HAZARD MITIGATION PLANNING

Lessons from 20+ Years of Writing Plans

West Virginia Floodplain Managers Association

2025 Conference ~ June 13, 2025

AGENDA

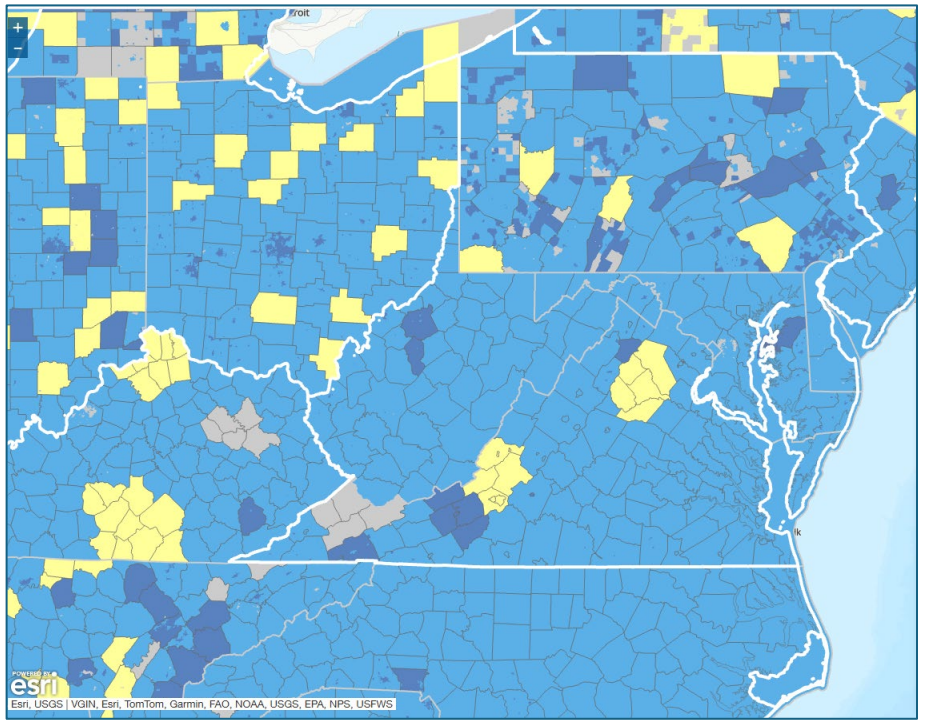
- Intra-Cycle Planning Process
- Expirations
- Lessons
  - Regulations & Guidance
  - HMP Scope
  - Where do the data come from?
  - “Plan to Plan” Coordination
  - Engagement vs. Extraction
  - So what?
- Q&A

Intra-Cycle Planning Process

- General
  - Plans require updates and re-adoption every **five years**.
  - "The Wheel" identifies other activities that can support a more robust hazard mitigation program.
    - Annual meetings
    - Secure funding
    - Leave time for a thorough planning process!

Expirations

- Region 1: 08/09/2027
- Region 2: 09/05/2029
- Region 3: 10/19/2027
- Region 4: 09/06/2027
- Region 5: 01/12/2028
- Region 6: 08/12/2029
- Region 7: 04/02/2029
- Region 8: 08/26/2029
- Region 9: 01/31/2027
- Region 10: 11/08/2027
- Region 11: 08/11/2029
- Jefferson County: 07/17/2029



National Status Map: https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/status

LESSONS

Lesson 1: Change is Inevitable
(*Regulations & Guidance*)

- Robert T. Stafford Disaster Relief & Emergency Assistance Act
  - National Flood Insurance Program (NFIP)
  - High Hazard Potential Dams (HHPD) Program
    - FEMA Policy 104-008-7 (Note Items B.1.b and B.2.d related to the HMP as an eligibility criterion)
- Local Mitigation Planning Policy Guide, FP-206-21-002 (effective April 11, 2025)
- Local Mitigation Planning Handbook (June 2025)

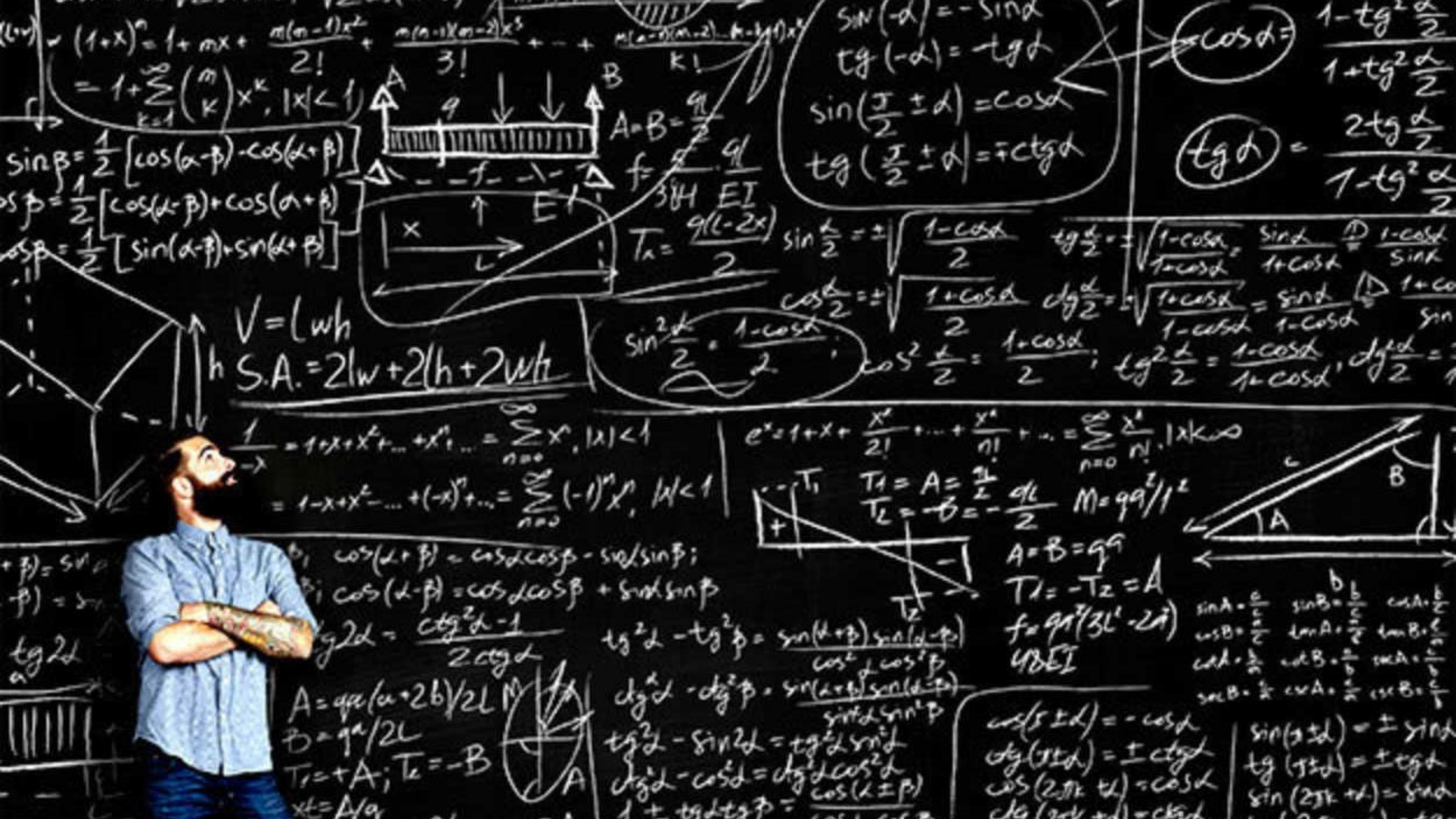
Lesson 2: Words Matter…and So Do Numbers (*HMP Scope*)

- New Buzz Phrase: **"Mitigation planning is risk-informed decision making"** (FEMA, 2025, p. 5).

- What ***has*** to be in the hazard mitigation plan?
  - Risk assessment → *Here's the data.* The risk assessment is the tool that informs you of the risk to support your decision making.

  - Action plan → *What are you going to do about that risk?* These projects are evidence of the decisions you've made.
    - Can include identifying areas where you need additional information
    - Can include folding more or new partners into the process
    - Does include the process you'll use to keep the plan current

Lesson 3: Speaking of the Numbers…They're All Around Us (*Now, where do the data come from?*)


V = lwh
S.A. = 2lw + 2lh + 2wh
sin(α/2) = ±√((1−cosα)/2)
cos(α/2) = ±√((1+cosα)/2)
tg(α/2) = ±√((1−cosα)/(1+cosα))
sin²(α/2) = (1−cosα)/2
cos²(α/2) = (1+cosα)/2
tg²(α/2) = (1−cosα)/(1+cosα)
sin(−α) = −sinα
tg(−α) = −tgα
sin(π/2 ± α) = cosα
tg(π/2 ± α) = ∓ctgα
cosα = (1−tg²(α/2))/(1+tg²(α/2))
tgα = 2tg(α/2)/(1−tg²(α/2))
A = B = ql/2
f = 5ql⁴/384EI
T_x = q(l−2x)/2
M = qa²/l²
f = qa²(3l²−2a²)/48EI
T1 = A = ql/2
T2 = −B = −ql/2
T1 = −T2 = A
A = qa(a+2b)/2l
B = qa/2l
T1 = +A; T2 = −B
sin(α+β) = sinα cosβ + cosα sinβ
cos(α−β) = cosα cosβ + sinα sinβ
tg2α = (ctg²α − 1)/(2ctgα)
tg²α − tg²β = sin(α+β)sin(α−β)/(cos²α cos²β)
ctg²α − ctg²β = sin(α+β)sin(β−α)/(sin²α sin²β)
tg²α − sin²α = tg²α sin²α
ctg²α − cos²α = ctg²α cos²α
sinβ = ½[cos(α−β) − cos(α+β)]
cosβ = ½[cos(α−β) + cos(α+β)]
cosβ = ½[sin(α−β) + sin(α+β)]
(1+x)^m = 1 + mx + m(m−1)x²/2! + m(m−1)(m−2)x³/3! + ... + m(m−1)...(m−k+1)x^k/k!
= 1 + Σ_{k=1}^{∞} (m choose k) x^k, |x| < 1
1/(1−x) = 1 + x + x² + ... + x^n + ... = Σ_{n=0}^{∞} x^n, |x| < 1
= 1 − x + x² − ... + (−x)^n + ... = Σ_{n=0}^{∞} (−1)^n x^n, |x| < 1
e^x = 1 + x + x²/2! + ... + x^n/n! + ... = Σ_{n=0}^{∞} x^n/n!, |x| < ∞
sin²α/2 + cos²α/2 = 1
cos²α/2 = (1+cosα)/2
tg²α/2 = (1−cosα)/(1+cosα)
sinA = a/c
cosA = b/c
tgA = a/b
ctgA = b/a
cosB = a/c
sinB = b/c
tgB = b/a
ctgB = a/b
A
B
C
a
b
c
q
f
x
L
EI

Lesson 4: Tap Into the Potential for Layering Plans (*"Plan to Plan" Coordination*)

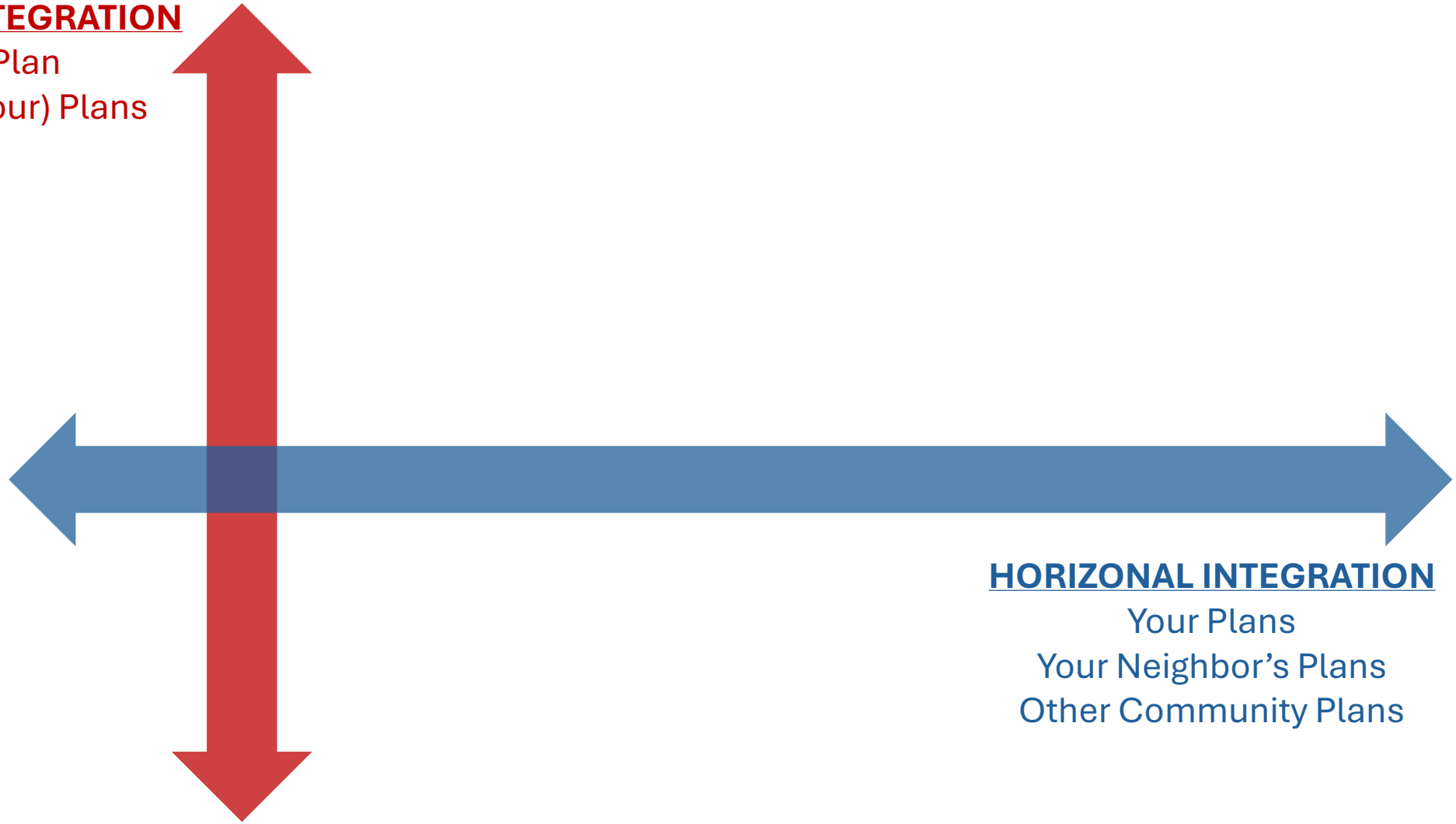
- Multi-Jurisdictional Plan
  - Benefits
    - Cost-effective
    - Cross-boundary consideration of risk
    - Allows for the identification of collaborative, inter-jurisdictional mitigation actions
  - Cons
    - Sacrifice a level of detail
    - Balcony-level descriptions and aggregated data are less useful for tactical decision making
- It's <u>not</u> *just* the hazard mitigation plan!
  - Comprehensive, land use, community and economic development, transportation, stormwater management, source water protection…

“Plan to Plan” Coordination (cont.)

VERTICAL INTEGRATION

State Plan

Regional (Your) Plans



HORIZONAL INTEGRATION

Your Plans

Your Neighbor’s Plans

Other Community Plans

Lesson 5: It Really Is About the People

(*Engagement vs. Extraction*)

So what?

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- YOU are the emissary.
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- But don’t forget about that data!
- **Learn to think in terms of data.**

So what?

- YOU are the emissary.
- Your stories matter as much as your data.
- But don’t forget about that data!
- Learn to think in terms of data.
- **Just participate!**

THANK YOU!

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