

Hurricane Evacuation Workshop Minutes

Jan 30, 2012

Mayor Pete Worthington, City of Marathon, welcomed the group and introduced the participants. He announced that all the presentations could be viewed on the Department of Economic Opportunity's web site at the following link:

<http://www.floridajobs.org/community-planning-and-development/programs/areas-of-critical-state-concern/florida-keys-hurricane-evacuation>

Jeff Alexander, with the Northeast Florida Regional Planning Council, provided a report on the Division of Emergency Management's development of the regional emergency evacuation model's capability (*Statewide Regional Evacuation Study Program Model* on DEO website link). He provided information regarding the technology used to develop the software and the origin of the data. Mr. Alexander indicated that the evacuation modeling used a uniform statewide approach for each county in the state and has received several awards. Additionally, he presented new storm surge data and how hurricane storm events are being separated (wind from storm surge) since there is no direct correlation between the height of the storm surge and the wind intensity. The scenarios produced by DEM utilize 100% participation whereas in the past, the Miller model used a lower participation rate.

Christine Hurley, with Monroe County Growth Management, reviewed the Administration Commission's (Governor and Cabinet) adopted rules for the Florida Keys (e.g. Rule 28-20.140, F.A.C.). She presented the 5 Work Program tasks related to hurricane evacuation modeling and completing an analysis of maximum build-out capacity for the Florida Keys. The rules include tasks to update the census data and to develop build out scenarios and reach consensus on a Memorandum of Understanding regarding the Hurricane Evacuation Model's assumptions and variables (*Administration commission Directive and Progress* on DEO website link). She pointed out that the Administration Commission task will result in the need to amend each local government's comprehensive plan to reflect ten years growth. The Department of Economic Opportunity will report back to the Governor and Cabinet regarding the various hurricane scenarios runs with a recommendation for the new allocation and distribution of growth between the local governments.

Rebecca Jetton, with the Department of Economic Opportunity, provided the history of how the 24-hour hurricane evacuation clearance time standard evolved and the linkage to hurricane forecasting capability (*Myths and Facts* on DEO website link). She discussed the potential outcomes of the meetings and how the rate of growth will likely need to be amended to revise the amount and distribution of new development in order to develop a ten year planning horizon and maintain the 24-hour standard. She stated that the workshop could result in a reduction of units per year for each local government or a new distribution of units to each local government based

upon the variables that are selected and after the group reviews the placement of development to see how that affects the 24 hour evacuation time. She indicated that each local government should carefully review the number of vacant buildable lots within their jurisdiction. She stressed the need to reduce the liability of each local government to potential “takings” cases. If the evacuation time is exceeded and privately owned vacant buildable lots continue to be available, this could increase the potential liability for takings. She explained that each local government must balance private property rights while ensuring public safety. Based upon preliminary data, the following vacant lots exist within each local government.

Monroe	8758	Key West	84
Marathon	1281	Key Colony	92
Islamorada	1109	Layton	13

The Work Group indicated that there must have been an improvement in evacuation clearance time based upon the loss of population and the improvements that have been made to US Highway One. Ms. Jetton clarified that the improvements made to US 1 have not resulted in additional capacity for hurricane evacuation. She stated that the Florida Department of Transportation (FDOT) will provide a presentation regarding the sustainable capacity of US Highway One at the next meeting. Ms. Jetton provided an overview of previous recommendations made by several Work Groups in the past to improve hurricane evacuation clearance time. She stated that attempts to widen the 18-mile stretch had resulted in a law suit. Recommendations for creating an additional lane with the use of coning had been dismissed because of the time required to set up the cones, the time lost when cars queue up to cross over multiple bridges, and that certain employees would have to be designated and remain behind to handle the cones while their families evacuated. This led to a discussion about the construction of shoulder enhancements to create an additional lane for evacuation purposes only and that the Florida Department of Transportation has provided funding for the enhancements within the FDOT 5-Year Work Plan. The group also discussed the Division of Emergency Management’s preference that the shoulder enhancement lane be used for emergency or disabled vehicles and that in areas that were already 4 lanes, the Monroe County plan contains a policy that additional lanes beyond four lanes cannot be counted toward capacity for hurricane evacuation. The issue regarding the shoulder enhancements will be included in the Memorandum of Understanding between all the local governments.

Mr. James Franklin, with the National Hurricane Center, reported on the current capability of forecasting at the National Hurricane Center. He indicated that the Center has improved in its ability to project where a hurricane will make landfall. The ability to predict intensity beyond 48 hours continues to be limited. Projection of landfall has improved from 24 hours to 36 hours; however, Mr. Franklin cautioned the Work Group stating that rapid intensification of a hurricane system is still a major issue with forecasting. He indicated that the Weather Forecasting Services

routinely misses intensity (off by 1 category). He said that 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.

Richard Ogburn, with the South Florida Regional Planning Council, provided a review of how the census data is obtained and the intervals for receiving the American Communities Surveys (*Census Data in the Statewide Regional Evacuation Study Program* on DEO website link). He described how the data contains three sets of cumulative sampling estimates: 1-year, 3-year and 5-year. The 5-year is considered the best since it has a larger sampling base than the 1-year and 3-year. He explained that data is collected from the US Census block group level which is the smallest geographical unit utilized by the US Census which contains housing characteristics. There are approximately 76 census block groups in Monroe County. These census block groups are then aggregated into 40 Traffic Evacuation Zones. Mr. Ogburn also indicated there are approximately 20,000 dwelling units that are classified as vacant that are considered vacant and are not counted in the evacuation stream. Afterwards, the group discussed mechanisms that might assist in determining if some of these units are actually occupied as vacation rentals/second homes.

Barbara Powell, with the Department of Economic Opportunity, provided data regarding human behavior including percentages of how and when people will evacuate (*Behavioral Surveys* on DEO website link). She summarized human behavioral surveys taken by Dr. Earl Baker for the Regional Evacuation including surveys of hotels and mobile homes. She stressed that more people will participate in an evacuation based upon the perceived severity of the hurricane event and the urgency and clarity of the evacuation notice. With regard to a hotel survey that was taken by Dr. Baker, those results indicate that 93% of the tourists in hotels in the keys would evacuate the first day. Approximately 30% of the hotels would close within 12 hours of the evacuation order; 66% of the hotels would close within 24 hours of the evacuation order; 18% of the hotels would not close until landfall; and 3% of the hotels would not close. Ms. Powell indicated that the surveys show that 15-20% of any type of housing leave before the mandatory evacuation order is given. She stated that individuals are reluctant to leave after 8 pm. After Ms. Powell's presentation, the group discussed adopted comprehensive plan policies that direct mobile home owners to evacuate 36 hours prior to anticipated landfall of hurricane force winds and how the notice for mobile home occupants would occur at 7 pm at night if the tourists were notified to leave at 7:00 AM. The behavioral studies also indicate that mobile home occupants' behavior is much like the behavior of individuals residing in a site built home and that it would take longer for a mobile home occupant to respond than it would for a tourist to respond and evacuate. The group discussed running scenarios with some portion of the mobile home units added in to the site built evacuation. The group discussed the need to educate the public so that

mobile home occupants will evacuate with the tourists because mobile homes are considered more vulnerable to damage. Mayor Worthington requested that staff compare the evacuating cars counted by FDOT for the links and compare that number to the sustained capacity report developed by FDOT.

Mayté Santamaria, with Monroe County Planning & Environmental Resources, gave an overview of the various models that have been utilized and the variables of each model (*History of Modeling in Keys and Parameters* utilized on DEO website link). She stated that the original Rate of Growth Ordinance (ROGO) allocation was based on the ability to achieve a 30-hour evacuation with the long term goal of achieving a 24 hour evacuation. At the time of adoption of the Monroe County Comprehensive Plan, 35 hours was adopted as the existing clearance time. When the Monroe County Comprehensive plan was challenged and finally resolved, the Final Order found that the maximum acceptable clearance time should be 24 hours because of the National Weather Service's ability to forecast storms, forecast errors, and a lack of shelters. Mayté provided a brief summary of the models utilized in the Keys, including the PBS&J model, Miller model, SFRPC model, and the new Division of Emergency Management TIME model). She discussed the Miller Model, explaining the model is a spreadsheet-based program executed in Microsoft Excel. The model is comprised of 39 Excel spreadsheets, 31 of which relate to individual roadway segments. The 31 roadway segments are defined by roadway cross-section, capacity, and mile markers. She stated the Division of Emergency Management has developed a program called TIME/CUBE which has dynamic traffic assignment capabilities. This model is developed in Cube with a custom built GIS based graphic user interface. The Florida Keys Area of Critical State Concern Program now utilizes the model prepared by the Division of Emergency Management. Ms. Santamaria explained that the PBS&J model and the Miller model used a 45% occupancy rate for hotel occupancy. The TIME model currently utilizes an 85% occupancy rate for hotel units for the Phase 1-Day 1 evacuation. Dick Ogburn stated the 85% occupancy rate for hotels represents a worst case scenario for tourist units. The group discussed completing some model runs using the Smith Travel data that contains current hotel occupancy for the upper, lower, middle keys and Key West. Mayté Santamaria gave an overview of the other variables that have been used in previous evacuation models including the PBS&J and Miller models. (The TIME model scenarios published by the Division of Emergency Management assume that all tourists and mobile homes have evacuated before the permanent evacuation is initiated. It has been reported by DEO staff that Phase 1-Day 1 evacuation of mobile home and tourist units can be accomplished in 17 hours).

There was discussion regarding the fact that it takes special needs individuals up to 30 hours to evacuate for a hurricane storm event. The Special Needs population is notified to leave 48 hours prior to landfall of hurricane force winds. John Hammerstrom expressed concerns regarding safety and stated that with the current configuration of the model (Day 1 and Day 2) that it gives the impression that additional tourist units can be added because they do not affect the Day 2 Phase (site-built units). Rebecca Jetton pointed out that while it appears that there is a buffer

between Day 1 and Day 2, the model processes cars until midnight and this is inconsistent with the behavioral surveys that show that people do not like to evacuate after 8 PM. There was group discussion regarding the number of vehicles per unit data; the tourist occupancy rate; the tourist population calculated in the model; storm surge and storm wind categories; and various scenarios.

Don Craig questioned how the Naval Air Station-Key West orders military personnel to evacuate and when the families of military personnel leave in reference to the TIME model and indicated that additional information is needed. The following information is found in the Human Behavior Studies completed by Dr. Baker for the Department of Community Affairs.

Evacuation of Military Installations

At the suggestion of Monroe County Emergency Management, a representative of Key West Naval Air Station was interviewed with respect to the installation's evacuation procedures. Although there are other military installations in the Keys, the Naval Air Station is the largest, and procedures followed by others were thought to be similar. Jim Brooks, the Public Information Officer, was interviewed.

There are 1,676 uniformed military personnel in the Keys, including all installations, with 1,015 family members. There is up to 459 military training personnel in addition who would be flown out in an evacuation. Other personnel and their families would drive their own vehicles in and evacuation. Up to 100 would remain on base. Civilians assigned to the base number 848. No one would evacuate prior to an evacuation order being issued by the County. (The exception presumably would be personnel removing equipment.) Salary and expenses would be paid during a mandatory evacuation and NAS reserves hotel rooms in Orlando for personnel and dependents. Mr. Brooks estimated that 90% of personnel and families would leave within 6 hours of the evacuation order and 98% would be gone within 12 hours. His general impression was that vehicle ownership would be comparable to the general population. It is possible that a larger percentage of available vehicles would be taken in an evacuation because certain personnel would be required to return to the base within 24 hours of passage of a hurricane.

The following is a list of actions that the group requested.

Action Items:

Contact Florida Keys Electric Cooperative to request any studies that would indicate the number of vacant units through reduced electric consumption.

Contact Florida Keys Aqueduct Authority to request any studies that would indicate the number of vacant units through reduced water consumption.

Contact Division of Motor Vehicles to establish the number of licensed vehicles in Monroe County. Compare to number of cars that are being counted in model to validate the number.

Contact Naval Air Station-Key West to ascertain what type of evacuation policies are being utilized for military personnel and for military dependants.

Post presentations and other pertinent documents from the first workshop to website.

Determine if any schools meet hurricane shelter requirements (this is being done by the County, coordinating with DEM)

Mail out draft Memorandum of Understanding.

Report on the percent (and/or number) of units that are second homes. Determine the number of rented occupied homes from US Census. Reduce the number of non-homesteaded units by this number to find a rough estimate.

The Working Group discussed problems with citizens gaining entry after a storm event and that an effort be made to shorten the time involved in re-entering the county. Some members thought that the delays encountered in re-entry resulted in a decrease in the participation level. The group discussed the low percentage of citizens who go to a hurricane shelter during an evacuation. The Emergency Management Director was requested to contact Dave Halstead at Division of Emergency Management (DEM) to discuss the potential for funding or retro-fitting a building as an evacuation shelter in Key Largo or in Dade County. The DEM has available 3 million per year for this purpose

Evacuation Scenario Requests:

Commissioner Murphy & John Hammerstrom requested a worst case scenario model run. Day 1- including tourist, mobile and site-built units.

Christine Hurley requested a model run including vacant, private, non-habitat lots for all jurisdictions within the site-built (Day 2) run

The group discussed completing a model run with 10 years of growth at the current allocation.

Rebecca Jetton and George Garret made a request for a model run with mobile units added to site-built units.

Participation rates: Add the vacant dwelling units from Phase 2-Day 2 to the Phase 1-Day 1 mobile home and hotel evacuation stream. The hotels participate at 85% occupancy. The dwelling units would be considered 100% occupied and another run with 70% occupied.

Occupancy rates for hotels: Use the Smith Travel results which break out the occupancy into different percentages for upper, lower, middle keys and Key West.

Dwelling units: Revise the number of dwelling units to reflect the 2010 census numbers.

Road map Segment: Eliminate segments of North Roosevelt in Key West for two years that will be closed.