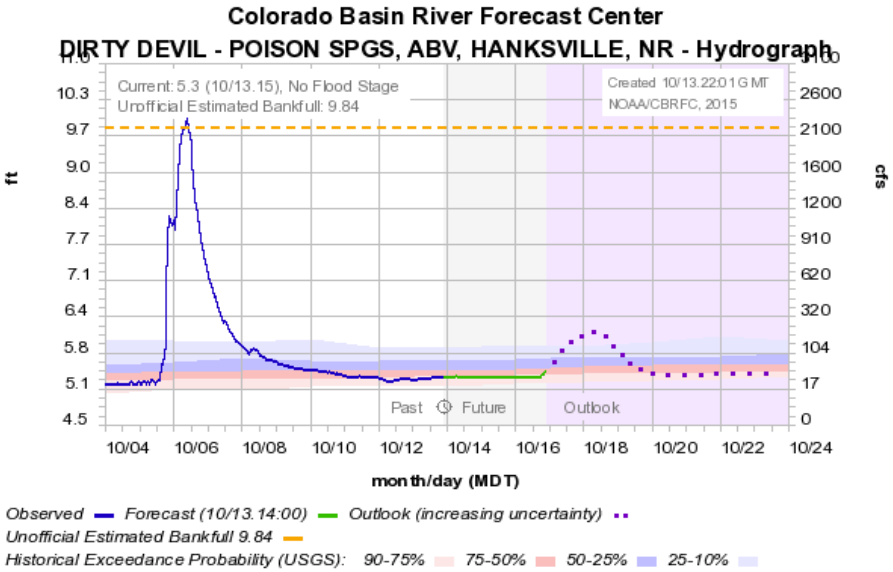
Forecast Interpretation

CBRFC Stakeholder Forum
October 20, 2015

Forecast Interpretation

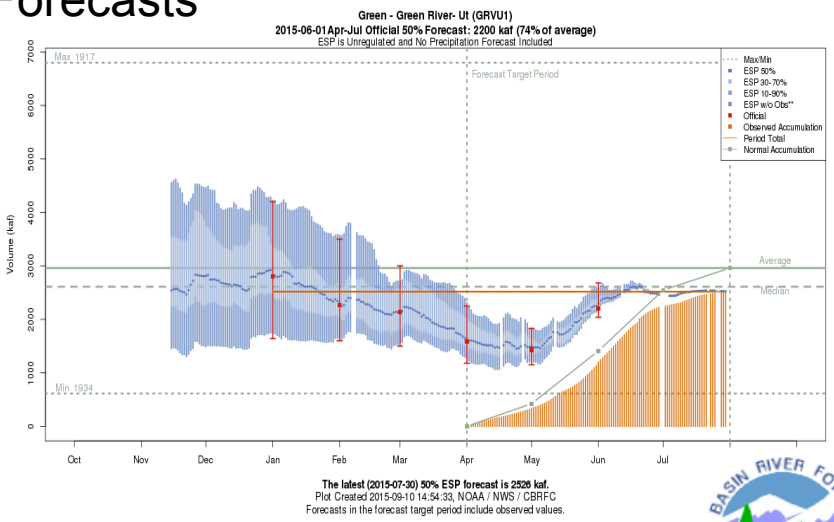
Deterministic Forecasts – Single Valued

- Example: 10 Day Streamflow forecasts
- No “measure” of uncertainty
- Easy to Understand



Probabilistic Forecasts - Range of Possible Outcomes

- Example: Water Supply Forecasts, Peak Flow Forecasts
- A way to express uncertainty
- More difficult to understand



Forecast Interpretation

Probability = likelihood a particular event will happen

$$\text{Probability} = \frac{\text{event/s}}{\text{\# of outcomes}} * 100$$

Example #1: Flipping a Coin

Two Possible Outcomes:

1. Heads
2. Tails

What is the probability of landing on heads?

½ * 100 = 50%

Example #2: Odds of "Your Favorite Team" beating "Team You Hate"

Odds 9:4 for "Your Favorite Team"

Odds = # desired outcomes : # undesired outcomes

Odds -> Probability of YFT Winning

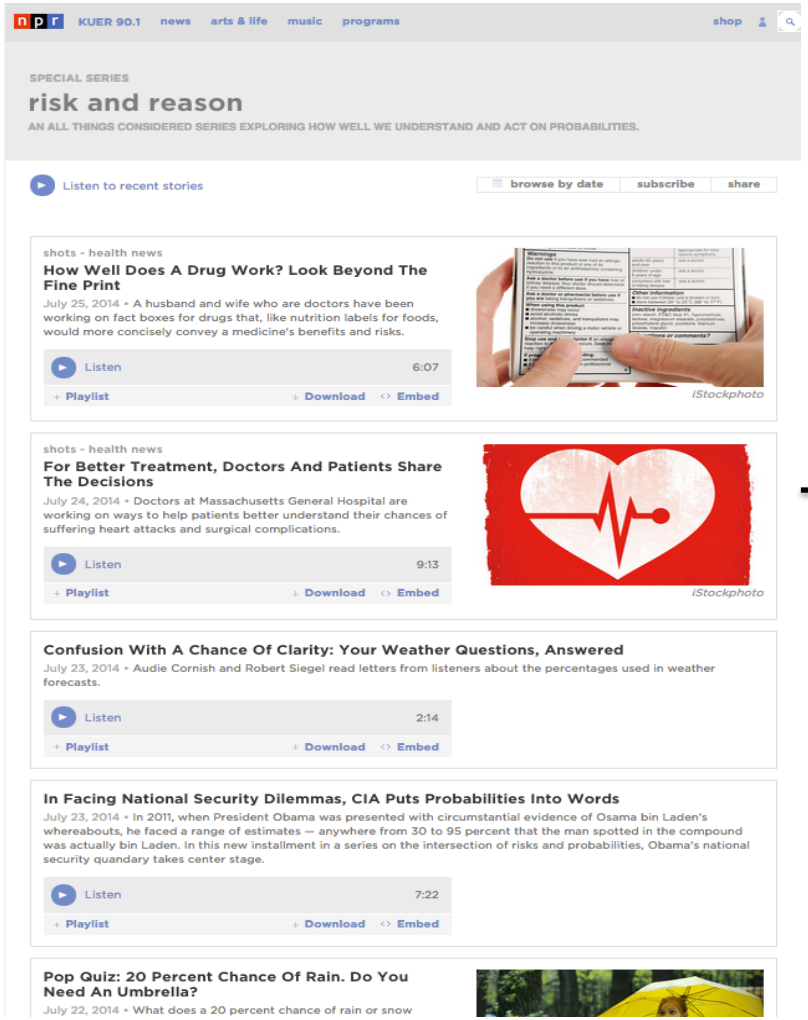
Total outcomes = 9 / (9+4)

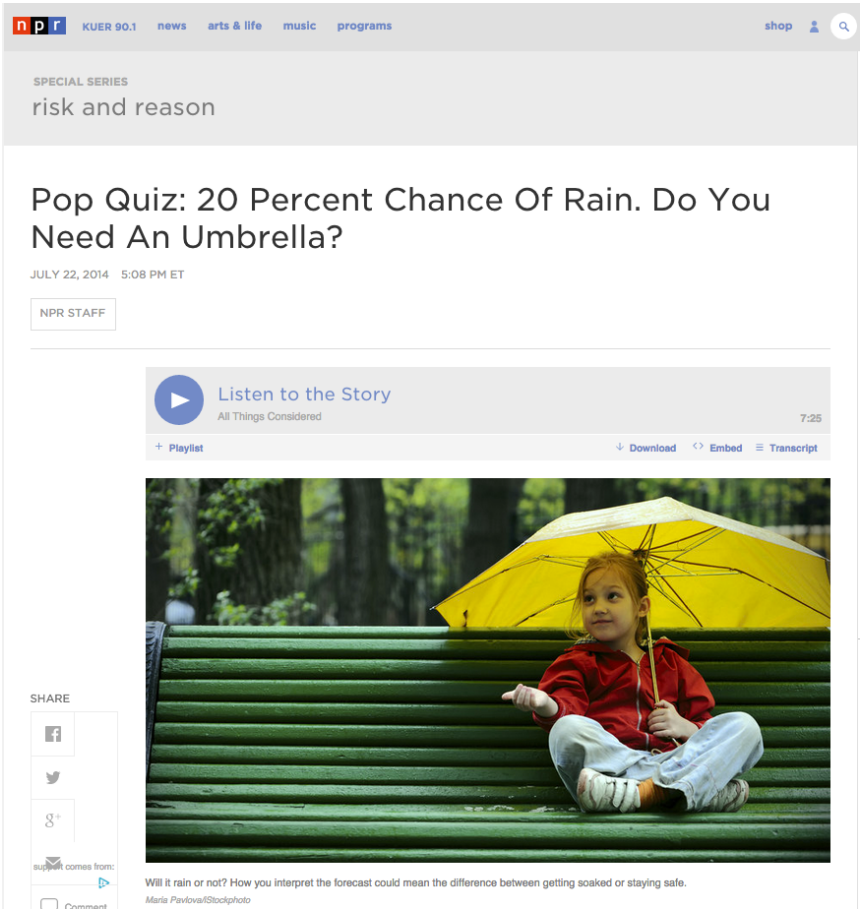
Probability = 9/13 * 100 = 69%

Easy Right?..... Or is it?

Forecast Interpretation: NPR Series

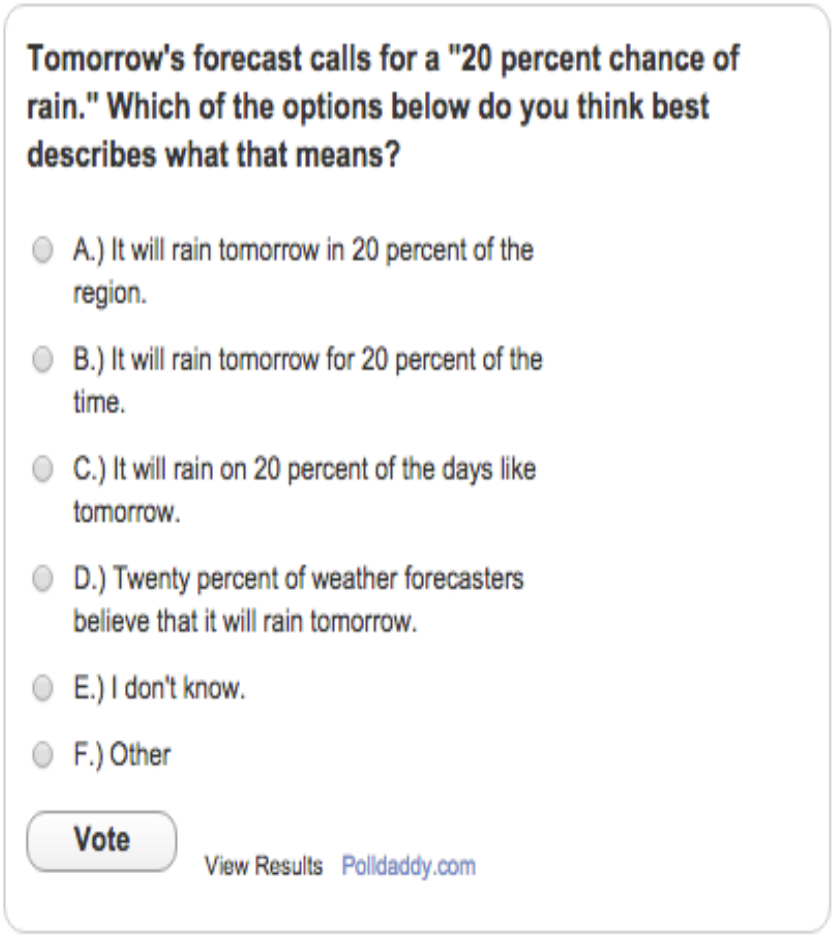
NPR Special Series - Risk and Reason: How people interpret probability





Forecast Interpretation: NPR Series

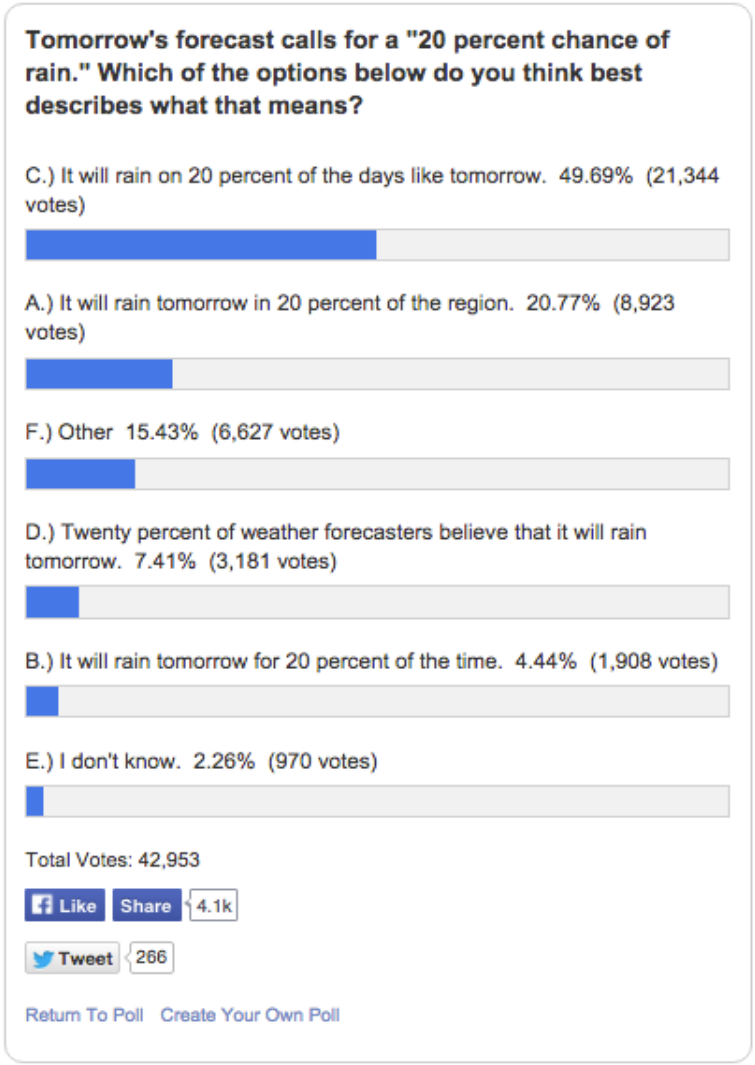
One of the most common encounters we have with probability has to do with the weather……



- NCAR Survey to understand how people understand weather forecasts
- Journal Article :
  Morss, R.E, Demuth,J.L, and Lazo,JK (2008). Communicating Uncertainty in Weather Forecasts: A Survey of the U.S. Public, *Weather and Forecasting,23,* 974-991

Forecast Interpretation: NPR Series

NPR Online Results



Many Different Conclusions
- 20% Chance = definitely bring an umbrella
- 20% Chance= maybe a drizzle

"We think people know what it means," she says. "I have conversations with my colleagues in meteorology all the time about what that means. And, in fact, I challenged one today to tell me, in less than five minutes."

Brown walked away without a clear answer – confirming her suspicions that much of the public is also likely confused.

Forecast Interpretation: NPR Series

Bottom Line:

- General public in confused about probability
- Forecasters add to confusion with poor explanations

- Probability is simple

- Interpretation of probability is not simple

Oh and the correct answer to the survey question is ……

Forecast Interpretation: NPR Series

SPECIAL SERIES
risk and reason

Confusion With A Chance Of Clarity: Your Weather Questions, Answered

JULY 23, 2014 4:19 PM ET

ROBERT SIEGEL

Listen to the Story
All Things Considered
2:14

Playlist Download Embed Transcript

Many listeners and readers felt a concise explanation of "a 20 percent chance of rain" was missing from this story about weather forecasts and probability, so we followed up with two meteorologists.

From meterologist Eli Jacks, of the National Oceanic and Atmospheric Administration's National Weather Service:

> "There's a 20 percent chance that at least one-hundreth of an inch of rain — and we call that measurable amounts of rain — will fall at any specific point in a forecast area."

RISK AND REASON
Pop Quiz: 20 Percent Chance Of Rain. Do You Need An Umbrella?

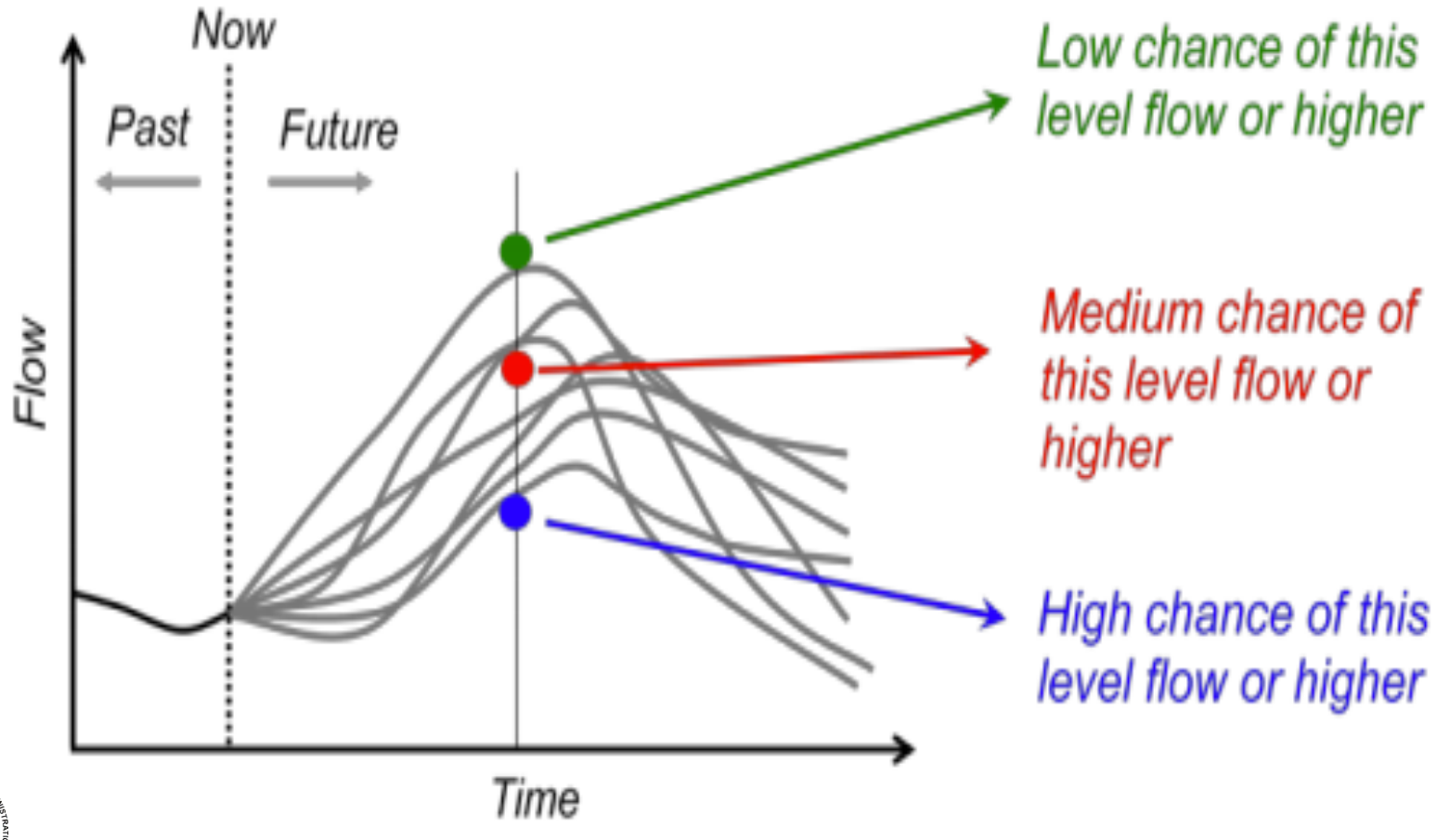
SHARE

And from Jason Samenow, chief meteorologist with *The Washington Post*'s Capital Weather Gang:

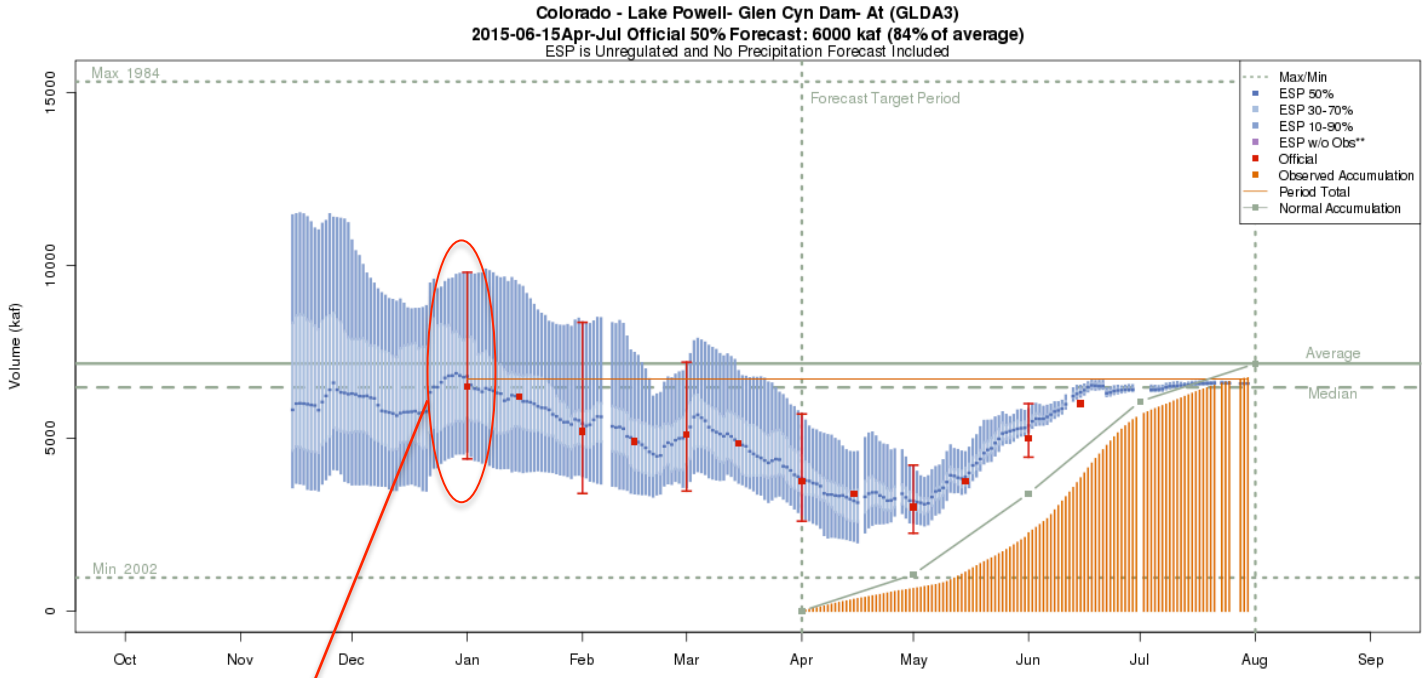
> "It simply means for any locations for which the 20 percent chance of rain applies, measurable rain (more than a trace) would be expected to fall in two of every 10 weather situations like it."

Forecast Interpretation: CBRFC Forecasts

- 30 possible future streamflow scenarios 1981-2010
- Each year is given a 1/30 chance of occurring
- Statistics are simplified



Forecast Interpretation: CBRFC Forecasts



9800 KAF — 10% chance Apr-Jul observed could be > than 9800

6500 KAF — 50% chance Apr-Jul observed could be > than 6500
50% chance Apr-Jul observed could be < than 6500

4400 KAF — 90% chance Apr-Jul observed will be > than 4400

3/30 scenarios should be higher than the 10% probability

24/30 scenarios should fall in between the 90%-10% range

3/30 scenarios should be lower than the 90% probability