

South Carolina Sea Grant Consortium

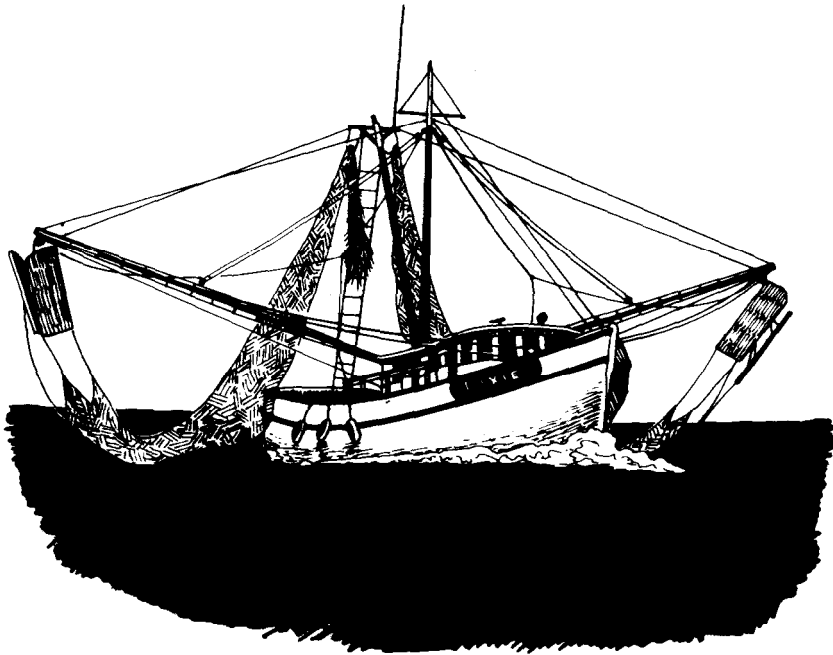
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Hurricane Preparedness



For Commercial Fishing Vessels Docks and Fish Houses



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Introduction

The hurricane season in the southeastern United States and the Caribbean spans almost half a year, from June through October, bringing with it the threat of high winds, tidal storm surges and flooding. Hurricanes present special problems to the owners of docks, fish houses, and vessels, who must prepare for the storm season as part of normal maintenance. Just as you plan to repair pilings, nets, lines and traps, you should develop a specific step-by-step plan to put into action when these severe and often unpredictable storms threaten. The following information should help you develop your own hurricane plan.

What Are Hurricanes?

Hurricanes are tropical cyclones. These cyclones are areas of extremely low barometric pressure combined with strong winds. In the northern hemisphere these winds move in a counterclockwise direction around a center, or “eye.” The eye of a storm can have deceptively calm winds. However, winds will pick up speed and change direction as the second half of the storm advances.

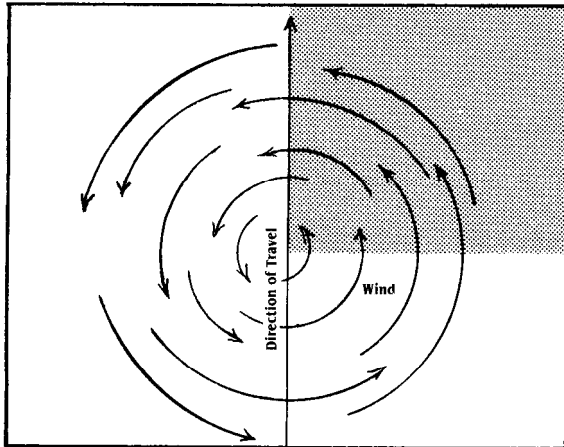
As a hurricane nears, sea level pressure falls slowly at first, and then rapidly as the eye of the storm approaches. A barometer reading of about 29.20 inches of mercury usually signals the advent of a hurricane. In more extreme cases, the pressure may fall below 27.20 inches of mercury. The lowest pressure ever recorded during a hurricane was in 1935 when the pressure dropped to 26.35 inches at Matecumbe Key, Florida.

There are two types of tropical cyclones. The first is the milder tropical storm, which has winds between 40 and 74 miles per hour (mph). The second type has winds greater than 74 mph and is called a hurricane. There are five hurricane classifications, ranging from category 1, with sustained winds of 74 mph, to category 5, with winds that can exceed 200 mph. Strong winds may extend as much as 200 miles from the eye of the hurricane, and tornados are often spun off from these storms.

Table 1
Saffir/Simpson Hurricane Scale

Storms Category	Central Pressure		Winds (MPH)	Storm Surge (FT.)	Damage
	Millibars	Inches			
1	980	28.94	74-95	4-5	Minimal
2	965-979	28.50-28.91	96-110	6-8	Moderate
3	945-964	27.91-28.47	111-130	9-12	Extensive
4	920-944	27.17-27.88	131-155	13-18	Extreme
5	920	27.17	155	18	Catastrophic

As strong as the winds may be, however, the greatest damage, and nine out of ten hurricane fatalities, are the result of flooding. During a hurricane, as much as 30 inches of rain can fall in a 24-hour period. In addition, tidal storm surge, a rise in tide resulting from water that is pushed ahead of the storm, can cause major flood damage. In fact, if the storm hits at high tide, water levels may rise as much as 15 to 20 feet above normal. Wind and storm surge are highest in the right front quadrant of an approaching hurricane. The actual storm surge height depends on such factors as the intensity of the storm and the profile of the ocean bottom.



Avoid the right front quadrant (shaded area) of an approaching hurricane.

The National Hurricane Center, which is part of the National Weather Service, tracks hurricanes with satellite, aircraft, radar, and weather station information. This data is used to determine the intensity of the storm and to predict the course it is expected to follow. The Hurricane Center then issues one of three types of bulletins:

1. **Advisory** – This is an alert that will furnish the name, position, intensity and projected movement of a storm.
2. **Watch** – A watch is given in a general locality when there is a threat of hurricane conditions within 24 to 36 hours.
3. **Warning** – A warning is issued when hurricane conditions are expected in a specific area within 24 hours or less.

What To Do, Where To Go

Small Vessels

Small vessels without trailers should be moved to high ground once a hurricane warning has been issued. You can move the vessel across land by pushing or winching it over pipes or logs placed underneath the hull. Once safely on high ground, the motor and gear should be removed and the boat should be securely fastened with multiple tie-downs. Small, open vessels may also be moved into shallow water and flooded. You may use rocks or bricks as ballast, to sink the vessel to the bottom. All gear should be removed before the vessel is submerged. After the storm has passed, the ballast can be removed and the boat refloated.

Other small vessels, such as outboards and small inboards, that have trailers, should be removed from the water, taken to high ground, and stored in a covered area such as a garage. If the boat and trailer must remain outside, all equipment, including oil and gas cans, Personal Flotation Devices (lifejackets), oars and paddles, and other loose gear, should be removed and stored indoors. The trailer frame should be placed on blocks so that the frame will carry the boat's weight instead of the axle and springs. The drain plug should be installed, and the boat should be partially filled with water if the hull is strong enough to withstand flooding (most fiberglass hulls). The trailer tongue should be supported in a level position, and trailer and boat should be firmly anchored to the ground with tie-downs.

If the hull is not strong enough to hold water (plywood or wooden planked hulls), remove the plug and use multiple anchor tie-downs to hold the boat and trailer in position. Large tent pegs (2 feet) or house trailer tie downs should be considered for this anchoring system, and the trailer should be kept level.

Large Vessels

Boaters who own large vessels that will remain in the water have another set of guidelines to follow. In general, you should have a written hurricane plan that can be used as a checklist. When a hurricane watch is issued, begin making preparations. This will give you 24 to 36 hours before the hurricane hits. If you wait until the hurricane warning is issued, you may not have enough time to prepare your vessel!

When preparing a vessel for a hurricane, all loose gear should be removed and stored, including nets, floats, baskets and tools. Trawl doors should be securely fastened in their racks, All running rigging

(door lines and whip lines) should be made fast and as tight as possible. The bilges should be clean and pumped dry, and intake screens should be installed on the pumps' suction hoses. Automatic on/off switches for bilge pumps should be operational, and an extra anchor and anchor line should be put aboard.

All hatches should be secured against water and rain. This may involve taping, nailing, bolting or latching and covering them with a tarp, nailed in place. Since most commercial fishing vessels are not fitted with storm covers (deadlights) for windows or ports it's a good idea to make plywood storm covers for windows before hurricane season. In addition, you should consider how to make hatches to the forepeak, engine room, ice-hold or after-compartment water-tight well before hurricane season begins. The deadlights and water-tight provisions for hatches should be stored aboard the vessel and installed when the hurricane watch is issued.

Having made your preparations, you will have to decide whether to go offshore or remain inshore during the storm. In the Gulf of Mexico, some areas of the coast afford little or no protection from hurricanes. In such cases, it may be better to ride out the storm at sea. By contrast, many areas along the East Coast have natural inlets and sheltered areas that provide inland protection. Therefore, vessel owners in such areas should consider remaining tied to the dock or seeking shelter in a harbor.

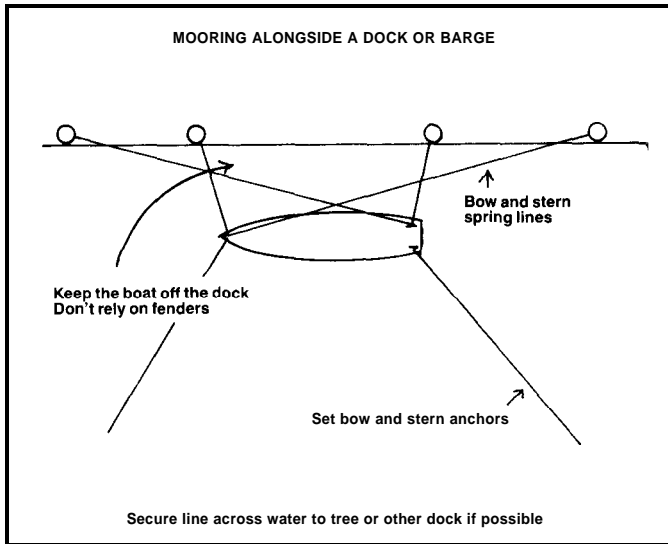
Your decision to remain at the dock should depend upon the intensity of the storm, the location of the dock, how well it is built, and how much shelter is provided at the dock. It is possible that a vessel left tied up will be damaged as the wind and waves pound it against the dock. At worst, high water and waves can submerge the dock and pull out cleats and other fastenings for dock lines. Under these conditions, mooring lines will float off pilings, or pilings will pull out, leaving your vessel adrift.

If the dock does not afford adequate protection from wind and waves, be prepared to seek shelter at a safe anchorage in some coastal harbor or inlet.

Naturally these guidelines are simply recommendations and should be regarded as such. Assembled from the prudent advice of experienced captains, these guidelines offer suggestions about things to consider as hurricane season approaches. When in doubt, or for more

complete information about your specific region, ask questions of other captains in your area, the U.S. Coast Guard, the marine police, dockmasters, or your local marine extension agent. They should be able to help you come up with a plan that is best for you.

Three general plans are presented here. Again, consider all the possibilities and options before deciding which is best for you in a given set of circumstances.



1. Going Offshore

Vessel owners should consider going offshore during a hurricane if there is inadequate protection inshore. Unsheltered docks, broad expanses of low-lying land, and a scarcity of sheltered anchorages may make some inshore areas inhospitable, and even dangerous, during a hurricane. Ship channels should be avoided because of shipping traffic. Channels also tend to concentrate hurricane winds, creating tremendously destructive wave action. Prepare to go offshore when a hurricane watch is issued. Set your course offshore perpendicular to the path of the advancing storm. While at sea be sure to avoid the forward right quadrant of an approaching hurricane; this is normally the most severe part of the storm.

Once offshore maintain a wheel watch; do not rely on the autopilot. Additionally, the bilge should be checked regularly by a different

member of the crew. Your vessel will probably ride the storm better by quartering advancing waves.

When returning to port after the storm avoid floating debris. You should also expect navigational aids to have been altered by the storm.

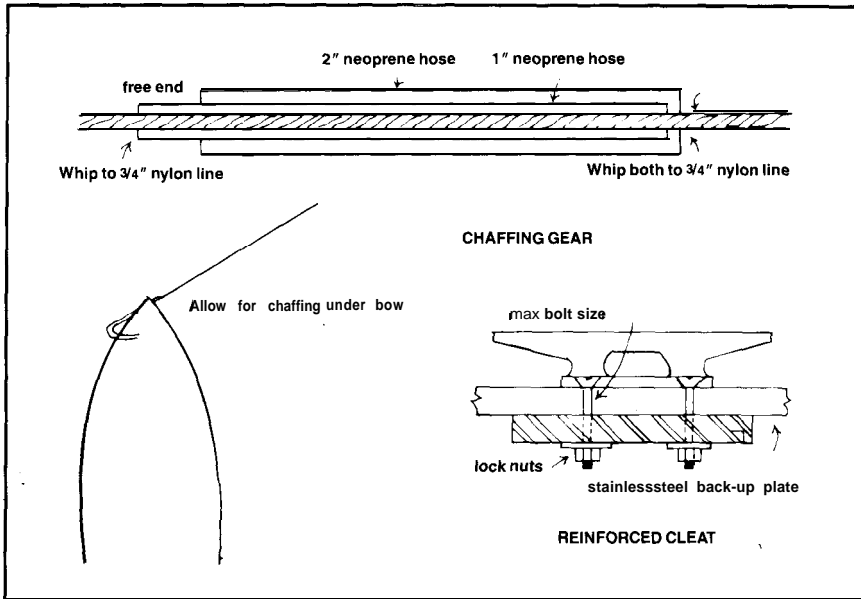
2. Remaining at the dock.

Most docks are in protected harbors or creeks. Such locations provide good protection from wind and waves. Large vessels should, therefore, have adequate protection from hurricanes up to and including category 2.

The condition of the dock must be considered when deciding whether to remain or seek shelter elsewhere. Is the dock well constructed and in good condition? Have the pilings been eaten through by worms? Take a good look at the dock at low tide to be sure that the pilings, cross supports, stringers, and deck are all in good condition before you decide to remain there during a hurricane.

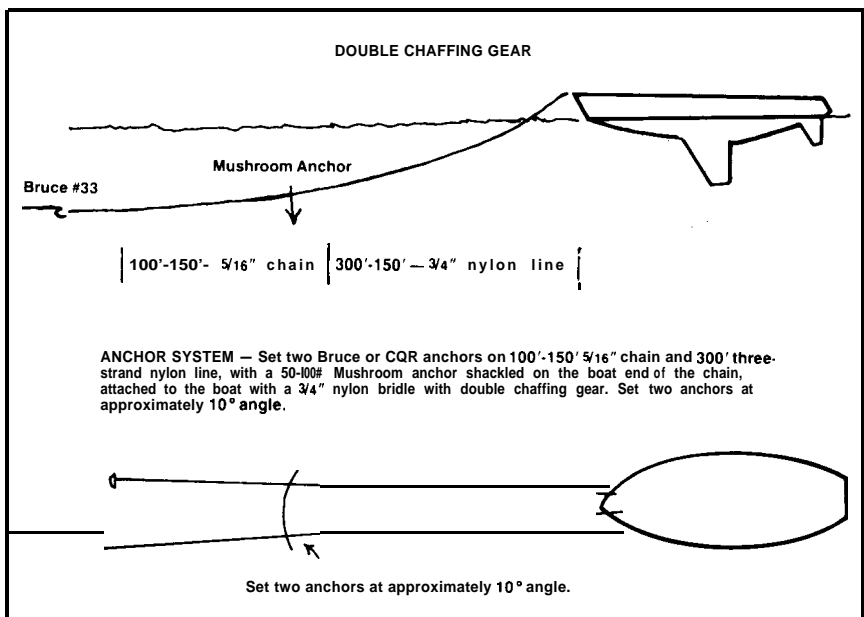
Having decided to remain at the dock, lines should be doubled and chafing protection should be placed where dock lines pass through fair leads and chocks or over the side of the vessel. Chafing protection for dock lines could include cloth or canvas wrapped and tied with string around the line. Firehose or rubber belting also makes very good chafing materials. Chafing should be flexible enough to allow the line to move and bend while offering enough strength to provide protection.

If your vessel is tied next to the dock, any vessels tied outside of your vessel will put severe strains on your dock lines. In fact, vessels tied outside of your vessel should have dock lines of their own.



A vessel tied to a dock should have ample fenders, such as tires, to provide protection for the hull. Dock lines should be attached to the pilings rather than to cleats or other fastenings on the dock. Dock lines should be secured to pilings that extend well beyond the level of the planking on the dock. As flooding and storm surge raise the water level, dock lines will move up the pilings. Taller pilings will allow for greater flux in water level so that dock lines will not float or be pulled off the pilings.

Having secured your vessel, leave the dock and seek shelter on high ground.



3. Seeking a safe anchorage.

If you decide the dock will be unsafe during a hurricane and the coastline provides protection then you should head for a hurricane hole. A hurricane hole is an area that offers some protection from wind and waves and has good holding ground for an anchor. Hurricane holes can be located before storm season by consulting an inland chart. The best spots take as little time as possible to reach from the dock, and have a route free of highway and railroad bridges. Bridges will often stop opening to boat traffic well in advance of an approaching hurricane because of dangerously high winds or community evacuations. Look for a location that has deep water (you may have to arrive at low tide) and that has protection, such as a high bluff, an outer reef, or tall trees, on as many sides as possible.

A good hurricane hole has plenty of room. One or more boats should be able to swing in a complete circle at anchor, with enough space between them to accommodate the change in wind direction should the storm eye pass over the location. It might be wise to choose two hurricane holes, in case one is crowded with boats, and to

visit several possible locations before making those choices. This should be done before hurricane season.

Once you have arrived at a hurricane hole, set your anchor with at least a 7 to 1 scope (ie., if you are in 30 feet of water, you will need 210 feet of anchor line). Nylon is the best anchor line because of its elasticity. Chafing protection should be used where the anchor line passes through the anchor chute or chocks. Chafing protection can be provided by wrapping the anchor line with fire hose, canvas, or cloth and securely fastening it in place with twine.

To set an anchor hard on the bottom, drop the anchor over board, pay out the line, secure the line to the samson post and back down hard with the engine in reverse. If you decide to set two anchors, make sure the lines are set at a 45 degree angle or less.

The violent vertical movement of the bow during a hurricane will tend to jerk the anchor off the bottom. To help prevent this a mushroom anchor or other weight should be attached to the anchor line about midway between the anchor and the boat. The anchor or weight is a shock absorber and keeps the anchor line parallel to the bottom.

You may also want to take advantage of any large trees near the bank in your anchoring system. If you do, tie up to trees set back from the water. Trees on or next to the bank may erode or wash away during the storm.

If you are anchoring in an area with a rocky or coral bottom, remember to use chain between the anchor line and the anchor. This will prevent the anchor line from chafing, fraying or tearing along the rough bottom.

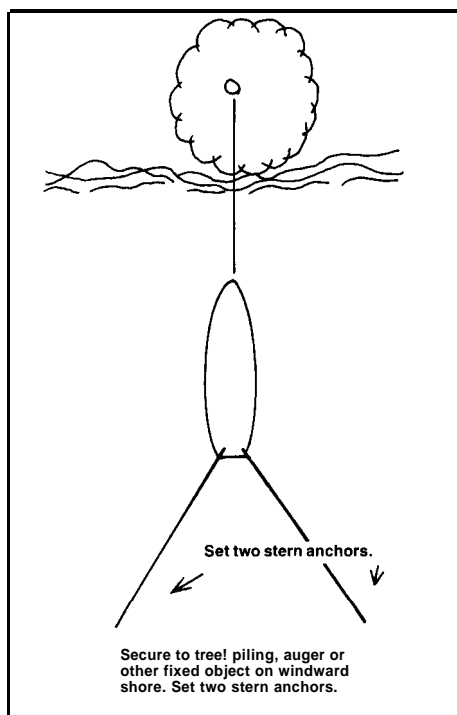
Experts recommend that, once securely anchored, you double-check all automatic switches, lower the outriggers, and **LEAVE YOUR VESSEL BY MEANS OF A SMALL BOAT.**

If you elect to stay aboard, be sure you have stocked up on fuel, water, food, ice, clothing, a portable radio and flashlight with extra batteries, and any prescription medicines. Let family or friends know of your plans and be familiar with theirs. Stay in touch with all weather advisories. Do not leave vehicles or other valuables at the dock because these areas are prone to flooding during severe weather conditions.

Remember to keep your boat engine running. It might be necessary

to put the engine in gear during the worst part of the storm to ease the strain on the anchor line. Securely fasten storm covers (with narrow slits, allowing you to see out) over all exposed and glassed areas. Have someone stay awake on anchor watch at all times to prevent the boat from drifting. Use a spot light and/or radar at night to help maintain your position. Check the bilge regularly, both to make sure the pumps are operating properly, and to see if water or debris is accumulating. Finally, watch for other boats or large objects drifting toward your vessel.

Once the storm has passed, do not rely solely on traditional markers or navigation aids to guide you – the storm may have rearranged such aids.



Docks and Fish Houses

Commercial docks and fish houses also must be prepared for hurricane threats. Dock owners should encourage vessel owners to leave the dock prior to the approach of a hurricane. Vessels tied to docks increase wind and water resistance on the pilings, thereby increasing the potential for damage to both the boat and the dock. All loose objects in the area, including trash cans, lumber, barrels, tools and equipment, should be taken indoors or securely tied down. Equipment such as pumps, motors and refrigeration units should be stored as far from the dock as possible, and on high ground, to prevent salt-water damage. Electricity, gas and water should be turned off, and vehicles should be moved from the parking lot.

Prior to hurricane season buildings should be made as secure from wind damage as possible. This includes such measures as installing additional tie-downs from the foundation to the walls and from the walls to the roof. These tie-downs or straps should be placed on every floor supporting member and every roof rafter. Such tie-downs are available from most building supply stores as sheet metal straps that can be nailed in place. Tie-downs can also be fabricated from sheet metal using tin shears.

If tie-downs have already been installed, the straps should be checked for corrosion and replaced if necessary.

When a hurricane watch has been announced, outside doors should be latched or nailed shut and windows should be taped or boarded up. Make sure tin used on roofs is securely nailed down. Any roofing material that is loose enough to flap will surely be pulled back and torn off in a severe storm.

Finally, the dock or fish house owner and dock workers should seek shelter on high ground. Very little can be done at the dock once the hurricane hits.

Conclusion

Severe hurricanes do happen, and those who earn their livelihood from the sea should be ready to meet their special challenges. This can be as simple as developing a plan, making your hurricane season preparations in advance, expecting the unexpected, playing it safe and staying informed. Don't be foolish. Be prepared.

Checklists

Small vessels

1. Remove from water and move to high ground.
2. Remove and store all gear.
3. Secure vessel with tie-downs.
4. Use blocks under boat trailer.

Large vessels

1. Decide where to:
 - a. go offshore
 - b. stay tied to the dock
 - c. go to a “hurricane hole”
2. Have a pre-planned “hurricane hole”
3. Don’t leave your vehicle at the dock.
4. Remove all loose gear and secure hatches.
5. Have a portable radio with extra batteries.
6. Check out all equipment beforehand.
7. Consider making storm covers for cabin and pilot house windows.
8. Consider leaving your vessel.
9. If you remain aboard, keep the engine running and maintain a full-time anchor and bilge watch.
10. Know your family’s plans and make sure they know yours.
11. Be careful when returning to the dock, familiar landmarks and navigation aids may be missing.

Docks and fish houses

1. Encourage vessel owners to leave dock.
2. Take loose objects indoors, and store equipment away from dock area.
3. Latch or nail outside doors and tape windows.
4. Turn off electricity, gas and water.
5. Move vehicles from parking lot.
6. Leave the area and seek shelter on high ground.

For Further Information

Agency:	Name:	Telephone:
Coast Guard	_____	_____
Harbor Patrol	_____	_____
Weather Service	_____	_____
Marine	_____	_____
Extension Office	_____	_____
Dock Master	_____	_____
Bridge Tender	_____	_____
Emergency	_____	_____
Preparedness Office	_____	_____
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