State of Florida
2019
Shelter Retrofit Report

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State of Florida Shelter Retrofit Report

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EXECUTIVE SUMMARY

The Division of Emergency Management (Division), as directed by section 252.385, Florida Statutes, annually publishes a *Shelter Retrofit Report*. The report provides a list of facilities recommended to be retrofitted for use as public hurricane evacuation shelters. Retrofitting is the modification of an existing structure to make it stronger and more disaster resistant. For example, installing hurricane shutters on an existing building protects doors and windows from wind-borne debris. Such measures bring public shelters up to established safety criteria and increase the availability of public hurricane evacuation shelter spaces in the State of Florida.

Since 1999 significant progress has been made toward reducing the deficit of safe public hurricane shelter space and meeting the American Red Cross's *Hurricane Evacuation Shelter Selection Standards* (June, 2018) or the former *Standards for Hurricane Evacuation Shelter Selection* (January, 2002). A combination of existing building surveys, retrofitting and application of enhanced hurricane design and construction standards has increased available hurricane shelter spaces to a total of 1,077,491. Another 53,870 spaces (meeting ARC 4496 safety standards) are expected to be available to the public by August 2020 for a total of 1,131,361 spaces.

In preparation of the *2019 Shelter Retrofit Report*, the Division reviewed all projects submitted by county emergency management agencies in cooperation with other partner organizations (local American Red Cross chapters and school boards) that participate in hurricane shelter planning and operations. After careful evaluation of the proposed projects, the Division, by priority, recommends 347 projects for retrofitting. These projects alone will create an additional 141,400 risk recognized hurricane shelter spaces statewide at an estimated cost of $30,874,820.

A significant increase in public hurricane shelter capacity has been achieved over the past 19 years. This is largely due to the availability of retrofit and mitigation-related funds to accomplish the recommended projects. Prior to 1999, the State lacked a dedicated funding source to meet the demands for public hurricane evacuation shelter space. However, since 1999 the Governor and the Legislature have committed to fund the State's retrofit program on a recurring basis. Per section 215.559(1)(b), Florida Statutes, the Division is provided $3 million per year to retrofit hurricane evacuation shelters as prioritized in the annually published *Shelter Retrofit Report*. The Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP) has provided approximately $45 million to harden or retrofit public hurricane shelters during the history of the program. Table 1-1 summarizes the State's progress in creating needed public hurricane shelter space through retrofit of appropriate buildings.

The Division's public hurricane shelter deficit reduction strategy focuses on five major components: 1) surveying hurricane shelter facilities in existing local inventories to identify unused space; 2) surveying facilities not currently listed in local inventories to identify additional capacity; 3) providing funding for cost-effective retrofit or other mitigation measures on existing buildings that can provide additional shelter capacity; 4) incorporating hurricane shelter design

criteria into new public building construction projects; and 5) reducing hurricane shelter demand through improved public information, education and behavioral analysis, and decreased evacuation need.

A significant component of the strategy to increase the availability of "safe" hurricane shelter space is construction of new school facilities that comply with the Public Shelter Design Criteria provisions of the Florida Building Code; also known as Enhanced Hurricane Protection Area (EHPA) provisions. Table 2-1 illustrates a net gain of 506,686 hurricane shelter spaces since code adoption. Many Regional Planning Council (RPC) regional hurricane shelter space deficits have been eliminated, and consequently so has the requirement to design and construct new schools to the EHPA code provisions. As new EHPA buildings and or schools are completed, the Division surveys the facilities to determine if they may be added to the inventory as is or if they need additional protections.

Since 1995, the state has made significant progress toward improving the safety and availability of public hurricane shelter space. On a statewide cumulative basis, the current capacity is about 12 percent greater than the estimated demand calculated in Table 2-1. The metrics are evidence that the comprehensive strategy is an effective means to eliminate shelter deficits. However, RPC regions 6, 7 and 8 currently have deficits per data from the *2018 Statewide Emergency Shelter Plan* (SESP). For Special Needs Shelters (SpNS) nearly all regions have a deficit.

Changes in Federal Emergency Management Agency flood and National Weather Service storm surge inundation maps reduced the previously recognized quantity of hurricane evacuation shelter space in some regions. The hurricane shelter space figures also do not take into account the aging of the current stock of public shelters nor the approaching end of the useful life of some of the original retrofit projects. As existing buildings constructed to older building codes continue to age, replacement facilities, such as new construction or retrofit of recently constructed facilities, will be needed to ensure that state shelter capacities meet both current and future needs. In addition, recent population and demographic trends reflected in evacuation studies caused an increase in shelter space demand for 2016 and beyond. Specifically, forecasting for the five-year period indicates higher demand for special needs shelters. These changes and their consequent impacts indicate a continuing need for additional hurricane evacuation shelter space.

In summary, as the number of Floridians in areas vulnerable to hurricanes continue to grow, it is vitally important that construction of hurricane shelters and retrofitting of existing buildings continue. Full implementation of the Division's shelter deficit reduction strategy will create a greater level of preparedness, a more efficient capability for responding to incidents and an increased ability to meet the needs of disaster survivors.

I. INTRODUCTION

Purpose

To continue to reduce the State's public hurricane shelter deficit, the Division of Emergency Management (Division) annually issues a *Shelter Retrofit Report* (report), which provides a list of facilities recommended to be retrofitted using state funds. *See* Sec.252.385 (3), Florida Statutes. The annual report is provided to the President of the Senate, the Speaker of the House of Representatives and the Governor. The report recommends and prioritizes facilities to be retrofitted based on each Regional Planning Council (RPC) public hurricane evacuation shelter deficit. The RPC regions are established to coordinate planning for economic development, growth management, emergencies and other regional impacts. The report's objective is to improve relative safety and reduce the hurricane evacuation shelter space deficit in the state.

All funding recommendations and assessments of available shelter spaces in this report reflect only those of state-recognized shelters. State-recognized shelters are those facilities that meet the state's hurricane shelter guidelines; to include protection from high winds and storm surge. Facilities in storm-surge zones are not included in this assessment when determining sufficient hurricane shelter space and are not eligible for retrofitting investment by the state. Other assessments that are not specific to state-recognized hurricane shelters may have figures that conflict with this report.

The Need for Shelter Retrofitting

Every county in Florida is at risk of hurricane and hurricane-related hazards, including flooding, storm surge, high winds, and power outages. These hazards place specific physical, geographical, and infrastructural limitations on what is a suitable and safe hurricane shelter for evacuees. Due to Florida's unique statewide risk for hurricanes and the unique requirements for suitable shelters, the Division is tasked with preparing a *Statewide Emergency Shelter Plan* that assess the current and projected shelter space sufficiency and deficit. The table below summarizes the findings of the studies conducted since 2012.

Statewide Shelter Spaces Sufficiency / Deficit		
Year	**General Population**	**Special Needs**
2012	125,205	**-20,829**
2014	88,601 **(-29%)**	**-14,218** (+32%)
2016	74,567 **(-16%)**	**-23,431 (-65%)**
2018	100,027 (+34%)	**-19,958** (+15%)
2023 *(Projected)*	91,751 **(-8%)**	**-20,700 (-4%)**

Despite the showing of a sufficiency for Statewide General Population Space, there are two (2) findings that are of concern. First, there continues to be a general downward trend for the general population sufficiency. Two, there are three (3) planning council regions that have overall general population shelter deficits; Central Florida, Tampa Bay, and Southwest Florida. These regions also have some of the highest evacuation clearance times in the state,

which means that the internal capability of the region is critical for providing residents safe sheltering options. The below table shows how the gap in these three (3) regions continues to grow, despite an overall sufficiency.

Shelter Spaces Sufficiency / Deficit in Select Regions			
Year	**2012**	**Forecasted 2023**	**Change**
Central Florida	10,276	**-15,581**	**-252%**
Tampa Bay	50,750	**-17,678**	**-135%**
Southwest Florida	**-80,115**	**-123,767**	**-54%**

As the population of Florida continues to grow and development continues in risk-prone areas, the dependence on suitable hurricane shelters will continue to grow. While new construction is an ideal solution, the reality is the sufficiency of general population shelter space is shrinking, and the gap for special needs shelter space is growing. Retrofitting projects augment the gaps and allows the state to more rapidly meet its capability goals.

The maps below highlight the value this program has brought to the State of Florida. The first shows which Florida counties had deficits in 2000. The second map shows the current deficits based on the latest available data from 2018.

The full report in this document presents the Division's procedures and courses of action for meeting these concerns. Table 3-1 shows the Division's recommendations on projects that will add 141,400 additional shelter spaces, including 81,603 spaces to the three planning regions with growing gaps (Central Florida, Tampa Bay, and Southwest Florida). Meeting the sheltering needs in Florida requires multiple tactics among state and local partners. While retrofitting is only one part, it is a relatively cost-effective method of increasing the usability of existing structures during hurricanes and other disasters in the state.

Figure 1-1. 2000 County Hurricane Evacuation Shelter Space Deficit / Sufficiency Status of General Population Shelters

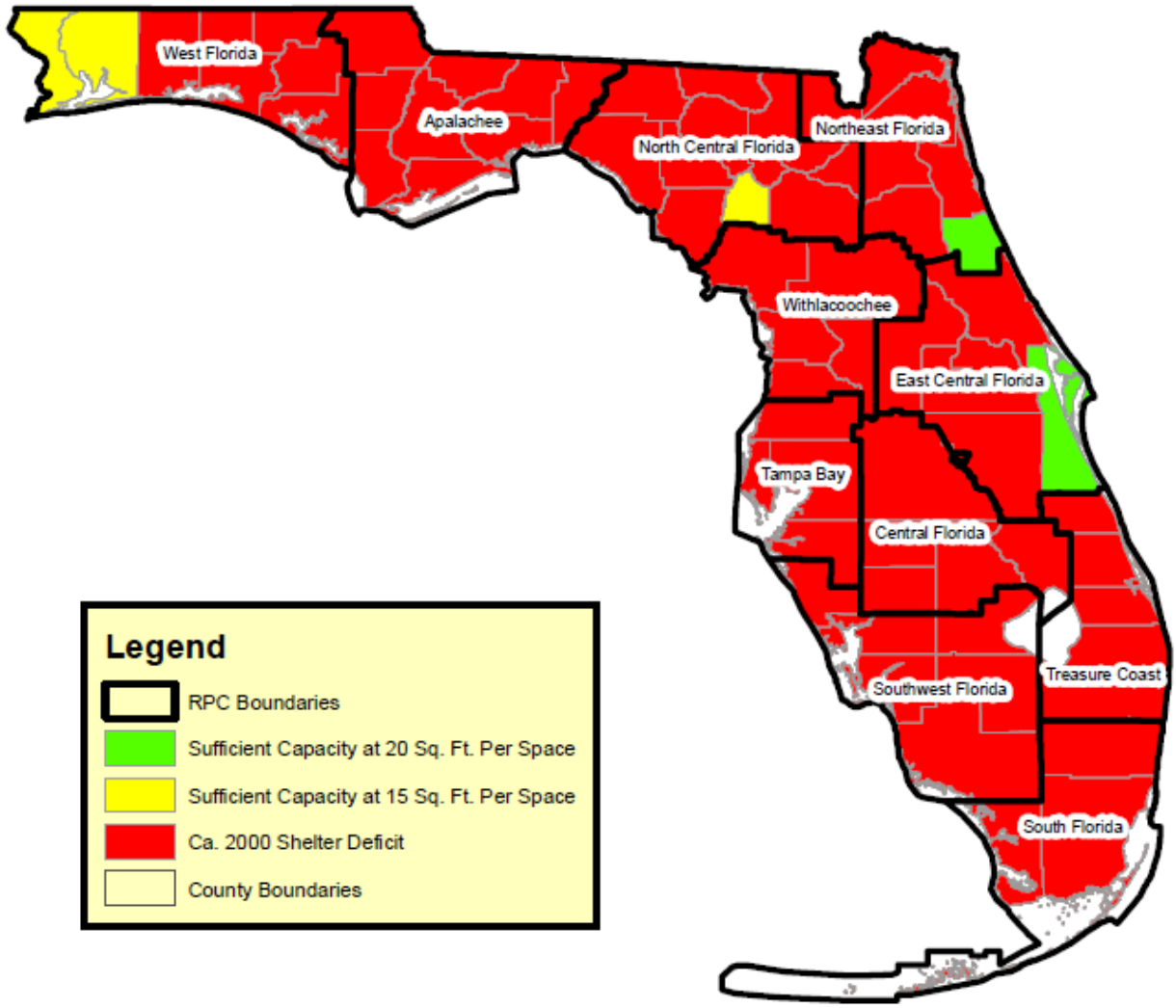
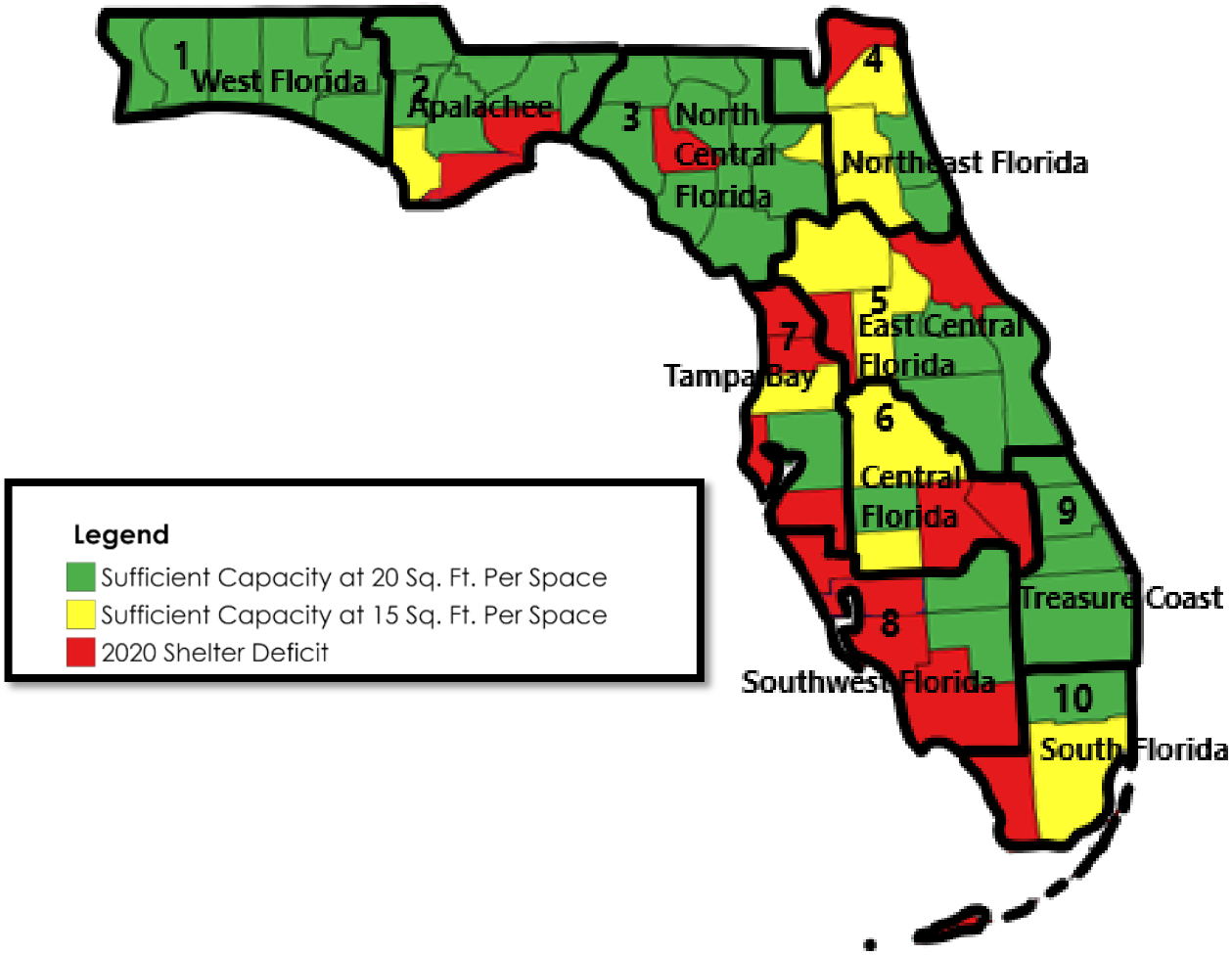


Figure 1-2. 2019 County Hurricane Evacuation Shelter Space Deficit / Sufficiency Status of General Population Shelters



Shelter Retrofit Project Identification Procedure

In collaboration with local school boards and public and private agencies, county emergency managers provided the data used for the *2019 Shelter Retrofit Report*. The Division recognizes that local officials are aware of facilities and are in a position to make recommendations that will best serve their communities. In order to identify potential shelter retrofit projects for inclusion in the report, the Division provided general guidance for the development of proposals in a questionnaire-type format that the counties could use for project submittal.

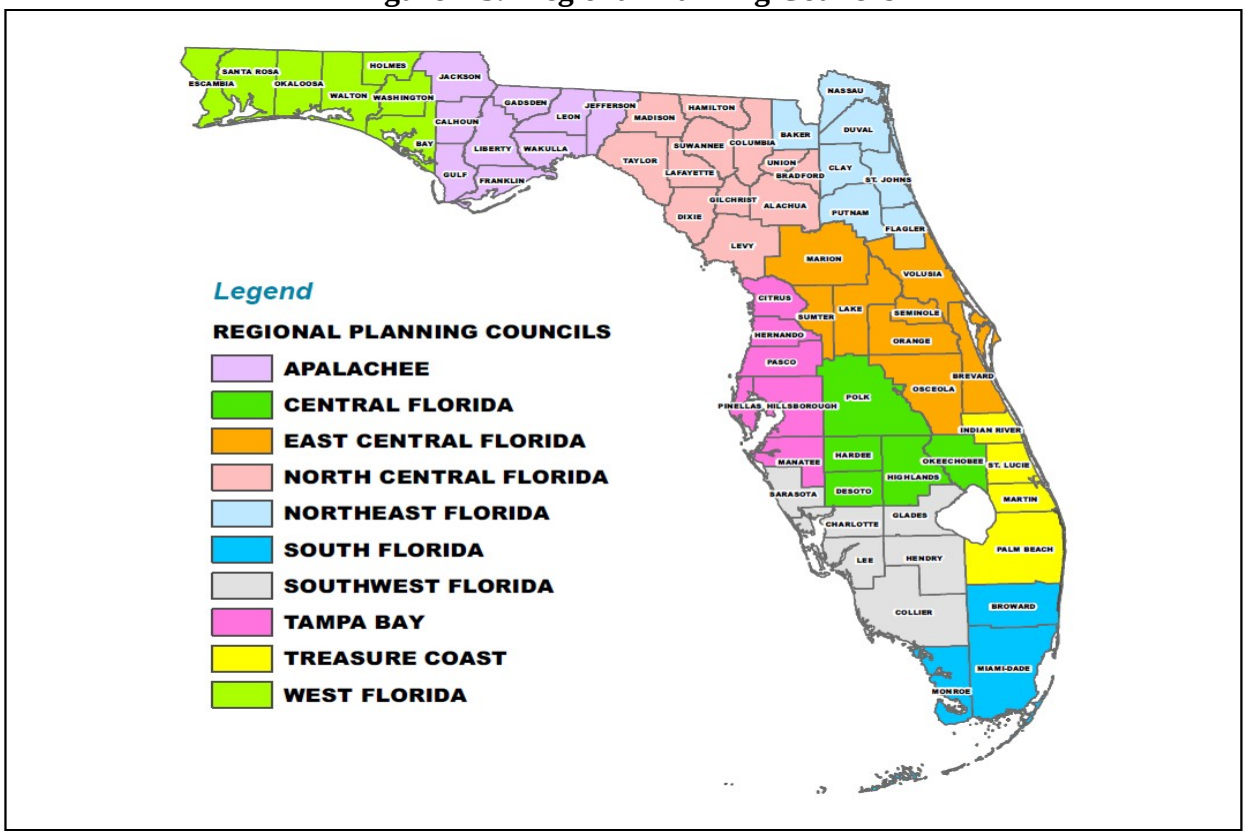
The questionnaire was prepared to include sufficient information to determine if the facility could meet the Division's Least Risk Decision Making (or LRDM) hurricane hazard safety guidelines, clearly define project scope(s) to be undertaken and their impact upon hurricane evacuation shelter space capacity and safety, and explain the interrelationship of the proposed project(s) and local and regional shelter strategies. The cost estimates were generally provided by local agencies, commercial contractor "rough orders of magnitude," or, in some cases, past experience in the retrofit program. Division staff reviewed the projects and assigned priority point values as illustrated in Appendix E.

This Report includes projects originally submitted in previous reports. Previous projects have been re-ranked as appropriate. The State's criteria consist of the following:

- Regional and Local Shelter Deficit Reduction
- Structural and Hazard Vulnerability Review
- Shelter Capacity Increase, Building Ownership and Availability, and Cost-Effectiveness Considerations
- Other Considerations / Demonstration of Impact Upon the State and Regional Shelter Deficit Situation

For more details on each criteria, please review *Methodology for Recommendation of Projects for Funding* attached hereto as Appendix D. Figure 1-3 below shows a map of the RPC regions across the State of Florida. The RPC regions are established to coordinate planning for economic development, growth management, emergencies, and other regional impacts.

Figure 1-3. Regional Planning Councils



The retrofit projects recommended in this report will, if funded, substantially improve state and local hurricane evacuation preparedness. As Table 1-1 illustrates, the State Legislature and Governor have demonstrated a sustained commitment to reduce the deficit of safe public hurricane evacuation shelter space. From 1999 to 2013, approximately $80 million in federal and state funds have been committed towards retrofitting suitable facilities, funding an estimated 486,232 hurricane shelter spaces. From 2014 to 2019, an additional $18 million in state funding is committed to adding approximately 80,000 new or replacement spaces.

Table 1-1.
Historical Summary of Florida's Hurricane Shelter Retrofit Program

Shelter Retrofit Report Year	Annual Shelter Retrofit Report Recommended Projects Cost $ (without generators)	Annual Shelter Retrofit Report Potential Number of Spaces Gained	Federal and State Funds Allocated to Shelter Retrofit Report Ranked and Recommended Projects	Shelter Retrofit Report Spaces Gained	Cumulative Shelter Retrofit Report Spaces Gained
1999	$16,185,193	88,679	$8,473,341	72,230	72,230
2000	$36,399,457	250,362	$25,572,795	119,087	191,317
2001	$26,943,516	119,905	$5,233,731	20,574	211,891
2002	$26,959,668	157,326	$4,735,113	41,710	253,601
2003	$23,349,714	137,985	$3,000,000	33,381	286,982
2004	$13,457,737	93,967	$7,500,000	68,765	355,747
2005	$11,882,722	68,882	$3,000,000	24,481	380,228
2006	$8,683,049	54,415	$3,000,000	13,820	394,048
2007	$10,956,377	82,930	[a] $6,607,263	[b] 25,645	419,693
2008	$13,432,213	85,997	$0	[c] 0	419,693
2009	$11,777,884	69,465	$3,000,000	14,427	434,120
2010	$15,634,282	120,447	$1,750,000	[d] 14,427	442,040
2011	$20,337,203	109,308	$2,250,000	14,974	457,014
2012	$14,707,717	110,394	$3,000,000	14,408	471,422
2013	$12,745,072	87,150	$3,000,000	14,810	486,232
2014	$13,994,180	107,236	$3,000,000	[e] 13,333	499,565
2015	$15,188,945	117,609	$3,000,000	[e] 13,333	512,898
2016	$13,465,342	69,541	$3,000,000	[e] 13,333	526,231
2017	$13,794,763	65,303	$3,000,000	[e] 13,333	539,564
2018	$23,189,218	108,104	$3,000,000	[e] 13,333	552,897
2019	$30,874,820	141,400	$3,000,000	[e] 13,333	566,230
TOTAL	**N/A**	**N/A**	**$98,122,243**	**[f] 566,230**	**N/A**

[a] – $6,607,263 was based on federal funds plus state match for FY 2007/2008 HB7121 and non-federal matched projects from Special Appropriation 1621X

[b] – 25,645 spaces were gained from HB 7121 & 1621X shelter retrofit projects

[c] – For Fiscal Year 08-09, no funds were appropriated for the Shelter Retrofit Report

[d] – 7,929 reflects gain from FY 2010/2011 Specific Appropriation 1617 @ $1,750,000

[e] – 13,333 spaces is preliminary estimate gained based upon $225 per space from annual $3,000,000 Specific Appropriation in fiscal years where funding is obligated or under contract.

[f] – 566,230 reflects all gains, to include current projects under contract and estimates from Specific Appropriations

II. CURRENT SITUATION

Florida has experienced major disasters with loss of life and property due to tropical storms, hurricanes and a wide array of other disasters. Of the state's sixty-seven (67) counties, thirty-five (35) of them lie along 8,426 miles of coastline, tidal inlets, bays, and other waterways. Nearly 80% of Florida's population live in coastal counties, and 40% of the population is in a storm surge zone.

The proximity of population concentrations along the Gulf of Mexico and the Atlantic Ocean, coupled with low coastal elevations, significantly increase the state's vulnerability to hurricane damage, tidal surges, and storm-related flooding. This vulnerability has manifested itself in the need for hundreds of thousands of safe public hurricane shelter spaces.

Statewide sheltering is not solely a coastal phenomenon. In 2018 Hurricane Michael made landfall as a Category 5 storm (on the Saffir-Simpson Hurricane Wind Intensity Scale) and exited the state as a Category 3. Thus, the impacts of the storm extended well inland to non-coastal counties in Florida and Georgia. The future safety of all our vulnerable citizens will require additions to the statewide public hurricane shelter inventory. Improved methodology in evacuation studies and registration for persons with special needs created an increase in demand for hurricane evacuation "risk" shelters.

The Division has a multifaceted approach to reduce the deficit of hurricane evacuation "risk" shelter spaces. The approach includes: 1) annually surveying about five percent of public facilities statewide to identify additional spaces; 2) surveying facilities not currently in inventories to identify unused capacity; 3) offering funding for cost-effective retrofit on existing buildings that can provide additional shelter spaces; 4) incorporating hurricane shelter design criteria into new public building construction projects; and, 5) reducing hurricane shelter demand through improved public information, education and behavioral analysis, and decreased need for evacuation.

Statewide Progress in Retrofitting and Enhanced Hurricane Protection Area Construction

Table 2-1 shows spaces created through retrofitting of existing facilities using state funds, and spaces created through design and construction of new public school facilities to Enhanced Hurricane Protection Area (EHPA) building code provisions. Additionally, Table 2-1 shows the estimated shelter demand for 2019-2020 (provided via the Division's hurricane evacuation studies and the 2018 Statewide Emergency Shelter Plan), the hurricane evacuation shelter space adequacy/deficit in each county, and for the state as a whole. There is still need for further effort statewide even with the projects in the queue and the significant progress demonstrated.

General Population hurricane evacuation shelter space capacities are calculated based on the recommended 20 square feet (sq.ft.) per evacuee, and for Persons with Special Needs (PSN) the capacity is based on the recommended 60 sq.ft. per client.

Table 2-1.

Hurricane Evacuation Shelter Deficit Reduction Progress Success Stories

Regional Planning Council, (RPC)	RPC Region Deficit?	County	Current Retrofit & As-Is Capacity	Current EHPA Capacity	Retrofit Shelter Capacity Under Contract	Total Hurricane Shelter Capacity	GenPop + SpNS Demand	Capacity Sufficient Estimate
3	No	Alachua	11,187	1,600	2,795	12,787	13,077	-290
4	No	Baker	1,675	1,612	0	3,287	2,699	588
1	No	Bay	14,944	956	2,422	15,900	8,177	7,723
3	No	Bradford	1,695	0	0	1,695	1,457	238
5	No	Brevard	30,381	12,063	0	42,444	33,579	8,865
10	No	Broward	500	60,005	0	60,505	29,587	30,918
2	No	Calhoun	2,239	172	0	2,411	1,112	1,299
8	Yes	Charlotte	0	0	0	0	13,386	-13,386
7	Yes	Citrus	3,647	208	0	3,855	13,386	-9,531
4	No	Clay	4,613	2,985	2,566	7,598	11,540	-3,942
8	Yes	Collier	5,784	0	0	5,784	32,010	-26,226
3	No	Columbia	4,949	4,105	0	9,054	5,111	3,943
6	Yes	Desoto	2,602	151	0	2,753	3,296	-543
3	No	Dixie	2,562	1,256	0	3,818	1,978	1,840
4	No	Duval	35,630	15,343	103	50,973	45,127	5,846
1	No	Escambia	25,510	1,803	0	27,313	11,211	16,102
4	No	Flagler	24,608	3,034	2,086	27,642	6,575	21,067
2	No	Franklin	0	0	0	0	535	-535
2	No	Gadsden	2,000	5,732	0	7,732	3,925	3,807
3	No	Gilchrist	3,129	0	0	3,129	1,200	1,929
8	Yes	Glades	650	388	0	1,038	1,613	-575
2	No	Gulf	232	228	0	460	742	-282
3	No	Hamilton	1,835	1,196	0	3,031	1,116	1,915
6	Yes	Hardee	139	4,623	0	4,762	2,211	2,551
8	Yes	Hendry	5,263	1,000	0	6,263	3,494	2,769
7	Yes	Hernando	1,416	8,051	0	9,467	11,617	-2,150
6	Yes	Highlands	2,550	6,137	0	8,687	11,854	-3,167
7	Yes	Hillsborough	27,004	65,699	1,400	92,703	55,285	37,418
1	No	Holmes	2,220	4,133	135	6,353	1,115	5,238
9	No	Indian River	10,507	0	300	10,507	6,337	4,170
2	No	Jackson	499	3,365	0	3,864	1,774	2,090
2	No	Jefferson	0	809	0	809	948	-139
3	No	Lafayette	1,136	0	1,166	1,136	622	514
5	No	Lake	3,414	24,546	7,507	27,960	26,453	1,507
8	Yes	Lee	500	0	9,307	500	74,751	-74,251
2	No	Leon	21,307	1,245	0	22,552	4,590	17,962
3	No	Levy	5,057	354	0	5,411	4,206	1,205
2	No	Liberty	836	822	0	1,658	751	907
3	No	Madison	4,236	0	0	4,236	1,327	2,909
7	Yes	Manatee	9,735	21,702	0	31,437	25,176	6,261
	Page 1 Totals:		**276,191**	**255,323**	**29,787**	**531,514**	**474,950**	**56,564**

Table 2-1.								
Hurricane Evacuation Shelter Deficit Reduction Progress Success Stories								
Regional Planning Council, (RPC)	**RPC Region Deficit?**	**County**	**Current Retrofit & As-Is Capacity**	**Current EHPA Capacity**	**Retrofit Shelter Capacity Under Contract**	**Total Hurricane Shelter Capacity**	**GenPop + SpNS Demand**	**Capacity Sufficient Estimate**
3	No	Marion	7,930	10,257	0	18,187	19,185	-998
9	No	Martin	11,383	10,047	1,035	21,430	5,756	15,674
10	No	Miami-Dade	77,529	26,454	0	103,983	100,632	3,351
10	No	Monroe	723	0	0	723	3,051	-2,328
4	No	Nassau	1,822	4,554	0	6,376	5,529	847
1	No	Okaloosa	11,574	2,025	0	13,599	6,027	7,556
6	Yes	Okeechobee	1,891	1,175	300	3,066	8,671	-5,605
5	No	Orange	2,530	28,678	5,650	31,208	31,804	-596
5	No	Osceola	18,001	7,982	0	25,983	10,821	15,162
9	No	Palm Beach	22,793	48,355	0	71,148	32,351	38,797
7	Yes	Pasco	10,199	17,556	0	27,755	32,316	-4,561
7	Yes	Pinellas	24,250	10,150	0	34,400	46,275	-11,875
6	Yes	Polk	2,423	33,157	0	35,580	45,621	-10,041
4	No	Putnam	3,495	1,196	31	4,691	4,848	-157
4	No	Saint Johns	12,937	7,198	5,274	20,135	11,847	8,288
9	No	Saint Lucie	12,997	4,388	0	17,385	10,737	6,648
1	No	Santa Rosa	7,536	5,471	0	13,007	6,041	6,966
8	Yes	Sarasota	4,597	9,296	7,748	13,893	31,781	-17,888
5	No	Seminole	30,220	1,206	4,045	31,426	12,199	19,227
5	No	Sumter	725	200	0	925	9,824	-8,899
3	No	Suwannee	50	3,484	0	3,534	3,966	-432
3	No	Taylor	2,582	2,424	0	5,006	1,777	3,229
3	No	Union	1,371	345	0	1,716	752	964
5	No	Volusia	15,291	8,879	0	24,170	39,650	-15,480
2	No	Wakulla	0	400	0	400	953	-553
1	No	Walton	4,028	5,269	0	9,297	1,962	7,335
1	No	Washington	5,737	1,217	0	6,954	1,700	5,254
	Page 1 Totals:		**276,191**	**255,323**	**29,787**	**531,514**	**474,950**	**56,564**
	Page 2 Totals:		**294,614**	**251,363**	**24,083**	**545,977**	**486,092**	**59,885**
	Subtotals:		**570,805**	**506,686**				
	Totals:		**1,077,491**		**53,870**	**1,077,491**	**961,042**	**116,449**
	Grand Total:		**1,131,361**					

III. SUMMARY OF PROJECT RECOMMENDATIONS

In fiscal year 2018-2019, the Division requested county emergency managers to submit new hurricane evacuation shelter retrofit projects and confirm or delete any projects on the current Shelter Retrofit Report lists. Each proposed retrofit project is required to fall within the preferred or less preferred/marginal ranking on the respective Least Risk Decision Making survey report upon completion. The Division identified 347 projects that could meet the standard after retrofitting. All projects were ranked using such factors as: local and regional hurricane evacuation shelter space deficit; greatest provision of space; cost efficiency per space; and vulnerability to high winds and storm surge. *See* Appendix E for a list of recommended projects.

Table 3-1 provides a summary of the proposed shelter retrofit projects, the RPC and county served, the construction-related costs of the proposed projects, and the total hurricane evacuation shelter space capacity that will be created upon completion. *See* Figure 1-3 for a map of the State's RPC regions.

Table 3-1.

2019 Shelter Retrofit Report County and Regional Recommended Project Totals

31-Jul-2019

Region	County	Construction-related Costs, $	Hurricane Shelter Capacity Gained, Spaces
1	Bay	$614,100	2,422
1	Walton	$126,000	1,310
	Region 1 Totals:	**$740,100**	**3,732**
2	Calhoun	$193,500	1,000
2	Gadsden	$538,223	1,957
2	Jefferson	$344,025	1,529
2	Leon	$1,101,025	4,652
2	Wakulla	$1,173,825	5,217
	Region 2 Totals:	**$3,350,598**	**14,355**
3	Alachua	$1,398,475	5,489
3	Columbia	$579,822	1,562
3	Hamilton	$674,100	2,996
3	Lafayette	$193,500	860
3	Taylor	$412,720	1,876

	Region 3 Totals:	**$3,258,617**	**12,783**
4	Clay	$160,000	285
4	Duval	$548,925	3,745
4	Flagler	$528,325	2,965
4	Nassau	$928,975	4,662
4	Putnam	$57,980	260
	Region 4 Totals:	**$2,224,205**	**11,917**
5	Lake	$2,313,150	8,840
5	Marion	$742,000	1,428
5	Orange	$4,098,393	20,814
5	Osceola	$1,272,450	1,522
5	Seminole	$1,165,780	4,660
5	Sumter	$345,600	1,565
5	Volusia	$1,310,175	5,823
	Region 5 Totals:	**$11,247,548**	**44,652**
6	Desoto	$376,075	1,348
6	Hardee	$294,900	323
6	Highlands	$261,875	905
6	Okeechobee	$190,000	1,160
6	Polk	$1,302,575	6,567
	Region 6 Totals:	**$2,425,425**	**10,303**
7	Citrus	$160,000	858
7	Hernando	$453,892	1,976
7	Manatee	$429,563	3,574
7	Pasco	$1,099,775	5,499
7	Pinellas	$210,000	420
	Region 7 Totals:	**$2,343,230**	**11,977**
8	Charlotte	$261,250	1,050
8	Glades	$52,875	235
8	Lee	$2,398,617	15,235
8	Sarasota	$1,162,080	8,454
	Region 8 Totals:	**$3,874,822**	**24,974**
9	Indian River	$40,800	184
9	Martin	$439,475	3,031
9	Palm Beach	$111,500	500
9	St. Lucie	$230,000	882
	Region 9 Totals:	**$821,775**	**4,597**
10	Broward	$385,000	900
10	Miami-Dade	$193,500	860
	Region 10 Totals:	**$578,500**	**1,760**
	Summary Total:	**$30,874,820**	**141,400**

If funded, the projects listed in this report will provide an estimated increase of 141,400 hurricane evacuation shelter spaces at a cost of $30,874,820 (construction-related costs). Projects that include a standby electric power source add to the overall functionality and sustainability of a shelter, but do not increase shelter space capacity.

IV STRATEGY FOR PUBLIC SHELTER DEFICIT REDUCTION

The Division is responsible for developing a strategy to eliminate the deficit of "safe" public hurricane shelter space in Florida Statutes; *See* Secs. 252.35(2)(a)2 and 252.385(1), (2) and (3), Florida Statutes. The Division's strategy includes the following components:

Component 1 – Develop and Implement Model Shelter Survey and Selection Guidelines

The Division is responsible for administering a survey program of existing schools, universities, community colleges, and other state, county and municipally-owned public buildings. The Division is also responsible for annually providing a list of facilities that are recommended to be retrofitted using state funds. The Division established survey criteria that include storm surge, rainfall flooding and high wind hazards, plus a basic least-risk decision making model and report format. The performance assessments give preference to building qualities, or features that performed well in Hurricane Andrew and avoids (or mitigates) those that performed poorly, and has been updated to accommodate modern building codes, standards, and practices.

Component 2 – Implement Shelter Survey Program

The Division completed the first statewide baseline survey, and initiated a second baseline survey to continue to improve accuracy and capture changes in the statewide inventory of hurricane evacuation shelters. The results of the surveys are used by state and local agencies to prepare and implement strategies to reduce and eliminate the deficit of recognized hurricane evacuation shelter space. Between 1999 and 2019, more than 6,257 buildings were surveyed utilizing in house surveyors and private-sector consultants. The survey program has identified about 114,225 "as-is" spaces and, directly or indirectly, led to creation of more than 456,580 retrofitted shelter spaces. These totals combined with the EHPA construction of 506,686 spaces results in a total capacity of 1,077,491spaces.

Component 3 – Retrofit appropriate facilities to meet Guidelines

Since 1999, the State Legislature has provided recurring funds for retrofit projects listed in annual *Shelter Retrofit Reports*. The retrofit projects identified through the survey program, are recommended only when the retrofit can create spaces that meet the safety criteria upon completion in the project.

For Fiscal Year 2019-2020, the State Legislature appropriated $3 million to structurally enhance or retrofit public hurricane evacuation shelters. Funding will create an estimated 13,333 spaces during the life of the appropriation.

Component 4 – New construction of public school facilities as Shelters

Florida Department of Education (FDOE) appointed a committee to develop a public shelter design criterion for use in new school facility construction projects. The committee included representatives from many stakeholder agencies (e.g., state and local emergency

management, school board, community college and university officials, the American Red Cross, architects, engineers, etc.). The charge of the committee was to develop a set of practical and cost-effective design criteria to ensure that appropriate new educational facilities can serve as public shelters for emergency management purposes. The final criterion recommended by the committee was consistent with the current safety criteria used in the LRDM surveys.

The recommended wind design criterion was the American Society of Civil Engineers Standard 7 (ASCE 7) with a 40 mile per hour increase in basic map wind speed and an importance factor I=1.00. In addition, the hurricane shelter's exterior envelope (walls, roofs, windows, doors, louvers, etc.) must all meet a basic wind-borne debris impact standard (i.e., SSTD 12; 9lb 2x4 @ 34 mph). However, school board officials successfully protested the increase in base wind speed, so the minimum wind design criterion was reduced to ASCE 7 at basic map wind speed with an essential facility importance factor I=1.15. The 40 mile per hour increase in base wind speed was still recommended within the code, but not required. The criteria were promulgated into the State Requirements for Educational Facilities in April, 1997. The Division's model hurricane shelter evaluation criteria's preferred recognition was adjusted to be consistent with FDOE's public shelter design criteria (also known as the Enhanced Hurricane Protection Area or EHPA criteria).

Schools are funded primarily by state and local capital outlay funds, and school districts are generally reporting that the EHPA construction cost premium is about three to nine percent. Since 1997, EHPA construction has created 506,686 spaces (Table 2-1), which accounts for about 47 percent of the statewide risk recognized space inventory.

Component 5 – Shelter demand reduction through improved public information and education and through decreased evacuation

Hurricane evacuation studies have historically indicated that at least 25 percent of a vulnerable population would seek public shelter during an evacuation event. However, recent studies indicate that only about 15 percent will actually seek public shelter. This is consistent with the findings of recent post-storm assessments that indicate less than 10 percent of vulnerable populations seek public shelter.

The public shelter demand resulting from hurricane evacuation was significantly reduced from 1995 to 2019 due to improvements in public education and information, and more accurate storm surge/evacuation zone modeling with the use of the LiDAR (Light Detection and Ranging). However, changes in Federal Emergency Management Agency flood and storm surge maps coupled with recent population and demographic trends reflected in evacuation studies, created a significant increase in shelter demand beginning in 2016, which continues to impact shelter demand currently. Forecasting for the five-year period indicates higher demand for special needs shelters, specifically. These demand figures do not take into account the aging of the current stock of public shelters nor the approaching end of the useful life of the original retrofit projects. The *2019 Statewide Regional Evacuation Studies* (SRES) resulted in a small

statewide aggregate hurricane evacuation shelter space decrease in demand spaces. Florida's projected statewide hurricane evacuation shelter space demand for 2019 is 961,042 spaces.

Statewide Progress in Shelter Deficit Reduction

Since 1995, Florida has made significant progress toward improving the safety and availability of public hurricane shelter space. A comprehensive strategy of surveys, retrofitting, new construction, evacuation studies and public education is the basis for the success. An expansion in storm surge/evacuation zones, aging building stock and decommissioned school buildings plus changes in planned local school room use has resulted in a decrease of nearly 20 percent since 2012. Losing hard won space is difficult when the State of Florida has made so much progress in increasing the overall state capacity. The usable life of buildings and the aging of the retrofits provided previously is a factor impacting the availability of safe hurricane evacuation shelter space. For example, the useful life of storm screen window protection retrofits is about 15 – 20 years. It remains critical to ensure the safety of public hurricane shelter space by replacing the capacity of older buildings with those built to more recent codes, and retrofitting new projects with a longer life expectancy. Improved evacuation studies also benefitted the estimated total shelter demand with an aggregated reduction of more than 45 percent. This year, adequate general population public hurricane shelter space is available in 41 counties. RPC regions 6, 7 and 8, when standing alone, have a deficit in shelter space, even though the statewide aggregate availability of space is sufficient.

V. CONCLUSION

The State of Florida recognizes the necessity of providing safe hurricane evacuation shelter space for its residents during disasters. Hurricane Andrew (1992) made the need clear and the Lewis Commission Report following Hurricane Floyd (1999) concurred. The State remains steadfast in its commitment to provide safe hurricane evacuation shelter space to all during a disaster. Through funding of the recommended *2019 Shelter Retrofit Report* projects, Florida will continue to see improvements in shelter capacity.

Since 1995 hurricane shelter spaces have been identified, or created through retrofitting of existing buildings or by new construction. In the past two years, some hurricane shelters have been decommissioned due to new storm surge mapping, age, remodeling or reuse that is incompatible with mass care shelter operations, deterioration or removal of window protection products, or other reasons. Changes in storm hazard maps (e.g., SLOSH, national flood insurance, etc.) also affect a site's ability to be risk recognized. Therefore, the *2019 Shelter Retrofit Report* of available retrofit space totals 1,077,491 shelter spaces.

In 2015, an additional provision, Sec. 252.355 Florida Statutes, established new requirements for special needs registries under county emergency managers, which is now handled by the Florida Department of Health. Although shelters for persons with specials needs have been available, the additional statutory provision increased demand because medical professionals have been encouraged to register their patients. Additionally, digital marketing is required for the registry. In 2016, and in the following years, changes in evacuation studies, demographics and public awareness increased the demand for shelters for persons with special needs. Special needs shelters require more floor area space and other accommodations per client compared to general population shelters. They are more expensive to retrofit, as the spaces generated per dollar invested are fewer. As a result, 25 of Florida's 67 counties have a special needs deficit in 2019.

An additional 141,400 spaces could be created if the projects in this report are funded, resulting in 1,272,761 spaces available to be used for risk hurricane evacuation shelters. Some projects could receive greater funding for special needs retrofitting, reducing overall spaces but providing safe haven for Florida's most vulnerable population. Combined shelter demand for fiscal year 2019-2020 is 961,042 spaces.

In 2019 three (3) regions of the state still report a deficit of hurricane evacuation shelter space in general and or special needs categories. Regions that have an adequate number of hurricane evacuation shelter spaces currently will need to maintain their inventory. Since 2017, more than 65,000 spaces previously risk recognized were removed from inventory due to changes in hazard maps (e.g., surge and flood maps) that will continue to affect a facilities' recognition of meeting hurricane safety criteria. Over time, more hurricane shelters will be decommissioned due to changes such as theses as well as changes in use. Thus, even though the aggregate statewide deficit is reduced in the *2019 Shelter Retrofit Report*, a "maintenance level" of shelter space production will be necessary to avoid falling back into an overall deficit situation.