

**Hurricane wind, storm surge,
flooding rains – why some people
don't get it?**



**Bill Read
Director
National Hurricane Center**

Questions:

- * How many of you know the flood risk of your home?
- * How many of you have Flood Insurance?
- * How many know what wind speed your home was built to resist?
- * How many of you have a Family Action Plan in case of disaster?

Denial



Is not just a River in Africa!

- * Rare events – low probability of occurrence but high probability of severe impact - *Outliers*
- * Denial - a *natural* human response to above
- * For big hurricanes - actions required at least 48 hours prior to onset
- * Uncertainty – even 2 days before landfall – track, intensity, size, impact
- * If uneducated about the threat – *RE*active rather than *PRO*active response by the public (Rita evacuation in Houston)

Rita Evacuation

- No recent history
- Katrina one month earlier
- Unclear local official plans
- Public was reactive, not proactive
- Maximum 27 hours



Everyone leaves – even if they don't really have to

Ike Evacuation

- Memory of Rita
- Better local official plans
- Same forecast information!
- Public was proactive, not reactive
- Maximum 10 hours



Food for thought

- * Same forecast products for Katrina, Rita, Ike and Wilma.
- * About 80% of those ordered to do so evacuate for Katrina, Rita and Ike, (Alabama through Texas) while less than 10% for Wilma in the Florida Keys.
- * Why?
- * Conveying forecast information much more complex than format of our forecast products!

Lesson not learned:

The 100 Year Event does not mean absolute protection

	10 year	25 year	50 year	100 year	500
1 yr	10%	4%	2%	1%	.2%
10	65	34	18	10	
20	88	56	33	18	
30	96	71	45	26	6
50	99	87	64	39	

Nashville, May 2010



- * Wiggers says she and her husband, Jason, asked their real estate agent, builder, lender and insurance agent about flood insurance.
- * **"They all said, 'You're not in a flood plain, so you don't need it,' "** recalls Wiggers, who left her home Sunday in a rescue boat with her dog. "I was like, **FEMA** and the bank said we won't need it, so we're in the clear.' "

“I was told I wasn’t in a flood plain” Atlanta, 2009

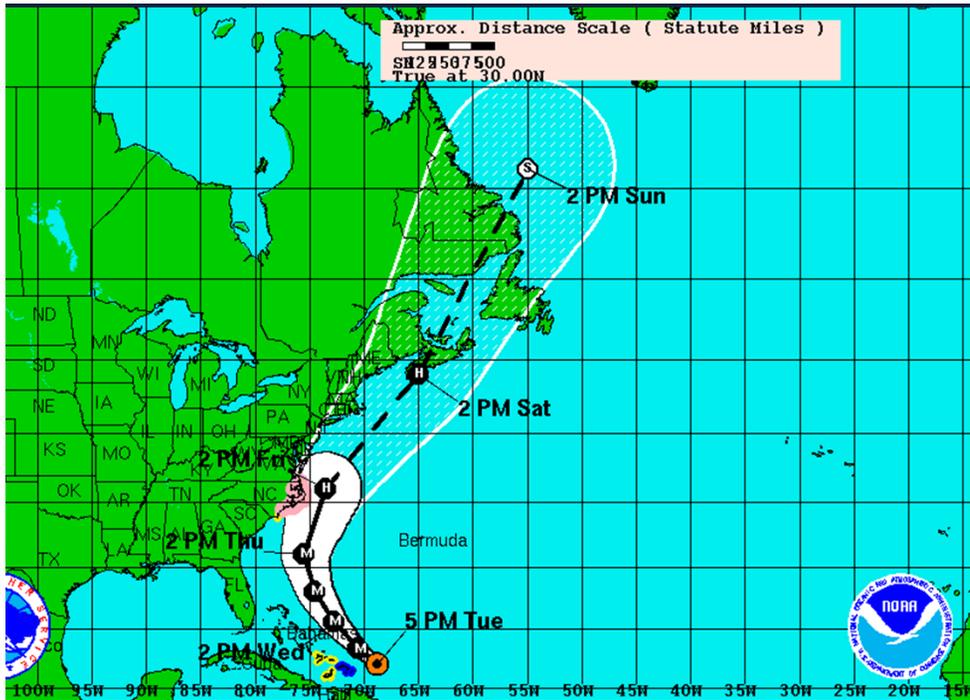




Tropical Storm Allison

- * Most flooded property above the 100 year flood zone
- * Most of 100,000 cars were parked – streets are floodways
- * Medical center flooded 1976 and most hospitals mitigated to the 100 year event – 2.5B in damage due to Allison...
- * Deaths - all either drove or walked into flood water well after warnings issued





Earl
 August 31, 2010
 Advisory 26
 National Hurricane Center

Current Information:
 Center Location 22.0 N 68.8 W
 Max Sustained Wind 135 mph
 Movement NW at 14 mph

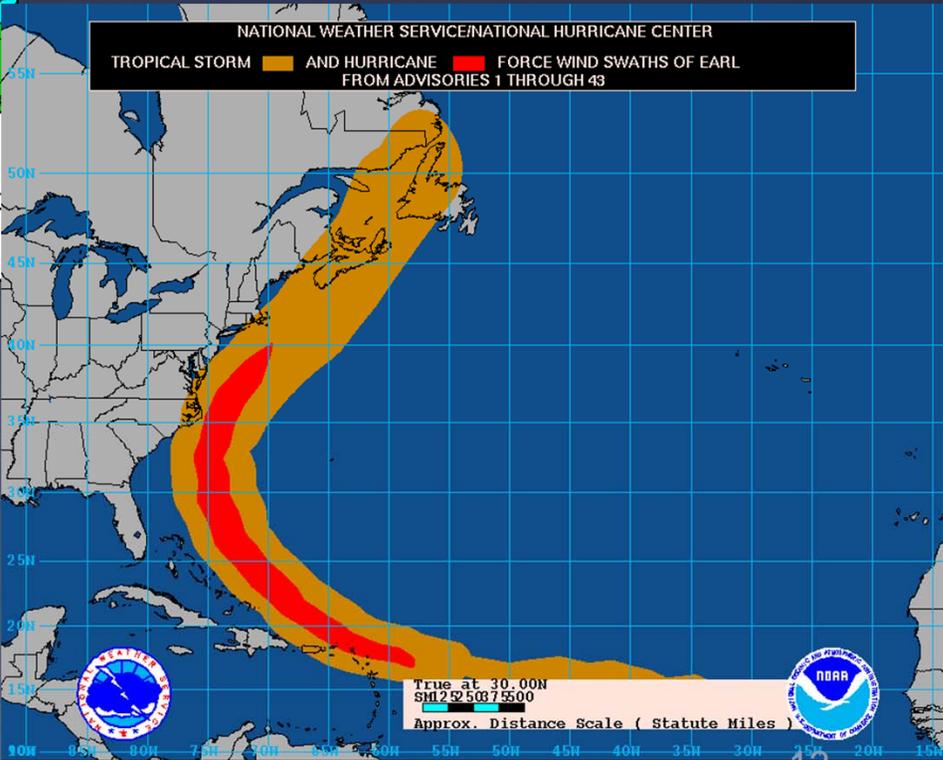
Forecast Positions:
 ● Tropical Cyclone ○ Post-Tropical
 Sustained Winds: D < 39 mph
 S 39-73 mph H 74-110 mph M > 110mph

Track Area:
 Day 1-3 Day 4-5

Watches:
 Hurricane Trop.Storm

Warnings:
 Hurricane Trop.Storm

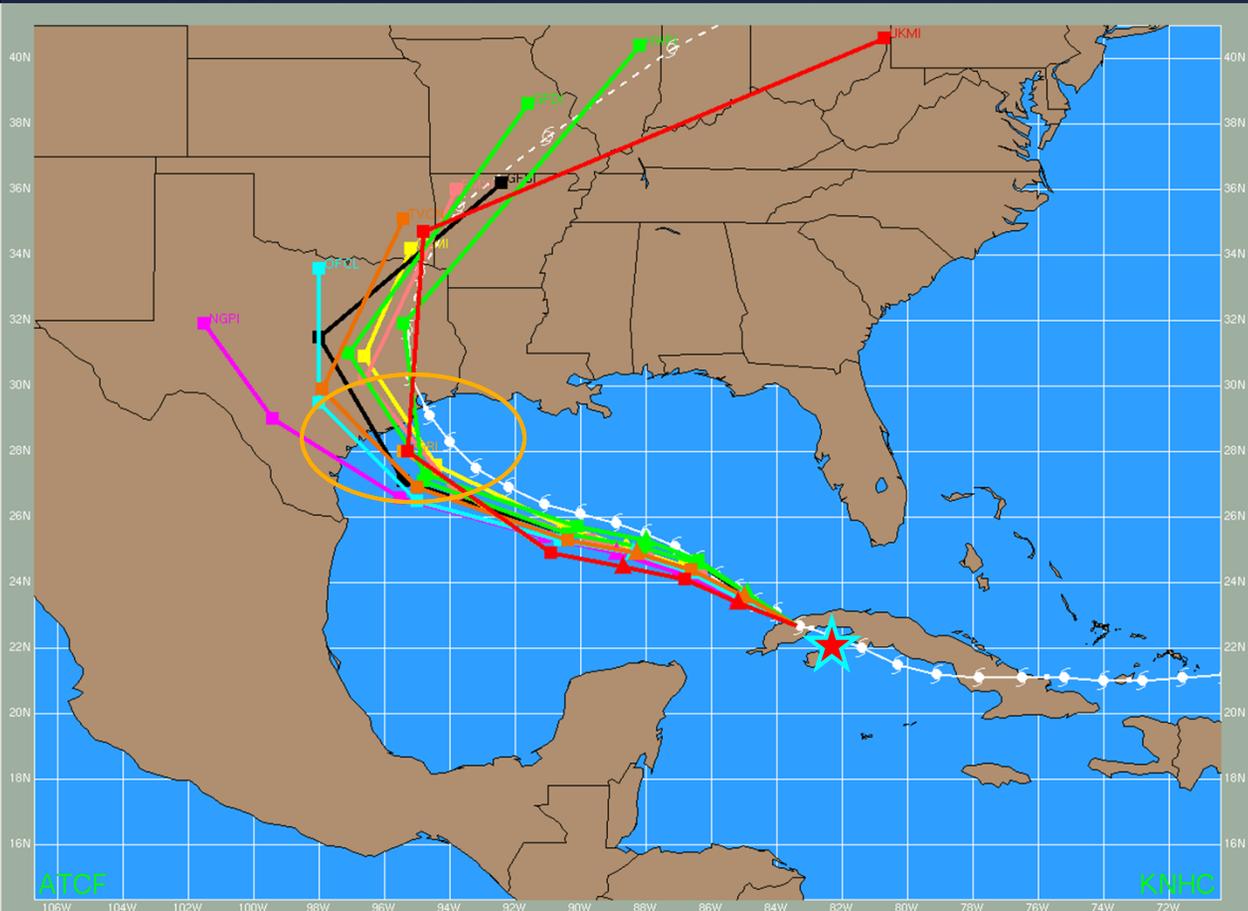
Good forecast?
 Decision maker
 confidence resulted in few
 evacuations



**Which is why
 decreasing our
 uncertainty is
 important**

Bad forecast?

18Z 9 Sep Forecast Cycle
12Z 9 Sep Global Model Cycle



- Skill in **model** forecast is the key to improved **official** track forecast

- All model guidance is within the skill level for 72-96h forecast

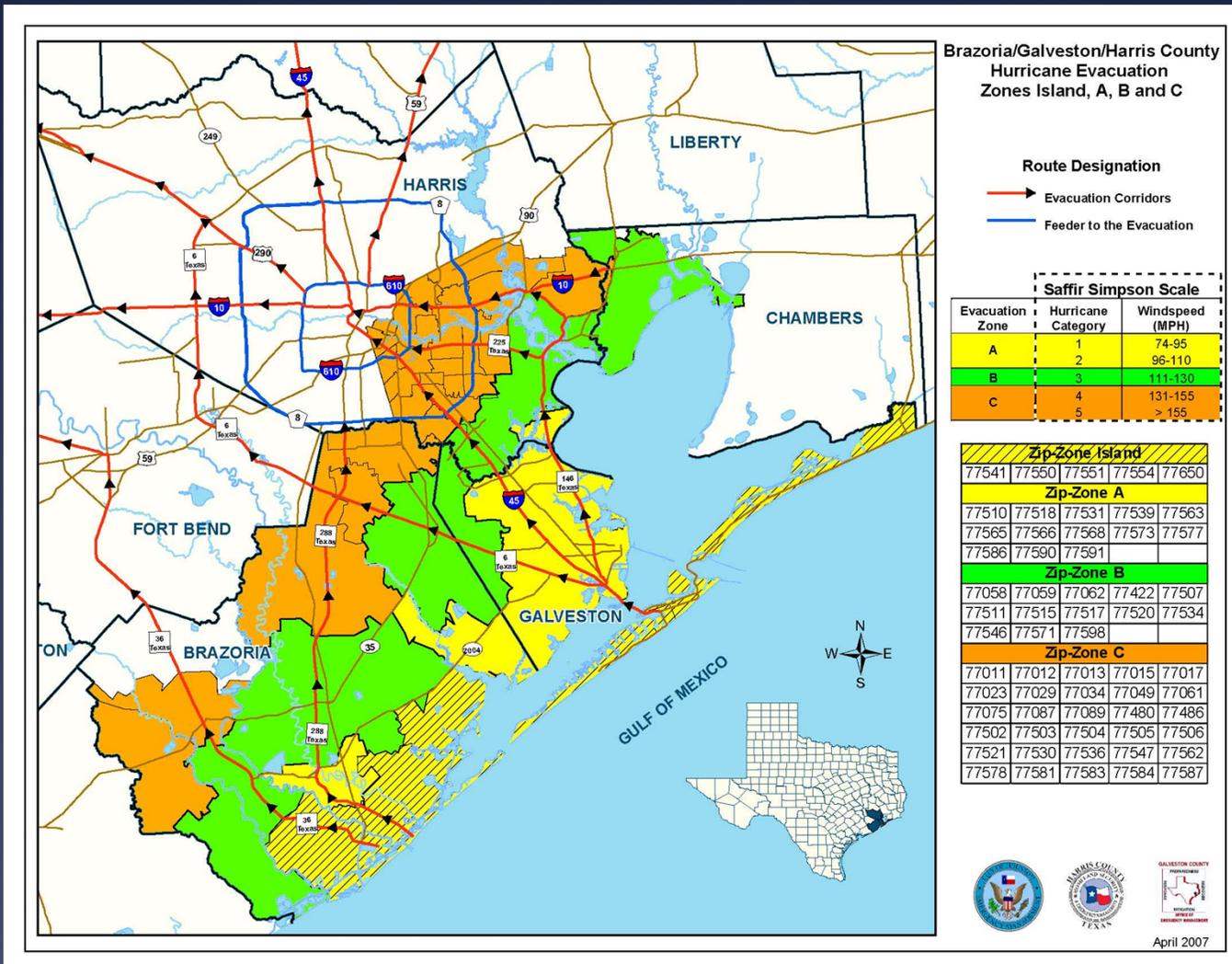
- Most “public” would say this was not a good forecast.

How to convey **variability** in track guidance confidence?

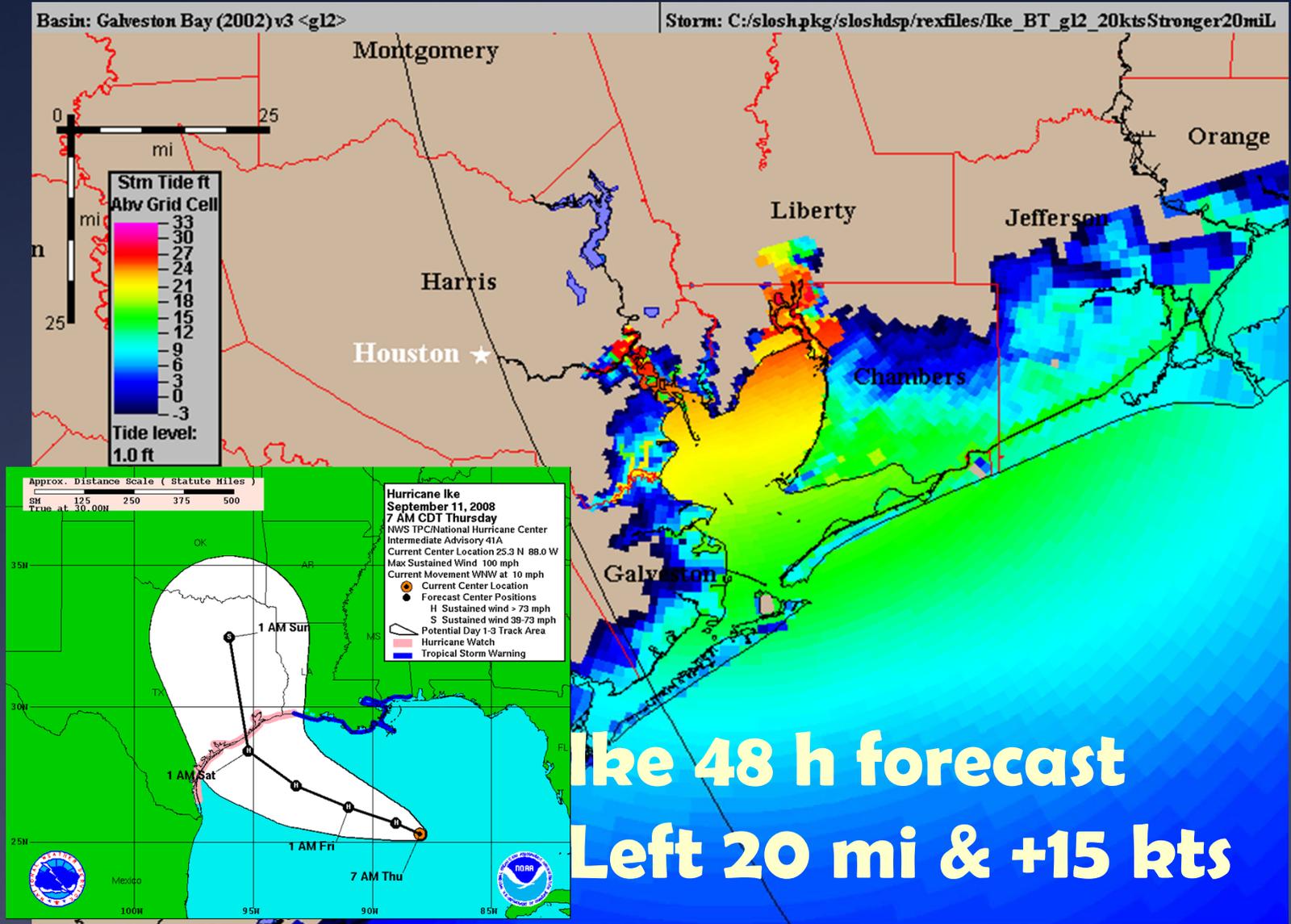
Evacuation: A Primary use of forecasts

Let's look at our Ike example...

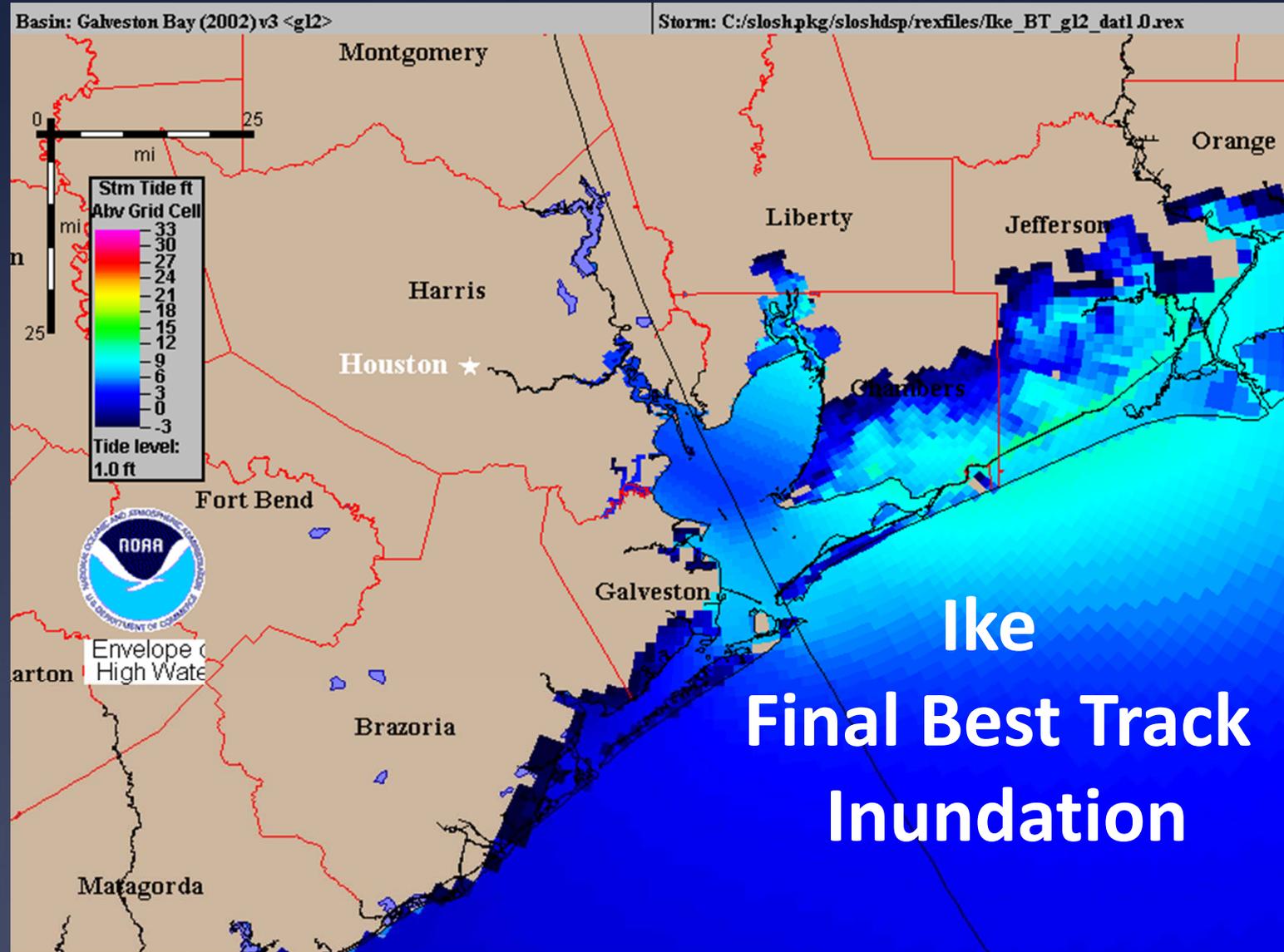
Over 1,000,000 folks reside in evacuation zones...and most go thru Houston!



...NHC forecast at decision time...



300,000 less people flooded with just a 20 mile eastward shift

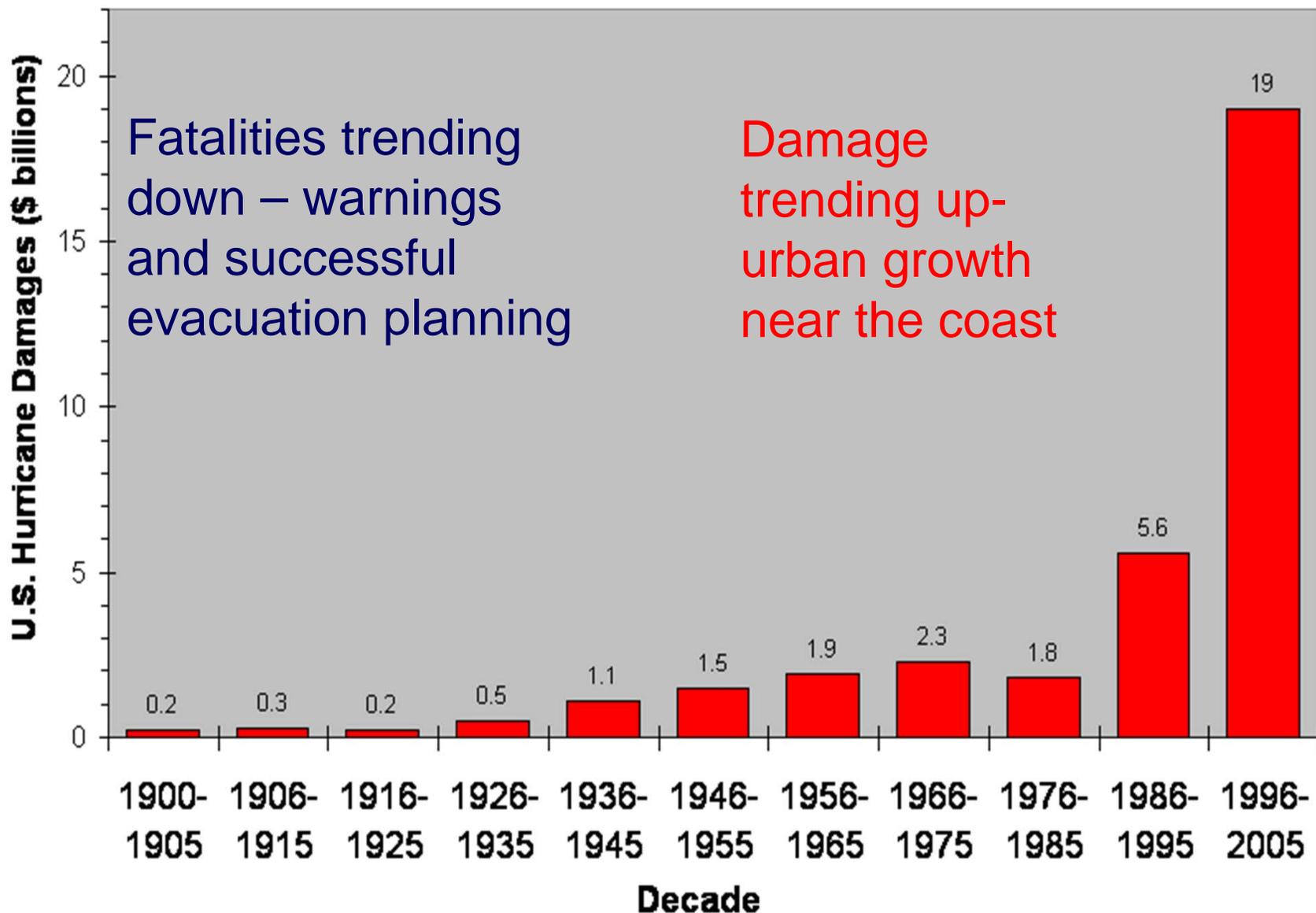


Storm Surge Challenges

- * Correcting misuse of 100 year event
- * Conveying the risk down to the individual
“what’s going to happen to me”
- * How to convey complexity of uncertainty?
- * Now let’s look at winds and damage from Hurricanes

U.S. Tropical Storm and Hurricane Damages

\$BILLIONS Annually - Inflation Adjusted



IBHS Research Facility



Three Takeaways

- * Without personal knowledge of risk, unlikely any format of hazard product/information will convey the intended message to our satisfaction
- * Land use and building codes convey a false sense of safety to weather hazards which may influence understanding of forecast products
- * Need to answer “what does this forecast mean for me?”

The Road ahead....?



Thanks!