

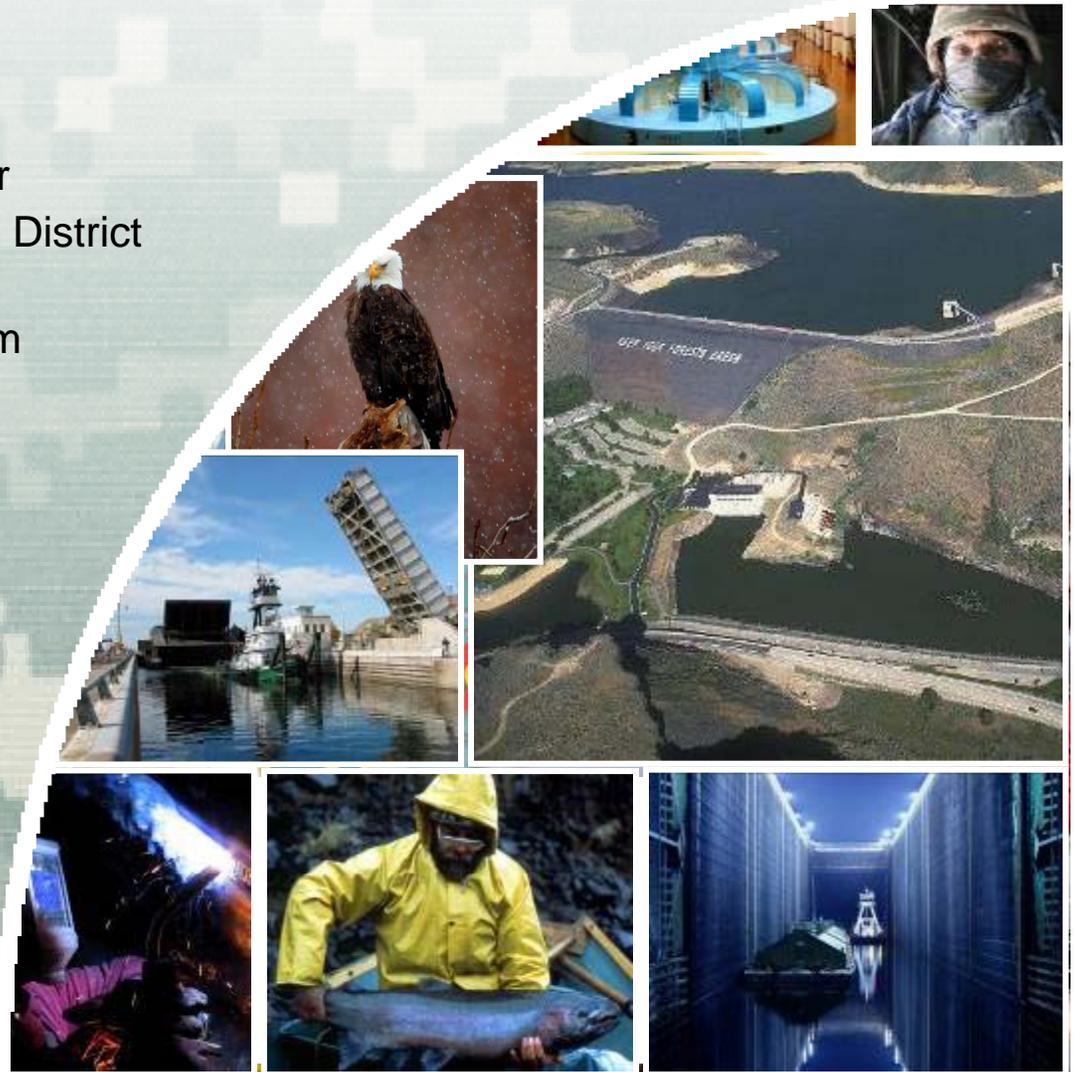
# Critical Infrastructure: Plan and Prepare

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US Army Corps of Engineers  
**BUILDING STRONG**



# Critical Infrastructure Program Overview

- **Reduce infrastructure failure risk**
  - Assess infrastructure condition & risk
  - Communicate benefits & risk
  - Manage risk through projects & operations

# Reduce infrastructure failure risk

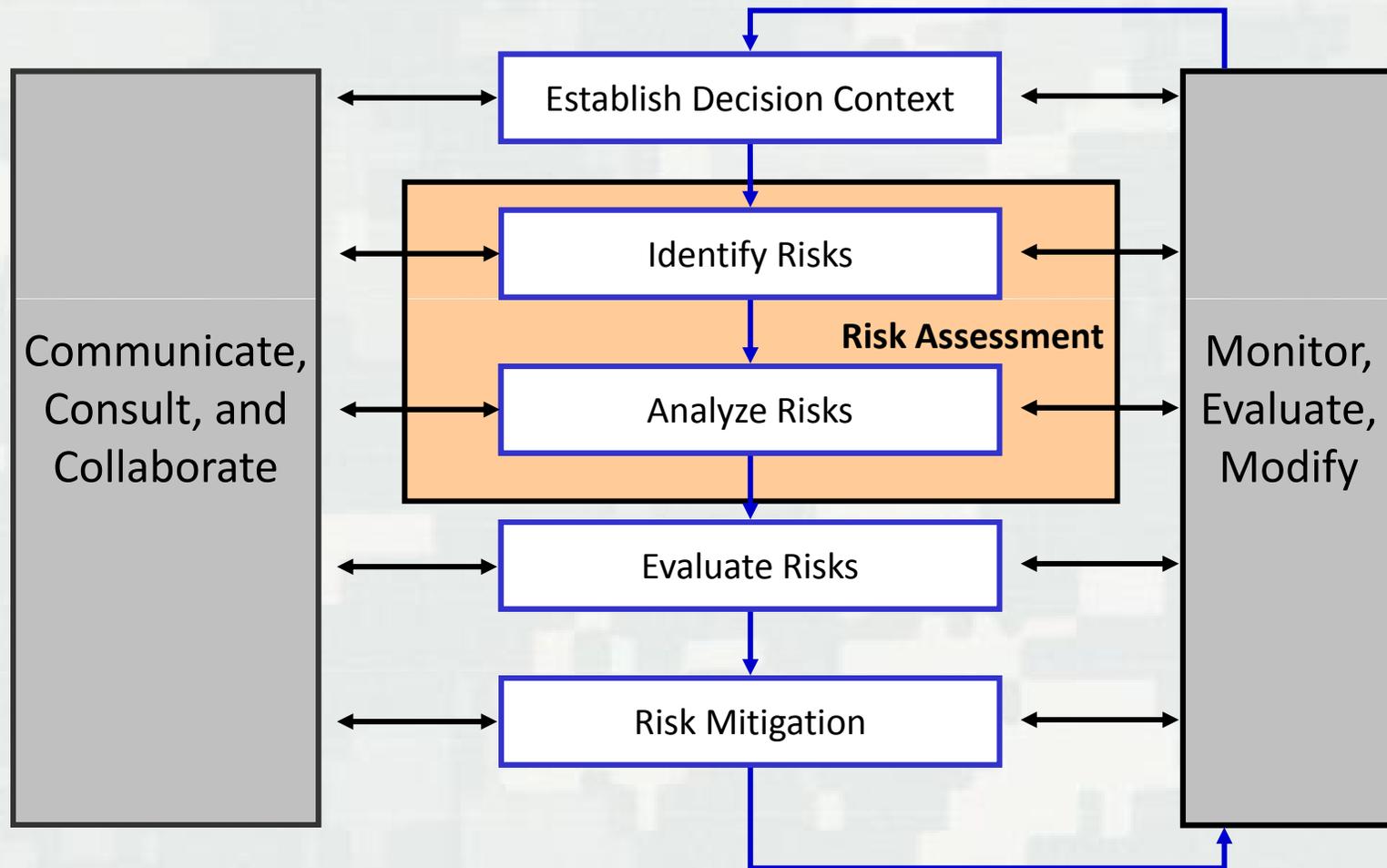
Detroit Dam Spillway Gates



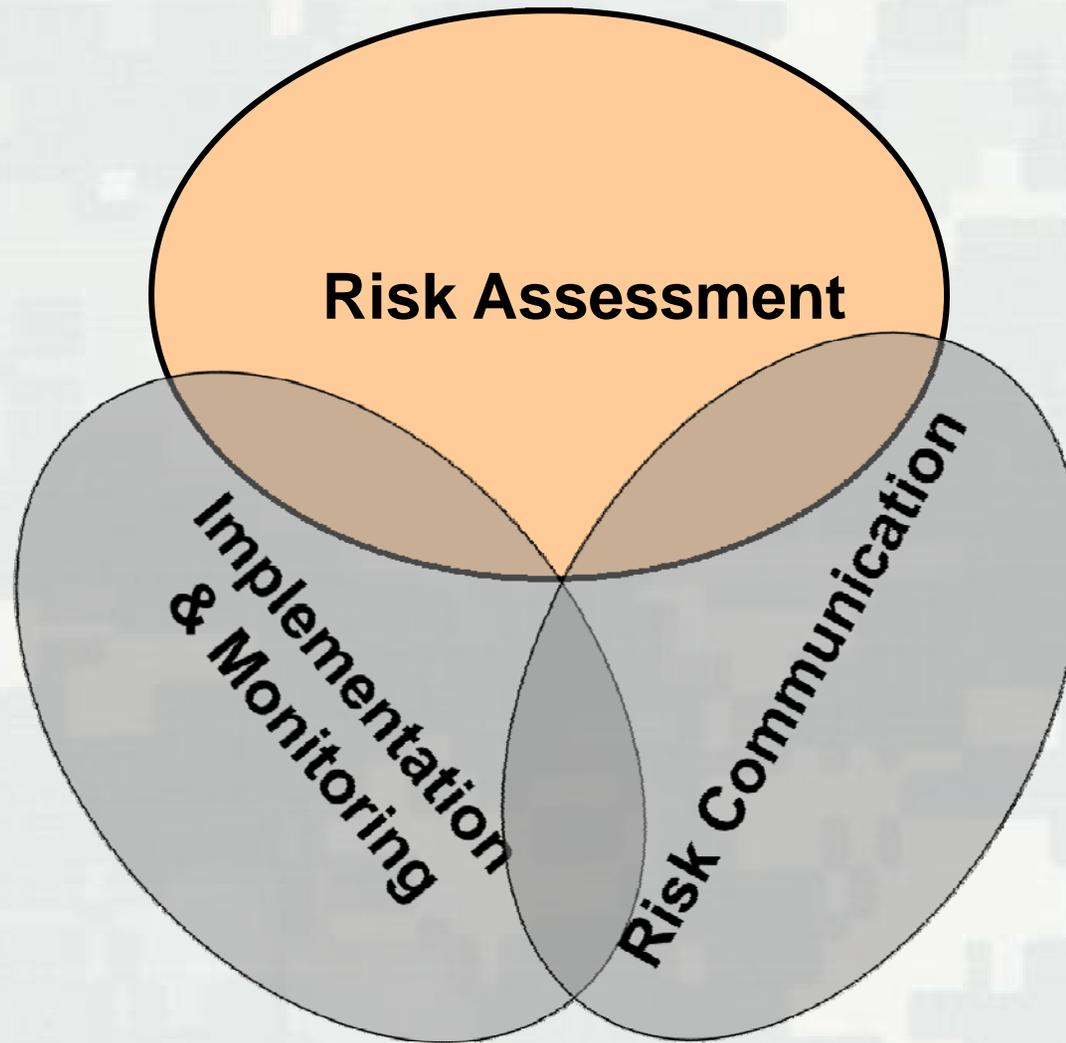
Oregon Coast  
Jetty Repairs

# ISO 31000

## Integrated Risk Management Process



# Simplified Risk Management



# Assess risks



Folsom Dam  
Spillway Gate Failure

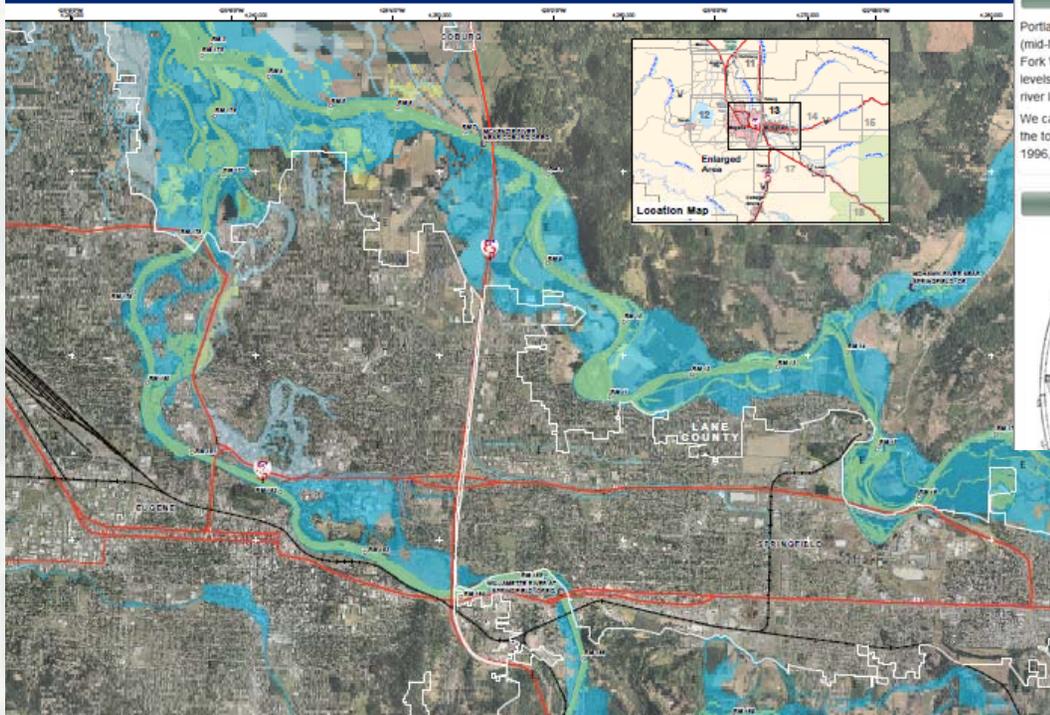
## Bonneville Navigation Lock Gate Damage



# Communicate risks

## Willamette Valley Flood Map and Web Page

### Flood Data within the Willamette Valley, Oreg



**US Army Corps of Engineers**

Our flood risk management mission in the Willamette Valley

Portland District's Willamette Valley flood risk management mission is to save lives and reduce property damage. During the wettest time of the year (mid-November through January), we operate our 13 dam and reservoir projects in the North and South Santiam, McKenzie, and Coast and Middle Fork Willamette river basins to help reduce flooding downstream. We store incoming water during significant rain events, and then release it as river levels subside. River levels may remain high for an extended time after rain events as we release stored water. Whenever possible, we try to keep river levels at or below the "bankfull" levels established by the National Weather Service.

We cannot prevent floods, but we can significantly reduce the level of floods and the damage they cause. Our dams can regulate about 88 percent of the total basin runoff that reaches the Jasper gauge above Eugene, 42 percent that reaches Salem, and 27 percent that reaches Portland. Since 1996, they have provided an annual average of almost \$1 billion in flood damage reduction. Click here for a map of the Willamette River Basin.

#### Spillway gates issues

Diagram illustrating a spillway gate structure with labels: **Deformation in top strut**, **Trunnion pin**, and **Spillway gate top strut**.

#### Water level impacts

#### Gate Tracking

We are reducing the risk of uncontrolled releases while continuing to provide flood reduction support through the winter. We have lowered the pool elevations at which spillway gates need to be opened, to reduce pressure on the gates and the potential for their failure. This in turn means the dams may need to release more water during flood events, leading to higher than usual downriver flows.

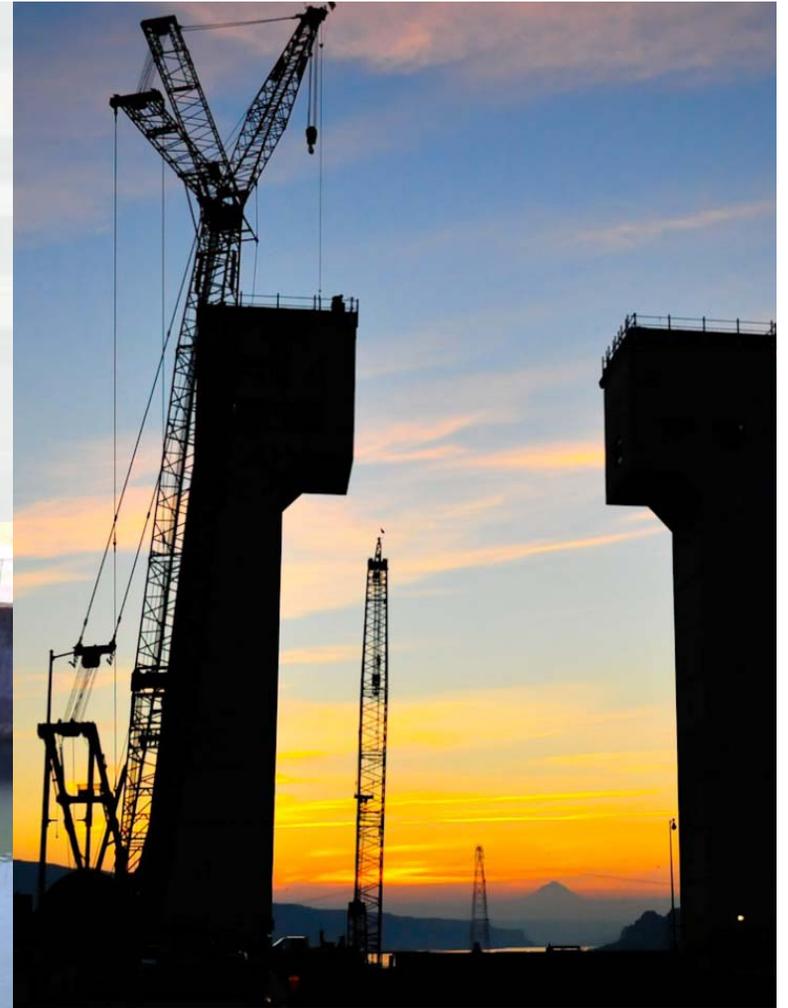
Diagram illustrating gate tracking with labels: **Gates remain closed when reservoir below top strut**, **Gates raised as reservoir level rises to keep water below top strut**, **Spillway gate top strut**, **Spillway crest**, and **Spill from reservoir**.

## Newport Jetty Warning Sign



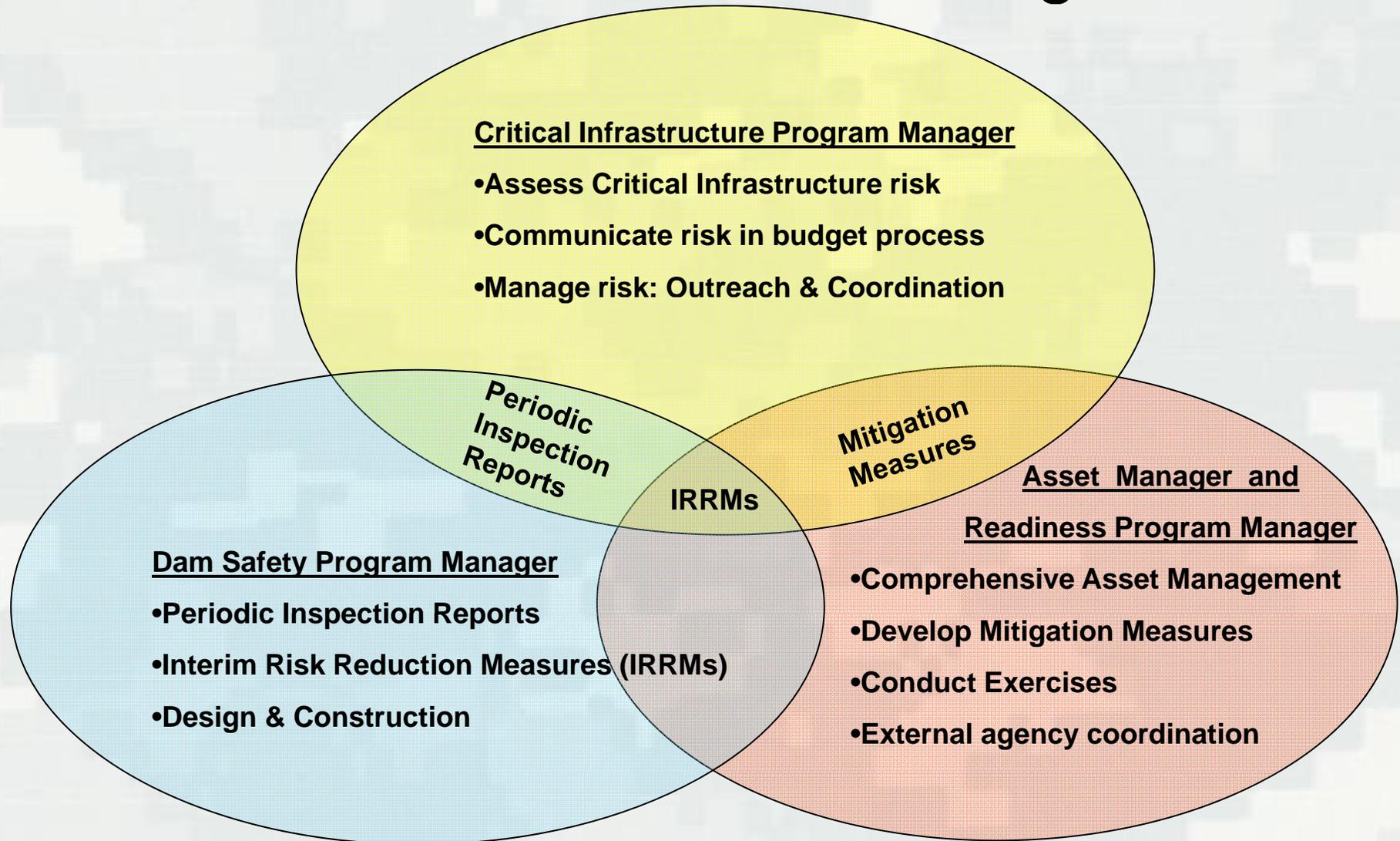
# Manage risks

## Dexter Dam Gate Repairs

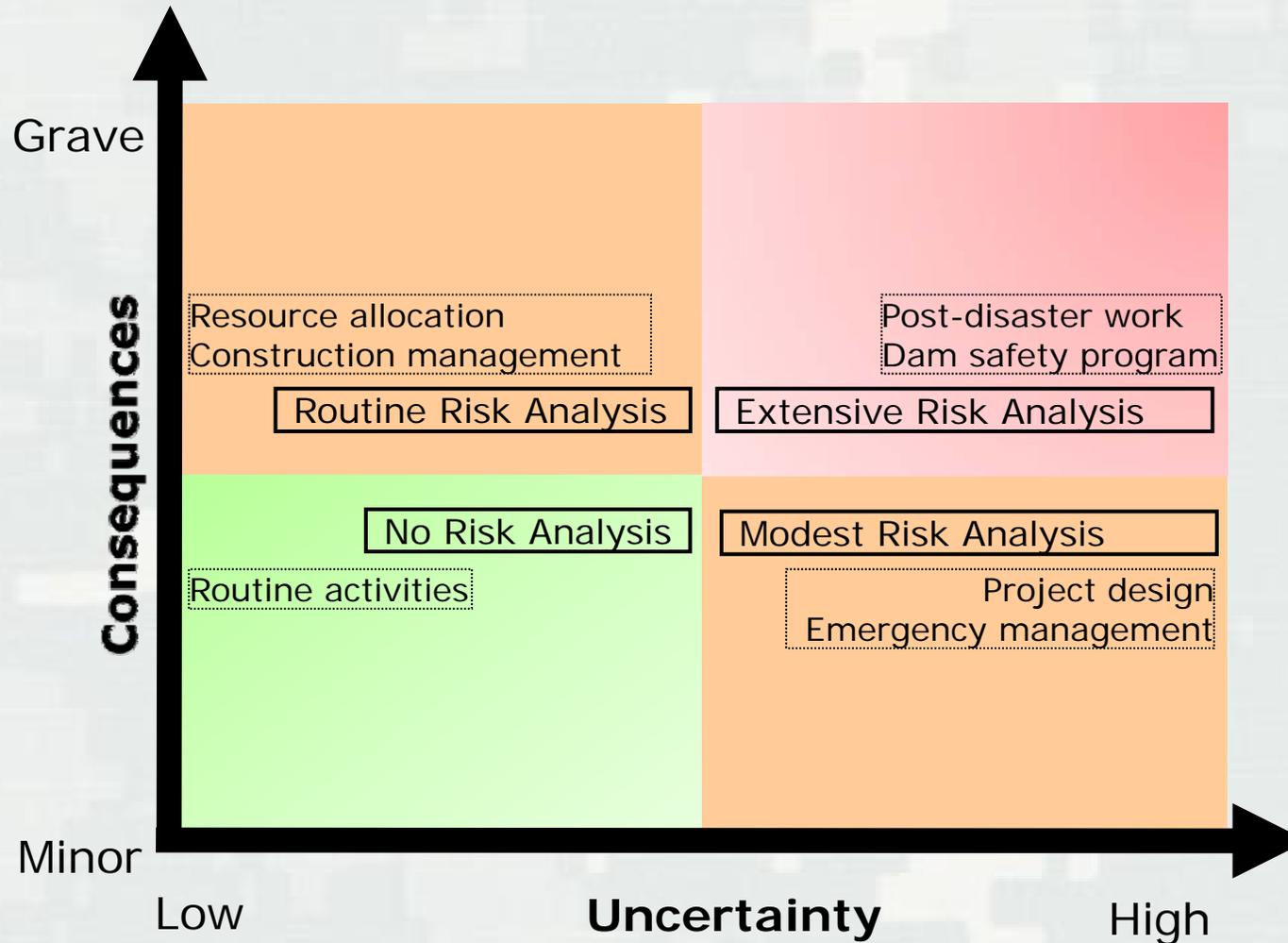


## John Day Navigation Lock Gate Replacement

# Portland District Critical Infrastructure Program

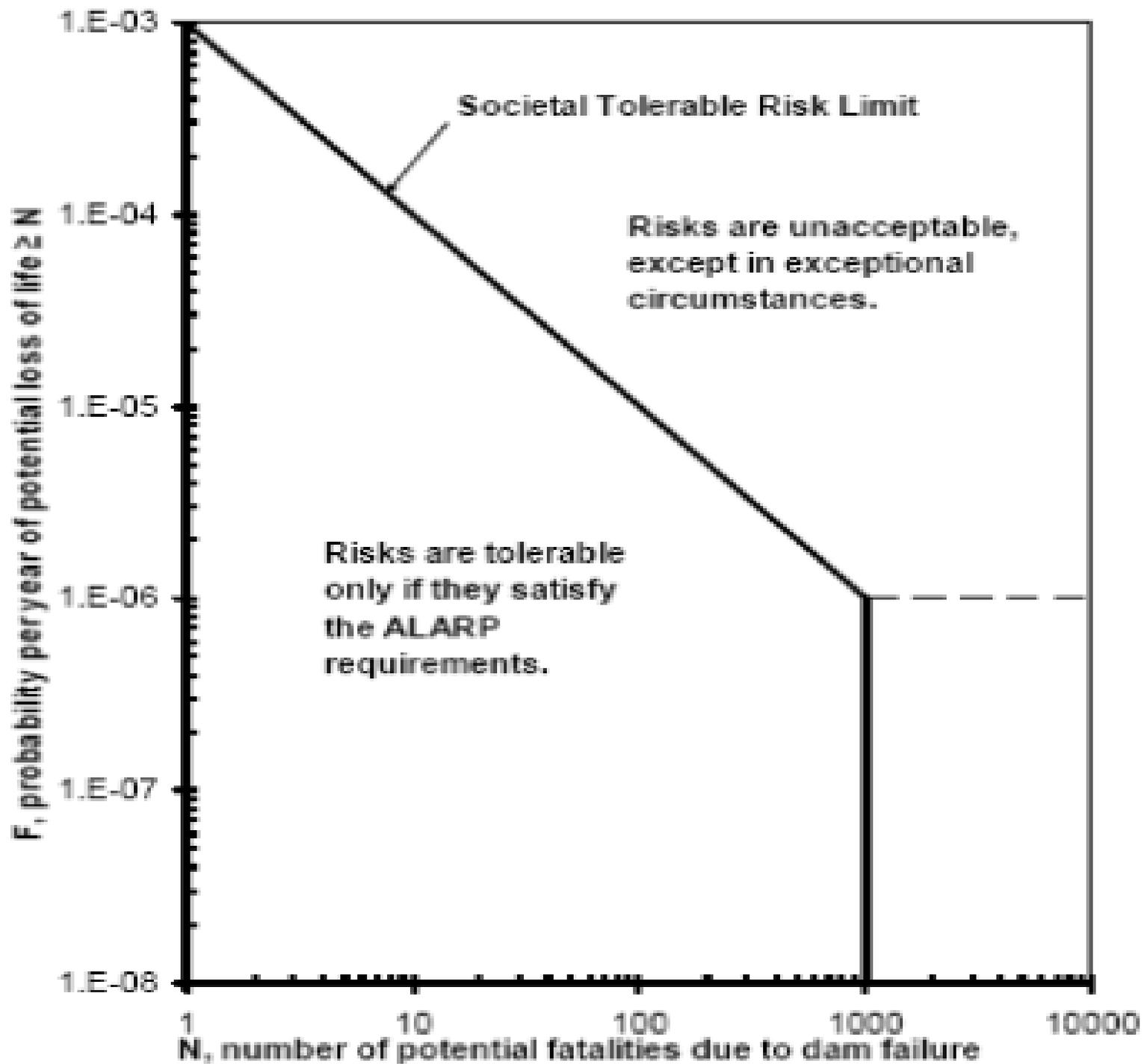


# When to do risk analysis



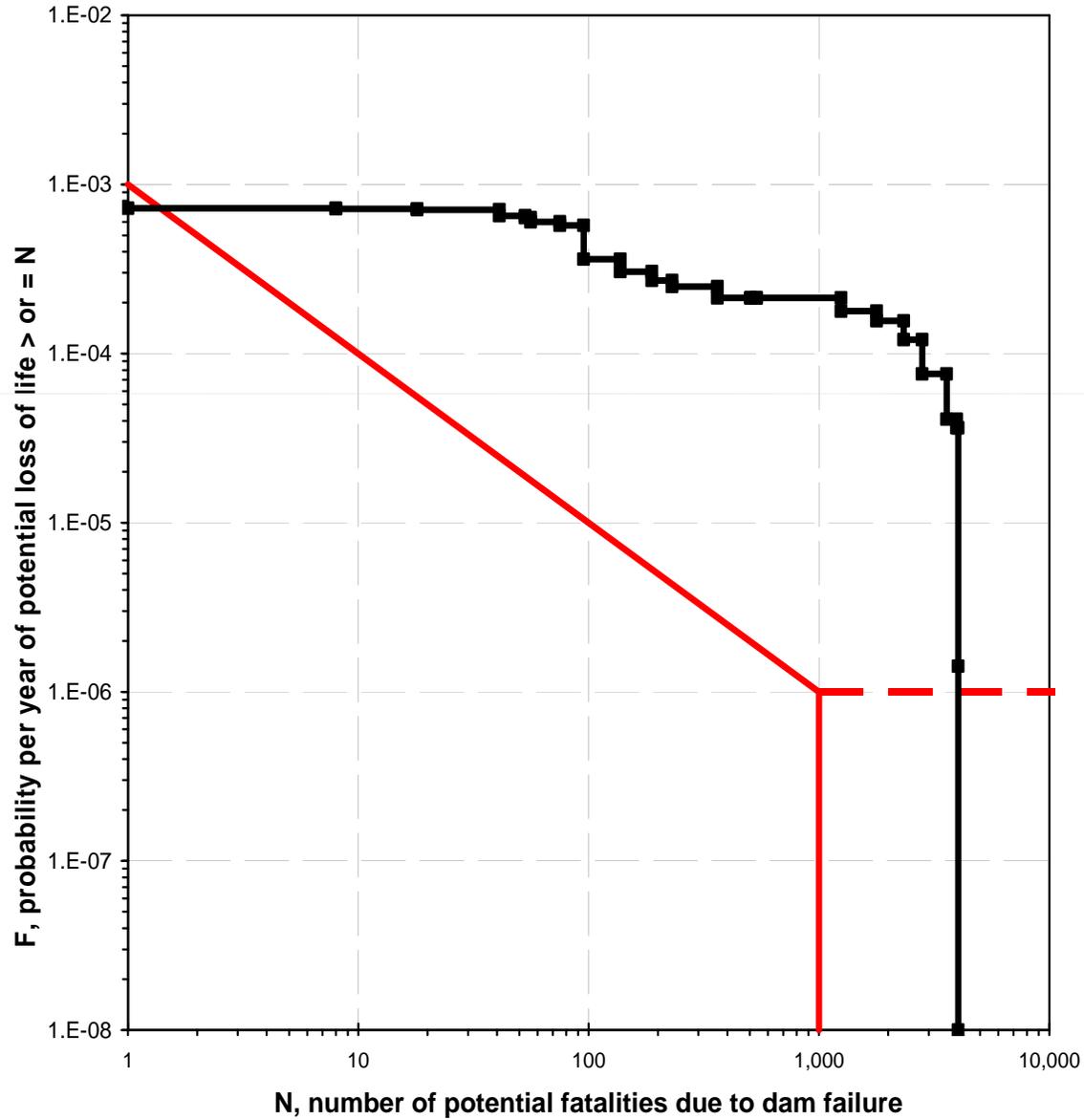
# Relative Risk Index Matrix

Condition		F Failed	D Poor	C Fair	B Good	A Excellent
Consequence Category	I National	1	2	6	10	15
	II Multi-Regional	3	5	9	14	19
	III Regional	4	8	13	18	22
	IV Local to Regional	7	12	17	21	24
	V Local	11	16	20	23	25



# Societal Risk - Probability

## Distribution of Potential Life Loss for Dam XYZ



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