

Extremely Active Hurricane Season

Forecasters with the National Oceanic and Atmospheric Administration (NOAA) predicted an above normal 2020 Hurricane season. As of this publication there have been seventeen named storms with two months of the season still to go. The Atlantic hurricane season runs from June 1 through November 30. While the hurricane season typically peaks between late August through the fall, it is important to keep in mind that the Outer Banks is also prone to strong nor'easters over the winter months.

This publication will address some basic considerations that property owners, residents, and vacationers should keep in mind to mitigate storm related hazards and to stay out of harm's way.

Hurricane Isabel— 2003



Storm Preparedness

Historic Storms

The Town of Duck is surrounded by water. Therefore, buildings along the shoreline are susceptible to wave action and high tides associated with storm surges generated in the Atlantic Ocean and Currituck Sound.

Properties in low-lying areas are prone to flooding from overwash as well as significant rainfall, particularly when the seasonal groundwater table is high due to consecutive rain events. When the groundwater table is high, the soil cannot absorb water quickly, and water stands at the surface for longer periods of time.

The Town is also vulnerable to shoreline erosion and sea level rise which, over a period, will increase the vulnerability of both ocean and soundfront structures to these forces.

Flooding from the Atlantic Ocean occurs when offshore storms create storm surge and wave conditions that result in ocean overwash. As the storm passes inland, overwash can flood oceanfront structures and can often create ponds of water behind the primary frontal dune that can flood low-lying areas.

The Town of Duck has seen impacts from hurricane events on several occasions.

Hurricane Isabel hammered the Outer Banks in September 2003, with 90 mph east winds that caused significant erosion along the oceanfront. Areas in Ocean Pines and Carolina Dunes experienced overwash that resulted in moderate flooding behind the primary frontal dune. The storm destroyed approximately 90

percent of the ocean walkways and dune decks from Sanderling to the southern Town line and flooded many ground floor enclosures.

Damage to beach walkways and flooding of ground floor enclosures also resulted from the Thanksgiving nor'easter of 2006, the September nor'easter of 2008, the November nor'easter of 2009, and Hurricane Sandy in the fall of 2012.

Hurricane Irene made landfall in North Carolina in late August 2011. This Category One storm produced sustained southwesterly winds of 82 mph. It caused widespread damage to homes from Cape Lookout northward and produced extensive power outages. Significant storm surge damage occurred along southern portions of Currituck Sound, including Duck. The heaviest flood damage sustained in Duck affected the commercial buildings along the sound in the village, and lower level residential enclosures north of the Army Corps of Engineers Field Research Facility. In addition to flooding, heavy wave action damaged almost every

"Hurricane Irene set the new standard for severe soundside flooding with the highest flood heights ever recorded since the Army Corps of Engineers began documenting sound water elevations in 1979."

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pier and bulkhead along Duck's Currituck Sound shoreline. Wave action coupled with torrential rains also caused severe erosion on the high bluffs located above the sound shoreline near at the southern end of town. Low lying sections of the Town of Duck Soundside Boardwalk also sustained moderate structural damage.

Flooding along Duck's Currituck Sound shoreline occurs when prevailing winds gust for several days from a southerly or westerly direction. Hurricane Irene set the new standard for severe soundside flooding with the highest flood heights ever recorded since the Army Corps of Engineers began documenting sound water elevations in 1979. The flooding that occurred during Irene topped the 1993 "Storm of the Century" flooding by an additional four to six inches. Since Irene, we recently saw **Hurricane Michael** sneak up on us in October 2018. This was a fast-moving storm with little to no rain, but it brought with it a 2-4 foot storm surge along the soundside.

Hurricane Matthew made landfall in October 2016 and brought with it 3-5 feet of storm surge along with 12 inches of rainfall within a 12-hour time frame. This rainfall was preceded

by Hurricane Hermine in September that brought 6+ inches of rainfall in an already above average year for rain. The impacts to Duck resulted in standing water in low lying areas for nearly a month following the storm.

While we often look at coastal named storms as the events to concern ourselves when preparing for flooding, that is not always the case. In July and August of 2018, when we typically see 4 to 5 inches of rain, we saw 20 inches. Substantial flooding and standing water were recorded as a result of this rainfall.

The result in each of these storms and rain events was flooding in the low-lying areas

These events have helped the Town better understand and assess the vulnerabilities and risks that exist in specific areas of Duck. They also highlight the importance of properly siting, designing, and constructing buildings and infrastructure, as well as taking precautions to ensure property is protected and risks are minimized.



Hurricane Irene— 2011



Tropical Storm Michael in 2018 came up the sound damaging almost every soundside structure in Duck.



Severe shoreline erosion and property damage sustained from hurricane conditions.

Saffir-Simpson Hurricane Wind Scale

The Saffir-Simpson wind scale was developed in the 1960s by structural engineer Herbert Saffir to help quantify potential damage resulting from hurricane force winds. The scale was expanded in the 1970s by then Director of the National Hurricane Center. Increasing in intensity the category scale goes from 1 to 5. Storm category is determined by a range of factors including barometric pressure, wind speed, storm surge, and damage potential.

Wind speed is the determining factor for the storm category. The storm surge is estimated based on the continental shelf slope in the landfall region. Therefore, it is important to note that while the category of storm can help in planning, the storm surge and flooding can vary, be unpredictable, and can happen at any category.

SAFFIR-SIMPSON HURRICANE WIND SCALE		
CATEGORY	WIND SPEED	DAMAGE
1	74-95 mph	Very dangerous winds will produce some damage
2	96-110 mph	Extremely dangerous winds will cause extensive damage
3	111-129 mph	Devastating damage will occur
4	130-156 mph	Catastrophic damage will occur
5	156+ mph	Catastrophic damage will occur

Before, During, and After a Storm

Most emergency events that occur in Duck are weather related. Fortunately, several sources exist to track storms and monitor evacuation notifications and emergency procedures.

The Town of Duck maintains a page on its website dedicated to Emergency Preparedness and provides current storm-related information: www.townofduck.com/emergency-preparedness/. This page contains useful links to track and monitor storms, understand evacuation orders and procedures, and assist with developing a personal storm preparedness plan.

Hurricane Preparedness/Before the Storm

It is never too early to prepare yourself and your homes for a hurricane. Follow these simple steps and make sure that you are ready in the event disaster strikes.

1. **Determine Your Risk**– Find out if your home is subject to flooding. Evaluate what you need to protect your home and family.
2. **Develop an Evacuation Plan**– Plan for multiple options and destinations and be ready to execute them when needed.
3. **Assemble Disaster Supplies**– Make a list and stock/restock items needed to sustain your family and your pets to last at least three (3) days, to include:
 - First aid kit, hand sanitizer, cleaning supplies and essential medications.
 - Canned food and can opener.
 - At least three gallons of water per person.
 - Protective clothing, including masks, rainwear, and bedding.
 - Battery-powered radio, flashlight, and extra batteries.
 - Special items for yourself, infants, elderly, or disabled family members including medicines and medical records.
 - Items for your pet including food, water, medicines, and



medical records.

- Written instructions on how to turn off electricity, gas, and water if authorities advise you to do so. Remember, you may need a professional to turn them back on.

4. **Get an Insurance Checkup**– Check in with your insurance agency well before a storm. Prepare your home and belongings according to your policy. Locate all insurance documents to take with you during an evacuation.

5. **Strengthen and Protect Your Home**

- Make sure it is in good repair and up to local hurricane building code specifications.
- Secure any loose items that can be tossed around by high winds.
- Install hurricane shutters or purchase precut 1/2" outdoor plywood boards, along with the screws to install them, for each window of your home.
- Install anchors for the plywood and pre-drill holes in the plywood for quick installation.
- Make trees more wind resistant by removing diseased and damaged limbs, then strategically remove branches so that wind can blow through.

6. **Help Your Neighbor**- Check in with your neighbors and offer any help that they may need to prepare.

7. **Complete a Written Plan**– Writing down your plan will help you avoid mistakes when faced with an emergency and ensure everyone in your home is prepared for the next storm.

For more information and helpful tips on how to prepare, visit weather.gov/wrn/hurricane-preparedness or readync.org.

This mass notification system keeps you informed during emergency situations.

While signing up for the service, you can choose which form of communication you prefer, as well as the frequency with which you receive the alerts and messages. You can also sign up to receive weather alerts from NOAA and the National Weather Service. Change your mind? Not a problem! You can change these settings or unsubscribe at any time. Your Regroup account will still be active and you can change your personal setting to receive alerts again.

Regroup
Mass Notification

Sign up now at townofduck.com/regroup/

Social Media Outlets

Dare County Social Media:

Twitter:

@DareCountyEM

@DareCountyGovt

Town of Duck Social Media:

Twitter: @DuckOBX

Facebook: Town of Duck

Instagram: townofduck

National Weather Service

Social Media:

Twitter: @NWSMoreheadCity

Facebook: NWS Morehead City

When a Hurricane Watch is Issued

1. **Stay informed** by listening to NOAA Weather Radio, local radio, television stations, and local government social media outlets for up-to-date storm information. A list of other available social media outlets are listed on this page. Have multiple ways to receive warnings.
2. **Sign up for Emergency Alerts:** In the Spring of 2017 Dare County, in partnership with the towns, purchased into an agreement with Regroup Mass Notification as a means of delivering vital information more quickly. When signing up, you can choose from email, text, and voice alerts. To learn more about Regroup and to sign up for emergency alerts from the Town of Duck visit townofduck.com/regroup/. To sign up for Regroup through Dare County Emergency Management visit darecountym.com
3. **Prepare your home:** Bring inside any lawn or deck furniture, outdoor decorations or ornaments, trash bins, hanging plants, and anything else that can be picked up by the wind. Cover all windows of your home. If shutters have not been installed, use precut plywood as described earlier. Note: Tape does not prevent windows from breaking, so taping windows is not recommended.
4. **Fill your car's gas tank.**
5. **Recheck manufactured home tie-downs.**
6. **Check your disaster supply kit!**



Dare County Evacuation Map

When a Hurricane Warning is Issued

1. Please do not take any chances. Follow the instructions of emergency management officials. Find Dare County information regarding hurricanes, including evacuation routes, at darenc.com/hurricanes.
2. Identify your evacuation route.
3. Identify ahead of time where you could go if you are told to evacuate. Choose several places--a friend's home in another town, a motel, or a shelter.
4. Remember: There are no American Red Cross approved shelters in Dare County. Inland shelter locations may be broadcast on local radio stations, Regroup or on Charter Cable Channel 20.
5. Complete preparation activities. If you are not advised to evacuate, stay indoors and away from windows.
6. Be aware that the calm of the "eye" is deceptive; the storm is not over. The worst part of the storm happens after the eye passes over and the winds blow from the opposite direction. Trees, shrubs, buildings, and other objects damaged by the first winds can be broken or destroyed by the second winds.
7. Be alert for tornadoes as they can occur during a hurricane and after it passes over. Remain indoors, in the center of your home, in a closet, or bathroom without windows.
8. Stay away from flood waters. If you come upon a flooded road, turn around and go another way. If you are caught on a flooded road and waters are rising rapidly around you, get out of the car and climb to higher ground. FEMA maintains a useful website with information on this topic titled: "Turn Around Don't Drown" at weather.gov/safety/flood-turn-around-dont-drown.

When a Hurricane is Over

1. Keep listening to NOAA Weather Radio, local radio, television stations, and local government social media outlets for instructions.
2. If you evacuated, return home only when local officials tell you it is safe to do so. Town personnel and public safety will be extra busy with clean-up, damage assessment, and providing emergency services. Be smart and follow the advice of local officials.
3. Inspect your home for damage.
4. Use flashlights in the dark; do not use candles.



Aerial view of flooding at Georgetown Sands following twenty (20) inches of rainfall between July 1 and August 5, 2018

Possible After Effects of Hurricanes

- **Polluted water**
- **Severe Flooding**
- **Limited communications and services**
- **Store closures**
- **No power, phone, or water**
- **Backed up or flooding septic tanks**
- **Structures undermined**
- **Severe shoreline erosion**
- **Roadway debris**
- **Damage to personal property**

How to Help Mitigate Flooding Impacts

- Water quality and flooding are directly impacted by runoff from development and impervious surfaces, such as roofs and driveways. Management of stormwater, both excessive quantities of water that can result in flooding and polluted water that can impact surface water quality, is important. When possible, reduce the amount of impervious surfaces, retain natural topography and features, and provide opportunities for water to infiltrate back into the ground on your property.
- Develop Rain Gardens and Swales - Shallow depressions with native vegetation and mulch will hold and slowly release stormwater into the groundwater table, while the plants will aid in water uptake and can even remove some pollutants.
- Consider Permeable Pavements Options or the use of gravel for your driveways.
- Put your rainwater to use by harvesting rainwater in barrels. You can save it to water landscaped areas and vegetable gardens.
- Reroute downspouts so they direct into an area where stormwater can infiltrate directly into the soil or connect your downspout to a rain barrel or cistern and use the water for landscaping or washing your car.
- Prevent erosion by planting (native plants whenever possible) and stabilizing soil.
- Consider using rain sensors or drip irrigation when irrigating to reduce excess water runoff.

Still not sure what you can or want to do to protect your property from flooding? Town staff are available to assist you. We can talk through your flood hazard risk and potential protection measures whether they are related to existing conditions or new development and offer recommendations for improvement. Call the office to schedule an on-site visit with one of the staff members listed below:

Joe Heard— Director of Community Development
jheard@townofduck.com

Sandy Cross— Floodplain Manager
scross@townofduck.com

Steve McMurray— Building Inspector
smcmurray@townofduck.com



Residential flooding following Hurricane Matthew in 2016

Floodplain Regulations and Insurance Requirements

Due to recent changes to the Flood Insurance Rate Maps (FIRM), a significant number of structures in Duck are no longer located in a “*Special Flood Hazard Area*” (SFHA). These are areas identified by the Federal Emergency Management Agency’s (FEMA) Flood Insurance Rate Maps (FIRM) as being particularly susceptible to flooding and wave action.

Figures provided by the NC Floodplain Mapping Program show the number of structures located in a V flood zone decreased from 397 to 255 (a 36% decrease). The number of structures in an A flood zone are decreased from 882 to 187 (a 79% reduction). Based on these figures, a significant number of property owners may benefit from reduced insurance rates and expect lower development standards.

Property owners may perceive that the change in their flood zone from an A or V flood zone to an X flood zone means they have very minimal or no risk of flooding. This perception of very low or no risk may prompt owners to drop flood insurance. Changes in your flood zone should not be a reason to drop your flood insurance. One in four flood losses occur in “low-risk” or X flood zones. The Town wants to emphasize “low-risk” is not “no risk” and strongly encourages owners to maintain their flood insurance policies.

The Town of Duck participates in the National Flood Insurance Program which allows property owners to purchase federally backed flood insurance. As a primary requirement of this program, the Town must apply and enforce regulations within the Special Flood Hazard Area in accordance with its Floodplain Damage Ordinance that are designed to reduce the risk of flooding.

The National Flood Insurance Program’s (NFIP) Community Rating System (CRS) is a program administered by FEMA. This voluntary incentive program recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. The primary goals of the CRS are to:

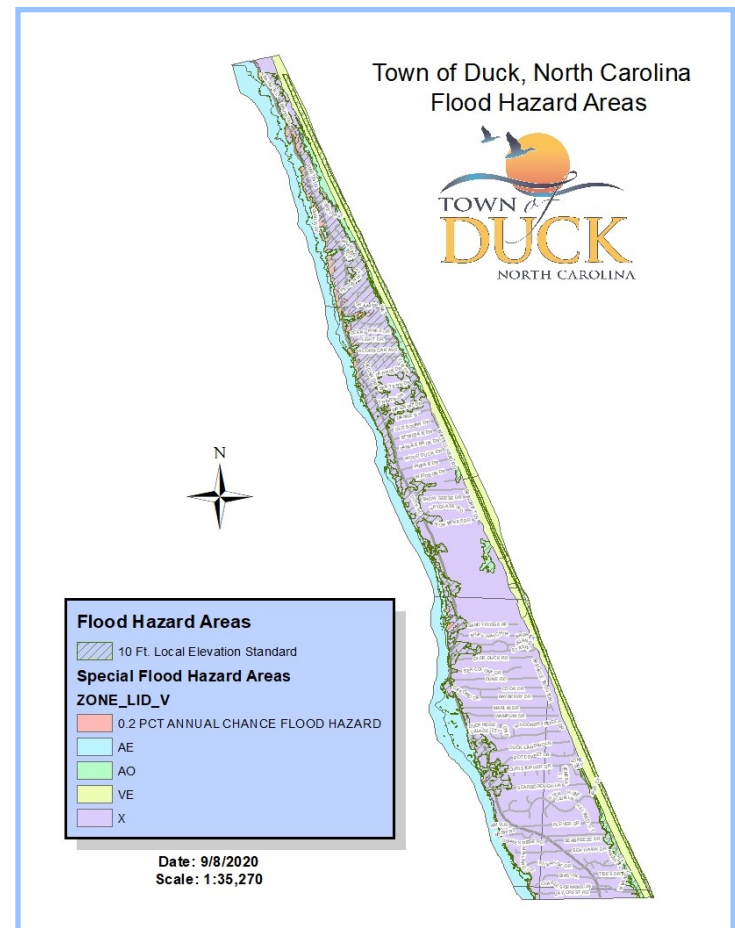
- Reduce flood damage to insurable property;
- Strengthen and support the insurance aspects of the NFIP; and
- Encourage a comprehensive approach to floodplain management.

Keeping in line with these goals and understanding that the risk associated with flooding is not limited to those areas delineated on the FIRM, the Town of Duck Town Council adopted new FIRM maps effective June 19, 2020 to include a higher regulatory standard. This adoption followed several years of

community outreach through the “low risk” is not “no risk” educational campaign.

A few key elements of the adopted ordinance are listed below.

- Establish a minimum local elevation standard (LES) of 10 feet in X flood zones.
- Require freeboard of one foot or elevation of 10 feet, whichever is greater, in A flood zones.
- Maintain free-and-clear standard of 2 feet and establish a freeboard of 2 feet in Coastal High Hazard Areas.
- Include all oceanfront properties in a Coastal High Hazard Area subject to V-zone (high velocity) standards.
- Require typical A zone standards for development below the 10’ (LES) in X zones.
- Allow enclosures below LES to be temperature controlled.
- Allow remodeling or renovation of existing enclosures below LES.
- Require existing structures proposing substantial (over 50%) repairs or improvements to be brought into compliance with current ordinance standards.
- Require pre and post development elevation certificates.



*Overview of Flood Zones and
properties below the 10' LES*

Floodplain Development Permits

All properties located within the Special Flood Hazard Area or below the local elevation standard (LES) elevation in Duck are subject to state and local development regulations.

Before undertaking development, a builder or homeowner must secure the necessary permits from the Town of Duck specifically covering the proposed activity.

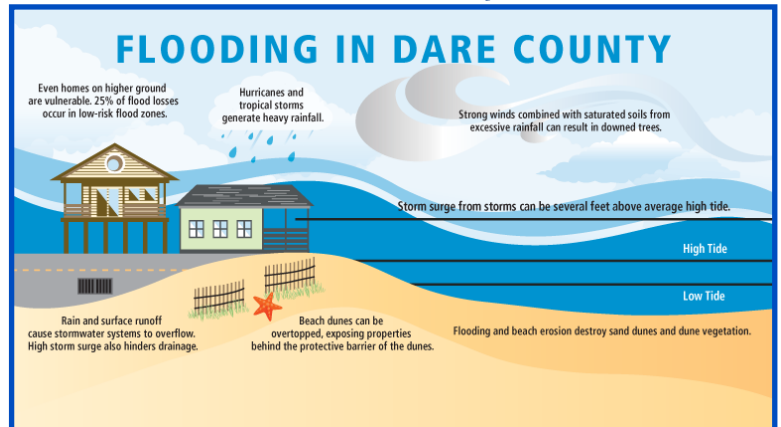
Development activities include but are not limited to: Man-made changes to improved or unimproved real estate not limited to buildings or structures; mining, dredging, filling, grading, paving, excavating, or drilling operations; storage of materials; and erection of temporary structures (including tents).

If your structure sustains damage from flooding, you will likely need to obtain building permits from the Town before proceeding with the repairs.

If unauthorized activities are observed, or if you need help determining whether or not a permit is required for a proposed activity, please contact the

Town of Duck Building Inspector, Steven McMurray at (252) 255-1234 or smcmurray@townofduck.com. Walk-in service will be available at 1200 Duck Road, second floor once COVID-19 restrictions have been lifted.

Illustrated explanation of typical flooding in Dare County



Substantial Improvement/Damage Requirements

If you own a structure within the Town of Duck's Special Flood Hazard Area or below the local elevation standard (LES), and you intend to modify or add on to this structure, please note that the value of the proposed work will determine what you will be allowed to do prior to prompting the requirement of bringing the entire structure into compliance with the Town's flood damage prevention ordinance. If you are planning a project, and the dollar value of the proposed work exceeds fifty percent (50%) of the value of the structure as determined by the Dare County Tax Assessor, or an independent appraisal, then the entire structure will need to meet the current flood damage prevention ordinance standards. When determining the value of the work; labor and materials must be included, even if you are doing the work yourself.

Similarly, if any habitable structure in a Special Flood Hazard Area or below the LES sustains damage that is more than fifty percent (50%) of the value of the structure or is destroyed by any cause (not just flooding), then the repairs/reconstruction will be required to meet all provisions of the current flood damage prevention ordinance.

Purchase Flood Insurance

Every property carries some risk of flooding, even those not located near a known flooding source such as a river, ocean, sound, or lake. Flooding is the most common and costly natural disaster in the United States. Floods can cause physical and emotional anguish and financial devastation. Just one inch of water in an average sized home can cause more than \$25,000 in damage. It is important to know that a standard homeowner's insurance policy does NOT cover flood-related losses and flood maps do not account for all sources of flood risks. It is important to understand that flood maps only depict those areas subject to a 1% annual chance of flooding and do not reflect other sources of flooding such as rainfall, elevated groundwater levels, or sea level rise.

While flood insurance is only required for properties with federally backed mortgages, FEMA and the Town strongly encourage all property owners to purchase flood insurance, even if the property is not in a designated Special Flood Hazard Area. Outside the Special Flood Hazard Area, preferred risk policies can be purchased which carry a relatively low premium. Please be aware that there is a 30-day waiting period before coverage goes into effect. Flood policies generally cover up to \$250,000 for flood-related damage to single-family dwellings, with an additional \$100,000 of coverage to the contents of the building.

For additional information regarding your flood risk, you can visit www.floodsmart.gov or fris.nc.gov/fris/.

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1200 Duck Road
Phone: 252.255.1234
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www.townofduck.com

Map Information Service

The Town of Duck maintains a Flood Map Information Service as part of its participation in the NFIP/CRS Program. The Town maintains copies of current and previous Flood Insurance Rate Maps (FIRM) for areas within the Town's incorporated limits. We can determine if a structure is located within a Special Flood Hazard Area as well as the applicable flood zone and base flood elevation that applies to the property. In addition to property map location, we can provide the FIRM community number, panel number, index date, and elevation datum (NGVD or local datum). This information can be requested and provided to you directly, or can be accessed online at townofduck.com/community-development/floodplain-info/.

The Town can provide you with copies of your FEMA Elevation Certificates since the Town's incorporation in

2002. Town records include some FEMA Elevation Certificates maintained by Dare County for the Duck area prior to the Town's incorporation. In addition to elevation certificates, we can provide property contours from recent aerial pictometry, and we can verify local drainage or stormwater issues, hot-spot flooding, repetitive loss areas and coastal erosion hot-spots.

If you have questions about our flood maps, would like to request information as part of this service or would like more details regarding the new maps and the associated flood damage prevention ordinance, please call the Town of Duck Department of Community Development at 252-255-1234 or email Sandy Cross, the Town's Floodplain Manager, at scross@townofduck.com. Walk-in service will be available at 1200 Duck Road, second floor, once COVID-19 restrictions have been lifted.

Example of FIRM

