

How do people use hurricane forecasts and warnings?

Rebecca E. Morss

National Center for Atmospheric Research

Mesoscale and Microscale Meteorology Division

Overview

- Focus on how members of the at-risk public use hurricane forecasts for protective (e.g., evacuation) decision making
- Results from:
 - Case studies of hurricane decision making
 - Studies of hypothetical / general hurricane decision making
 - Studies of hurricane risk perception and communication

(Usually reported in non-meteorological literature, e.g., review papers in *Natural Hazards Review*, Aug 2007)

Myth: There is a “correct” decision as a hurricane approaches (i.e., evacuate)

Hurricane Katrina

August 27, 2005

10 AM CDT Saturday

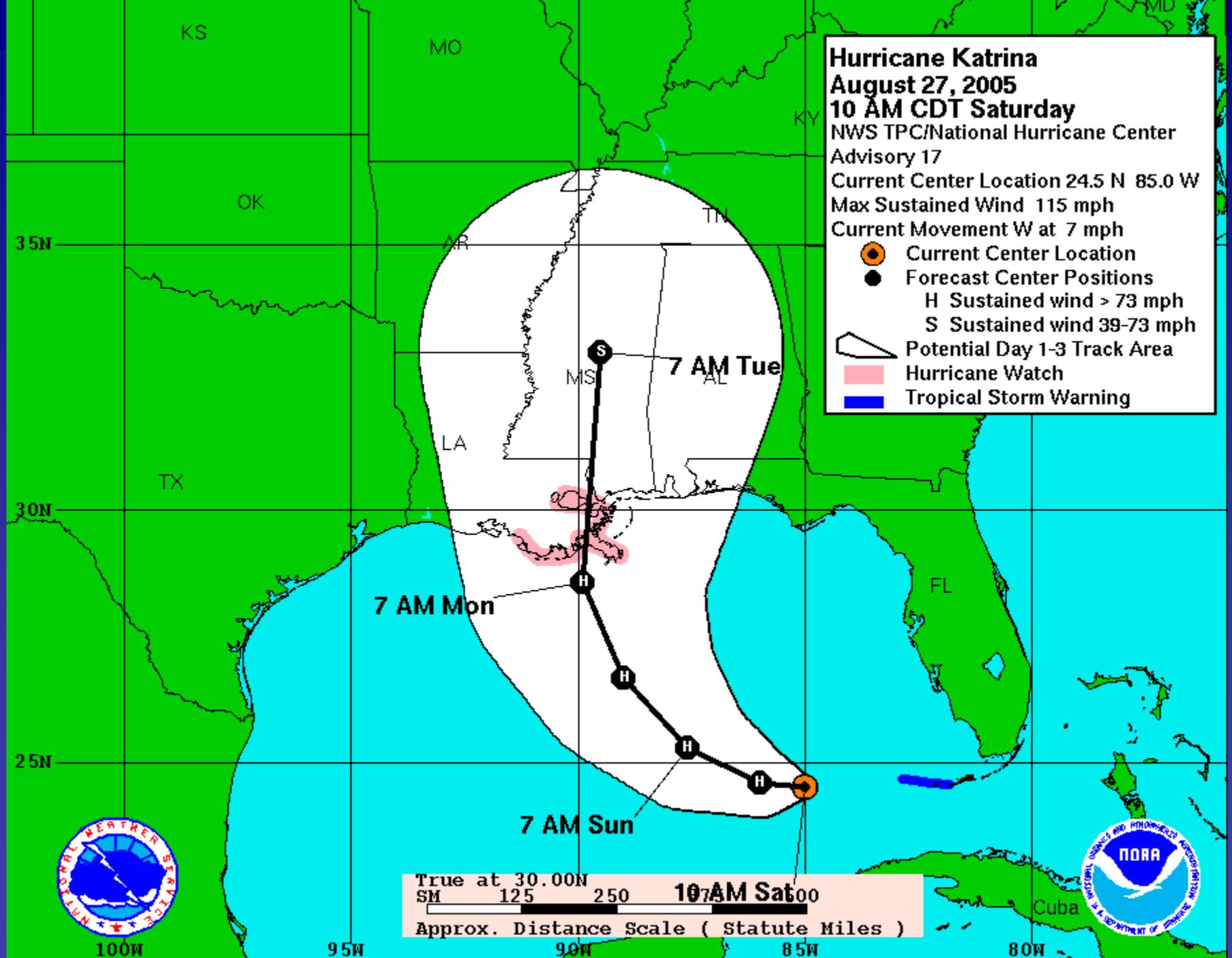
NWS TPC/National Hurricane Center
Advisory 17

Current Center Location 24.5 N 85.0 W

Max Sustained Wind 115 mph

Current Movement W at 7 mph

-  Current Center Location
-  Forecast Center Positions
 - H Sustained wind > 73 mph
 - S Sustained wind 39-73 mph
-  Potential Day 1-3 Track Area
-  Hurricane Watch
-  Tropical Storm Warning



True at 30.00N
SM 125 250 10 AM Sat 00
Approx. Distance Scale (Statute Miles)





People make decisions using the best information they have, based on their situation and perception of hurricane risk

- Hindsight is 20-20
- Some people should shelter in place
- Some people will stay no matter what
- Most people occasionally make decisions that experts would consider “unwise”
- Every decision situation is unique



(Ray Asgar)

Myth: Evacuation decisions are individual, one-time, yes-no decisions

Evacuation decisions are complex, multi-dimensional, interactive, and evolving

- Most decisions are household/family-based
- Most decisions unfold as a hurricane approaches and information evolves
- Decisions involve trade-offs (e.g., between time for preparation and evacuation)
- People have a variety of constraints (e.g., money, work, transportation, household members, pets)

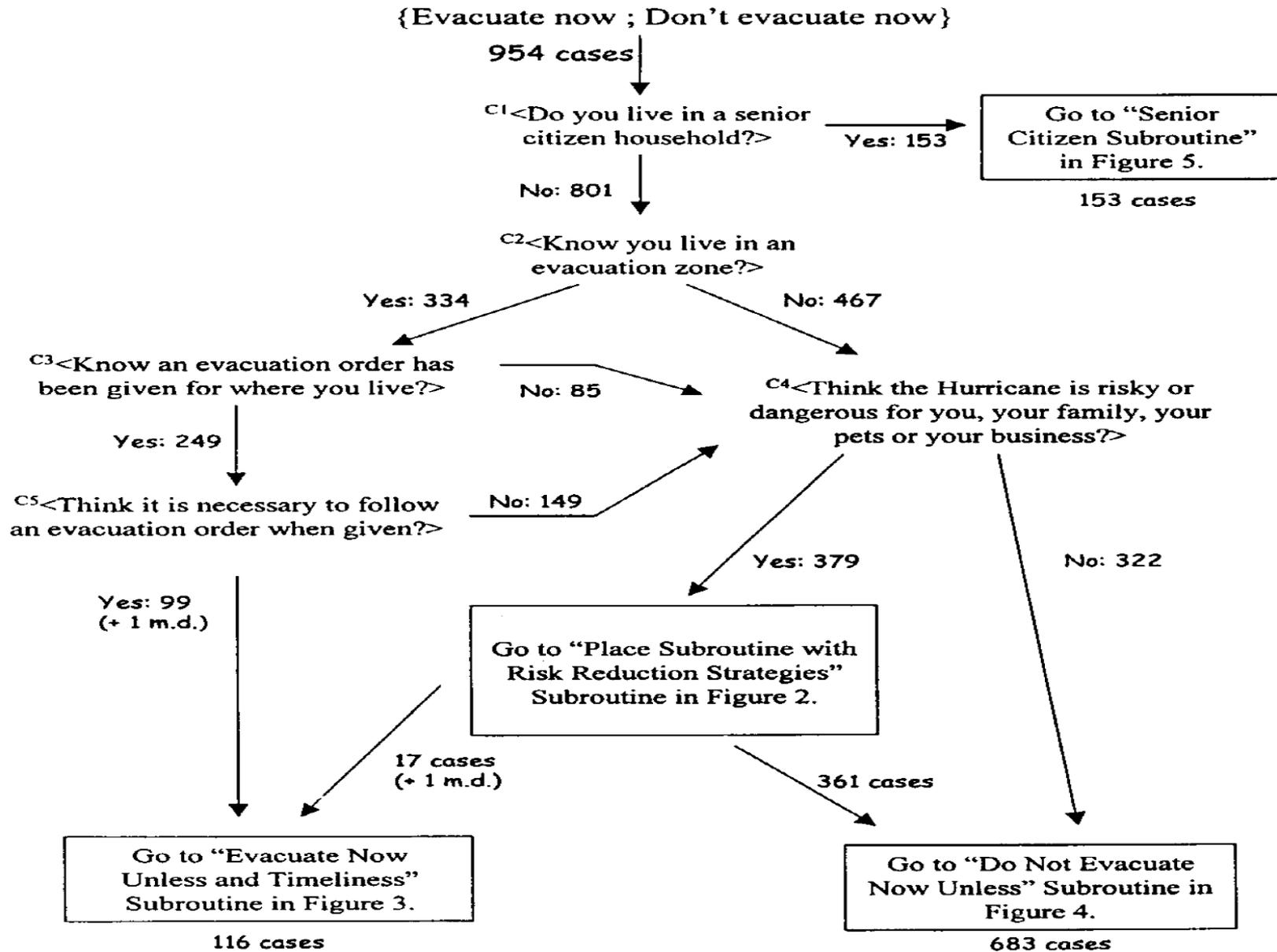
Myth: Most people evacuate in response to public officials' recommendations

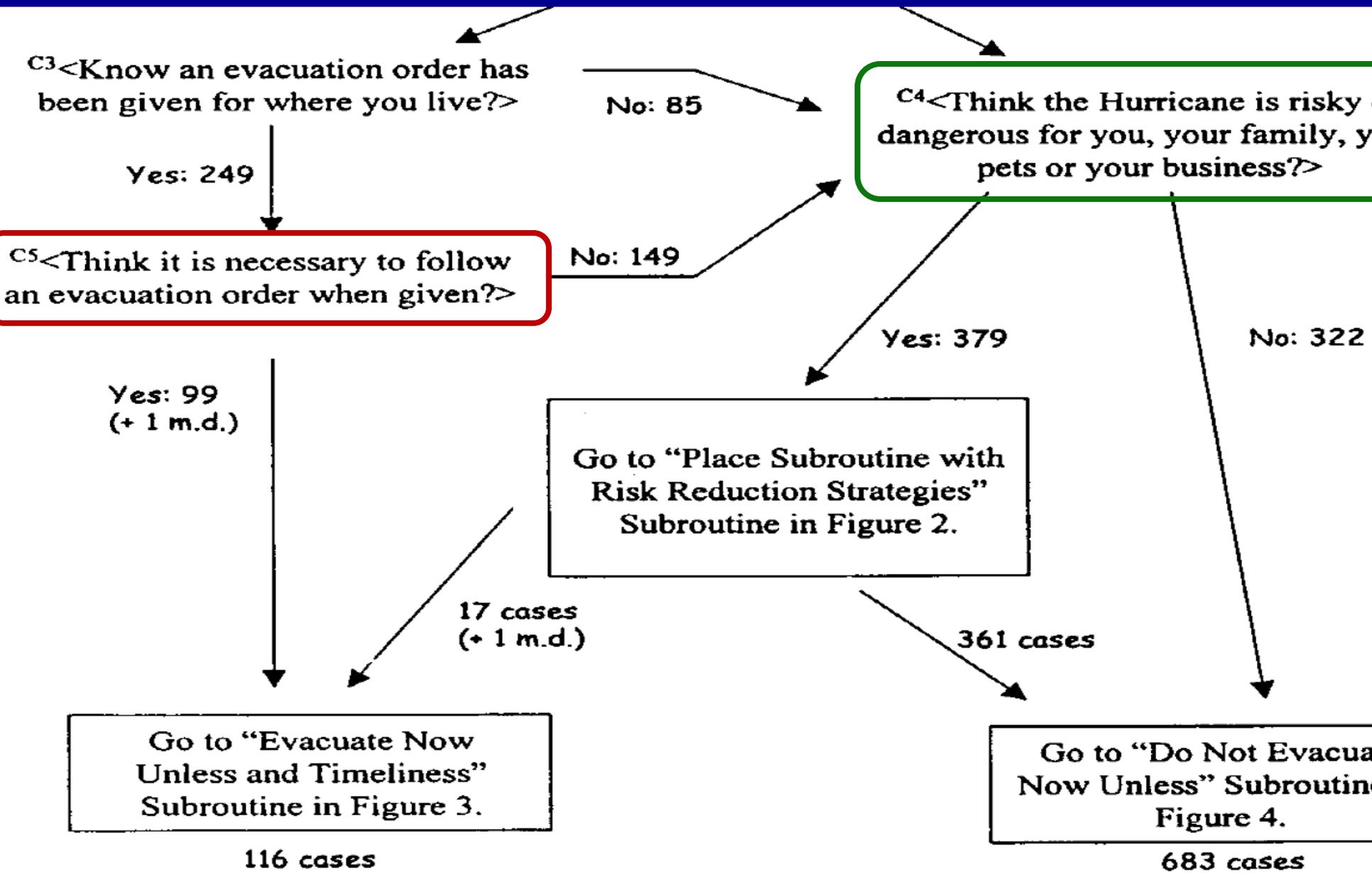
- Corollary: The primary role of public sector hurricane forecasts is to convey risk to public officials, so they can convey appropriate protective actions to the public

Public officials' recommendations are important, but many people evaluate their own risk as a hurricane approaches

- Different people weigh factors differently in their decisions

Figure 1. Hurricane Evacuation Decision Model





Public officials' recommendations are important, but many people evaluate their own risk as a hurricane approaches

- Different people weigh factors differently in their decisions
 - Most people obtain forecasts from multiple sources, frequently, as a hurricane approaches
- ➡ It is important to effectively communicate hurricane risk to the public

Myth: People want to know where the hurricane will go and how strong it will be

Hurricane SUITER

Friday May 29, 2009

11 AM EDT Advisory 22

NWS TPC/National Hurricane Center

● Current Center Location 22.1 N 71.9 W

Max Sustained Wind 150 mph

Current Movement WNW at 16 mph

Forecast Center Positions:

● Tropical cyclone

M Sustained wind > 110 mph

H Sustained wind > 73 mph

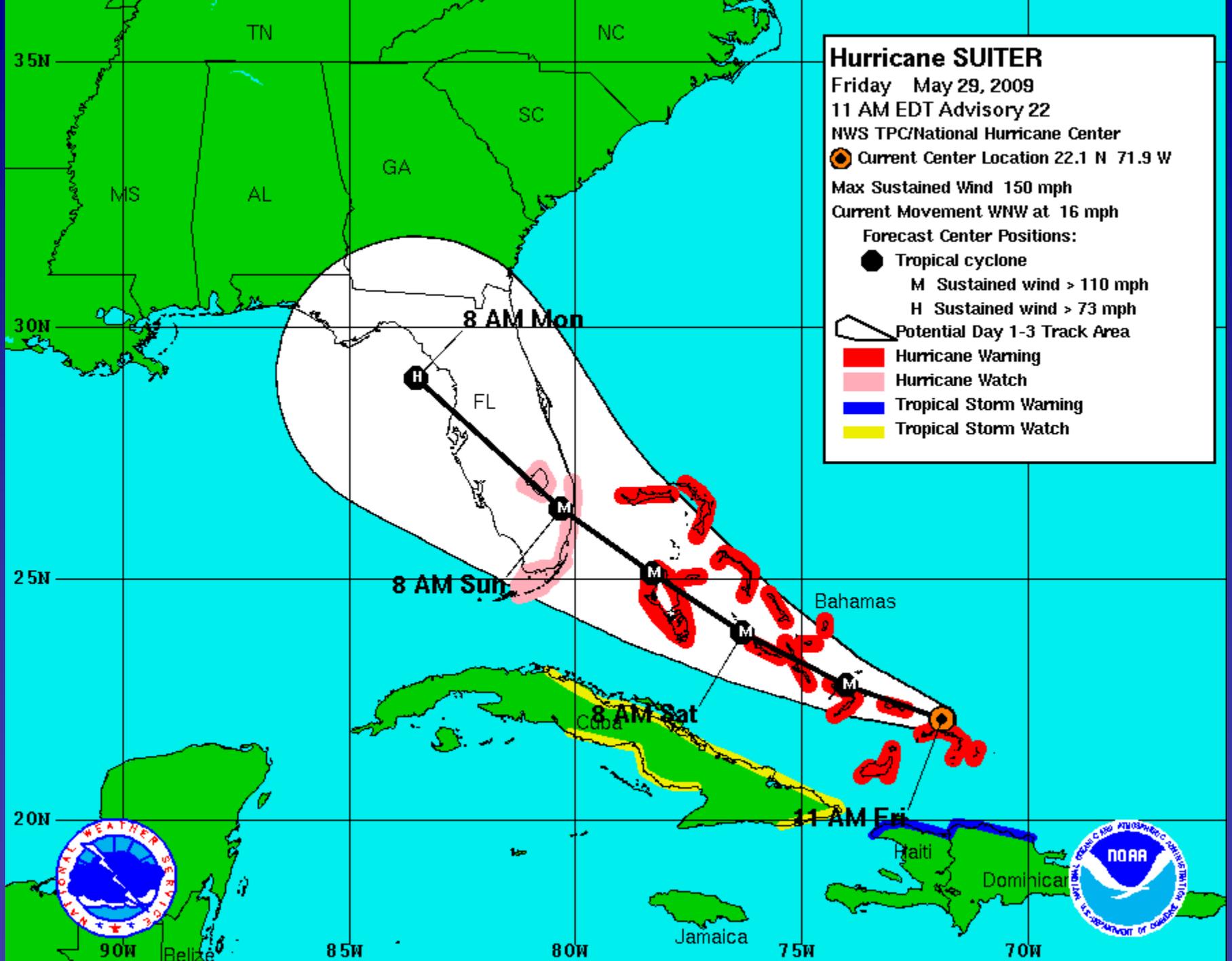
▭ Potential Day 1-3 Track Area

■ Hurricane Warning

■ Hurricane Watch

■ Tropical Storm Warning

■ Tropical Storm Watch

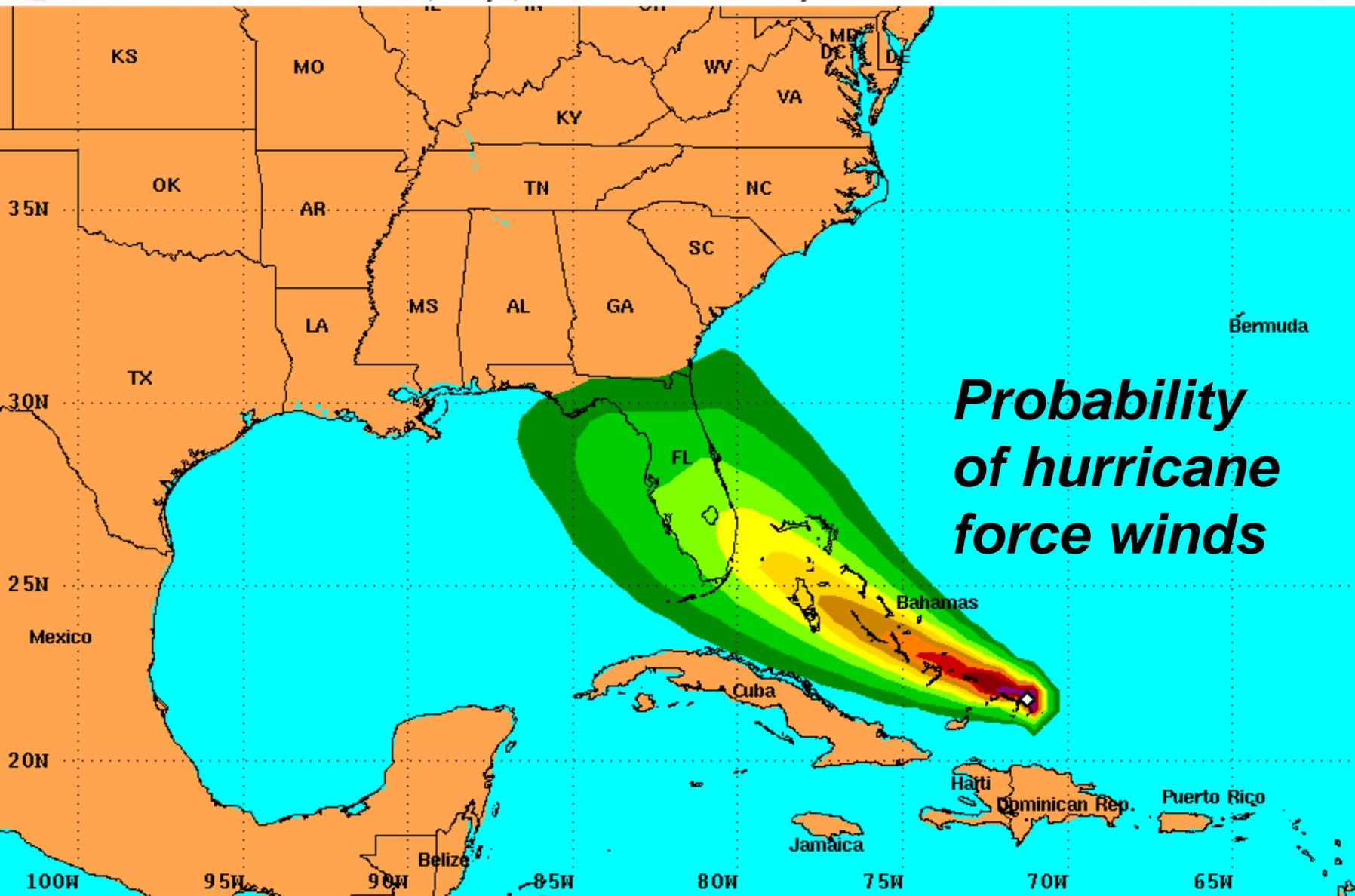


People want to know what conditions their residence will experience and what the hurricane's impacts will be

- This information helps them evaluate their risk, given their situation



PRELIMINARY (SINGLE STORM) Hurricane Force Wind Speed Probabilities
 For the 120 hours (5 days) from 8 AM EDT Fri May 29 to 8 AM EDT Wed Jun 3



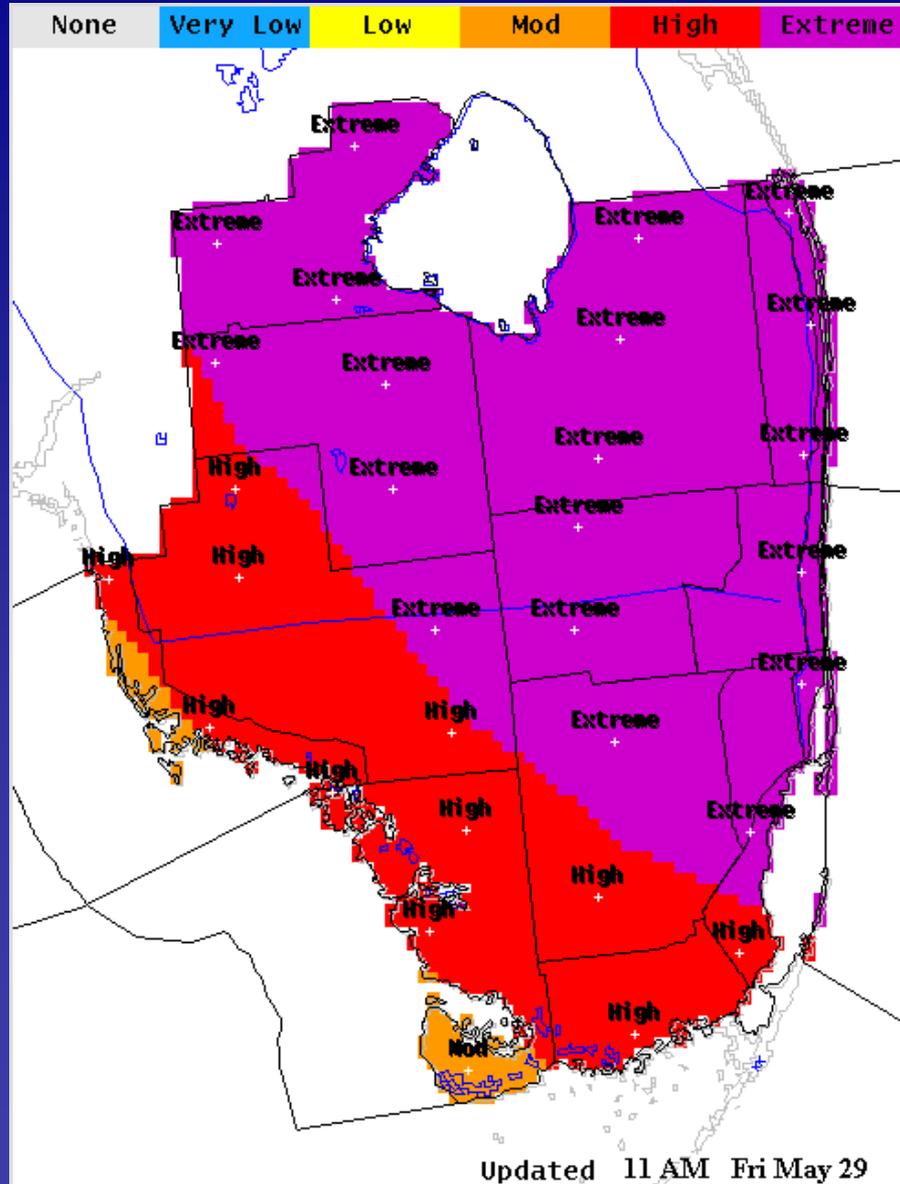
*Probability
of hurricane
force winds*

Probability of sustained hurricane force surface winds (1-minute average of 74 mph or greater)

◇ indicates HURRICANE SUITER center location at 8 AM EDT Fri May 29 2009 (Forecast/Advisory #22)



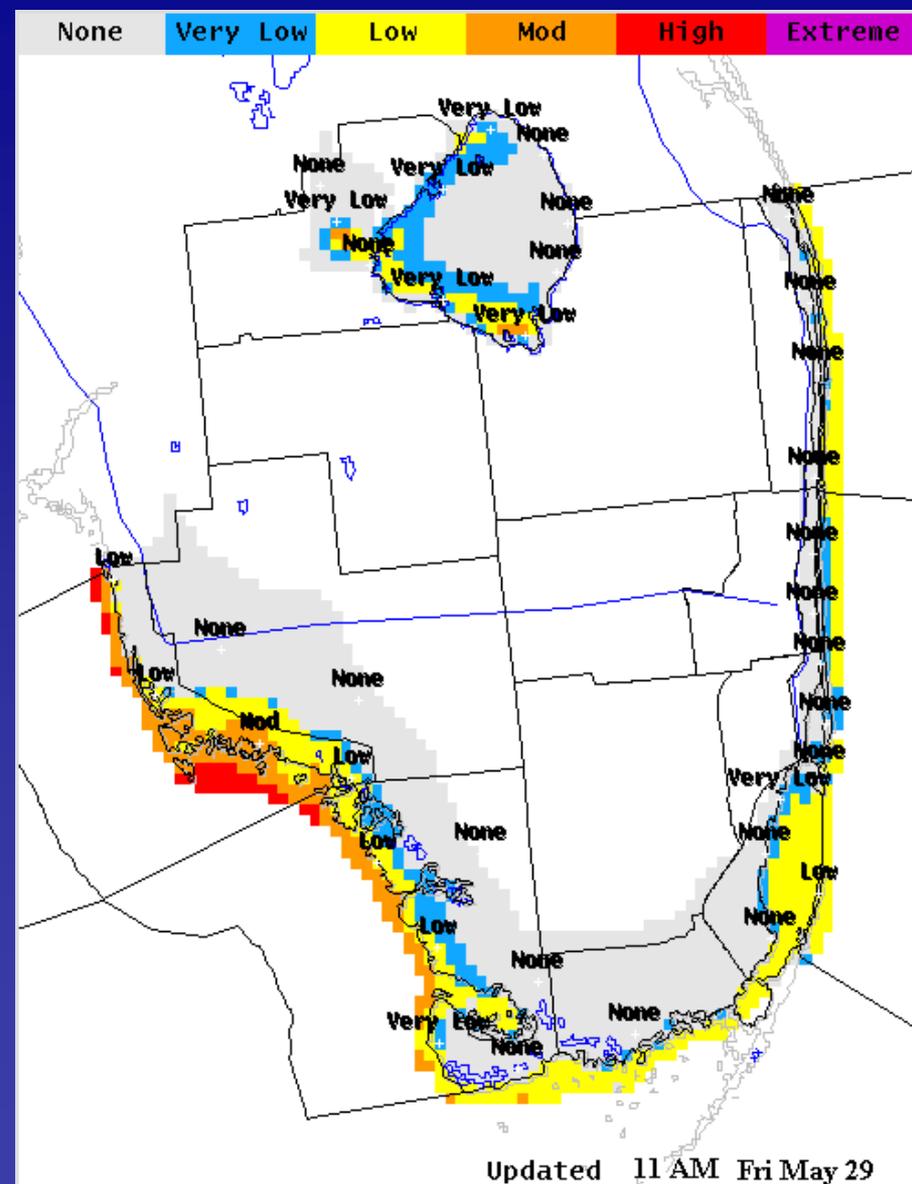
Wind impact



Wind Impact - NWS Miami FL



Coastal flooding impact



Coastal Flooding Impact - NWS Miami FL

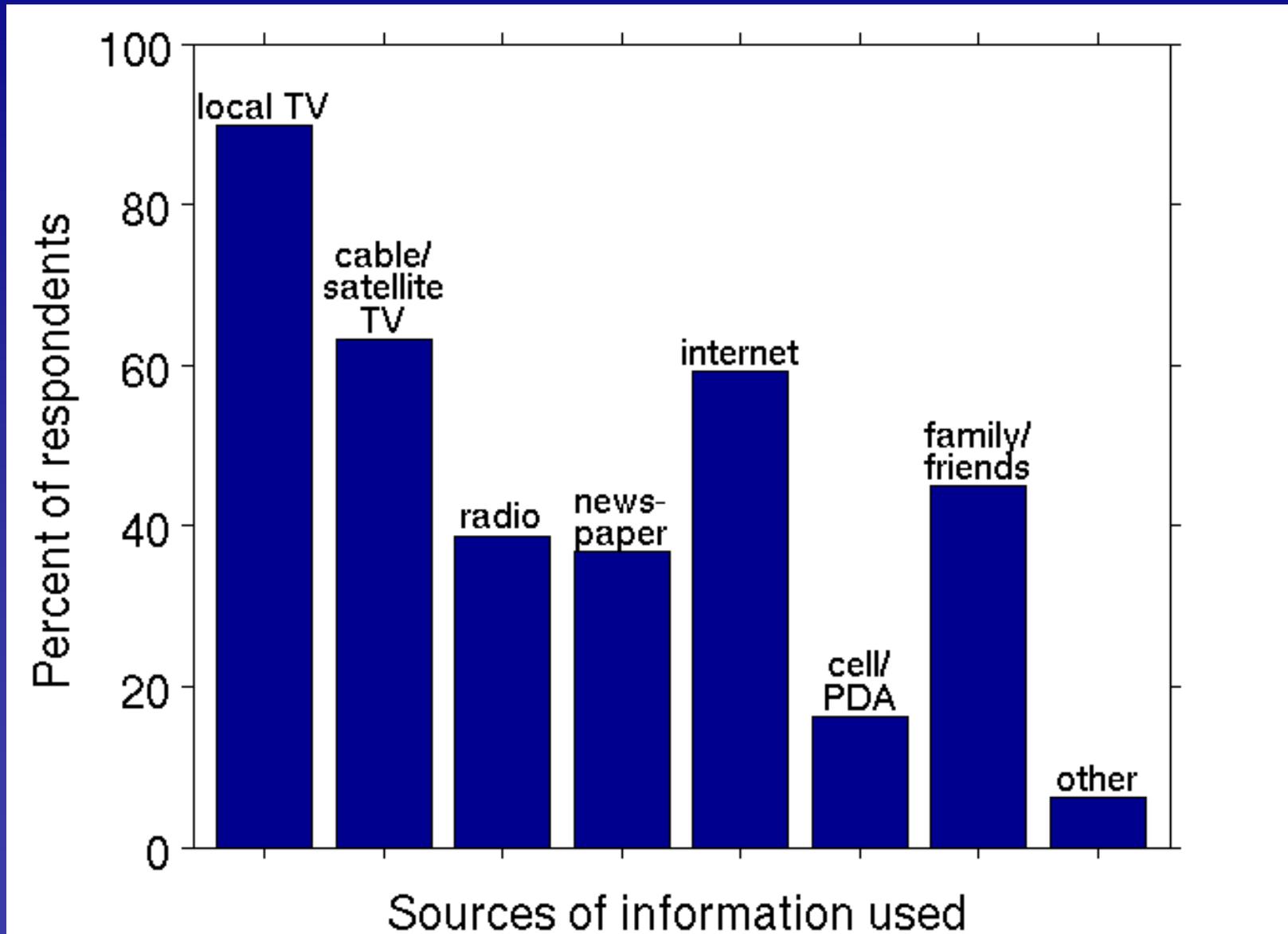


Myth: There is a “best” way to communicate hurricane risk messages

Hurricane risk messages should and will be communicated in different ways to different audiences

- Different people have different information capacities, interests, and needs
- People obtain information from different sources — and sources are diversifying
- Much information is received second- or third-hand

Sources of hurricane information before Ike landfall



Hurricane risk messages should and will be communicated in different ways to different audiences

- Different people have different information capacities, interests, and needs
- People obtain information from different sources — and sources are diversifying
- Much information is received second- or third-hand

➔ Significant room for improvement in communication of hurricane risk

- People make decisions based on their information, situation, and risk perception
- Evacuation decisions are complex, multi-dimensional, interactive, and evolving
- Many people evaluate their own hurricane risk
- To evaluate risk, many people want to know the hurricane's impacts
- Hurricane risk messages should and will be communicated in different ways

➔ Communicating hurricane risk more effectively

- is important and
- requires understanding how people interpret and use information

Questions?