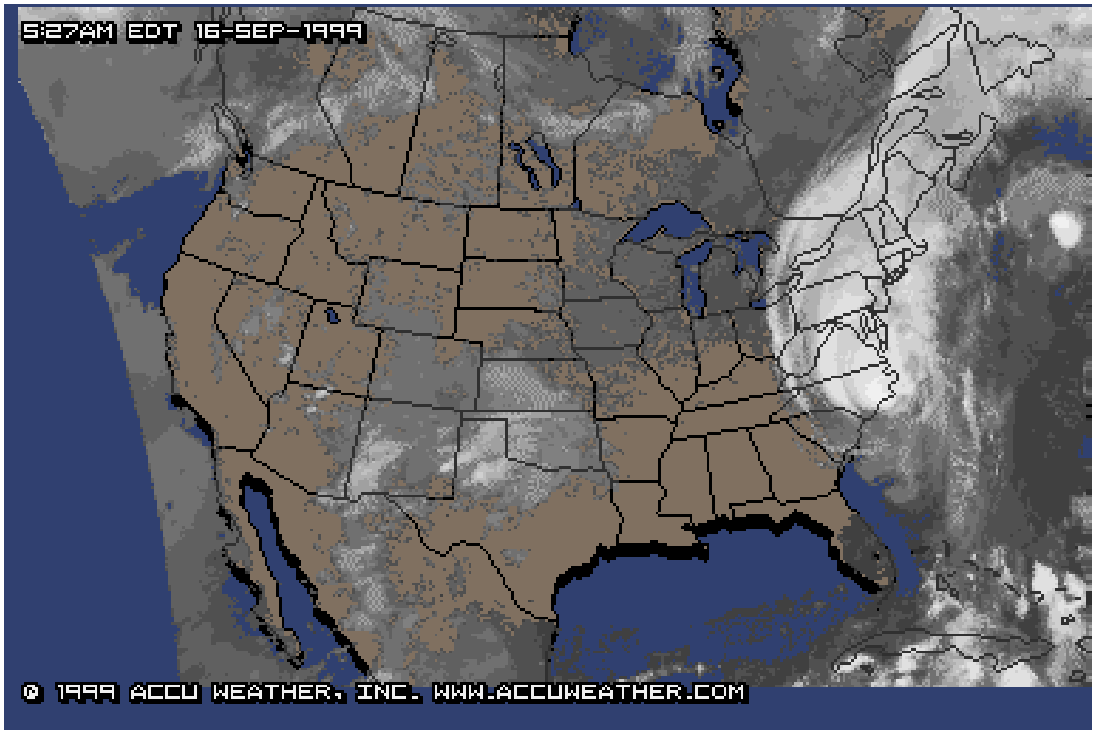

Pecan Grove Marina 2003 Hurricane Plan

Oriental, North Carolina 28571

Version 1.0

The cover illustration is an Accu Weather image of Hurricane Floyd as it passed over Oriental, NC on September 16, 1999.

Contents

Purpose of this Plan

This plan provides for an organized, effective response to the continuing risk of hurricanes (i.e., tropical cyclones) to Pecan Grove Marina (hereafter "the Marina") facilities and any boats docked at the marina.[1] See the Glossary for terms used in this plan and in hurricane weather forecasts.

Note: This document is a plan. Some of the procedures and resources mentioned are under development. However, the Marina requires that all Residents take early and appropriate action to mitigate the impacts of hurricanes. Such actions may prevent any loss of life or injury and will certainly better protect the residents' boats and Marina property. The Marina intends to resource this plan more fully as revenues permit. This plan is valid for the period of June 1, 2003 through October 31, 2003.

Objectives of this Plan

The objectives of this plan are to:

- Prevent any risk to the lives, health, or safety of all residents, workers, or visitors at the Marina during a hurricane and afterwards
- Minimize the risk to the Marina facilities and boats docked at the marina.

The overriding principle behind these objectives is that *property is replaceable; people are not*. We can protect property with prudent actions before each hurricane and with adequate insurance. While a hurricane and its aftereffects impact the Marina, only the minimum number of personnel designated by the Pecan Grove Directors or Officers will be allowed into the Marina and its facilities.

Introduction

The Hurricane Threat to Pecan Grove Marina

The Marina's location in Coastal Carolina has a significant hurricane risk. As Appendix A shows, 11 of 64 hurricanes hitting the United States from 1900 to 1996 also hit North Carolina. The majority of those hurricanes (8 of 11) hit in September. Of the 11 hurricanes, 10 were Category 1, 4 Category 2, and 10 were Category 3. Only one was Category 4 and none were Category 5, the most destructive category. See Appendix B for a detailed description of the categories and their effects.

[1] James Edward Giles III, Consultant, prepared this plan for the Board of Directors, Pecan Grove Yacht Owners Association.

For coastal areas, the effects of hurricanes include high wind, storm surge, waves, and flooding. Wind pressure and buffeting can affect structures such as the clubhouse and docked boats directly. Wind can also pick up unsecured items and throw them against structures and boats causing damage. Hurricane pressure differences between the center and its edges create storm surge flooding by the lifting the surface of bodies of water. The intensity of wind, its duration in time, and distance over water over which it blows (i.e., fetch) determine the size and frequency of waves. Flooding also results from excessive rain.

In any coastal location, the impact of any of above effects is a function of the intensity of the storm, its rate and direction of movement, and its proximity. Because tropical cyclones have counterclockwise circulation, their direction and speed of travel add velocity to wind to the right, forward quadrant of the storm. Thus for any location, wind may be greater or lesser depending on the observer's location relative to the hurricane eye.

The official hurricane season runs from June 1 through October 31. The Commerce Department's National Oceanic and Atmospheric Administration (NOAA) stated "the 2003 Atlantic hurricane season will likely have above normal levels of activity. The outlook calls for the potential of 11 to 15 tropical storms, with six to nine hurricanes, and two to four classified as major hurricanes (category 3 or higher on the Saffir-Simpson Hurricane Scale). Officials from NOAA and the Federal Emergency Management Agency (FEMA) advised residents in Atlantic and Gulf Coast states to be prepared throughout the season...."[2]

However, powerful cyclones can occur any time of the year at the Marina. In the off-season, they are "nor'easters".

Table 1 lists the names for the 2003 Atlantic hurricane season.

1. Ana	8. Henri	15. Odette
2. Bill	9. Isabel	16. Peter
3. Claudette	10. Juan	17. Rose
4. Danny	11. Kate	18. Sam
5. Erika	12. Larry	19. Teresa
6. Fabian	13. Mindy	20. Victor
7. Grace	14. Nicholas	21. Wanda

[2] *U.S. Department of Commerce, National Oceanic and Atmospheric Administration News, NOAA Forecasters Say Six To Nine Hurricanes Could Threaten In 2003, NOAA and FEMA Stress Preparedness for Residents in Hurricane Prone Areas*, May 19, 2003.

Table 1 Atlantic Hurricane Names 2003

Pecan Grove Marina as a "Hurricane Hole"

The Marina sits a short distance across from the Town of Oriental, NC with the opening of its dogleg entrance channel facing the Town to the east. Land bounds the north, west, and south sides. On the west side, is a large open field. Tree lines protect the north and south sides. The perimeter roadway is high enough so that the walkways, finger piers, and the docked boat hulls are below grade under most water conditions.

Because of Pecan Grove's bounded location, its risk from wind is less than a more open location such as Oriental Harbor. The short fetch from the Town of Oriental and its dogleg entrance channel limits the Marina's exposure to waves.

The greatest risks to the Marina are from storm surge and excessive local rain flooding. While tides at the Marina are about a few inches, the Marina experiences significant high and low water conditions due to local geography. The Marina sits near the mouth of the Neuse River at the southwest end of Pamlico Sound. At any time, strong winds from the west and south blow water away from the Marina to the other end of the Sound resulting in low water. Likewise, strong winds from the east and north blow water from the sound toward the Marina resulting in high water.

The most significant risks to the Marina are from flooding. Depending on the location, direction, and duration of hurricane winds, very low or very high water can occur at the Marina. Hurricanes traveling northerly whose centers pass to the west may result in low water. While such hurricanes passing to the east may result in high water. Again, actual outcomes depend on many interrelated factors. U.S. Army Corps of Engineer data[3] show that the Marina is subject to flooding in a Category 1 hurricane. In fact, most of Pamlico County east of NC 306 is subject to flooding in Category 4 and 5 storms.

Past Hurricane Experience at Pecan Grove Marina

Since construction completion in 1998, the Marina has withstood several Category 1 and 2 hurricanes. The Marina weathered Hurricane Bonnie in 1998. The most significant hurricanes were in 1999 when Hurricane Dennis, which struck twice, and Hurricane Floyd, which closely followed Dennis, caused widespread flooding damage to Eastern North Carolina.

None of these hurricanes resulted in any significant damage (i.e., any damage for which the Marina filed an insurance claim or had a claim filed against it). The highest wind recorded at the Marina was 117 mph during Hurricane Dennis when flooding covered the walkways and finger piers by about 2 feet. The greatest impact on the marina from hurricanes has been some silting of the entrance channel. However, silting is a problem after any significant northeast storm.

Remember: Past experience is just that, past. Future impacts may be far greater.

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[3] Interpretation based on map produced by Hurricane Maps Enterprises, 9296 Post Office Road, Leland, NC 28451, 910-371-1212, hurrmap.ibm.net.

Roles & Responsibilities

All Residents & Others

Residents include condominium slip owners, slip lessees, and slip sub-lessees. Slip owners are those who have purchased condominium slips or own them as the developer, Cox Family Enterprises. Slip lessees, and slip sub-lessees rent slips from slip owners or lessees. Residents include those who occupy their boats as liveaboards and those who do not. Others include guests of residents and trades people working at the Marina on behalf of residents.

Slip owners shall be responsible for acquiring the current version of this plan and distributing it to slip lessees and slip sub-lessees before each hurricane season. The Marina will keep a copy of this plan in the Dock Master's office. Owners can obtain an electronic version by sending an e-mail request to:

Jim.Giles@coastalnet.com

Owners may view the electronic copy with Adobe Acrobat Reader.

All residents and others shall comply with directions from public authorities before, during, and after a hurricane with respect to evacuation, movement about the area, and other public safety measures.

Pecan Grove Yacht Owners Association, Inc.

Pecan Grove Yacht Owners Association, Inc. (hereafter PGYOA) operates and maintains the Marina for the residents. Table 1 shows the current corporate directors and officers. The current directors, officers, and all those working for PGOYA are the hurricane management team.

Table 1, Current Directors and Officers[4]

Title	Name	Phone
Director (3 years)	Jim Giles	252-249-3007
Director (2 years)	Dave Wright	252-249-7225
Director (1 year)	Cathy Taylor	919-362-5423
President	Lee Cox	919-847-5554
Vice-President	Jim Giles	252-249-3007
Assistant to President	Grosvenor Barber	252-249-2884
Secretary	Charles Matthews	252-249-2113
Treasurer	Ed Fuller	252-249-2205

[4] Grosvenor Barber is also the current Dock Master.

The hurricane management team will take available appropriate actions to achieve the objectives of this plan. Specifically, the hurricane management team will take the steps identified for the Dockmaster in Appendix C.

The hurricane management team will also comply with direction from public authorities. Thus, the hurricane management team may not be immediately available just before, during or after a hurricane. In the case of the management team being absent from the marina, the security of property, i.e., the Marina and its facilities and the residents' boats rests with preparations taken before a hurricane.

When the hurricane management team is present at the Marina during or immediately after a hurricane, they will control who is present at the Marina. Residents who wish to be at the Marina during and immediately after a hurricane must get verbal permission from a member of the hurricane management team. While this may seem to be an infringement of property rights, PGOYA believe such control is in the best interests of the residents.

Residents

Since the Marina is now a home for more than 100 residents' boats, the hurricane management team cannot assume any responsibility to get residents' boats ready for a hurricane. Residents have sole responsibility for preparing their boats for a hurricane. They may make these preparations personally or arrange to have the work done for them.

Residents shall at all times secure their boats with sufficient numbers of dock lines of adequate strength and length to keep their boats secure for all conditions of flooding up to four feet above mean low water. Dock lines shall include appropriate chafing and shock absorbing gear as required.

Note the Marina has two slip configurations with respect to the attachment of dock lines. Slips around the periphery of the Marina (i.e., Slips 1-54 and 87-119) have piles outboard of the walkways and cleats on the walkways. Slips in the T-dock (i.e., Slips 55-86) differ in that they have two piles with cleats on them at the walkway. Pilings provide the strongest attachment point for dock lines. The cleats on the piles or the walkways are not as strong. Therefore, Residents using the T-dock should attach their dock lines to the piles and use the cleats for only temporary attachment. Residents along the periphery must use the cleats for their quarter lines. The Marina is taking steps to reinforce the attachment of cleats along the walkways.

Note: Residents should secure dock lines outboard of the walkways so that they can adjust the lines from the boat and dock lines inboard of the walkways so that they can adjust the lines from the walkways or finger piers. This practice facilitates line adjustment in high water conditions.

Throughout the hurricane season, residents shall keep an additional set of dock lines as described in the previous paragraph topsides on their boats dock lines preferably near the cockpit. In addition, if the Marina activates its hurricane plan as described below, Residents shall secure AC shore power and remove and stow shore power lines and remove Biminis. The Marina also encourages residents to remove dodgers also.

The dock boxes are Marina property. The Marina may secure or move dock boxes as appropriate as part of hurricane preparations. The hurricane management team cannot move dock boxes if residents have fastened them in place. Thus, residents shall not fasten dock boxes in place.

Residents shall also take other prudent measures to reduce windage, to secure gear that might come adrift in a hurricane, and otherwise prevent damage to their boat or other boats. Appendix D provides a set of prudent practices for residents' consideration.

The Hurricane Management Cycle at Pecan Grove Marina

Synchronization of Activities

The activities in this plan are keyed to forecasts from the National Weather Service. The Marina will commence executing its plan for a hurricane when the probability is 50 percent or higher that the center of a named hurricane will pass within 75 miles of Oriental, NC within 72 hours. Information about hurricane probabilities is available at:

http://www.nhc.noaa.gov

Annual Planning

PGOYA will update this plan annually and make it available it to all residents. Acknowledgement and compliance with this plan will be a part of all leases and sublease contracts as well as all new sales contracts.

Annual Preparations

To be developed (TBD) based on experience.

Preparation for Each Hurricane

TBD.

Recovery & Getting Ready for the Next Hurricane

TBD.

Compiling Lessons Learned from Each Hurricane Season

PGOYA will compile a set of lessons learned each year and include these lessons in subsequent versions.

Glossary

Advisory	Official information issued by tropical cyclone warning centers describing all tropical cyclone watches and warnings in effect along with details concerning tropical cyclone locations, intensity and movement, and precautions that should be taken. Advisories are also issued to describe: tropical cyclones before issuance of watches and warnings and subtropical cyclones.
Best Track	A subjectively smoothed path, versus a precise and very erratic fix-to-fix path, used to represent tropical cyclone movement. It is based on an assessment of all available data.
Center	The vertical axis or core of a tropical cyclone. It is usually determined by cloud vorticity patterns, wind, and/or pressure distributions.
Center/Vortex Fix	The location of the center of a tropical or subtropical cyclone obtained by reconnaissance aircraft penetration, satellite, radar, or synoptic data.
Central North Pacific Basin	The region north of the Equator between 140W and the International Dateline. The Central Pacific Hurricane Center (CPHC) in Honolulu, HI is responsible for tracking tropical cyclones in this region.
Cyclone	An atmospheric closed circulation rotating counter-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.
Eastern North Pacific Basin	The region north of the Equator east of 140W. The National Hurricane Center in Miami, FL is responsible for tracking tropical cyclones in this region.
Eye	The relatively calm center of the tropical cyclone that is more than one half surrounded by wall cloud.
Eye Wall/Wall Cloud	An organized band of cumuliform clouds immediately surrounding the center of a tropical cyclone. Eye wall and wall cloud are used synonymously.
Explosive Deepening	A decrease in the minimum sea-level pressure of a tropical cyclone of 2.5 mb/hr for at least 12 hours or 5 mb/hr for at least six hours.
Extratropical	A term used in advisories and tropical summaries to indicate that a cyclone has lost its “tropical” characteristics. The term implies both poleward displacement of the cyclone and the conversion of the cyclone’s primary energy source from the release of latent heat of condensation to baroclinic (the temperature contrast between warm and cold air masses) processes. It is important to note that cyclones can become extratropical and still retain winds of hurricane or tropical storm force.
Fujiwhara Effect	A binary interaction where tropical cyclones within a certain distance (300-750 nm depending on the sizes of the cyclones) of each other begin to rotate about a common midpoint.
Gale Warning	A warning of 1-minute sustained surface winds in the range 34 kt (39 mph or 63 km/hr) to 47 kt (54 mph or 87 km/hr) inclusive, either predicted or occurring not directly associated with tropical cyclones.
High Wind Warning	A high wind warning is defined as 1-minute average surface winds of 35 kt (40 mph or 64 km/hr) or greater lasting for 1 hour or longer, or winds gusting to 50 kt (58 mph or 93 km/hr) or greater regardless of

	duration that are either expected or observed over land.
Hurricane/Typhoon	A warm-core tropical cyclone in which the maximum sustained surface wind (using the U.S. 1-minute average) is 64 kt (74 mph or 119 km/hr) or more. The term hurricane is used for Northern Hemisphere cyclones east of the International Dateline to the Greenwich Meridian. The term typhoon is used for Pacific cyclones north of the Equator west of the International Dateline.
Hurricane Local Statement	A public release prepared by local National Weather Service offices in or near a threatened area giving specific details for its county/parish warning area on (1) weather conditions, (2) evacuation decisions made by local officials, and (3) other precautions necessary to protect life and property.
Hurricane Season	The portion of the year having a relatively high incidence of hurricanes. The hurricane season in the Atlantic, Caribbean, and Gulf of Mexico runs from June 1 to November 30. The hurricane season in the Eastern Pacific basin runs from May 15 to November 30. The hurricane season in the Central Pacific basin runs from June 1 to November 30.
Hurricane Warning	A warning that sustained winds 64 kt (74 mph or 119 km/hr) or higher associated with a hurricane are expected in a specified coastal area in 24 hours or less. A hurricane warning can remain in effect when dangerously high water or a combination of dangerously high water and exceptionally high waves continue, even though winds may be less than hurricane force.
Hurricane Watch	An announcement of specific coastal areas that a hurricane or an incipient hurricane condition poses a possible threat, generally within 36 hours.
Post-storm Report	A report issued by a local National Weather Service office summarizing the impact of a tropical cyclone on its forecast area. These reports include information on observed winds, pressures, storm surges, rainfall, tornadoes, damage, and casualties.
Preliminary Report	A report summarizing the life history and effects of an Atlantic or eastern Pacific tropical cyclone. It contains a summary of the cyclone life cycle and pertinent meteorological data, including the post-analysis best track (six-hourly positions and intensities) and other meteorological statistics. It also contains a description of damage and casualties the system produced, as well as information on forecasts and warnings associated with the cyclone. NHC writes a preliminary report on every tropical cyclone in its area of responsibility.
Present Movement	The best estimate of the movement of the center of a tropical cyclone at a given time and given position. This estimate does not reflect the short-period, small-scale oscillations of the cyclone center.
Probability of Tropical Cyclone Conditions	The probability, in percent, that the cyclone center will pass within 50 miles to the right or 75 miles to the left of the listed location within the indicated time period when looking at the coast in the direction of the cyclone's movement.
Rapid Deepening	A decrease in the minimum sea-level pressure of a tropical cyclone of 1.75 mb/hr or 42 mb for 24 hours.
Relocated	A term used in an advisory to indicate that a vector drawn from the preceding advisory position to the latest know position is not

	necessarily a reasonable representation of the cyclone's movement.
Storm Surge	An abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. Storm surge is usually estimated by subtracting the normal or astronomic high tide from the observed storm tide.
Storm Tide	The actual level of seawater resulting from the astronomic tide combined with the storm surge.
Storm Warning	A warning of 1-minute sustained surface winds of 48 kt (55 mph or 88 km/hr) or greater, either predicted or occurring, not directly associated with tropical cyclones.
Subtropical Cyclone	A low pressure system that develops over subtropical waters that initially has a non-tropical circulation but in which some elements of tropical cyclone cloud structure are present. Subtropical cyclones can evolve into tropical cyclones. Subtropical cyclones are generally of two types: An upper level cold low with circulation extending to the surface and maximum sustained winds generally occurring at a radius of about 100 miles or more from the pressure center. A mesoscale cyclone originating in or near a frontolyzing zone of horizontal wind shear, with radius of maximum sustained winds generally less than 30 miles. The entire circulation sometimes encompasses an area initially no more than 100 miles in diameter. These generally short-lived, marine cyclones may vary in structure from cold to warm core.
Subtropical Depression	A subtropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 33 kt (38 mph or 62 km/hr) or less.
Subtropical Storm	A subtropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 34 kt (39 mph or 63 km/hr) or more.
Synoptic Track	Weather reconnaissance mission flown to provide vital meteorological information in data sparse ocean areas as a supplement to existing surface, radar, and satellite data. Synoptic flights better define the upper atmosphere and aid in the prediction of tropical cyclone development and movement.
Tropical Cyclone	A warm-core, nonfrontal low-pressure system of synoptic scale that develops over tropical or subtropical waters and has a definite organized surface circulation.
Tropical Cyclone Plan of the Day	A coordinated mission plan that tasks operational weather reconnaissance requirements during the next 1100 to 1100 UTC day or as required, describes reconnaissance flights committed to satisfy both operational and research requirements, and identifies possible reconnaissance requirements for the succeeding 24-hour period.
Tropical Depression	A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 33 kt (38 mph or 62 km/hr) or less.
Tropical Disturbance	A discrete tropical weather system of apparently organized convection—generally 100 to 300 nmi in diameter---originating in the tropics or subtropics, having a nonfrontal migratory character, and

	maintaining its identity for 24 hours or more. It may or may not be associated with a detectable perturbation of the wind field.
Tropical Storm	A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) ranges from 34 kt (39 mph or 63 km/hr) to 63 kt (73 mph or 118 km/hr).
Tropical Storm Warning	A warning for tropical storm conditions including sustained winds within the range of 34 to 63 kt (39 to 73 mph or 63 to 118 km/hr) that are expected in a specified coastal area within 24 hours or less.
Tropical Storm Watch	An announcement that a tropical storm poses or tropical storm conditions pose a threat to coastal areas generally within 36 hours. A tropical storm watch should normally not be issued if the system is forecast to attain hurricane strength.
Tropical Wave	A trough or cyclonic curvature maximum in the trade-wind easterlies. The wave may reach maximum amplitude in the lower middle troposphere.

Appendix A — U.S. Mainland Hurricane Strikes

Table A-1, Hurricane Direct Hits on the Mainland U.S. Coastline for Individual States 1900-1996 by Saffir/Simpson Category[5]

Area	Category Number					All	Major
	1	2	3	4	5	1,2,3,4,5	3,4,5
U.S. (Texas to Maine)	58	36	47	15	2	158	64
Texas	12	9	9	6	0	36	15
(North)	7	3	3	4	0	17	7
(Central)	2	2	1	1	0	6	2
(South)	3	4	5	1	0	13	6
Louisiana	8	5	8	3	1	25	12
Mississippi	1	1	5	0	1	8	6
Alabama	4	1	5	0	0	10	5
Florida	17	16	17	6	1	57	24
(Northwest)	9	8	7	0	0	24	7
(Northeast)	2	7	0	0	0	9	0
(Southwest)	6	3	6	2	1	18	9
(Southeast)	5	10	7	4	0	26	11
Georgia	1	4	0	0	0	5	0
South Carolina	6	4	2	2	0	14	4
North Carolina	10	4	10	1 *	0	25	11
Virginia	2	1	1 *	0	0	4	1 *
Maryland	0	1 *	0	0	0	1 *	0
Delaware	0	0	0	0	0	0	0
New Jersey	1 *	0	0	0	0	1 *	0
New York	3	1 *	5 *	0	0	9	5 *
Connecticut	2	3 *	3 *	0	0	8	3 *
Rhode Island	0	2 *	3 *	0	0	5 *	3 *
Massachusetts	2	2 *	2 *	0	0	6	2 *
New Hampshire	1 *	1 *	0	0	0	2 *	0
Maine	5 *	0	0	0	0	5 *	0

[5] * - Indicates all hurricanes in this group were moving faster than 30 mph. State totals will not necessarily equal U.S. totals, and Texas or Florida totals will not necessarily equal sum of sectional totals.

Table A-2, Major Hurricane Direct Hits on the Mainland U.S. Coastline & Individual States 1900-1996 by Month[6]

Area	Jun	Jul	Aug	Sep	Oct	All
U.S. (Texas to Maine)	2	3	15	36	8	64
Texas	1	1	7	6	0	15
(North)	1	1	3	2	0	7
(Central)	0	0	1	1	0	2
(South)	0	0	3	3	0	6
Louisiana	2	0	4	5	1	12
Mississippi	0	1	1	4	0	6
Alabama	0	1	0	4	0	5
Florida	0	1	2	15	6	24
(Northwest)	0	1	0	5	1	7
(Northeast)	0	0	0	0	0	0
(Southwest)	0	0	1	5	3	9
(Southeast)	0	0	2	7	2	11
Georgia	0	0	0	0	0	0
South Carolina	0	0	0	3	1	4
North Carolina	0	0	2	8	1	11
Virginia	0	0	0	1	0	1
Maryland	0	0	0	0	0	0
Delaware	0	0	0	0	0	0
New Jersey	0	0	0	0	0	0
New York	0	0	1	4	0	5
Connecticut	0	0	1	2	0	3
Rhode Island	0	0	1	2	0	3
Massachusetts	0	0	0	2	0	2
New Hampshire	0	0	0	0	0	0
Maine	0	0	0	0	0	0

[6] State totals will not necessarily equal U.S. totals, and Texas or Florida totals will not necessarily equal sum of sectional totals. This is taken from *The Deadliest, Costliest, and Most Intense United States hurricanes of this century (and other frequently requested hurricane facts) [NOAA Technical Memorandum NWS TPC-1] updated in February 1997.*

Appendix B — The Saffir-Simpson Hurricane Scale

The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf in the landfall region. Note that all winds are using the U.S. 1-minute average.

Category One Hurricane

Winds 74-95 mph (64-82 kt or 119-153 km/hr). Storm surge generally 4-5 ft above normal. No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage. Hurricanes Allison of 1995 and Danny of 1997 were Category One hurricanes at peak intensity.

Category Two Hurricane

Winds 96-110 mph (83-95 kt or 154-177 km/hr). Storm surge generally 6-8 feet above normal. Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings. Hurricane Bonnie of 1998 was a Category Two hurricane when it hit the North Carolina coast, while Hurricane Georges of 1998 was a Category Two Hurricane when it hit the Florida Keys and the Mississippi Gulf Coast.

Category Three Hurricane

Winds 111-130 mph (96-113 kt or 178-209 km/hr). Storm surge generally 9-12 ft above normal. Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Damage to shrubbery and trees with foliage blown off trees and large tress blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the hurricane center. Flooding near the coast destroys smaller structures with larger structures damaged by battering of floating debris. Terrain continuously lower than 5 ft above mean sea level may be flooded inland 8 miles (13 km) or more. Evacuation of low-lying residences with several blocks of the shoreline may be required. Hurricanes Roxanne of 1995 and Fran of 1996 were Category Three hurricanes at landfall on the Yucatan Peninsula of Mexico and in North Carolina, respectively.

Category Four Hurricane

Winds 131-155 mph (114-135 kt or 210-249 km/hr). Storm surge generally 13-18 ft above normal. More extensive curtainwall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the hurricane center. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km). Hurricane Luis of 1995 was a Category Four hurricane while moving over the Leeward Islands. Hurricanes Felix and Opal of 1995 also reached Category Four status at peak intensity.

Category Five Hurricane

Winds greater than 155 mph (135 kt or 249 km/hr). Storm surge generally greater than 18 ft above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the hurricane center. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required. Hurricane Mitch of 1998 was a Category Five hurricane at peak intensity over the western Caribbean. Hurricane Gilbert of 1988 was a Category Five hurricane at peak intensity and is the strongest Atlantic tropical cyclone of record.

Appendix C — The Marina Hurricane Management Schedule

Throughout the Year

Dock Master will maintain the following equipment on site:

Batteries
Camera
Dewatering pump
Duct tape
Emergency water and rations
Fasteners (screws and nails)
First aide kit
Flashlights
Hammers
Heater, propane
Lantern, propane
Life jackets
Lines
Mall
Propane
Rigging knives
Saw (chain and bow)
Screw drivers
Shovels
Spill containment gear
Stove, propane
Tarps
VHF radio
Work gloves
Wrenches

Dock Master will inspect yearly the following:

All residents have current insurance for their vessels
All residents have received checklists for hurricane planning
All employees are trained for hurricane plan actions
Docks are attached to pilings that can sustain a 50 year storm surge and wind load
Docks have quick shut off above the flood plain
There is enough storage space above the flood plain for dinghies, dock boxes, and vehicles
There is storage space above the flood plain for office records and equipment

Dock Master will inspect monthly the following:

Building roofs, doors and windows
Debris is removed from open areas
Dry storage areas and dinghy racks
Electrical supplies
Fire fighting gear
Fuel and sewer pumping lines
Dinghy lift
Spill containment gear
Trash containers are secured in protected areas
Trees and shrubs are trimmed

Dock Master will maintain a recovery team roster. The current roster is as follows:

Service Name	Name	Phone
County Inspector	Skip Lee	TBD
FEMA Assistance	TBD	TBD
CAMA Permit Rep	TBD	TBD
Crane	Goldman's	252-633-0892
Diver	Bottom Feeders Dive Company	252-745-3626
Plumber	Bob Boris	252-249-0326
Electrician	Lee Cox	919-847-5554
Roofer	Tim Eckloff	252-249-1753
Boat Repairs	Sail Craft	252-249-0522
General Contractor	David Hodges	252-745-7018
Dock Supplier	Village Hardware	252-249-1211
Fuel Spill	U.S. Cost Guard Station - Hobucken	252-745-3131
Engineer	Bob Perrone	919-782-6406

72-48 Hours before Projected Storm Arrival

Dock Master will:

Acts as home base where employees can report jobs completed and where help is needed
Allow residents to evacuate to an off-site location
Assist residents in preparation
Assist where needed
Back up computer records
Begin checking boats that have decided to remain at the docks
Contact all contractors for post-storm clean-up
Contact volunteers to begin preparation work
Coordinate supplies, tools and labor
Coordinate volunteers
Cover and tape windows

Delay orders of materials and stocks that are due to be shipped
Monitor NOAA weather station and/or the internet weather reports
Notify Residents that facility is on alert
Process mail and all paperwork
Remove or secure blowables (signs, tables, chairs, trash cans, etc.)
Remove or secure small drystorage boats (dinghies, kayaks, canoes etc.)

48-24 Hours before Projected Storm Arrival

Dock Master will:

Check boats to see that no occupants are remaining
Confirm insurance coverage and secure policies
Continue securing vessels
Establish an "outside the area" contact person for communication during evacuation
Have a source of ready cash for recovery work
Move all vehicles upland
Move items that could sustain water damage to tables or off the ground
Purchase extra batteries, food and water for emergency securing and recovery workers
Remove equipment and records to safe storage
Secure the marina from non-essential traffic
Take pictures of the facility and preparation conditions
Turn off water supply if it is public

24-0 Hours before Projected Storm Arrival

Dock Master will:

Conduct a last patrol of the vessels, checking docklines and moorings
Do a last patrol of the grounds
Ensure everyone has the number of the off-site contact
Ensure no one remains on their vessel-if they choose to remain have them sign a waiver of liability and give you the next of kin address and phone number
Give approximate time to return to the marina (to be confirmed by off-site contact)
Give instructions for post-storm activities
Lock doors and brace them against wind
Secure all access points
Send all employees home unless a skeleton crew is needed to remain for the storm
Set up answering machine (have battery back-up installed)
Turn off main electricity and water

During the Storm

All persons remaining on-site shall:

Monitor weather reports on radio, TV and/or internet
Stay in a protected area

Use extreme caution and stay off the docks

Do not attempt to re-tie or board a loose vessel during the storm

All residents off-site should

Monitor weather reports on radio, TV and/or computer

Coordinate return of all employees

Review recovery plan

Review insurance policy

Recovery and Preparation for the Next Hurricane

Members of the Recovery Team shall:

Begin clean-up efforts

Beware of fire ants, snakes, downed electric lines, wet electronic equipment, leaking gas or fuel

Complete a survey of the Marina including equipment and inventory

Contact employees regarding when they should return

Contact insurance company to get an adjuster and surveyor to you

Contact recovery crews

Control conflicts between returning residents and recovery of damaged boats

Control news media; no media exposure is usually better

Coordinate employees and contractors

Coordinate utility evaluation and reinstitution of service

Estimate damages and prepare a written assessment if possible

If anything is stolen, file an incident report with local police

If the Marina did not sustain damage, let other marinas know that you can take boats is appropriate

Investigate boat repair facilities for customer referral

Investigate to find a marina where your customers can berth temporarily

Order repair supplies

Photograph everything

Set up an answering machine or volunteer to respond to customers' inquiries

Set up security to prevent looting and for crowd control

Residents' Checklist

Equipment to be Kept On Board

Chafing gear

Fenders

Two sufficient anchors with 300' or more oversized rode

Flashlight with spare batteries

Battery-operated radio

Check Monthly

Exterior lights operable

Auto bilge pump operating (check battery)
Hatches are watertight
Power and electric gear operating
Engine battery charged
Flashlight battery charged
Radio batteries charged

To Do When New at Pecan Grove

Learn Marina approaches and basin
Learn the size and type of your dock mooring arrangements
Ensure dock lines are sufficient for all likely wind direction and velocity
Learn your lease and rental agreement responsibilities
Learn responsibilities for your boat's safety when a hurricane is approaching
Develop a plan for securing your vessel outside the marina if you plan to evacuate
If evacuating, visit the site by boat and time the trip
Learn what possible delays you may encounter when evacuating (boat traffic etc.)
Photograph your boat and surroundings
Keep a list of all equipment on board
Keep a list of all equipment that will be removed during storm preparations
Keep a complete set of records for your boat at home
Give the Dockmaster the name and number of your absentee skipper
Give the Dockmaster a description of your boat, registration number and location

Boat Preparations

Strip all removable items, including spare rigging
Clear self-bailing cockpit drains
Close all through-hull fittings
Set chafing gear where lines will rub (chocks, cross lines, deck edge, dock edge etc.)
Remove portable fuel and oil storage containers
Remove ship’s papers
Shut off fuel tanks
Leave auto bilge pump on
Check openings to ensure boat is watertight

Appendix D — Prudent Practices

Recommendations of David Pascoe[7]

Wind Direction

Relative to the eye, there are three major wind zones in a hurricane, north, center and south. The north zone will experience winds mainly from the east. In the central zone, the eye, the winds can be from all directions. In the south, the worst winds will be westerly, causing a low, rather than high water problem. The north zone of a hurricane usually has winds of longest duration.

Use the National Hurricane Center's strike probability estimates to estimate which side of the storm you're likely to be on. This will give you a better idea what to expect, and be better able to prepare. If you're on the south side, you don't have to worry about storm surge, but the opposite effect, low water. Most boats wrecked on the south side of the storm resulted from cleats pulling out and lines parting because there was insufficient slack to allow for extreme low water. If the storm's course is fairly constant, you can prepare for this. If not, the best you can do is attempt to choose a happy medium.

Remember that the water level difference from extreme highs and lows can easily be 20' and you can't prepare for both. If you prepare for high water and end up on the south side, your best efforts will be defeated. However, if you live close to your boat, you may get a 6-8 hour window of opportunity to make adjustments. If your boat will be on the north side, it will usually become fairly obvious with adequate time to prepare for extreme high water.

Docks & Pilings

Low dock pilings are one of the biggest destroyers of boats during a hurricane because of storm surge lifting the boats above the pilings which then puncture the bottom or hull sides. If the boat is going to stay at the dock, one of the most important considerations is to be sure that the dock has tall pilings. An adequate piling height is six feet above the gunwale. Much higher than this is not practical, but if the pilings are only a few feet higher than the gunwale at high tide, then one way or another the boat has

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[7] David Pascoe, Marine Surveyor, *Safe Harbor, Lessons Learned From Recent Hurricanes Can Help Boaters In Southeast Florida Protect Their Boats Against The Ravages Of These Devastating Storms*, www.yachtsurvey.com. Dave Pascoe is a Ft. Lauderdale, NAMS Certified Marine Surveyor with 28 years experience in dealing with marine catastrophes, starting with Hurricane Agnes in 1968. Most recently he has worked Hurricanes Andrew, Erin, Opal, Hugo and Marilyn. The information contained in this article is the result of his studies of the effects of these storms on boats of all types, and in a variety of geographic locations.

to be gotten away from the dock. Narrow slips are another problem. If a dock slip is too narrow, then there's no chance of keeping it off the pilings with the rise and fall of storm surge. The boat is likely to be battered by it's neighbors. Boats docked in tightly packed marinas, even if well-sheltered, need to be moved to better locations. If the boat can't be moored away from the pilings, count on it being destroyed.

The Coco Plum Experience

This private marina at the south end of Coral Gables gave us an excellent lesson in hurricane protection in the aftermath of Andrew. Most of the boats in all the marinas to the north and south of Coco Plum were destroyed, even though all these marinas directly front Biscayne Bay. And yet, incredibly, not one boat at Coco Plum was lost, and only a few had significant damage.

So what distinguished this marina from all others? First, the entrance channel to the marina has a sharp dog leg that greatly reduced wave action. Next, the marina was protected by a buffer zone of dense mangroves. But just as important, the concrete docks at the marina have very wide slips with heavy, tall pilings. This allowed boat owners to tie their boats well off the docks. Even with a 10' storm surge, not one boat came down on the pilings, and hence none were lost. Whereas at Diner Key, Matheson Hammock and Black Point, nearly all the boats were lost because all had narrow slips and inadequate pilings. The lesson for boat owners with boats in narrow slips is that your chance for survival is very slim indeed.

Marinas

Its no longer legal for marina owners to force boat owners to leave in the event of a storm. However, many of the marinas on the east coast are quite vulnerable. Consider these points to determine whether to remain in a marina. (1) Slip width should be minimum 140% of the beam of your boat. If your boat can't rise and fall 10' without coming down on a piling, you need to move. (2) Piling height should be 6' above highest gunwale point. (3) Check tidal zone of pilings; ideally there should be no wastage. (5) If the marina has lumber bolted to concrete instead of full-size, driven pilings, move. (6) Try to make sure that the boat is tied facing into the wind of the approaching storm, an easterly direction. (7) If your neighbor's boat is not as well tied as yours, his boat will likely wreck yours. (8) None of the marinas on the barrier islands, or fronting the bays, are secure. Move your boat or loose it.

Never tie to wooden docks, especially cleats attached to docks; they're guaranteed to come loose. After hurricane Opal, virtually every wooden dock we saw was damaged or destroyed and many pilings were pulled out. You have almost no chance of survival tied to a wooden dock. Moreover,

pilings that are jetted in with water jets, instead of being driven, have very little holding power. If you're using cleats on concrete sea walls, make sure they're well attached. The bases on Coconut and Royal Palm trees make good mooring posts in winds up to 150 MPH. Beyond this, even the palms start coming down. But make sure the palm is not too close to the water's edge.

Knots and Lines

Making the proper attachment to a cleat or a piling is far more important than one might imagine. What's okay for normal use often fails during the violence of a hurricane. You should have an extra set of new, and slightly oversized storm lines - about ¼" larger than normal size. By all means, do not depend on aged cordage. Remember that, although an older line may look okay, it may be seriously weakened by ultraviolet or fungicidal degradation that may not be visible. Use new lines for primaries and the normal dock lines as backups or doubles.

When doubling up lines, try to reduce dependency on a particular tie up point. Any time you can double a line to a different point, do it. Two lines tied to one piling or cleat are of no help if the piling or cleat fails. Spread lines to as many different tie points as possible. Consider that under high water conditions, your lines will be angling downward as the water level rises.

Never tie to cleats on pilings. Lines tied to pilings should have a fair lead off the curve of the piling (tangential) and should not be cinched by the knot so that the line is pinched or pulled by the knot. Take only two wraps around the piling, making sure that they do not overlap. Cinch knots or hitches around the piling should not be used as this pinches the rope. Remember that it is the friction of the line around the piling that provides 98% of the holding power. There will be very little pressure on the knot which merely keeps the line from slipping. Do not use bowlines; instead, three simple half-hitches around the standing end are more than adequate and will minimize chafing. Then wrap the free end back around the piling with hitches to keep it in place.

Cleats, Chocks & Pulpits

There is a right way and a wrong way to attach a line to a cleat. Cleats can be troublesome because rope can get pinched and abraded if not tied right. We recommend that only lines with properly made eye splices be attached to cleats. Put the eye through the center hole of the cleat and fold it over. If you have to use hitches, make sure the line leads off the base as fair as possible with minimal potential for chaffing against the hitches.

The rule for cleats is, the larger the better; the smaller the cleat, the more it pinches. Nowadays, mooring cleats seem to be getting smaller and more

poorly installed. Now is the time to take a look at how they're attached. Do they have adequate back up plates on the under side? Aluminum or fiberglass blanks make for the best back up plates. Plywood doublers will crush and allow the cleat go loose. Back up plates should be as large as practical, preferably 1.5X the length of the cleat and 1X length wide. If your bow cleats are too small, and don't have adequate back ups, seriously consider replacing them.

Our studies of Hurricane Opal revealed that large numbers of boats broke loose from anchorages and docks because of lines cutting on various areas of bow pulpits. A lot of pulpits have a sharp edges on the underside that can very quickly slice through a line. The motion of a boat in a storm is far more violent than one might imagine. A pitching pulpit can snag a dock line or anchor rode. If the bottom edges of your pulpit are sharp, it's a good idea to have the edges rounded over as much as possible.

For chafe protection, we recommend that stiff plastic hose, such as old garden hose, be slid over the end of the line. Plastic hose is slippery and resists abrasion better. The hose should not be slit down the middle because the chances of it coming off are very high. Drill a hole in each end of the hose and tie it to the mooring lines with nylon string, running the string through the laid line to prevent movement. Don't use rags for chafe protection, they won't do the job.

Mooring chocks tend to be particularly troublesome because they're usually poorly designed, tending more to damage the line than protect it. There are several types of mooring chocks that are extremely bad this way, having sharp corners. If your chocks are like this, get them replaced and make sure that they have good back up plates below. Many are just screwed on and won't hold. Through bolting into an aluminum back up plate is best. Its better not use a chock than one that's guaranteed to cut the line.

Sailboats in particular have notoriously small, badly shaped and poorly placed cleats and chocks. They are often placed in a cluttered spot on the bow with other equipment that will cut the lines. This is one of the reasons why so many sail boats break loose. If this describes your boat, consider upgrading if you want your boat to survive a hurricane.

Tophamper

Anything that increases the windage above the superstructure is called tophamper. Virtually all canvass, tops and sails and enclosures should be removed from the vessel. If you can get these off the boat completely, so much the better. Cabins stuffed full of sails and canvass have hampered many a salvage operation. Outriggers should be removed from the boat, as well as antennas, particularly if they're on a tower. Don't hesitate to cut antenna wires, if necessary, to get them off. For sailboats with a lot of

external halyards, we recommend that you cut the end and pull them down; they dramatically increase wind resistance aloft. Its also a good idea to remove the boom, if you can, and lash it down ashore.

Check all pedestal seats to be sure that they are securely locked. All exterior cushions, even if secured with snaps, should be removed and stored inside. For loose deck furniture, if you can't remove it, group it together in a corner and thoroughly lash it to railings. Tape up all exposed cabinets and drawers. If you have a Plexiglas bridge windscreen, unscrew it and store it below.

Tuna Towers

A number of sport fishermen with tuna or marlin towers were literally capsized by wind. When the vessel starts to heel over, the Bimini or tower top then starts to catch the wind. Once this happens, it will either capsize or be torn away from the moorings. If a strong category two or higher storm is approaching, we recommend that a Bimini strung on a tower be removed since it won't survive anyway. This will greatly reduce the chance of capsizing. Remove everything that will be wind or water damaged.

Engine Protection

Some yachts sank because the boats heeled over so far that the hull side ventilators went underwater. But also remember that 150 MPH winds eliminate any distinction between sea and sky. Wind-driven water is going to go right into the engine room vents. If the engine room hull side vents are small enough, they can be taped up with duct tape. If the vent is larger, use a thin piece of plywood and screw it directly into the vent cowl or even the hull side if that's all that is available, and then tape over the edges.

Don't forget that on the reverse side of the storm, the boat may be hit by winds from astern. If you don't want to take the chance of water being driven up the exhaust and into your engines, then plugging the pipes is the thing to do. Sailboats and gas engine boats can use simple wood plugs. Sailboat owners absolutely should plug their exhaust lines and close the seawater intake sea cocks. For larger diesel exhausts, the inflatable balls available at most marine stores are the best solution.

If you have a generator under an open cockpit deck, cover it with sheet plastic so it won't get wet. Close the water intake seacock. If you have the proper size bungs, stop up the exhaust outlet. Tape over with duct tape the fuel and water tank vents on the side of the hull.

Electronics

It should go without saying that all external electronics should be removed. That includes those mounted in covered boxes. After Andrew, we found shredded leaves inside closed, locked electronics boxes. The wind force was so great that it bent the plastic doors, creating gaps. Again, don't hesitate to cut wires and cables for removal. The cost of reinstallation is far less than having to replace costly electronics. If electronics inside boxes cannot be removed, completely tape around the cabinet doors with duct tape to help keep water out. Tape tightly over all instrument faces that can't be removed, as well as switches and the like.

Windows & Hatches

One of the more amazing results of our survey was how well window glass holds up even in the most extreme winds. Less than 5% of all boats we looked at had broken window glass. Plexiglas, on the other hand, fared poorly. However, wind-driven rain is a serious problem that can find its way into the smallest cracks. We also learned that most superstructures on motor yachts are fairly weak. That means that wind stress often distorts superstructures enough open up small gaps in window frames and between glass panels. Also that the wind can set up some really heavy vibration that will rattle sliding glass panels open. Be aware that wind pressures can literally bow window glass and hatches, opening up gaps that you'd never imagine possible. We've found shredded leaves inside boats and couldn't imagine how it got there. We recommend that all windows be locked and taped with duct tape. Tape all joints and seams on both sliding and fixed window glass on the outside. If you have window covers, leave them in place; they often help. Also tape around all hatch covers and entrance doors.

Securing the Interior

We already mentioned how violent the motion of the boat can get, so it's wise to take the same precautions on the interior. For example, in the galley clear out all elevated cabinets where doors will open and contents spill out. Even tape probably won't hold the doors shut. Put breakables in boxes down low. Remove all heavy objects that will force doors open during extreme rolling. Anything loose like televisions, bric-a-brac, lamps, and the like should be secured on the sole. Prepare for some serious water leaks. Slide furniture away from windows. Raise Venetian blinds and take down drapes; they'll get wet for sure and if a window breaks, they'll cause even more damage. Take up all carpets in lower quarters and place on berths. Roll back or take up carpet in way of exterior doors, then duct tape the doorjambs when leaving the boat to keep wind driven water out.

Mattresses on berths in forward cabins in way of portholes and hatches should be wedged up on end so that leaking won't soak them. Strip, pillows, sheets and spreads and store in a safer place.

Don't forget the refrigerator. Clean out all perishables and glass bottles that will slide around and break. Make sure the door is firmly latched. If you have an AC/DC reefer, make sure that is turned OFF so that it won't drain the batteries.

Find the seacocks for the heads and close them. Close or plug all sink drains. Shut off all other seacocks except for the main engines.

Disconnect and stow shore power cords away. Electrical power will be lost anyway and leaving it plugged in will only result in the loss of the cord. Turn off all DC circuit breakers except the main and bilge pumps. Then make sure that all pumps are working and the batteries are fully charged.

Sail Boats

Owners often strip off all sails and canvass and stuff it all down below. Unfortunately, if a boat fills partly up with water, this creates a terrible problem getting these materials out of a flooded cabin. If you can, get all loose sails off the boat. If you take the furling genoa down, again, don't stuff it in the cabin. Tie it to a tree or something, or take it home. The cabin areas should be kept as free as possible to tend to an emergency if necessary.

Imagine hosing down the interior of your boat and then letting it sit for a couple days. That's what the inside of your boat is likely to look like when you finally get to it, many days later. Your boat will leak in ways you never imagined impossible. All that stuff packed into lockers needs to be removed. The easiest way to deal with it is to stow it all in heavy trash bags and seal the ends tight. Then stow them tightly in a high corner somewhere.

Remove vent cowls and heavily tape over the openings.

Take all the bunk and dinette cushions, stand them edgewise and wedge them in place such as around the dinette or a quarter berth.

Close all sink and head sea cocks. Check to be sure that cockpit scuppers are clear. Loch the wheel or lash tiller in the centered position, not to one side. The Bimini top should be removed from the boat, frame and all. Don't try to lash it down because the wind will tear it free. Lash it down ashore. Remove all equipment attached to the lifelines or pulpits.

Duct tape over all windows, ports, and hatches around the base. When leaving the boat, tape over the companionway hatch joints.

Express Cruisers

If you have an open cockpit express cruiser, take down the top frame because you'll loose it anyway; if the frame gets loose it will do great damage. Dismantle the top, remove the cover, and stow the frame on the cockpit deck. If you have a canvass instrument cover, it won't help. Instead cover instruments and switches with duct tape, applying in a shingling fashion. Just remember to get it off soon after the storm. Remove electronics and tape up any open holes in the dash. Tape all switches and the ends of the cable connectors. If you have a generator, cover it with plastic. Next, duct tape the gaps of all hatches in the cockpit deck. This will help prevent water from getting in the engines, particularly the generator. Then, make sure the deck scuppers are clear. Tightly lash fixed, folding swim ladders. Remove all antennas, don't just fold them down. If there are electric panels in the cockpit, tape around the doors. Remove all loose deck equipment such as fender racks, life rafts and anchors. Before leaving the boat, tape over the companionway doorjamb. If you have a gas boat, we recommend that you shut off the fuel valves to all engines, especially the valve at the tanks.