



USING INTEGRATED RISK MANAGEMENT TO SUPPORT ADAPTIVE MANAGEMENT OF A LARGE SCALE CONTAMINATED SITES PROGRAM

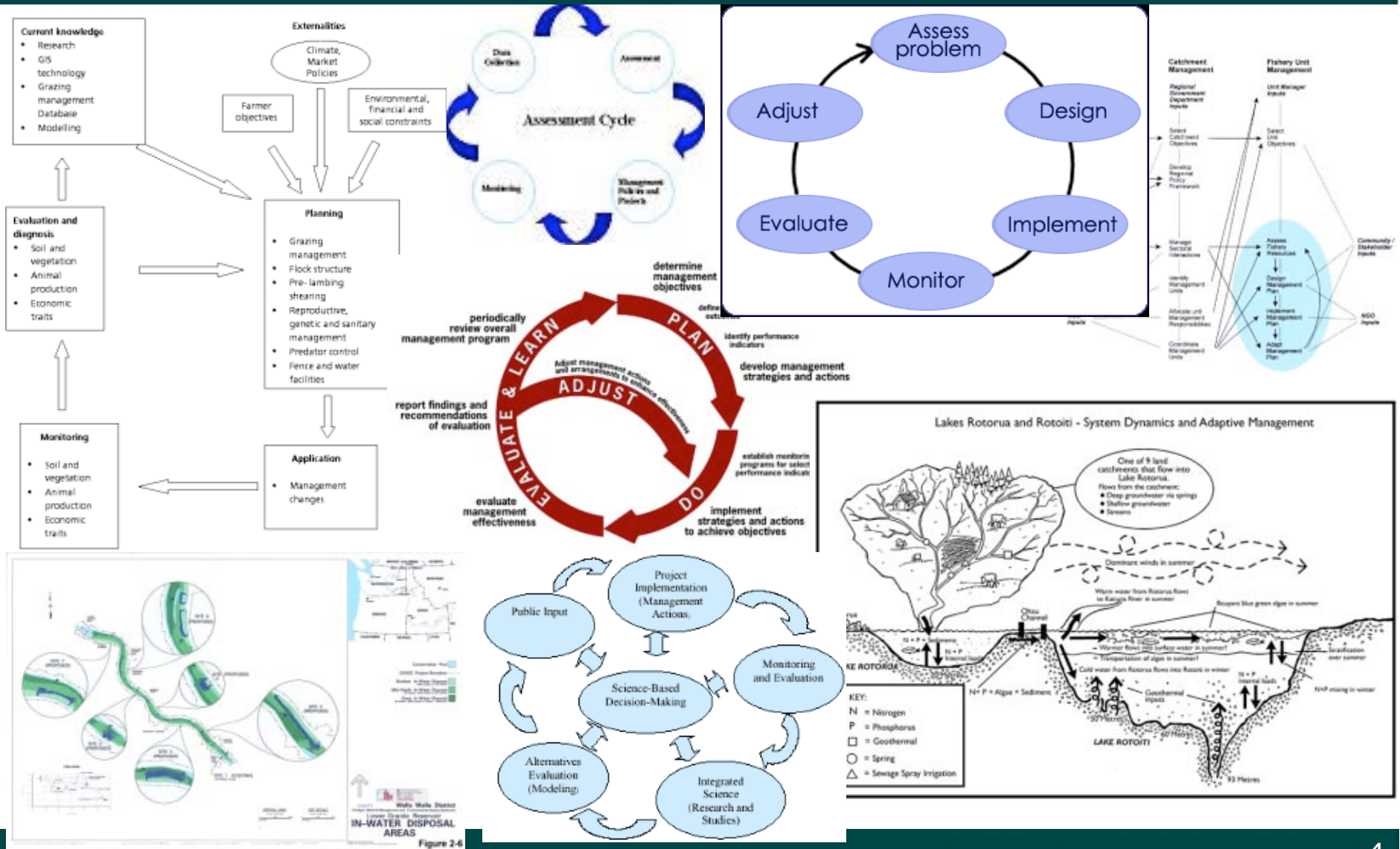
2008 RPIC Federal Contaminated Sites
National Workshop
Stream B, Remediation Management
Presentation 1
Tuesday April 29th, 9:30
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- What is adaptive management
- How can Integrated Risk Management be implemented in a Contaminated Sites Program?
- Where does Integrated Risk Management fit within adaptive management?
- Identifying and responding to risk information
- Steps to implementing a sustainable and risk based adaptive management regime

The History of Adaptive Management

- The origin of the approach and the use of the term is vague, some attributing it to Frederick Taylor, a scientist who studied “time and motion” (then called scientific management) in the early 1900’s and others attributing it to Dr. C. S. Holling in his work in 1978 at the University of British Columbia and the International Institute for Applied Systems Analysis.

The Many Faces of Adaptive Management



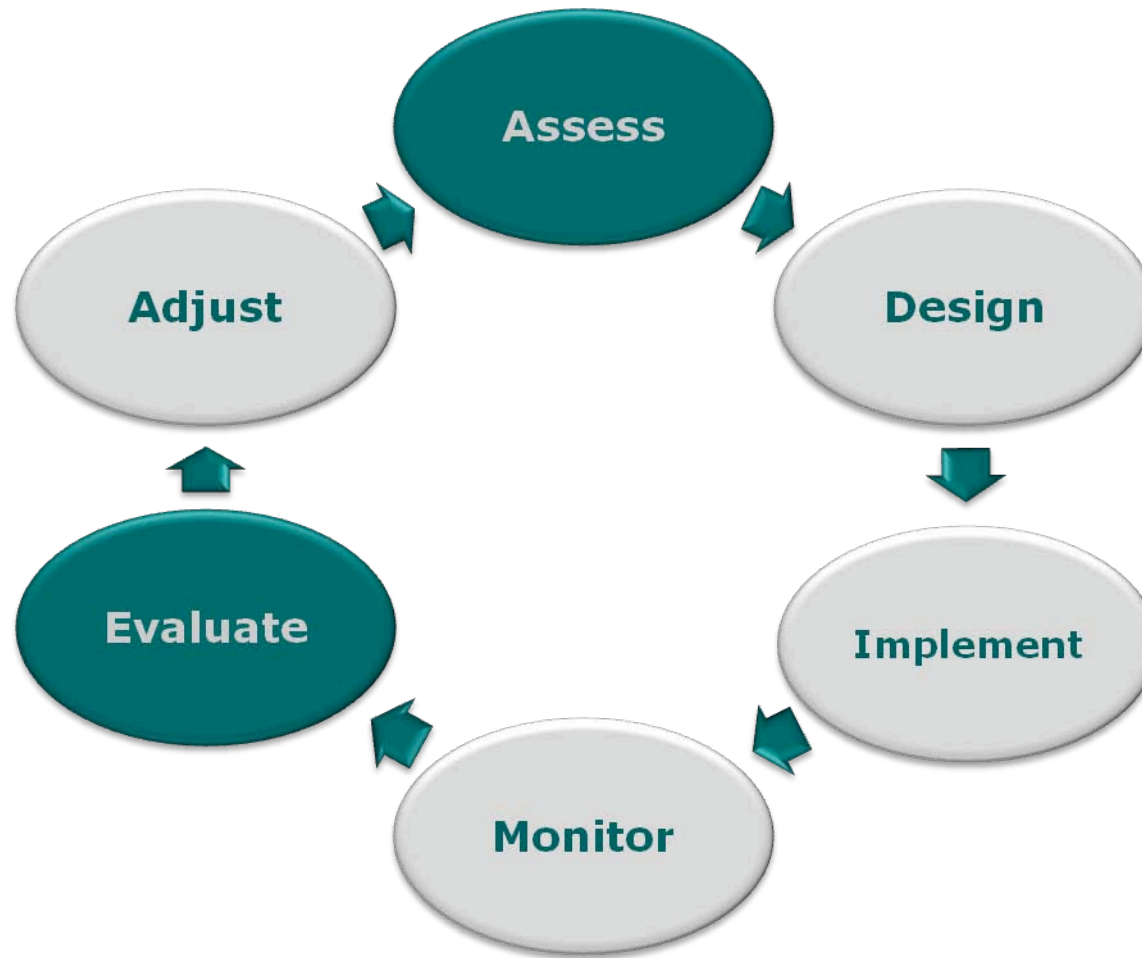
*"Adaptive Management is a
systematic process for **continually improving**
management policies and practices
by learning from the outcomes of operational
programs."¹*

Essentially, a quality improvement feedback loop...

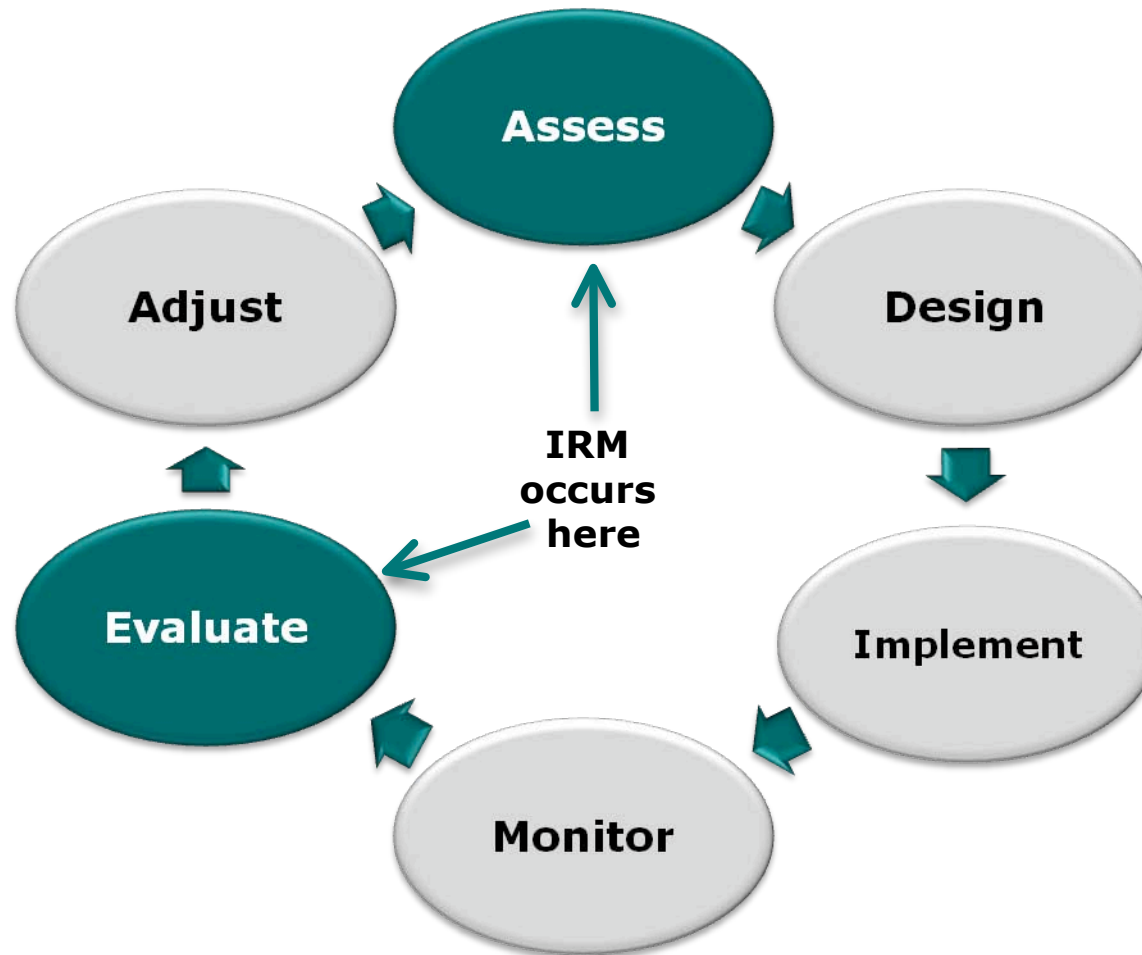
¹ (B. C. Forest Service <http://www.for.gov.bc.ca/hfp/amhome/Amdefs.htm>)

The Essential Adaptive Management Process

- A simple representation



Where Integrated Risk Management Fits In



- It is at this stage where the overall goal or objective of the enterprise is assessed.
- Where:
 - Activities → Outputs → **Outcomes**
- Often an evaluation framework or a “results based management accountability framework” (RMAF) is a good place to start.
- An RMAF shows how success is measured and who is accountable

Integrated Risk Management in the Assessment Phase

Integrated Risk Management:

- Starts with “what can, and does, go wrong?”
- It looks to similar enterprises and experiences
- Seeks specifics for:
 - ✓ Causes (risk drivers)
 - ✓ Remedies (mitigation)
 - ✓ Consequences (if/when the risk expresses)

This can be done for an existing, or proposed, activity

Sample Risk Information Sheet

There is a risk that . . .

Statement of the risk event that, if it materializes, can negatively affect the achievement of enterprise objectives

Risk Drivers

- Identifies possible sources of the risk event, such as environmental factors or management framework weaknesses

Current Risk Mitigation

- Identifies examples of current actions, processes, controls, etc., that reduce likelihood of risk occurring, or severity if it were to occur

Possible Consequences

- Describes possible impacts if the risk were to fully express

Overall Objective for a Contaminated Sites Program

"Managing contaminated sites to reduce and eliminate, where possible, risk to human and environmental health and liability associated with contaminated sites in a cost-effective manner"

1. To meet federal and departmental policy obligations
2. To require that the sites be assessed in a timely, consistent and cost effective manner
3. To provide a scientifically valid risk management based framework for setting priorities, planning, implementing and reporting

4. To remediate all NCS 1 contaminated sites in the North on a priority basis (unless an alternative form of management is appropriate)
5. To promote the social and economic benefits that may accrue to northern Aboriginal peoples and Northerners when carrying out required activities
6. To promote the federal “polluter pays” principle

Activities → Outputs → Outcomes

To Meet Legal and Policy Obligations...

Program Components

- Liaison with federal departments and agencies (e.g. Interdepartmental Regional Working Group)
- Ongoing identification and tracking of requirements in each region (tracking territorial requirements)
- Internal communication of requirements, monitoring and compliance by site (e.g. audits, quarterly reporting)
- Consultations (Local communities and self-govt requirements, constitutional requirements, regulatory, ...)
- Procurement (e.g. FTA, Aboriginal Content Requirements)
- Transfer resources & responsibilities
- Delivery of DTA obligations
- Applying for permits and licenses
- Compliance with applicable internal and external regulations and licenses
- Activities to support ISO compliance
- Ensuring compliance with applicable H&S regulations

Outputs

- Listing of policy and regulatory requirements
- Work Plans/procedures to reflect requirements
- Reports on conformance/status of violations/corrective actions

Outcomes

- Aware of applicable regulation and policy requirements
- In compliance with all relevant legislations, regulations, policies and procedures
- Reports on conformance/status of violations/corrective actions

Sample Risk One: Logistics

There is a risk that logistics failures or limitations of winter roads, and air, land or water transportation firms will prevent the Contaminated Sites Program from achieving its objectives.

Risk Drivers

- Impact of weather
- Season length including warmer winters limiting the reliability and capacity of winter roads
- Limited number of fixed and rotary wing aircraft for charter
- High prices for charter because of competition from other development (e.g. diamond mines)
- Access to winter roads
- Limited capacity to store fuel at distribution facilities
- Discontinuity between remediation ability and logistics/transportation
- Quality of airstrips

Current Risk Mitigation

- Scheduling to account for anticipated delays, especially for mobilization
- PWGSC Pre Authorized Amendment Approval and Potential Additional Work (Contingency)
- Communication (e.g. inclusion of PWGSC in directors' call)
- Coordination with winter road joint users group (NWT only)
- Provide opportunity to transportation firms to go on site visits

Possible Consequences

- Remediation project delays
- Assessment delays
- Increased costs
- Missed milestones
- Lapsed funds
- Non-compliance with land-use permits
- Escalating costs due to perception of logistics risks

Sample Risk Two: Major Unanticipated Change

There is a risk that detailed assessments reveal larger scope and or far higher complexity and costs than were anticipated.

Risk Drivers

- Permafrost has not behaved as expected in some cases dramatically increasing costs and complexity
- Climate Change drives extreme weather events or other changes at a rate that has not been anticipated.
- Link to 'Funding' risk
- Risk managing assessments at remote sites (heavy equipment costs prohibit more thorough assessments)
- Site changes (e.g. Disruption) between assessment and remediation
- Linked to procurement risk

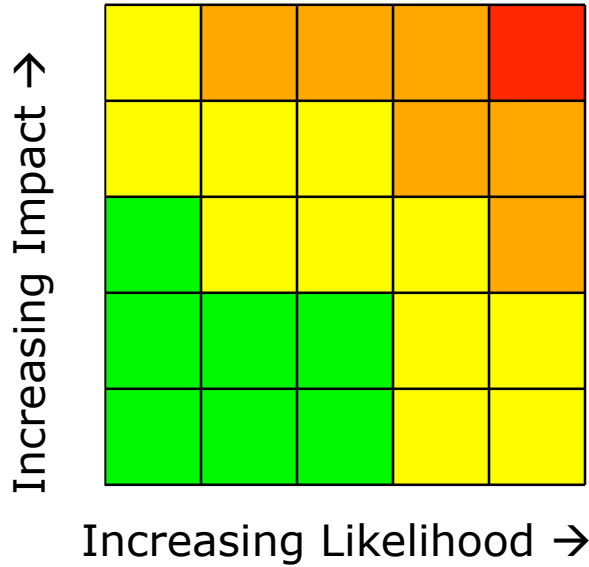
Current Risk Mitigation

- PWGSC Pre-Approved Amendment Authority (PAAA)
- Contingency funds (Potential Additional Work)
- Experience in conducting assessment and selecting consultants (ability to recognize patterns at similar sites)
- Corporate procedures
- Training
- Terms and conditions of contracts (e.g. Unit rates for additional work, procedures for work outside of scope)

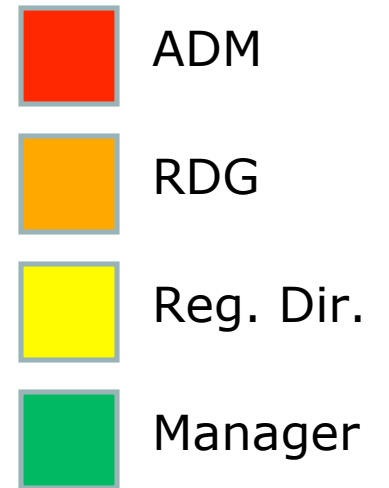
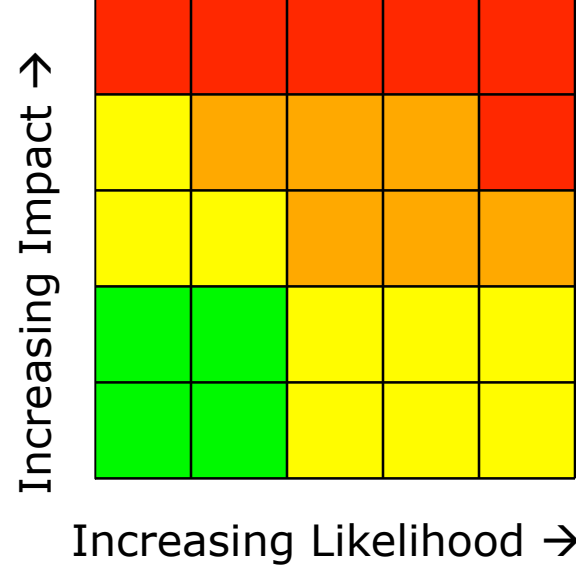
Possible Consequences

- Failure of implemented remediation solution
- Increased H&S risks
- Increased costs
- Impacts to ecosystem

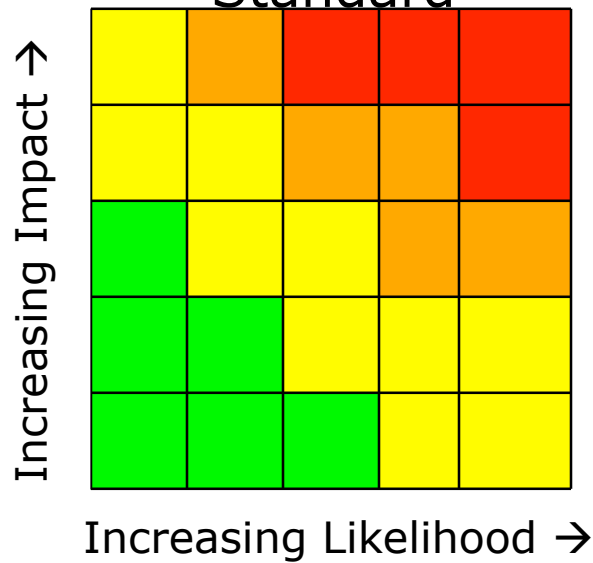
Large Appetite for Risk



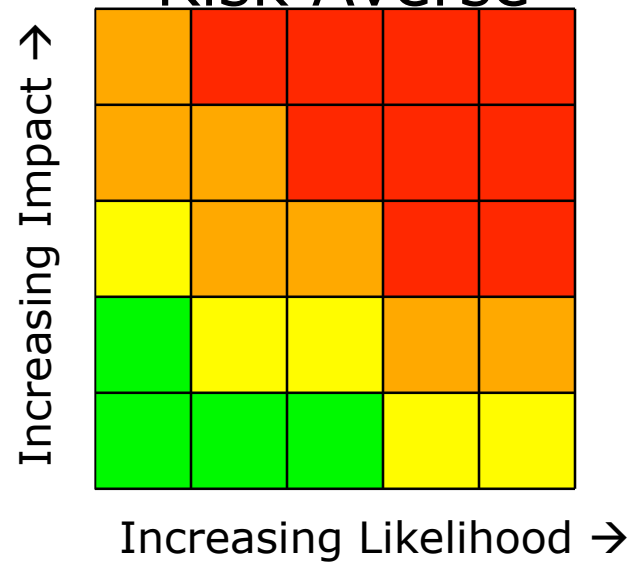
Plan for All Extreme Risks



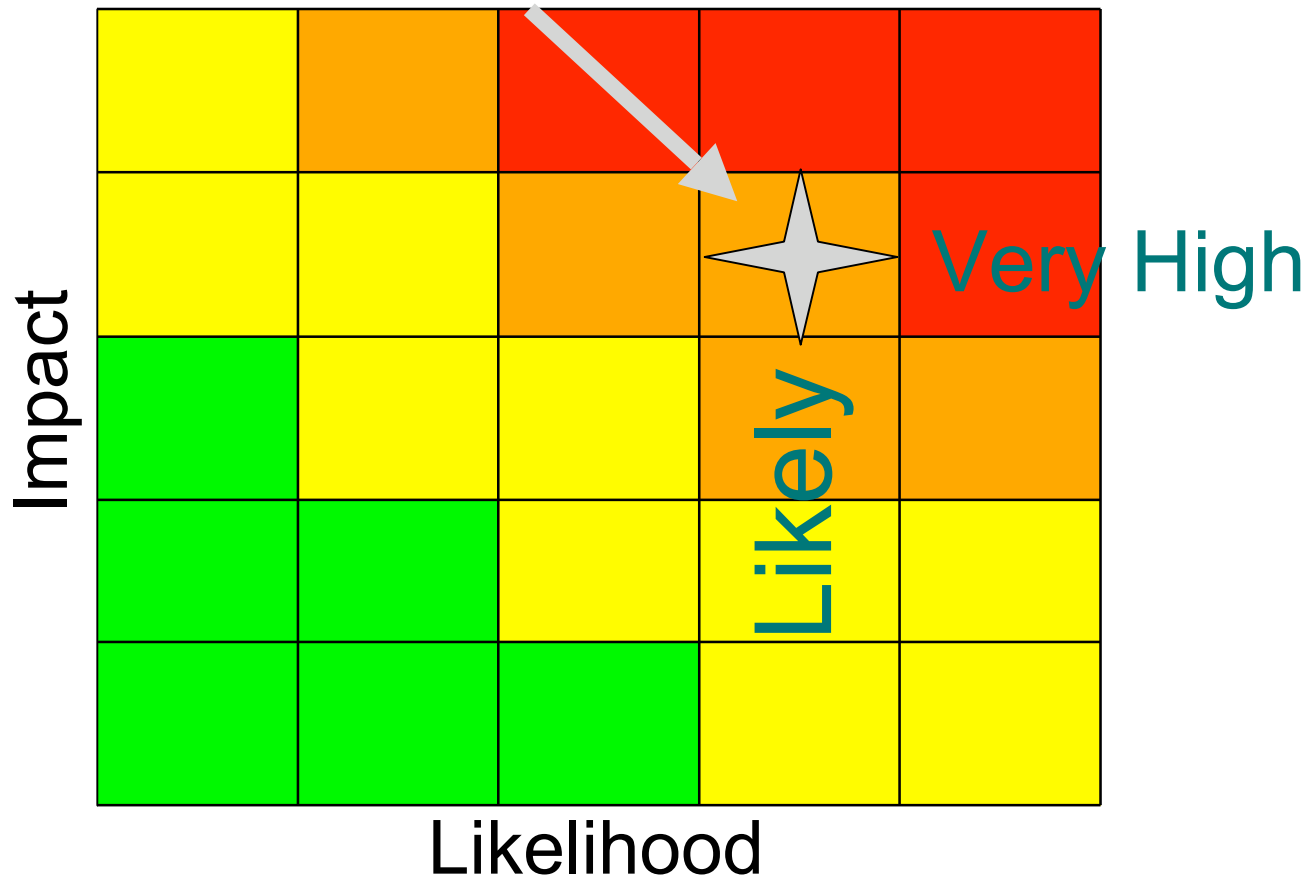
Standard



Risk Averse



The Nature Of the Risk



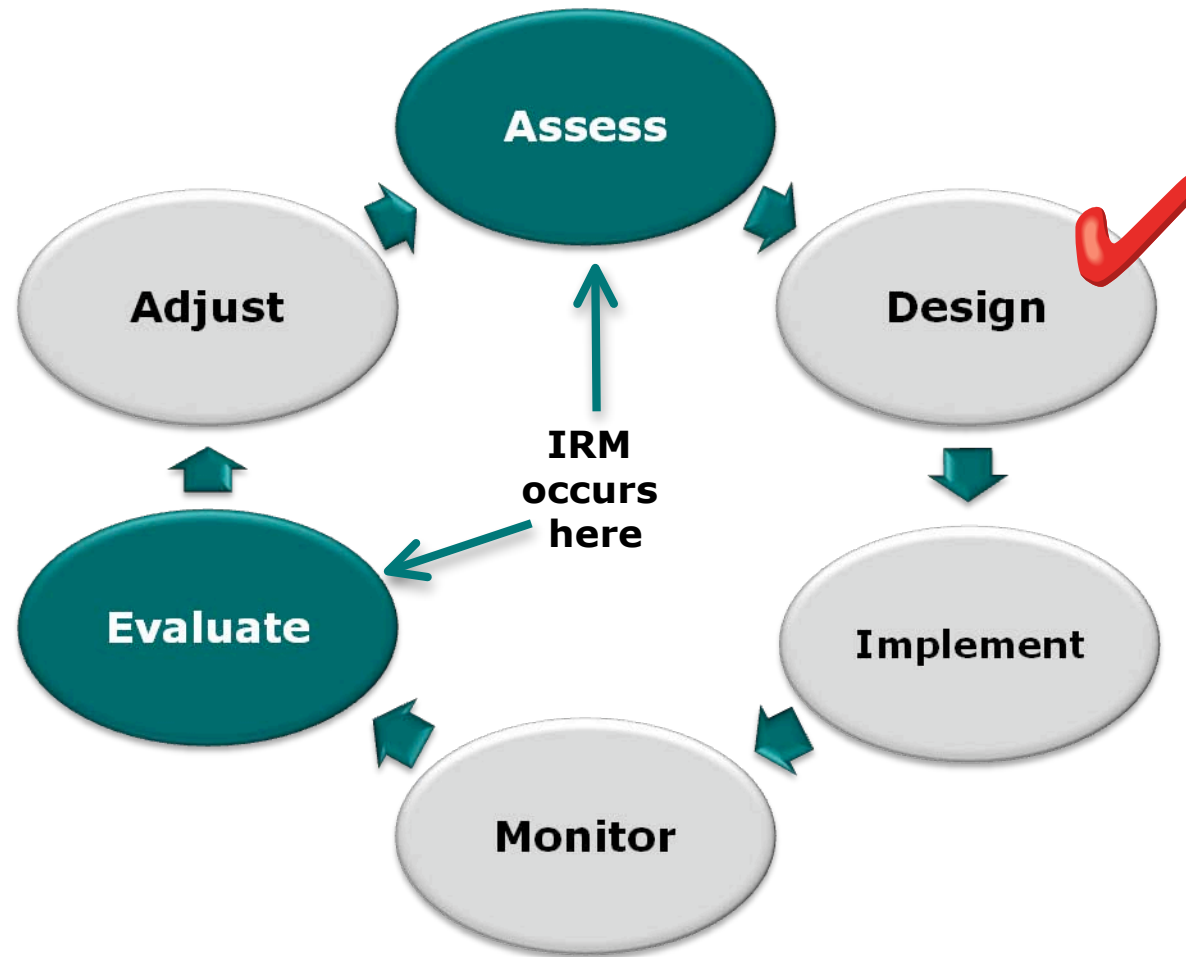
Risk Assessment by Strategic Objective

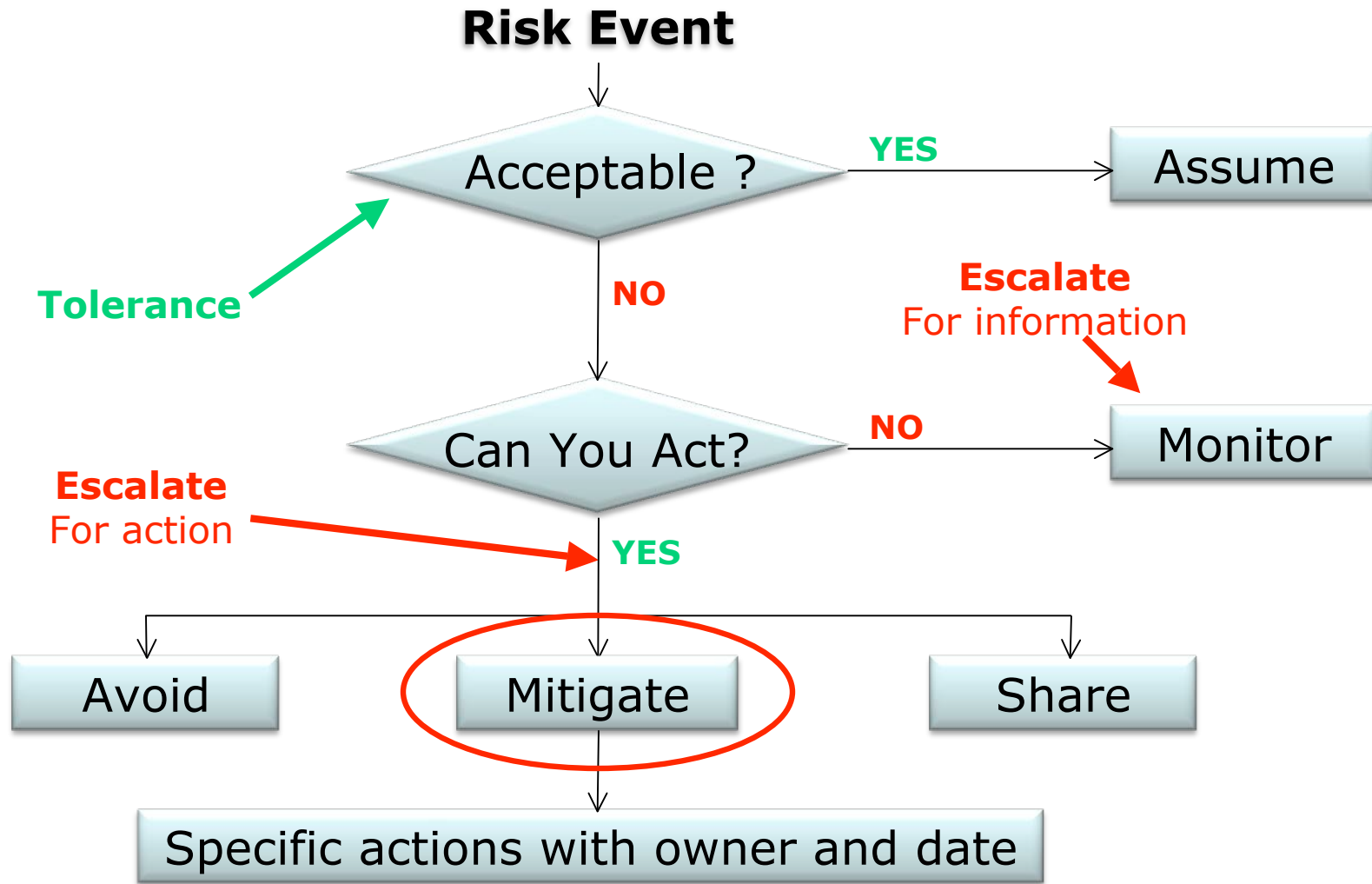
Table Showing level of risk for each objective

Risks → Objectives ↓	A	B	C	D	E	F	G	H
1	Yellow	Green	Red	Yellow	Green	White	White	White
2	White	White	Yellow	Yellow	White	White	Orange	Orange
3	Orange	Green	White	White	Yellow	White	White	Green
4	Red	Red	Red	White	Yellow	Orange	Orange	Green
5	Yellow	Red	White	White	Yellow	White	White	White
6	Yellow	White	Orange	Green	White	White	Yellow	Yellow
7	Yellow	Red	White	Green	White	Orange	Orange	White

**FOR
ILLUSTRATIVE
PURPOSES
ONLY**

The Next Step is Design

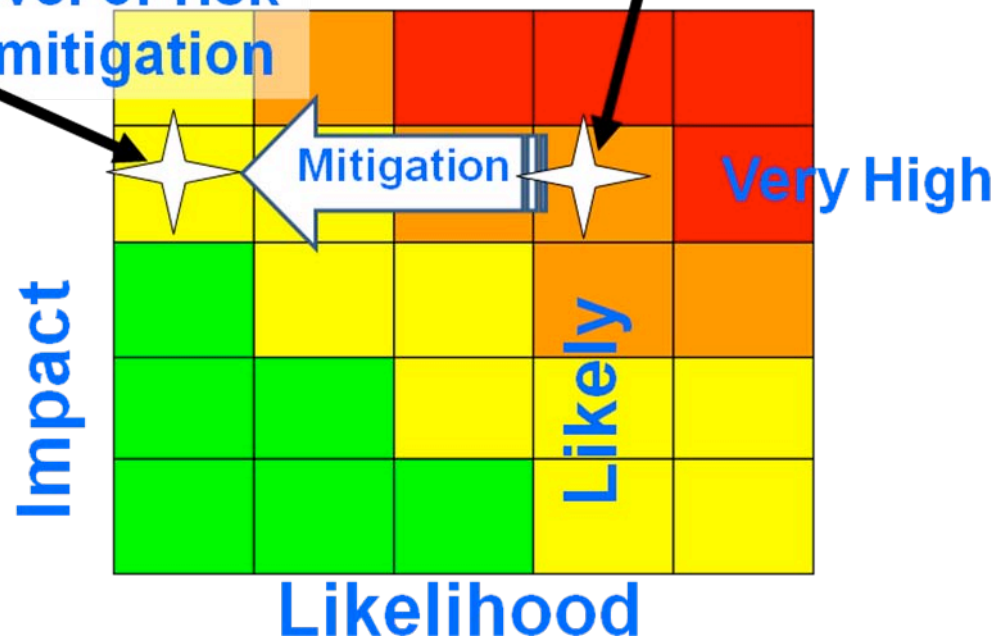




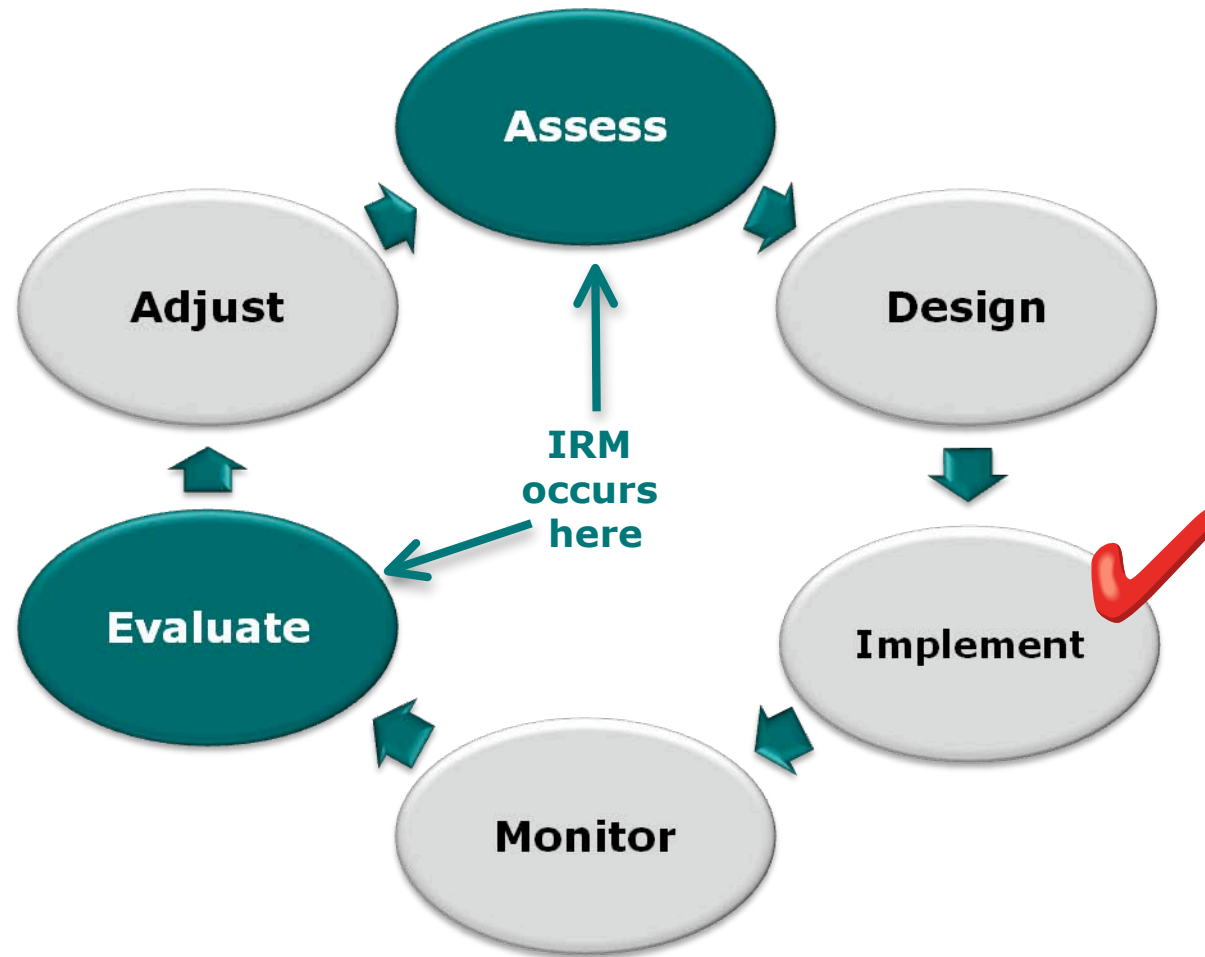
The Profile of One Risk

The level of risk **before** mitigation

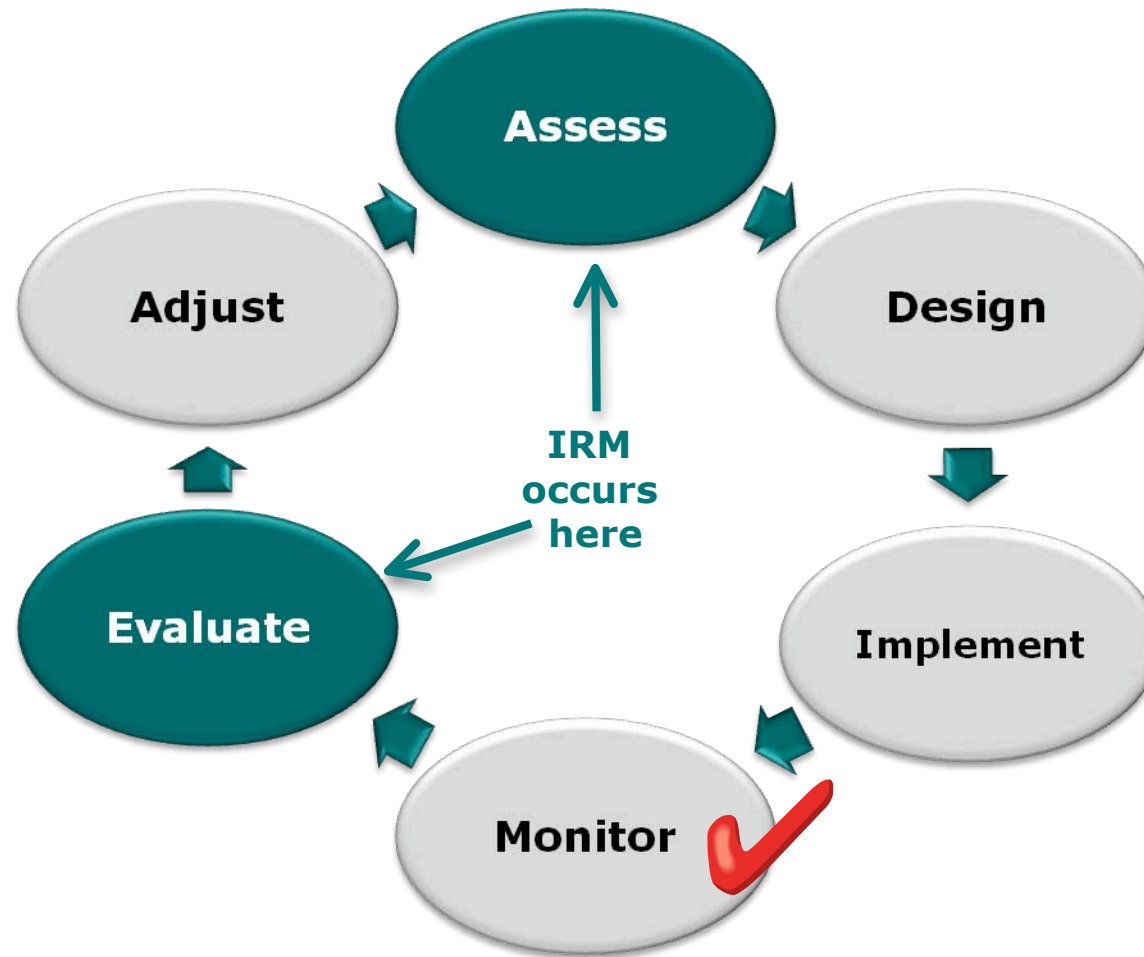
The level of risk **after** mitigation



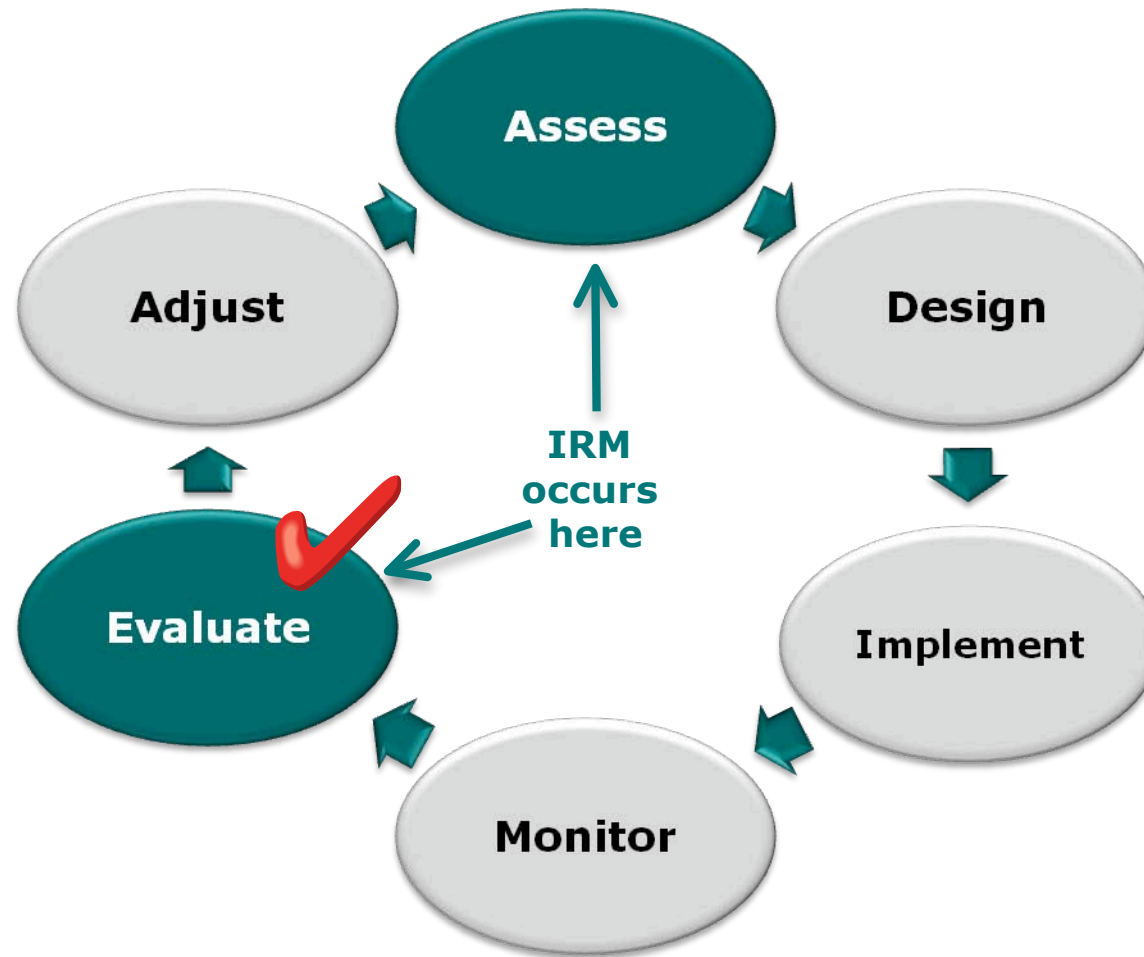
The Next Step is Design



The Next Step is Design



The Next Step is Design



Enterprise Wide Evaluation of Mitigation

Table Showing the effect of mitigation on the level of risk for each objective

Risks → Objectives ↓	A	B	C	D	E	F	G	H
1	→							
2								
3	→							
4	→							
5								
6								
7								

FOR ILLUSTRATIVE PURPOSES ONLY

In response to the evaluation step

Adjust

To account for mitigation that has worked, and to identify mitigation that has been incomplete or ineffective.

Adaptive Management is well suited to annual planning

*"Adaptive Management is a **systematic process** for **continually improving** management policies and practices **by learning from** the outcomes of operational programs."¹*

Adaptive management, informed by integrated risk management is a reliable method to optimize performance.

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Questions?