

# Let's talk about risk: Engaging on low-likelihood, high-consequence events

---

## Openly Discussing High Consequence Events with Context and Bounds



**Matt Horn, Ph.D.**

*Principal Scientist & Operations Lead, Tetra Tech  
United States*

<https://www.linkedin.com/in/matt-horn-a7080872/>

<https://www.tetrattech.com>



# High Consequence Events



# Assessment Cycle



- Conduct Assessment(s)
- Engagement & Regulatory Review
- Questions, Comments, Clarifications, and Additional Requests
- Re-work... (lather, rinse, and repeat)

**New North American norm / expectation is to ~~meet~~ far exceed regulatory standards.**

**Similar internationally.**

# Framing the Assessment

Consequence



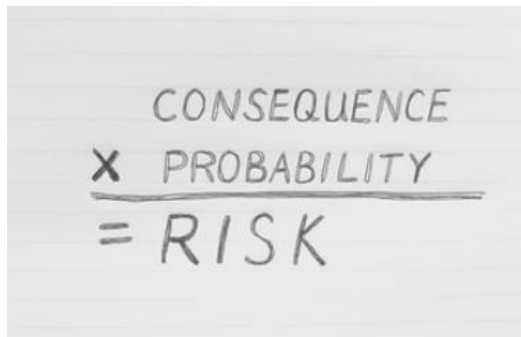
Likelihood

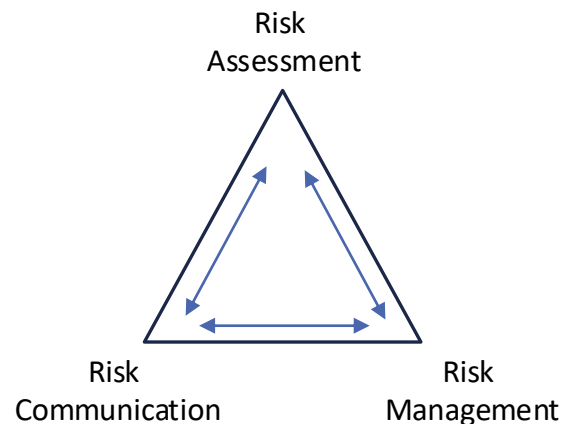
Emergency  
Response

# Communicating Risk & Consequence

- **Tough Conversations:**

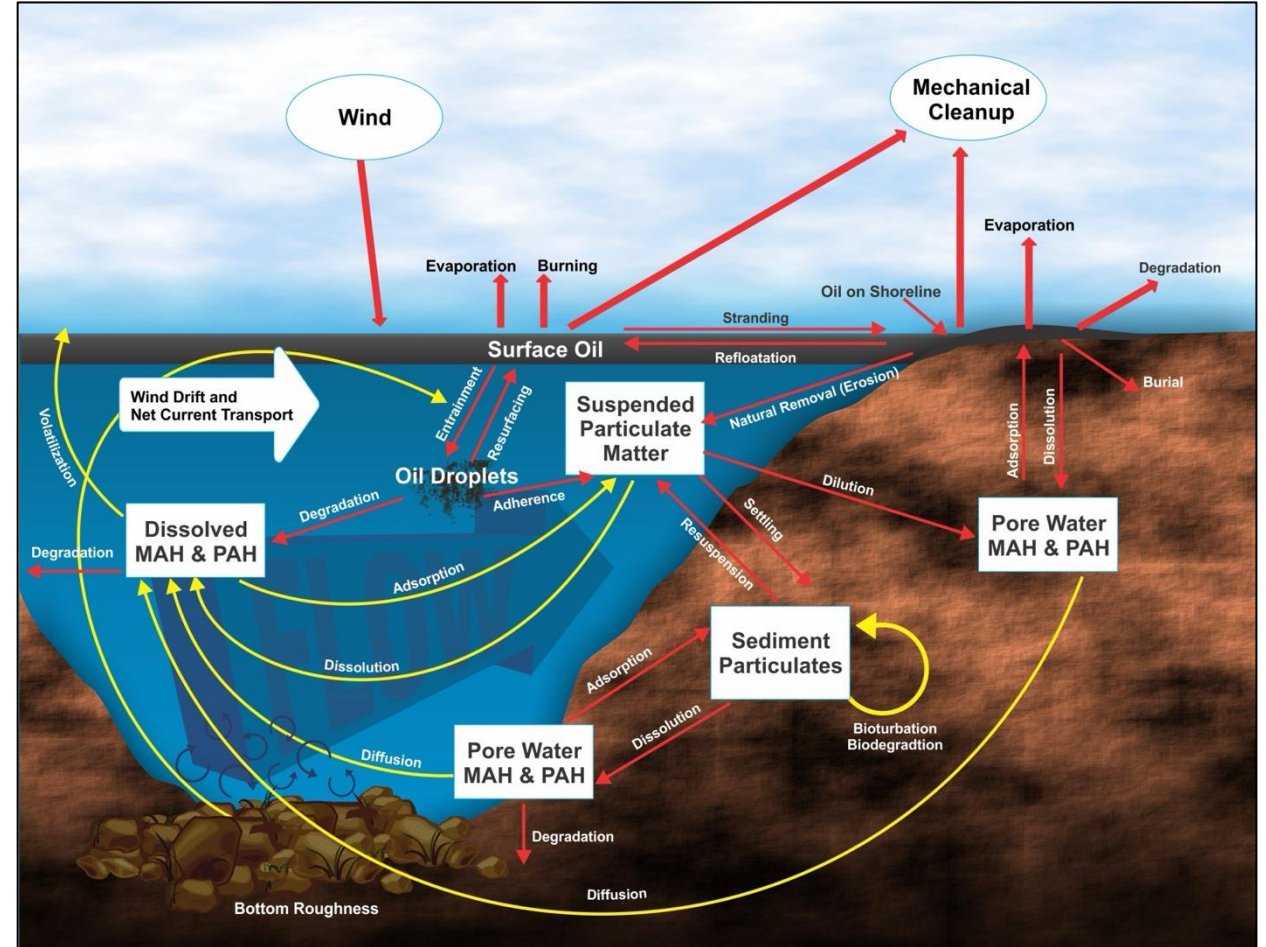
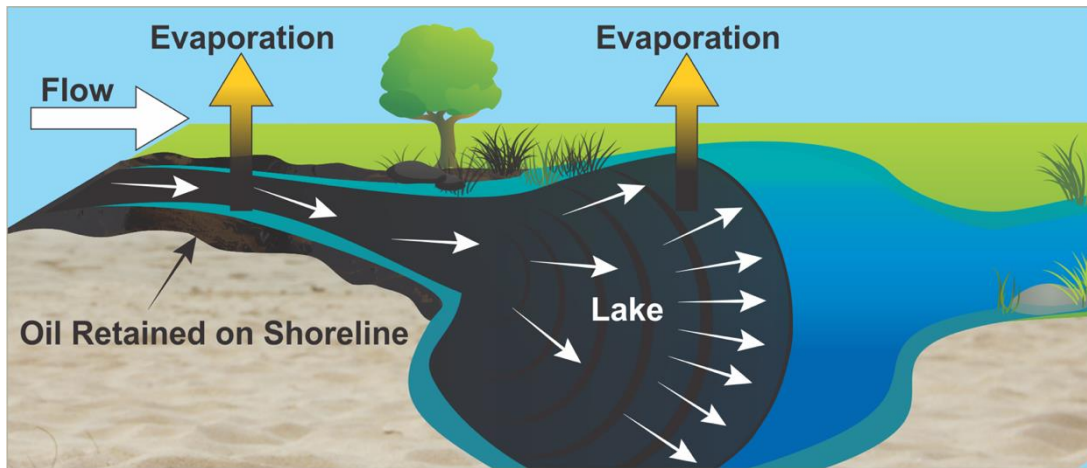
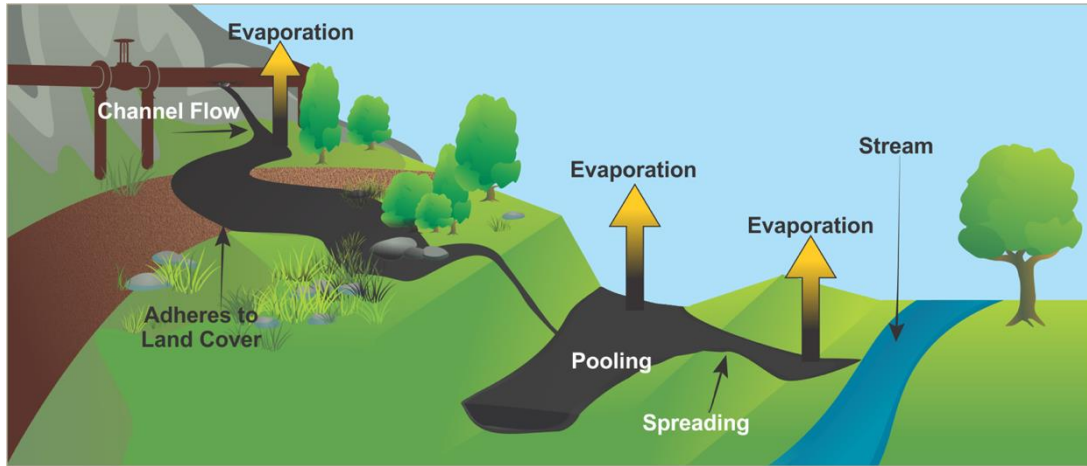
- **Consequence** – the “effect” of a given activity or event
- **Probability** – the “likelihood” that an event will occur
  - Chance, probability, likelihood, return period, etc.
- **Risk** – a situation involving exposure to *danger*


$$\begin{array}{r} \text{CONSEQUENCE} \\ \times \text{PROBABILITY} \\ \hline = \text{RISK} \end{array}$$



		IMPACT				
		VERY LOW	LOW	MEDIUM	HIGH	VERY HIGH
PROBABILITY	VERY LIKELY	Yellow	Orange	Red	Red	Red
	LIKELY	Green	Yellow	Orange	Red	Red
	POSSIBLE	Green	Yellow	Yellow	Orange	Red
	UNLIKELY	Green	Green	Yellow	Yellow	Orange
	RARE	Green	Green	Green	Green	Yellow

# Identifying Approaches



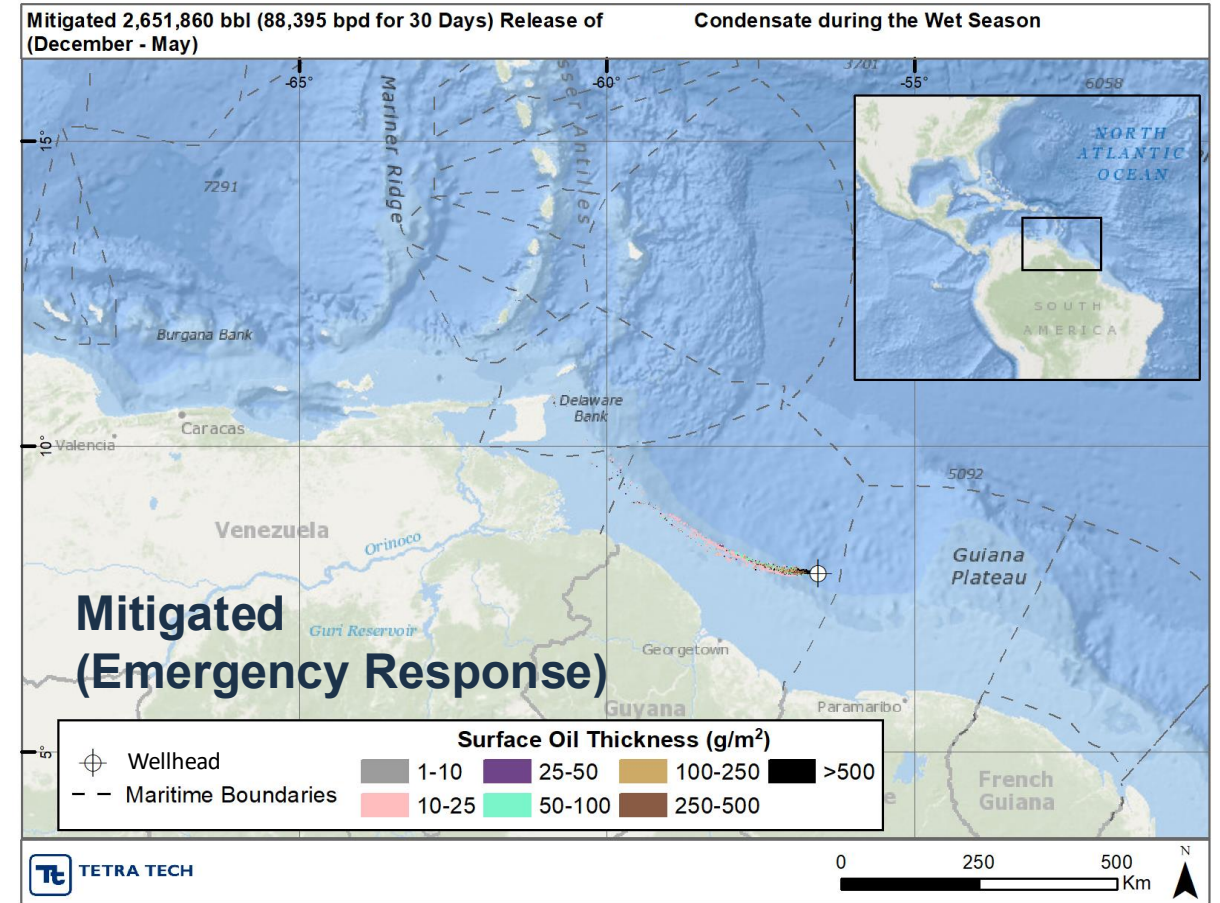
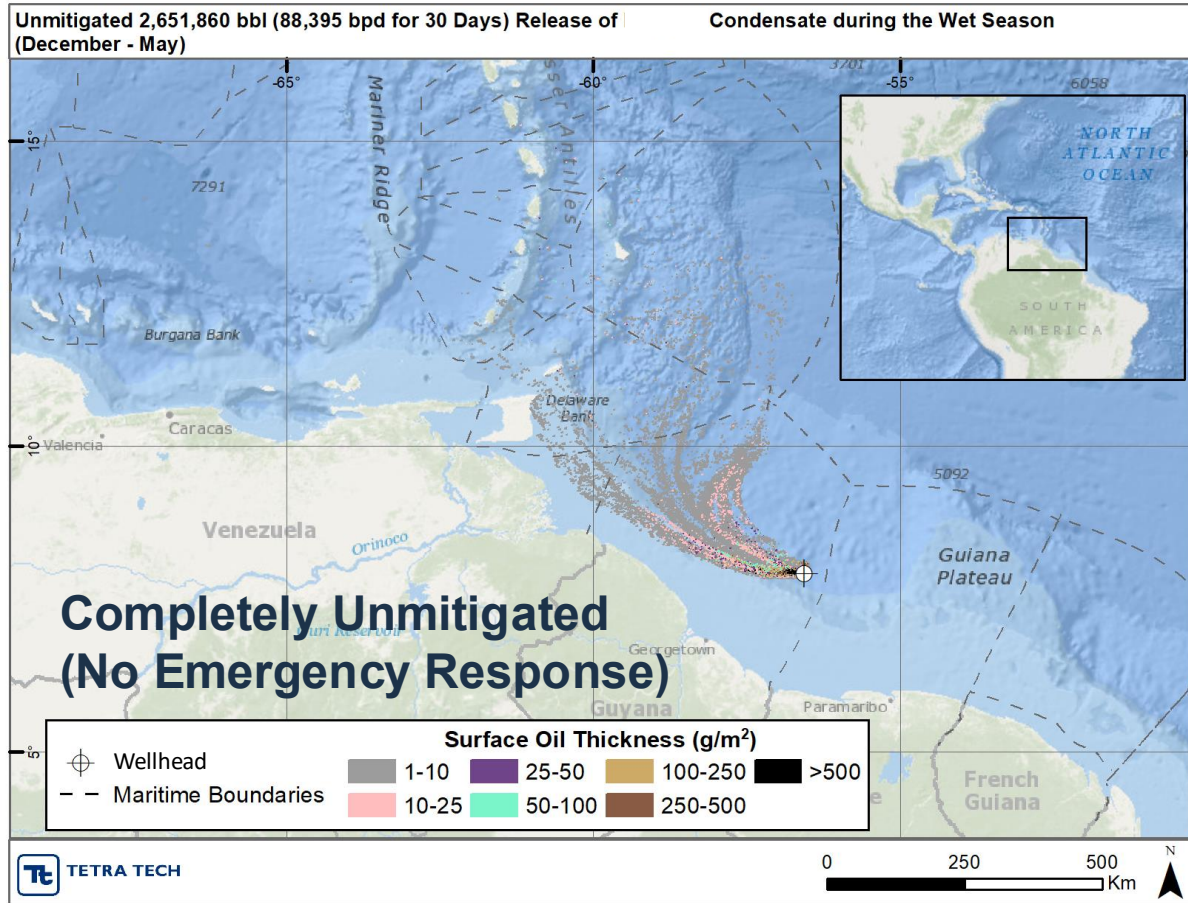
# Developing Scenarios

- **Levels of Assessment:**
  - High level and qualitative (rapid and low cost) vs. detailed quantitative (longer time and higher cost) assessment
  - Use realistic scenarios and representative locations/scenarios to **limit the infinite**
- **Modeling Assessment Examples:**
  - Atmospheric
  - Fire & Explosion
  - Overland
  - In-water
  - Subsurface
- **Scenarios:**
  - **Cast a wide net:** Vary release volume, location, season, environmental condition (e.g., river flow conditions, atmospheric stability, receptor presence, etc.), release conditions (delayed vs. immediate ignition), inclusion/exclusion of emergency response mitigation





# Logical Comparisons



**Cumulative Maximum Surface Oil Thickness Over Entire Simulation**



# Company Engagement

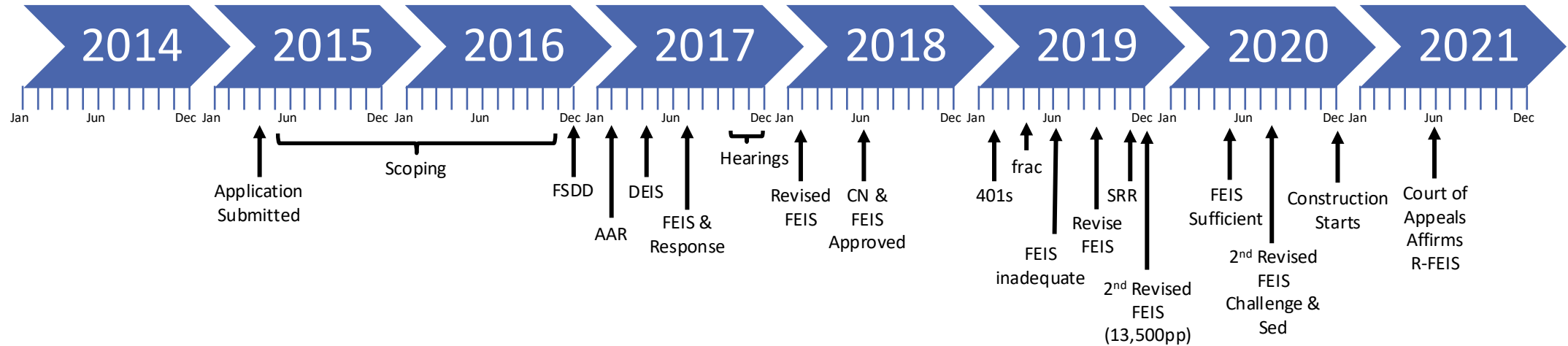
- Regional Engagement
- Project Engagement
- Addressing Stakeholder Input
- Public Awareness Programs
- Emergency Responder Engagement
- Spill Modeling Focus (★)
  - Hypothetical Nature
  - Enhances Awareness (planning)
  - Informs Decisions

**Listen and Adapt!**

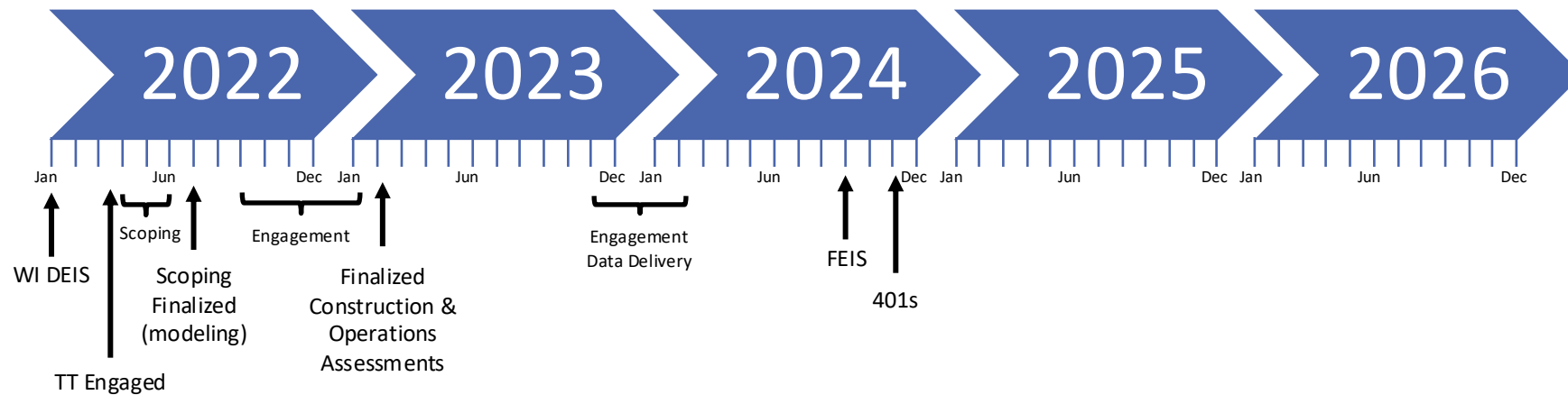
Ways we engage	Landowners and tenants	Community members	Emergency responders	Government and regulators
★ Face-to-face meetings	•	•	•	•
★ Newsletters, brochures and other collateral mailouts	•	•	•	•
★ Town halls and open houses	•	•		
★ Websites	•	•	•	
★ Social media	•	•		
★ Landowner advocacy group workshops and presentations	•	•		
Community events (such as BBQs)	•	•	•	
Employee volunteer projects		•		
Partnerships with local and regional organizations		•		
Community investment projects		•	•	•
★ Online emergency responder training			•	
Facility and ROW tours	•	•	•	•
★ Emergency response tabletop exercises			•	•
★ Regulatory compliance				•

# Timeline Comparison

## Project A: ~6 years to complete FEIS



## Project B: ~3 years\* to complete FEIS



# Lessons Learned

- **Communicating Early and Often:**
  - Engage at inception to allow others to enhance awareness (planning) and help inform the assessment.
  - Don't shy away from complexity / scary
  - What will be assessed, how (what tools), what will be provided, and how this can be used to inform a decision
- **Identify Stakeholder Concerns:**
  - Public Fears / Misconceptions / Refocus if necessary
  - Identify key receptors of concern
- **Reiterate Hypothetical Nature:**
  - Assumed events, location, and conditions that may never occur
  - Focus on Prevention, Identification, BMP, Mitigation & Response
  - Conservative nature of all assumptions (WCD, unmitigated)
- **Limit the Infinite:**
  - Cast a wide net when identifying scenarios, but recognize that there will always be another scenario to assess
  - Get it right from the start by doing more than required/regulatory minimums



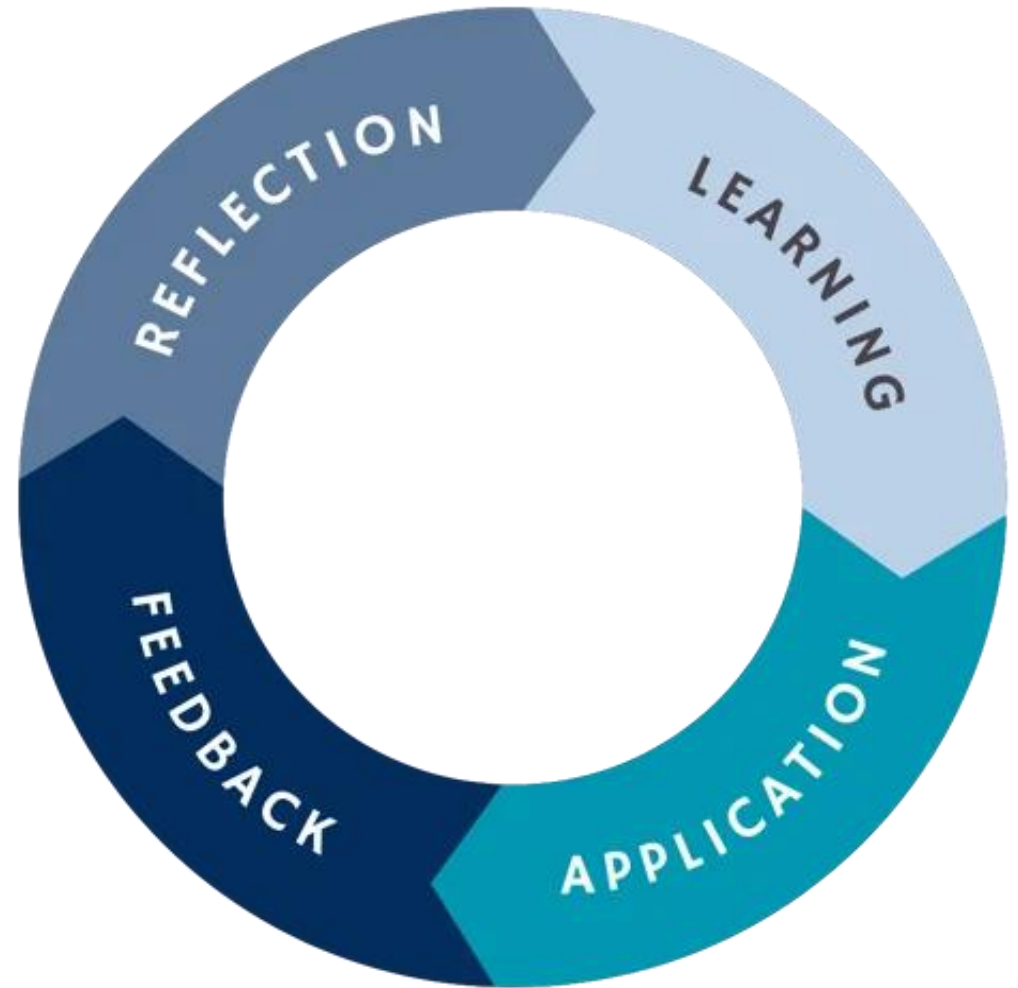
Andrew Jones, 2013

# Conclusions

- Timelines for project review and approval is growing increasingly long, especially with numerous additional stakeholder considerations
- Additional stakeholder concerns are added to regulatory minimums
- Providing a comprehensive assessment up-front more than halved the timeline to completion for the Project Example provided
- **Proactive assessment and engagement enables:**
  - Decision makers to arm themselves with relevant information to make timely decisions
  - Reduce multiple rounds of extended IR's
  - Get ahead of questions
  - Get ahead of messaging
  - Reduce overall timeline and project budget
- **The approach can be applied to most major infrastructure projects to reduce time spent in permitting & approvals**

# Recommended Process

- Engage early and often
- Bring ideas to the table, but be receptive to listening
- Don't wait, provide more than is required up front  
(bookend scenarios)
- Capture the full range  
(don't hide anything)
- Get ahead of questions
- Get ahead on messaging





**IAIA26**  
QUÉBEC CITY, CANADA

# Let's continue the conversation!

Message me your questions or comments in the IAIA26 app.

**Matt Horn, Ph.D.**

*Principal Scientist & Operations Lead, Tetra Tech*

*United States*

*<https://www.linkedin.com/in/matt-horn-a7080872/>*

*<https://www.tetrattech.com>*

**#iaia26**