

Forecast Interpretation

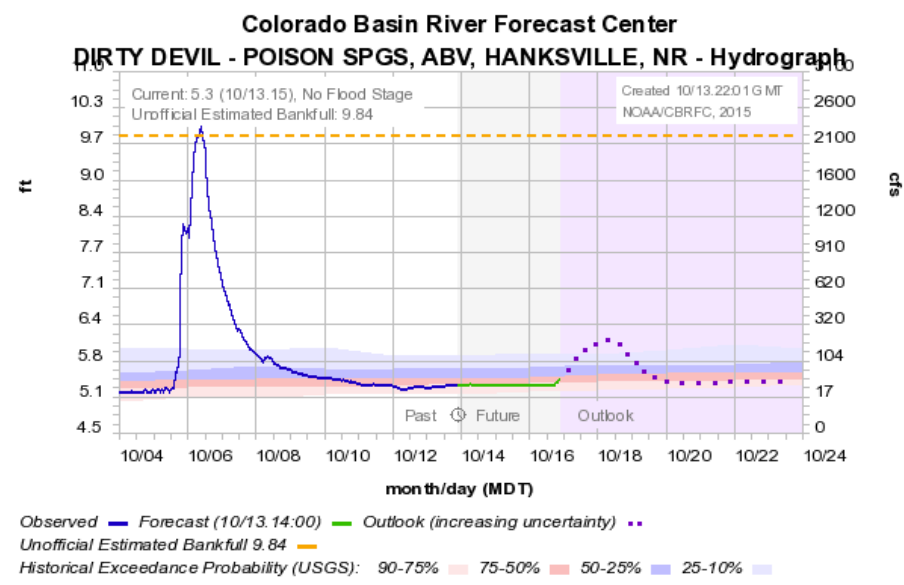
CBRFC Stakeholder Forum
October 20, 2015



Forecast Interpretation

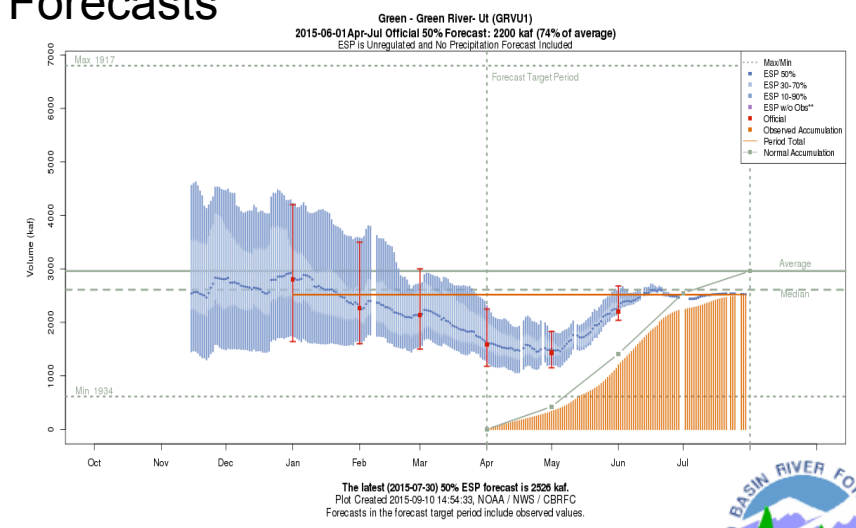
Deterministic Forecasts – Single Valued

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?

$$\frac{1}{2} * 100 = 50\%$$

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

$$\text{Total outcomes} = 9 / (9+4)$$

$$\text{Probability} = 9/13 * 100 = 69\%$$

Forecast Interpretation: NPR Series

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

The screenshot shows the NPR website's 'risk and reason' special series page. It features a list of five articles, each with a title, date, author, and a 'Listen' button with a duration. The articles are:

- How Well Does A Drug Work? Look Beyond The Fine Print** (July 25, 2014) by Audie Cornish and Robert Siegel. Duration: 6:07.
- For Better Treatment, Doctors And Patients Share The Decisions** (July 24, 2014) by Audie Cornish and Robert Siegel. Duration: 9:13.
- Confusion With A Chance Of Clarity: Your Weather Questions, Answered** (July 23, 2014) by Audie Cornish and Robert Siegel. Duration: 2:14.
- In Facing National Security Dilemmas, CIA Puts Probabilities Into Words** (July 23, 2014) by Audie Cornish and Robert Siegel. Duration: 7:22.
- Pop Quiz: 20 Percent Chance Of Rain. Do You Need An Umbrella?** (July 22, 2014) by Audie Cornish and Robert Siegel. Duration: 7:25.



The screenshot shows the NPR website's 'Pop Quiz: 20 Percent Chance Of Rain. Do You Need An Umbrella?' article page. It features a large image of a young girl sitting on a green park bench under a yellow umbrella. The article includes a 'Listen to the Story' button with a duration of 7:25, a 'SHARE' section with social media icons for Facebook, Twitter, and Google+, and a 'comment' section. The article text reads: 'Will it rain or not? How you interpret the forecast could mean the difference between getting soaked or staying safe. Maria Pavlova/Stockphoto'.



Forecast Interpretation: NPR Series

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

Tomorrow's forecast calls for a "20 percent chance of rain." Which of the options below do you think best describes what that means?

- A.) It will rain tomorrow in 20 percent of the region.
- B.) It will rain tomorrow for 20 percent of the time.
- C.) It will rain on 20 percent of the days like tomorrow.
- D.) Twenty percent of weather forecasters believe that it will rain tomorrow.
- E.) I don't know.
- F.) Other

Vote

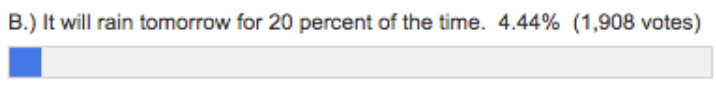
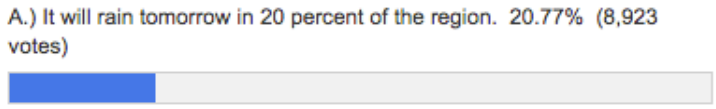
[View Results](#) [PollDaddy.com](#)

- 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

Tomorrow's forecast calls for a "20 percent chance of rain." Which of the options below do you think best describes what that means?



Total Votes: 42,953

Like Share 4.1k

Tweet 266

[Return To Poll](#) [Create Your Own Poll](#)

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 is 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


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

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

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

SHARE

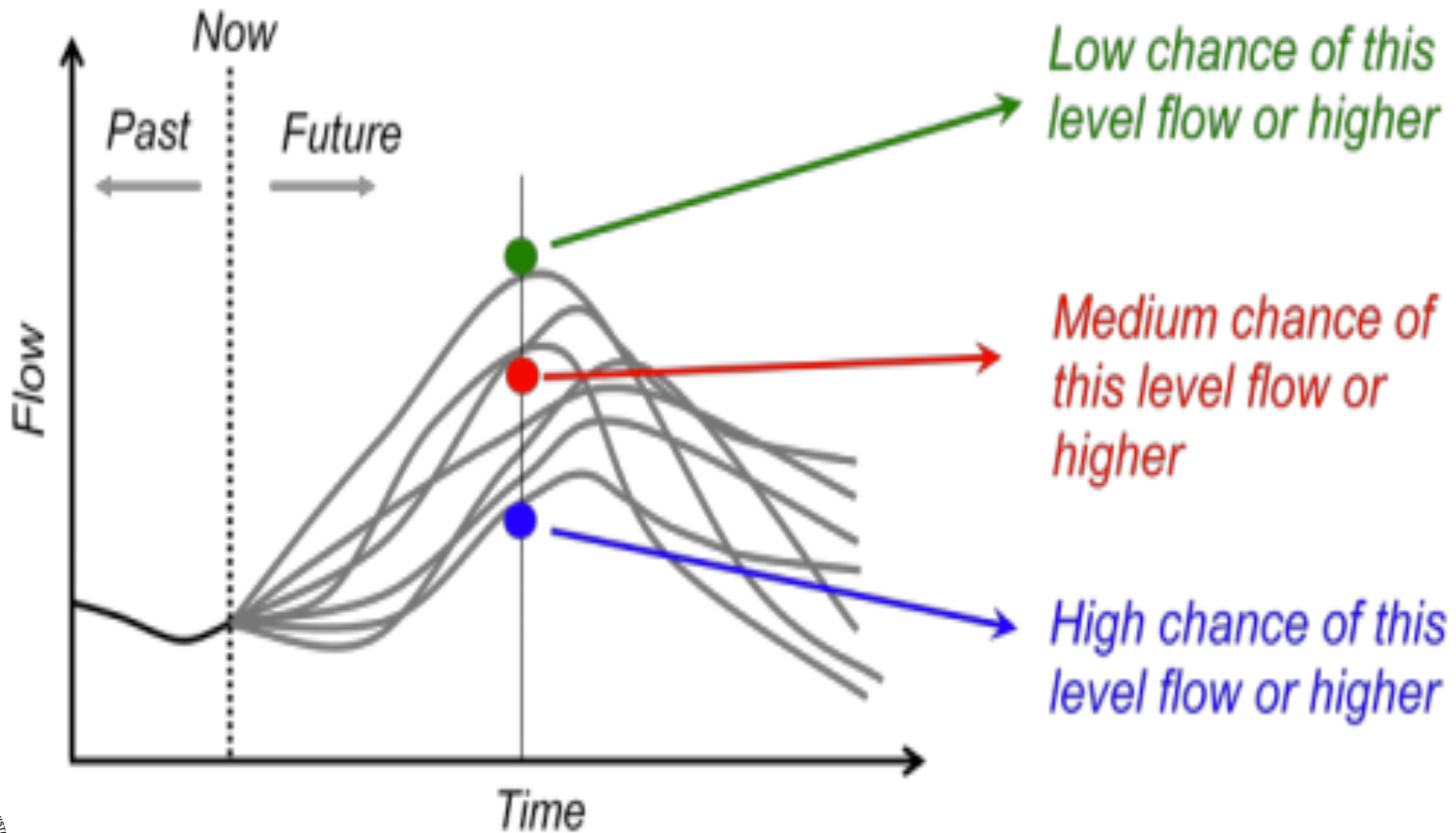
   

And from Jason Samenow, chief meteorologist with *The Washington Post's* Capital Weather Gang:

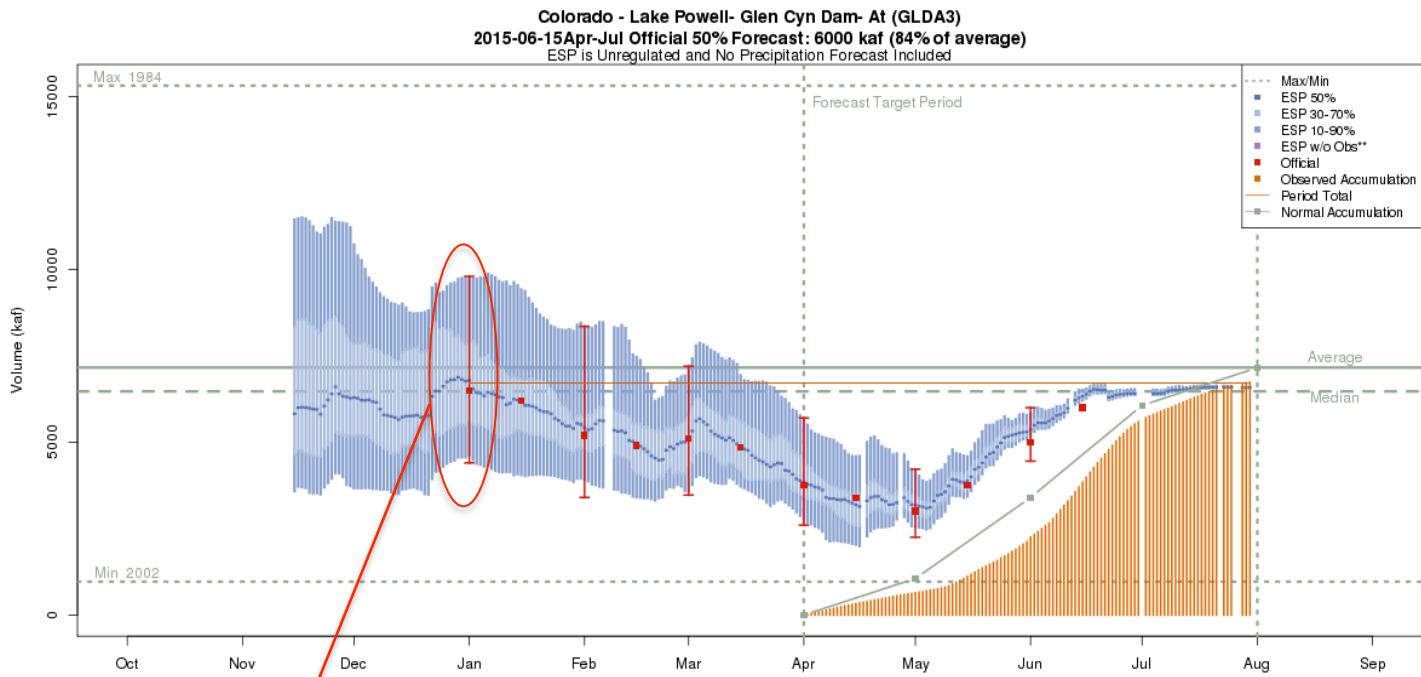
"It simply means for any locations for which the 20 percent chance of rain applies, measurable rain (more than a trace) would be expected to fall in two of every 10 weather situations like it."

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

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

6500 KAF

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

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

4400 KAF

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

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

