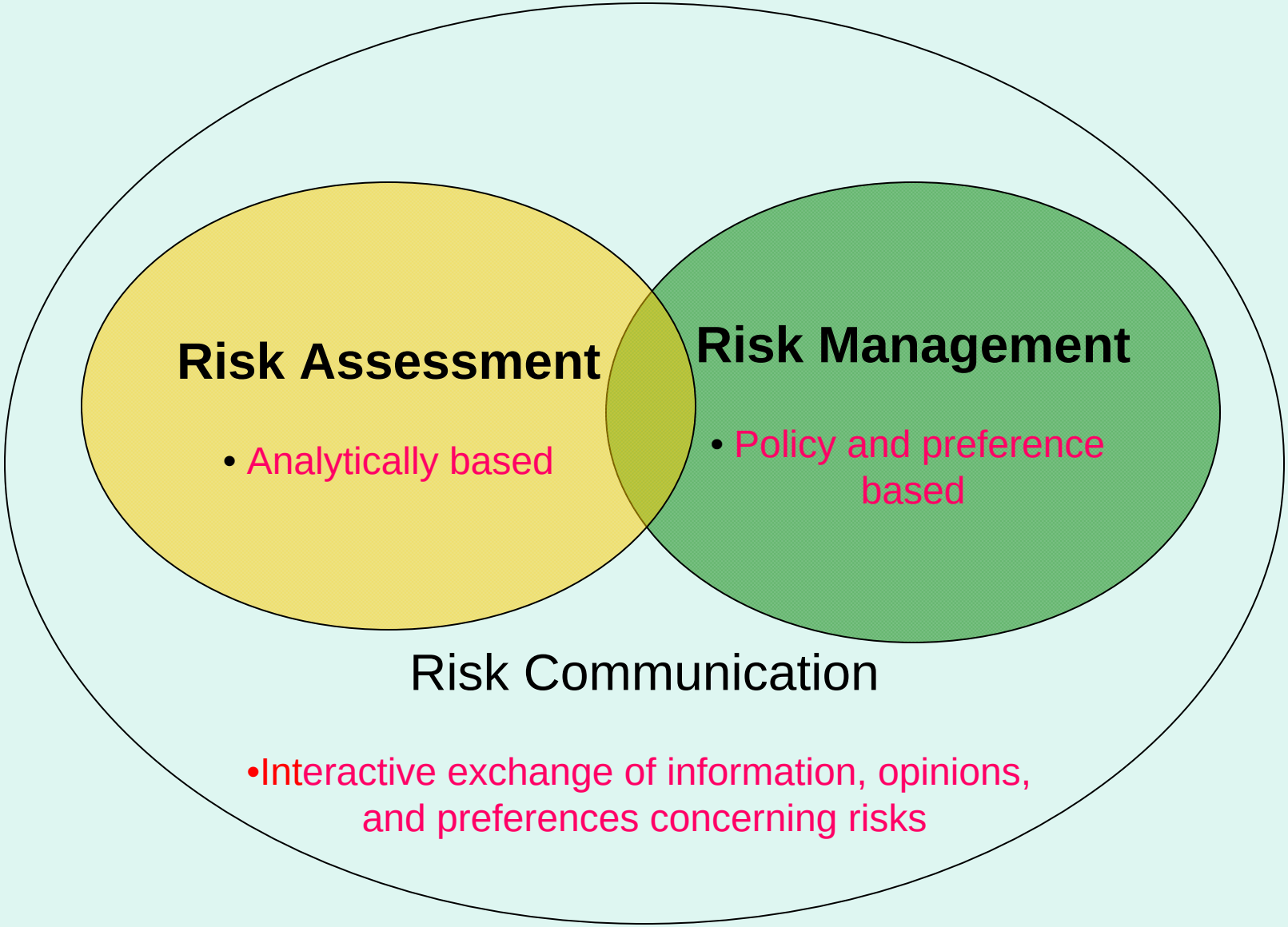
Risk Analysis in the USACE Civil Works Program: History and Prospects

Leonard Shabman


Risk Assessment
• Analytically based
Risk Management
• Policy and preference based
Risk Communication
•Interactive exchange of information, opinions, and preferences concerning risks

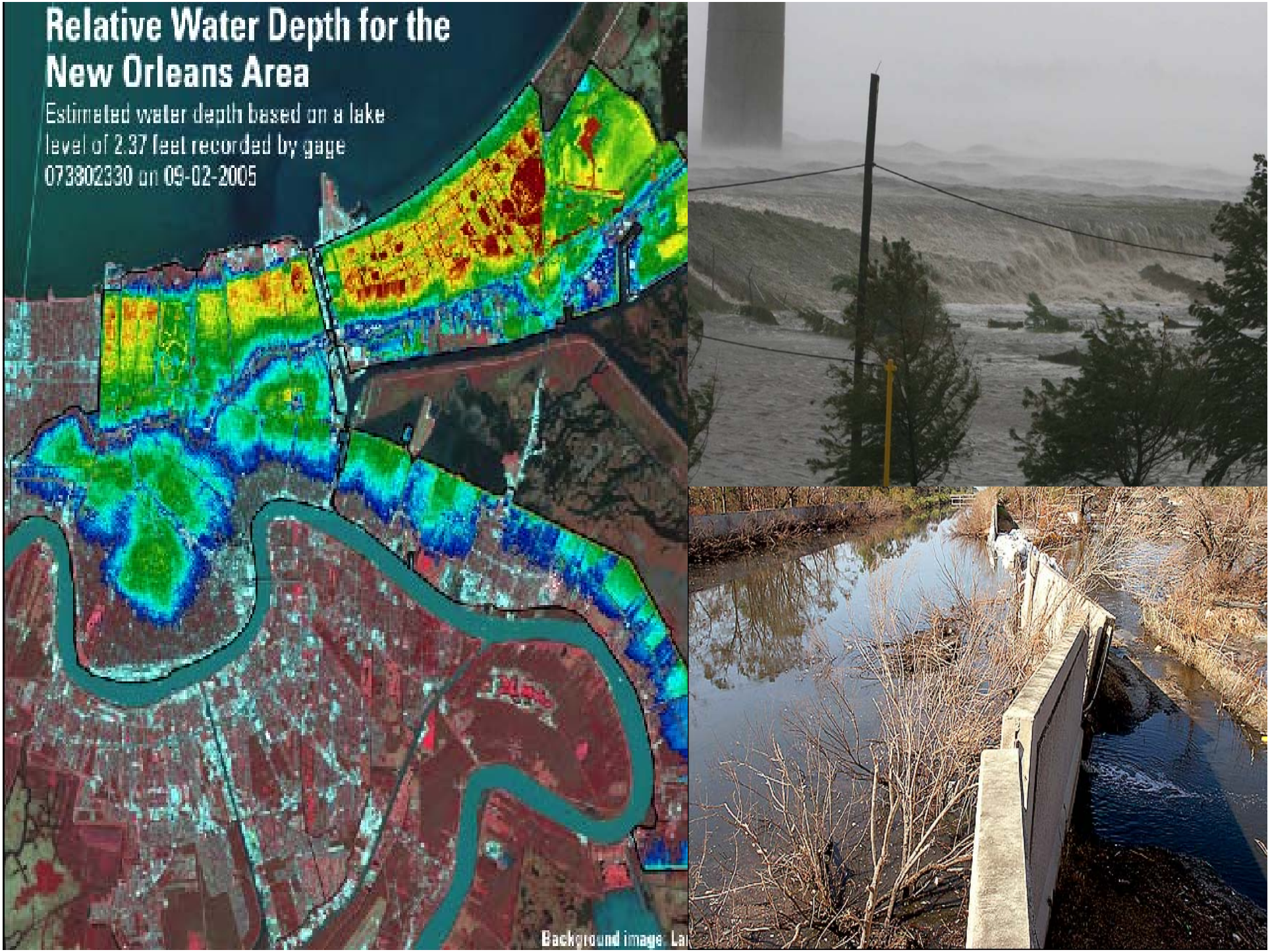
Consider the reliability of the data, the chances of exceedence of design floods, the consequences of exceedence and the potential for catastrophe. Judgment and the acceptability of risk are important elements in the process of arriving at the appropriate level of protection. *(Department of the Army, 12 December, 1975.)*

“ That engineers have moral and legal obligations beyond those of the ordinary citizen is well accepted. This is because trained engineers can perceive and evaluate hazardous conditions that ordinary persons are not aware of. This is especially true for man-made hazards, because engineers are often involved in making them ... In more basic ethical terms, the moral obligation of the engineer arises from the general philosophy that it is part of a natural relationship between human beings to warn and protect one another from hazards as far as they can be known. Because of his knowledge, therefore, an engineer has a higher moral obligation than one who is not knowledgeable in the field.”

"Ever since the President indicated that risk should be a factor in evaluating water resources projects, the academic community and others have become strong advocates of satisfying the requirement by using statistical and probability theory to quantify the risk...

'Although some of the onslaught has been dampened, the forces advocating the use of risk analysis are inexorably growing. To counteract this, I believe we must become better acquainted with the subject and must attempt to influence the approach as much as possible."
(October 1980)

"... all designs for use are arbitrary. The designer or his client has to choose in what degree and where there shall be failure. Thus the shape of all things is the product of arbitrary choice. If you vary the terms of your compromise - say more speed, more heat, less safety, more discomfort, lower first cost - then you vary the shape of the thing designed. It is quite impossible for any design to be 'the logical outcome of the requirements' simply because, the requirements being in conflict, their logical outcome is an impossibility."


Relative Water Depth for the
New Orleans Area
Estimated water depth based on a lake
level of 2.37 feet recorded by gage
073802330 on 09-02-2005
Background image: La

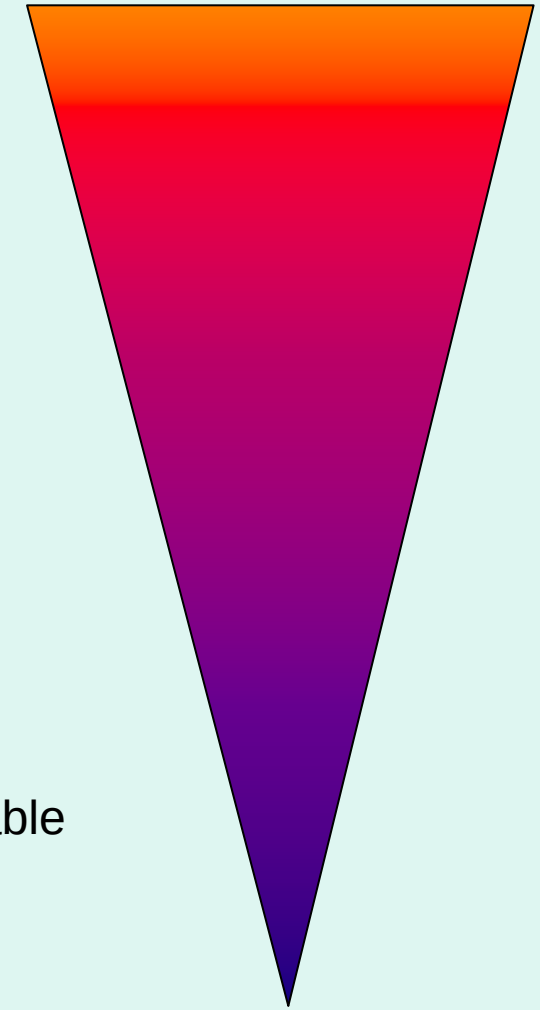
Tolerable Risk

Increasing Individual risks and societal concerns

Unacceptable Region

Tolerable Region

Broadly acceptable Region



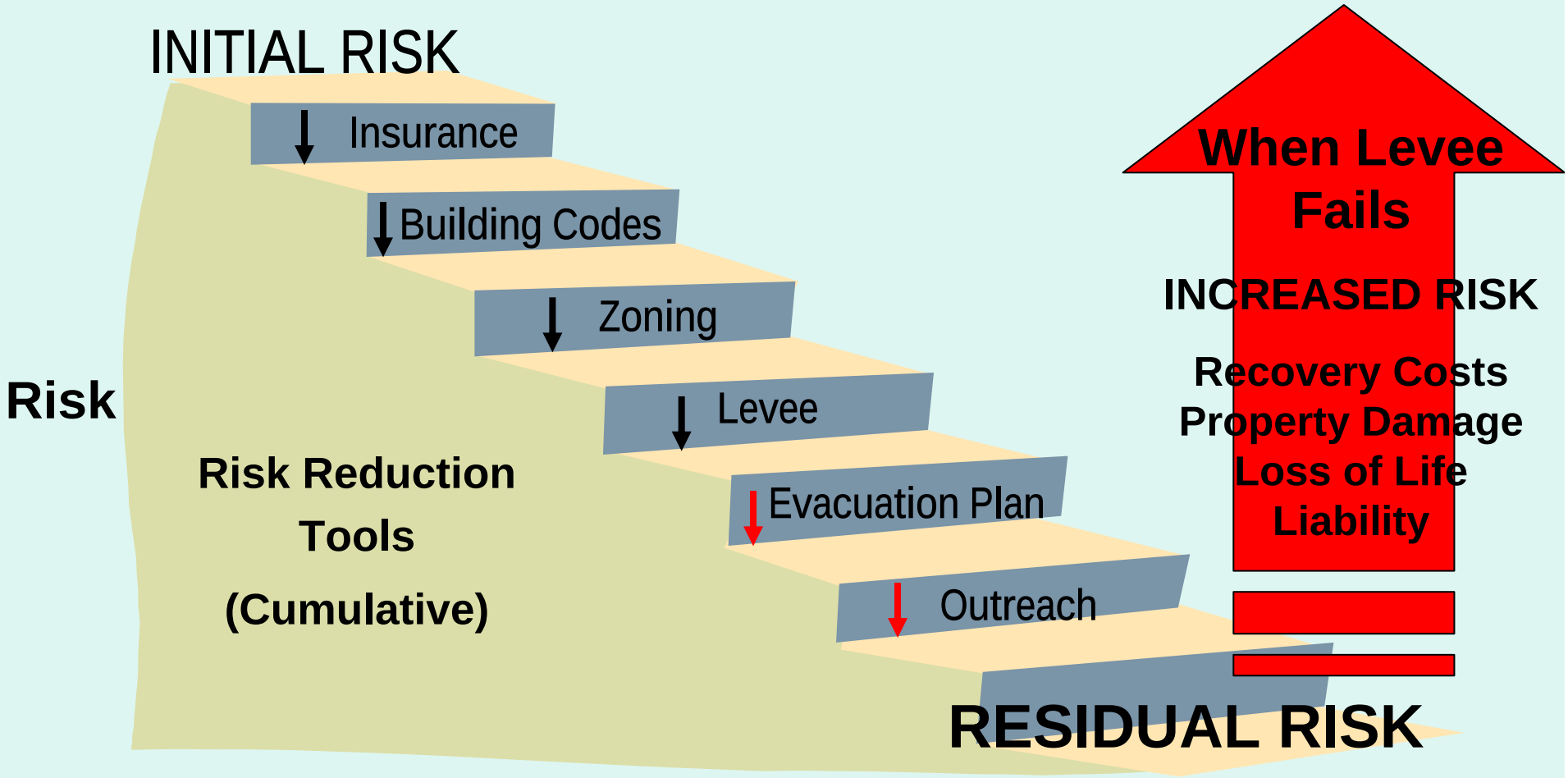
Risk **cannot be accepted** except in extraordinary circumstances

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

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

BUYING DOWN FLOOD RISK :

All Stakeholders contribute to reducing risk



Risk= probability x consequences

County's Dilemma: Cut trees or lose federal funds, Seattle PI

Chop down riverside trees that provide shade for young salmon or lose
millions in federal support to fix aging levees -- that's what the Army Corps of Engineers is telling King County.

Agency says Mamaroneck rejected solution, The Journal News

MAMARONECK - Last year's flooding, which cost many residents thousands of dollars in damage to their homes, could have been prevented if officials in the 1980s hadn't rejected a plan from the Army Corps of Engineers, members say.

... In more basic ethical terms, the moral obligation of the engineer arises from the general philosophy that it is part of a natural relationship between human beings to warn and protect one another from hazards as far as they can be known. Because of his knowledge, therefore, an engineer has a higher moral obligation than one who is not knowledgeable in the field."

“…expertise places them in a unique position to monitor projects, to identify risks, and to provide clients and the public with the information needed to make reasonable decisions.”

Martin and Schinzinger Ethics in Engineering, 2000

Public understanding of understanding of professional ethical responsibility to warn and inform as opposed to “protect”

Agency mission and expectations of society of the expert to warn, inform and share decision making.

WRDA 2007, Section 9005

Nothing in this title shall be construed as---

- creating any liability of the United States or its officers or employees for the recovery of damages caused by an action or failure to act; or
- relieving an owner or operator of a levee of a legal duty, obligation, or liability incident to the ownership or operation of a levee.”

The path ahead

Risk analysis as a process opens up the possibilities and can structure a new public dialogue on the Corps, the engineer and flood and storm hazard management.

Are we ready?