

## Flood Probabilities

- 1) Assume that a 25-year return period peak discharge produces flood damage at your site (i.e., a flood is defined as an event with a 25-year return period).
  - a)  $P(1 \text{ flood during a year}) = 0.04$
  - b)  $P(2 \text{ floods in two years}) = 0.0016$
  - c)  $P(3 \text{ floods in three years}) = 0.000064$
  - d)  $P(N \text{ floods in } N \text{ years}) = (0.04)^N$
  
- 2) Assume that a 5-year return period peak discharge produces flood damage at your site.
  - a)  $P(1 \text{ flood during a year}) = 0.2$
  - b)  $P(\text{No flood during a year}) = 1 - 0.2 = 0.8$
  - c)  $P(\text{No floods in two years}) = 0.64$
  - d)  $P(\text{No floods in three years}) = 0.512$
  - e)  $P(\text{No floods in } N \text{ years}) = (1 - 0.2)^N = (0.8)^N$
  
- 3) Determine the flood risk (i.e., the probability of at least one flood) for the design flows having a 2-, 10-, or 100-year return period, for the design periods (M) shown below for designs

T (years)	p	M (years)		
		1	10	50
2	0.5	0.5	0.9990	~1
10	0.1	0.1	0.6513	0.9948
100	0.01	0.01	0.0956	0.3950