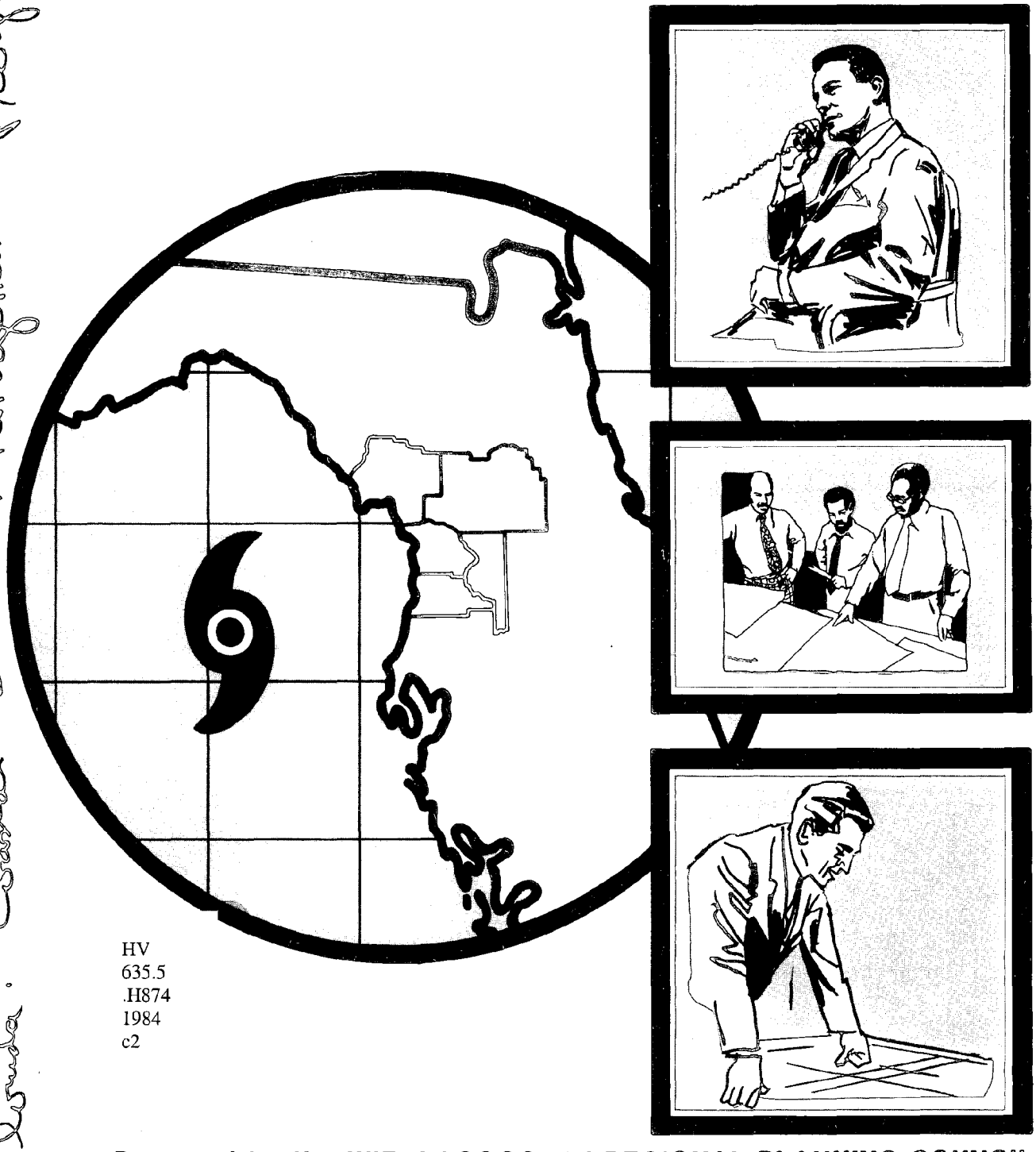
HURRICANE EVACUATION DECISION MAKING GUIDE

MARION COUNTY

Florida Coastal Zone Management Program



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Prepared by the WITHLACOOCHEE REGIONAL PLANNING COUNCIL

July, 1984

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Withlacoochee Regional Planning Council

July, 1984

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INTRODUCTION

As part of the Withlacoochee Hurricane Evacuation Plan, decision-making guides are to be furnished to each county in the region and the Florida Bureau of Emergency Management for use as a ready reference tool by decision-makers during the approach of the storm. The purpose of the guide is to provide information to assist local and state civil defense officials and other emergency management organizations to implement the critical actions necessary to prepare for, and respond to, a hurricane threat.

This guide consists of two parts. The first part is excerpted from the technical data report prepared for the inland counties of the region. This section provides information on the expected number of evacuees, needed sheltering and evacuation times according to the direction of the hurricane.

The second part is concerned with the coordination of the evacuation. This includes information on the roles and responsibilities of agencies involved in the issuance of the evacuation order and the management of the evacuation. In addition, the coordination section includes a discussion of the implications of the findings of the technical data report on local evacuation decision-making.

Also, a quick reference guide is included which presents information on the expected number of evacuees and recommended evacuation order times according to several evacuation scenarios.

CHAPTER I

QUICK REFERENCE GUIDE

The purpose of this chapter is to provide local decision-makers with a quick reference guide as to the number of persons vulnerable to hurricane hazards in Marion County and the recommended evacuation order times according to the forecasted intensity of the hurricane.

As stated in the technical report, it is recommended that mobile home residents be evacuated due to hazards created by hurricane winds. An estimated 17,625 persons from Marion County are expected to seek public shelter.

It should be noted that the remaining chapters in this document should be read prior to consulting this quick reference guide in order to gain familiarity with how these numbers were calculated.

The evacuation times shown in the following tables include the hours needed for clearance and avoidance of the pre-landfall wind hazard.

TABLE 1

MARION COUNTY EVACUATION TIMES
(LOCAL EVACUATION ONLY)

STORM TRACK	INTENSITY	EVACUATION TIME (HOURS)
Normal	1	13½
Normal	2	14
Normal	3	16
Normal	4	17
Normal	5	15
Exiting	1	12½
Exiting	2	13½
Paralleling	1	12½
Paralleling	2	13½
Paralleling	3	15
Paralleling	4	16

TABLE 2

MARION COUNTY EVACUATION TIMES
(WITH TAMPA BAY AREA EVACUATION)

STORM TRACK[1/]	INTENSITY	EVACUATION TIME (HOURS)
Normal	1	25
Normal	2	25½
Normal	3	27½
Normal	4	28½
Normal	5	26½
Exiting	1	24
Exiting	2	25
Paralleling	1	24
Paralleling	2	25
Paralleling	3	26½
Paralleling	4	27½

1/ A normal storm track is a head-on direct strike.

CHAPTER II

EXTENT OF EVACUATION

The extent of the hurricane evacuation refers to the identification of those persons vulnerable to hurricane hazards in Marion County and the calculation of this vulnerable population.

Identification of Vulnerable Population

The major hazards associated with a hurricane are: (1) storm surge and saltwater flooding; (2) high winds; and (3) fresh water flooding. In Marion County the hazards relevant to potential inland area evacuation are limited to freshwater flooding and high winds.

Freshwater Flooding

Freshwater flooding occurs as a result of rainfall before, during and after a hurricane. About 6 to 12 inches of rainfall can be expected to accompany a hurricane, although no predictive tools are available for determining the rate and geographic distribution of the rainfall. In Marion County the problems associated with freshwater flooding during a hurricane include: lake and river flooding necessitating evacuation of homes; and inundation of possible evacuation routes. Freshwater flooding in the inland counties is usually slowly rising water that does not create a life threatening situation. The effects of early rainfall on evacuation times are discussed in Chapter IV, Evacuation Times.

Hurricane Winds

Hurricane force winds are defined as attaining and exceeding sustained wind velocities of 74 mph; sustained winds being defined as the average wind value for 1 minute interval. There have been reported cases of hurricane winds reaching as high as 190 mph. In addition to sustained winds, peak gusts are also a factor to consider.

Although the impact of sustained winds on large building structures has been examined using wind-tunnel tests and numerical modeling procedures, no experiments in the real atmosphere have been conducted to determine the impact of hurricane gusts on structures. However, it is clear that sustained hurricane force winds and peak gusts can cause roof failure, the outward collapse of walls and glass openings, and enormous agricultural losses.

In Marion County, mobile homes are the structures most vulnerable to hurricane force winds. They are necessarily of lightweight construction, with generally flat sides and ends. Because of these characteristics, the winds of hurricanes can toss mobile homes around, rolling them over and over to complete the destruction. In addition, mobile homes are also more susceptible to damage from flying debris.

Although local regulations require that mobile homes be anchored to withstand high winds with "over-the-top" and frame tiedowns, anchorage system requirements usually are designed only to withstand a wind velocity of from 70 mph to 100 mph. In addition, the threat of flying debris is not mitigated by tiedowns. Because hurricane winds can reach 190 mph, the National Weather Service recommends that mobile home residents move to more sound structures prior to the onset of hurricane winds.

Not only must the high winds hazard be considered for its ability to damage property, but also for its ability to interrupt evacuation efforts. Evacuation activities cannot be safely carried out after the arrival of sustained gale force winds (40 mph), generally several hours before hurricane eye landfall. Therefore, it is recommended that all evacuees should have completed their movement to safe destinations before the arrival of these winds.

Population-At-Risk

The hazards of the hurricane will require the evacuation of an estimated 32,759 persons in Marion County.

Evacuation Destination Distribution

As part of the technical data for this plan, a statistically significant survey of hurricane response behavior was

conducted in the Withlacoochee region.[1/] One of the questions asked in the survey was the evacuation destination. The destinations were public shelter, friend or relative and hotel/motel.

Based on the results of this survey and discussions with the Regional Disaster Preparedness Advisory Committee, the following evacuation destination distribution was developed for the inland counties:

Evacuation Destination	Percentage of Population-At-Risk Seeking Destination
Public Shelter	53.8%
Friend or Relative	18.5%
Hotel/Motel	27.7%

It should be noted that, for the hotel/motel destination there is not sufficient hotel/motel capacity to accommodate the expected number of evacuees seeking this destination. Therefore, those evacuees unable to obtain a hotel or motel in Marion County are assumed to seek such destinations outside the region.

Tampa Bay Evacuees

Tampa Bay evacuation data has been analyzed by the Florida Bureau of Emergency Management to estimate the number of evacuees expected to enter the Withlacoochee Region.[2/]

It is estimated that 114,455 persons will enter the region on U.S. 301 and I-75 and U.S. 41. Of these evacuees, about 36,800 will seek public shelter in the inland counties of Marion and Sumter.

[1/] Behavioral Surveys for the Withlacoochee Regional Disaster Preparedness Plan, H. W. Lochner, Inc., 1982.

[2/] Report on the Expected Coastal Demand for Inland County Shelter Facilities from the Tampa Bay and Southwest Florida Regions, Florida Bureau of Emergency Management, 1982.

The number of evacuees entering Marion County will depend on the available public shelter capacity in Sumter County (see Table 3). This amounts to 4,178 available spaces.[1/] Subtracting this figure from the number of Tampa Bay evacuees seeking shelter reveals that 32,622 persons will enter Marion County seeking shelter. Available shelter space left after local evacuees are sheltered amounts to 21,716 spaces. This indicates a shortfall of 10,906 spaces for Tampa Bay evacuees. These persons will pass through to other areas.

Evacuation Routes and Zones

As part of a transportation model of a hurricane evacuation in the Withlacoochee region, the evacuation roadway network for each county was designated.[2/] This network is displayed in Map 1 for Marion County.

Another task of the transportation modeling effort was to divide the counties into evacuating zones. Zones were based on the roadway network and other easily identifiable boundaries. These zones show the distribution of the population-at-risk within the county and thereby assists in the allocation of manpower and other resources within the county. Map 2 displays the evacuation zones developed for Marion County. Appendix A provides a written description of these zones. Table 4 shows the distribution of the evacuation population and number of vehicles, broken out by evacuation destination.

[1/] About 4,178 spaces are available in Sumter County assuming that both primary and secondary shelters are opened. Arrangements for Red Cross approval of secondary shelters is not complete.

[2/] Transportation Analysis: Withlacoochee Regional Hurricane Evacuation Plan, Post, Buckley, Schuh & Jernigan, August, 1983.

TABLE 3

INLAND SHELTER CAPACITY SUMMARY

	LOCAL EVACUEES SEEKING SHELTER	SHELTER SPACE PRIMARY + SECONDARY = TOTAL	REMAINING OPENINGS
MARION	17,625	29,329 + 10,012 = 39,341	21,716
SUMTER	4,902	6,407 + 2,673 = 9,080	4,178

TABLE 4

MARION COUNTY EVACUATING POPULATION AT RISK AND EVACUATING VEHICLES

	Evacuating Population	1	2	3	4	Evacuating Vehicles	1	2	3	4
Zone #M01	1108					641				
		596	205	307	0		345	119	178	0
Zone #M02	1342					777				
		722	248	372	0		418	144	215	0
Zone #M03	3026					1753				
		1628	560	838	0		943	324	485	0
Zone #M04	4862					2816				
		2616	899	1347	0		1515	521	780	0
Zone #M05	348					202				
		187	64	97	0		109	37	56	0
Zone #M06	421					244				
		227	78	117	0		131	45	68	0
Zone #M07	1906					1104				
		1025	353	528	0		594	204	306	0
Zone #M08	5559					3219				
		2991	1028	1540	0		1732	596	892	0
Zone #M09	1490					863				
		802	276	413	0		464	160	239	0
Zone #M10	5697					3299				
		3065	1054	1578	0		1775	610	914	0
Zone #M11	793					459				
		427	147	220	0		247	85	127	0
Zone #M12	2236					1295				
		1203	414	619	0		697	240	359	0
Zone #M13	926					536				
		498	171	256	0		288	99	148	0
Zone #M14	3045					1763				
		1638	563	843	0		949	326	488	0
	32759	17625	6060	9075	0	18971	10207	3510	5255	0

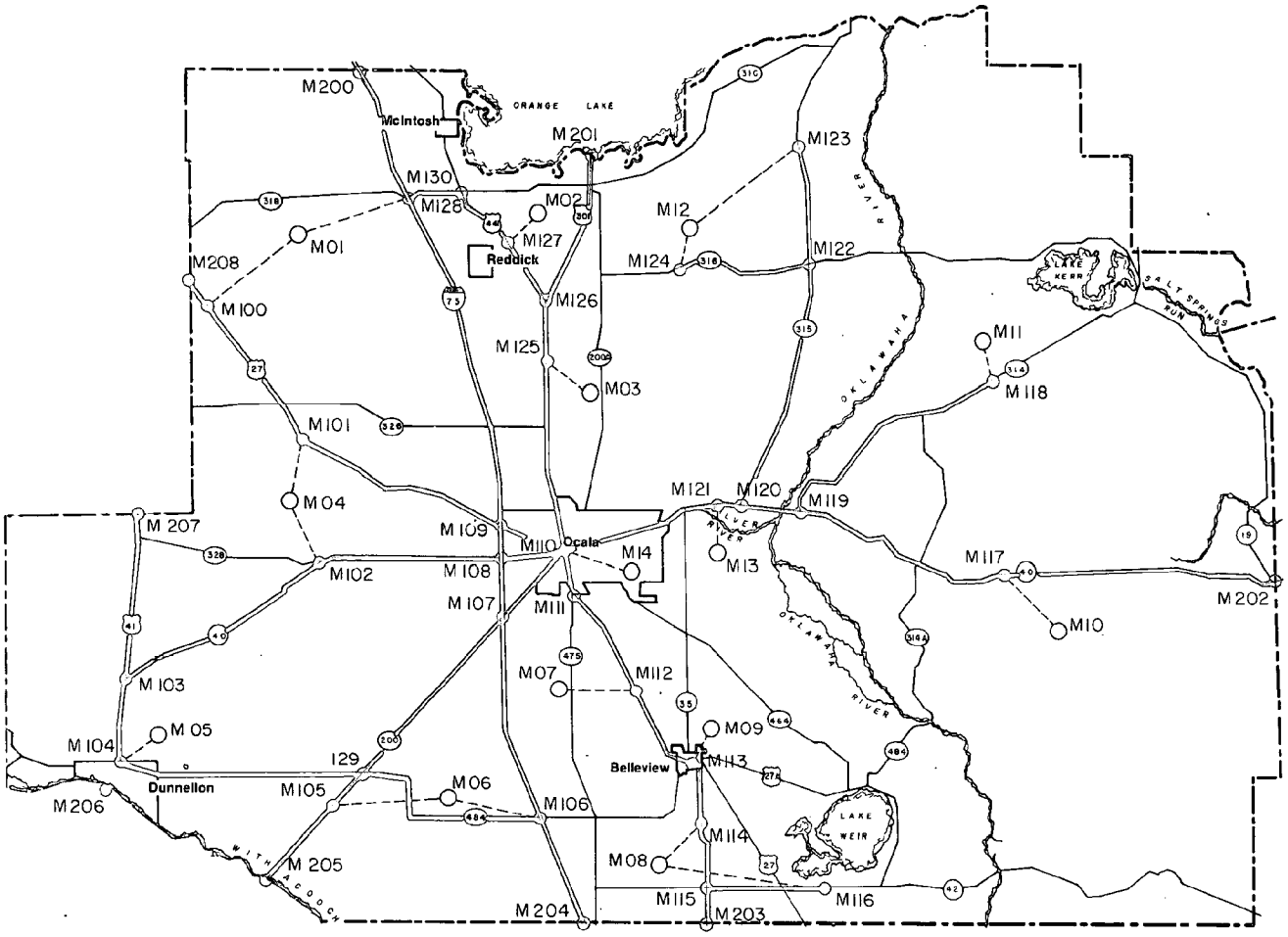
1 = Red Cross Shelter
2 = Friends Home
3 = Hotel/Motel
4 = Do Not Know

% Participation 100
# per Mobile Home Unit 2.6
# per Other Unit 2.6
Avg. Veh. per D.U. 2.1
Veh. Usage % 71.7
Dist. %: S=53.8 FR=18.5 HM=27.7 DK=0

Surge Zones

MAP 1

EVACUATION NETWORK - MARION COUNTY



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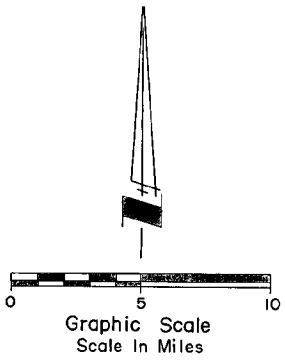
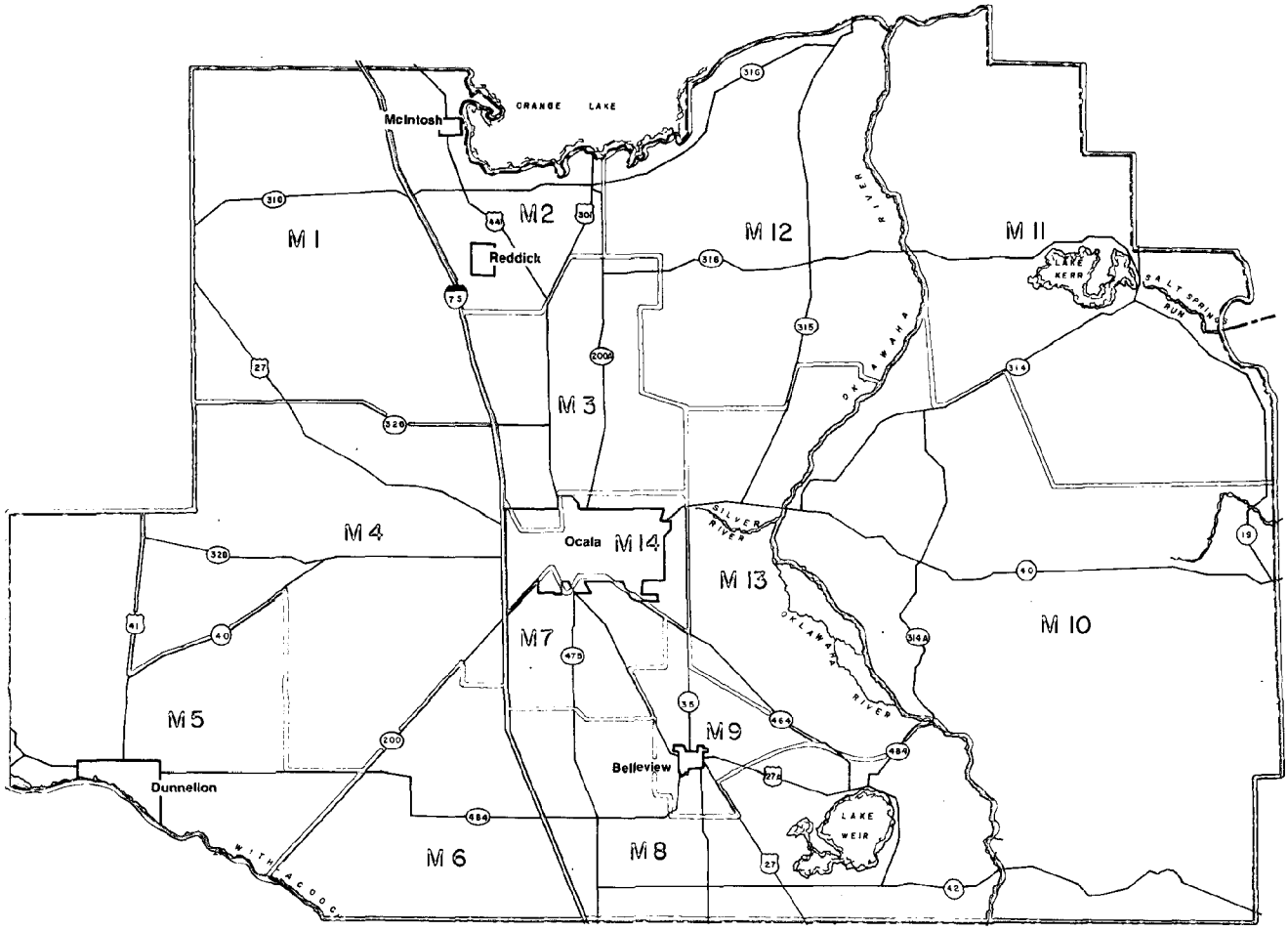
- ○ STREET OR INTERSECTION LOCATION (NODE)
- ○ EVACUATION ZONE CENTER (CENTROID)
- M 113 NODE OR CENTROID NUMBER



Source: Post, Buckley, Schuh & Jernigan, Inc.

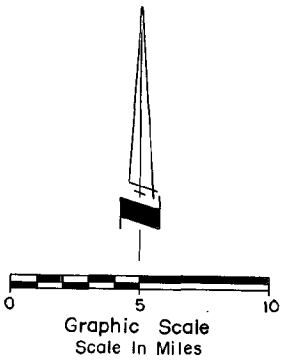
MAP 2

EVACUATION ZONES - MARION COUNTY



LEGEND

M 10 EVACUATION ZONE NUMBER



Source: Post, Buckley, Schuh & Jernigan, Inc.

CHAPTER III

PUBLIC SHELTER CAPACITY

Primary and Secondary Shelters

Primary shelters consist of the public schools in Marion County which will be opened and used first in the event of a evacuation. Table 5 presents the capacity of the primary public shelters in Marion County. About 29,300 persons could be accommodated.

Secondary shelters in Marion County are churches, meeting halls and other public oriented buildings. The capacity of secondary shelters is presented in Table 6.

More than sufficient space is available to shelter local evacuees. However, if an evacuation order is issued for both the Tampa Bay and Withlacoochee regions, all the primary and secondary shelter capacity in Marion County may have to be utilized. The implications of a Withlacoochee and Tampa Bay evacuation on evacuation times are discussed in the next chapter.

Shelter Duration Periods

The shelter duration period is defined as the minimum period of time in which evacuees must remain in their evacuation destination until the hurricane passes. This is defined as the period of time before and after the occurrence of gale force winds (32 - 63 mph). Gale force winds are assumed to create hazardous conditions due to flying debris. These times were calculated from the results of the SPLASH model and are displayed in Table 7 for each hurricane type and intensity. It should be noted that these are minimum shelter duration periods and that actual shelter duration periods may have to be increased depending on the results of the storm.

TABLE 5

MARION COUNTY PRIMARY SHELTERS

Name of Structure	Address	Shelter Capacity at 20 Sq. Ft./Person
Belleview Elementary	5556 S.E. Agnew Road Belleview	166
Belleview-Santos Upper Elementary	N. Hwy. 444 Belleview	810
College Park Elementary	3155 S.W. 26th Street Ocala	560
Dunnellon Elementary	Chestnut Street Dunnellon	480
Dunnellon High School	Chestnut Street Dunnellon	1,452
East Marion Elementary	County Road 326 Lynne	1168
Eighth Street Primary	513 S.E. 8th Street Ocala	536
Fessenden Elementary	State Road 25A Martin	836
Forest High School	1614 S.E. Ft. King St. Ocala	1672
Fort King Middle	545 N.E. 17th Street Ocala	1010
Ft. McCoy Elementary	State Road 315 Fort McCoy	265
Hillcrest	3143 S.E. 17th Street Ocala	66
Howard Upper Elementary	306 N.W. 7th Avenue Ocala	213
Lake Weir Middle	Sunset Harbor	1600
Lake Weir High	State Road 464	3346

TABLE 5

MARION COUNTY PRIMARY SHELTERS (cont'd)

Name of Structure	Address	Shelter Capacity at 20 Sq. Ft./Person
Madison Street Primary	1239 N.W. 4th Street Ocala	812
Marion Education Resource Center	2091 N.E. 35th Street Ocala	180
North Marion High	State Road 329 Sparr	2696
North Marion Middle	Lower Sparr Road Sparr	3896
Oakcrest Elementary	1156 N.E. 28th Street Ocala	245
Reddick-Collier Elementary	State Road 25A Reddick	774
Sparr Elementary	State Road 329 Sparr	282
Stanton-Weirsdale Elem.	W. Hwy. 42 Weirsdale	512
Vanguard High	7 N.W. 28th Street Ocala	4854
Wyomina Elementary	511 N.E. 12th Avenue Ocala	898
TOTAL		29,329

Source: Withlacoochee Regional Planning Council staff, Marion County Shelter Inventory, March, 1982.

TABLE 6

MARION COUNTY ALTERNATE SHELTERS

Secondary Shelter	Address	Capacity 20 sq. ft./person
First Baptist Church	S.E. 137th Ct. & 164th St., Weirsdale	175
United Methodist Church	N. Hwy. U.S. Alt. 441, Oklawaha	150
Weirsdale Presbyterian	N. Hwy. US Alt. 441, Weirsdale	300
First Baptist Church	525 Pine Road, Silver Springs Shores Ocala	350
First United Methodist Church	1126 E. Silver Springs Blvd., Ocala	200
Covenant Missionary Baptist Church	606 S.W. Broadway, Ocala	100
College Park Church of God	3140 S.W. 26th St., Ocala	272
Zion United Methodist	600 N.W. 16th Avenue, Ocala	30
St. Mark's United Methodist Church	1839 N.E. 8th Avenue, Ocala	200
St. Matthew's Lutheran	3453 N.E. Silver Springs Blvd., Ocala	40
Elks Club	2449 N.E. Silver Springs Blvd., Ocala	300
Oakcrest Baptist Church	1109 N.E. 28th St., Ocala	450
Central Christian Church	3010 N.E. 14th St., Ocala	500
Northside Missionary Baptist	2321 N.E. 11th St., Ocala	100
Ft. King Presbyterian Church	13 N.E. 36th Avenue, Ocala	150
First Christian Church	1908 S.E. Ft. King, Ocala	125

Table 6 (Cont.)

Central Baptist Church	1714 S.E. 36th Ave., Ocala	1,500
The Lord's Chapel	2111 N.E. 36th Ave., Ocala	180
St. Paul's United Methodist	4060 S.E. 8th St., Ocala	175
Grace Episcopal Church	503 S.E. Broadway, Ocala	90
Bible Baptist Church	349 S.E. Lake Weir Blvd., Ocala	50
Blessed Trinity Church	5 S.E. 17th St., Ocala	220
First Pentecoastal Holiness Church	1845 S.W. 1st Ave., Ocala	170
Church of the Nazarene	5930 S.E. Robinson Rd., Belleview	350
Belleview United Methodist Church	5508 S.E. Brown Rd, Belleview	100
Temple B'nai Darom	Banyon Course, Ocala	320
First United Methodist	Ohio & Chestnut St., Dunnellon	350
Silver Springs Shores Presbyterian Church	674 Silver Road, Silver Springs Shores, Ocala	531
Oak Grinder Baptist Church	6422 Jacksonville Rd., Ocala	600
United Methodist Church	St. Hwy. 25A, Reddick	60
Flemington Baptist Church	St. Hwy. 329, Flemington	50
United Baptist Church	P. O. Box 456, Reddick	150
Church of Christ	2750 S.E. Maricamp Road, Ocala	200
Olivet Baptist Church	8495 S. Magnolia, Ocala	342
City Auditorium	836 N.E. Sanchez Ave., Ocala	338
Municipal Airport Passenger Terminal	1550 S.W. 60th Ave., Ocala	30
City Hall	151 S.E. Osceola Ave., Ocala	26
Golf Course #1 Clubhouse	3130 N.E. Silver Springs Blvd., Ocala	71
Library	15 S.E. Osceola Ave., Ocala	259

Table 6 (Cont.)

Library		
Lincoln St. Youth Center	1710 N.W. 10th St., Ocala	146
War Memorial Auditorium	1510 N.W. 4th St., Ocala	262
TOTAL		10,012

Source: Withlacoochee Regional Planning Council staff, Secondary Shelter Inventory, March 1983.

CHAPTER IV

EVACUATION TIMES

Evacuation times consist of three components: pre-landfall hazard time, behavioral response time and clearance time.

Pre-landfall hazard time is the number of hours before the eye of the storm strikes or makes its closest point of approach in which gale force winds occur. It is assumed that evacuation must be completed before the occurrence of gale force winds due to the potential hazardous driving conditions. Pre-landfall hazard times are presented in Table 7 for each storm type and intensity.

Behavioral response time is the amount of time it takes for the vulnerable population to respond to the evacuation order. These times were based on the survey of hurricane response behavior conducted in the Withlacoochee region and previous evacuation studies and were calculated as part of the transportation model.

Clearance time is the amount of travel time it takes for the vulnerable population to reach their evacuation destinations. This time was calculated as a part of the transportation model developed for the Withlacoochee Region.[1/]

Evacuation time is the sum of these components. Tables 10 and 11 display the evacuation times by each level of vulnerability for each county in the Withlacoochee region. It can be seen that evacuation times are greatly increased in some counties, if both the Withlacoochee and Tampa Bay regions are issued an evacuation order.

[1/] Clearance time is calculated by determining which link in the evacuation roadway network, displayed in Map 1, is the most congested during the evacuation process. The amount of time it takes for the last vehicle to "clear" this link is the clearance time.

TABLE 7

GALE FORCE WIND ANALYSIS AND SHELTER DURATION PERIOD
BY STORM TYPE AND INTENSITY

Storm Type	Storm Intensity	Pre-landfall Hazard Time	Shelter Duration Period
Normal	5	7.0[1/]	12.0[1/]
Normal	4	9.0	15.0
Normal	3	8.0	14.0
Normal	2	6.0	11.0
Normal	1	5.5	9.5
Paralleling	4	8.0	17.0
Paralleling	3	7.0	15.0
Paralleling	2	5.5	11.0
Paralleling	1	4.5	9.0
Exiting	2	5.5	13.0
Exiting	1	4.5	12.0

[1/] Pre-landfall hazard time and shelter duration period for storm intensity category five are shorter due to a narrower radius of maximum winds

Source: SPLASH II computer output.

Timing Adjustments

(1) Evacuation Order Adjustment. The behavioral response time includes response time before and after the evacuation order is issued. The amount of response time before the evacuation order is issued should be subtracted from the evacuation times listed in tables 9 and 10 in order to arrive at the minimum evacuation order time. These adjustments are as follows:

Behavioral Response	Behavioral Response Adjustment Change in Evacuation Time
A (quick)	subtract 1 hour
B (medium)	subtract 2 hours
C (slow)	subtract 3 hours

(2) Early Arrival of Rainfall. The evacuation times set forth in this report include the number of hours before eye landfall (pre-landfall hazard time) when ambient high winds might prevent evacuation from being carried out. However, depending on the structure, size, or forward speed of the storm, hurricane-induced rainfall may precede this point in time. Historically, rainfall has occurred as late as two hours before eye landfall and as early as twenty hours before eye landfall. Such rainfall would reduce roadway carrying capacity because of limited driver visibility and wet pavement. This reduction has been estimated at approximately fifteen percent in past transportation studies. This adjustment requires a monitoring of the forecasted arrival of rainfall by the local weather service office radar. If the arrival of rainfall is forecasted substantially before the pre-landfall hazards time an amount of time equal to about fifteen percent of the clearance time should be immediately added to the evacuation time. The clearance time is the overall evacuation time minus the pre-landfall hazards time.

Based on the above, the following are the changes in evacuation time according to behavioral response:

Behavioral Response	Rainfall Adjustment- Change in Evacuation Time
A	add 1.5 hours
B	add 1.5 hours
C	add 2 hours

(3) Changes in Hurricane Parameters. Certain variables were used to predict wind speeds in the SPLASH model. If, according to the monitoring of the storm before landfall, these variables are different, the arrival of gale force winds could change and thereby affect pre-landfall hazard times.

The parameters in the SPLASH model which can affect the arrival of gale force winds and thereby pre-landfall hazard times are the forward speed of the storm and the radius to maximum winds. As the storm speed increases, there is less time required for the arrival of gale force winds, thereby reducing pre-landfall hazard time. As the radius-to-maximum winds increases, gale force winds arrive sooner, thereby increasing pre-landfall hazard times.

In order to ascertain the sensitivity of pre-landfall hazard times to the aforementioned, additional SPLASH program runs were made. Forward speed and radius-to-maximum winds were independently varied in each additional run. The results are presented and explained in Table 8.

(4) Unpredictable Road Blockages. The intensity of traffic during a hurricane evacuation will always be accompanied by a certain number of traffic accidents and breakdowns. Although roadway shoulders are available for vehicles in distress, the movement of such vehicles to these areas is often difficult and disruptive. It is recommended that at least two traffic control personnel be positioned at each key roadway link so that one can assist disabled vehicles as needed. A tow vehicle should also be positioned at each critical link to facilitate the removal of immobilized vehicles. Those roadways that historically experience flooding due to rainfall alone should be monitored for vehicle distress and help.

To guard against an unpredictable, and thus unquantifiable blockage of evacuation routes that could add to the overall evacuation time, a safety margin of up to two hours will be added to the evacuation times. Such unpredictable blockages could include disabled vehicles, traffic accidents and fallen trees or other debris.

Recommended Evacuation Times

It is recommended that a medium behavioral response be used in determining the evacuation order time. It is also recommended that two hours be added to the evacuation time to account for unpredictable road blockages. Other adjustments in evacuation times should be made as necessary according to the previously mentioned adjustment factors.

TABLE 8

SENSITIVITY ANALYSIS OF PRE-LANDFALL HAZARD TIMES

Storm Speed

Intensity Level	Change in Storm Speed	Change in Hazard Time[1/]
1	+15 mph	-1.5 hrs.
2	+15	-2.0
3	+15	-4.0
4	+15	-4.0
5	+15	-3.0

Radius to Maximum Winds (RMW)

Change in RMW	Change in Hazard Time[2/]
-10	-2
+10	+2
+20	+4
+30	+6

[1/]Changes in pre-landfall hazard times for other changes in storm speed can be determined from this table. For example, if the storm speed is forecasted 10 mph greater than the storm speed used in the SPLASH model, which is 15 mph, the resultant change in storm speed is proportional. The hazard times will increase only if the forecasted storm speed is less than 15 mph.

[2/]Generally there is a 2 hour change in hazard time for every 10 mile change in RMW. The RMW used in the SPLASH model are shown in table 1.

SOURCE: SPLASH II computer printouts prepared by the National Hurricane Center.

Based on the above recommendations, the following is a range of recommended evacuation order times:

Recommended Evacuation Time

12½-28½ hours

The times represent minimum evacuation order times, excluding previously mentioned adjustment factors. These times should be adjusted, using these factors, according to forecasted hurricane conditions.

The effects of evacuation times on local preparedness activities are further discussed in Chapter VII, Local Coordinative Mechanism.

TABLE 9

REGIONAL VULNERABILITY LEVELS

Vulnerability Level	Storm Descriptions/Saffir-Simpson Intensity Category
A	Exiting hurricane, category 1-2 Paralleling hurricane, category 1-2 Normal hurricane, category 1-2
A w/Tampa Bay	Same as vulnerability level A, Tampa Bay Region also evacuates
B	Paralleling hurricane, category 3-4 Normal hurricane, category 3-5
B w/Tampa Bay	Same as vulnerability level B, Tampa Bay Region also evacuates

TABLE 10

EVACUATION TIMES (in hours)

VULNERABILITY LEVEL 'A'[1/]

	Response Curve	REGIONAL VULNERABILITY LEVEL A	A w/Tampa Bay Evacuation
Levy County	A-Quick Response	8 3/4 - 12 1/4	8 3/4 - 12 1/4
	B-Medium Response	11 3/4 - 15 1/4	11 3/4 - 15 1/4
	C-Slow Response	14 3/4 - 18 1/4	14 3/4 - 18 1/4
Citrus County	A-Quick Response	12 1/4 - 15 3/4	12 1/4 - 15 3/4
	B-Medium Response	14 - 17 1/2	14 - 17 1/2
	C-Slow Response	16 - 19 1/2	16 - 19 1/2
Hernando County	A-Quick Response	8 3/4 - 12 1/4	29 1/2 - 33
	B-Medium Response	12 - 15 1/2	30 - 33 1/2
	C-Slow Response	15 - 18 1/2	30 3/4 - 34 1/4
Marion County	A-Quick Response	9 1/2 - 13 1/2	22 1/2 - 26
	B-Medium Response	12 1/2 - 16	24 - 27 1/2
	C-Slow Response	15 1/2 - 19	25 1/2 - 29
Sumter County	A-Quick Response	9 - 12 1/2	22 1/2 - 26
	B-Medium Response	11 3/4 - 15 1/4	24 - 27 1/2
	C-Slow Response	14 1/2 - 18 1/4	25 1/2 - 29

SOURCE: Post, Buckley, Schuh & Jernigan, Inc. and WRPC Staff.

[1/] The Vulnerability Level describes the flooding levels in coastal counties associated with different storm intensities and angles of approach. The Regional Vulnerability Levels are presented in Table 9.

TABLE 11

EVACUATION TIMES (in hours)

VULNERABILITY LEVEL 'B'

	Response Curve	REGIONAL VULNERABILITY LEVEL B	B w/Tampa Bay Evacuation
Levy County	A-Quick Response	10 3/4 - 13 3/4	11 3/4 - 14 3/4
	B-Medium Response	14 1/4 - 16 1/4	14 1/4 - 16 1/4
	C-Slow Response	17 1/4 - 19 1/4	17 1/4 - 19 1/4
Citrus County	A-Quick Response	16 1/4 - 18 1/4	16 1/4 - 18 1/4
	B-Medium Response	18 - 20	18 - 20
	C-Slow Response	20 - 22	20 - 22
Hernando County	A-Quick Response	15 1/4 - 18 1/4	32 - 34 1/2
	B-Medium Response	15 1/4 - 17 1/4	32 1/2 - 34 1/2
	C-Slow Response	17 1/2 - 19 1/2	33 1/4 - 35 1/4
Marion County	A-Quick Response	12 - 14	25 1/4 - 27 1/4
	B-Medium Response	15 - 17	26 3/4 - 28 3/4
	C-Slow Response	18 - 20	28 1/4 - 30 1/4
Sumter County	A-Quick Response	11 1/2 - 13 1/2	25 - 27
	B-Medium Response	14 1/4 - 16 1/4	26 1/2 - 28 1/2
	C-Slow Response	17 1/4 - 19 1/4	28 - 30

SOURCE: Post, Buckley, Schuh & Jernigan, Inc. and WRPC Staff

CHAPTER V

WARNING INFORMATION

Warning information refers to the flow of information on the need for hurricane evacuation from the National Hurricane Center to the general public. The purpose of this chapter is not to propose a new method for the dissemination of warning information, but rather to explain the existing system.

Agency Participants and Warning Process

The following are the principal Federal, State and local governmental agencies involved in the warning system:

- National Hurricane Center, Miami
- Tampa Area Office, National Weather Service, Ruskin
- Florida Bureau of Emergency Management, Tallahassee
- Central Florida Area Office, Florida (Bureau of Emergency Management, Wildwood)
- County Civil Defense Department
- Public Media (TV/Radio)

The warning process is initiated by the National Hurricane Center and reaches the public through the following five-step procedure:

1. A potential hurricane picked up in satellite images is usually the subject of the first of a series of advisory messages issued by the National Hurricane Center at six hour intervals (5 and 11 A.M. and P.M., Eastern Standard Time). These early advisories are aimed mainly at shipping and aviation interests. When the storm intensifies further into a tropical storm, it is given a name.

2. If the hurricane or tropical storm approaches land, the advisory information begins to focus on coastal and inland effects.

   - A Hurricane Watch announcement becomes part of the NHC advisories when the storm threatens coastal and inland areas. This Watch covers a specified area and period of time and means that hurricane conditions are a real possibility.

- A Hurricane Warning is added to the advisory when hurricane conditions, winds of at least 74 miles per hour, high water and storm tides, are expected within a period of up to 24 hours. The Warning identifies coastal areas where these conditions are expected to occur.

3. As the threat to coastal areas becomes more apparent, the advisories are then interspersed with intermediate advisories every three hours or as needed.

4. Once a hurricane becomes a threat to the Withlacoochee Region, then the Tampa Area office of the National Weather Service will add local statements to each NHC advisory and intermediate advisories. The local statements will consist of recommendations for precautionary actions and completion times, existing conditions of wind and tides, information regarding projected storm tides confronting counties of the region.

5. All normal warning information will be provided to the general public through the media (radio/TV) by the NHC and when necessary, local government.

The warning information provided by the hurricane advisories, intermediate advisories and local statements will be used as a basis to alert local officials and disaster organizations of any potential hurricane threat. These warnings are augmented by restricted information to local governments also furnished by the NHC to assist those governments in preparation and evacuation decision-making. This restricted information is normally received over the National Warning System (NAWAS) by the Department of Civil Defense, or, when activated, the Marion County Emergency Operations Center (EOC).

On the basis of the aforementioned warning procedure, the Governor of Florida is advised by the State Bureau of Emergency Management to issue an evacuation order for the affected local area; or, the chief elected official of each affected local political jurisdiction may issue the evacuation order, as advised by its disaster preparedness agency or committee.

The Central Florida Area Office will serve as the lead agency for coordinating an interregional evacuation, which is described in Chapter V, Regional Coordinative Mechanism.

Local disaster preparedness agencies and other agencies, such as fire districts, Red Cross and Sheriffs' Departments will be the key agencies in carrying out the evacuation. Agency involvement and specific evacuation procedures are discussed in Chapter VII, Local Coordinative Mechanism.

The following is a chronological summary of key warning conditions, based on the above information, in relation to the number of hours before projected hurricane eye landfall or closest point of approach:

- 72 hour advisory: storm assigned Category number on Saffir/Simpson Scale by NHC (See Appendix B for a description of the Saffir/Simpson scale)
- 48 hours before projected eye landfall: local areas placed under hurricane watch condition by NHC
- 24 hours before projected eye landfall: local areas placed under hurricane warning condition by NHC
- 12-24 hours before projected eye landfall: local area advised to evacuate by NHC advisory or local NWS office Local Action Statement
- Governor advised by Bureau of Emergency Management to issue an evacuation order for the local area or Executive Group, Hurricane Evacuation Committee advised by its control group to issue an evacuation order for the jurisdiction.[4/] The local evacuation order should be issued according to the recommended evacuation order times in this guide.

[4/] The composition of the executive and control groups is described in Chapter VII, Local Coordinative Mechanism.

CHAPTER VI

REGIONAL COORDINATIVE MECHANISM

Regional Evacuation Scenarios

For purpose of this report, "regional" is defined as affecting more than one county. Accepting this definition, the hurricane is definitely a regional event. This is not only because its hazards can affect a relatively large area, but also due to the error in prediction as to where the hurricane will strike, or make its closest point of approach (CPA) during the hurricane warning period, typically 12 to 24 hours before CPA. It is possible that up to a 250-mile "warning area" along the coast may occur during the warning period due to this error in prediction. Therefore, it is possible that, for example, both the Withlacoochee and the Tampa Bay regions may fall under this "warning area" and, hence, have to be evacuated.

It should be further noted that the rate of reduction of hurricane-force winds after the hurricane makes its closest point of approach is largely unpredictable. Therefore, it is assumed that the mobile-home residents in the inland counties will have to evacuate regardless of the type or intensity of the hypothetical hurricane tracks modeled in the SPLASH computer model, should an evacuation order be issued for the inland counties.

Based upon the above information, three regional evacuation scenarios have been designated for purposes of this report. They are as follows:

- Regional Scenario A: includes all of the residents within the evacuation zones associated with Vulnerability Level 'A' in the coastal counties, the mobile-home residents in the remainder of the coastal counties and the mobile-home residents in the inland counties.

- Regional Scenario B: includes all of the residents within the evacuation zones associated with Vulnerability Levels A and B, the remainder of the coastal mobile-home residents and inland mobile-home residents.

- Regional Scenario C: includes all of the residents in Regional Scenario B and the number of persons entering the Withlacoochee region from the Tampa Bay region, based on the worst-case regional evacuation scenario for the Tampa Bay region.

The aforementioned scenarios do not cover all the possibilities in that it is possible that, for example, only the northern counties of Levy and Marion need be evacuated should the "warning area" be further to the north. The same applies to the southern counties of Citrus, Sumter and Hernando; should it be further to the south. It is also possible that the Tampa Bay region may be evacuated without any of the counties in the Withlacoochee region evacuated. Thus, the regional scenarios should be viewed as worst-case planning possibilities, based on currently available information.

The population-at-risk for each regional scenario is shown below:

Regional Scenario	Regionwide Population-At-Risk
A	98,742
B	112,232
C	255,742

Implications for Evacuation Decision-Making

The evacuation times for Marion County are influenced by the extent of the evacuation traffic from the Tampa Bay region. The influx from this area will generate additional traffic that will slow the local evacuation of mobile homes.

Evacuees entering from the coastal area of Hernando, Citrus and Levy Counties will be limited to those seeking shelter at friends, relatives or hotel/motel.

Regional Coordination

Lead Agency

To effectively coordinate a regional response to a hurricane emergency, a lead agency must be designated to provide a linkage among the organizational participants. The lead agency must have jurisdiction over a multi-county area, and possess sufficient expertise, staff and funding to effectively manage the evacuation. A reliable communication system is also crucial for the overall coordination of the evacuation.

It is proposed that the Central Florida Area Office for the Bureau of Emergency Management (CEFA) located in Wildwood, be designated as the lead agency for interregional evacuation management. While other entities were considered for designation as lead agency, CEFA appears to be best qualified for terms of the criteria mentioned above. (See Figure I.)

As the lead agency with overall responsibilities for coordination in the Withlacoochee Region, CEFA will serve as the focal point for the flow of information on hurricane warnings, evacuations and shelter openings.

Regional Entities

Organizations that will be involved at the regional level include the Florida Highway Patrol, the Red Cross and the Health and Rehabilitative Services Department. The FHP maintains traffic control and maintains the progress of the evacuation. Continuous communication with the regional EOC will provide up-to-the-minute information on the evacuation and thereby improved decision-making during the emergency. The Red Cross will be involved at the regional level in the opening and staffing of shelters. The regional office of the Red Cross would assist in areas without a local Red Cross Chapter. The State Department of HRS provides manpower assistance to the Red Cross should insufficient personnel be available for staffing of hurricane shelters.

Figure 1

Emergency Facility Profile

Name

Central Florida Area Office (CEFA),
Bureau of Emergency Management

Location

E. C. Rowell Building
S.R. 301 & 44A
Wildwood, Sumter County

Communication Systems:

- Standard Phone line
- Local Government Radio (18 counties, daily roll call)
- National Warning System (NAWAS - dedicated telephone line, some counties only)
- State Warning System (telephone line)
- "Hot ring" to nuclear plant and Levy and Citrus Counties
- Emergency Telephones - 16 telephones

Staffing

Normal Conditions - Hours 8 a.m. - 5 p.m., M-F
Secretary
Communicator
Local Government Assistance Representative

Emergency Conditions - 24 hours until emergency is over. In addition to normal staff, representatives from State agencies are present at the site (e.g. Florida Highway Patrol)

Other Facilities

EOC Room, Status Board, area-wide maps

Procedures for Implementation of the Interregional Evacuation Plan

To be effective, the plan for interregional evacuation must contain a coordinative mechanism to establish procedures for the opening of shelters and reception sites in coordination with evacuation movements. The proposed procedures for implementation of the interregional plan are described below for each phase of the hurricane emergency.

Normal Conditions

Representatives of the participating agencies involved in the plan will meet on a regular basis to enhance ongoing coordination among the agencies and identify problems with the implementation of the plan.

This group should meet as a permanent committee, and focus on the regional aspects of hurricane planning and operations. Activities of the committee may include:

- testing of the plan;
- review of the institutional arrangements for coordination;
- improvement of public awareness of hurricane hazards;
- exchange information on ways to improve disaster response and recovery.

Emergency Conditions

As a hurricane develops and threatens land areas, the National Hurricane Center will issue a hurricane watch twenty four to forty-eight hours before landfall. This alerts threatened areas to potential storm conditions. A hurricane warning should be issued according to the recommended evacuation order times in this report. These warnings are issued to the State Bureau of Emergency Management as well as county civil defense offices.[2/]

[2/] It should be noted that warning times may have to be revised in light of the evacuation times calculated for the county.

Post Emergency Conditions

As the hurricane hazard recedes from the region, the Area Coordinator should continue to act as the liaison between coastal and inland counties. Information on when it is safe to return to effected areas can be transmitted to the inland county civil defense offices. The Area Office should also assist where ever possible in an expedient and effective disaster recovery process.

After recovery has been completed, the interregional committee should meet to evaluate the plan as implemented and identify any problems that may have occurred.

Public Notification

During non-emergency periods, public information and education is disseminated by various agencies through news releases, news features, and radio and television programs. Such activity serves to increase awareness of emergency preparedness programs and provides the citizens with a knowledge of the basic precautions necessary during an emergency.

During emergency periods, it is necessary to provide the public with clear, concise, and timely information and instructions to the general public. It is important that one single agency in each jurisdiction be designated as the sources of public information in an emergency. This will avoid the issuance of conflicting reports and provide a continuous flow of information regarding governmental decisions, recommendations and instructions. Public notification and instructions will be issued by the civil preparedness agency within each respective jurisdiction. This information should be disseminated after consultation and coordination with the Central Florida Area Office, Bureau of Emergency Management.

While primary responsibility for public notification is conferred to the respective civil preparedness agencies, it is suggested that the procedures below be incorporated into the public notification process to improve interregional coordination. These suggestions are divided into three phases: normal, emergency, and post emergency conditions.

Normal

Public information materials developed as part of the Regional Hurricane Evacuation Plan (and prepared by the Regional Planning Council) should be disseminated to coastal and inland residents. This material will educate the public on hurricane hazards, and provide instructions based on the findings of the inland shelter study. The material will identify the sources of further information and assistance during the emergency phase.

Emergency

It is suggested that as the emergency approaches, an emergency public information officer be activated to act as the only official sources of public information for that jurisdiction. This officer should be pre-designated and in constant communication with the National Hurricane Center, surrounding EOC's and CEFA.

Evacuation and sheltering instructions on cassette tapes or radio scripts which have been prepared beforehand can be dissminated at this time. In the print media, area newspapers could print hurricane supplements which have been prepared in cooperation with the civil preparedness agency.

Post Emergency

In this phase the public information officer should continue to be the official source of public information and should receive information from various service agencies for dissemination to the public. The officer should assist State and Federal officers in local dissemination of information concerning their programs.

Personnel for Reception Centers and Shelters

Assignment and notification of personnel to emergency facilities is the responsibility of the county civil defense director. The mobilization of emergency personnel will follow the issuance of an evacuation order. Through consultation with CEFA, the civil defense director should have a good idea of the timing and scope of the evacuation in coastal areas. He may then mobilize county resources to the required level.

To ensure that shelters and reception centers are properly staffed in an emergency, it is suggested that procedures be established for assignment and notification of personnel. These procedures should be developed as part of a plan of action that is consistent with the regional plan and relevant to the needs and resources of the county.

Suggested Plan of Action

Key members of county government, the Red Cross and other agencies should meet with the civil defense director as a group to establish the roles and responsibilities of the participants. A plan of action can be devised to acquaint each member with the duties that his organization is expected to perform.

The group or committee is put on call with the issuance of the hurricane watch. Key members of the committee (those in charge of a county division for example) would meet with the civil defense officer to review plans, and determine readiness of equipment, supplies and personnel.

Several hours prior to the recommended evacuation order times, the key personnel would activate their departmental or agency emergency plans, and alert and maintain communications with personnel. As evacuations are announced, the committee would monitor the situation and respond to instructions from the civil defense officer.

Prior to the recommended evacuation order times, the EOC should be fully operational with each participant performing assigned duties and tasks. Emergency operations would be in full swing and involve several different areas:

- communication with the Red Cross for shelter openings
- broadcast of hurricane precautions
- communications with public utilities
- law enforcement: patrols, road blocks, rescues
- coordination of emergency services and needs

With the onslaught of the hurricane, activities in the effected areas are halted. The progress of the storm and emergency operations are monitored at the EOC.

After the danger has passed, post disaster operations will be initiated. A written report and evaluation should be provided to the civil defense officer.

CHAPTER VII

LOCAL COORDINATION

Procedures and Policies

Local coordination of hurricane evacuation is described in detail in the Hurricane Annex of the Marion County Peacetime Emergency Plan currently under preparation.

The general policies section of the Plan describe the following roles and responsibilities established by the Marion County Board of County Commissioners.[1/]

County Commission - has command control over Civil Preparedness activities, functions, and programs of the county. They are responsible for policy and decisions governing emergency actions to include legal matters and public information until normalcy has been restored and/or instructions from higher authority prevail.

Civil Preparedness Director - is the executive head of the County Civil Preparedness Organization under direct control of the County Commissioners. He is responsible for the administration and implementation of Civil Preparedness programs and organization. He coordinates all Civil Preparedness activities and maintains liaison with higher, lower, and adjacent Civil Preparedness agencies. He has such additional authority, duties, and responsibilities as authorized by law, and, as may be assigned or delegated by the County Commissioners.

Special Staff - responsible for advising executive group on legal matters and preparation of public information releases.

Operations Group - the operations staff members are responsible for advising the Civil Preparedness Director in matters pertaining to their own appropriate service or department and exercises operational control over their individual departments.

[1/] Marion County Peacetime Emergency Plan, FY 1983. Approved December 21, 1982.

Disaster Analysis Group - responsible for performing physical damage assessment and reporting such damage to the Emergency Operations Center.

Resources Group:

1. Distribution and use of essential goods and products, including food, medical supplies, and fuels under county control.

2. Coordinating inventory and resupply requirements of those resources under county control and private sector.

3. Assignment and distribution of manpower and health resources.

4. Establishing priorities and use of local service distribution systems providing water, gas, electric power, transportation and communications services.

5. Establishing and control of consumer rationing, prices, and rents; and assistance in controls of monetary, credit and tax operations, wages and salaries.

6. Establishment of and maintaining records pertaining to disbursement of funds, contracts made, etc., as authorized by competent authority.

Administration/Support Group (Civil Preparedness Staff)

1. Responsible for administration functions of the Emergency Operations Center (EOC).

2. Maintains records and dispatches reports as required.

3. Supervises clerical, message center, and housekeeping staff of the EOC.

4. Provides support services to include security, personnel, food, and supplies for the EOC.

Local Implications of Regional Evacuation

It should be noted that local evacuation will be slowed considerably by a large scale interregional evacuation. Major evacuation routes will be congested with this traffic and mobilization of additional equipment and manpower will be required. Local officials should consider acceleration of local evacuation and sheltering activities if a concurrent evacuation is ordered in the Tampa Bay area.

APPENDIX

APPENDIX A

MARION COUNTY
EVACUATION ZONE BOUNDARIES

Evacuation Zone	Zone Boundary Description
M1	South of Marion County line; west of I-75; north of CR 326; east of Marion County line
M2	South of Marion County line; west of SCL railroad; north of CR 316, SR 200 and CR 329; east of I-75
M3	South of CR 329, SR 200, and CR 315; west of Mallard Lake and Mt. Olive Cemetary; north of NE 35th St. and US 27; east of I-75
M4	South of CR 326; west of I-75; north of SR 200 and CR 484; east of the western Rolling Hills and Rolling Ranches area and east of US 41
M5	South of Marion County line; west of US 41, Rolling Hills, Rolling Ranches and SR 200; north of Marion County line; east of Marion County line
M6	South of SR 200; west of I-75; north of Marion County line; east of Marion County line
M7	South of SR 200 and CR 464; west of Silver Springs Shores; north of CR 312; east of I-75
M8	South of CR 312, Belleview city limit, Belleview Candler Highway, and CR 464; west of Oklawaha Canal; north of Martin County line; east of I-75
M9	South of SCL Railroad; west of Belleview Candler Highway; all of Belleview; east of CR 467
M10	South of CR 314 and Juniper Prairie; west of Marion County line; north of Marion County line; east of Oklawaha River
M11	South of Marion County line; west of Marion County line; north of CR 314 and Juniper Prairie; east of Oklawaha River
M12	South of Marion County line; west of Oklawaha River; north of Indian Lake Prairie; east of SCL Railroad and Mallard Lake
M13	South of Indian Lake Prairie; west of Oklawaha River; north of CR 464 and SCL Railroad; east of CR 350
M14	City of Ocala

APPENDIX B

THE SAFFIR/SIMPSON HURRICANE SCALE

The Saffir/Simpson Hurricane Scale is used by the National Weather Service to give public safety officials a continuing assessment of the potential for wind and storm surge damage from a hurricane in progress. Scale numbers are made available to public safety officials when a hurricane is within 72 hours of landfall. Scale assessments are revised regularly as new observations are made, and public safety organizations are kept informed of new estimates of the hurricane's disaster potential.

Scale numbers range from 1 to 5. Scale No. 1 begins with hurricanes in which the maximum sustained winds are at least 74 mph, or which will produce a storm surge 4 to 5 feet above normal water level, while Scale No. 5 applies to those in which the maximum sustained winds are 155 mph or more, which have the potential of producing a storm surge more than 18 feet above normal.

The scale was developed by Herbert Saffir, Dade County, Florida, consulting engineer, and Dr. Robert H. Simpson, former National Hurricane Center director, and projects scale assessment categories as follows:

Category No. 1 - Winds of 74 to 95 mph. Damage primarily to shubbery, trees, foliage, and unanchored mobile homes. No real damage to other structures. Some damage to poorly constructed signs. Storm surge 4 to 5 feet above normal. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.

Category No. 2 - Winds of 96 to 110 mph. Considerable damage to shrubbery 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. Coastal roads and low-lying escape routes inland cut by rising water two to four hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying island areas required.

Category No 3 - Winds of 111 to 130 mph. Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. Storm surge 9 to 12 feet above normal. Serious flooding at coast and many smaller structures near coast destroyed; large structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water three to five hours before hurricane center arrives. Flat terrain 5 feet or less above sea level flooded inland 8 miles or more. Evacuation of low-lying residences within several blocks of shoreline possible required.

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. Storm surge 13 to 18 feet above normal. Flat terrain 10 feet or less above sea level flooded inland as far as six miles. Major damage to lower floors to structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water three to five hours before hurricane center arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single-story residences on low ground within two miles of shore.

Category No. 5 - Winds greater than 155 mph. Shrubs and trees blown down; considerable damage to roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings over-turned or blown away. Complete destruction of mobile homes. Storm surge greater than 18 feet above normal. Major damage to lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water three to five hours before hurricane center arrives. Massive evacuation of residential areas on low ground within five to ten miles of shore possible required.

Dr. Neil Frank, present National Hurricane Center director, has adapted atmospheric pressure ranges to the Saffir/Sampson Scale. These pressure ranges, along with a numerical breakdown of wind and storm surge ranges are:

APPENDIX B

SCALE NUMBER	CENTRAL PRESSURES MILLIBARS	CENTRAL PRESSURES INCHES	WINDS (MPH)	SURGE (FT.)	DAMAGE
1	980	28.94	74- 95	4- 5	Minimal
2	965-979	28.5 -28.91	96-110	6- 8	Moderate
3	945-964	27.91-28.47	111-130	9-12	Extensive
4	920-944	27.17-27.88	131-155	13-18	Extreme
5	920	27.17	155+	18+	Catastrophic

WITHLACOOCHEE REGIONAL PLANNING COUNCIL

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Executive Director

Lorene Finch
Administrative Assistant

Peggy Alexander
Finance Director

Charlotte Neupauer
Full Charge Bookkeeper

William E. Taylor
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Principal Planner

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