YOUR BEST CHANCE OF SURVIVAL

♦ BE PREPARED

♦ ACT EARLY

PERSONAL HURRICANE SURVIVAL GUIDE

ST. LUCIE COUNTY
COOPERATIVE EXTENSION
ST LUCIE COUNTY COOPERATIVE EXTENSION
8400 PICOS ROAD, SUITE 101
FORT PIERCE, FL 34945-3045
(772) 462-1660
http://stlucie.ifas.ufl.edu

Anita S. Neal, County Extension Director and Environmental Horticulture Agent
Fred Burkey, Multi-County, Florida Yards and Neighborhoods Agent
Karla Lenfesty, Family and Consumer Sciences Agent
Ed Skvarch, Commercial Horticulture Agent
Ken Gioeli, Natural Resources Agent
Sue Munyan, 4-H/Agriculture Agent
Tim Gaver, Citrus Agent

Updated April 10, 2011

An Equal Opportunity / Affirmative Action Institution

Funding for the duplication of this publication is provided in part by the St. Lucie County Commissioners.
# TABLE OF CONTENTS

1  Hurricane Preparedness

## IMPORTANT NUMBERS-SHELTERS

2-3  Important Numbers – County-State-National-Personal Numbers
4  Hurricane Shelters

## HURRICANE INFORMATION

5  Hurricane History
6  Saffir/Simpson Hurricane Scale
7  Fact Sheet for Hurricane and Tropical Storm Probabilities
8  Storm Tracking Map
9  Glossary of common terms

## BEFORE THE HURRICANE

11  Hurricane Awareness/Preparedness
12  Your “Safe Place”/General Safety Rules
12-13  Supply Checklists
14-17  Care of Household Pets
18  2004 Hurricane-Related Insurance Payments
19  Prior to the Hurricane
20-22  Advanced Preparations
23  Plant/Tree Trimming
24  Protecting a Mobile Home
25-27  Checklist For Boaters
28-29  Hurricane Shutters
30-31  Wind Effects on Buildings
32-38  Is Your Home “Hurricane Proof?”
39-43  Handling Insurance

## DURING THE HURRICANE

44  Safety/General Information

## AFTER THE HURRICANE HAS PASSED

45  Sources of Drinking Water
46  Meal Preparation/Food Safety
47-48 Safety of Frozen Foods
49-50 Emergency Repairs
50-52 Appliance Repairs
53-66 Home Clean-up/Renovations
67 Landlord/Tenants Information
68-70 Home Inventory Worksheets
71-72 Other Important Numbers, Recovery Resources and Services
73-84 Education + Action = Mitigation: University of Florida Fact Sheets on Home Mitigation
  • How Safe is Your House
  • How Wind Affect Homes
  • Reinforcing Your Roof
  • Door Danger Zones
  • Install Window Shutters
  • Protect with Plywood
EVACUATION INFORMATION

Special Information - You must tune to your local radio or TV station for evacuation instructions and location of shelter openings! All shelters will not be open at the same time.

Primary radio stations are 88.9 FM and 1590 AM. Primary TV station is Channel 12, check local cable listing for this channel.

EVACUATION AREAS

ST. LUCIE COUNTY

Category I, II, III Hurricanes, Landfall

Winds 74 - 130 MPH
Hurricane Storm Surge 6.9 to 10.0 Feet
Damage Potential - Minimal to Extensive

1. All barrier islands (North and South Hutchinson Island)
2. All mobile & manufactured homes.

City of Ft. Pierce

a. Residents along Moores Creek that live within the area that is East of Means Court, South of Avenue D, North of Avenue B and West of Indian River Drive.
b. Residents along Taylor Creek that live East of North 13th Street, South of Taylor's Creek, West of U.S. Highway 1, North of Avenue M.
c. Residents and businesses along and East of Old Dixie Highway from the North Beach Causeway South to U.S. Highway 1.
d. Residents and businesses along and East of North 2nd Street from Taylor Creek South to Citrus Avenue.
e. All areas known by residents to be subject to severe flooding as a result of intense rainfall.

City of Port St. Lucie

a. Residents living West and South of Westmoreland Drive from Port St. Lucie Blvd. to the St. Lucie/Martin County Line.
b. Residents West of Midport Road from Lyngate Park to U.S. Highway 1.
c. Residents of Vikings Landing.
d. Residents living east and north of Southbend Blvd.
e. All areas known by residents to be subject to severe flooding as a result of intense rainfall.

Unincorporated Areas of St. Lucie County

o. Residents along and East of Old Dixie Highway from the St. Lucie/Indian River County Line to North Beach Causeway.
b. Residents along the North fork of the St. Lucie River that live:
   1) South of Bell Avenue, West of Sunrise Blvd., North of Midway Road.
   2) Along French Creek, West of Oleander Blvd.
   3) South of Midway Road, West of Citrus Avenue, including River Hammock and Canoe Creek.
c. All residents along and West of South Indian River Drive from Eden Plantation, South to the St. Lucie/Martin County Line.
d. All residents of Bay St. Lucie.
e. All areas known by residents to be subject to severe flooding as a result of intense rainfall.

Unincorporated Areas of St. Lucie County

a. Residents living West and South of Westmoreland Drive from Port St. Lucie Blvd. to the St. Lucie/Martin County Line.
b. Residents living West of Midport Road from Port St. Lucie Blvd. to U.S. Highway 1.
c. Residents of Vikings Landing.
d. All residents whose home fronts the West Bank of the North fork of the St. Lucie River.
e. Residents living in the area south of the C24 canal, east of Florida Turnpike and north of Becker Rd.
f. All areas known by residents to be subject to severe flooding due to intense rainfall.

Unincorporated Areas of St. Lucie County

a. Residents along and East of Old Dixie Highway from the St. Lucie/Indian River County Line to North Beach Causeway.
b. Residents along the North fork of the St. Lucie River that live:
   1) South of Bell Avenue, West of Sunrise Blvd., North of Midway Road.
   2) Along French Creek, East of Oleander Blvd.
   3) South of Midway Road, West of Citrus Avenue; including River Hammock and Canoe Creek.
c. All residents along and West of South Indian River Drive from Eden Plantation, South to the St. Lucie/Martin County Line.
d. All residents of Bay St. Lucie and Harbour Ridge.
e. All residents of Hidden River Estates.
f. All areas known by residents to be subject to severe flooding as a result of intense rainfall.

All Hurricanes, Exiting

(Landfall on West Coast)

1. All mobile & manufactured homes.
2. All areas known by residents to be subject to severe flooding as a result of intense rainfall.
3. Additional evacuation areas may be identified, if the time an evacuation order is issued. The extent of the areas will be based on information from the National storm surge expected from the specific exiting hurricane.

For additional information, contact
St. Lucie County Emergency Management Office
462-8100

The Categories are based on the Saffir-Simpson scale.

In case of a hurricane, please tune in to the radio station: WQCS 88.9

WQCS 88.9
www.wqcs.org
## Important Phone Numbers

### Emergency Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Management SLC</td>
<td>462-8100</td>
</tr>
<tr>
<td>American Red Cross</td>
<td>878-7077</td>
</tr>
<tr>
<td>Fire District</td>
<td>621-3400</td>
</tr>
</tbody>
</table>

### Local Government

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Lucie County Admin</td>
<td>462-1100</td>
</tr>
<tr>
<td>Ft. Pierce City Hall</td>
<td>460-2200</td>
</tr>
<tr>
<td>PSL City Hall</td>
<td>871-5225</td>
</tr>
<tr>
<td>State Attorney</td>
<td>465-3000</td>
</tr>
<tr>
<td>SLC Courthouse</td>
<td>462-6900</td>
</tr>
</tbody>
</table>

### Special Needs

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Council on Aging</td>
<td>465-5220</td>
</tr>
<tr>
<td>Community Transit</td>
<td>464-7433</td>
</tr>
<tr>
<td>Elder Care Help Line</td>
<td>465-1485</td>
</tr>
<tr>
<td>TTD</td>
<td>465-5221</td>
</tr>
</tbody>
</table>

### State of Florida

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL. Highway Patrol (FHP)</td>
<td>468-3967</td>
</tr>
<tr>
<td>FHP National Response</td>
<td>911</td>
</tr>
<tr>
<td>Oil/Toxic Chemical Spills</td>
<td>1-800-424-8802</td>
</tr>
<tr>
<td>Poison Information Center</td>
<td>1-800-282-3171</td>
</tr>
<tr>
<td>Price Gouging Dept.</td>
<td>1-800-435-7352</td>
</tr>
<tr>
<td>AG/Consumer Services</td>
<td>1-800-435-7352</td>
</tr>
<tr>
<td>FL. Game &amp; Fish Comm.</td>
<td>1-888-404-3922</td>
</tr>
<tr>
<td>Insurance Commissioner</td>
<td>850-413-3140</td>
</tr>
</tbody>
</table>

### Hospitals

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawnwood</td>
<td>461-4000</td>
</tr>
<tr>
<td>Port St. Lucie</td>
<td>335-4000</td>
</tr>
</tbody>
</table>

### Utilities

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida Power &amp; Light</td>
<td>462-0555</td>
</tr>
<tr>
<td>A T&amp;T Repair</td>
<td>611</td>
</tr>
</tbody>
</table>

### Agriculture

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture Agent</td>
<td>462-1660</td>
</tr>
<tr>
<td>Family &amp; Consumer Science</td>
<td>462-1660</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>462-1660</td>
</tr>
<tr>
<td>4-H/Livestock/Citrus</td>
<td>462-1660</td>
</tr>
<tr>
<td>Master Gardeners</td>
<td>462-1660</td>
</tr>
</tbody>
</table>

### Animals

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Resources Agent</td>
<td>462-1660</td>
</tr>
<tr>
<td>4-H/Livestock Agent</td>
<td>462-1660</td>
</tr>
<tr>
<td>SLC Humane Society</td>
<td>461-0687</td>
</tr>
<tr>
<td>FL Game &amp; Fish Comm.</td>
<td>850-488-4676</td>
</tr>
<tr>
<td>Animal Control</td>
<td></td>
</tr>
<tr>
<td>Port St. Lucie</td>
<td>871-5042</td>
</tr>
<tr>
<td>Ft. Pierce</td>
<td>465-5770/911</td>
</tr>
<tr>
<td>St. Lucie County</td>
<td>462-8210</td>
</tr>
</tbody>
</table>

### Storm Tracking

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Hurricane Center</td>
<td>305-229-4470</td>
</tr>
</tbody>
</table>

### Law Enforcement

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Pierce Police Dept.</td>
<td>461-3820</td>
</tr>
<tr>
<td>St. Lucie County Sheriff</td>
<td>462-7300</td>
</tr>
<tr>
<td>Port St. Lucie Police</td>
<td>871-5000</td>
</tr>
</tbody>
</table>

### Emergency Operations Centers

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSL EOC Info Line</td>
<td>871-5100</td>
</tr>
<tr>
<td>Martin County Info Line</td>
<td>287-1652</td>
</tr>
<tr>
<td>Indian River Co Info Line</td>
<td>226-1444</td>
</tr>
</tbody>
</table>
IMPORTANT NUMBERS

Home Insurance Company
Name____________________________________ Phone_____________Policy #_____________
Address__________________________________ City_________________State___Zip__________

Automobile Insurance Company
Name____________________________________ Phone_____________Policy #_____________
Address__________________________________ City_________________State___Zip__________

Life Insurance Company
Name____________________________________ Phone_____________Policy #_____________
Address__________________________________ City_________________State___Zip__________

Health Insurance Company
Name____________________________________ Phone_____________Policy #_____________
Address__________________________________ City_________________State___Zip__________

Executor of Estate
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Lawyer
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Religious Affiliation
Name____________________________________ Phone_________________________
Address__________________________________ City_________________State___Zip__________

Business / Work
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Family member
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Family member
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Family member
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Family member
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Close Friend
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________

Close Friend
Name____________________________________ Hm Phone_____________Work_______________
Address__________________________________ City_________________State___Zip__________
North Treasure Coast Chapter
American Red Cross
Shelter Listing

CA Moore Elementary
827 North 29th St
Fort Pierce, FL 34947

Floresta Elementary
1501 S.E. Floresta Drive.
Port St. Lucie, FL 34983

Fort Pierce Central High School
4101 S 25th St
Fort Pierce, FL 34981

Lakewood Park Elementary
7800 Indrio Road
Ft. Pierce, FL 34951

Morningside Elementary
2300 S. E. Gowin Dr.
Port St. Lucie, FL 34952

Oak Hammock K-8
1251 SW California Blvd.
Port St. Lucie, FL 34953

Parkway Elementary
7000 N. W. Selvitz Road
Port St. Lucie, FL 34983

Treasure Coast High School
1000 SW Darwin Blvd
Port St. Lucie, FL 34050

West Gate K-8
1050 SW Cashmire Blvd.
Port St. Lucie, FL 34986

Westwood High School
1801 Panther Lane
Ft. Pierce, FL 34947

Windmill Point Elementary
700 Darwin Blvd.
Port St. Lucie, FL 34953

Samuel S. Gaines Academy K-8
2250 S Jenkins Road
Fort Pierce, FL 34947

SPECIAL NEEDS SHELTER

Havert L. Fenn Center
2000 Virginia Ave.
Ft. Pierce, FL 34950

NOTE: ALL SHELTERS WILL NOT BE OPENED AT THE SAME TIME. YOU MUST LISTEN TO LOCAL RADIO & TV STATIONS FOR INSTRUCTIONS. ALL SHELTERS WILL HAVE FIRST AID PERSONNEL ON HAND. THE SPECIAL NEEDS SHELTER IS SUPERVISED BY THE HEALTH DEPARTMENT
Four major factors combined with the history and probability of a storm occurring generates a high level of vulnerability for our county. These factors are:

1. The physical characteristics of low lying islands and coastal areas bordered by bays, sounds, rivers, estuaries/and
2. An ever increasing coastal population generally inexperienced in hurricane preparedness; and
3. A low-lying and low capacity transportation system which must eventually serve as the evacuation routes for this coastal population; and
4. A significant percentage of the population residing in mobile homes (manufactured housing), recreational vehicles and on boats.
The Saffir/Simpson Hurricane Wind Scale is used by the National Weather Service to give public safety officials an assessment of the potential wind damage from a hurricane. Scale numbers are available to public safety officials when a hurricane is within 72 hours of landfall. Scale assessments are revised regularly as new observations are made. Public safety organizations are kept informed of new estimates of the hurricane’s disaster potential.

Scale numbers range from 1 to 5. Category No. 1 begins with hurricanes in which the maximum sustained winds are at least 74 miles per hour, while Category No. 5 applies to hurricanes with maximum sustained winds of 155 mph or more.

The scale was developed by Herbert Saffir, Dade County Florida, Consulting Engineer, and Dr. Robert H. Simpson, a former National Hurricane Center Director. Scale assessment categories are as follows:

**Category No. 1** – Winds of 74 to 95 mph. Damage primarily to shrub and tree foliage, and unanchored mobile homes. No major damage to other structures. Some damage to poorly constructed signs.

**Category No. 2** – Winds of 96 to 110 mph. Considerable damage to shrub and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roofing materials of buildings; some window and door damage. No major damage to buildings. Some structural damage to small buildings. Mobile homes destroyed.

**Category No. 4** – Winds of 131 to 155 mph. Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows, and doors. Complete failure of roofs on many small residences. Complete destruction of mobile homes. Major beach erosion.

**Category No. 5** – Winds greater than 155 mph. Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe damage to windows and doors. Complete failure of roofs on many residence and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Central Pressures</th>
<th>Winds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Millibars</td>
<td>Inches (MPH)</td>
</tr>
<tr>
<td>1</td>
<td>74-95</td>
<td>Minimal</td>
</tr>
<tr>
<td>2</td>
<td>96-110</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>111-130</td>
<td>Extensive</td>
</tr>
<tr>
<td>4</td>
<td>131-155</td>
<td>Extreme</td>
</tr>
</tbody>
</table>
FACT SHEET FOR HURRICANE AND TROPICAL STORM PROBABILITIES

The National Weather Service issues hurricane and tropical storm probabilities in public advisories. The probabilities are used to realistically assess the threat of a hurricane or tropical storm hitting your community. The probabilities are defined as the chance in percent that the center of the storm will pass within approximately 65 miles of 44 selected locations from Brownsville, Texas to Eastport, Maine.

Probabilities are intended primarily for decision makers in local government and private industry who must begin protective actions early. Your local emergency management officials use probabilities to help decide when to open shelters and begin evacuation. The probability figures are available through the news media.

Probabilities are issued four times a day. The times are: 5 A.M., 11 A.M., 5 P.M. and 11:00 P.M. Eastern Daylight Time. The probability advisories are appended to the public advisories in tabular form.

There are several key points to remember. First, if you live between two listed locations you may estimate your chance of being affected by averaging the numbers on either side. Second, to assess your threat, compare the probability of your community with those of neighboring locations. If you have the highest value, your hurricane threat is greatest. Finally, be sensitive to increasing values from one advisory to the next. Increasing probabilities indicate a greater risk than when probabilities remain the same or decrease.

When the hurricane is 36 to 72 hours from predicted landfall, probabilities are quite low. The numbers increase more rapidly as the storm is closer than 36 hours. If a storm is forecast to be directly over your location in 72 hours, the maximum probability is 10 percent. At 48 hours from predicted landfall, the maximum probability is 13 to 18 percent. At 36 hours the maximum probability is 20 to 25 percent. At 24 hours the maximum probability is 35 to 45 percent. When the storm is less than 24 hours from forecast landfall the values increase even more rapidly to 60 to 70 percent probability.

If you live in an area that requires a long time to evacuate, you may have to leave when probability values are low. Listen carefully to your elected officials concerning evacuation for your community. Heed their advice. If you wait too long your escape route may be cut off by rising storm tides as the hurricane gets closer.

Use caution when interpreting the probabilities. Potential loss of life and property will vary depending on the intensity of the storm. The probability figures do not tell you about intensity. Intensity information is given in the advisory. Secondly, you must not confuse hurricane and tropical storm probabilities with precipitation probabilities. Precipitation probabilities are routinely included in Weather Service forecasts. Not only are the two probabilities computed differently, but the implications of being rained on and being hit by a hurricane are markedly different.

National Weather Service, August 1983
GLOSSARY OF COMMON TERMS

CLOSEST POINT OF APPROACH (CPA)
Point where hurricane eye makes closest contact to shore without actually making landfall.

COASTAL FLOOD WARNING
A warning that significant wind-forced flooding is to be expected along low-lying coastal areas if weather patterns develop as forecast.

COASTAL FLOOD WATCH
An alert that significant wind-forced flooding is to be expected along low-lying coastal areas if weather patterns develop as forecast.

COUNTY DIVISION OF EMERGENCY MANAGEMENT
Local government organization created in accordance with the provision of Florida Statutes 252.31-252.60 to discharge emergency management responsibilities and functions of the County.

COUNTY EMERGENCY OPERATIONS CENTER (EOC)
The county facility that serves as a central location for the coordination and control of all emergency preparedness and response activities.

EMERGENCY ALERT SYSTEM (EAS)
A system designed to permit government officials to issue up-to-date and continuous emergency information and instructions to the public in case of a threatened or actual emergency.

EMERGENCY PUBLIC INFORMATION
Information, which is disseminated primarily, but not unconditionally, at the actual time of an emergency; and in addition to providing information as such, frequently directs actions, instructions, and transmits direct orders.

EMERGENCY PUBLIC SHELTER
Generally a public school or other such structure designated by County officials as a place of refuge.

EVACUATION TIME
The lead-time that a populated coastal jurisdiction must have to safely relocate all residents of vulnerable areas from an approaching hurricane. This time can also be perceived as the necessary amount of time between the issuance of the local official evacuation order and the arrival of sustained gale force winds (40 mph) and/or flooding.

EXTENT OF EVACUATION
The identification of vulnerable people who must evacuate as a result of various hurricane scenarios, based on estimated inundation areas and/or dwelling units susceptible to hurricane force winds.

FLOOD WARNING
Indicates the expected severity of flooding (minor, moderate, or major), as well as where and when the flooding will begin.

FORWARD SPEED (HURRICANE)
The rate of movement (propagation) of the hurricane eye in miles per hour or knots.

GALE WARNING
Is defined as sustained winds within the range 39-54 miles an hour (34-47 knots) either predicted or occurring. NOTE: Gale warnings are not normally issued during tropical cyclone situations.

HURRICANE
The term is used when winds reach constant speed of 74 miles per hour or more. These winds blow in a large spiral around a relatively calm center of extremely low pressure known as the eye of the hurricane. Around the rim of the eye, winds may gust to more than 200 miles per hour. The entire storm dominates the ocean surface and lower atmosphere over tens of thousands of square miles.

HURRICANE ADVISORIES
Notices numbered consecutively for each storm, describing the present and forecasted position and intensity of the storm. Advisories are issued at six hour intervals at midnight, 6:00 AM., noon, and 6:00 P.M., Eastern Daylight Time. Bulletins provide additional information. Each message gives the name, eye position, intensity, and forecast movement of the storm.

HURRICANE EYE
The relatively calm area near the center of the storm. In this area winds are light and the sky is often partly covered by clouds.

HURRICANE EYE LANDFALL
The point in time when the eye, or physical center of the hurricane reaches the coastline from the hurricane's approach over water.

HURRICANE PATH OR TRACK
Line of movement (propagation) of the eye through an area.
HURRICANE SEASON
The portion of the year having relatively high incidence of hurricanes. In the Atlantic, Caribbean and Gulf of Mexico, it is usually regarded as the period from June 1st through November 30th.

HURRICANE/TROPICAL STORM PROBABILITIES
National Weather Service issues hurricane/tropical storm probabilities in public advisories to realistically assess the threat of a hurricane or tropical storm hitting your community. The probabilities are defined as the chance in percent that the center of the storm will pass within approximately 65 miles of 44 selected locations from Brownsville, Texas to Eastport, Maine. Fort Myers, Florida is one of the 44 selected locations.

HURRICANE WARNING
An alert added to a hurricane advisory when hurricane conditions are expected within 24 hours. Hurricane warnings identify coastal areas where winds of at least 74 miles per hour are expected to occur. A warning may also describe coastal areas where dangerously high water or exceptionally high waves are forecast, even though winds may be less than hurricane force.

HURRICANE WATCH
An alert added to a hurricane advisory covering a specified area and duration. A hurricane watch means that hurricane conditions are a real possibility; it does not mean they are imminent. When a hurricane watch is issued, everyone in the area covered by the watch should listen for further advisories and be prepared to act quickly if hurricane warnings are issued.

NOAA WEATHER RADIO
A twenty-four hour continuous broadcast of existing and forecasted weather conditions for St. Lucie County utilizing the weather radio frequency of 162.425 MHz.

PRE-EYE LANDFALL TIME
The time before actual hurricane eye landfall or CPA within which evacuation cannot be carried out because of earlier effects such as the inundation of evacuation routes from the storm surge or rainfall and the arrival of sustained gale force winds. It is composed of the time of arrival of sustained gale force winds or the time roadway inundation from storm surge/rainfall begins, whichever comes first.

PUBLIC INFORMATION OFFICER (PIO)
An individual appointed by County Emergency Operations Center (EOC) to be responsible for the formulating and coordinating of the dissemination of emergency public information with both the electronic and written media, ensuring that accurate information is being released to the general public.

SEVERE THUNDERSTORM WARNING
Indicates that severe thunderstorms have been sighted or indicated on radar.

SEVERE THUNDERSTORM WATCH
Indicates that conditions are favorable for lightning, damaging winds greater than 58 miles and hail and/or heavy rainfall.

SHELTER PERIOD
The interval of time from that point of evacuation until the primary situation or event has decreased to a level which will permit people to leave designated emergency public shelters. This time may vary from several hours to a couple of days depending upon the degree of the severity of the hurricane event.

SLOSH (Sea, Lake and Overland Surges from Hurricanes)
A computerized model which is able to estimate the Overland tidal surge heights and winds that result from hypothetical hurricanes with selected characteristics in pressure, size, a forward speed, track and winds. The resultant tidal surge action is then applied to a specific locale's shoreline configuration, while also incorporating the unique bay and river configurations, water depths, bridges, roads, and other physical features. The model estimates open coastline heights as well as surge heights over land, thus predicting the degree of propagation or run-up of the surge into inland areas.

SMALL CRAFT ADVISORY
A warning of winds from 20 to 33 knots inclusive or for sea conditions either forecasted or occurring, which are considered potentially hazardous to small boats in coastal waters.

SPECIAL MARINE WARNING
A warning for hazardous weather conditions, usually of short duration, not adequately covered by existing marine warnings. Such weather conditions include sustained winds or gusts of 35 knots or more with a duration of 2 hours or less.

SQUALL
A sudden increase of wind speed by at least 18 miles per hour (16 knots) and rising to 25 miles per hour (22 knots) or more and lasting for at least one minute.

STORM SURGE
The high and forceful dome of wind-driven waters sweeping along the coastline near where the eye makes landfall or passes close to the coast.
HURRICANE AWARENESS

A hurricane need not create the fear some people associate with the impending storm. Preparation before the hurricane season and before storms arrive are the key to seeing a hurricane through SAFELY. Remember - a hurricane consists of two factors, WIND AND WATER. You can reduce damage by being prepared. Residents who properly prepare themselves and their homes reduce their discomfort and damage from a hurricane.

Three groups of residents should consider evacuation a must if a hurricane threatens to strike our county:
1. Residents of the off-shore islands and barrier islands.
2. Residents of boats, mobile homes, and recreational vehicles, even when threatened by a minimal hurricane.
3. Residents along all rivers and those extremely low lying flood prone areas whose homes, even if well constructed, offer little protection against storm surge or rainfall flooding.

HURRICANE PREPAREDNESS

Here is a list of some of the things that you can do before the Hurricane Season (June 1 to November 30) officially starts.

- Restock your supply of boards for shutters, tools, lanterns, matches, batteries, flashlights, and nonperishable foods. Make sure you have a portable, battery-operated radio in good working condition.
- Make sure your house is in good condition. If repairs are needed, do them as soon as possible.
  - Check soundness of roofs.
  - Clean gutters and downspouts.
  - Remove dead branches from trees and trim shrubs.
  - Acquire storm shutters or boards to protect glass windows and doorways.
- Know the first floor elevation (above Mean Sea Level) of your home or place of business.
- If you live in a mobile home, recreational vehicle, boat or on a barrier island, pre-arrange for safe refuge. Do not plan to remain in your home during the hurricane.
- Review your property insurance coverage with your insurance agent. Make sure you have enough insurance to fully replace your home and its contents.
- Public transportation is very limited. If you have no transportation, it is strongly recommended that you make arrangements with a relative, close friend, neighbor, or through your civic association for transportation help. Have them pick you and your family up and take you to the nearest designated emergency public shelter or another safe refuge.
- Make necessary arrangements for the safety of your pets and your boat.
- Remember each individual is responsible for preparing for his or her special needs in response to a hurricane threat. If the emergency warrants evacuation because of life threatening hazards, County officials may advise, or order evacuation of vulnerable areas. Your cooperation in preparedness efforts is essential to you and your neighbors' protection. Please be prepared.
YOUR “SAFE PLACE”

If you are staying in your one-story home, the strongest room is often a bathroom or walk-in closet near the center of the house away from windows and exterior doors. For a two-story house, the strongest wall is often a closet or cubicle near the stairwell. Stock your safe room with a first aid kit, small supply of food and water, a flashlight, tools to break through the rubble afterwards, a cellular phone (a cordless phone will not work without power), blankets and pillows, a radio, games and reading material, a strong animal carrier, and a mattress to protect you from falling/flying debris. You should also have copies of your insurance policies in a waterproof container. You will only be here for a few hours. Wear protective clothing you may have to push through debris to leave your safe place. If possible, reinforce this room with wooden beams for added protection. With other family members, identify in advance your escape routes out of the house.

GENERAL HURRICANE SAFETY RULES

LEAVE EARLY from low-lying beach areas. Low-lying areas are susceptible to high tides or storm waves. Leave mobile homes and recreational vehicles for more substantial shelter. Mobile homes and recreational vehicles are particularly vulnerable to strong winds.

BE AWARE that some areas will flood long before the arrival of the storm. Your evacuation route could be further complicated by the fact that the population density of some areas make it mathematically impossible for the evacuation roads to accommodate everyone within one day. Don’t get caught by the hurricane in your car on an open coastal road.

If local government advises evacuation of your area, LEAVE IMMEDIATELY. Turn on your car radio and listen for further instructions, such as the location of designated emergency public shelters. The magnitude and severity of the storm will dictate

SUPPLY CHECKLIST

Place these items in large waterproof containers. Your supplies should last you two weeks.

☐ Can Opener – manual.
☐ Disposable cups, plates and utensils (saves on water).
☐ Paper Towels and Baby Wipes
☐ Ice
☐ Gallon Zip-Lock Bags for making ice and waterproofing items.
☐ Large Garbage Bags to collect refuse and waterproof items.
☐ Cooking Facilities – Grill, charcoal and lighter fluid; gas grill and extra propane refills; fondue pot with sterno refills.
☐ Matches in a waterproof container.
☐ Food Supplies for at least seven days, preferably two weeks: Canned goods; meat, fish, fruit, soup, veggies (use liquids for cooking). Other Foods: peanut butter, jelly, bouillon cubes, fresh fruit, bread, cereal, ice, crackers, chips, peanuts, cheese, dried foods. Powdered or canned beverages (coffee, powdered milk with chocolate syrup, cola, punch, Kool-Aid, fruit juices). Bottled Water (1-1/2 gallons per person for seven days).
☐ Bleach (several gallons) for water purification (not the scented kind) or cleanup. Must not contain cleaning agents. Sodium Hypochlorite must be the only active ingredient.
☐ Eyedropper for measuring bleach.
☐ Soap in a plastic container.
☐ Toiletries – one month supply: toilet paper, aspirin, antacid tablets, anti-diarrhea medicine, cough medicine, allergy medicine, sunscreen, chapstick.
☐ Bug Repellant
☐ Pet Food and Cat Litter, Pet Carrier
☐ Film for camcorder and camera.
☐ Cash or Traveler’s Checks.
☐ Prescriptions refilled.
☐ Needle and Thread
☐ First Aid Kit and Manual: (3) rolls gauze adhesive bandages (assorted sizes), gauze pads (2 and 3 inch), adhesive tape, cotton swabs, moistened towelette packets, antiseptic ointment, first aid cream, hydrogen peroxide, burn ointment, rubbing alcohol, ammonia inhalants, scissors, needle, safety pins, thermometer, tweezers.
Copy of homeowner’s flood and auto policies and agent’s telephone number. The originals should be in your safe deposit box.

Fill car and fuel cans with gasoline.

Unleaded Gas and Mantles for Lantern.


Fuel for generator or chain saw.

Batteries – Two sets for every item you plan to use. One alkaline battery will last for 24 hours with continuous use; regular zinc carbon batteries will only last 2 to 4 hours during continuous use. Regular batteries should be used for flashlights and other items which do not draw much power.

Portable Radio

Portable TV with extra batteries (battery consumption is high).

Flashlights with extra bulbs.

Hurricane Lamps and oil.

Caulking to seal drain on tub and sinks (silicone type for easy removal).

Latex Gloves

Household cleaners and disinfectants for cleanup.

Fire Extinguisher (fully charged).

Duct Tape for securing broken windows.

Masking Tape – 2” wide.

Extra Shutter Fasteners and Bolts

Drill and Screwdriver Bits and Adaptor for Bolts for installing shutters.

1/2” CDX Exterior Plywood and Hardware (1/4” machine screw anchors or lead shields, large deep lag bolts, roofing nails and tin tabs) for securing windows and patching holes in the roof.

Roofing Tar and Tarpaper (or self-adhesive roofing paper) for a Category 3 and above storm.

Plastic covering (or tarpaulin, visqueen, canvas) for large holes in the roof, broken windows, making tents and to cover furniture.

Rope or Heavy Cord for clothesline and securing boats.

Ground Anchors to secure boat and tool shed.

Hammer and Nails

Screwdrivers

Razor knife

Emergency Generator - $200 for a 750 watt model that will run a few light bulbs to $2,000 from an 8,000 watt that will run everything in your house. A 4,000-watt model will run a small A.C., refrigerator and lights. A fuel tank larger than 5 gallons is preferable because it runs longer. Five gallons will be needed to run the generator all night long. Also, the generator should have an Oil Alert Switch to indicate the oil level.

Heavy Duty Extension Cords for generator connection to appliances.

Chain Saw – Small ones start at $100. Get one with a 12-14 inch chain – it will give 2-3 days of steady cutting before the chain has to be replaced. Extra chains cost $8.

Axe or Hatchet and Handsaw

Crowbar

Work Gloves

NOTE: The Federal Emergency Management Agency (FEMA), National Weather Service, and the American Red Cross all advise people not to use candles at all for any reason during or after a disaster. Candles can easily be knocked over by a gust of wind, and they tend to invite child fire play.
CARE OF HOUSEHOLD PETS

Write a family emergency plan and include the necessary arrangements for the safety of your pet(s) to board during the storm, and reserve space for your animals. Contact hotels and motels which will accept pet(s) if you decide to leave the area. There may be restrictions on the size and number of pet(s) allowed. If you plan to go to a public shelter, animals are not allowed to go with you.

BEFORE A STORM EMERGENCY:

Advance planning is essential and it could save your pet(s) life. You do not have to jeopardize your lives for your pet(s) when you are prepared.

☐ A pet carrier or portable kennel for each pet is a must. Acquire a pet carrier or portable kennel large enough for each pet to comfortably stand up and turn around inside. These carriers are available at local department, discount and pet supply stores.

☐ Take the time to familiarize your pet(s) until it feels secure and comfortable in the carrier. Include a cover (sheet, blanket) to place over the carrier to help your animal feel secure. Make sure your pet is current on all inoculations and is wearing tags identifying such. Keep a leash handy.

☐ Identify your pet(s) by current license and rabies tags on a properly fitted collar and, if you choose, by micro-chipping, tattooing or freeze-branding. Consider placing an ID tag with an out-of-state contact name and address along with your pet(s) local information on its collar. Displaced pets have a greater chance of being reunited with their owners when they are wearing current identification tags. Take clear, color photos (frontal, left and right sides) and store with your pet’s license, health records and ownership papers in a waterproof carrier to take with you.

☐ Reserve space at an animal clinic or boarding kennel, which will accept pets to board during a storm emergency. Call early, as space is very limited. When reserving space, confirm which vaccinations are required by the facility as many boarding facilities require current proof of vaccinations before accepting pets. Ask who will be staying with the animals and what they will do if evacuation of the facility becomes necessary. Ask when you must reclaim your pet(s) after the “all-clear” has been declared and what the costs will be if you cannot immediately take your pet(s) back home with you. When a Tropical Storm is named, call ahead and make reservations at a hotel/motel within a 100-mile radius and located away from coastal and river areas. Ask about the cancellation penalties, size restrictions, number of pets allowed and fees. Prepare a Small Animal Emergency Kit for each pet.

☐ Sign a Foster Care Agreement with someone out of the evacuation area in the event you must go to a shelter and cannot take your pet(s) or if you lose your home and cannot take care of your pet(s) for an extended period of time. Develop a list of friend & relatives who could also care for your pet(s) for an extended period of time. Prepare a Small Animal Emergency Kit for your pet(s).
MAKE YOUR SMALL ANIMAL EMERGENCY KIT:

- Carrier or portable kennel for each pet.
- Pet(s) ownership, registration, photos, and health papers.
- A leash and properly fitted collar/harness to restrain each pet.
- Non-spill food and water dishes.
- Water in non-breakable containers.
- Food supply and a manual can opener.
- Special medications, dosage, and care instructions.
- Newspapers/litter, scooper, plastic bags for wastes.
- Cleanser and disinfectant to properly handle wastes.
- Grooming equipment and hygiene items.
- Toys, blankets, and special comfort items.
- Consult your vet on what you need for your Pet First Aid Kit, and what to do if your pet(s) is on a special diet or needs motion sickness and other medications.

EVACUATION PLANS:

If you evacuate without your pet:

- Bring you pet(s) indoors. **DO NOT LEAVE ANY PET(S) OUTSIDE OR TIED UP DURING A HURRICANE.**

- Survey your home and determine the best location to place your pet(s) away from windows during a storm. Consider an easy-to-clean utility room, bathroom or other tiled area.

- Prepare an area for the pet(s) to use inside the house away from windows, such as a utility room, garage, bathroom or other tiled area, which can be easily cleaned.

- Leave plenty of drinking water. You can use a bathtub or other non-spillable container.

- Leave only dry foods in sturdy food containers.

- Birds must eat daily, put special food dispensers in cages.

- Never leave a cat with a dog, even if the two are normally friends.

- Confine and keep small pets, (birds, hamsters, etc.) away from cats and dogs.

- Provide access to high places such as counter tops and sofas, in case flooding occurs.

- Difficult or dangerous animals should be left in special crates or cages to reduce the possibility of escape.

- If you must evacuate, if possible, take your pet(s) and their Emergency Kits along with you. If it is unsafe for you to remain, then it is unsafe for your pet(s) as well.

AFTER THE STORM:

- The American Red Cross recommends never using candles or oil lamps, especially with pet(s) around.
Walk your pet(s) on a leash until they become reoriented to their surroundings.

Do not allow your pet(s) outdoors after the storm has passed without a leash. Familiar scents and landmarks will be altered and your pet(s) may become confused and lost. Debris, snakes, theft, downed power lines, displaced wildlife, contaminated food and water are some dangers your pet(s) will encounter if you allow them to run loose after the “all-clear” has been declared.

If your pet is lost during the storm emergency, contact the Veterinary Clinics/Hospitals, Boarding facilities, Humane Society and Animal Control Offices in your area. Having clear photos of your pet(s) will increase your chances of recovering your pet(s).

If you find a pet during the storm emergency, contact the facilities listed on the important number’s page of this Manuel.

ALL ABOUT YOUR PET’S MICRO CHIP

Your pet can have a microchip implanted by any participating veterinarian. The microchip has a unique number that will positively identify your pet if picked up by animal control, a stranger or even a thief. The microchip cannot be removed and will remain operative for the entire life span of your pet. If your pet is lost or stolen, this microchip will assist you and everyone concerned in reuniting your and your pet.

What is a Micro Chip?

A microchip is about the size of a grain of rice. It is implanted under the skin where it will firmly attach itself to the animal’s normal tissue within 48 hours after insertion. The microchip has no batteries or moving parts therefore no maintenance is required.

How Does A Microchip Work?

The microchip is located by a device called a scanner. As a scanner is passed over the animal it, painlessly, detects and displays the microchip number. All animal control officers within St. Lucie County, as well as most other counties across the country, are equipped with scanners. A large percentage of humane societies are also equipped with scanners. Here at the Humane Society of St. Lucie County EVERY animal received by us is scanned for a microchip.

The Humane Society of St. Lucie County has a computer system that is running 24 hours per day, 7 days a week, 365 days a year that may be accessed by any animal control agency or participating veterinarian to aid them in locating the owner of an animal that has a microchip. This computer system was built and is maintained by the Humane Society of St. Lucie County and access is offered to all veterinarians and animal control agencies at NO CHARGE.

Keeping Your Information Current:

Naturally, if your current telephone number or address is not on file when your animal is found, we will not be able to reach you quickly or at all. If your animal is injured, a matter of just a few minutes could be vital to the survival of your pet. WE MUST BE INFORMED IF THERE IS ANY CHANGE HOW WE MAY REACH YOU. You may call us during our normal operating hours, 10:00am to 4:00pm, Mon. – Sat., and inform us of any changes you may have had. THERE IS NO CHARGE FOR THIS SERVICE!
QUESTIONS

In your Hurricane Emergency Plan:

- Are your pets current on their inoculations and properly identified?
- If you must evacuate, will your pet(s) go with you or will they stay at home?
- If you must evacuate without your pet(s) what room would be
- If your pets are lost in a storm, who would be the first facility that you would contact?
2004 Hurricane-Related Insurance Payments

St. Lucie County was struck directly by two hurricanes during the 2004 Hurricane Season: Hurricanes Frances and Jeanne.

St. Lucie County property owners were hard hit during the 2004 Hurricane Season. Statewide, roughly 60% of insurance claims were paid to homeowner. Below is a summary of the number of claims submitted and paid to county property owners by insurance companies. These numbers were published in March 2005 and may change as the state updates their numbers.

<table>
<thead>
<tr>
<th>Named Hurricane</th>
<th>Number of Claims</th>
<th>Claims Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charley August 13, 2004</td>
<td>1,293</td>
<td>9,505,965</td>
</tr>
<tr>
<td>Frances September 3, 2004</td>
<td>57,726</td>
<td>949,050,224</td>
</tr>
<tr>
<td>Ivan September 13, 2004</td>
<td>831</td>
<td>5,295,112</td>
</tr>
<tr>
<td>Hurricane Jeanne September 24, 2004</td>
<td>30,821</td>
<td>196,107,522</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Summary</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>Number of Claims</td>
<td>Claims Payment</td>
</tr>
<tr>
<td>St. Lucie County</td>
<td>90,673</td>
<td>1,159,958,823</td>
</tr>
</tbody>
</table>

PRIOR TO THE HURRICANE

When a Hurricane Watch is announced, it means hurricane conditions are a real possibility for Florida. It does not mean a hurricane is imminent. When a Hurricane Watch is issued, listen for further advisories on a local radio or television station.

This is the time to begin Preliminary Precautions:

☐ Fill your car with gas. Make sure the battery is in good condition. Review county and state roadway maps.

☐ Check your battery-powered equipment. Your radio could be your only link with the outside world during and after a hurricane.

☐ Lower or secure TV and radio antennas (CB or HAM) to prevent antennas coming in contact with electrical wires. Remove all items from the yard and open patios. Board up windows. Close shutters, awnings, windows, and drapes.

☐ If you plan to stay home, check your supply of emergency food and water. Emergency food supplies should include: canned fish or chicken or meat; fruits (fresh and dried); soups; juices; milk (fresh or powdered); dry cereal; cookies; and bread. Include any other non-refrigerated food necessary for your family. Small families should purchase single serving size containers. Obtain and fill clean containers with drinking water. Do not store drinking water in used milk containers.

☐ Pack your valuables in waterproof containers. Valuables include jewelry, titles, deeds, insurance papers, licenses, stocks, bonds, inventory list, etc., in waterproof containers. Place valuables in a safety deposit box. If you do not have a safety deposit box, keep your valuables with you. Keep important papers with you at all times.

☐ Refill prescription drugs. Obtain an extra supply of special medication.

☐ Make arrangements for the safety of your house pets. Pets are not allowed in designated emergency public shelters.

☐ Make arrangements for the safety of your boats. Remember, if the situation warrants a mandatory evacuation, drawbridges will be closed to boat traffic.

☐ Fill clean plastic containers, cooking pots, or clean bathtubs with drinking water.

☐ Turn your refrigerator and freezer to the coldest setting. This will preserve food as long as possible in case of a power failure.

☐ Do not drain your swimming pool. Keep the swimming pool full to approximately 12 inches below the edge, to compensate for expected rain fall.

☐ Wedge sliding glass doors to prevent them from being lifted from their tracks. Brace your garage door. Protect appliances and furniture. Elevate them above floor level and cover them with plastic.

☐ Stay tuned to local radio and television stations for official weather statements and emergency instructions for your specific area.

☐ If county authorities advise or order evacuation of your area, LEAVE IMMEDIATELY.

☐ If you plan to go to an emergency public shelter, take these items: drinking water in a plastic container, nonperishable food, medicine, blankets, a complete change of clothing, personal hygiene items, flashlight with extra batteries and bulbs, quiet toys or games for children, plastic trash bags, eating and cooking utensils (plastic or paper), manual can and bottle opener, and a portable radio with extra batteries. Remember alcoholic beverages, pets, and weapons are not allowed in emergency public shelters.

☐ If you leave your home, shut off gas and electric at the main power source. Shut off water lines into your home. Lock all windows and doors before leaving your residence. Call relatives and friends and let them know what you are doing and where you are going. This will reduce phone system overloading from them trying to get in touch with you.

☐ If you live inland, away from the beaches and low lying coastal areas and your home is well constructed, stay home and make emergency preparations. Do not stay if officials recommend evacuation.

☐ Be alert for tornado watches and warnings. Hurricanes often spawn tornadoes. If your area receives a tornado warning, seek inside shelter immediately. Stay away from windows.

☐ If you stay in your residence, avoid using electric appliances. Seek refuge in a small, interior area such as a hallway, closet, or bathroom.

☐ If your evacuation route is impassible and you become trapped on low ground, seek refuge in a third or fourth floor hallway of a high-rise building.
ADVANCE PREPARATIONS

EVACUATIONS

Many residents will evacuate from South Florida through our area, and the number will be much greater since Andrew’s destruction has been seen. Get going EARLY!!! Traffic will be bottlenecked on the local highways because people from four counties will be heading north in an area where there are few north/south roads. It is recommended to leave three days in advance. Hotel rooms during Andrew could not be found until you reached the Georgia border (make reservations in advance, if you can). Combine these facts with the fact that you may be heading into the storm’s northerly path anyway, and the result is: do not count on driving out as an option. Choose a hurricane shelter as a last resort (try to stay with friends who do not live in an evacuation zone). Make sure you turn off the water and electricity before you leave and bring along all valuable documents and irreplaceable items (photo albums). See “OUTSIDE PREPARATIONS BEFORE THE STORM – CAR”.

SHELTERS

If you must go to a shelter, bring your own supplies because none will be provided for you. Most shelters are run by the Red Cross and do not supply food or beds. You should go as soon as a shelter announces that it is open because space is limited. Bring a flashlight, radio, medicines, food for 24 hours, sleeping bags and pillows, a folding chair, toiletries, photocopies of valuable papers, identification, and items to keep you amused. You may not bring guns, alcohol or pets. Make sure you turn off the water and electricity before you leave. Only guide dogs are allowed in shelters. Leave your pets home alone only as a last resort (be sure to leave a five day supply of food and leave the animal in your safe place). Call a kennel in advance to reserve space. Ask about emergency procedures and admission requirements. Many kennels require proof of vaccinations, so arrange for those in advance. Some branches of the Humane Society accept pets, but call first. Be sure to identify your pet with tags and bring a collar, familiar toy or blanket, and any needed medications.

WORK REQUIREMENTS: Ask your boss now to excuse you from work to tend to children when a storm threatens. If your job requires you to work during the storm, make sure now that, when the hurricane hits, at least one parent or adult will be with the children.

PEOPLE WITH SPECIAL NEEDS: Those people who need help with evacuations or require care in the aftermath of a storm should register with your local Emergency Management Office. Keep the registration form handy. Find out if they will provide transportation and be prepared to bring a safety kit such as that listed under “EVACUATIONS”.

SURVIVAL is essentially up to you – it is critical to be able to be independently capable of survival. You are on your own!
INSIDE
PREPARATION
BEFORE THE STORM

Leaves a message with neighbors if you will be leaving your home. Also, inform at least two family members who live outside your area what your hurricane plans are.

Children should be advised of what is going on. The more they know, the more confident they will be. Let them help you in your preparations. Make sure you are calm enough not to frighten them. Make sure they understand how important it is for them to listen to adults during the storm.

Take Pictures and videotape the house inside and out. Include individual pictures of valuable items. Make a detailed inventory listing (price, date purchased). Keep original in your safe deposit box and a copy with you in your "safe place".

Important Papers should be stored in waterproof containers: copy of insurance policies, income tax records, picture albums, home inventory, and home videos. Bring with you to your "safe place".

Medication should be stored in a waterproof container.

Furniture should be moved away from all windows, cover with plastic and draw all drapes.

Pictures/Paintings - wrap in plastic garbage bags.

Computer, TV and Stereo - Unplug and wrap these items in plastic garbage bags.

Video Batteries - Recharge for filming after the storm.

Cards, Games and Books - Gather for entertainment without electricity.

Water - Fill all available containers. You will need 4 quarts per person per day (2 quarts for drinking, 2 quarts for sanitation). Wash containers and rinse with bleach. After they are dry, fill with tap water.

Bathtub and Sinks - Clean, sponge with bleach and let dry. Caulk the drains with a silicone caulking and let dry. Fill with water to be used for sanitary purposes only.

Refrigerator and freezer set to coldest setting. Freeze water filled containers to help keep foods frozen longer. Fill refrigerator with containers of water for storage and to keep the refrigerator cooler longer. Correct temperatures can be maintained for 48 hours in the freezer and 2 hours in the refrigerator if left unopened.

Ice Chest - Fill with ice to put cold-cuts, condiments and drinks in after the storm. This will keep the refrigerator and freezer colder longer by not frequently opening the door.

OUTSIDE PREPARATION

Garbage Can - scrub clean and dry out. Use for waterproofing items such as charcoal, cat litter, etc.

Tape windows - this past practice is no longer recommended. All tape does is prevent windows from breaking into small pieces. The Federal Emergency Management Agency, National Hurricane Center and the American Red Cross jointly recommend that all windows must be protected with substantial hurricane shutters or covered with 5/8-inch plywood to prevent windows from breaking at all.

Jalousie Louvers - Insert newspaper between louvers to prevent rain seepage. Hurricane shutters are especially recommended.

Screen Enclosures - Remove panels as well as the aluminum door and panels.

Sliding Glass Doors - Brace by tapping wedges in the top track.

French doors - Brace with 2 x 4's.

Ornamental Shutters - Remove. Attic: Remove valuable items and close the attic door.

Roof Turbines - Remove and install covers with screws. Otherwise cover the turbines with plastic and tie down securely.

Chimneys - cover with caps.

Plumbing Vent Stacks on the roof should not be closed. They allow sewer gases to escape.

Gutters and downspouts should be cleaned out. Loose ones from outside should be gathered and brought inside.

Dead Tree Branches and Coconuts - Prune trees so the wind can blow through the branches without snapping them. Remove dead branches and coconuts. Do these items only if you have a place to store the debris.

Lock all windows, exterior doors and gates.

Turn off water at the meter to prevent contaminated water from entering the home.

Outside Antenna - Remove after disconnecting the television and the power source.

Storage Shed - Tie down with straps or thick rope using ground anchors. Lock door.

Air Conditioning Unit should be wrapped with plastic.

Pool Pump Motor - wrap with plastic.

Swimming Pools - Drain approximately one foot of water from the pool (saturated grounds or changes in pressure can force a drained pool out of the ground). Add at least three gallons of chlorine for each 5,000 gallons of water (a 15 x 30 pool contains 15,000 gallons of water). Cut off the electricity to the filter motor, then remove it or wrap it in plastic. Cut off electricity to the pool lights. Do not put the patio furniture in the pool (it can damage pool surfaces).
SURROUNDING AREA

Landscaping: In terms of Ground Zero landscaping, nothing is going to make it. Prune trees (except pines) in the middle so the wind can blow through the canopy without snapping them (“Hatracking”). See trimming instructions on next page.

A lacy, open canopy with few limbs internally is best (example: Kapok trees, Poinciana trees, Live Oaks) and you should avoid trees with narrow V crotches that are prone to splitting. Palm trees with open fonds (Queen Palm) will do better than those with a closed, palm shaped fond. Consider removing trees, such as Australian pines, which do not have deep taproots. Trees in some areas do not have very deep roots due to the high water table or they were grown in containers where the roots spiraled before planting leading to a poor root system. Also consider removing large, top heavy trees that are close to your house (black olives, ficus).

PRIVACY WALLS constructed of concrete, if strategically placed can be helpful in deflecting the wind force away from the building.

TREE REMOVAL As soon as the hurricane has passed workers usually appear with chain saws. Many are individuals anxious to make a “fast buck” removing trees and other damaged property. Before agreeing to have any tree work done contact your local tree services. Tree removal requires considerable skill. A felled tree can cause damage to the home or to a neighbor’s home. Also, there is the potential for a tree cutter to be injured. Local tree services are licensed, insured and experienced. They carry liability insurance eliminating the potential for the homeowner to be sued in case of an accident. Ask for an estimate of the cost for work needing to be done and a time schedule for the work to be completed. Find out if the trees will be removed from property after they are cut. If possible get an estimate from more than one tree service. Have all details of the agreement written into a contract and signed by the company and the homeowner.

If considerable damage is done by a hurricane, tree service companies from throughout the region may come to the area to help clear away the devastation. This can be an asset if there is more work to be done than the local companies can handle. Before employing one of these companies ask to see its license and evidence of liability insurance. Get all pertinent information in a written contract before employing a company and before the work begins.

Be very wary of employing any unknown individual who appears with a chain saw. Tree removal is a high-risk operation that requires skill. If an uninsured worker is injured on your property you may be sued for damages. In spite of the risks involved, if you decide to employ an independent tree cutter, draw up a written contract that clearly spells out the work to be done. (Example: number of trees to be cut, stump height or treatment, what is to be done with the cut trees and by whom, beginning and completion date of work and amount to be paid and when. NEVER pay for work before it is done. Include a statement about who is responsible for expenses in case of an accident. This should include what happens if the worker damages your property accidentally and who pays if the worker is accidentally injured. This statement is no assurance of protection but it may help. Remember, if a company comes to your door and solicits your business, you have three business days within which to cancel the contract if you change your mind provided the work has not been done. You must be given the name, address and telephone number where the company can be reached for cancellation.
Trimming trees

Trees and shrubs should be trimmed before hurricane season. Don't trim once a hurricane watch or warning has been issued; trash pickup will be suspended, and the storm could turn your trimmings into dangerous missiles.

• The canopy of a dense or vine-covered tree is too solid to allow air to pass through. Such a tree will catch and hold the wind like an umbrella. Winds will topple or uproot the tree.

Hatracking
A 'hatracked tree is one that has been so heavily pruned that only stubs of branches remain.
PROTECTING A MOBILE HOME

Of the 1,167 mobile homes in Homestead, 99% were leveled—only nine remained standing after Hurricane Andrew.

Never stay in a mobile home during a hurricane. Its flat sides and ends, along with its light weight, literally make it a pushover.

To tie down a mobile home

- Over-the-top straps keep the homes from tipping over. The straps are secured with anchors on each side.
- Frame ties made of wire rope or rust-resistant steel strapping prevent the home from tipping over. They may secure the frame ties to the home and itself is not strapped down properly, the home can be blown off its fixed frame.
- Use both over-the-top straps and frame ties to secure mobile homes 10, 12 and 14 feet wide. (Double-wides, because their width makes them more stable, usually require only frame ties.)

SOURCES: Broward County Division of Emergency Preparedness, Fleetwood Manufactured Home Installation Manual
CHECKLIST FOR BOATERS

PRELIMINARY ACTIONS

☐ Locate hurricane moorings. Obtain permission from appropriate persons to moor your boat. For keel boats, make certain there is enough water at low tide.
☐ Make a practice run to check accessibility, depth of water, bridges, locating aids, and obstructions to navigation. Remember, drawbridges will not open for boats during evacuation.
☐ Record and keep with you the vessel's registration number, engine numbers, description, and its mooring location.
☐ Inform the local Marine Patrol or police officials of your secured vessel's identification and location.
☐ Vacations, business trips, or other reasons for being out of town during hurricane season requires you to make plans for your boat's safety. Ask someone knowledgeable of boat safety procedures to care for your boat if necessary.
☐ Check your marina contractor policy. Know your responsibilities and liabilities with your boat and the marina.

☐ Keep fuel tanks full during hurricane season.
☐ Keep batteries fully charged. An extra or spare battery is a good idea. Keep bilge pumps in working order.

SECURING THE BOAT

☐ Prepare, in advance, a checklist of things needed to secure your boat. Assemble equipment and supplies. Keep them together in a handy location.
☐ You may fasten your boat to large trees. Ensure that the trees chosen are alive and have a good root system. Some trees are stronger than man-made pilings.
☐ Tides can reach heights of 10 to 20 feet above normal. When securing lines, take care to consider tide fluctuation. If tied off too short, your boat can be pulled under or be damaged as the tide rises.
☐ Wind direction reverses itself in a hurricane. Secure your boat for all directions. Use more than one anchor.
☐ Strip your boat of all movable equipment such as canvas, sails, dinghies, radios, and cushions. Lash down all items you cannot remove, such as tillers, wheels, booms, etc.
☐ Seal all openings to make your boat as watertight as possible. Air conditioning duct tape can be used as a sealer.
☐ If you leave your boat on a davit, leave the boat drains open.

SECURING BOAT'S ON LAND

☐ Place wooden blocks between the frame member and axle inside each wheel. Let about half of the air out of the tires. Fill the boat 1/3 full of water to help hold it down. The blocks will prevent damage to the trailer springs from the additional water weight.
☐ Tie your boat and trailer securely to a strong object such as a telephone pole or large tree. Use heavy-duty line.
SEARING BOAT'S ON LAND,  
Continued

☐ Remove outboard engine if possible.
☐ Pick a site away from trees and power lines. Do not park between buildings where wind tunnels can develop. Remove electrical equipment and strip all loose gear or gear affected by wind.
☐ Use wooden blocks at the trailer’s wheels. Deflate the tires. If boat is on a trailer, lash it to trailer and tie trailer down to something secure. Ground anchors are best and can be purchased if there is time.
☐ If you don’t have a trailer, fill the boat with water and tie it to the most secure thing you can find in your yard. If the boat is very small, gurnit upside down and lash it to the ground or put in garage and leave car outside!

For a free guide to securing boats, contact the Boat Owners Association of the United State (BOAT/US): (800) 283-2883 or www.boatus.com/hurricanes
PROTECTING YOUR BOAT IN A HURRICANE
Whatever preparations you must make for your boat, make them early.

Tying down your boat at a marina or dock
- Double all ties.
- Make ties high on pilings to allow for rising water.
- Cover all tie lines at contact points with rubber or other material to prevent chafing.
- Install fenders to protect the boat from rubbing against the dock.
- Be sure batteries are sufficient to run bilge pumps throughout the storm.
- Put duct tape on windows and hatches.
- Insert plugs in engine ports.
- Strip Bimini tops, sails, life rings - anything that could blow away.
- Disconnect shore power.
- Close fuel valves, end cockpit seacocks.

Tying down your boat at home
- If you can, put the boat in a garage.
- If you must leave the boat outside, remove outboard motors.
- Lash down the boat.
- Fill the boat one-third to halfway with water. (Filling: all the way could break the trailer springs or axle.)
- Support the axle with blocks inside each wheel. Remove any item that could blow off the boat.
- Place the boat away from trees or objects that could fall on it.

Finding safe harbor
- If the boat cannot be removed from the water, it should be sailed to a safe refuge and secured there to ride out the storm.
- Many marinas must be evacuated during a hurricane alert. Check your dockage lease and consult the dock master.
- Canals leading inland offer varying degrees of protection for boats, but with the exception of the New River in Fort Lauderdale, all major east-west waterways are blocked at some point by floodgates, limiting their usefulness.

- Consult the dock master and fellow boaters for suggestions.
- Drawbridges limit movement of large vessels, and ground traffic will get priority in an evacuation. Boat owners should act ahead of an evacuation order.
- If you decide to move your boat inland make a test run to ensure the water is deep enough and overhead clearances are high enough.

EMERGENCY PHONE NUMBERS
COAST GUARD
St Lucie County
772-464-6100

IDA FISH & WILDLIFE
ERVATION COMM.
St. Lucie County
850-488-4676
Hurricane Shutters

During Andrew, hurricane shutters performed well on the windward walls but many were sucked off the leeward walls. The purpose of shutters is not to seal the house (the windows do that) but to protect the windows from penetration. When a window bursts open, the wind that penetrates exerts extreme pressure on the structure including the roof. Properly installed storm shutters are essential to help keep winds out and maintain the integrity of the structure. Once the envelope of the house is breached, the internal pressures are so high that the house actually explodes. Holes should be drilled every 8-12” and pre-set with lead shields or tapcons (nails will not suffice). All window coverings should be installed flush to the building at least four inches over and outside the opening, not close to the edges. To attach, use drilled holes, lead shields or tapcons, and large, deep lag bolts or tapping screws (fasteners should preferably be made of stainless steel). Make sure you can lift and install your shutters prior to hurricane season.

Hurricane shutters are manufactured of aluminum, heavy-gauge steel, reinforced PVC or Lexan. Many require reinforcing bars for maximum protection and the number of bars used should follow the manufacturer’s recommendation. Manufacturers claim the strongest shutters are metal accordion-type and the metal panels because of the corrugated or pleated surface. The lower the gauge of the steel or the thicker the aluminum, the stronger the shutter will be. Example: .050 aluminum is stronger than .040. Steel gauge should be 20 or less. Shutters should be cleaned and the moving parts lubricated every six months. With storm panels, care should be taken when storing them to prevent damage to the clips and springs. Removable shutters and panels can be difficult to install for one person. The most important factor about storm shutters is how well they are anchored to the outside walls.

Costs vary by the type of shutter and the size of the window opening. Costs vary from $7 square foot upwards to $40 square foot for the most expensive.

**Aluminum Awnings** are slightly rounded shutters permanently attached to the top of the window with bolts. They swing down over the window and are bolted into place at the bottom. Construction: aluminum.

**Bahama Shutters/Awnings** are flat louvered panels permanently attached to the top on the window with bolts. They swing down over the window and lock into place with a latch. Some models crank down from the inside. They cannot be used on sliding glass, garage or entrance doors. Construction: aluminum.

**Colonial Awnings/Shutters** are permanently attached to each side of the window with bolts. They swing over the window like double doors and lock into place with a reinforcement bar. Construction: aluminum.

**Hurricane or Storm Panels** are slipped into permanently attached tracks at the top of the window and clipped into place or bolted to the structure with an additional track on the bottom or a reinforcing bar. Construction: aluminum or steel. Cost: $5-$7 per square foot.

**Accordion Shutters** slide on a permanently attached track inside the window frame and are locked in place with a reinforcement bar. Construction: aluminum or heavy-gauge steel.

**Roll-Down Shutters** roll down via a hand crank along a track from a valance bolted across the top of the window. Construction:
aluminum, foam-filled aluminum, PVC or Lexan.

**Plywood Shutters:** If the windows are no more than 3 feet across, 1/2" plywood attached with screws may be sufficient to prevent interior damage most of the time. 5/8 " plywood is preferred. To install plywood, cut 4x8 sheets of 1/2" CDX exterior plywood slightly larger than the window or door opening and mark each sheet for location. The plywood should overlap the window or door opening by four inches. Pre-drill holes in the concrete on both the left and right sides of the window using a masonry or carbide-tipped drill bit. Hammer three 1/4" or 1/2" machine-screw anchors or lead shields that are two inches long into the pre-drilled holes. Tighten 2” tapping screws through the plywood and a washer until the wood is held flush against the wall. You can join pieces by nailing cross members of 2x4’s back and forth. This should be done for large windows and sliding glass doors although plywood is not recommended for such large openings. The most important factors are securing the plywood properly to the exterior wall and providing at least 4" spacing between the glass and the plywood to provide for flexing.

**PATIOS:** Best bet - remove screens and doors and reinstall them after the storm. It is less expensive than replacing the screens. There is no foolproof method to minimize damage to patio screens. Leave a little play in the screens (not installing them too tight) and brace with thin pieces of wood where you expect maximum deflection.
Recent major hurricanes in Florida and along the Eastern Seaboard have taught many lessons on construction techniques to Emergency Management Agencies, Building officials and Insurers. After Hurricane Andrew, building codes and their enforcement were strengthened throughout south Florida to take advantage of these “lessons learned”. The major changes were to dramatically improve the survivability of the structures by ensuring the integrity of the building’s roof and its support system including anchoring to the walls and through to the foundation and protection of the openings in the structure. Windows, doors and garage doors breaches from wind and debris are the common precursors to major damage.

The physics of wind are force and mass. Once the envelope of a structure is breached, whether from being blown in or from being broken by flying objects, wind penetrates the structure. Its force will continue with its mass enlarging until it finds a way out, either through collapsing walls, breaking out other windows or lifting the roof. Often times, it will exit in a combination of ways.

Roofing systems and their design type create unique problems. Our desire to build homes that are pleasing to the eye is a natural part of our culture and is representative of our chosen life-styles. Not many families would choose to live on a street of bunkers if given the choice. Our life-style choices therefore lead us to homes with roofs that are ill designed and not built for hurricane force winds. Gable ends present a direct vertical surface to the full force of the wind, extended eves create lifting areas for the wind, and roofs without adequate pitch, generally 4X12, create lifting foils that simulate the wing surfaces of an airplane. As winds increase across gently sloping roofs, areas of negative or reduced pressure form, creating lift.

Building codes have been revised and inspections have become more rigorous for homes built after 1994. Major strides have been taken to tie the foundation, walls and trusses together to reduce susceptibility to lift. At the same time, the roof sheathing requirements and nailing patterns have been defined to help keep the roofing materials on the house. In 1998, Martin County began requiring for new construction, roof shingles that have been tested to withstand 110 MPH winds.

Residential and commercial window units use glass that has been load tested to 110 MPH. However, the testing does not reflect the cyclical nature of hurricane winds and the glass is not required to be impact resistant to stop flying debris.
ASSESSMENT AND MITIGATIVE MEASURES FOR THE HOMEOWNER

Structural evaluation of your home should be made by an experienced inspector from the construction field who belongs to associations such as the American Society of Home Inspectors or the Florida Association of Building Inspectors, Engineers. Check the Better Business Bureau for any complaints against him. The cost for this service begins at $200. Anyone considering buying an existing home should have a professional inspection in addition to checking out the builder's previous

THE ROOF

LATERAL BRACING

Horizontal bracing spans the length of the roof, attaching one gable end to another or it can span one section of a roof, starting at the gable end.

Diagonal bracing connects the top of one truss to the bottom of an adjacent truss. It keeps the trusses from toppling over during heavy winds.

Plywood can be nailed to the floor of attic to act as bracing.
THE ROOF

In general, the streamlined aerodynamics of a four-sided hip roof provide much more protection than the two-sided gabled roof, and flat cement tiles offer greater protection than barrel tiles or shingles. You should not be able to see plywood seams on the gable ends (if the gable wall framing is wood). The gabled ends should preferably be constructed on CBC instead of wood frame. Current research indicates that many of the roof failures (roof truss and shingle failure) could have been prevented if the building inspections during construction were properly performed. One weak link opens the door to disaster: if shingles fly off, the underlying roofing materials become soaked and weaken. Or, once you allow movement, then you’ve got cracks and you’ve got fatigue. Roof leaks can be caused by poor workmanship in the installation of tiles, tarpaper or plywood or simply by the age of the roof. Attics guard homes from the sun and wind – they breathe, absorbing heat before it reaches the living area and exhale heat through vents under the eaves and vents on top of the roof. Turbines and chimneys should be covered with caps when a hurricane threatens. Attached residences should have firewalls and other dividers in the roof to prevent the roof from acting as a single unit during a hurricane.

PITCH OF THE ROOF: Flat roofs and roofs that slant only slightly are more vulnerable. Flat tar-gravel roofs should have a pitch of at least 3/8” per foot to allow for proper drainage. The pitch on all other roofs should ideally be greater than 20 or 30 degrees but not too steep. The reason for this is because when wind flows over a low-pitched roof, the same aerodynamics that enable an airplane to fly can help lift a roof from the foundation of the house: the low pressure of the high-speed winds as they pass over the house are offset by the high air pressure contained within the house resulting in an upward lift force against the roof as the wind tries to equalize the pressures. The design of the early structures in the Keys with their moderately steeped sloped roofs stood up to sustained winds of 140 mph from Hurricane Donna in 1960. Lower sloped roofs in the area produced well over 90 percent of all the roof failures.

ROOF TRUSSES: A small, low attic is not suitable for storage – materials in the attic put an unwanted strain on the trusses. Trusses must be cleanly nailed together at the joints with nails near the center of the truss. If nails miss or are poking out (not driven in straight) of the side of the truss, the strength of the nail is reduced. Trusses with large knots, splits/cracks or bark on the wood do not meet building codes. Cracked trusses can be caused by improper installation, poor quality wood or added stress on the truss in addition to faulty manufacture. You may find pieces of wood shimmied in beside a truss – when the truss was installed, it did not sit evenly on the walls of the house. These pieces of wood should be nailed to the truss to prevent movement if the shimmy pops out. Gable end trusses differ from conventional trusses – instead of diagonal weaving patterns designed to resist upward and downward forces, the members run uninterrupted straight up and down. The flat or weakest side of the wood on the gable ends should not face outward. To repair trusses: Engineer places a 2-by-4 splint on both sides of the truss for additional support around the crack or break (cost $200 to $400). The 2-by-4 should be at least 8 feet long. Periodic maintenance: check periodically for insect damage as well as cracks in the trusses.

HURRICANE STRAPS AND TRUSS PLATES: the South Florida Building Code requires straps or truss plates to be attached to each cross beam or roof truss (everywhere wood is joined together). Truss plates should be installed with two 6-penny nails on each beam. Hurricane straps are imbedded in and protrude from the concrete tie beam of the building along various points at the top of the exterior walls of the house. This is what holds the roof to the frame of the house. Every roof joist, rafter or truss must be hurricane strapped. They should emerge from the concrete tie beam flush with where
the truss sits; a gap will enable the roof to lift up by that same amount. The straps should be at least 8 inches deep in the tie beam and anchored every six feet on the gabled ends. Straps should be one-inch wide, 1/8-inch thick galvanized steel. They must wrap over the top of the truss, and should be nailed through every wood truss with three 16-penny nails on the far side of the truss with the point of the nails bent over. There should be no slack after nailing. To repair missing or rusting straps: the contractor removes the edge of the roof to anchor new straps into the concrete and attach the straps to the trusses: an 18" strip of drywall or plaster from the ceiling and wall is cut where the truss is set; the strap is secured to the truss and when the bottom of the strap is run vertically down at least 9" and secured with power-actuated concrete nails or lag bolts at three points along the perimeter concrete tie beam; ceiling and wall board are replaced and re-painted (cost approximately $450 per strap).

**BRACING OF THE ROOF:** Proper bracing is inexpensive and easily installed by a general contractor or engineer ($200-$300).

**Horizontal or lateral bracing** of the gabled ends of roofs is not required by the South Florida Building Code but it is good business practice. When heavy winds hit a gable roof head on, the trusses will topple onto each other unless sufficiently braced (the domino effect). Lateral bracing is how you tie the gable end truss to the rest of the truss system. Since hip roofs deflect the wind better than gable roofs, their horizontal bracing is not as crucial. Proper lateral bracing means having the proper bracing along the bottom of the trusses and the center of the gable end truss.

Homes should have substantial horizontal bracing: a 2x4 or a 2x6 that stretches from one gable end of the roof to the other. Attach one about one-third of the way up from the bottom and one as close to the peak as you can get it. Attach this board to every single truss as you go along. Attach two more on the opposite side of the roof in the same manner.

1x4" boards known as **rat runs** should be found between each truss and running every 10 feet to lend support against being pushed sideways. These boards were meant to be only temporary reinforcement during construction. Don't discount **Plywood** should be 5/8" thick (all lesser thicknesses as well as all particle boards failed during Andrew). Plywood must be nailed with a minimum of 8-penny rounded resin-coated nails to trusses at 6-inch intervals along the sides and every 12 inches in the middle of the plywood and preferably clipped together with aluminum clips at all-joints. If the nail misses, it should be removed. Otherwise, the nails will work their way out of the roof, leaving a hole. Check the underside of the plywood while in the attic for exposed nails. If an entire row of exposed nails is present, the plywood should be re-nailed. That portion of the roof will have to be removed and re-nailed. (Cost $450 per
in between the sheets of plywood. Gaps greater than 1/8”, which is allowed under the Code, can cause wind from the attic vents to blow through the gaps and lift that portion of the roof. With a shingle roof, the winds can blow through weak asphalt shingles and through the gaps. If you have a leak, look in the attic for gaps in the plywood and/or rotting wood. Particle or pressed board was allowed during the 1980’s and has since been outlawed.

**NAILS AND STAPLES:** Plastic-coated nails must be used to fasten plywood to the trusses to bond the nail to the wood and truss. Roofs that are attached by staples are not as strong because the staple itself may become crimped by the application of the staple gun (banned in Dade County since Andrew).

Also, the stapled shingles blow off more easily because the surface of the nail head is greater than that of staples. Hand Nailed vs. Nail Guns: nail gun nails are t-shaped and grab less decking than the rounded hand nails, are often driven too deeply into the plywood, and you cannot always tell when they hit wood. Recent tests show that a combination of gluing and nailing of sheathing to the trusses doubles the holding power over nailing alone.

**TARPAPER** should only be attached with roofing nails and tin tabs, not staples. If a roof has a low slope, use double felt under shingles. In 1957, the South Florida Building Code required #30 felt on top of the roof decking. In 1980, this was changed to two layers of #15 felt. Since Andrew, #30 is again mandatory as is an inspection of the trusses, bracing and deck before the felt application.

**ROOF TILES** should be consistently secured with evenly spread mortar and nailed down (nailing is not required by the Code unless the pitch of the roof is steep—otherwise you may use nails or cement or both). The mortar installation is more important than the nails and proper installation is a must. The mortar should be evenly applied in a continuous horizontal strip, must not globbed on. The cement must be wet enough and the tile not be too hot: moisture can be absorbed from the mortar resulting in the surface of the tile not adhering properly to the cement. During Andrew, the nailed tiles in the most damaged areas were blown off and more than half of the roofs with cemented tiles also blew off (due to improper cement application). Never install tiles on top of old shingles. Flat cement tiles are better than barrel tiles because they are heavier and their shape makes them less likely to catch winds although the porous clay tiles adhere better with mortar than the cement tiles. Use a 90-pound hot mop membrane waterproofing, not a 43-pound as allowed by Code, and insist on copper flashing and drip edges, not galvanized. Regardless of the type of covering used, installation over a sound and tight roof system (properly nailed and spaced roof sheathing) is the most important factor. Cost to re-roof: $350-$400 per 100 square feet for cement shingles ($450-$500 for barrel tiles). Add $500 for installation with nails.

**SHINGLES:** Shingles should be nailed (not stapled) carefully to the roof: six roofing nails (two in each tab directly above the sealant strip) should be used in each asphalt shingle and should be long enough to pierce ¾” into the roofing deck. Since Andrew, in Dade County the number of nails required per shingle has raised from four to six. Each shingle has three tabs on one end that are not coated with granules with the adhesive strip approximately center on the shingle. Plastic must be removed from the adhesive strips for the shingle to properly bond to the other shingles. What makes one shingle more wind resistant than another is the sealant used on the shingle. Plastic shingles with embedded zinc particles are made to withstand mildew, but minimum 250 pound weight shingles are preferred, and if the roof has a low slope, use double felt under the shingles. Cost to re-roof: $175 per 100 square feet for fiberglass shingles (add $500 for installation with nails instead of staples).
WALLS AND FOUNDATION

Preferred Construction: Houses should be single-story and constructed with concrete block as opposed to wood framing. The concrete walls should be tied down to the poured concrete slab with iron bars running inside the block. The concrete walls should be tied down to the poured concrete slab with iron bars running inside the block. The tie-beam is a reinforced concrete beam that runs horizontally across the top of a concrete block wall. It supports the roof and anchors the hurricane straps that are partially embedded in the concrete at the time of construction. It is usually 8 inches wide and 12 inches deep with two steel reinforcing bars at the top and bottom (ideally the tie beam should have four or more steel reinforced rods and be connected to vertical reinforcing rods going down through the hollow block walls and embedded in the footings). Tie beams can be strengthened with steel plate strips or by increasing their thickness with wood beams. To determine if you have a tie beam: remove a piece of drywall or plaster about 12 to 14 inches deep from an inside perimeter wall, adjacent to the ceiling. If there is a reinforced concrete tie beam, it should be visible: about 12 inches deep as measured from the top of the ceiling on single-story structures. The concrete looks different from the concrete block below it. The interior walls of the home should be wood frame instead of today's flimsier metal frame. Use plasterboard coated with metal reinforced plaster on interior walls to provide sturdiness. The air conditioning compressor should be anchored to a concrete slab with nails.

Periodic Maintenance (1) Periodically check metal and wood support columns on patios for rust and wood decay. (2) Check the anchoring of the air conditioning compressor to see if it feels loose. (3) Check tie beam for crumbling concrete and rusted steel rods. (4) Look for cracks in your exterior walls as well as the foundation. Cracks are caused by shifts in the ground below the house, typically caused by rotting vegetation. Cracks less than one half inch wide are common in walls and do not mean that the wall is weak (only wide cracks indicate a problem). All cracks in the foundation should be repaired. To repair foundation: Pressure grouting company or geotechnical engineer drills hole in slab and pumps cement in to fill the gap (cost $1000 to $3000).

Protecting Your Property from Wind:

Double Entry Doors

Are You At Risk?

If you aren’t sure whether your house is at risk from hurricanes or tornadoes, check with your building official, city engineer, or planning and zoning administrator. They can tell you whether you are in an area where these high-wind events occur. Also, they usually can tell you how to protect yourself and your house and property from the effects of high winds.

What You Can Do

Hurricane and tornado protection can involve a variety of changes to your house and property -- changes that can vary in complexity and cost. You may be able to make some types of changes yourself. But complicated or large-scale changes and those that affect the structure of your house or its electrical wiring and plumbing should be carried out only by a professional contractor licensed to work in your state, county, or city. One example of hurricane and tornado protection is reinforcing double entry doors. This is something that skilled homeowners can probably do on their own.

Reinforce Double Entry Doors

Many houses are equipped with double entry doors. These doors typically consist of an "active" door (which is used when only one door is needed) and an "inactive" door (which usually remains closed but can be opened when necessary). These doors are convenient, but because they span a wider opening than a single door, they are usually not as strong as a single door and are therefore more susceptible to wind damage. If your doors fail under wind pressure they will allow wind to enter your house, where it can cause more damage and possibly injure you or members of your family.

You can reinforce double entry doors to make them less susceptible to wind damage. You can add a heavy-duty dead bolt or replace the existing dead bolt with a stronger one, add slide bolts at the top
longer screws that extend further into the doors and frames.

**Tips**

Keep these points in mind if you plan to reinforce double entry doors:

- Hardware and home supply stores are good sources for slide bolts and other devices designed to make doors stronger and more secure.

- Heavy-duty deadbolt locks intended for use where extra strength is needed usually have thicker and longer bolts, heavier strike plates, and heavier mounting hardware. Locksmiths and hardware and home supply stores can advise you about selecting and installing stronger locks.

- If your doors are old or damaged, you should consider replacing them with stronger doors. Home supply stores and lumber yards can usually advise you about the relative strengths of alternative double door systems.

- If you don't want to reinforce or replace your existing doors, you can hire a contractor or handyman to do the work for you. Also, home supply stores and lumber yards will often install the doors they sell.

- You can protect doors further by covering the door opening with temporary plywood covers bolted to the door frame. This can be especially helpful if the doors contain glass.

**Estimated Cost**

Reinforcing a set of double entry doors with side bolts, longer hinge mounting screws, and a stronger lock will cost you about $100. This figure covers only the materials you will have to buy and the cost of any tools you use and the value of your time. If you hire a contractor or handyman to do the work, you will have to pay for time as well as materials.

**GARAGE DOORS**

**Are You At Risk?**

If you aren't sure whether your house is at risk from hurricanes or tornadoes, check with your local building official, city engineer, or planning and zoning administrator. They can tell you whether you are in an area where these high-wind events occur. Also, they usually can tell you how to protect yourself and your house and property.

**What You Can Do**

Hurricane and tornado protection can involve a variety of changes to your house and property -- changes that can vary in complexity and cost. You may be able to make some types of changes yourself. But complicated or large-scale changes and those that affect the structure of your house or its electrical wiring and plumbing should be carried out only by a professional contractor licensed to work in your state, county, or city. One example of hurricane and tornado protection is reinforcing garage doors to protect them from damage by high winds, or replacing them with doors that are more wind-resistant. These are things that should be done only by a trained door systems technician.

**Reinforce or Replace Garage Doors**

High winds from hurricanes and tornadoes can damage garage doors or even blow them in. If wind enters a garage it can cause dangerous and expensive structural damage. Reinforcing your garage door helps you protect not only your garage but its contents as well

The garage door industry strongly recommends that any determination concerning the need to reinforce or replace a garage door be based on an
inspection by a trained door systems technician or a qualified professional engineer. Adding weight to a garage door in the form of reinforcement may require an adjustment to or replacement of the door's counterbalance system. Only a trained door systems technician should perform the adjustments or replacement. An inspection may find that other improvements should be made to an existing door, and if the door is old or damaged, replacement with a stronger door system may be recommended.

**Tips**

Keep these points in mind when an inspection by a trained door systems technician or qualified professional engineer has determined that your garage door needs to be reinforced or replaced:

- Because of the extreme amount of stored energy in the door counterbalance system combined with the potential impact on the counterbalance system's effectiveness when weight is added to an existing door, reinforcing a garage door is a job that should be done only by a trained door systems technician.

- A local garage door professional should be able to assess the wind load requirement of your garage door, which is based on size, local design wind speed, and location on the structure, among other factors. The Door & Access Systems Manufacturers Association International (DASMA) can also be of help in this area.

- Don't wait until a hurricane warning is issued to have your garage door evaluated; there will probably not be enough time for this service to be provided.

- Glazing (windows) in a garage door can be broken by windborne debris and should be avoided. If glazing is installed, it should be hurricane rated impact glass. Your local garage door professional or DASMA may be able to advise you on garage door glazing and the governing requirements.

- Most screened attic and floor vents during Andrew were blown off – they should be protected in the same manner as any window or door opening. Even the dryer vent should be closed off.

**Estimated Cost**

If you hire a contractor to reinforce an existing two-car garage door, you can expect to pay about $600. However, this cost can vary depending on the size and type of door.
SURROUNDING AREA

LANDSCAPING: In terms of Ground Zero landscaping, nothing is going to make it. Prune trees (except pines) in the middle so the wind can blow through the canopy without snapping them ("hatracking"). See trimming instructions on next page. A lacy, open canopy with few limbs internally is best (example: Kapok trees, Poincianna trees, Live Oaks) and you should avoid trees with narrow V crotches that are prone to splitting. Palm trees with open fronds (Queen Ann) will do better than those with a closed, palm-shaped palm frond. Consider removing trees, such as Australian pines, which do not have deep taproots. Trees in some areas do not have very deep roots due to the high water table or they were grown in containers where the roots spiraled before planting leading to a poor root system. Also consider removing large, top heavy trees that are close to your house (black olives, ficus).

PRIVACY WALLS constructed of concrete, if strategically placed, can be helpful in deflecting the wind force away from the building.
INSURANCE CONSIDERATIONS

Hold on to your current homeowner’s policy if at all possible. Pay your premiums on time. Know that companies are monitoring claims activity very closely. If, however, you have to go looking for a new policy, you may want to consider the items in the following paragraphs.

It may still be possible to find a good homeowners policy with a private company despite what you have read recently. Try several insurance agents, at least, before concluding you have no choice but to join the state insurance pool. Search out a reputable agent who knows about local building codes, welcomes questions and is willing to explain things clearly and patiently. The agent should visit your home, inspect your property and present coverage’s available to you.

Understand that all insurance policies are not created equal. Insure to the full value of your home and property. Don’t make the mistake of asking your agent for the “top-of-the-line” policy, paying your premium and then considering yourself adequately protected. Some policies offer “guaranteed replacement cost coverage”. Those policies promise that if your 15 year
old home is destroyed, the insurer will cover the cost of the building a new one just like it. Many people assume they have replacement cost coverage, when in fact, they have only “actual cash value coverage”. Those policies promise that if your 15 year old home is destroyed, you are entitled to a specified amount only.

Standard homeowners’ policies usually cover the contents of a home, up to a specified limit. Some policies protect contents on a replacement cost basis. An actual cash value policy would entitle you to only the original cost of your possessions. There are special endorsements or riders, if you can get them, which could provide replacement cost coverage for contents under the terms of an actual cash value Homeowner’s policy. Other riders are available to enable you to buy more coverage for expensive items such as jewelry, furs and computer equipment.

There are “catches” to homeowners coverage. A good agent will alert you to them and offer you options. Your house, for example, may have aluminum wiring, which was installed before your local government ordered that all new homes must contain copper wiring. If your home is partially damaged but must be rebuilt to meet local building codes, some insurers may say they are not responsible for anything more than what is provided for in the policy. You can protect yourself by buying a “code endorsement rider”. That kind of coverage is especially important.

There is no such thing as “hurricane insurance”. Standard homeowners’ policies protect you from virtually all types of damage a hurricane can inflict except one – flood, or “rising water” damage. Flood insurance is underwritten only by the federal National Flood Insurance Program and must be purchased separately.

Although standard homeowners policies will not cover damage from rising water, such as from storm surge, they will cover water damage from rain driven by winds through damaged roofs or blown-out windows. The part of a policy that offers such protection is called “windstorm coverage”. Insurers’ vulnerability to future losses because of windstorm coverage was a major factor in cutbacks in writing new policies.

Be sure to ask your agent whether you should buy additional coverage to protect you from the “50 Percent Rule”. The rule states that if a structure in a flood zone is 50 percent or more destroyed - by a hurricane or anything else – it must be rebuilt so that its ground floor meets minimum elevation requirements. If the front door of your home now stands at 4 feet above sea level, the government could require that your rebuilt house be twice as high or higher. Insurers have argued that they shouldn’t have to pay for raising the first floor of a structure unless specifically provided for in a policy. Ask about this. Special endorsements are available to cover elevation costs.

Comprehensive auto and boat coverage’s should protect your car or boat from any damage caused by a hurricane, including flood damage. Ask your agent to make sure you are adequately covered. Raising the deductible may save you money.

Before the Storm: Take a room-to-room inventory with a camcorder. Keep all receipts for all valuables. Make a complete written inventory that lists everything down to the number of pairs of socks you own. Keep all records in a safe deposit box. Update the listing once a year. Keep a copy of the inventory at home.
The official start of hurricane season is June 1 and it ends November 30.

Recent years’ storms were a powerful reminder that homeowners need comprehensive insurance coverage, including flood coverage. Review your insurance coverage yearly and make sure it’s adequate so you can protect what you’ve worked so hard to build.

Nearly 1.7 million insurance claims, representing $21 billion in losses, were filed after four hurricanes inflicted damage in 54 of Florida’s 67 counties in 2004.

Consider the following storm tips from the Florida Department of Financial Services:

• Don’t wait until the last minute to buy coverage. If you’re covered, carefully review your policy, especially its “declarations” page. Upgrade your policy limits if they do not cover the current value of your home and its contents.

• Know whether your policy pays the “replacement cost” or “actual cash value” for a covered loss. Many 2004-2007 storm victims were shocked to learn that “actual cash value” rarely paid enough to replace a destroyed item at today’s prices.

• Be sure you know what your deductible is for hurricane losses. Most policies now have a hurricane deductible of two to five percent of a home’s insured value. Legislation passed in the 2005 session now allows insurers to offer a 10 percent deductible. Many hit by 2004’s storms were caught off guard financially and unaware that the deductible was based on the structure’s insured value instead of the estimated hurricane damage costs.

• Consider your law and ordinance coverage. Many insurers offer a rider for 25 percent law and ordinance coverage that helps pay for rebuilding an older home to meet modern building codes. Legislation recently passed now requires insurance companies to offer riders for up to 50 percent law and ordinance coverage.

• Inventory your household items, including receipts, purchase dates and serial numbers. Photograph or videotape your possessions. Keep copies of this information and your insurance policies in a safe place and keep the originals in a safe deposit box.

• Write down the name, address and claims-reporting telephone number of your insurance company, which may differ from your agent’s contact information. Keep this information in a safe place and make sure you have access to it if you are forced to evacuate your home.

• When a hurricane threatens, take action to protect your property. Buy the materials you need to secure your property and minimize your losses. Cover your windows with shutters, siding or plywood. Move vehicles into a garage or carport when possible.

• Remember to withdraw money BEFORE a pending natural disaster. Normally financial
institutions will be closed at least two days after a direct hit and ATMs could be out of
commission even longer.

• Keep materials such as plywood and plastic on hand in case you need to make
temporary repairs after a storm. Repairs made to prevent further damage to property
are reimbursable by your insurance company as long as you keep all receipts.

Alert to Floridians that legislation recently passed prohibits insurance companies from non-
renewing homeowners’ policies until 90 days after hurricane repairs are completed and requires
insurers to pay replacement costs up front on a storm claim rather than holding back money
until repairs are completed or replacement contents are purchased.

Homeowners can also look forward to insurance companies offering plain language policies,
including clear financial disclosures, and a checklist that will detail what is and what is not
covered.

Representatives from the Department of Financial Services (DFS) usually partaicipate in several
Hurricane Preparedness Expos around the state throughout the hurricane season. Consumer
guides, tips and other useful information is usually available from the department and other
organizations concerned with hurricane safety online at

To find out about a Hurricane Preparedness Expo in your area or to request a free guide on
insuring your home, or brochure on “Natural Disasters,” visit www.fldfs.com. Consumers may
also call the department’s toll-free Consumer Helpline at 1-877-MY-FL-CFO (1-877-693-5236);
TDD line: 1-800-640-0886; and Out of State Callers: (850) 413-3030. The statewide toll-free
helpline is available 7am–6pm.
Insurance and Reconstruction Information For Property Owners

Insurance Information

1. Immediately report property damage to your agent or insurance company.
   - If you are unable to reach your agent or company, call the Florida Department of Financial Services at 1-800-22-STORM (227-8676)

2. Know the different kinds of claim adjusters: company, independent and public.
   - Insurance companies pay company and independent adjusters to assess the damage and negotiate the settlement of covered losses on behalf of the company.
   - If you use a public adjuster, you must pay the public adjuster a percentage of the settlement you receive. The fee is capped at 10% of the claim amount. However, you can negotiate for a lower fee.
   - Do not pay a public adjuster up front.
   - Public adjusters will not necessarily speed up your claim or obtain a larger settlement on your behalf.

3. Beware of unlicensed or unscrupulous adjusters who urge disaster victims to fraudulently overstate their insurance claims.
   - It is illegal to adjust claims in Florida without a license.
   - If you are approached by an adjuster, ask him or her to show you proof of license in Florida. To verify a license call 1-800-227-8676.

4. Consult your insurance agent to see if the repairs or reconstruction are covered by your policy.

5. Bring repair estimates to your adjuster or agent to verify the proper procedure you must follow to ensure payment of a claim.

6. Make sure your name is on the claim payment check as the payee.
   - Before you sign and cash the check, make sure the claim settlement amount is correct. Carefully review the claim payment check as it may contain a release provision for your claim. Make sure you understand any release provision.

Finding a Licensed Contractor

1. Get written estimates from at least three, Florida licensed contractors. Make sure the estimate includes everything you want the contractor to do. Beware of contractors soliciting work door-to-door. To verify a contractor’s license, call the Department of Business and Professional Regulation at 1-850-487-1395.

2. Ask for proof of insurance. If the contractor does not have liability and workers’ compensation insurance, you may be liable for accidents or injuries on your property. To verify a contractor’s workers compensation coverage, call the Division of Workers’ Compensation at 1-800-742-2214.

3. Ask for and check references of other work the contractor has done.

4. Ask the contractor how many jobs he or she may have ongoing, in order to get an idea of how much direct supervision your job will receive and whether the reconstruction time frames are realistic.

5. If you are having difficulty finding contractor, contact one of the contractor associations listed on the reverse side of this document.

Entering Into A Repair or Reconstruction Contract

1. Get a contract in writing. The contract should cover what is to be done, when work will start, cost and payment schedules, the quality of materials to be used, and all necessary building permits and licenses.

2. Never make full payment up front. Don’t sign over an insurance settlement check to a contractor. Most reputable contractors accept payment draws as stages of work are completed.

3. Don’t make final payment until all work that needs to be done is completed.

4. Request city or county inspection prior to final payment.

5. Don’t automatically choose the lowest bidder. If one bid is substantially lower than the others, poor workmanship, inferior materials and unfinished jobs are often the result.

6. You should make sure prior to signing the contract that it accurately reflects your understanding of the work to be done.

Canceling a Contract

Some home improvement or repair contracts may be cancelled without penalty or obligation by midnight of the third business day after signing. These contracts include:

1. Agreements signed anywhere other than the seller’s normal place of business, unless you have requested the specific goods or services

2. Agreements resulting from door-to-door sales solicitation.

3. Agreements that pay on an installment basis for more than 90 days.

It is important to note that emergency home repairs, made at the owner’s request, are not subject to cancellation under the three-day rule.
**Safe Room** – Identify a safe, interior room with no windows ready with all your supplies (food, lights, radio, camera, purse, insurance policy copy, medications, glasses, blanket, pillows, mattress). Stay There! Remain indoors during the hurricane. Blowing debris can injure or kill. Travel is extremely dangerous.

**Animals** should be placed in their carriers.

**Windows and Doors** – Stay away from all windows and doors. DO NOT open a window on the opposite side of the as we have been advised in past.

**Candles** – DO NOT use; they can blow over.

**Telephone** should not be used when there is lightning present.

**Power** – Turn off all appliances at the fuse box (circuit breaker) or remove fuses when the power begins to be intermittent or when flooding begins. Leave one breaker on that operates a light.

**Eye of the Hurricane** – Do not be fooled by the storm’s calm eye, which takes from several minutes to an hour to pass. Stay in your “safe place” unless emergency repairs are absolutely necessary. Winds will blow suddenly in the opposite direction after the eye passes. The strongest winds are north-east of the eye.

**Tornadoes** often precede a hurricane. If you are caught outside, move at right angles from the tornado.

**Lightning** – If you are outside and your hair stands on end or your skin tingles, lightning may be about to strike you. Drop to the ground and bend forward with hands on knees.

**Radio** – Listen to local radio stations. Remain indoors until local government officials announce it is safe.
SOURCES OF DRINKING WATER

One of your most crucial needs is a supply of safe water. Every person in your family needs about 2 quarts of water or other liquids daily (more in hot weather). You also need pure water for preparing foods, brushing teeth and keeping clean.

When warned of a severe storm which could cause flooding, or which could otherwise disrupt water services, insure an adequate supply of safe water for your family by filling large clean containers: pots, pans, sinks and bathtubs with water. Then shut off the main water valve to protect the clean water already in your water system. If possible close the valves on the water lines leaving the house.

You may have emergency sources of water, such as ice cubes on hand. Soft drinks and fruit juices are water substitutes. In addition, the water in your water pipes and toilet tanks (NOT THE BOWLS) is safe to drink if you closed the valve on the main water line before the flood.

To use the water still in pipes, turn on the faucet located in the highest point in the house – usually in an upstairs bathroom. This lets air into the system. Then draw water from the lowest faucet in the house.

Your water heater or water pressure tank could supply 30 to 60 gallons of safe water in an emergency. Before using water from the water heater, switch off the gas or electricity which heats the water. Leaving the heating part on while the heater is empty could cause an explosion or burn out elements. After turning off the gas or electricity open the drain valve at the bottom of the tank. Do not turn the water heater on again until the water system is back to normal service.

TREATING WATER

Unless you are absolutely certain your home water supply is not contaminated by floodwater, treat all water before using it for drinking, food preparation, brushing teeth or dishwashing. If the water contains sediment or floating material, strain it through a cloth before treating it. Water can be treated by boiling or by chemical treatment.

Boiling

Boil water at a rolling boil for 10 minutes to kill any disease-causing bacteria in the water. Add a pinch of salt to each quart of boiled water to improve the taste.

Chemical Treatment

If water cannot be boiled, treat it with chlorine bleach such as Clorox or Purex. Household bleach is a good disinfectant for water. However, check the label to make sure that the active ingredient, sodium hypochlorite, is 5.25 percent. Do not use bleach, which contains detergents.

Mix bleach thoroughly into the water. Let it stand for 30 minutes. The water should have a slight chlorine odor. If it doesn’t, repeat the dose and let the water stand for an additional 15 minutes.
MEAL PREPARATION AND FOOD SAFETY
DURING AND AFTER A POWER FAILURE

Preparing Food During
A Power Failure
During a power failure, cooking and eating habits must change to fit the situation. You may have no heat, no refrigeration, and limited water. In addition, health risks from contaminated or spoiled food may increase. When preparing food during a power outage follow these guidelines.

Conserve Fuel
1. Consider the amount of cooking time needed for particular foods. If you have limited heat for cooking, choose foods, which cook quickly. Prepare casseroles and one-dish meals, or serve no cook foods.
2. Alternative cooking methods include:
Fireplace. Many foods can be skewered, grilled or wrapped in foil and cooked in the fireplace.
Electric utensils. If gas is cut off, but you still have electricity, use electric skillets, hot plates or coffee makers to heat food.
Candle Warmers. Devices using candle warmers such as fondue pots may be used if no other heat sources are available.
Camp stoves and charcoal burners. These maybe used outside your home. Never use fuel-burning camp stoves or charcoal burners inside your home, even in a fireplace. Fumes from these stoves can be deadly.
3. Do not cook frozen foods unless you have ample heat for cooking. Some frozen foods require considerably more cooking time and heat than canned goods. Also, if power is off, it is best to leave the freezer door closed to keep food from thawing.
4. Commercial canned foods can be eaten straight from the can. Do not use home canned vegetables unless you have the means to boil them for 10 minutes before eating.

Conserve Water
1. Save liquids from canned vegetables. Substitute these for water in cooked dishes.
2. Drain and save juices from canned fruits. Substitute these for water in salads and beverages.

Observe Health Precautions
1. Boil all water used in food preparation for at least 10 minutes.
2. If you are without refrigeration, open only enough food containers for one meal. Some foods can be kept a short time without refrigeration. If available, packaged survival or camping foods are safe. Do not serve foods that spoil easily, such as ground meats, creamed foods, hash, custards and meat pies. These are potential sources of food-borne illness.
3. If necessary, substitute canned and powdered milk for fresh milk. Canned milk will keep safely for many hours after you open the can. If you are using canned mills to feed a baby, however, open a fresh can for each bottle. Use only boiled or disinfected water to mix powdered milk. Use reconstituted milk immediately after it is mixed if you have no refrigeration. If safe water or water disinfectants are not available, use canned or bottled fruit juices instead of water.
4. Prepare and eat foods in their original containers, if possible. This will help if dishwashing facilities are limited.

<table>
<thead>
<tr>
<th>Amount of Water</th>
<th>Drops of Chlorine to Add</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 quart</td>
<td>4 drops</td>
</tr>
<tr>
<td>1 gallon</td>
<td>16 drops</td>
</tr>
<tr>
<td>5 gallons</td>
<td>80 drops</td>
</tr>
</tbody>
</table>

**Using iodine to treat water is not recommended.**
Some people have reactions to iodine that can quickly cause them to become ill or die. This is especially true for children, elderly people, and people with chronic illness.

Water Purification Tablets as sold in camping stores are not recommended for general use. According to the USDA and the Center for Disease Control, about 10% of the adult population has a hidden chronic illness or other problem which these tablets may aggravate. Also, children, elderly, and people with chronic illness should not use these tablets.
SAFETY OF FROZEN FOODS AFTER A POWER FAILURE OR FLOOD

When anticipating a power failure (as prior to a flood warning), set the refrigerator and freezer temperature to the coldest setting to build up a cooling reserve.

If flood water enters your freezer or refrigerator, dispose of all food not sealed in metal airtight cans or glass jars.

Keep Freezer Closed
With the freezer closed, foods usually will stay frozen at least a day, perhaps two or three days, depending on the quantity of insulation. Food in well-fitted, well insulated 4-cubic-foot home freezers will not begin to spoil in fewer than three days; in 12 to 36-cubic-foot freezers, food will not begin to spoil in fewer than five days, and may be all right seven or eight days if the food is very cold.

Open the freezer only to take out the food for moving to a locker plant or to add dry ice.

Thawing Rate
With the door closed, food in most freezers will stay below 40 degrees F up to three days, even in summer. Thawing rate depends on:

1. The amount of food in the freezer. A full freezer stays cold longer than a partially-full one.
2. The kind of food. A freezer filled with meat stays cold longer than a freezer filled with baked goods.
3. The temperature of the food. The colder the food, the longer it will stay frozen.
4. The freezer. A well-insulated freezer keeps food frozen longer than one with little insulation.

NOTE: Do not put hot foods into the freezer since this will increase the temperature. (Keep hot foods covered and discard if not eaten within 2 hours. Meat should be kept above 140˚ F.)

Emergency Measures
1. Keep the door closed.
2. If Possible, move food to a locker plant. Call the locker plant to see if it is operating and if so, whether it has room for your food. If space is available, wrap the food in plenty of newspapers and blankets or use insulated containers, such as camping coolers. Then rush the food to the locker plant.

NOTE: It is best to make arrangements well in advance with your local locker plant to take care of food in an emergency.

3. If you can’t take food to a locker plant, leave it in your freezer and cover freezer with blankets, quilts, crumpled newspaper or excelsior. Do not cover air vent openings.

4. Use dry ice if it is available. Wear gloves to handle dry ice and proceed as recommended. (See section on Using Dry Ice During A Power Failure).

5. Can the food if it is possible to do so under sanitary conditions and with proper equipment.

When Food Has Thawed
Partial thawing and re-freezing does reduce the Quality of foods, particularly fruits, vegetables and prepared foods. Red meats are affected less than many other foods.

You may safely re-freeze some foods if they still contain ice crystals or if they have been kept at 40 degrees F or below for no more than 2 days. If the temperature is above 50 degrees F throw food away.

Canning. Foods that cannot be re-frozen but are safe to use may be canned immediately.

Treat completely thawed foods as follows:

1. Fruits. Re-freeze fruits if they taste and smell good. Fruit that is beginning to
1. Insulation. The larger the freezer, the longer food stays frozen.

2. **Frozen dinners.** Do not re-freeze frozen dinners that have thawed.

3. **Vegetables.** Do not re-freeze-thawed vegetables. Bacteria in these foods multiply rapidly. Spoilage may begin before bad odors develop. Such spoilage may be very toxic. Re-freeze vegetables only if ice crystals remain throughout the package. If you question the condition of any vegetables, throw them out.

4. **Meat and Poultry.** Meat and poultry become unsafe to eat when they start to spoil. Examine each package of thawed meat or poultry. If odor is offensive or questionable or if the freezer temperature has exceeded 40 degrees F for 2 hours or longer, don't use. It may be dangerous! Discard all stuffed poultry. Cook immediately thawed but unspoiled meat or poultry. After cooking, meat can be re-frozen.

5. **Fish and Shellfish.** These are extremely perishable. Do not re-freeze unless ice crystals remain throughout the package. Seafood may be spoiled, even if it has no offensive odor.

6. **Ice Cream.** Do not re-freeze-melted ice cream. Discard or consume it in the liquid form before off-flavor develops.

7. Cook thawed frozen foods and frozen dinners immediately if they are still cold. Do not re-freeze. If any foods have an offensive or questionable odor, do not eat.

**USING DRY ICE DURING A POWER FAILURE**

If it seems likely that your freezer will not be operating properly within one or two days, dry ice may help keep some frozen food from spoiling. The more dry ice you use, the longer the food will stay frozen. However, dry ice is very expensive and is not easy to obtain in some areas. If a flood is predicted, and you decide to use dry ice, locate a source in advance, and obtain it quickly.

You may be able to buy dry ice from a local dairy or cold-storage warehouse or your power company may be able to direct you to a source of dry ice. Follow these guidelines for using and handling dry ice:

1. Wear gloves when handling dry ice. Do not touch it with your bare hands, because it causes severe frostbite and tissue damage.

2. Allow 21/2 to 3 pounds of ice per cubic foot of freezer space. (More will be needed for an upright freezer, because ice should be placed on each shelf)

3. Move any food from the freezing compartment to the storage compartment of the freezer. Place boards or heavy cardboard on top of packages. Place dry ice on top of boards. In an upright freezer, place ice on each shelf.

4. You may cover the freezer with blankets, quilts or some other covering, but do not lock it or cover air vent openings. It will help to put crumpled newspaper or excelsior between the cabinet and the blankets.

5. Gas given off by the dry ice needs a place to escape. Open basement or room windows or doors to vent out gas from dry ice.

**SAFETY OF REFRIGERATED FOODS AFTER A POWER FAILURE**

1. Most chopped meats. Poultry and seafood sandwich fillings should not be left without refrigeration for more than two hours. If you have to leave your home without an ice chest containing ice, take cold salad ingredients to mix and eat as soon as you arrive. If any salad is left, throw it away.

2. You can extend your food supply by cooking all unspoiled meat immediately. Cooked meat needs to be kept above 140 degrees F if it cannot be cooled below 45 degrees F within two hours. Large, solid, unboned pieces of fresh beef or lamb such as rump roast or leg of lamb are least susceptible to quick spoilage.

3. Uncured sausage is vulnerable to contamination because it is free of preservatives. Keep frozen until you "must' leave, and then cook before it is completely thawed.

4. Raw chopped meats, like hamburger, spoil quickly. Pork, fish and poultry spoil quickly. Dispose of them if they have been in the refrigerator.
without power for 12 hours or more. Do not trust your sense of smell.

5. **Hard Cheese** usually keeps well at room temperatures. Other cheeses, such as cream cheese, opened containers of cheese spreads and cottage cheese, spoil quickly. Throw out when off-flavor develops. If surface mold develops on blocks of cheese, slice 1-inch below the surface and discard.

6. **Milk** spoils quickly without refrigeration. Throw out spoiled milk. Sour milk may be used in baking.

7. **Custard, gravies, creamed foods, chopped meats, poultry and seafood sandwich fillings** spoil quickly when unrefrigerated and provide ideal growing places for organisms causing food-borne illness. Dispose of these foods if they have warmed to room temperatures. Spoilage is difficult to detect since there may be no offensive odor or taste.

8. **Commercially-made baked goods with cream fillings** are not safe to take when evacuating unless you have a cold place to keep them. It is best to leave cream pies and all foods containing high protein and moisture at home unless you store them in a cooler with ice.

---

**POWER SUPPLY**

If your roof or windows have leaked, there may be water in the walls and ceiling – call an electrician and do not touch any electrical equipment wires. Report only downed lines and/or the fact that service has not been restored to your house if the rest of the neighborhood has power. Do not turn on the power until water service is restored if the water heater was drained. Appliances should be turned off or unplugged after losing power so that power systems will not be overloaded when the electricity is re-stored. Do not turn on any appliances until electrical parts are dry. Don’t touch any electrical appliances unless they are in a dry area or you are standing on a dry piece of wood and wearing rubber gloves and foot-wear.

**Overhead Power Supply:** Call FPL if there is damage to the meter (they are responsible). Damaged piping, meter box and/or weatherhead (where wires enter the pipe on the roof) are the owner’s responsibility.

**Underground Power Supply:** If the meter box is not intact, contact an electrician.

**EMERGENCY GENERATORS**

DO NOT use inside the house – they emit carbon monoxide. Do not hook the generator up to the main power supply at the breaker panel or fuse box: downed power lines can be re-charged and shock people working on the lines. Add up the wattage of each appliance and make sure that it is lower than the wattage rating of the generator.

**ROOF REPAIR**

Look inside the attic at the trusses first to make sure they will support your weight.

*For A Small Hole:* cover with roofing cement or caulking.

*Large Section Of Tarpaper Missing:* starting at the bottom, coat with roof cement and cover with tarpaper (you might find some in the debris or you may use a piece of plastic but make sure it overlaps the peak of the house). Coat the edges with roof cement. Nail down the tarpaper every six inches with roofing nails (or nails with big heads) and tin tabs. Cover nails and tin tabs with roofing cement.

*Large Holes:* Using 4 x 8 sheets of plywood, nail down to the truss members. Fill in as much of the hole as possible then apply tarpaper as in above.

**CHAINSAWS**

Chainsaws should be used with extreme caution. Always wear protective clothing: gloves, eye goggles and hearing protection. Long pants and boots should be worn to protect the legs – most injuries occur to the legs as the saw swings down after cutting.
through an item. Be aware of a chainsaw's potential for kickback, which can throw the saw back into your face or body. Striking the tip against any object can cause kickback.

Proper operation: Start cuts with the base of the chain. Pivot the blade at the base to work the blade through the wood. Never pivot on the tip of the saw. Never operate from a ladder or tree and keep all spectators at a safe distance. Begin and continue cutting at full throttle.

Maintenance: Keep chain properly lubricated. Fill the oil tank each time you re-fuel. Clean the cooling system after every other re-fueling.

SAVING FALLEN TREES

Should I Replant It: If a tree has not been pulled too far out of the ground and the root ball is still intact, try re-planting the tree and bracing it. If more than one third of the plant is missing, it may be better to replace it. If the bark has been split and a significant portion of the green below the bark is exposed, the plant will not survive.

Procedure: Keep the roots covered with wet towels or dirt (not plastic) until it is re-planted. Restake plants uprooted plants (see above) and those that are leaning and as little as possible. Angle stakes toward the tree so they will give in heavy winds. Pad the wire to protect the bark. Mound dirt to form a trench around the tree to aid in water retention. Place three to four inches of mulch over and around the base and water daily: give it enough water to keep the area damp but not soggy (citrus trees cannot tolerate over watering). Wait for new growth to appear before fertilizing. If the leaves droop, too many roots may have been damaged. The tree probably will not root any deeper; all root systems tend to be shallow in South Florida.

ROADS may be undermined.
WATER PUDDLES - Stay clear of all water puddles - they may be in contact with power lines.
LOOTERS - Deter with a sign spray-painted on your house: "You Loot, I Shoot". Stay outside, especially at night, keeping your home well lit.
PRICE GOUGING should be reported to the state Attorney General's Office, Consumer Division (985-4780). Don't him unlicensed roofers, tree-trimmers or contractors.

Electrical Systems And Appliances

Damaged Wiring And Switches

You may be able to repair flood-damaged electric wiring and switches yourself if you take certain precautions.

1. Disconnect the main switch and any switches, which control pumps and out buildings.
2. Stand on a dry board when turning off any switch or pull the handle with a dry stick.
3. Remove all branch circuit fuses so no one can reconnect the electricity while you are working on equipment and wiring. Wear rubber gloves because electrical leakage may be present if the switch box is filled with mud or debris.
4. Allow the entire wiring system to dry out, uncovering all possible openings to hasten drying.
5. To clean rigid conduit wiring in farm shop or dairy buildings, cut the wires and pull them out. Blow or suck air through the conduit to dry it out.
6. When the entire system is dry, have an electrician check it for leakage and grounds.
7. After all of these precautions have been taken, it should be safe to check the wiring by following these steps:
   a. First, replace the main fuses and close the main switch. If there is current leakage, the switch needs further repair or replacement.
   b. If there is no evidence of leakage, insert a fuse in one of the branch circuits and close the main switch. Additional repair is necessary if the fuse blows or if there is any sign of smoking or heating.
   c. After all circuits have been repaired and checked one at a time, insert all branch fuses.
RECONDITIONING AND SANITIZING FLOODED ELECTRICAL APPLIANCES

Do not try to use washers, refrigerators or other large electrical appliances until they are checked by a serviceman. Attempting to run equipment before it is properly cleaned could seriously damage it. Each manufacturer’s authorized dealer has detailed information for the inspection and repair of its specific equipment and should be called for repairs if possible.

Lamps and Lights
1. Be sure electricity is disconnected.
2. Remove fixtures that were submerged. Clean outlet boxes and wiring.
3. Clean fixtures and dry the wiring.
4. Clean dirt from sockets.
5. Completely disassemble and clean floor and table lamps. Clean wiring, sockets and switches.
6. If a switch cannot be opened for cleaning, replace it.
7. Replace all damaged cords and plugs.

Electrical Cords
1. Throw away any damaged or fabric-covered cords.
2. Rubber-covered cords in good condition (with no cracks in the rubber) can probably be reconditioned as follows:
   a. Remove connections from both ends.
   b. Peel back rubber covering until inside braid is dry.
   c. Cut off damaged part of cord.
   d. Clean up plug and receptacle; connect to cord or replace.

SANITIZING LAUNDRY EQUIPMENT

Washers and dryers should be sanitized if they have been immersed in floodwater. After appliances have been cleaned and reconditioned, sanitize them as follows:
1. Pour a disinfectant (quaternary, chlorine, pine oil or phenolic) into the empty washing machine. Then operate a 15-minute cycle at the “hot” water setting.
2. Unplug the dryer and wipe or spray the drum with a disinfectant solution. Be sure to wipe all areas of the drum and dryer door.
3. Rinse with a cloth dipped in clear water.
4. Leave the dryer door open until all parts are thoroughly dry—preferably overnight.
5. When the drum is dry plug in the dryer and resume normal service. In addition to disinfecting the washer and dryer, be sure to sanitize clothes baskets, work surfaces and containers where clean, sanitary clothes will be placed.

Keep clean, sanitized clothes separate from those not yet clean and away from surfaces likely to be contaminated.

SANITIZING REFRIGERATORS AND FREEZERS

If water seeps into an older model refrigerator or freezer, it will probably lose its insulation and have to be discarded. Appliances with ruined insulation will either run continuously, frost up on the outside or develop bad odors.

Newer models with foam insulation will probably be all right. Have the refrigerator or freezer checked by your local serviceman to be certain the motor and freezing unit are in safe working order. Then clean and sanitize as follows:
1. Dispose of any spoiled or questionable food.
2. Remove shelves, crispers and ice trays. Wash them thoroughly with hot water and detergent.
3. Rinse with a disinfectant solution (1 teaspoon chlorine bleach for each gallon of water).
4. Wash the interior of the refrigerator, including the door and door gasket, with hot water and baking soda.
5. Rinse with a disinfectant solution.
6. Leave the door open for about 15 minutes to allow free air circulation.
7. If odor remains, place several pieces of activated charcoal in an open container, or use a commercial refrigerator deodorizer.
8. Wash the outside of the refrigerator with a mild detergent and hot water.
9. If stains are difficult to remove or soil particles remain use a mild cleanser or spray cleaner. Be careful not to damage the finish.

ELECTRICAL CIRCUITS AND EQUIPMENT

The whole electrical system should be checked for short circuits by an electrician or competent person, before being turned on. Ask your power supplier for advice and help with electrical systems.

Things to do before the electrician arrives:
1. Be sure electricity is shut off at both the meter and in the buildings.
2. Remove covers from all switches, convenience outlets, light outlets and junction boxes that have been under water.
3. If the box is filled with mud, remove screws holding receptacle or switch in box. Pull receptacle, switch and wires in junction boxes out about two inches from box. Clean out all mud and dirt from box and receptacle switch. Do not remove electrical connections. Leave boxes open.
4. Remove all fuses and cover from entrance panel. Clean out all mud. Wires can be moved, but Do Not Disconnect. After above has been done and wiring has a chance to dry, the electrician can check the system without delay.
   For some equipment such as pumps, a temporary line can be installed by an electrician until the permanent wiring has a chance to dry.

APPLIANCES

Here are some general rules to follow:
1. Motorized appliances: Remove the electric motor and take it to an electrical repair shop. The controls (thermostat, pressure switches, wiring, etc.) will have to be cleaned and dried. Insulation should be dried and all dirt removed. Sealed units on refrigerators and freezers should not be harmed by water. Clean up unit and recondition controls.
2. Heating appliances: Disconnect and flush with clean water. Float out water with carbon tetrachloride. (Be careful of carbon tetrachloride fumes they are dangerous if inhaled. Do the job in open air and do not smoke ) The insulation on hot water heaters will be soaked. Remove all panels and, if possible, the top of the heater. This will give the insulation a chance to dry. Clean and dry thermostat and wiring. Apply rust inhibitor to all metal parts.
3. Lamps and Lights: Remove fixtures that were submerged. Clean outlet boxes and wiring. Clean fixture and dry out wiring. Check socket for dirt. Floor or table lamps should be completely disassembled and cleaned. Clean up wiring, sockets and switches. If a switch cannot be opened for cleaning, replace with a new switch. Unless the cord is in good shape, replace it. Check the plug.
4. Extension Cords: Any cords not in excellent condition should be thrown away. Fabric covered cords should be replaced. Rubber covered cords in good condition (no cracks in rubber, etc.) can probably be reclaimed. Remove connections from both ends. Peel back the rubber covering until inside braid is dry. Cut off damaged part of cord. Clean up the plug and receptacle and connect to cord or replace with new ones.
5. Grounding: For your protection, all metallic appliances should be grounded when in use to prevent an electrical shock. This applies especially to such appliances as washers, dryers, ranges, waffle irons, etc., and to equipment such as portable drills, saws and grinders. Attach a wire from the frame of the appliance to water pipe or to the ground wire in a grounded wiring system.
BUILDING DAMAGE

Check walls and foundations for damage. In spite of heavy damage to buildings caused by high water, much can be done to recover their usefulness. To make the best of it, repair structures as soon as possible.

Here are a few key points:
1. Check foundations and footings. Start from the bottom when investigating structural features. See that underlying material has not washed out. Filling done under the footings should be with masonry or concrete, never with earth or gravel. Raise or brace up in position to make doors level.
2. Wash out the mud, dirt and debris as soon as you can. This should be done before the walls and floors dry out. Start from the top or upper limit of the flooding and work downward, using a hose and mop or washrag.
3. Dry out the building and the crawl space under the building. Open doors, windows and foundation vents for good ventilation. If electric power is available, use electric fans to improve circulation. Drying will take considerable time—several days or even weeks, if the weather is damp. Wet wood will decay; dry as soon as possible to reduce decay and mold.
4. Insulated frame walls may require special drying. Strips of siding, gypsum board or plaster can be removed from upper and lower portions of the walls to speed up drying of the studding and insulation.
5. See that walls are plumb. Check with a level or plumb-bob. Correct and brace walls to keep them vertical.
6. Repair and patch where necessary, on a temporary basis. Final repairs can be done later, in dry weather, when more time is available.
   a. Concrete floors are easily patched, using a rich mix of mortar having no coarse aggregate, one to four mix.
   b. Wooden floors will dry out slowly. Don’t build hot fires to rush drying. Try to prevent buckling and warping by driv-

WARPED AND DE-LAMINATED FLOORS

Some warped wood flooring is repairable and some is not. The extent of damage will depend partly on the kind of material used in the floor. Different woods react differently to dampness or flooding.

Plywood

Many homes have plywood subfloors. Plywood usually separates (de-laminates) from excessive moisture. This will make the covering material (carpet, sheet-flooring or tile) buckle. Consult a reliable contractor for this work.

If only a small section of the subfloor has separated it can be replaced with new plywood. If the entire floor has de-laminated, either remove the entire subfloor and replace it, or re-nail new plywood over the old. The subfloor must be thoroughly dry before recovering it.

Hardwood

Badly warped hardwood floors usually can’t be repaired. If the floor is obviously beyond repair, take it up and discard it. Allow subflooring to dry for several months before installing another floor over it.
To repair slightly warped hardwood floors:
1. Clean and dry the floor completely before attempting any repairs. This may take weeks or even months.
2. If the floor is still warped in places when it is dry, remove strips adjacent to the bulges, and plane them on their edges. This will give more space for the warped boards to flatten out in time. (If boards are tongue and groove, consult a carpenter about the special techniques necessary for this work.)
3. You may be able to draw some buckled flooring into place by nailing the bulged spots. Some humps may be removed by planing or sanding. Heavily planed or sanded floors, though unsuitable to be used uncovered, can serve as a base for new flooring or for carpet or resilient floor covering.

Pine
Warped wide pine board flooring will often flatten out after it has thoroughly dried. Clean the floor and let dry for several months. Using the furnace as much as possible during the drying time will speed up the process. Do not try to repair the floor until it is dry. If any boards are still slightly warped when dry, use the same technique as for warped hardwood floors (see Hardwood section). When laying a new floor or subfloor, remove baseboards and moldings. The finished floor should be the same level as the original floor, if possible. If floor level changes, doors must be refitted to the new level. Consult a carpenter before attempting this work.

REPAIRING FLOODED TILE, LINOLEUM AND VINYL

Subfloor
Water coming up from below will cause the most damage to subfloor material. If a linoleum or vinyl floor covering is not under water many days, the floor covering may partially-protect the subfloor material. Long submersion, however, will loosen adhesives and warp subflooring. If a plywood or hardwood subfloor is wet, you should probably remove the linoleum or vinyl and replace the subfloor material.

Removing Loosened Floor Coverings
Some floor coverings may crack or break when you try to loosen them. Contact a reputable dealer to find out what solvent will loosen adhesives with a minimal amount of damage to linoleum or vinyl.

Heating with a heat lamp or propane torch may make the covering less brittle. How easily the covering can be lifted depends on the material and adhesive. If the adhesive is waterproof, it may be difficult, if not impossible, to remove the floor covering without considerable damage.

Tiles
If the floor has not been badly soaked, you may not need to replace the subfloor. It is possible to re-cement-loosened tiles of any type. Be sure the floor is thoroughly dry before trying to re-cement.
Blisters may be left in the linoleum tiles after warped wooden flooring has dried. Carefully puncture each blister with a nail. With a hand syringe, force diluted linoleum paste through the hole, and weigh the linoleum down with bricks.

Sheet Linoleum or Vinyl
Water may have seeped under a loose section of vinyl or sheet linoleum. Carefully remove the entire sheet. Allow the floor to dry thoroughly before trying to re-cement the linoleum. Thorough drying may take as long as six weeks or more. Use a new sheet of lining felt before re-cementing the floor covering.

CLEANING FLOODED FLOORS AND WOODWORK

1. Shovel out the worst of the mud and silt before it dries. Use a hose if necessary.
2. Before the house has dried out, scrub floors and woodwork with a stiff brush, plenty of water, a detergent and a disinfectant. Remove mud and silt from corners, cracks and crevices.
3. Water may have accumulated in partitions and exterior walls. Drain these areas by removing baseboard and drilling holes between studs a few inches above the floor. You may need to remove sections of the wallboard or plaster so that wall studding and interior can dry thoroughly - a process that may take months.
4. Give floors a final thorough washing with a nonsudsing cleaning product.

Removing Surface Mildew
1. Heat the room to a temperature of 50 to 60 degrees F to help dry mildewed wood.
2. Scrub mildewed floors and woodwork with a mild alkali solution such as washing soda or tri-sodium phosphate (4 to 6 tablespoons to a gallon of water), available in paint and grocery stores. Or use a cloth
dipped in hot water and a small amount of kerosene, or in a mixture of borax dissolved in hot water.

3. Rinse with clear water.
4. Wipe clean floors dry with old towels.
5. Allow wood to dry thoroughly.
6. Apply a mildew-resistant paint after woodwork has thoroughly dried.
7. Replace badly infected wood.

Bleaching Wood Stained By Mildew
1. Remove paint or varnish with paint remover with room well ventilated.
2. Apply a solution of 3 tablespoons oxalic acid dissolved in a pint of water to the stains. (Oxalic acid crystals can be purchased at drug stores. Oxalic acid is poisonous. Label it clearly and keep out of children’s reach.)
3. Rinse with clear water. Wipe dry.
4. Dry thoroughly before refinishing.

Refinishing
You may prefer to have floors professionally refinished. If you decide to do the work yourself:
1. Be sure floors and subfloors are thoroughly dry.
2. Sand the surface until it is clean and smooth. (Heavily planed floors may never look good again, but they can serve as a base for carpeting, tile or sheet flooring.)
3. If floor is oak, apply a filler; then apply two coats of a penetrating floor seal or spar varnish. Sand between coats.
4. Apply varnish, following directions on can.
5. Treat fir flooring in the same way, but omit the filler.

Drying Walls

Inner Walls
Walls must dry from the inside out. The interior framing of walls should be allowed to dry thoroughly. Sometimes this process takes weeks or even months. To release water and mud from walls, remove top and bottom strips of siding on the outside of the building. Drill several holes in walls near the inside floor line.

The total drying time will depend partially on the amount of dry air that can circulate through the studding (called “chimney action”). To provide for maximum chimney action, first consider the construction of the building.

Fire Stops or Cross Bracing
These are horizontal or diagonal braces between the vertical supports or studs.

Cross bracing will prevent chimney action between the studding. However, cross bracing is not usually found in modern construction, except in two-story houses where it has been specified. To allow free air movement, remove interior or exterior wall covering wherever cross braces are located. To check for cross bracing or fire stops, extend a stiff wire into the wall cavity.

Insulation
Most types of insulation will be ruined if water-soaked. You will probably have to replace flood-soaked insulation.
1. Loose fill (such as vermiculite) will settle to the bottom of walls. As it dries it can be removed. If not removed, loose fill insulation will create odors and eventually cause decay of the studding.
2. Rock wool batting insulation will also bunch and settle. If it is absorbent it will create odors and could eventually cause studding decay.
3. Fiberglass batting will also bunch, but may not develop odors. Its insulating value will be greatly reduced if it is not thoroughly dry or if it settles and leaves areas at the top of walls unprotected.
4. Reflective surfaces (such as aluminum foil) will probably lose their reflective ability, thus decreasing their insulation effectiveness. The material itself should be undamaged.

Wall Coverings and Finishes
1. Plaster will take weeks or even months to dry, but may not be ruined by water. Old plaster, however, may disintegrate after being wet for a long time.
2. Dry wall (plaster board) will warp and disintegrate in water. Warping above the water level can also be expected. Drywall
that has been submerged must be replaced.

3. **Laminated paneling** (plywood, masonite) will separate and warp above and below the water level. The extent of damage will depend on how long the paneling was submerged and how quickly moisture is removed from the studding. Slow drying decreases the possibility of delamination.

**Siding**
1. **Masonry** will dry slowly but will be undamaged except for possible cracking or settling. Open the inside walls to prevent mildew and decay of wooden supports.
2. **Lapped siding** (wood, asbestos, aluminum). Remove strips or sections to dry insulation and studding. The type of sheathing will determine drying rate. To prevent oxidation, make sure backing of aluminum siding is dry.

**Sheathing (Material Between Studding and Finish Siding)**
1. **Wooden boards** will dry slowly and some will warp. If possible, re-nail warped areas before they dry. Replace those that are too badly warped to salvage.
2. **Sheathing board** is usually absorbent and will be difficult to dry. Some will disintegrate or separate and must be replaced.
3. **Plywood** will probably separate and must be replaced. Marine plywood will not warp or separate, but is generally considered too expensive to use in residential construction unless the building is subject to frequent flooding.

**CLEANING INTERIOR WALLS**
1. If walls have been flooded, hose them down, if possible, while they are still damp to remove most of the mud and silt.
2. Scrub with a sponge and a warm detergent solution or a commercial cleaner. Clean a small section of the wall at a time.
3. To get rid of the stench that often accompanies flooding, rinse with a solution of 2 tablespoons sodium hypochlorite laundry bleach (such as Purex or Clorox) to a gallon of water. Repeat the scrubbing and rinsing several times if necessary. Household disinfectants such as Lysol can also be used. Follow directions on container.
4. Work from the floor to the ceiling to prevent streaking. Rinse with an old bath towel wrung out in clear water. Overlap sections.
5. Clean the ceiling last.

6. Allow walls to dry thoroughly before repainting, repairing plaster, papering or applying any wall covering. Four to six weeks should be allowed as a minimum drying time. Total drying time will depend on weather conditions. You may need to remove baseboards or sections of the walls to dry interior studding and insulation (see Drying Walls section).
7. If mildew appears on walls, scrub with a solution of trisodium phosphate, a disinfectant or a solution of 1/2-cup bleach and 1/2 cup mild detergent in a gallon of warm water.

**REPAIRING EXTERIOR WALLS**
1. **Strip drywall and insulation from inside wall.** Allow studs to dry thoroughly before proceeding. (Insulation can cause skin irritation. Wear protective skin covering when working with it.) Clean electrical outlets and check wiring.
2. **Check for silt deposits in crevasses behind Siding.** If crevasses are filled with silt, remove siding and clean out all silt. Silt left in crevasses will trap moisture, causing mold and peeling paint.
3. **Check or cracked or warped siding.** If only a few boards are warped or cracked, replace them individually. If all siding is warped, cover entire wall with new material. You can install new siding over old, if there are no silt deposits behind old siding. This will also help improve insulation.
4. **Cover or replace warped siding.** It is easiest to cover warped horizontal beveled siding with new vertical siding, and to cover warped vertical siding with horizontal siding. Installing new siding over old will require trim work around doors and windows. Consult a carpenter for installation details. Siding is available in vinyl, aluminum and wood. Wood siding may be either natural or prefinished. Vinyl and aluminum siding are permanently colored.

**CARE OF DOORS**
Take the knobs from the doors and lay the doors on a level surface with wooden strips separating them to facilitate drying and to prevent warping and twisting out of shape. Veneered doors are very likely to be ruined by submersion, but some of them may be usable if they are piled properly and dried carefully to prevent separation.
Windows

Get windows open as soon as possible to speed up drying of floor and walls.

Raising wooden windows in a building that has been flooded may be difficult, since window frames and sashes will probably be water-soaked and swollen. Don’t try to pry windows open. Panes or sashes will probably break if you try to force them. Windows with metal frames should be opened. Adding wax to the tracks along which the windows move will protect them against corrosion. To open windows:
1. Remove side-molding strips in front of inside sash. Molding strips or stops are usually nailed or screwed on, and can be easily removed.
2. Go outside the building and remove the sash by pushing one side gently toward the inside. Lift the sash inside.
3. Allow the sash to dry thoroughly before trying to fit it back into the window frame.

REPLACING BROKEN WINDOW PANES

Prepare Sash
1. If you need to remove the sash from the frame to make repairs, use a broad chisel or other prying tool to remove vertical strips holding sash in frame. Remove sash and place on a horizontal work surface.
2. If you plan to leave sash in place during repairs, chisel out old putty to free loose or broken panes. Wear gloves, and be careful to avoid being cut.
3. With a pair of needle-nose pliers or a screwdriver, remove glazier’s points (used in wooden sashes) or metal clips (used in metal sashes).
4. Scrape away putty sealing glass to groove on outside of pane.

Cut Glass
You can buy glass to fit, or cut your own from larger pieces you have available. Wear gloves and work on a solid surface covered with newspapers.
1. Measure glass, using a ruler or straight edge. Allow 1/16-inch space on each side.
2. Holding glass cutter between your first and second fingers with your thumb under the handle, make a smooth continuous stroke along the straight edge toward yourself.
3. To complete the break, hold small pieces firmly and bend quickly away from the cut. Tap larger pieces with cutter handle on opposite side over the scored line. For safety, wear gloves during this step.

Install Glass
1. Check pane size again. Make sure there is at least 1/16-inch clearance on all sides to assure a tight putty joint.
2. Remove panel. Apply glazing compound or putty along the groove holding the pane. (Use the kind of glazing compound recommended for your type of frame material.) Roll compound into ¼ inch rope-like lengths. Place it in position.
3. Set pane in place. Press down gently on all sides of the pane to depress glazing compound into a flat film and to seal the exterior joint.
4. Insert glazier’s points (one centered on each end and two along each side in a wooden frame) or metal clips (in a metal frame) to secure the pane.
5. Apply glazing compound on interior side. First apply a generous amount of compound by drawing a loaded putty knife across the mullions (pane separators) on edges of sash at a right angle. Then draw the knife parallel to the frame to smooth the compound into a triangular bead. Size the bead so that glazing compound is not visible from the other side of the frame.
6. With the putty knife remove excess putty from the outside of the frame. Smooth remaining putty edge.

Clean Pane
1. Remove specks of glazing compound with turpentine or benzene.
2. Paint wooden trim when compound is dry.
Cleaning & Sterilizing
Dishes & Cooking
Utensils

1. Any piece of equipment that can be taken apart should be cleaned in pieces. Remove plastic and wooden handles from frying pans and sauce pans. Clean parts separately.

   Stainless Steel, Nickel-Copper Alloy, Nickel or Chrome Plated Metals
   1. Wash thoroughly and polish with a fine powder cleanser.
   2. If furniture plating or hardware is broken so that base metal is exposed and rusted, wipe with kerosene and then wash and dry the surface. Wax to prevent further rusting.

   Air-dry dishes. Do not dry them with a dishtowel. If cupboards and food preparation surfaces were in contact with floodwater, clean and rinse them with a chlorine bleach solution before storing dishes and utensils.

   Rust causes most damage to flooded household metals, especially iron. Use the following treatment to control rusting.

   Iron Pots, Pans and utensils:
   1. Wash with soap and water, using a stiff brush and scouring powder.
   2. If rust remains, wipe with an oil saturated cloth or use a commercial rust remover.
   3. Remove rust from kitchen utensils by scouring with steel wool.
   4. Wash in hot soapsuds, rinse and dry thoroughly.
   5. Season iron pans and utensils with a generous amount of unsalted cooking oil. Heat in a 250˚F oven for two or three hours. This will permit oil to soak into pores of metal. During the heating process apply more oil as needed. When seasoning is completed wipe off the excess oil.

   Hardware
   1. Coat iron hardware with petrolatum or machine oil to prevent further rusting.
   2. Use stove polish on stove or similar ironwork.

   Locks and Hinges
   Locks and hinges, especially those made of iron, should be taken apart, wiped with kerosene and oiled. Follow the same procedure as for iron hardware. If it isn't possible to remove locks or hinges, squirt a little machine oil into the bolt opening or keyhole. Work the knobs to distribute the oil. This will help prevent rusting of the springs and metal casing. (Do not use too much oil as it may drip on the woodwork, making painting difficult.)

   1. Wash thoroughly and polish with a fine-powdered cleanser.
   2. If furniture plating or hardware is broken so that base metal is exposed and rusted, wipe with kerosene and then wash and dry the surface. Wax to prevent further rusting.

   Aluminum Pans and Utensils
   1. Wash thoroughly with hot soapsuds. Scour any unpolished surfaces, such as the insides of pans, with steel wool pads with soap. Rub in one direction only.
   2. Polish plated aluminum surfaces with a fine cleansing powder or silver polish. Do not scour.
   3. Sterilize in a chlorine solution.
   4. To remove dark stains from aluminum pans caused by alkaline foods, fill pan with water. Add 1 tablespoon vinegar or 2 teaspoons cream of tartar for each quart of water. Boil for 10 to 15 minutes, scour with steel wool pad with soap, rinse and dry.

   Copper and Brass
   1. Polish with a special polish or rub with cloth saturated with vinegar or with a piece of salted lemon.
   2. Always wash copper thoroughly with soapsuds after using acids or commercial polishes or they will retarnish rapidly.
   3. Wash lacquered ornamental copper in warm soapsuds. Rinse with warm water and wipe dry. Do not polish. Do not soak.

   Pewter
   1. Wash thoroughly with hot soapsuds, rinse and
dry. Use a soft toothbrush to get into crevices.
2. Rub on silver polish (paste or liquid, not the dip type) with a soft cloth. Use a soft toothbrush to get into crevices.
3. Rinse in hot soapsuds and dry.
4. Check for small holes, cracked joints and dents. If the pewter needs mending and is a prized piece, let a professional fix it.
5. Small holes can be mended by cleaning the metal inside the pewter object with steel wool, then fill with pewter epoxy mender. Follow instructions on the label carefully.
6. Felt or other protection materials that have separated from household decorative accessories such as bookends, ashtrays and candle holders, should be replaced. Felt or protective materials can be purchased in fabric stores, cut to match those damaged and glued in place with rubber cement.

SALVAGING CLOTHING

Hard water may be contaminated with sewage waste so it is important that flood-soiled clothing be thoroughly cleaned and disinfected in order to kill harmful bacteria. Prompt attention may save much of your clothing that has been damaged by flood waters. If possible, do not permit the flood water and mud to dry in shoes or garments.

Washable Garments
- Check your care label to make sure garments are washable.
- If labeled hand washable only, then hand wash – do not put into the washing machine.
- If garment is dry, brush off loose dirt.
- Rinse in clean, cool water to remove mud and floodwater. This will take several rinsings – until rinse water is clear.
- Work a heavy duty detergent (liquid) or paste of granule detergent into all stained areas. Let stand 15 to 30 minutes.
- Follow care labels and wash in hottest water safe for garment with detergent.
- Sanitize using a disinfectant. Always test on an inconspicuous seam to be sure it does not harm the garment, such as a color change. Add to washing machine before adding clothing.
- Liquid chlorine bleach (Clorox, Purex) if safe for garment. Do not use on washable wools and silks. Follow directions for use carefully.
- Pine oil (Pine-O-Pine, Fyne Pine) is safe for most washable garments. Do not use on washable wools and silks since the odor will remain.
- Phenolic (Pine-Sol, Al-Pine) is safe for most washable garments. Do not use on washable wools and silks since the odor will remain.
- Hang garments to dry.

Dry Cleanable Clothing
Take to the drycleaner as soon as possible. Be sure to shake and brush well to remove as much dirt as possible. Give the drycleaner as much information as possible about:
1. What caused the damage.
2. The fiber content of fabric, if known, dye.

When Dry Cleaning Service Is Not Available

Garments Still Damp With Muddy Water
1. Rinse in cold water to remove watersoluble, clay-type soil. Rinse garment as quickly as possible to avoid bleeding of dyes and to keep shrinkage to a minimum.
2. Gently squeeze out excess water and shake out wrinkles. Rolling in dry towels will help remove excess water.
3. Place garment on hanger and dry in cool air or smooth it out on flat surface to dry.

Garments That Are Only Partly Wet
1. Try to rinse out the wet portion without dipping the entire garment in cold water.
If this cannot be done without leaving a strong stain line, it is better to dip the entire garment.

2. Shake out wrinkles and dry in cool air.

**Dry Garments With Soil in Them**

The soil may be difficult to remove. Shake well to remove as much soil as possible before sending to the dry cleaner.

**Wet Garments, But Not Soiled**

Dry in cool air to prevent mildew and transfer of dye.

---

**LEATHER AND SUEDE GARMENTS AND ACCESSORIES**

Leather and suede garments, shoes, belts and handbags should be allowed to dry away from direct heat then:

- Brush off as much mud as possible.
- Use mild soapsuds and cool water to remove remaining dirt.
- Rinse with clean water and wipe gently with clean cloth until all dirt is removed. Do Not get the leather or suede too wet while cleaning.
- Stuff shoes, handbags, and sleeves with paper to maintain their shape.
- Dry away from sun and heat.
- Clean with saddle soap.
- Use oil for leather or suede to soften and prevent stiffening.

**NOTE:** This oil may darken the leather, so check before using.

- Use a suede brush to restore its original appearance. Be sure to brush in only one direction.

---

**CLEANING HOUSEHOLD LINENS AND FURNISHINGS**

**Mattresses**

Due to the complex construction of modern mattresses, renovation is usually not possible. It is best to buy a good used mattress or a new mattress.

If a mattress must be used temporarily, scrape off surface dirt and wash with a bleach solution (3/4 cup of bleach to 1 gallon of water) to clean and disinfect the mattress. Use gloves when washing the fabric and then expose the mattress to the sun. Turn occasionally to dry. Household fans may also speed up the drying process. Cover mattress with plastic or a rubber sheet before using it.

**Feather Pillows**

**Washing feathers and ticking together.** If ticking is in good condition, wash feathers and ticking together.

1. Brush off surface dirt.
2. To circulate water through pillows, open a few inches of the seam to opposite corners of the pillow, turn edges, sew loosely with strong thread or fasten with safety pins.
3. Wash in machine or by hand in warm (not hot) suds 15 to 20 minutes. Use a disinfectant in the wash cycle. If using an automatic washer, do not wash more than two pillows at a time.
4. Rinse at least three times in clear, warm water.
5. Spin off water or gently squeeze out as much wear as possible. Do not put pillows through wringer.
6. Dry in an automatic dryer at moderate heat setting or dry in a warm room with a fan or across two or three clotheslines. Put several bath towels or a clean tennis shoe in dryer with pillows to speed up drying and to keep the pillows “moving”. Allow at least two hours. Shake up feathers occasionally to hasten drying.

**Washing feathers and ticking separately.** If ticking is not in good condition or if pillow is badly soiled, wash feathers and ticking separately.

1. Find a muslin bag or large pillowcase, which is two or three times larger than the ticking.
2. Open one edge of ticking.
3. Sew open edges of the ticking and the bag together.
4. Shake the feathers from ticking to muslin bag.
5. Close seam of bag.
6. Wash bag of feathers in lukewarm, sudsy water and disinfectant.
7. Repeat if necessary.
8. Rinse in lukewarm water, changing water several times.
9. Squeeze out as much water as possible by hand. Do not use a wringer.
10. To air-dry, hang on line by two corners. Change position end to end and shake feathers occasionally to speed up drying.
11. Wash the ticking. With a sponge, apply a starch solution to the inside of the ticking or use a spray starch.
12. Transfer clean feathers to the clean, sanitized starched ticking, using the same methods as for emptying.
It is very important to completely dry the feathers to reduce potential odors. If pillows have been badly soiled, it may not be possible to remove all objectionable odors.

**Polyester Fiberfill Pillows**
1. Brush off surface dirt.
2. Wash by hand or in a washing machine in warm water and low-sudsing detergent. Add a disinfectant to the wash water. Flush water through pillow by compressing it. (Twisting and wringing will tear filling.) Change water and repeat if necessary.
3. Rinse three times in clear, warm water.
4. Spin off water in automatic machine. Tumble dry in dryer at moderate setting with several bath towels or press out as much as possible by hand and hang on line outdoors to dry.

**Foam Rubber or Urethane Pillows**
1. Remove cover. Brush off surface dirt.
2. Follow manufacturer’s directions if they are available. Otherwise, soak in cool water; then wash in warm, suds by hand. Use a bathtub or large sink. Then wash by pushing down on pillow, releasing, and pushing down again. Rinse the same way in lukewarm water.
3. Gently squeeze or spin out excess water. Blot with towels.
4. **Dry away from heat or sunlight.** Do not dry in dryer unless on an “air only” setting. Pillows may dry very slowly in the air. If the pillows are old they may crumble.

**BLANKETS, QUILTS AND COMFORTERS**
Wash only one blanket, quilt or comforter at a time.
1. Shake and brush to remove surface dirt. Follow manufacturer’s laundering directions if available. Otherwise, proceed as follows.
2. Soak at least 15 minutes in lukewarm water, turn two or three times during soak period. Several soak periods may be beneficial depending on the amount of soiled lodged in fibers. Change water for each soak period.
3. Wash using a mild detergent, disinfectant and lukewarm water. Immerse blanket and work suds in gently, using as little agitation as possible.
4. Rinse in several changes of lukewarm water. Soak each time for five minutes turning once or twice by hand. Extract as much water as possible.
5. Hang blanket over two lines to dry so it forms an “M” shape or dry it in preheated dryer with several large, dry bath towels. Remove blanket from dryer while still damp and hang over two lines to finish drying. Gently stretch blanket into shape.
6. Brush blanket on both sides to raise nap. Steam press binding, using synthetic setting on iron. Wash lightweight quilts following directions for wool blankets. Dry outdoors in sunlight, if possible, to remove unpleasant odors.
You may need to take thick comforters apart and wash cover and filling separately.

**Washable Woolen Bedding**
Shake and brush well to remove loose dirt. Wash in lukewarm (barely warm) water with mild soap or detergent. Use a disinfectant.

Dry in warm place or in direct sunlight.

**Electric Blankets**
Follow manufacturers directions, if available. Most manufacturers recommend electric blankets be washed, not Dry-cleaned. Cover plug with heavy cloth and follow instructions above. Avoid bending wiring. Do not put electric blankets through a wringer or dry in a dryer, unless manufacturer recommends. To dry, squeeze down blanket lengthwise and hang over two lines.

**Sheets, Towels, Linens**
1. Brush off as much loose dirt as possible.
2. Rinse mud-stained fabrics in cold water to take out particles of soil lodged in fibers.
3. Wash in warm suds and disinfectant sev-
4. If stains remain after several washings, try bleaching white cottons and linens. Do not over bleach. Sun drying will aid bleaching. Bleaches may be used on some colored fabrics; follow directions on bleach package.

CLEANING FLOOD-SOILED RUGS AND CARPETS
It is likely that rugs and carpets will have to be cleaned by a professional rug cleaner. However, you can try the following cleaning methods.

Dry
Dry rugs and carpets as soon as possible to prevent mildew. Mildew is a spreading gray-white mold that stains and rots fabrics. Pull up water logged rugs immediately to prevent further damage to the floor. If possible dry small rugs outdoors in sunlight. Dry blankets or towels can be used to blot up excess moisture. Lay towels on the wet floor and walk on them to absorb moisture. To get air and heat to carpets, open windows if weather permits or use household electric fans or electric lights suspended on coat hanger "nests." Do not try to vacuum, sweep or shampoo carpets until they are thoroughly dry.

Sweep or Vacuum
After carpet is dry, thoroughly vacuum or sweep to get rid of dirt and debris. Move vacuum cleaner slowly to pick up more dirt. Clean off as much crusted dirt and sediment as possible before shampooing.

Shampoo
Note: Some rugs may shrink when shampooed.
1. Use a commercial rug shampoo, which may be applied to the carpet with an electrical rug shampooper, a manual applicator, a sponge mop or a hand brush.
2. An electrical shampooper agitates the carpet fibers and works the shampoo into the pile, removing soil. It should not be used on shag carpeting because the long pile can become tangled in the brushes.
3. After cleaning each section of the carpet, brush the wet pile in one direction with the applicator.
4. When the foam has dried thoroughly, vacuum the carpet to remove dry shampoo and loose dirt.

on the sponge, since water will weaken carpet backing.

Caution: Bleach may discolor carpet. Test bleach mixture in an out-of-the-way place before applying.
6. Rinse several times with clear water, wringing most of the water from the sponge each time. Change the rinse water as it becomes dirty.
7. Blot up remaining moisture with bath towels or other soft absorbent material.

Dry
After shampooing, dry rugs or carpets quickly. Hang rugs on line if possible, or lay them out flat in a warm, dry place. An electric fan will speed up drying. Carpets and rugs should be thoroughly dried

Even though the surface seems dry, any moisture remaining at the base of the fiber tufts will cause mildew or rot. If you must walk on the carpet before it is dry, put down brown paper. Vacuum again when dry, and brush the nap in one direction.

SALVAGING HOUSEHOLD FURNITURE
Before starting to salvage damaged furniture, decide which pieces are worth restoring. Such decisions should be based on:
a. Extent of damage
b. Cost of the article
c. Sentimental value
d. Cost of restoration

Consider each piece individually.

Antiques may be worth the time, effort and expense of restoration. Unless damage is severe. You will probably need to clean, dry and reglue the piece. Slightly warped boards may be removed and straightened.

Wood Veneered furniture is available in many qualities. Extensive damage may be costly to repair. If veneer is loose in just a few places, you may be able to repair it.

Upholstered Furniture may be salvageable, de-
pending on its general condition. Flooded pieces will need to be cleaned and dried, and mildew should be removed. If damage is extensive, you may have to replace padding and upholstery. Since this is an expensive process, it might be wiser to apply the money toward a new piece of furniture.

You will not need to repair all pieces immediately. Any furniture worthy of repair should be completely cleaned, dried and stored in a dry, well-ventilated place until you have time to repair it.

SALVAGING UPHOLSTERED FURNITURE

Upholstered furniture that has been submerged in flood water may be impossible to salvage if it has been badly soaked. If the piece seems worth the effort, however, you will need to clean and oil the springs, replace stuffing and clean the frame.

Stuffing and Covering
1. Remove furniture coverings using a ripping tool, hammer or tack puller, screwdriver or chisel.
2. Remove all tacks from the frame.
3. Wash coverings.
4. Throw away all cotton stuffing. You can dry, fumigate, and sometimes reuse padding made of materials other than cotton.

Springs and Frame
1. Wipe off springs and frame. Dry all metal parts and paint them with rust-inhibiting paint. Oil springs.
2. Store wood furniture where it will dry out slowly.

Mildew
Mildew may have developed on damp or wet furniture. Mildew is a gray-white mold that leaves stains and rots fabric unless it is removed promptly. To remove mildew or mildew spots:

1. Brush with a broom to remove loose mold from outer covering. Do this outdoors if possible, so you don’t scatter mildew spots (which can start new growth) in the house.
2. Vacuum the surface to draw out mold. Dispose of the vacuum cleaner bag outside to avoid scattering mold spores in the house.
3. If mildew remains and fabric is washable, sponge lightly with thick soap or detergent suds. Wipe with a clean, damp cloth. Get as little water on the fabric as possible, so the padding doesn’t get wet.
4. If mold remains, wipe the furniture with a damp cloth dipped in dilute alcohol (1 cup denatured alcohol to 1 cup water) or a chlorine bleach solution (1/4 teaspoon bleach to a cup of water). Test in an area that is “hidden.”
5. Dry the article thoroughly.
6. Use a low-pressure spray containing a fungicide to get rid of musty odors and remaining mildew. Moisten all surfaces thoroughly. Re-spray frequently if mildew is a continuing problem. Spraying rooms with an aerosol material will not eliminate mildew problems.
7. If molds have grown into inner part, send furniture to a dry cleaning or storage company for thorough drying and fumigation. Fumigation will kill molds present at the time, but will not protect against future attacks.

SALVAGING FLOODED WOODEN FURNITURE

Wooden furniture damaged by floods can best be salvaged through slow drying and proper repair.

Submerged Furniture
1. Take furniture outdoors and remove as many drawers, slides and removable parts as possible. Drawers and doors will probably be stuck tight. Do not try to force them out from the front. After allowing to dry for a brief period, use a screwdriver or chisel to remove the back and push out
the drawer from behind.

2. After you have removed movable parts, clean off mud and dirt, using a hose if necessary.

3. Take all furniture indoors and store it where it will dry slowly. Furniture left in the sunlight to dry will warp and twist out of shape.

4. When furniture is dry, re-glue it if necessary. You will need woodworking tools and clamps to re-glue some pieces. Before you start, decide whether you have the time, equipment and ability to do the work. Consult an experienced cabinetmaker if necessary. To re-glue loose joints, thoroughly clean joints of old glue so the area will be as clean and free of glue as possible. Use a white all-purpose glue, following directions on container. Hold parts together with rope tourniquets or suitable clamps. To prevent damage from ropes or clamps, pad contact areas with cloth protection.

Damp Furniture - Removing White Spots

Furniture that has been submerged in floodwaters will frequently exhibit mildew or mold, which can be removed with warm soapy (mild detergent) water and a soft cloth. White spots or a cloudy film may develop on damp furniture that has not been submerged. To remove white spots:

1. If the entire surface is affected, rub with a damp cloth dipped in turpentine or in a solution of 1/2-cup household ammonia and 1/2 cup water. Wipe dry at once and polish with wax or furniture polish.

2. If color is not restored, dip 000 steel wool in oil (boiled linseed, olive, mineral or lemon). Rub lightly with the wood grain. Wipe with a soft cloth and re-wax.

3. For deep spots use a drop or two of ammonia on a damp cloth. Rub at once with a dry cloth. Polish. Rubbing cigarette ashes, powdered pumice, or a piece of walnut into spots may help remove them.

4. If spots remain after all efforts to remove them, the piece should be stripped of the old finish and refinished.

Veneered Furniture

Thoroughly dry furniture. If veneer is loose in just a few places, carefully scrape glue under loose area.

1. Press veneer back in place. Place wax paper over affected area and heat with warm iron, remove iron and place weights on the area.

2. If veneering doesn't stay in place or is bubbled, carefully slit the loose veneer with a razor blade, apply a good quality glue. Weights are applied after covering glued spots with wax paper to prevent excess glue (which may spurt out when pressure is applied) from gluing the weights to the furniture.

Repairing badly damaged veneered furniture requires special skill and tools. Unless you are an experienced woodworker, don't attempt the job yourself. Take the furniture to a cabinetmaker or have your dealer return it to the factory for repair.

If insurance allows part value on flood-damaged furniture, it may be financially worthwhile to apply the money to new articles, rather than pay for extensive repairs.

STRAIGHTENING WARPED FURNITURE BOARDS

Slightly warped furniture boards, as in table or dresser tops, usually can be straightened if they are made of solid wood. However, do not attempt to straighten severely warped parts, veneered parts (veneer usually separates) or parts with an elaborate grain, such as curly maple. If such pieces are worth salvage expense, send them to a reliable furniture repair shop. Get a cost estimate before leaving the piece for repair.

To straighten slightly warped boards:

1. Remove the warped board from the furniture.

2. Strip the board of its old finish. A clean board straighten better than a finished board. You may have to strip the entire piece of furniture to attain an even finish when the board is straightened, refinished and replaced.

3. The principle of warp removal is to add moisture to the dry side (concave) and remove it from the wet side (convex). You can do this by:
   a. Placing the board with the wet side (convex) down on a radiator or heat vent in the winter.
   b. Placing the wet side (concave) up in the direct rays of the sun.

With either method keep the concave side moist with damp cloths and place bricks or other weights on top of the board and leave it for several days or until board is straight.

4. Clamp board in a flat position when it has straightened. Place clamps no more than 12 inches apart. Use small pieces of wood or pads between board and clamps to protect the board. Loosen clamps and move them slightly once or twice a day to prevent splitting.

You may place several boards in the same clamps. Insert small wooden blocks between boards for air space.
5. Stand on end and leave in the clamped position until thoroughly dry. This will take from several days to several weeks.

6. Paint or refinish as desired. Apply the finish to both underside and top of board. This will keep the board from absorbing moisture and from eventually re-warping.

**DRYING BOOKS AND FAMILY PAPERS**

Dry books and papers slowly:

1. If books and papers are damp, sprinkle cornstarch or talcum powder between pages to absorb moisture. Leave powder on for several hours and then brush off.

2. Books that have sustained water damage should be placed on end with pages separated.

3. When pages are partially dry, pile and press books to keep pages from crumpling.

4. Alternate drying and pressing until books are thoroughly dry. This helps prevent mildew. Use a fan to hasten drying.

5. When books are nearly dry, apply low heat with an electric iron. Separate the pages to prevent musty odors. This is a tedious process, which you may want to use only with valuable books.

6. Some chemicals such as parachlorobenzene may help stop mold growth. Books can be placed in closed containers with moth crystals to help stop mold growth. Contact your County Extension Office for recommendations.

7. When books are thoroughly dry, close them and use C-clamps to help retain their shape.

8. Books and papers may be frozen until you have time to work with them. Freezing is very effective in controlling mold growth.

9. Even if books and papers appear to have dried successfully, they may disinte-grate because of materials in the flood water. As a precautionary measure, photo-copy important documents or papers.

10. An excellent source of information is the publication, “Procedures for Salvage of Water-Damaged Library Materials” by the Library of Congress available at your local library.

**AVOIDING FRAUDS & DECEPTION**

When the hurricane has passed, it is time to survey the damage and begin to clean up. Often the homeowner is devastated when he/she views the damage that has occurred. Trees may be down and probably there is roof or other structural damage. The homeowner knows that unless repairs are made promptly, additional damage may occur or the residence may be uninhabitable until repairs are made. For the homeowner this is a stressful period and a time when he/she may be easily victimized by unethical workmen who attempt to take advantage of those needing or wanting to get home repair work done quickly.

It is very important for hurricane victims to be cautious about employing unknown people to remove trees and do repair work. Every agreement and credit contract should be read carefully and evaluated before it is signed. Shoddy workmanship and price gouging are common occurrences associated with crisis situations.

**TREE REMOVAL**

As soon as the hurricane has passed workers usually appear with chain saws. Many are individuals anxious to make a “fast buck” removing trees and other damaged property. Before agreeing to have any tree work done contact your local tree services. Tree removal requires considerable skill. A felled tree can cause damage to the home or to a neighbor’s home. Also, there is the potential for a tree cutter to be injured. Local tree services are licensed, insured and experienced. They carry liability insurance eliminating the potential for the homeowner to be sued in case of an accident. Ask for an estimate of the cost for work needing to be done.
and a time schedule for the work to be completed. Find out if the trees will be removed from your property after they are cut. If possible get an estimate from more than one tree service. Have all details of the agreement written into a contract and signed by the company and the homeowner.

If considerable damage is done by a hurricane service companies from throughout the region come to the area to help clear away the devastation. This can be an asset if there is more work to be than the local companies can handle. Before employing one of these companies ask to see its license and evidence of liability insurance. Get all pertinent information in a written contract before employing a company and before the work begins.

Be very wary of employing any unknown individual who appears with a chain saw. Tree removal is a high-risk operation that requires skill. If an uninsured worker is injured on your property you may be sued for damages. In spite of the risks involved, if you decide to employ an independent tree cutter, draw up a written contract that clearly spells out the work to be done. (Example: number of trees to be cut, stump height or treatment, what is to be done with the cut trees and by whom, beginning and completion date of work and amount to be paid when. NEVER pay for work before it is done. Include a statement about who is responsible for expenses in case of an accident. This statement is no assurance of protection but it may help.)

Remember, if a company comes to your door and solicits your business, you have three business days within which to cancel the contract if you change your mind provided the work has not been done. You must be given the name, address and telephone number where the company can be reached for cancellation.

**HOME REPAIRS**

If damage to the home occurs from a hurricane, the homeowner should immediately contact his/her insurance company, if the home is insured. The insurance company may require specific procedures be followed to collect for repairs.

If the homeowner is responsible for arranging for the repairs there are certain precautions to follow. Florida has specific laws, The Home Improvement Sales and Finance Act and Florida's Deceptive and Unfair Trade Practices Act, which are designed to protect consumers from home repair con-artists.

Take the time to investigate the quality of work and reliability of the home repair (or improvement) contractor or the workman that you are considering hiring. Shoddy work will only increase your loss and frustration. In Florida home improvement contractors must be registered with the state. Ask to see this license. Always get any agreement in writing and signed by both parties before work begins. Verbal agreements can be misunderstood and usually are unenforceable.

In Florida "home improvement" contractors include those doing construction work, roofing, siding, plumbers, electricians, swimming pool, heat and cooling equipment. State law requires all home improvement or repair contracts to be in writing and they shall carry the following information:

- Approximate date for beginning the work and the completion date unless a specific disclosure states that no completion date is provided. (You should always require a completion date be given.)
- A description of the work to be done. (Always require this to be detailed, describing the materials and grades to be used as well as the repairs to be made.)
- All financing information required by state and federal laws.
- Any warranty agreements
- Name and address of contractor and person for whom work is to be done.

Never sign a completion certificate until all work is satisfactorily done. Also, never pay a home repair contractor or a workman for work before it is done. If considerable work is to be done you may divide the cost for the work to be done into several payments, example, pay one half of the cost when the job is half completed.

If a mortgage is to be placed against the home to pay for the work that is to be done even more stringent state regulations exist. These include allowing either party to cancel the contract within 72 hours (3 working days) after signing the contract. In case of an emergency where work is needed immediately, an exemption to the three-day rule is permitted if both parties sign the statement. Unless work is to begin immediately, (the day of the signing or the following day) it is not wise to sign this exemption.
LANDLORDS AND
TENANTS

If you are renting a residence that is damaged by a hurricane, you have special rights and responsibilities. Repairs are the responsibility of the landlord. You should immediately notify the landlord of any damage to the property and you should make reasonable efforts to help protect it from any additional damage. The landlord is responsible for having the residence repaired and returned to livable condition.

If repairs are not made within a reasonable time, the tenant has the right to have the rent reduced or in some instances terminate the lease and move.

References


LAST BUT NOT LEAST

LOOTERS – Deter with a sign spry painted on your house: “You Loot, I Shoot”. Stay outside, especially at night, keeping your home well lit.

PRICE GOUGING should be reported to the state Attorney General’s Office, Consumer Division (985-4780). Don’t hire unlicensed roofers, tree-trimmers or contractors.

Editor’s Note: The chapter entitled “Home Clean-Up and Renovation” was furnished by the Home Economics Department of the University of Florida. Extension Specialists included:

- Nadine Hackler, Professor, Clothing and Textiles.
- Marie S. Hammer, Associate Professor, Home Environment.
- Mary N. Harrison, Professor, Consumer Education.
- Nayda I. Torres, Associate Professor, Family and Consumer Economics.
<table>
<thead>
<tr>
<th>Item #</th>
<th>Description of Item</th>
<th>Manufacturer Model Number Serial Number</th>
<th>Where Acquired</th>
<th>Documentation*</th>
<th>Purchase Date</th>
<th>Replacement or Restoration Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #</td>
<td>Description of Item</td>
<td>Manufacturer Model Number Serial Number</td>
<td>Where Acquired</td>
<td>Documentation*</td>
<td>Purchase Date</td>
<td>Replacement or Restoration Cost</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------</td>
<td>-----------------------------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>--------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* A = appraisal          E = estimate          B = paid bill/receipt          O = other
  P = photo              C = cancelled check       CR = credit card receipt
<table>
<thead>
<tr>
<th>Item #</th>
<th>Description of Item</th>
<th>Manufacturer Model Number Serial Number</th>
<th>Where Acquired</th>
<th>Documentation*</th>
<th>Purchase Date</th>
<th>Replacement or Restoration Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*A = appraisal  E = estimate  B = paid bill/receipt  O = other
P = photo  C = cancelled check  CR = credit card receipt*
211 is the 3-digit telephone number to call for information, referral, crisis intervention, and community education. 211 Palm Beach/Treasure Coast is able to assist any individual living in Palm Beach, Martin, St. Lucie, Indian River, and Okeechobee Counties year round, 24 hours per day, 7 days per week, 365 days per year.

In addition to our year round services, 211 Palm Beach/Treasure Coast is ready and available to connect individuals to essential community resources during hurricane season as well. Individuals can contact 211 to get up-to-date information on available health and human service needs before, during, and after a hurricane or other disaster, as well as for community resources that address everyday needs. For more information, call 211 or check us out on the web at www.211palmbeach.org or www.211treasurecoast.org

If and only when a hurricane approaches, visit our special hurricane website at http://hurricane.211pbtc.org for updated information on resources in Palm Beach, Martin, St. Lucie, Indian River, and Okeechobee Counties.

St. Lucie County COAD (Community Organizations Active in Disaster) is an umbrella organization whose members are active in disaster preparedness, response, recovery and mitigation. The voluntary agencies, government, faith-based organizations, local businesses and community-based entities that are members of St. Lucie County COAD coordinate resources in times of disaster. Its mission is to bring together community partners active in disaster services to foster a more effective response to the people of St. Lucie County in times of disaster.

For more information on how to donate time or resources or to request assistance through St. Lucie INTACT, please contact our coordinator at 772-462-2093 or visit our website at http://www.stlucieco.gov/community/intact.htm
St. Lucie County COAD (Community Organizations Active in Disaster) is an umbrella organization whose members are active in disaster preparedness, response, recovery and mitigation. The voluntary agencies, government, faith-based organizations, local businesses and community-based entities that are members of St. Lucie County COAD coordinate resources in times of disaster. Its mission is to bring together community partners active in disaster services to foster a more effective response to the people of St. Lucie County in times of disaster.

If you are looking for assistance during a disaster, or would like more information on volunteering with St. Lucie COAD, please contact us at 772-462-2093 or 772-461-3950.

**St. Lucie County COAD**, Community Organizations Active in Disaster, Alan Williams, Chair
American Red Cross, 540 NW University Blvd. Suite 107, Port St. Lucie, FL 34947, 772-878-7077

“Putting the pieces together before and after disaster.”
Living with hurricanes is a common event for Florida’s residents. Researchers have found four major areas where homes commonly fail as a result of hurricane-force winds. Proper hurricane preparation takes action to strengthen these areas.

What Should Be Done to Prepare this House for a Hurricane?
(Hint: Turn to the back for answers)
What Can You Do to Prepare Yourself?

All families should have a disaster kit ready before a storm hits. Refresh your kit every 6 months. Here’s a checklist so you can be prepared whether you evacuate or stay home:

- Seven-day supply of food that does not need refrigeration or cooking.
- Seven-day supply of water (one gallon per person per day).
- Seven-day supply of clean clothes and shoes.
- Sleeping items (blankets, pillows, etc.).
- Toiletries (toothbrush, toothpaste, soap, deodorant, shampoo/conditioner, etc.).
- Cash (in case ATMs/banks are closed).
- First aid kit (including basic medicines and prescription drugs).
- Operable vehicle with a full gas tank.
- Radio (battery powered or wind-up).
- Flashlight (batter powered or wind-up).
- Spare batteries.
- Tools (for basic car and/or house repair).
- Important documents stored in a waterproof container (medical records, insurance records, Social Security cards, etc.).
- Pet care items (food, water, cage, leash, immunization record, etc.).
- Any other specialty items.


Other Resources

For additional information on ways to prepare your property and your family for a hurricane, we recommend the following Web sites:

University of Florida | Disaster Handbook
[http://disaster.ifas.ufl.edu/](http://disaster.ifas.ufl.edu/)

University of Florida | Storm Preparation for Landscapes
[http://hort.ifas.ufl.edu/woody/stormprep.htm](http://hort.ifas.ufl.edu/woody/stormprep.htm)

Federal Alliance for Safe Homes
[www.flash.org](http://www.flash.org)

Federal Emergency Management Agency | Disaster Prevention & Preparation Library
[www.fema.gov/library/prepandprev.shtm](http://www.fema.gov/library/prepandprev.shtm)

Florida Division of Emergency Management | Information Page
[www.floridadisaster.org/DEMinformation.htm](http://www.floridadisaster.org/DEMinformation.htm)

Institute for Business and Home Safety
[www.ibhs.org](http://www.ibhs.org)
Wind forces are complex. The effect of wind on a building depends on the interaction of many variables. Natural variables include wind speed, wind height, ground surface features, and the properties of the air. Building variables include the shape, location, and physical properties of structures. Together, these variables create differences in pressure that push and pull on the exterior surfaces of buildings.

### How Wind Forces Affect Homes

**Uplift** occurs as wind flows over a roof. Similar to the effect on airplane wings, wind flow under a roof *pushes* upward while wind flow over a roof *pulls* upward.

**Tilting or sliding** occurs when horizontal wind pressures create a shearing action along the foundation.

**Overturning**, or rotating off the foundation, can also result from shearing action when a structure is otherwise unable to tilt or slide off the foundation.

### Only As Strong As The Weakest Link

A safe home is designed to resist these three effects of wind. The exterior surfaces of a home interact to function as the building envelope. Think of this envelope as a protective shield from the outdoor elements such as heat, humidity, and stormy weather. A stronger shield makes for a safer home and more comfortable occupants.

The structural components of a building envelope are the foundation, walls, and roof. A safe envelope has a **continuous load path**. This path connects all the structural parts of a building envelope much like how a human skeleton supports and connects parts of our body.

The non-structural components of a building envelope include windows, doors, garage doors, and other openings in the structural components. These parts protect the inside of a building much like how human skin protects our internal organs.

The weakest link in the building envelope is the point most likely to fail in a windstorm. When a hurricane or tornado strikes, a home is only as strong as the weakest link.

For more detailed information about wind resistant building envelopes, please read the other fact sheets in our *Education + Action = Wind Damage Mitigation Series*. 

---

1. This document ABE379 is part of the Education + Action = Wind Damage Mitigation series. Publication date: April 2007.
2. Kathleen C. Ruppert, Associate Extension Scientist, Program for Resource Efficient Communities; Hal S. Knowles, III, Coordinator, Program for Resource Efficient Communities; Karla A. Lenfesty, Windstorm Damage Mitigation Program Specialist, St. Lucie County Cooperative Extension, Institute of Food and Agricultural Sciences, University of Florida.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Employment Opportunity - Affirmative Action Employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For information on obtaining other extension publications, contact your county Cooperative Extension Service office. Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences / University of Florida / Larry R. Arrington, Dean.

Publication partially funded from a Florida Department of Community Affairs Residential Construction Mitigation Program Grant.
How Wind Forces Cause Damage

Wind forces can break the building’s load path or punch a hole in the building envelope. Sometimes the actual force of high winds can cause a door or window to break open.

Other times nearby debris can be picked up in the wind and projected against the building envelope. Roof shingles from a neighbor’s home, branches from fallen trees, or unsecured yard furniture are examples of potentially dangerous wind-borne debris.

Once wind forces create an opening in the building envelope, the dangers of structural failure greatly increase. Water intrusion is another damaging effect of wind driven rain.

If your house is in an unobstructed location or within 1,500 feet of open water, you are more susceptible to damages caused by high winds. Proper landscaping may help to shield your home and divert winds around the building.

Hurricane and Tornado Resistance

Check with your local building official to determine the wind-borne debris region of your location. Use the protections that will help your home resist the design wind speed of your region. It is a good investment to build or renovate beyond minimum code requirements. This may provide additional damage resistance, peace of mind, increased market value, and help you qualify for current or future incentives such as property wind insurance discounts.

- **Fortified...for safer living** is a home certification program of the Institute for Business and Home Safety (IBHS), a research and educational organization of property insurance companies. A Fortified...for safer living designation means that a qualified inspector has confirmed that the house is designed and built to withstand the perils commonly experienced in the area. Some insurance companies offer premium discounts on wind coverage for certified Fortified homes. For more information, visit [www.ibhs.org](http://www.ibhs.org)

- **Blueprint for Safety** is an educational program of the Federal Alliance for Safe Homes (FLASH), a non-profit, charitable education organization dedicated to promoting home safety. The program offers guidelines and builder training designed to provide reliable information about disaster-safety building techniques and features for floods, wildfires, and windstorms. For more information, visit [www.blueprintforsafety.org](http://www.blueprintforsafety.org) and [www.flash.org](http://www.flash.org)

References and Resources

Federal Emergency Management Agency | Disaster Prevention and Preparation Library
[www.fema.gov/library/prepandprev.shtm](http://www.fema.gov/library/prepandprev.shtm)

Florida Division of Emergency Management | Information Page
[www.floridadisaster.org/DEMinformation.htm](http://www.floridadisaster.org/DEMinformation.htm)

Texas Tech University | Wind Science and Engineering Research Center
[www.wind.ttu.edu](http://www.wind.ttu.edu)

University of Florida | Disaster Handbook
[http://disaster.ifas.ufl.edu/](http://disaster.ifas.ufl.edu/)
Reinforcing Your Roof

Hal S. Knowles, III, Kathleen C. Ruppert, Karla A. Lenfesty and Barbara Haldeman

The roof helps keep your home comfortable and dry. But during the high winds of a hurricane, poorly designed or maintained roofs can fail. Here are a few tips to reinforce your roof.

Why Does Roof Design Matter?

Roofs with very steep slopes perform poorly against horizontal winds. Roofs with very shallow slopes allow increased vertical uplift. Slopes between 3:12 and 6:12 (horizontal run : vertical rise) are often considered the safest.

Both hip roofs and gable roofs are common throughout Florida. Because of their design, hip roofs are more resistant to high wind loads.

Gable roofs can be made safer with a few minor improvements.

Cross ("X") Brace the Gable ("A" Frame)

First, install diagonal cross bracing between the gable truss and the fourth truss back. Be safe, remember to “X” the “A”. (See the diagram at the bottom of the left-hand column.)

Brace to Avoid the Domino Effect

Second, install horizontal truss bracing to prevent the trusses from getting pushed together from extreme winds. This is shown in the photo on the left. Be safe, remember to “avoid the domino effect”.

Third, install a shutter over any vents on the gable end wall. If you are building a new house with a gable roof, consider using continuous wall construction or balloon framing. This creates a solid unit of wall framing from the ground through to the roof on the gabled end of the house.
**Create a Continuous Load Path**

A house is a system of connected parts. If there is one weak link in the system, the whole house can be damaged. This is why it is important to create a continuous load path between the ground and the top of your house. This unifies the vertical structure of your house and resists the uplift forces of hurricane winds.

A continuous load path requires that you anchor the house roof to the walls, the second floor to the first floor, and the walls to the foundation. This can be done using hurricane straps for the roof-to-wall and floor-to-floor connections, and anchor bolts for the wall-to-foundation connections.

![Diagram of anchor bolts](image)

There are many hurricane straps and other anchoring devices available. Be sure to choose a product approved for use by the Miami-Dade County Building Code. Always use the manufacturer’s specifications for installation.

**Proper Sheathing & Shingle Attachment**

When installed improperly or with substandard materials, roof shingles, siding, and other exterior materials can be torn from a house. This allows wind and water inside, damaging the house. Also, these materials can become dangerous flying—or “wind-borne”—debris during a storm. Proper fastening techniques can prevent materials from being torn off a home during severe storms.

Connect roof sheathing to the roof framing with ten-penny weight common or eight-penny weight ring shank nails. Space them four inches apart along the edges, and six inches apart in the middle, of the plywood sheathing. Use wood adhesive underneath the sheathing along the connecting joint with the roof trusses.

Ring shank nails provide increased holding power as a result of their threaded rings. These rings bite into the sheathing and framing and resist higher uplift forces.

![Diagram of a ring shank nail](image)

**Other Resources**

Federal Alliance for Safe Homes  
[www.flash.org](http://www.flash.org)

Federal Emergency Management Agency | Disaster Prevention & Preparation Library  
[www.fema.gov/library/prepandprev.shtm](http://www.fema.gov/library/prepandprev.shtm)

Florida Division of Emergency Management | Information Page  
[www.floridadisaster.org/DEMinformation.htm](http://www.floridadisaster.org/DEMinformation.htm)

Institute for Business and Home Safety  
[www.ibhs.org](http://www.ibhs.org)

University of Florida | Disaster Handbook  
[http://disaster.ifas.ufl.edu/](http://disaster.ifas.ufl.edu/)
Doors provide safe access into and out of a home. However, high winds can make doors a pathway for storm damage.

**What Makes a Safe Door?**
A safe door has three hinges and a dead bolt lock with a bolt throw at least one inch long. The bolt throw should penetrate into the wall framing beyond the door jamb.

Safe doors also open toward the outside of the house. Any good exterior door should be made of metal or solid wood. Install shutters over doors with windows or hollow cores.

**What Makes Double Doors Unique?**
Double doors, such as French doors, need added protection. This is because the door opening is twice as wide as it is for single doors.

You can improve the wind resistance of your double doors by installing barrel bolts in the inactive door. The bolt throws should penetrate through the door jamb into the header and through the bottom threshold into the subfloor.

**Why Do Garage Doors Fail?**
Garage doors are usually made of thin metal panels spanning very wide openings in the shell of a home. Under high wind conditions these characteristics can lead to garage door failure.

High winds can cause garage doors to collapse into the house or pop out of their mounting tracks. Once this happens, winds can enter the house. The wind creates a positive pressure inside the house that can blow out windows, doors, walls, and—potentially—the roof.
**Brace or Replace Garage Doors**

If you live in an older house you may need to brace or replace your garage door. Existing doors can be reinforced with horizontal bracing positioned at the center of each door panel row. You may also need the additional strength provided by removable vertical bracing spaced across the span of the door and anchored into the floor and roof trusses.

The garage door track is another common area in need of reinforcement. As shown in the figure on the bottom right of this page, an unreinforced track can bend allowing the garage door to break free from the wall.

**Additional Issues to Consider**

Sometimes retrofitting existing garage doors to improve high wind resistance can be a difficult task. It may be worthwhile to hire a qualified contractor to install the necessary bracing or even to install a new hurricane resistant garage door.

Should you choose to make these garage door improvements on your own, remember that the new bracing may increase the weight of your door. This may require the replacement of the garage door motor.

When bracing existing garage doors, remember to cover any windows on the door panels with shutters to protect the glass. Avoid purchasing new garage doors with windows.

If maximum protection is your goal, be sure to select products approved by the very thorough Miami-Dade County standards (see product search link below).

**Other Resources**

Federal Alliance for Safe Homes [www.flash.org](http://www.flash.org)


Institute for Business and Home Safety [www.ibhs.org](http://www.ibhs.org)

Unprotected windows are one of the most common locations where storm damage takes place. As covered in our document, *How Safe is Your House?*, broken windows can allow wind and rain inside the house and even lead to roof failure.

**What Makes a Safe Window?**

People often tape their windows to protect them. Taping windows does **NOT** increase the strength of the glass and it will **NOT** protect your home from flying debris.

Even shatter resistant windows can fail when the entire window frame is under enough pressure from wind and debris. Similarly, window films alone, are not a complete protective measure. The best way to protect your windows is to install shutters.

**How Do I Choose the Right Shutter?**

Each homeowner should install shutters that best meet their individual needs. Factors such as cost, ease of installation, and degree of protection are important considerations.

Shutters provide protection from flying (wind-borne) debris impacts and/or wind pressure for windows, French doors, sliding glass doors, and other openings. No matter what type of shutter you choose, proper installation is important to ensure best performance.

**Additional Issues to Consider**

If maximum protection is your goal, be sure to select products approved by the very thorough Miami-Dade County standards (see product search link below). But simply installing shutters is not enough. It is important to use proper construction techniques to maintain your shutter strength and reduce the potential for missile debris. These issues include:

- Securing loose outdoor items including patio furniture, garbage cans/recycling bins, plant pots, etc.
- Attaching shutters to your home’s structural framing, **NOT** window or door frames.
- Using corrosion resistant materials for all exposed parts of the shutter system, including shutter panels, fasteners, etc.

**Other Resources**

Miami-Dade County | Building Code Compliance Product Search  

NOAA & AOML | Hurricane Shutters FAQ  
[http://www.aoml.noaa.gov/hrd/shutters/index1.html](http://www.aoml.noaa.gov/hrd/shutters/index1.html)

---

2. Hal S. Knowles, III, research associate, Program for Resource Efficient Communities; Kathleen C. Ruppert, Extension scientist, Program for Resource Efficient Communities; Karla A. Lenfesty, family and consumer sciences agent, St. Lucie County Cooperative Extension, Institute of Food and Agricultural Sciences, University of Florida; Barbara Haldeman, editorial assistant, Florida Energy Extension Service.

Publication partially funded from a Florida Department of Community Affairs Residential Construction Mitigation Program Grant.
## What Shutter Options are Available?

<table>
<thead>
<tr>
<th>Shutter Image</th>
<th>Shutter Type &amp; Details</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Automatic Rolldown" /></td>
<td><strong>Automatic Rolldown</strong>&lt;br&gt;These shutters roll down tracks from a box above each protected opening. They are generally made of metal and lock at the bottom.&lt;br&gt;<strong>Pros:</strong> preinstalled, easy to use, can be motorized.&lt;br&gt;<strong>Cons:</strong> very expensive.</td>
<td>$$$$$</td>
</tr>
<tr>
<td><img src="image2.jpg" alt="Accordion" /></td>
<td><strong>Accordion</strong>&lt;br&gt;These shutters are pulled together from the side of each protected opening. They are generally made of metal and lock together or to a middle divider.&lt;br&gt;<strong>Pros:</strong> preinstalled, easy to use.&lt;br&gt;<strong>Cons:</strong> somewhat expensive, architecturally less appealing.</td>
<td>$$</td>
</tr>
<tr>
<td><img src="image3.jpg" alt="Awning" /></td>
<td><strong>Awning</strong>&lt;br&gt;These shutters are dropped down and locked in place. They are made of metal or fiberglass and provide full window shade when not in use.&lt;br&gt;<strong>Pros:</strong> preinstalled, easy to use.&lt;br&gt;<strong>Cons:</strong> somewhat expensive, architecturally less appealing.</td>
<td>$$</td>
</tr>
<tr>
<td><img src="image4.jpg" alt="Bahama Awning and Colonial Shutter" /></td>
<td><strong>Bahama Awning and Colonial Shutter</strong>&lt;br&gt;These louvered panel shutters are either Awning (which provide partial shade when not in use) or Colonial style.&lt;br&gt;<strong>Pros:</strong> preinstalled, easy to use, architecturally appealing.&lt;br&gt;<strong>Cons:</strong> somewhat expensive, strength varies greatly by design.</td>
<td>$$</td>
</tr>
<tr>
<td><img src="image5.jpg" alt="Hurricane Screen" /></td>
<td><strong>Hurricane Screen</strong>&lt;br&gt;These shutters are made from a partially porous reinforced fabric that reduces wind pressures and debris impact damage.&lt;br&gt;<strong>Pros:</strong> fairly inexpensive, allow light through, easy to store.&lt;br&gt;<strong>Cons:</strong> somewhat new technology, debris impacts can break windows in contact with screen, best for non-glazed openings.</td>
<td>$$ - $$$</td>
</tr>
<tr>
<td><img src="image6.jpg" alt="Storm Panel" /></td>
<td><strong>Storm Panel</strong>&lt;br&gt;These shutters must be stored and installed temporarily for a storm. They are made of steel or aluminum panels that are locked into a preinstalled steel channel above/below the protected opening, or they can be anchored or bolted directly to the house.&lt;br&gt;<strong>Pros:</strong> inexpensive, strong.&lt;br&gt;<strong>Cons:</strong> often heavy, difficult to install and store.</td>
<td>$$</td>
</tr>
<tr>
<td>N/A</td>
<td><strong>Plywood</strong>&lt;br&gt;See our “Protect with Plywood” document for more information.</td>
<td>$</td>
</tr>
</tbody>
</table>

*Source: St. Lucie County Extension*<br>*Source: www.hurricaneshuttercompany.com*<br>*Source: Florida Coastal Monitoring Program*<br>*Source: www.stormshutters.com*<br>*Source: www.stormshutters.com*
Proper storm protection requires time and money. When time is too short to hire a commercial contractor or if costs must remain low, properly installed plywood shutters can provide reasonable protection for your house.

Due to the temporary nature of plywood shutters, the panel weight, and the installation labor required, we recommend using them as a last resort. Pick up our “Install Window Shutters” document to review other options.

Are All Plywood Shutters the Same?

NO. There are many ways to install plywood shutters. However, we suggest you use one of two main methods. For concrete block homes with windows inset two or more inches from the exterior wall, we recommend using barrel bolt plywood shutters. Overlapping plywood shutters are best for windows that are inset less than two inches.

Barrel Bolt Plywood Shutters

Needed Materials:
- Minimum 5/8 inch thick plywood (3/4 inch is recommended)
- 3- or 4-inch barrel bolts
- Drill
- Circular saw

Basic Installation Directions:
Cut plywood to fit snugly in each window indentation. Connect multiple sheets with 2 × 4s or sturdy hinges for large openings. Screw barrel bolts to each plywood shutter, using one bolt for every 12 inches of vertical plywood. Mark location for bolt holes in the wall. Label each panel with “Top” and “Bottom” and the window it fits. Drill holes. Plug the holes when not in use.
Overlapping Plywood Shutters

Needed Materials:
- Minimum 5/8 inch thick plywood (3/4 inch is recommended)
- Nails (less secure) or screws/bolts (more secure) at least 2 inches long
- Lead or stainless-steel sleeve wall anchors (do NOT use plastic)
- Hammer (for nails) and/or drill (for screws)
- Wood shims (if necessary)
- Circular saw

Basic Installation Directions:
Cut plywood to overlap each window opening by 4 inches or more. Connect multiple sheets with 2×4s or sturdy hinges for large openings. Drill matching holes through the plywood and the wall. Label each panel with “Top” and “Bottom” and the window it fits. Hammer sleeve anchors into wall holes. Screw (or bolt) plywood into the anchors. Plug the holes when not in use.

Additional Issues to Consider
Avoid OSB: It takes 30% thicker oriented strand board (OSB) to equal the impact strength of plywood. We recommend using plywood.

Plan Ahead: Plywood is cheap, convenient, and available at most hardware stores. However, buy your plywood before a storm approaches. If you wait until the last minute your local hardware store may run out.

Store Properly: Plywood requires proper storage to prevent wood damage. Florida’s hot humid climate can warp or degrade plywood making the shutter unusable. It is best to waterproof your plywood shutters with a sealant or paint and store them in a cool, dry place. Keep the shutter hardware (the bolts and screws) in a labeled container with the shutters. Storing plywood flat may also help prevent warping. Never store wet plywood.

Watch Out for Termites: Additionally, choose a storage location that keeps the plywood shutters off the ground. This will help reduce the potential for termite damage.

Label the Shutters: Most homes have a variety of window types and sizes. It is important to clearly mark each of your plywood shutters so you know which window it fits and which side is up. You may consider making a drawing of your house and marking each window on it with a special number to match your shutter labels.

For more detailed guidelines on a variety of plywood shutter designs, visit the APA (Engineered Wood Association) Web site (see below). Click on their “Publications” page and search for “hurricane shutters.”

Other Resources
APA – The Engineered Wood Association
www.apawood.org

NOAA & AOML | Plywood Hurricane Shutters
http://www.aoml.noaa.gov/hrd/shutters/index2.html