



Hurricane Preparation

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Why Should You Prepare for a Hurricane?

- Preparation is always cheaper than recovery and repair
- You will have to pay the deductible out of your pocket
- Depending on your insurance policy, all damage might not be covered – costing you additional money
- After a hurricane repair shops are vastly overbooked – which will take months out of your boating season waiting for repair
- Your insurance company will only pay the book value of your boat in the event of a total loss, which might be a fraction of what the boat is worth to you
- *You really do not need the hassle!*





You Need a Hurricane Plan

- **Your Hurricane Plan identifies:**

- The location you will keep your boat during the hurricane
- Equipment you need to remove or secure
- Mooring requirements and supplies
- Checklist for things you need to do in advance, prior, during and after the storm
- Checklist for marina, boat yard and/or insurance requirements
- Contact names and phone numbers



- **Develop your Hurricane Plan before the hurricane season**

- Update the plan each year prior to June
- Must be specific to your boat and the equipment on it
- Keep the plan where you can quickly get to it.

- **Monitor National Hurricane Center warnings/watches**

- Sign up for automated announcements (*www.BoatUS.com; www.nhc.noaa.gov/*)
- Track developing hurricanes (*NOAA, news media, internet, weather radio, etc.*)





What You Are Protecting Your Boat From

- **Storm surge and flooding are the most destructive aspects of a hurricane for boats along the coastline**
 - The surge flood raises mean water levels to several times normal, and when the surge ebbs, it violently retreats with massive amounts of onshore debris
 - Sea surge (and its associated flooding) cause ~80% of all damages
- **Violent winds can repeatedly slam boats in the water into docks and pilings, can blow boat off jack stands on the hard, and/or blow heavy debris into the boat**
 - Boats on the hard with their beam to the winds are most susceptible
 - Limit the sail area – remove/stow biminis and unnecessary covers
 - Hurricanes are measured by sustained winds – however, a F1 hurricane (73-112 MPH) can easily have wind gusts up to 30 % higher (95-146 MPH)
- **Heavy rains can flood low-lying areas, and collect in the boat bilge, open cockpits and interior spaces of the boat**
 - Consider the flooding possibilities due to heavy rain and sea surge
 - Close and batten all hatches, windows and doors (*deck cabinets and access doors*)
 - Clear all scuppers, overboard drains – test bilge pumps and batteries





Storm Surge and High Winds



Hurricane Katrina

Hurricane Sandy



Storm surge can be several times normal mean water levels





Storm Surge and High Winds (Continued)



High winds can blow boats off jack stands



Location of Your Boat During the Storm

- **Choosing the most storm-worthy location possible is the single most important thing you can do to protect your boat during a storm – this decision dwarfs all other preparations you will make.**
- **Depending on the size of your boat, your choices will be:**
 - At a marina – in the slip
 - At a marina – on the hard
 - In the water on a mooring ball(s)
 - In the water on the anchor(s)
 - On a trailer – at the marina
 - On a trailer – on the hard well away from the water
 - On the hard – well away from the water





Location of Your Boat – Marina

- **A seawall or sandy spit that normally protects a harbor or marina may not offer any protection in a hurricane**
 - Sea surge will exceed the barrier height – exposing the marina to the full storm
- **Consider the available room for your boat to move in its slip**
 - Mooring lines must be long enough to accommodate the sea surge
 - Look for protrusions (*e.g., bolts*) in and above the slip that might damage the boat
 - If the slip is covered, consider the height of the boat, tide and surge to the roof
- **Consider access to your boat during the storm**
 - Ability to access the mooring lines to accommodate sea surge in a tight slip
- **Consider pulling your boat onto the hard**
 - Make decision and reservations well in advance of the storm
 - Consider flooding possibilities in the area where the marina will stow your boat
 - Professional boat haulers can move your boat well inland (*expensive*)





Boats Damaged at a Marina

- A study by MIT after hurricane Gloria found that boats stored ashore were far less likely to have been wrecked than boats stored in the water.





Location of Your Boat – Mooring Ball

- **Mooring ball anchor systems**

- Mooring balls are not generally rated for storm use
- Designed for short scope
- Many mooring balls are mushroom anchors or weights on the bottom surface



- **Typically, mooring areas are in open water**

- Outside the marina breakwater or in an open harbor area
- Greater exposure to the effects of high winds

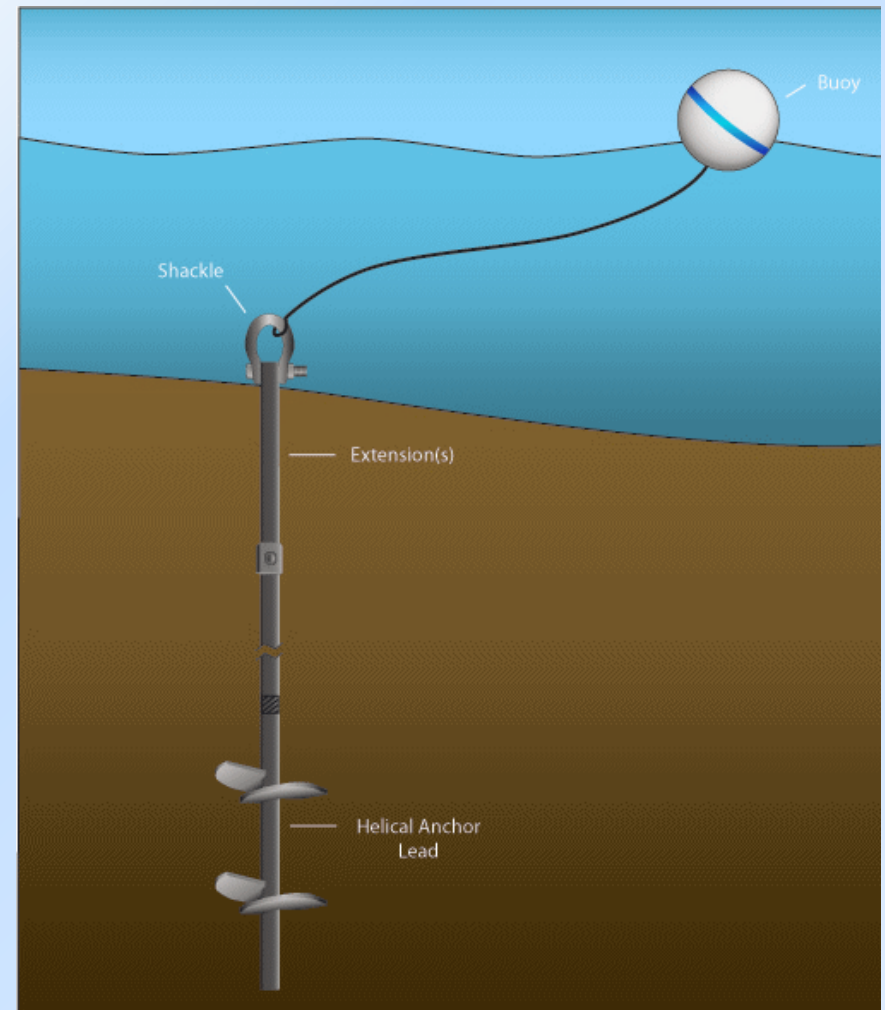
- **Generally, mooring balls do not come paired**

- Typically there is only one mooring unless the mooring area is tight (*Annapolis, MD*)
- Does not permit fore and aft mooring – requires extensive swing radius



Location of Your Boat – Mooring Ball (Continued)

- **Storm-worthy mooring balls must have a helix-type anchoring system**
- **Preferably**
 - Dual helix head
 - Anchored in mud
 - Sufficient depth into bottom





Boats on a Mooring Ball Dragged Ashore

- After hundreds of boats dragged their moorings ashore in Hurricanes Gloria and Bob, many harbormasters replaced their mushroom and deadweight moorings with helix anchors, which can be screwed deep into the bottom of the harbor. Helix anchors have proven, over and over, that they have far greater holding power than anchors that sit on or near the surface





Location of Your Boat – Anchoring

- **Ideal location will be a good hurricane hole**

- Protected cove, river or canal
- Soft mud bottom
- Good distance from other boats or obstructions
- Good water depth during ebb conditions

- **Anchoring techniques**

- Need anchors and chain/rode properly sized for the boat
 - Danforth/Fortress or Bruce is best in mud
 - Plow and CQR and minimally effective
 - Mushroom, Grapnel and Car/Iron are ineffective
- Bow to the wind (*Note: the wind will swing 180° when the storm passes*)
- Multiple bow anchors – in series, or 45° angle
- Use multiple cleats – bridle if needed
- Use a storm scope – minimum of 10:1
- Consider sentinels or kellets to lower the catenary curve
- Stern anchor(s) to limit swing radius



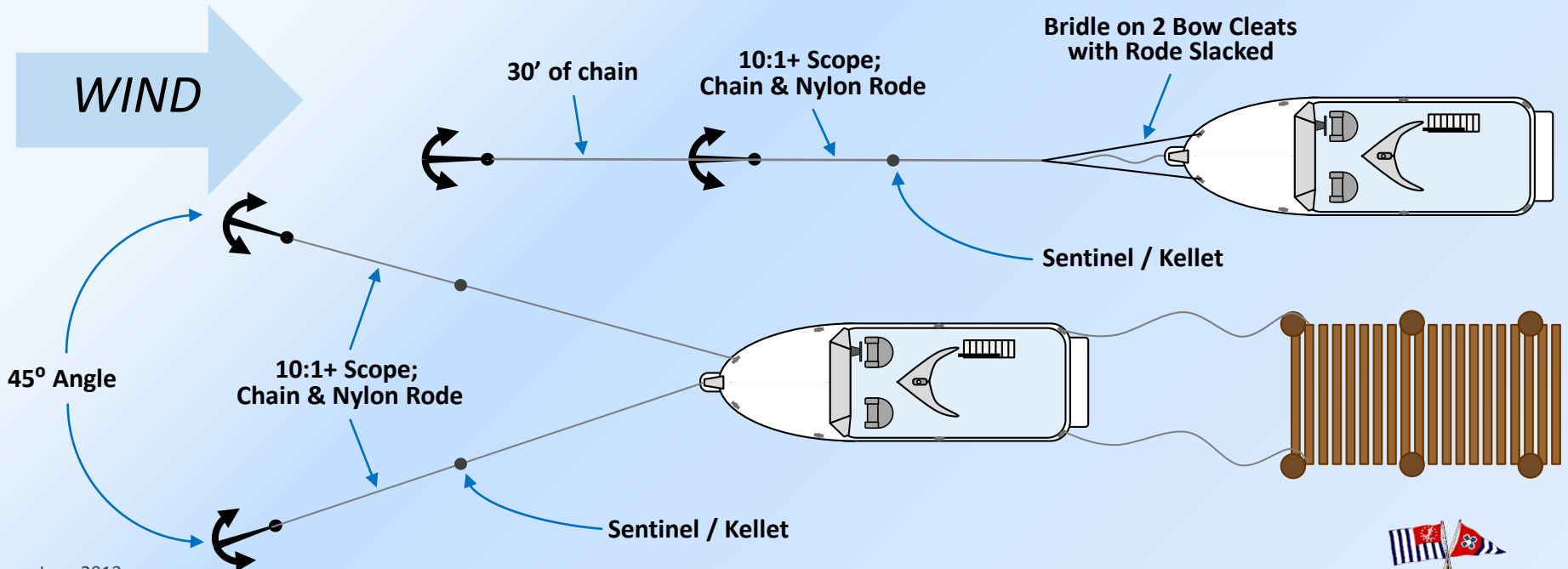


Location of Your Boat – Anchoring (Continued)

• Anchoring Techniques

- Dual anchor configurations
- Securing to objects on shore

• Make sure your batteries are fully charged and test your bilge pumps





Boat Aground Due to Anchor Dragging





Mooring Lines and Chafing Protection

- **Boats in the water – at the dock**
 - Consider fixed or floating dock needs
 - Consider condition of mooring lines:
 - Size and ability to stretch (*nylon lines are best*)
 - Age of the line or chafe damage to the line
 - Line length (*travel*), chafe points and cleat locations
 - Double all mooring lines – use multiple cleats
 - Rig crossing spring lines fore and aft
 - Leave enough slack in the lines to move to the full slip space
 - Keep the working end of the line on the boat
 - Disconnect and stow shore power cable, TV antenna cable, and water hose





Mooring Lines and Chafing Protection (Continued)

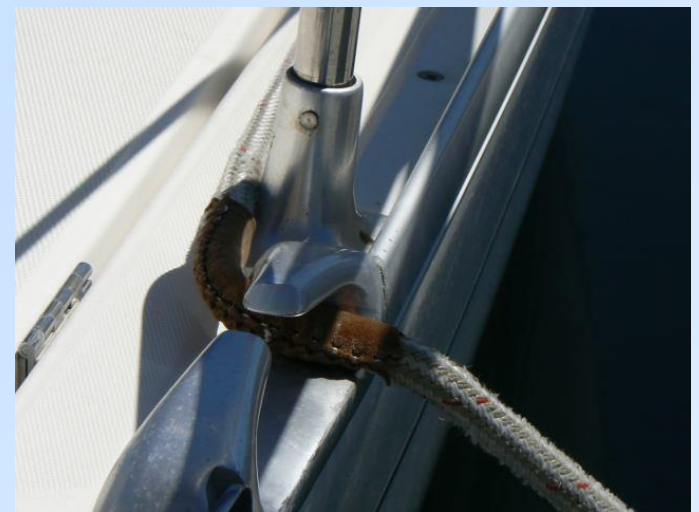
- **Tie-down vessels on the hard**
 - Wind will cause boats to rock on the jack stands which can dislodge their footing
 - Large helix anchors secured to the ground will limit rocking movement
 - Proper tie-downs are more secure
- **Use multiple lines and all cleats**
 - Multiple tie-downs can be connected to a properly secured anchor, but more anchors provide better stability
- **Secure boats to each other**
 - Provides a broader base for stability
 - Secure gunwale to gunwale (use cleats) with large fenders between hulls
- **Secure jack stands to each other**
 - Chain jack stand bases under the boat





Mooring Lines and Chafing Protection (Continued)

- **Chafing protection is needed at any rub point on the mooring line**
 - Through a Hawse pipe or deck chock
 - Over the edge of a swim platform or gunwale
 - Over the edge of a dock or around a piling
 - On a galvanized cleat
- **Canvas or leather protectors are best**
 - Allows good protection and keeps line cool
 - PVC or plastic hose causes nylon lines to heat internally and fail
 - Must be secured to the line to stay in place
 - Protection doesn't need to be expensive
 - Can use any protection material and tie-wraps
 - Old fire hose works well
 - Cloth securely tie-wrapped in place





Mooring Lines and Chafing Protection (Continued)

• Fenders and fender boards

- Not significantly helpful, but use them anyway
- Fenders secured to the boat stay with the boat, secured to the dock stay with the dock
 - Secured to the boat limits protection when water rises/falls
 - Secured to the dock only protects the boat at dock level



• Mooring lines

- Double all mooring lines during a storm
 - Leave 1 – 2 feet of slack in the second mooring line (Keeps the second line from failing with the first)
- Ensure lines are sufficiently sized
 - Up to 25': 3/8" minimum – 1/2" is better
 - 25' to 30': 1/2" minimum – 5/8" is better
 - 30' to 45': 5/8" minimum – 3/4" is better
 - 45' to 50' 3/4" minimum – 7/8" is better
 - 50' to 65' 7/8" minimum – 1" is better





Boat Damaged Due to Broken Mooring Lines





Location of Your Boat – On a Trailer

- **Option available only for smaller boats**
 - Boats under 26 feet with a beam of less than 8 feet
 - Must have the trailer – sized for the boat
- **Can be hauled well inland to higher ground**
 - Stored in any storage facility
 - Can be stored in a parking lot during the storm (*with owner's permission*)
- **Trailer must be secured**
 - Trailer must be staked down
 - Trailers will rock in the wind – significant concern for high-profile (*high COG*) boats
 - Wheel must be blocked (*preferably locked*)
- **Consider the effects of heavy rain and wind**
 - Damage caused by blowing debris
 - Water collecting in bilge and interior spaces





Trailer Boats Damaged by Tree



Owner moved his boats from the marina to avoid sea surge



Checklists – In Advance of a Hurricane

- **Locate hurricane moorings and obtain permission if necessary**
 - Check for sufficient water depth at low tide and surge ebb
 - Make practice runs – check accessibility, bridges, location of aids and/or obstructions to navigation and locations to secure lines or drop anchors
- **Consolidate all documents keep them in your possession in a locked water-proof box.**
 - Insurance policies, a recent photograph or video tape of your vessel, boat registration, equipment inventory, and check your lease or rental agreement with the marina or storage area to understand the marina's and your responsibilities and liabilities
 - Read and understand your insurance coverage – know your responsibilities and insurance coverage under a “Named Storm”
 - Make an inventory of the items to be removed and those left onboard
- **Arrange a reliable person to learn and carry out your plan if you are out of town**





Equipment You Need to Remove or Secure

- **Canvas and Isinglass/Strataglass**

- Remove biminis, unnecessary covers and Isinglass panels – stow onshore or in the interior of the boat - Collapse all bimini steel, remove or secure to the boat
- Remove sails, roller furling sails, radios, and sail covers
- Lash down everything you cannot remove, such as tillers, wheels, booms, etc.

- **Remove and stow anything loose on the deck**

- Deck chairs, coolers, cushions, life rings, life jackets, lines, personal items, etc.

- **Lower all antennas and flag masts**

- **Secure dinghy**

- Depending on your boat, remove and stow ashore – or secure to the boat with additional tie-down straps

- **Remove, stow and/or secure anything loose in the cabin**

- Secure all cabinets, close all lockers
- Seal all openings (*use duct tape*) to make the boat as watertight as possible





Checklists – In Advance of a Hurricane (Continued)

- **Make sure your vessel is in sound condition**
 - Make sure batteries are charged and bilge pumps are operable
 - Inspect the vessel's deck hardware in light of planned mooring arrangements.
 - Assess the size and structural attachment of the primary chocks, cleats, bitts, bollards and winches.
- **Arrange for a boatyard haulout or a supervised inspection of the vessel**
- **Purchase necessary materials ahead of time, such as additional lengths of mooring lines, helix anchors, fenders, fender boards, chafing gear and anchors.**





Checklists – Prior to a Hurricane

- Secure the boat
- Fuel tanks are full.
- Fuel filters are clean.
- Batteries are charged.
- Bilges are clean.
- Bilge pumps in sound working order
- Cockpit drains are free and clear.
- Fire fighting equipment is in good order.
- *Leave sufficient time to execute your Hurricane Plan. Moving a vessel, stripping sails and derigging, stepping masts and anchoring in 35 mph winds is extremely difficult—impossible at 45 mph*





Checklists – During the Hurricane

- **Staying onboard the boat during the hurricane**
 - Generally considered very unsafe - **Not advised**
 - Trust in your Hurricane Plan, and your insurance policy
 - Stay tuned to the news or NOAA broadcasts to know when the danger has passed
- **Staying onboard the boat during the hurricane at the dock**
 - Wear life vest at all times
 - Install a jack line on the dock and wear a safety harness
 - Listen to the weather radio and abandon the vessel if it becomes too dangerous
 - If something happens to the boat – stay with the boat as long as possible
- **Staying onboard the boat during the hurricane at anchor**
 - Not advised, and there should be no reason to do so
 - Wear life vest at all times
 - Listen to the weather radio and abandon the vessel if it becomes too dangerous
 - If something happens to the boat – stay with the boat as long as possible





Checklists – After the Hurricane

- **Inspect your vessel**

- In an area where you can get access to all sides of the vessel, inspect for any hull or superstructure damage
- Inspect the interior for water leaks and/or broken hatches, cabinets or windows
- Inspect the bilge for excess water
- If every thing looks serviceable, start engines, test electronics and appliances

- **If damage is present**

- Photograph the damage from different angles
- Write a detailed description of the damage
- Notify your insurance carrier as soon as possible

The longer you delay in getting a claim into your insurance company the longer, by several fold, it will take to get the claim resolved.





Contact Lists

- **Marina personnel and neighboring boat owners**
- **Emergency services**
- **Harbor Master**
- **US Coast Guard / State Marine Police**
- **Utility companies**
- **Towing/salvage services**
- **Insurance carrier**
- **Boat information**
 - Make, model and year of the vessel
 - Hull Identification Number
 - State license or USCG Documentation number and boat name
 - Boat equipment and personal items inventory

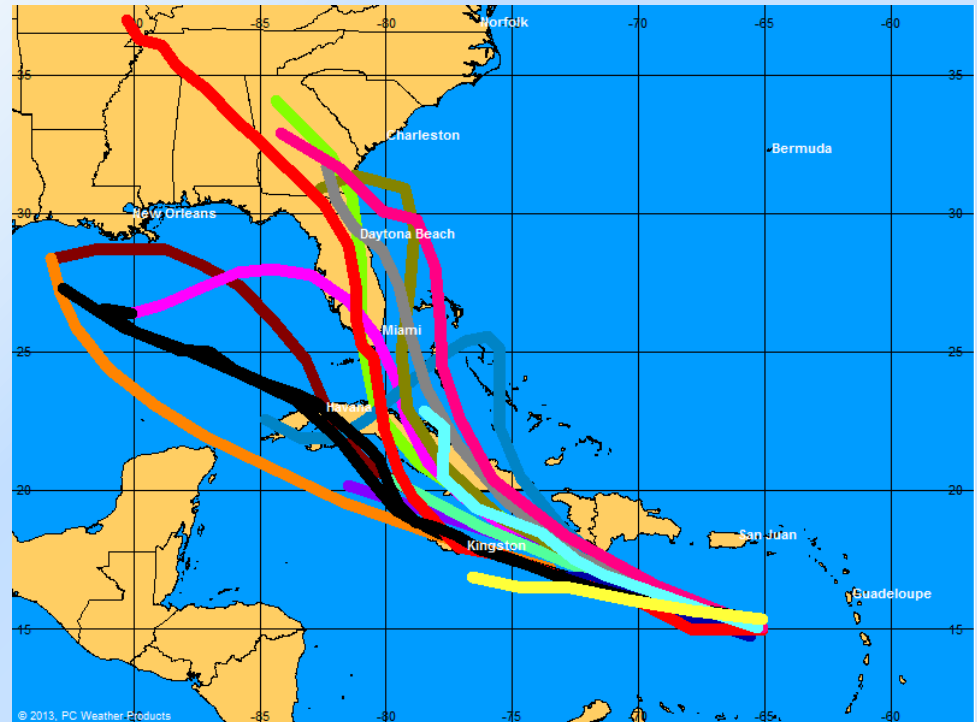




A Final Word on Chantal

- The NOAA “Spaghetti Model” shows Chantal will move into the Southeastern US, Likely South Carolina, by Sunday and not directly affect Northern Virginia.

- Tropical Storm
- Winds: 45 MPH
- Location: $16^{\circ}.5$ N, $-73^{\circ}.7$ W
- Speed: 15 MPH W
- Pressure: 1012mb - Rising





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