of existing size of structure
- Analysis and preparation of the moving route
- Preparation of the structure prior to the move
- Moving the structure to the new location
- Preparation of the new site
- Construction of the new foundation
- Connection of the structure to the new foundation
- Restoration of the old site

Barriers:

A flood protection barrier is usually an earthen levee/berm or a concrete retaining wall. While levees and retaining walls can be large spanning miles along a river, they can also be constructed on a much smaller scale to protect a single home or group of homes.

Advantages	Disadvantages
Relative cost of mitigation is less expensive than other alternatives	Property is still located within the floodplain and has potential to be damaged by flood if barrier fails or waters overtop it
No alterations to the actual structure or foundation are required	Solution is only practical for flooding depths less than 3 feet
Homeowners can typically construct their own barriers that will complement the style and functionality of their house and yard.	Barriers cannot be used in areas with soils that have high infiltration rates

The cost of constructing a barrier will depend on the type of barrier and the size required to provide adequate protection. An earthen berm will generally be less expensive compared to an equivalent concrete barrier primarily due to the cost of the materials. Another consideration is space; an earthen barrier requires a lot of additional width per height of structure compared to a concrete barrier to ensure proper stability.

<u>Key items to consider for barriers:</u>

- There needs to be adequate room on the lot
- A pump is required to remove water that either falls or seeps onto the protected side of the barrier
- Human intervention will be required to sandbag or otherwise close any openings in the barrier during the entire flood event

Floodproofing:

Wet floodproofing a structure consists of modifying the uninhabited portions (such as a crawlspace or an unfinished basement) to allow floodwaters to enter and exit. This ensures equal hydrostatic pressure on the interior and exterior of the structure which reduces the likelihood of wall failures and structural damage. Wet floodproofing is practical in only a limited number of situations.

Advantages	Disadvantages
Often less costly than other mitigation measures	Extensive cleanup may be necessary if the structure becomes wet inside and possibly contaminated by sewage, chemicals and other materials borne by floodwaters
Allows internal and external hydrostatic pressures to equalize, lessening the loads on walls and floors	Pumping floodwaters out of a basement too soon after a flood may lead to structural damage
	Does not minimize the potential damage from a high-velocity flood flow and wave action

A dry floodproofed structure is made watertight below the level that needs flood protection to prevent floodwaters from entering. Making the structure watertight involves sealing the walls with waterproof coatings, impermeable membranes, or a supplemental layer of masonry or concrete; installing watertight shields over windows and doors; and installing measures to prevent sewer backup.

Advantages	Disadvantages
Often less costly than other retrofitting methods	Requires human intervention and adequate warning to install protective measures
Does not require additional land	Does not minimize the potential damage from high-velocity flood flow and wave action.
May be funded by a FEMA mitigation grant program	May not be aesthetically pleasing.

Drainage Improvements:

Methods of drainage improvements include overflow channels, channel straightening, restrictive crossing replacements, and runoff storage. Modifying the channel attempts to provide a greater carrying capacity for moving floodwaters away from areas where damage occurs. Whenever drainage improvements are considered as a flood mitigation measure, the effects upstream and downstream from the proposed improvements need to be considered.

Advantages	Disadvantages
Could increase channel carrying capacity through overflow channels, channel straightening, crossing replacements, or runoff volume storage	May help one area but create new problems upstream or downstream
Minor projects may be fundable under FEMA mitigation grant programs	Channel straightening increases the capacity to accumulate and carry sediment
	May require property owner cooperation and right-of-way acquisition

Elevation:

Elevating a structure to prevent floodwaters from reaching living areas is an effective and one of the most common mitigation methods. Elevation may also apply to roadways and walkways. The goal of the elevation process is to raise the lowest floor of a structure or roadway/walkway bed to or above the required level of protection.

Advantages	Disadvantages
Elevating to or above the BFE allows a substantially damaged or substantially improved house to be brought into compliance	Cost may be prohibitive
Often reduces flood insurance premiums	The appearance of the structure and access to it may be adversely affected.
Reduces or eliminates road closures due to overtopping	May require property owner cooperation and right-of-way acquisition
May be fundable under FEMA mitigation grant programs (Elevate Florida Program)	May require road or walkway closures during construction

Note: *Elevating a structure with a slab-on-grade foundation can cost over 30 percent more than elevating a structure on a crawlspace foundation. Many of the properties located in the Indian River County Repetitive Loss Areas have slab-on-grade foundations, which may mean this mitigation alternative will be cost-prohibitive*.

Flood Insurance:

Insurance differs from other property protection activities in that it does not mitigate or prevent damage caused by a flood. However, flood insurance does help the owner repair and rebuild their property after a flood, and it can enable the owner to afford incorporating other property protection measures in that process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without requiring human intervention for the measure to work.

Advantages	Disadvantages
Provides protection outside of what is covered by a homeowners' insurance policy	Cost may be prohibitive
Can help to fund other property protection measures after a flood through increased cost of compliance (ICC) coverage	Policyholders may have trouble understanding policy and filing claims
Provides protection for both structure and contents.	Does not prevent or mitigate damage
Can be purchased anywhere in a community, including outside of a flood zone	

Step 5 Recommendations

Based on the field survey and collection of data, the analysis of existing studies and reports, and the evaluation of various structural and non-structural mitigation measures, the Indian River County proposes the following projects to be implemented for the Repetitive Loss Areas. The table below examines current mitigation actions in this area.

Current Mitigation Actions	
1	Property owners have documented flooding and have identified flooding concerns in returned questionnaires from this analysis
2	Property owners are aware of flooding causes. Some property owners have undertaken specific floodproofing measures at their own expense. Others note that drainage improvements made by the County have improved some of their flooding problems
3	Indian River County has developed a Stormwater Master Plan (2025) which identifies areas of stormwater flooding and has undertaken capital improvement projects to improve drainage throughout the City (5-Year Stormwater Management Plan)

Prioritization:

To facilitate the implementation of the following recommended mitigation actions, a prioritization schedule is included based on the following:

· Cost
· Funding Availability
· Staff Resources
· Willingness of property owners to participate
· Additional planning requirements

An overall priority rating of high, medium, or low is assigned to each recommendation action, using the following scale:

* High priority (should be completed within 2 years)
* Medium priority (should be completed within 2 to 4 years)
* Low priority (should be completed within 4 to 5 years)

Recommendations:

Indian River County will encourage property owners to use floodproofing measures to help protect lower levels of their property. Indian Rivere County will also increase its public education efforts to improve awareness of flood preparedness and flood protection measures including moving valuable items above the flood elevation and permanently elevating vulnerable HVAC units. At the same time, Indian River County will work with property owners, citizens, the state and other regional and federal agencies to implement capital improvement projects which will help to eliminate flooding in the repetitive loss areas.

Mitigation Action 1: Flood Insurance Promotion

Property owners should obtain and keep a flood insurance policy on their structures (building and contents coverage). The County will continue, on an annual basis, to target all properties in the repetitive loss areas reminding them of the advantages of maintaining flood insurance through its annual outreach effort. The County will also host an annual open house presentation for the public to ask questions/advice on flood insurance with a licensed flood insurance agent.

Responsibility: The County's Public Works Department will provide the most relevant up-to-date flood insurance information to all property owners within the repetitive loss areas through annual outreach and other efforts such as workshops, open house events.
Funding: The cost will be paid from the County's operating budget
Priority: High

Mitigation Action 2: Property Protection Information

Property owners should not store personal property in crawl spaces since personal property is not covered by a flood insurance policy without contents coverage. The County will increase its outreach efforts on an annual basis for the identified repetitive loss areas to include this specific information in the outreach materials.

Responsibility: The County's Public Works Department will provide the most relevant up-to-date flood insurance information to all property owners within the repetitive loss areas through annual outreach and other efforts such as workshops, open house events.
Funding: The cost will be paid from the County's operating budget
Priority: High

Mitigation Action 3: Floodproofing

When appropriate, commercial property owners should consider floodproofing measures such as flood gates or shields, flood walls, hydraulic pumps, and elevating electrical services including electrical outlets.

Responsibility: The County's Public Works Department will provide the most effective flood protection measures and provide advice and assistance to property owners who may wish to implement such measures in an on-going program.
Funding: The cost will be paid for by individual property owners. Advice and assistance will require staff time.
Priority: Medium

Mitigation Action 4: Natural Drainage Maintenance

Blockages in natural channels can cause upstream drainage issues and flooding. If natural floodplains and drainage features are blocked or filled they lose the ability to manage floodwaters, forcing those waters elsewhere where they may cause property damage.

Responsibility: The County's Public Works Department will make these changes and continue inspecting and managing the drainage maintenance system. Property owners are reminded to keep their swales free of debris and any overgrowth.
Funding: The cost will be paid by the County's general fund
Priority: Medium

Mitigation Action 5: CIP Drainage Improvements

Prioritize CIP projects to focus on drainage improvement projects in the drainage basins which contain the identified repetitive loss areas

Responsibility: The County's Public Works Department
Funding: The cost will be paid by FEMA's Hazard Mitigation Grant Program and/or the County's CIP budget.
Priority: Medium

Mitigation Action 6: Elevate Mechanical Equipment

Non-elevated HVAC units were found in all repetitive loss areas. The County will encourage property owners to elevate inside and outside mechanical equipment above the BFE.

Responsibility: The County's Planning & Development Department will promote effective flood protection measures and provide advice and assistance to property owners who may wish to implement such measures in an on-going program.

Funding: The cost will be paid for by individual property owners. Advice and assistance will require staff time. Promotion of existing floodproofing measures may require some additional funds from the County's operating budget.

Priority: Medium