Bayes' Theorem

$$P(A/E)P(E) = P(A, E)$$

$$P(E/A)P(A) = P(A, E)$$

$$P(A/E) = P(E/A)P(A)/P(E)$$

Bayesian Updating

$$F' = CFP(E)$$

F': Updated Probability Distribution
F: Prior Probability Distribution
C: Proportional Constant
E: Evidence

USE OF EXPERTS & BAYES' THEOREM

Experts can be used either to provide

1. Model of belief (e.g., our subjectively obtained distribution of alternative causes of Egypt Air plane crash).
2. Model of the world $\Rightarrow$ assignment of most likely alternatives or outcome (i.e., provides evidence as his/her expert opinion as if the evidence were resulting from a random trial).

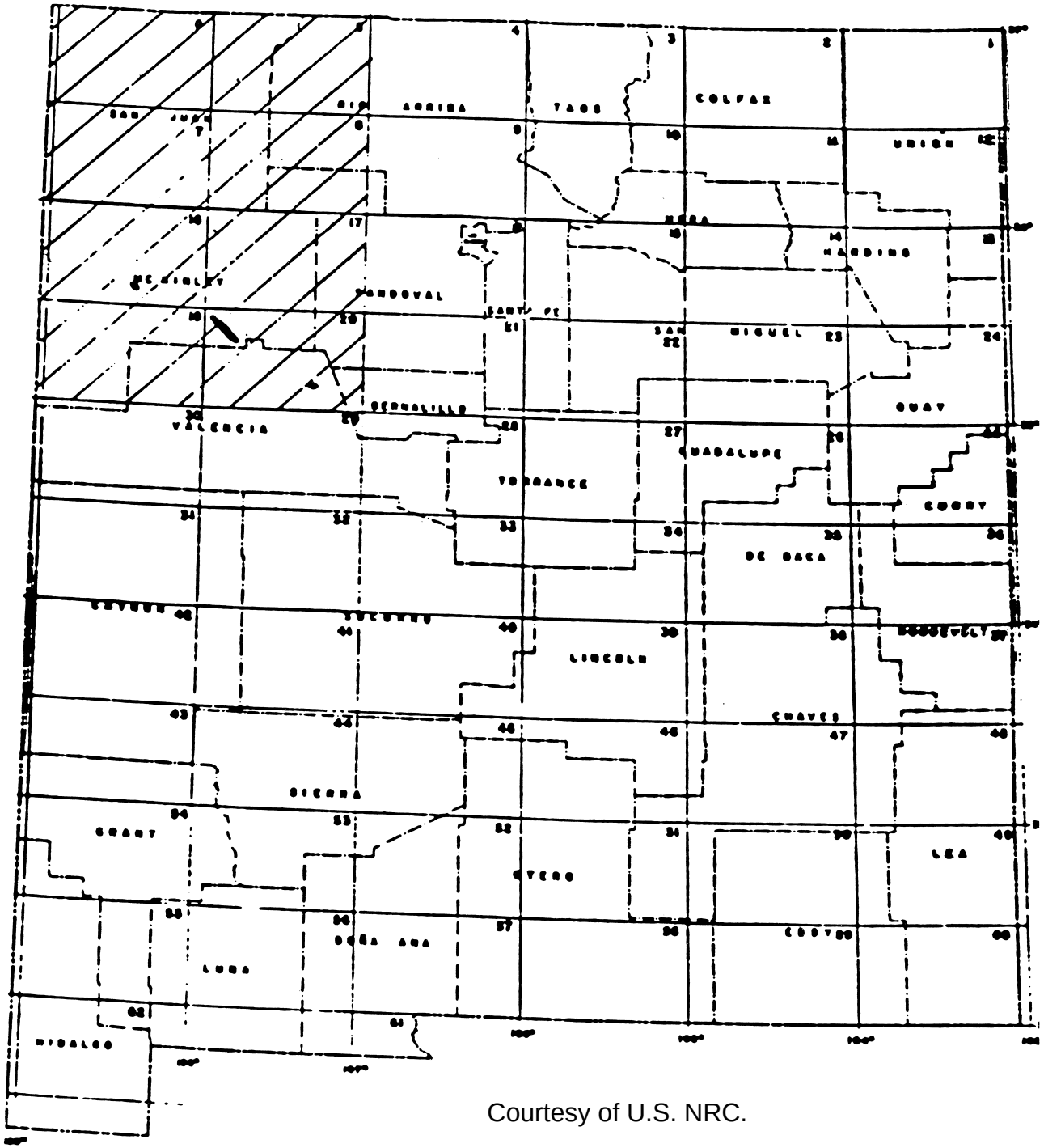
Former Case: New evidence can be used to update a subjective model of belief just as with any other model of belief.

Latter Case: $P(\Theta = \theta_i | E = e_j)$ is posterior probability distribution based upon evidence obtained from an expert.

$$= \frac{P\left(E = e_j | \Theta = \theta_i\right) P\left(\Theta = \theta_i\right)}{P\left(E = e_j\right)}, \text{ where}$$

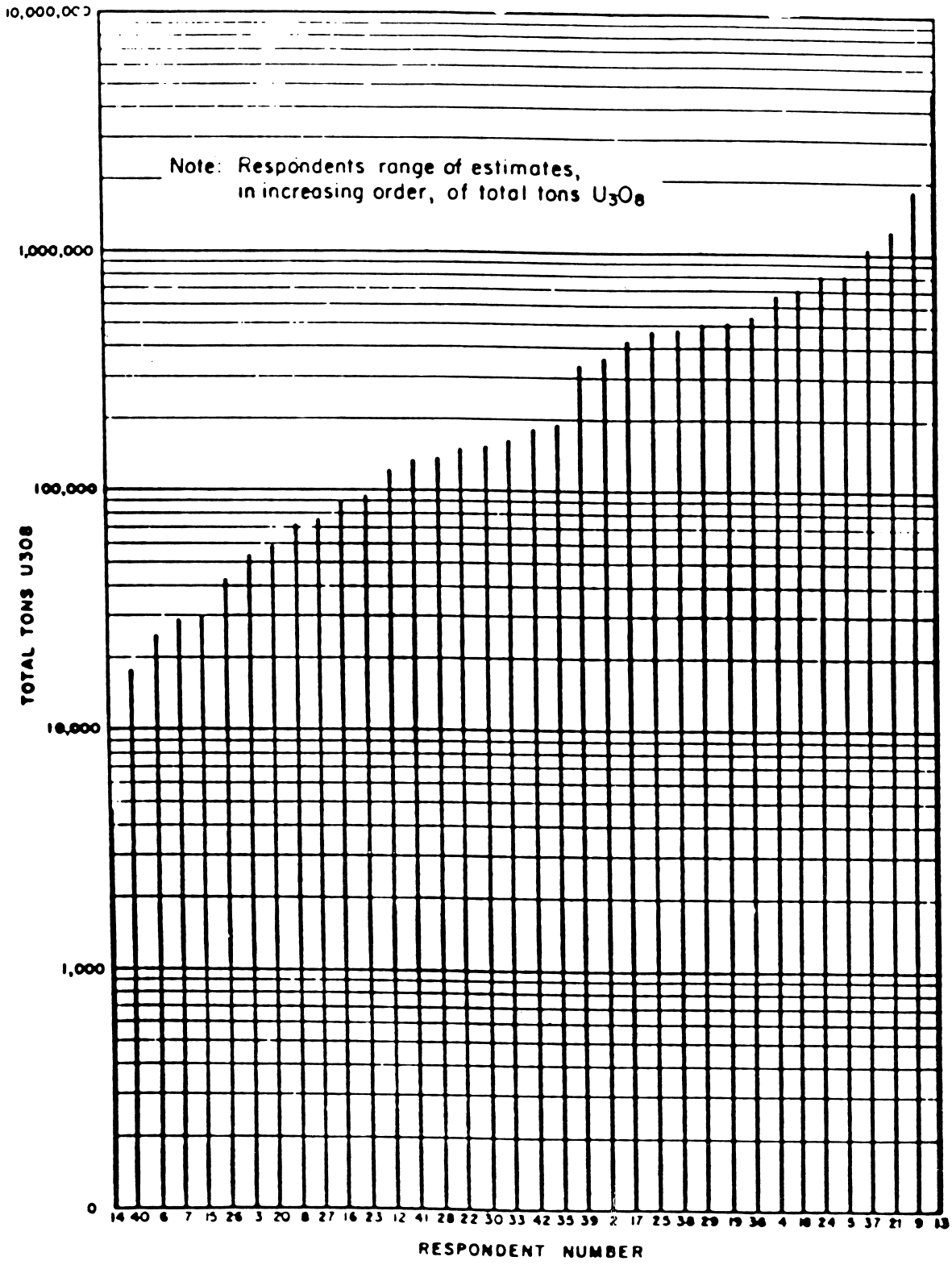
$P(E = e_i | \Theta = \theta_j)$ is observer's judgment of the probability that expert will give evidence, e_j, when observer believes that $\Theta = \theta_j$.

SUBJECTIVE PROBABILITY STUDY – STATE OF NEW MEXICO



Courtesy of U.S. NRC.

NEW MEXICO SUBJECTIVE PROBABILITY STUDY (AFTER DELPHI)



Courtesy of U.S. NRC.