- Responsible for assessment of current storm intensity, movement, and structure.
- Responsible for prediction of storm track and intensity through 120 hours.
Role of the Local NWS Office

Provides information relative to specific impacts for the area of responsibility:

- Time of arrival for wind velocity thresholds for various locations
- Timing and magnitudes of storm surge and resulting inundation
- Flooding rainfall and tornado/waterspout threat assessments
Flow of Local Impact Information

National Hurricane Center → General Public

General Public → Key West

Key West → EMERGENCY MANAGEMENT
84 hr - C130 to evacuate non ambulatory; Marinas begin making preparations
72 hr – Tourist evacuation (parks)
54 hr - Deploy National Guard assets
48 hr – Hurricane Watch
48 hr - Mobile home residents
36 hr – Hurricane Warning
24 hr – Evacuation of all residents
00 hr - Arrival of TS winds - Evacuation Ends
00 hr – Opening of Last Resort Refuges

EXAMPLE:
HURRICANE IKE Expected To Impact Florida Keys as Major Hurricane
*Tropical Storm Force in 84hrs*
SLOSH Basins (as of June 1, 2014)
• One storm forecast (generated by NHC) is followed by local NWS forecast offices. The role of the local office is to *predict and communicate impacts* to the local area.

• Storm surge guidance used in NWS forecasts comes from one model: *Sea, Lake and Overland Surges from Hurricanes (SLOSH)*
• Different approaches/guidance are used based on your location in the decision-making time frame:
  48-120 hours: composite approach (SLOSH MEOWs/MOMs)
  12-48 hours: probabilistic approach (pSurge/inundation graphic) statistically evaluating a large set of SLOSH model runs based on official NHC forecast
  0-12 hours: deterministic approach (only in certain cases)

• Forecasts are strongly coordinated among local offices and the National Hurricane Center
  - Forecast storm surge levels
  - Which MEOWs to use in briefings
  - What exceedance level to use in pSurge
  - Storm Surge Warnings
Example:

Storm Surge Impact Messaging during Hurricane Isaac
Hurricane Isaac Coastal Flooding: Southeast Louisiana (Aug/Sep 2012)

LaPlace (west of New Orleans): 12,000 homes flooded

LaPlace: major freeway under water

Braithwaite: locally built levee overtopped

North Shore of Lake Pontchartrain: Major flooding
Hurricane Isaac Forecast:
Pre-Watch/Warning Phase
Forecast Challenges

Saturday, August 25, 4PM
~84 hours before actual 2nd landfall

Sunday, August 26, 4AM
~72 hours before actual 2nd landfall
Two SLOSH MEOWs Used in Briefings

“Lower End” (Cat 1) Hurricane moving NNW 10 MPH
Two SLOSH MEOWs Used in Briefings

“Higher End” (Cat 2) Hurricane moving NNW 10 MPH
Hurricane Isaac Forecast: Watch/Warning Phase
Forecast Challenges

Sunday, August 26, 5PM EDT
~60 hours before actual 2nd landfall

Monday, August 27, 10AM CDT
~42 hours before actual 2nd landfall
pSurge 10% Exceedance Heights

~42 hours before landfall

This example: above datum

“Plausible worst case scenario”
For a specific customer,
At a specific location,
With a specific critical threshold,
Having a specific measure of tolerance.

“Choosing threshold level” in pSurge → not as good for general briefing package.

Best for those providing embedded support for specific customers.

pSurge Storm Surge Probability (this example: \( \geq 4 \) feet above datum)

\(~42\) hours before landfall
Close to landfall:

As impact period draws near, use the very high probability areas to help specific partners figure out where to focus resources for upcoming response and recovery.

~12 hours before second landfall

For response & recovery strategies.
Experimental Storm Surge Watch/Warning

*This graphic displays areas that would qualify for inclusion in a storm surge watch or warning system being developed by the National Weather Service. A storm surge warning would mean that there is a danger of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within 36 hours. A storm surge watch would mean that life-threatening inundation is possible somewhere within the specified area, generally within 48 hours. Persons located within the warning areas should take all necessary actions to protect life and property from rising water and the potential for other dangerous conditions. Promptly follow evacuation and other instructions from local officials.*
Hurricane Wilma (October 2005)
Hurricane Wilma: Monroe County Actions

**Wed 19 October**

0800 – Local state of emergency declared
1200 – Mandatory evacuation of non-residents ordered

**Thu 20 October**

0800 – Voluntary evacuation of residents encouraged

**Sat 22 October**

1200 – Mandatory evacuation of residents
Key West Inundation Estimate
7:00 to 9:00 AM EDT
Florida Keys NWS Office

22,752 square miles of water
163 square miles of islands
Facts About the Florida Keys

**FACT:** Population ~ 80,000 (swells to ~ 150,000 in season) 
~ 4,000,000 tourists annually

**FACT:** 40% of world maritime commerce passes through Straits of Florida shipping lanes (WFO Key West marine service area)

**FACT:** Florida Keys commercial fishing industry #2 nationwide (value)

**FACT:** Only barrier reef in continental U.S. (third largest in world)

**FACT:** NOAA/Florida Keys National Marine Sanctuary protects ~2,900 square nautical miles of marine habitat (estimated 6,000 species of marine life + numerous cultural resources (shipwrecks))

**FACT:** > 100 marinas; scores of charter fishing and diving operations

**FACT:** One of the largest “live-aboard” communities in the U.S. (Boot Key Harbor near Marathon)
We Need A Buoy!

Total number of moored buoys, WFO Key West + WFO Miami marine service areas = 0
Weather-Sensitive Operations

- Search and Rescue
- Vessel Groundings
- Hazardous Materials Spills
- Migrant Interdiction
- Law Enforcement
- Munitions/Explosives Unloading
- Dive Operations
- Exercises
FORECASTING CHALLENGES

CHANNEL BETWEEN KEYS & REEF (shallow water waves)

LONG-FETCH SWELL

SHOALING TIDAL CURRENTS

GULF STREAM

REEF

REFRACTION
Example of Marine Decision Support

**Forecast Discussion**

The weather over the extreme southeastern Gulf of Mexico on Wednesday will feature rather typical mid-June conditions, with light breezes outside of scattered showers and isolated thunderstorms. A weak pressure pattern will be in place, meaning that a light northeast breeze will prevail, averaging 5-10 knots or less. Seas will average around 1 foot. However, the coverage of showers and thunderstorms will be slightly above normal, with a chance of rain around 40-50% between 0600 and 1800 EDT. The chance for lightning strikes within 25 nautical miles of the wreck will be about 30% (0600-1800 EDT). Both wind direction and wind speed may vary depending on your location with respect to showers, thunderstorms, and the gust fronts they generate (cool air brought down by rain spreads out in all directions at the surface, and can result in locally gusty and shifting winds). Also, seas could be locally higher and confused in the vicinity of showers and storms. However, wave heights generally will range between flat calm and 2 feet. During the return trip to Key West (1500-1800 EDT), showers and storms may be somewhat more concentrated adjacent to the heated islands of the lower Keys.

**Experimental Current Velocity Predictions**

Sea Surface Temperature (Satellite-derived on 10 June 2013)
Florida Keys Marina Sign Project

WEATHER INFO

Call (305) 295-1316

CH: 2 or CH: 5
162.400 MHz
162.450 MHz

Scan here to visit our website, weather.gov/key

@NWSKeyWest
Any Questions????

Andrew Devanas (Science Operations Officer):
andrew.devanas@noaa.gov

Chip Kasper (Marine Focal Point):
kennard.kasper@noaa.gov

Matt Moreland (Meteorologist-In-Charge):
matthew.moreland@noaa.gov