

2012 Hurricane Evacuation Work Group Report

The Working Group made the following recommendations regarding the hurricane modeling assumptions and variables of the MOU:

1. **Tourist Units:** There are 13,665 tourist units with 11,287 units occupied (during July) with 100 percent participation for a Category 5 hurricane event. July is the highest month of hotel occupancy. The average car usage is 1.1 cars per unit.
2. **Mobile Home Units:** There are 8,134 mobile home units with 4,576 occupied units with 100 percent participation for a Category 5 hurricane event.
3. **Site-Built Units:** There are 43,718 site-built units with 27,320 occupied, with 90 percent participation for a Category 5 hurricane event.
4. **Response Curve:** 12 hours.
5. **Vehicle Usage by type of Unit:** The number of vehicles owned was taken from 2006-2010 American Communities Survey data
6. **The percent of vehicles** owned that will be evacuated is based upon the 2010 Statewide Monroe County Planning Assumptions, Volume 1-11, Appendix IIIC.
7. **Vehicle Usage by the Special Population:** 2,338 vehicles will be evacuated during Phase 1 by the Naval Air Station-Key West (electronic message to DEO from NAS Key West on July 7, 2012). The number of vehicles from the Florida Keys Community College is based upon the assumption that each of the 100 dorm beds will contribute one evacuating vehicle per bed.
8. **Evacuation Stream.** The evacuating traffic from Monroe County is the only traffic demand modeled (Section 163.3178(9), F.S.)
9. **The Roadway Capacity,** dated June 18, 2010, established by the Florida Department of Transportation.

Monroe County made the following recommendations regarding future allocations and mitigation options:

1. Local governments could consider Statutory, Rule and Comprehensive Plan revisions to amend the clearance time thresholds to reflect any improvements in forecasting.
2. Local governments could consider changing the rates and/or distribution of allocations to allow additional time to address vacant parcels as well as redistribute the potential, new vehicles participating in future evacuation events (reduce evacuating traffic).
3. Local governments could consider road improvements to address roadway capacity. It was noted that these projects are long term, costly, controversial and may conflict with community character.
4. Local governments should consider adopting policies to create and allow alternative uses of vacant properties, particularly along US1. Local governments can consider re-designating parcels to provide alternatives to residential development.

5. Local governments should adopt new funding mechanisms for land acquisition and management to accelerate the extinguishment of development rights and reduce evacuating traffic.
6. Local governments should adopt new incentives to facilitate development that donates land in order to extinguish development rights and reduce evacuating traffic.
7. Local governments should consider adopting policies to allow the transfer of development rights across jurisdictional boundary lines to redistribute existing density and reduce exposure to property rights takings cases.
8. Local governments could consider the construction of shelters outside of coastal high hazard areas in Monroe County funded by impact fees to improve public safety and reduce the number of evacuating vehicles. Note, this concept is not supported by the Florida Division of Emergency Management and only 3% of the population uses shelters.
9. Local governments could consider petitioning the federal government to designate all eligible vacant lots within the Keys as Coastal Barrier Resource Units (CBRS) to limit the developable areas that can receive federal funds or subsidies, such as flood insurance.

The Work Group made the following recommendations regarding future allocations:

The Work Group recommended scenario M5, from the scenarios presented on June 8, 2012, which includes the continuation of full allocations for each local government, with a provision that the City of Key West would transfer annually (by July 15th), any remaining allocations for the year to the other local governments. The unused allocations would be distributed to the other local governments based upon the local governments' ratio of vacant platted land. The vacant land analysis is the comparison of each local government's vacant land percentage to the whole of all the vacant lands in the Florida Keys.

The following table illustrates how the redistribution of the surplus allocations would be made based on the vacant land analysis. Key Colony Beach and Layton have less than 1 percent of the vacant land and would receive fractional allocations. Fractional units (to two decimal places) can be accumulated. However, only whole allocations can be awarded for the purposes of permit issuance.

Vacant Land Analysis Table	Vacant Parcels	% of Total Vacant Parcels	% of Surplus Key West Allocations
Islamorada	1,109	9.86%	5.03
Key Colony Beach	92	0.82%	0.42
Layton	13	0.12%	0.06
Marathon	1,281	11.38%	5.81
Unincorporated Monroe County	8758	77.83%	39.69
Total	11,253	100.00%	51.00

Concerns expressed by the Majority of the Work Group

1. **Timing of mobile home evacuation:** There is little information available regarding the precise time when a mobile home occupant will evacuate. Some members believe that mobile home occupants will not evacuate during Phase 1 and should be modeled as Phase 2. No evidence exists to indicate that mobile home occupants do or do not leave during Phase 1 of the phased evacuation.

Note: DEO recommended that educational workshops be conducted with the mobile home parks to provide education and to improve evacuation support services for individuals with pets and those lacking transportation to facilitate evacuation from mobile homes that are vulnerable to flooding, high winds and do not meet the current wind load standards under the Florida Building Code. The County Emergency Operations Director orders residents in vulnerable dwelling units to evacuate prior to the mandatory order for site built units.

2. **Human Behavioral Surveys** conducted by Dr. Baker for the DEM Statewide Regional Hurricane Evacuation Study indicates that 88 percent of mobile home occupants would evacuate for a Category 5 evacuation. The surveys included 400 telephone surveys conducted in Monroe County with 44 responses from mobile home occupants. These numbers were aggregated with Miami-Dade and Broward mobile home surveys for a total of 1600 surveys. While statistically sound, the small response from mobile home occupants in the Florida Keys was a concern to the Work Group since the adopted comprehensive plan policies and the Hurricane Evacuation model assume that the mobile home occupants evacuate on Phase 1 of the evacuation. Monroe County recommended that additional surveys of mobile home occupants be conducted.

Note: Several evacuation scenarios include 15% or 1,248 mobile home units modeled as evacuating with the site built units during Phase 2 and produced a 24 hour evacuation clearance time.

3. **Mobile home occupancy rate:** Some members questioned the validity of the occupancy rates reported by the U.S. Census and American Community Survey which indicates that out of 8,134 mobile homes, there are only 4,576 occupied units.

Note: This is the most recent, best available and relevant data.

Public Comments and responses

- Some citizens took the position that because the phased evacuation covers 48 hours, there is a clearance time of 48 hours, not 24 hours.

Note: The early evacuation of tourists and mobile home occupants is mitigation to maintain the 24 hour evacuation clearance time. The policy has been adopted for more than five years and the hurricane evacuation modeling software was developed in response to the adopted policy. To modify the policy requires a comprehensive plan amendment for five of the six local governments. Key West adopted the phased

evacuation policy by City Resolution. The adopted policies must be consistent with each other since the evacuation of the Florida Keys involves all of the local governments.

- Reduce units to the extent possible using vacant land analysis, until road improvements are made or develop additional means for evacuation.
- Petition for a toll on US1 and use funds for land acquisition to extinguish development rights.
- If future studies are proposed, the studies should first be submitted to Florida Division of Emergency Management for methodology approval.
- Tourist occupancy: Citizens recommended using the occupancy rate for the month of September and provided data showing that around 46% of hurricanes had occurred in September. The highest average hotel occupancy rate for the year occurs during July (Key West 90.5%, Lower Keys-75.9%, Marathon and Key Colony Beach 79%, Islamorada/Layton 67.5%, Key Largo 77.8%). The September average occupancy rate is lower than July's average occupancy rate. The citizens recommended using the Labor Day week-end occupancy rate which is 97% for Key West and 93% for the balance of the Keys for the Saturday during Labor Day weekend.

Note: DEO staff conducted a scenario using the highest occupied week end of the year which is Labor Day week end (97% and 93%) and the resulting evacuating time for Phase 1 was 17.5 hours.

- Some members expressed concern that mobile home occupants are permanent residents and should be counted evacuating with the Phase 2 site-built units.

Note: The adopted policies notify mobile home occupants to evacuate at 36 hours. The balance of the permanent residents live in permanent site built structures. Mobile homes are more vulnerable and mobile home occupants are asked to leave earlier as a safety precaution. Several evacuation scenarios include 15% or 1,248 mobile home units modeled as evacuating with the site built units during Phase 2 and produced a 24 hour evacuation clearance time.

- The currently adopted 48-hour phased evacuation policy is not reasonable due to the nature of hurricane storm events and tourists may not be able to evacuate before mobile and site-built units evacuate.

Note: The application of the worst case scenario would result in a building moratorium. Current hurricane forecasting and the media provide significant advance notice of approaching weather conditions.

- The Hurricane Evacuation Model accounts for 38% of the existing site built units because the Census data reports the balance of the site built units as vacant, therefore, providing evacuation clearance time results that are lower because of the applied occupancy and participation rates. The model should assume that some percentage of the vacant homes reported by the census and American Communities Surveys are being occupied by seasonal occupants.

Note: Insufficient data exists to provide an accounting for how many seasonal units may be rented without authorization or registration with the Department of Business and Professional Regulation and/or the local governments that issue vacation rental licenses.

Insufficient data exists to determine the number of units that may be occupied by a friend or relative, but have been classified as “vacant” in the hurricane evacuation model.

- Comments received from the public indicated there could be unlawful downstairs enclosures that are being reported by FEMA officials that may not have been counted by the US Census or included in the hurricane evacuation model’s evacuation stream.

Note: FEMA and the County are compiling the number. The County has implemented a program for home inspection when flood insurance policies must be renewed and when property sales occur and is taking enforcement action as needed.

- Comments received from the public recommended that the model use assumptions that account for a fast intensification of a hurricane where a phased evacuation is not possible and tourists and permanent residents evacuate simultaneously. Under this scenario, no additional new development could occur.

Note: With current technology, citizens are aware of potential storm threats several days in advance. Weather forecasting to predict where a hurricane will strike has improved and forecasters are able to predict as far out as 36 hours. The ability to project the precise intensity of the hurricane strike continues to be a challenge.

- Mr. James Franklin, with the National Hurricane Center, reported that the National Hurricane Center has improved in its ability to project where a hurricane will make landfall from 24 hours to 36 hours; however, rapid intensification of a hurricane system is still a major issue with forecasting. He indicated that the Weather Forecasting Services routinely misses intensity by 1 category and the hurricane track error increases by 45 miles/day. Track errors include: speed (timing) and location. He gave the following example: 48 hours in advance of storm (center of storm): Intensity is off by 15 knots and the track is off by 90 miles. 24 hours in advance of storm (center of storm): Intensity off by 11 knots and track is off by 51 miles.
- The occupancy rate for the existing site-built units could increase resulting in a longer evacuation time.

Note: Occupancy has declined over a 20 year period.

- Change rate and distribution of allocations based on vacant land analysis Keys wide.
- Decrease annual allocation rate to provide more time for acquisition of land and reduce evacuation stream
- Increase road capacity to facilitate evacuation.
- Re-designate vacant platted lots close to US1 for commercial/office uses to reduce residential evacuation.
- Revise evacuation clearance time in status and plans based on improved capacity.
- Consider referendum to create dependent taxing authority for land acquisition to reduce future evacuation stream.

Attachments

Excerpt of Rule 28-20.140, F.A.C.

11. By July 1, 2012, Monroe County shall enter into a memorandum of understanding with the Department of Community Affairs, Division of Emergency Management, Marathon, Islamorada, Key West, Key Colony Beach, and Layton after a notice and comment period of at least 30 days for interested parties. The memorandum of understanding shall stipulate, based on professionally acceptable data and analysis, the input variables and assumptions, including regional considerations, for utilizing the Florida Keys Hurricane Evacuation Model or other models acceptable to the Department to accurately depict evacuation clearance times for the population of the Florida Keys.
12. By July 1, 2012, the Florida Keys Hurricane Evacuation Model shall be run with the agreed upon variables from the memorandum of understanding to complete an analysis of maximum build-out capacity for the Florida Keys Area of Critical State Concern, consistent with the requirement to maintain a 24-hour evacuation clearance time and the Florida Keys Carrying Capacity Study constraints. This analysis shall be prepared in coordination with the Department of Community Affairs and each municipality in the Keys.
13. By July 1, 2012, the County and the Department of Community Affairs shall update the data for the Florida Keys Hurricane Evacuation Model as professionally acceptable sources of information are released (such as the Census, American Communities Survey, Bureau of Economic and Business Research, and other studies). The County shall also evaluate and address appropriate adjustments to the hurricane evacuation model within each Evaluation and Appraisal Report.
14. By July 1, 2012, the Department of Community Affairs shall apply the derived clearance time to assess and determine the remaining allocations for the Florida Keys Areas of Critical State Concern. The Department will recommend appropriate revisions to the Administration Commission regarding the allocation rates and distribution of allocations to Monroe County, Marathon, Islamorada, Key West, Layton and Key Colony Beach or identify alternative evacuation strategies that support the 24 hour evacuation clearance time. If necessary, the Department of Community Affairs shall work with each local government to amend the Comprehensive Plans to reflect revised allocation rates and distributions or propose rule making to the Administration Commission.
15. By July 1, 2013, if necessary, the Department of Community Affairs shall work with each local government to amend the Comprehensive Plan to reflect revised allocation rates and distribution or propose rule making to the Administration Commission.

Section 163.3178 (9), Florida Statutes

- i. A proposed comprehensive plan amendment shall be found in compliance with state coastal high-hazard provisions if:
 1. 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; or
 2. A 12-hour evacuation time to shelter is maintained for a Category 5 storm event as measured on the Saffir-Simpson scale and shelter space reasonably expected to accommodate the residents of the development contemplated by a proposed comprehensive plan amendment is available; or
 3. Appropriate mitigation is provided that will satisfy subparagraph 1. or subparagraph 2. Appropriate mitigation shall include, without limitation, payment of money, contribution of land, and construction of hurricane shelters and transportation facilities. Required mitigation may not exceed the amount required for a developer to accommodate impacts reasonably attributable to development. A local government and a developer shall enter into a binding agreement to memorialize the mitigation plan.
- (b) 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.
- (c) This subsection shall become effective immediately and shall apply to all local governments. No later than July 1, 2008, local governments shall amend their future land use map and coastal management element to include the new definition of coastal high-hazard area and to depict the coastal high-hazard area on the future land use map.

Note: This statute provides the basis for utilizing the category 5 storm event. All local governments in the Florida Keys had already adopted a 24 hour evacuation time prior to the enactment of this legislation.

Hurricane Evacuation Procedure for all Florida Keys Local governments

*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, recreational vehicles (RV's), travel trailers, live-aboards (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 permanent residents by evacuation zone (described below) shall be initiated. Existing evacuation zones are as follows...

Work Group Participant List

- I. Hurricane Evacuation Clearance Time Work Group**
 - a. Commissioner Sylvia Murphy (Monroe County)
 - b. Mayor Pete Worthington (City of Marathon)
 - c. Mayor Ron Sutton (City of Key Colony Beach)
 - d. Councilman Don Achenberg (Islamorada, Village of Islands)
 - e. Councilman Clark Snow (City of Layton)
 - f. Commissioner Teri Johnston (City of Key West)
 - g. Rebecca Jetton (Department of Economic Opportunity)
 - h. David Halstead (Florida Division of Emergency Management)
- II. Special Interest Group Representatives**
 - a. William Knetge (NAS Key West)
 - b. Daniel Samess (Florida Keys Federation of Chambers of Commerce)
 - c. Sheldon Suga (Florida Restaurant and Lodging Association)
 - d. Jodi Weinhofer (Lodging Association of the Florida Keys and Key West)
 - e. John Hammerstrom (Environmental Group Representative)
 - f. Annalise Mannix (Citizen Advocacy)
- III. Technical Advisory Contributors**
 - a. Jeff Alexander (Northeast Florida Regional Planning Council)
 - b. Richard Ogburn (South Florida Regional Planning Council)
 - c. Irene Toner (Monroe County Emergency Management)
 - d. Lou Caputo (Monroe County Sheriff's Office)
 - e. John Rizzo and Andrew Devanas (alternate) (National Weather Service)
 - f. Aileen Boucle (Florida Department of Transportation)
 - g. Jeannine Kelsick (Areas of Critical State Concern Program)
 - h. Barbara Powell (Areas of Critical State Concern Program)
 - i. Christine Hurley (Monroe County)
 - j. Mayte Santamaria (Monroe County)
 - k. George Garrett (City of Marathon)
 - l. Don Craig (City of Key West)
 - m. Edward Koconis (Village of Islamorada)
 - n. Vickie Bollinger (City of Key Colony Beach)
 - o. Philip "Skip" Haring (City of Layton)
 - p. James Franklin (National Hurricane Center)
 - q. Bryan Davisson (Monroe County)
 - r. Bob Shillinger (Monroe County)
 - s. Richard Shine (Department of Economic Opportunity)
 - t. Andrew Sussman (Florida Division of Emergency Management)
 - u. Jim Callahan (Monroe County)
 - v. Gary Boswell (Monroe County)