Risk Terminology and Communicating Flood Risk

David A. Moser, Ph.D.
Chief Economist, USACE
david.a.moser@usace.army.mil
Risk is not new to Corps

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Planning/Engineering
RISK-BASED ANALYSIS FOR EVALUATION OF HYDROLOGY/
HYDRAULICS AND ECONOMICS IN FLOOD DAMAGE REDUCTION STUDIES

1. Purpose. This circular provides guidance on the evaluation framework to be used in Corps of Engineers flood control and flood damage reduction studies. It is jointly promulgated by Planning and Engineering and applies to Hydrology/Hydraulics and Economic evaluations.

2. Applicability. This circular is applicable to all HQUSACE/OCE elements, major subordinate commands, districts, laboratories and all field operating agencies (FOA) having Civil Works responsibilities. It applies to all implementation studies for flood control and flood damage reduction projects.
What is New?

• Risk analysis as comprehensive approach
• Risk management is not just projects
• Risk is more than economics and expected values
• Uncertainty explicitly recognized in analysis and decisions
• Collaborative risk management may mean the Corps is not in charge
Risk Language

• Risk terms tend to be redefined by each discipline to meet their narrow usage
• If we are to communicate risk to stakeholders and the public we need to be able to communicate among ourselves
• The Corps needs to standardize its risk terminology
Risk

- The likelihood and severity of adverse outcomes
Speculative Risk

• A category of risk that, when undertaken, results in an uncertain degree of gain or loss
Uncertainty

• When there exists a constant or knowable fact unknown by us.

– lack of knowledge regarding the true value of a quantity
Risk Analysis

• Risk analysis is a decision-making framework that comprises three tasks: risk assessment, risk management, and risk communication.
Risk Management
- Policy and preference based

Risk Assessment
- Analytically based

Risk Communication
- Interactive exchange of information, opinions, and preferences concerning risks
Residual Risk

- Risk remaining after a risk management measure has been implemented.

We do not do a good job of communicating residual risk.
Safety is a subjective concept, whereas risk is more objectively assessed. It is impossible to achieve complete safety.

“Texas Chicken”
What Risk Communication is

- Considers human perceptions of risk
- Multi-directional communication among communicators, publics and stakeholders
- Activities before, during and after an event
- An integral part of an emergency response plan
- Empowers people to make their own informed decisions
Language of Communication is Important

• When federal officials repeatedly refer to "100 year" floods and levees designed to protect against them, they mislead people into thinking that such storms are once-in-a-lifetime events. Whatever statistical validity these terms ever had, they no longer serve the public, and the government would do better to drop them.

USA Today, 8 July
"PERSONS NOT HEEDING EVACUATION ORDERS IN SINGLE FAMILY, ONE OR TWO STORY HOMES WILL FACE CERTAIN DEATH."
### 10-yr Floodplain Occupant

<table>
<thead>
<tr>
<th>Time in floodplain</th>
<th>Probability of 1 or more floods</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 years</td>
<td>65.132%</td>
</tr>
<tr>
<td>25 years</td>
<td>92.821%</td>
</tr>
<tr>
<td>30 years</td>
<td>95.761%</td>
</tr>
<tr>
<td>75 years</td>
<td>99.963%</td>
</tr>
<tr>
<td>100 years</td>
<td>99.997%</td>
</tr>
</tbody>
</table>

#### Risk of 1 or More Floods Over 75 Years

- **No Mitigation**: 1.0
- **100-year**: 0.9
- **500-year**: 0.6
- **Evacuation**: 0.1

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**Risk Mitigation Measure**

![Bar chart showing risk mitigation measures]
Before Katrina, you had a 1% chance every year of flooding this deep from Hurricanes.

Notes:
- The depth map tool is a relative indicator of progress, over time, demonstrating risk reduction as a function of construction progress.
- The water surface elevations are mean values.
- The scale sensitivity of the legend is +/- 2 feet.
- The info does not depict interior drainage modeling results.

- The storm surge is characterized as the result of a probabilistic analysis of 5 to 6 storm parameters of a suite of 152 storms and not a particular event.

Assumes 0% Pumping Capacity

On June 1, 2007, you had a 1% chance every year of flooding this deep from Hurricanes.

Notes:
- The depth map tool is a relative indicator of progress, over time, demonstrating risk reduction as a function of construction progress.
- The water surface elevations are mean values.
- The scale sensitivity of the legend is +/- 2 feet.
- The info does not depict interior drainage modeling results.

- The storm surge is characterized as the result of a probabilistic analysis of 5 to 6 storm parameters of a suite of 152 storms and not a particular event.

Assumes 50% Pumping Capacity

With the 100-year level of protection, you have a 1% chance every year of flooding this deep from Hurricanes.

Notes:
- The depth map tool is a relative indicator of progress, over time, demonstrating risk reduction as a function of construction progress.
- The water surface elevations are mean values.
- The scale sensitivity of the legend is +/- 2 feet.
- The info does not depict interior drainage modeling results.

- The storm surge is characterized as the result of a probabilistic analysis of 5 to 6 storm parameters of a suite of 152 storms and not a particular event.

Assumes 100% Pumping Capacity
Risk Management & Tolerable Risk

Risk cannot be justified except in extraordinary circumstances

People and society are prepared to accept risk in order to secure benefits

Risk regarded as insignificant, further effort to reduce risk not required

Unacceptable Region

Tolerable Region

Broadly acceptable Region

Increasing Individual risks and societal concerns
Questions?