

**Hurricane Evacuation Clearance Workshop – Meeting 3**  
**April 30, 2012 Minutes**  
**10am – 6:00pm**

**Welcome and Opening Remarks**

Barbara Powell announced changes to the Agenda and the Work Group approved the previous meeting minutes. Mrs. Powell also announced that the presentation on Sunshine Law will occur later in the meeting.

Commissioner Sylvia Murphy welcomed the group.

**Economic Impact on Early Evacuation**

Andy Newman with the Florida Keys Tourism Development Council (TDC) provided a presentation on the economic impacts of early hurricane evacuation. Mr. Newman provided information on the role of the TDC in emergency preparedness. Mr. Newman emphasized that the purpose of the TDC in coordinating hotel evacuation is to protect lives and the Florida Keys' economy. Mr. Newman showed the Work Group and audience the TDC's website and the information it provides on evacuation orders, weather, and frequently asked questions. Mr. Newman stated that it can take anywhere from a few days to 6 weeks to restart tourism when a storm hits the Keys depending on the media coverage. The TDC works with the media to ensure that if an area of the Keys is struck by a hurricane, that there is equal emphasis on the non-impacted areas that are still open for business. Mr. Newman spoke to the proactive approach the TDC takes in ensuring tourists evacuate.

There were questions regarding evacuation via airlines. Mr. Newman stated that the flights are generally full and when flights are cancelled due to the approaching storm, the bus lines are utilized.

**Scenario Presentation**

Barbara Powell with the Department of Economic Opportunity presented the results of several hurricane evacuation scenarios that included requests from the Work Group members. Mrs. Powell began her presentation by describing the data that has been updated in the Transportation Interface for Modeling Evacuations, or TIME Model which is the hurricane evacuation model developed for the State of Florida.

**Assumptions Used in the Scenarios Presented**

**Tourist Units**

- Total Tourist Units: 13,665
- Average Vehicle Per Unit: 1.1
- Average Occupancy Rate Range: \*67.50 – 90.50% (July) \*These ranges are provided for a frame of reference. Each Traffic Evacuation Zone contains the specific occupancy provided by Smith Travel.
- July represents the highest hotel occupancy rates.

- Other months were used with different occupancy rates.

### **Mobile Home Units**

- Total Mobile Home Units: 8,134
- Average Vehicle Per Unit: .62 – 2.0
- Average Occupancy Rate Range: \*2.86 – 100.00%
- Each Traffic Evacuation Zone contains the specific occupancy provided by the 2010 census data.

\*These ranges are provided as a frame of reference only. The number of vehicles owned is derived from the census block information. The percent of vehicles that will be driven during a hurricane evacuation was determined by the Behavioral Surveys utilized in the statewide hurricane studies.

### **Site-Built Units**

- Total Site-Built Units: 44,630
- Average Vehicle Per Unit: .46 – 2.13
- Average Occupancy Rate Range: \*32.23 – 92.61%
- Each Traffic Evacuation Zone contains the specific occupancy provided by the 2010 census data.

\*These ranges are provided as a frame of reference only. The number of vehicles owned is derived from the census block information. The percent of vehicles that will be driven during a hurricane evacuation was determined by the Behavioral Surveys utilized in the statewide hurricane studies.

### **Special Populations**

- Naval Air Station Key West – Boca Chica – 2,025 vehicles
- Florida Keys Community College – Blue Lagoon Residence Hall – 100 vehicles

Mrs. Powell explained that all scenarios produced reflect participation rates (70%, 80%, and 90%) based on a Category 3-5 storm event and Level C-E surge event. The results presented below are based upon Category 5 storm event with 90% participation rate, a 12-hour response curve, 2010 US Census and 2006-2010 American Community Survey data. When additional units are projected, such as Scenario 2 where 3,540 units are being added, that number (3,540) has not been reduced by the occupancy rate and the participation rate.

### **Phase 2 Evacuation Scenarios (Assumes all hotels and mobile homes evacuated in phase 1)**

**Scenario 1:** The evacuation of 28,053 occupied units (of the 44,630 site-built units) had an evacuation clearance time of 23 hours.

**Scenario 2:** The evacuation of 28,053 occupied units (of the existing 44,630 site-built units) with an additional 3,540 units had an evacuation time of 24 hours. This scenario includes a full allocation to each local government for ten years.

**Scenario 3:** The evacuation of 28,053 occupied units (of the existing 44,630 units) with 1,780 additional units had an evacuation clearance time of 23 hours and 30 minutes. This represents a decrease in allocation of 50%.

**Scenario 4:** The evacuation of 28,053 occupied units (of the existing 44,630 site-built units) and an additional 2,660 units had an evacuation clearance time of 23 hours and 30 minutes. This represents a 25% reduction in allocation.

**Scenario 5:** The evacuation of 28,053 occupied units (of the existing 44,630 site-built units) with an additional 3,540 units and the 4,576 occupied mobile home units (of the existing 8,134 mobile home units) had an evacuation clearance time of 27 hours.

Mrs. Powell presented data that indicates over the past 20 years there has been a conversion of mobile home units to site-built units at a rate of 30.6% since 1990. She explained that using a linear projection, staff expects 1,248 mobile home units to convert to site-built units during the next 10 years. Staff suggested that the group monitor this conversion factor as the American Community Survey for Monroe County is released.

**Scenario 6:** The evacuation of 28,053 occupied units (of the existing 44,630 site-built units) and 3,540 projected units, and a conversion of 1,248 mobile homes to site-built units resulted in a evacuation clearance time of 24 hours and 30 minutes.

**Scenario 7:** The evacuation of the 28,053 occupied units (of the existing 44,630 site-built units), an additional 1,780 units), with a conversion of 1,248 mobile homes to site-built units had an evacuation clearance time of 24 hours.

**Scenario 8:** The evacuation of 28,053 occupied units (of the existing 44,630 site-built units) and an additional 2,660 units, a conversion of 1,248 mobile homes to site-built units had an evacuation clearance time of 24 hours.

**Scenarios 9-13 are on the next page**

**Scenario 14:** The evacuation of 28,053 occupied units (of the existing 44,630 site-built units) plus 1,780 units and the 4,576 occupied mobile home units (of the existing 8,134 mobile homes) had an evacuation clearance time of 26 hours and 30 minutes.

**Scenario 15:** The evacuation of the 28,053 units (of the 44,630 site-built units) plus 2,660 units, and the existing 4,576 occupied mobile homes (of the 8,134 mobile home units) had an evacuation clearance time of 26 hours and 30 minutes.

**Scenario 16:** The evacuation of the 28,053 occupied units (of the existing 44,630 site-built units) plus 11,287 occupied tourist units (of the existing 13,666 tourist units) plus 4,576 occupied mobile homes (of the existing 8,134 mobile home units), and 2,025 vehicles leaving from Naval Air Station Key West had an evacuation clearance time of 35 hours and 30 minutes.

**Scenario 17:** The evacuation of the 11,287 tourist units (of the existing 13,665 tourist units) and 2,025 vehicles from Naval Air Station Key West had an evacuation clearance time of 14 hours and 30 minutes. It was assumed that mobile home units did not participate in the evacuation.

**Scenario 18:** The evacuation of 28,053 occupied (of the 44,630 site-built) and 4,578 occupied mobile homes (of the 8,134 mobile home units) with an additional 500 units resulted in an evacuation time of 26 hours.

**Scenario 19:** The evacuation of 28,053 occupied units (of the 44,630 site-built) plus 4,578 occupied mobile homes (of the 8,134 mobile home units) with an additional 1,000 units resulted in an evacuation time of 26 hours.

**Scenario 20:** The evacuation of 28,053 occupied (of the 44,630 site-built) and 4,578 occupied mobile homes (of the 8,134 mobile home units) with an additional 1,500 units resulted in an evacuation time of 26 hours.

**Scenario 21:** The evacuation of 28,053 occupied (of the 44,630 site-built) and 4,578 occupied mobile homes (of the 8,134 mobile home units) with an additional 2,000 units resulted in an evacuation time of 26 hours.

**Scenario 22:** The evacuation of 28,053 occupied (of the 44,630 site-built) and 4,578 occupied mobile homes (of the 8,134 mobile home units) with an additional 2,500 units resulted in an evacuation time of 26 hours and 30 minutes.

**Scenario 23:** The evacuation of 28,053 occupied (of the 44,630 site-built) and 4,578 occupied mobile homes (of the 8,134 mobile home units) with an additional 3,000 units resulted in an evacuation time of 27 hours.

**Scenario 24:** The evacuation of 28,053 occupied units (of the 44,630 site-built units) 4,578 occupied mobile home units of the existing 8,134 mobile home units, and an additional 11,282 site-built units resulted in a clearance time of 30 hours and 30 minutes.

**Scenario 25:** The evacuation of 28,053 occupied units (of the existing 44,630 site-built units) and 4,578 occupied mobile homes (of the existing 8,134 mobile home units) had an evacuation clearance time of 25 hours and 30 minutes.

### **Phase 1 Evacuation Scenarios (Hotels, vacation rental, military, institutional, special needs)**

When additional units are projected, such as Scenario 9 where 100 additional hotel units are being added, that number (100) has not been reduced by the occupancy rate.

**Scenarios 9:** The evacuation of 11,287 occupied hotel units (of the 13,665 units), plus 100 additional hotel units, plus 4,576 occupied mobile homes (of the 8,134 mobile homes), plus military resulted in an evacuation time of 16 hours and 30 minutes. **July occupancy**

**Scenario 10:** The evacuation of 8,578 occupied hotel units of the 13,665 units), plus 100 additional hotel units, plus 4,576 occupied mobile homes (of the 8,134 mobile homes), plus military resulted in an evacuation time of 15 hours and 30 minutes. **October Occupancy**

**Scenario 11:** The evacuation of 10,034 occupied hotel units (of the 13,665 units), plus 100 additional hotel units, plus 4,576 occupied mobile homes (of the 8,134 mobile homes), plus military resulted in an evacuation time of 16 hours and 30 minutes. **November occupancy**

**Scenarios 12:** The evacuation of 9,540 occupied hotel units (of the 13,665 hotel units), plus 100 additional hotel units, plus 4,576 occupied mobile homes (of the 8,134 mobile homes), plus military resulted in an evacuation time of 15 hours and 30 minutes. **June –October average occupancy**

**Scenarios 13:** The evacuation of 11,287 occupied hotel units (of the 13,665 units, plus 100 additional hotel units, plus 4,576 occupied mobile homes (of the 8,134 mobile homes), plus military, with an additional 215 hotel units in Key West resulted in an evacuation time of 16 hours and 30 minutes. **July occupancy**

The highest occupancy rate for tourist units, based upon Smith Travel Research's Historic Trend Report, during the hurricane season is the month of July. Comments were received from the public expressing concern about the high occurrence of hurricanes in September and the occupancy of units during the Labor Day weekend. Staff pointed out that, based upon Smith Travel, using monthly averages; the occupancy rate for September is lower than the July monthly average.

### **Regional Evacuation Scenario**

**Scenario 26:** The concurrent evacuations of Miami-Dade, Broward Counties with Monroe with existing 28,063 occupied units (of the 44,630 site-built units), plus 1,780 site-built units (5 year allocation) and conversion of 622 mobile home units to site-built units, as well as the 2015 population for Miami-Dade and Broward Counties had a evacuation clearance time of 24 hours.

Ms. Jeannine Kelsick with the Department of Economic Opportunity presented information on the how the TIME Model uses the US Census and American Community Survey. She described the Florida Keys are broken up into 40 Traffic Evacuation Zones, or TEZs, of which each are comprised of block group data from the US Census and American Community Survey. Ms. Kelsick stressed the point that no one TEZ is the same and that they are different, reflecting the specific characteristics and unit totals inherent in their location.

In regards to the regional evacuation scenario results, Irene Toner, Monroe County's Emergency Management Director, stated that when the National Hurricane Center indicated that if there was a need for a simultaneous evacuation for all three counties that she would contact Miami-Dade and Broward Counties to identify the date and time that they would issue the order and would provide an earlier evacuation order for Monroe County.

There was also discussion regarding the different types of clearance times that can be produced: out-of-county, to-shelter, in-county and regional. Each evacuation scenario conducted provides results for each of these clearance time types. There was considerable debate regarding whether the Keys should use the out-of-county evacuation time or the regional time. Richard Ogburn, South Florida Regional Planning Council's Director of Research, gave the following definition:

**Regional Clearance Time:** The time necessary to safely evacuate vulnerable residents and visitors to a “point of safety “within the (RPC) region based on a specific hazard, behavioral assumptions and evacuation scenario. Calculated from the point in time when the evacuation order is given to the point in time when the last vehicle assigned an external destination exits the region. Using this definition, the scenarios would consider the evacuation time to include clearing the last evacuating car from Broward County for not just Monroe County but for all evacuating counties in an evacuation scenario.

There was discussion regarding the term “Regional Considerations” and how the term found in the Florida Administrative Code Rules and the Administration Commission’s 30-Day Report could be defined. Section 163.3178(9)(a)1., Florida Statutes, provides that a comprehensive plan amendment would be found in compliance with state laws regarding hurricane evacuation based upon the “adopted level of service for **out-of-county** hurricane evacuation”. Additionally, Section 163.3178(9)(b), Florida Statutes, provides that evacuation time, if not adopted by July 1, 2008, would be based on an “out-of-county hurricane evacuation”. Rebecca Jetton reminded the group that Monroe County has already adopted a 24 hour out of county hurricane evacuation time.

### **Sunshine Law**

Bob Shillinger, Monroe County’s Chief Assistant County Attorney, presented on the Sunshine Law and its applicability to the Work Group. He used an example of a recent email exchange amongst Group members. Though, nothing of significance was considered, Mr. Shillinger noted the Sunshine Law violation, Mr. Shillinger explained by revealing the action that occurred, providing all the members and the public (on the DEO web) with copies of the email, the violation has been cured.

Ron Miller presented hurricane information that he had prepared during the public comment period to the Work Group regarding the height of hurricane season for the Florida Keys.

### **MOU Review**

Rebecca Jetton with the Department of Economic Opportunity presented the draft Memorandum of Understanding (MOU) and took comments from the public regarding each point. Barbara Powell followed by questioning each member to see if they supported the components of the MOU in order to determine the number of points the group could agree upon.

### **Work Group discussion of concerns and how to proceed for MOU**

- **MOU Commencement and Completion**

Rebecca Jetton presented the draft MOU and recommended revisions Part One, Section A as follows:

“For the purposes of hurricane evacuation clearance time modeling purposes, clearance time shall begin when the Monroe County Emergency Manager, in concert with Monroe

County Board of County Commissioners, issues the evacuation order for the site built units for phase 2 of the evacuation for a hurricane that is classified as a Category 5 wind event or Category C or above surge event and pursuant to Rules 28-18, 28-19, and 28-20 Florida Administrative Code, the termination point for evacuation is US Highway One and the Florida Turnpike in Homestead/Florida City.”

Comments included suggestions for the following definitions to be included with the MOU for: phased evacuation, hurricane category, clearance time, and storm surge.

No Consensus

- **Tourist Units (Number)**

Comments included citing the source of data for the unit.

Consensus

- **Mobile Home Units (Number)**

Comments included citing the source of data for the units in the MOU and deleting the word “manufactured”.

Consensus

- **Site-built Units (Number)**

Comments included citing the source of data for the units in the MOU.

Consensus

- **12-hour Response Curve**

Consensus

- **Participation Rates for Category 3, 4, and 5 Hurricane Storm Event**

Consensus

- **Mobile Home Units (Occupancy Rates)**

The City of Key West and Village of Islamorada thought the occupancy rates for mobile homes were low as reported by the US Census and American Community Survey.

Consensus

- **Site-built Units (Occupancy Rates)**

### Consensus

- **Tourist Units (Occupancy Rates)**

Comments included citing the source of data in the MOU and include occupancy month from the Smith Travel Research date. Citizens urged use of the September occupancy and provided data on hurricane strikes. The work group agreed that July was the highest occupancy for the month for hotels based upon the Smith Travel research. Ron Miller presented data showing that around 46% of hurricanes had occurred in September and it is well understood that high numbers of tourists are in the keys in September. Rebecca Jetton explained that the data set provided by Smith Travel is averaged by the month and not by the week. She explained that staff utilized the highest occupancy rate reported by Smith Travel and that the assumptions and variables in the MOU must be based upon legally defensible data that is the most recent relevant professionally acceptable data available.

### **Consensus**

- **Vehicle Usage Rates and Vehicles per Unit (Mobile Home Units)**

Comments included discussion on the average vehicle length used for the vehicles evacuating in the TIME Model. Irene Toner indicated for emergency operations that high-profile vehicles are directed to evacuate during Phase 1 of a hurricane evacuation scenario. Jeff Alexander provided an explanation of how the high profile truck size was accommodated in the model. Christine Hurley wondered if some adjustment is needed to reduce the assumptions for phase 2.

### Consensus

- **Vehicle Usage Rates and Vehicles per Unit (Site-built Units)**

Comments included a need to review the TEZ 1220, which is for the Naval Air Station - Key West, to ensure that 870 military units have been removed from Phase 2 calculations because the military will evacuate in Phase 1.

### Consensus

- **Vehicle Usage Rates and Vehicles per Unit (Tourist Units)**

### Consensus

- **Highway capacity and lanes**

Comments include adding the number of lanes to exhibit regarding roadway configuration.

### Consensus

- **Evacuation stream to be considered**

During the comments, 9 of the 14 Work Group and Special Interest members wanted the regional stream of cars including Broward and Dade modeled. There was discussion regarding the consistency of this approach with the statutes that call for “out of county” evacuation. The group discussed the term “regional considerations” which is used in the Work Program within the adopted administrative codes for Monroe, Marathon, and Islamorada. Mayte Santamaria asked if the committee selected the regional evacuation scenario, if that would require a statutory change. The members requested more information and further explanation of what “regional considerations” means in the Florida Administrative Code.

Representatives from the Village of Islamorada, City of Marathon, Chambers of Commerce and FIRM Citizen Advocacy indicated they wanted only Monroe County’s population modeled. The Navy wanted more time to review before they commented. Consensus was not reached.

- **Phased Evacuation Procedure Policy**

There was discussion regarding “out-of-county clearance time” in the Florida Statutes as well as questions regarding the capacity of shelter space at FIU. FIU has a capacity for 600 individuals with an average use by 370 individuals. FIU has capacity for 90 special needs individuals with an average use by 70 special needs individuals.)

During group discussion, Rebecca Jetton proposed policy amendment as follows:

***Policy 216.1.8***

*In the event of a pending major hurricane (category 3-5) Monroe County shall implement the following staged/phased evacuation procedures to achieve and maintain an overall 24-hour hurricane evacuation clearance time for the resident population.*

- 1. Approximately 48 hours in advance of tropical storm winds, a mandatory evacuation of non-residents, visitors, mobile home residents, special needs residents, hospital and nursing home patients, recreational vehicles (RV’s), travel trailers, live-aboard (transient and non-transient), and military personnel from the Keys shall be initiated. State parks and campgrounds should be closed at this time or sooner and entry into the Florida Keys by non-residents should be strictly limited.*
- 2. ~~Approximately 36 hours in advance of tropical storm winds, a mandatory evacuation of mobile home residents, special needs residents, and hospital and nursing home patients from the Keys shall be initiated.~~*
- 3. Approximately 30 hours in advance of tropical storm winds, a mandatory phased evacuation of site built units permanent residents by evacuation zone (described below) shall be initiated.*

The Work Group could not reach consensus on when to model the evacuation of mobile home occupants. The adopted policy envisions the evacuation of mobile home occupants who live in the most vulnerable dwelling units evacuating 36 hours prior to landfall of hurricane force winds during Phase 1 of the 48-hour phased evacuation. Monroe County maintained that mobile home occupants should be modeled evacuating with the site-built units in the Phase 2 of the evacuation. The mobile home occupants were cited as the work force for the Florida Keys and least able to afford to evacuate.

The staff from the Department of Economic Opportunity encouraged the group to seek funding from the Division of Emergency Management to conduct workshops with the mobile home parks and to develop evacuation plans with each mobile home community; provide a better understanding of evacuation policies and shelter locations, the vulnerability of mobile homes to hurricane storm events, and to coordinate public transportation and assistance in handling pets. Some members questioned the occupancy rates reported by the Census that indicates that out of 8,134 mobile homes, there are 4,576 vacant. The Work Group requested a hurricane scenario where the mobile homes are modeled evacuating with the site-built units and at a different participation rate. The staff from the Department of Economic Opportunity had presented an evacuation scenario that indicated that if site-built units evacuate with mobile home units, the evacuation clearance time is more than 24 hours with no additional allocations for the future. The Work Group requested that scenario calculations runs be based on a regional evacuation stream and not just Monroe County traffic out-of-county. The Work Group could not reach consensus on the phased evacuation policy as currently written with mobile homes modeled leaving in phase one and they couldn't reach consensus on proposed revisions to the policy. Monroe BOCC has already adopted a resolution supporting modeling the mobile homes with site built homes.

No Consensus

Data that may need to be evaluated and changed in TIME Model includes:

1. Special needs permanent population moved to Phase 1;
2. High profile vehicles or vehicles with trailers are required to be evacuated in Phase 1; and
3. Navy vehicles may have been counted in Phases 1 and 2 (870 units and their associated vehicles).

Comments received from the public indicating there could be thousands of unlawful downstairs enclosures that are being reported by FEMA officials that may have not been counted by the US Census or included in the projected evacuation stream.

The Work Group requested that Naval Air Station - Key West provide a letter indicating that the military will evacuate during Phase 1 and provide the data sources for the number of vehicles and units they have identified in an earlier presentation.

The Work Group requested a scenario that models the ten foot shoulder enhancement along the entire length of US 1 with the exception of Key Largo.

There was insufficient time for Christine Hurley and John Hammerstrom to make presentations. The Work Group requested an additional meeting to conclude their recommendations. Any presentations or other issues from this workshop will go on the next meeting's agenda.



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## Scenario Results

Barbara Powell – Planning Analyst  
Area of Critical State Concern Program



## Data Update

- Model data updated with
  - 2010 Census Data
    - Dwelling Units
    - Vehicles per Unit
    - Occupancy Rate
    - Persons per Occupied Unit
  - Smith Travel Research (2011)
    - Hotel Occupancy



## Assumptions – Tourist Units

- Tourist Units - 13,665
- Average Auto Use – 1.1 cars per unit
- Occupancy ranges from 67-90%
- July represents the highest hotel occupancy rates

## Assumptions – Mobile Homes

- Mobile Home Units – 8,134
- Average Auto use – 1.1 – 1.5 cars per unit
- Average Occupancy – 42-80%

## Assumptions – Site-built

- Site-built Units – 44,630
- Average Auto use – 1.49 – 1.5 cars per unit
- Average Occupancy – 49-81%

## Assumptions – Special Populations

- NAS – Key West – 2,025 vehicles
- Florida Keys Community College – 100 vehicles

## Trends

- Conversion of 30.6% of mobile homes to site built homes in the past 20 years
- Occupancy rate has declined 9.2% since the 2000 Census

## Scenarios

		Category 3/ Level C	Category 4/ Level D	Category 5/ Level E
Participation		70%	80%	90%
1	2010 Census site-built units (44,630)	19 hours	21 hours	23 hours
2	2010 Census site-built units with full allocation for 10 years (44,630 + 3,540)	19 hours & 30 minutes	22 hours	24 hours
3	2010 Census site-built units with 50% decrease in current allocation for 10 years (44,630 + 1,780)	19 hours & 30 minutes	21 hours & 30 minutes	23 hours & 30 minutes
4	2010 Census site-built units with 25% decrease in current allocation for 10 years (44,630 + 2,660)	19 hours & 30 minutes	21 hours & 30 minutes	23 hours & 30 minutes

## Scenarios

		Category 3/ Level C	Category 4/ Level D	Category 5/ Level E
Participation		70%	80%	90%
6	2010 Census site-built units with full allocation for 10 years with 1,248 mobile homes (projected conversion to site-built) <i>(44,630 + 3,540 + 1,248)</i>	20 hours	22 hours & 30 minutes	24 hours & 30 minutes
7	2010 Census site-built units with 50% decrease in current allocation for 10 years with 1,248 mobile homes <i>(44,630 + 1,780 + 1,248)</i>	19 hours & 30 minutes	21 hours & 30 minutes	24 hours
8	2010 Census site-built units with 25% decrease in current allocation for 10 years with 1,248 mobile homes <i>(44,630 + 2,660 + 1,248)</i>	20 hours	22 hours	24 hours

## Scenarios

		Category 5/ Level E
Participation		100%
25	2010 Census site-built units and mobile homes <i>(44,630 + 8,134)</i>	25 hours & 30 minutes
14	2010 Census site-built units with 50% decrease in current allocation for 10 years and all mobile homes <i>(44,630 + 8,134 + 1,780)</i>	26 hours & 30 minutes
15	2010 Census site-built units with 25% decrease in current allocation for 10 years and all mobile homes <i>(44,630 + 8,134 + 2,660)</i>	26 hours & 30 minutes
5	2010 Census site-built units with full allocation for 10 years and all mobile homes <i>(44,630 + 8,134 + 3,540)</i>	27 hours

## Scenarios

9	Existing Hotel units, 100 hotel units in Marathon, Mobile homes, Military modeled using hotel occupancy rates for July <i>(13,665 units + 100 units + 8,134 units + 2,025 vehicles)</i>	16 hours & 30 minutes
10	Existing Hotel units, 100 hotel units in Marathon, Mobile homes, Military modeled using hotel occupancy rates for October <i>(13,665 units + 100 units + 8,134 units + 2,025 vehicles)</i>	15 hours & 30 minutes
11	Existing Hotel units, 100 hotel units in Marathon, Mobile homes, Military modeled using hotel occupancy rates for November <i>(13,665 units + 100 units + 8,134 units + 2,025 vehicles)</i>	16 hours
12	Existing Hotel units, 100 hotel units in Marathon, Mobile homes, Military modeled using hotel occupancy rates for the hurricane season average (June through November) <i>(13,665 units + 100 units + 8,134 units + 2,025 vehicles)</i>	15 hours & 30 minutes
13	Hotels, Mobile homes, Military modeled using hotel occupancy rates for July with an additional 215 units in Key West <i>(13,665 units + 100 units + 8,134 units + 2,025 vehicles + 215 units)</i>	16 hours & 30 minutes
17	Hotels, Military 100% participation, July occupancy (no mobiles) <i>(13,665 units + 2,025 vehicles)</i>	14 hours & 30 minutes

## Scenarios

		Category 5/ Level E
		90%
		Participation
18	2010 Census Site built units, mobile homes, 500 additional units <i>(44,630 + 8,134 + 500)</i>	26 hours
19	2010 Census Site built units, mobile homes, 1,000 additional units <i>(44,630 + 8,134 + 1,000)</i>	26 hours
20	2010 Census Site built units, mobile homes, 1,500 additional units <i>(44,630 + 8,134 + 1,500)</i>	26 hours
21	2010 Census Site built units, mobile homes, 2,000 additional units <i>(44,630 + 8,134 + 2,000)</i>	26 hours
22	2010 Census Site built units, mobile homes, 2,500 additional units <i>(44,630 + 8,134 + 2,500)</i>	26 hours & 30 minutes
23	2010 Census site-built units, mobile homes, 3,000 additional units <i>(44,630 + 8,134 + 3,000)</i>	27 hours
25	2010 Census site-built units and mobile homes <i>(44,630 + 8,134)</i>	25 hours & 30 minutes

## Scenarios

		Category 5/ Level E
Participation		90%
16	2010 Census Site built units, hotels, mobile homes, Military (44,630 + 13,665 units + 8,134 units + 2,025 vehicles)	35 hours & 30 minutes
24	2010 Census site-built units, mobile homes and vacant parcels (44,630 + 8,134 + 11,282)	30 hours & 30 minutes



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## Scenarios Regional Evacuation Run

		Category 5/ Level E
Participation		90%
26	2010 Census Units (Monroe 44,630) + 5 years full allocation (1,780) + 5 years of mobile homes converting to site-built (622), 2015 projections for Miami-Dade & Broward, 2015 Roadway Network	24 hours



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# FLORIDA KEYS ACSC

MOU Assumptions and variables



## Statutory Chapter 163.3178(9)(a)

The adopted level of service for out-of-county hurricane evacuation is maintained for a Category 5 storm event as measured on the Saffir-Simpson scale.

For those local governments that have not established a level of service for out-of-county hurricane evacuation by July 1, 2008, by following the process in paragraph (a), the level of service shall be no greater than 16 hours for a Category 5 storm event as measured on the Saffir-Simpson scale.

•F

This subsection shall become effective immediately and shall apply to all local governments.

The Keys local governments adopted their level of service standard for evacuation prior to July 1, 2008.

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**STATUTORY**

**Chapter 380.0552(9)(a)2., F.S.**

- Protect public safety and welfare in the event of a natural disaster by maintaining a hurricane evacuation clearance time for permanent residents of **no more than 24 hours**.
- **Principles for Guiding Development**
- Provide adequate alternatives for the protection of public safety in the event of a disaster
- Ensure population of keys can be evacuated

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## Assumptions/variables

- Modeling for worst case scenario  
Hurricane Category 5 Event
- Evacuation time cannot exceed 24  
hours



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## Commencement and Completion of Evacuation

- *For the purposes of hurricane evacuation clearance time modeling purposes, clearance time shall begin when ~~the~~ Monroe County ~~Emergency Management Coordinator~~ issues the evacuation order for Phase II of the evacuation for a hurricane that is classified as a Category 3, 4, or 5 wind event or Category C-E surge event...*



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## Transient Units modeled and data sources

Transient units:	13,665
Occupied:	9,540
Vacant:	4,125

The data source for the number and type of units and vehicular use is the Statewide Regional Evacuation Studies Program and the Department of Business and Professional Regulation. The data source for occupancy of transient units is the Smith Travel Research Data for 2011.



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## Mobile Units

- 8,134 mobile home units
- 4,576 occupied
- 3,558 vacant

The data source for the number and type of units, the vehicular use and occupancy of the units is the 2010 Census Survey supplemented by the American Communities Survey 2006-2010



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## Site built units

- 44,630 units
- 28,053 occupied
- 16,577 vacant units.

The data source for the number, type, occupancy, and vehicular use is the 2010 Census supplemented by the American Communities Survey 2006-2010 and the Statewide Regional Evacuation Studies Program

## Response Curve

12 hours for all unit types  
as utilized in the Statewide  
Regional Evacuation  
Studies Program.



## Participation

- Tourist units: 100%
- Mobile homes: 100%
- Site-built homes:
  - 70% for a Category 3 event
  - 80% for a Category 4 event
  - 90% for a Category 5 event



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## Occupancy Rate Mobiles

### Average Occupancy Rate

- Key West 80.4%
- Lower Keys 68.0%
- Middle Keys 52.2%
- Upper Keys 42.0%

Based on 2010 Census/American Communities Survey



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## Occupancy Rate site-built

### Average Occupancy Rate

- Key West 81.2%
- Lower Keys 67.1%
- Middle Keys 49.7%
- Upper Keys 54.9%

Based on 2010 Census/American Communities Survey

## Hotel Occupancy

Months	Location				
	Key West	Monroe County w/o Key West	Key Largo	Marathon	Islamorada
June	85.1%	71.7%	73.8%	74.8%	63.3%
July	90.5%	75.9%	77.8%	79.0%	67.5%
August	77.7%	61.3%	62.2%	64.8%	53.1%
September	63.2%	45.3%	47.9%	44.9%	40.3%
October	74.7%	52.8%	55.9%	52.9%	46.1%
November	85.2%	63.5%	67.3%	62.3%	58.5%
Hurricane Season (Average)	79.4%	61.8%	64.2%	63.1%	54.8%

## Vehicle Usage Rates Mobile Home

	Usage Rates	Cars per household
Key West	90%	1.10
Lower Keys	75%	1.55
Middle Keys	80%	1.52
Upper Keys	85%	1.56

## Vehicle Usage Rates Site-built

	Usage Rates	Cars per household
Key West	90%	1.21
Lower Keys	75%	1.43
Middle Keys	80%	1.51
Upper Keys	85%	1.49

## Vehicle Usage Special Population

Florida Keys Community College	100 vehicles
N.A.S. Key West	2,025 vehicles

## Vehicle Usage Hotels

**1.1 cars per unit**

## Highway Capacity

- Maximum Sustainable Traffic Flow Rates per Functional Evacuation Lane for Hurricane Evacuation Purposes



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## Evacuation Stream

- Monroe County only



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## Evacuation Procedure

- Approximately 48 hours in advance of tropical storm winds, a mandatory evacuation of non-residents, visitors, recreational vehicles (RV's), travel trailers, live-aboard boats, state parks and camp grounds (transient and non-transient), and military personnel
- Approximately 36 hours in advance of tropical storm winds, a mandatory evacuation of mobile home residents, special needs residents, and hospital and nursing home patients
- Approximately 30 hours in advance of tropical storm winds, a mandatory phased evacuation of permanent residents :

## Phased Evacuation

