

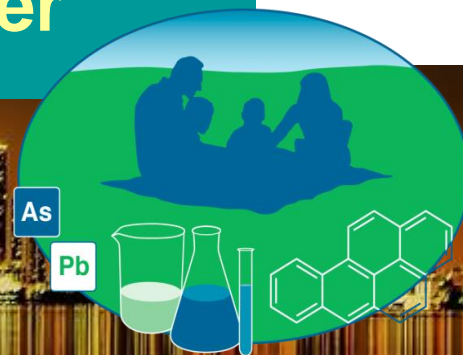


Team Leaders: C. Sorrentino & K. Durant
(CA - DTSC) (DE - DNREC)

L. Hay Wilson
Program Advisor

Bioavailability in Contaminated Soil

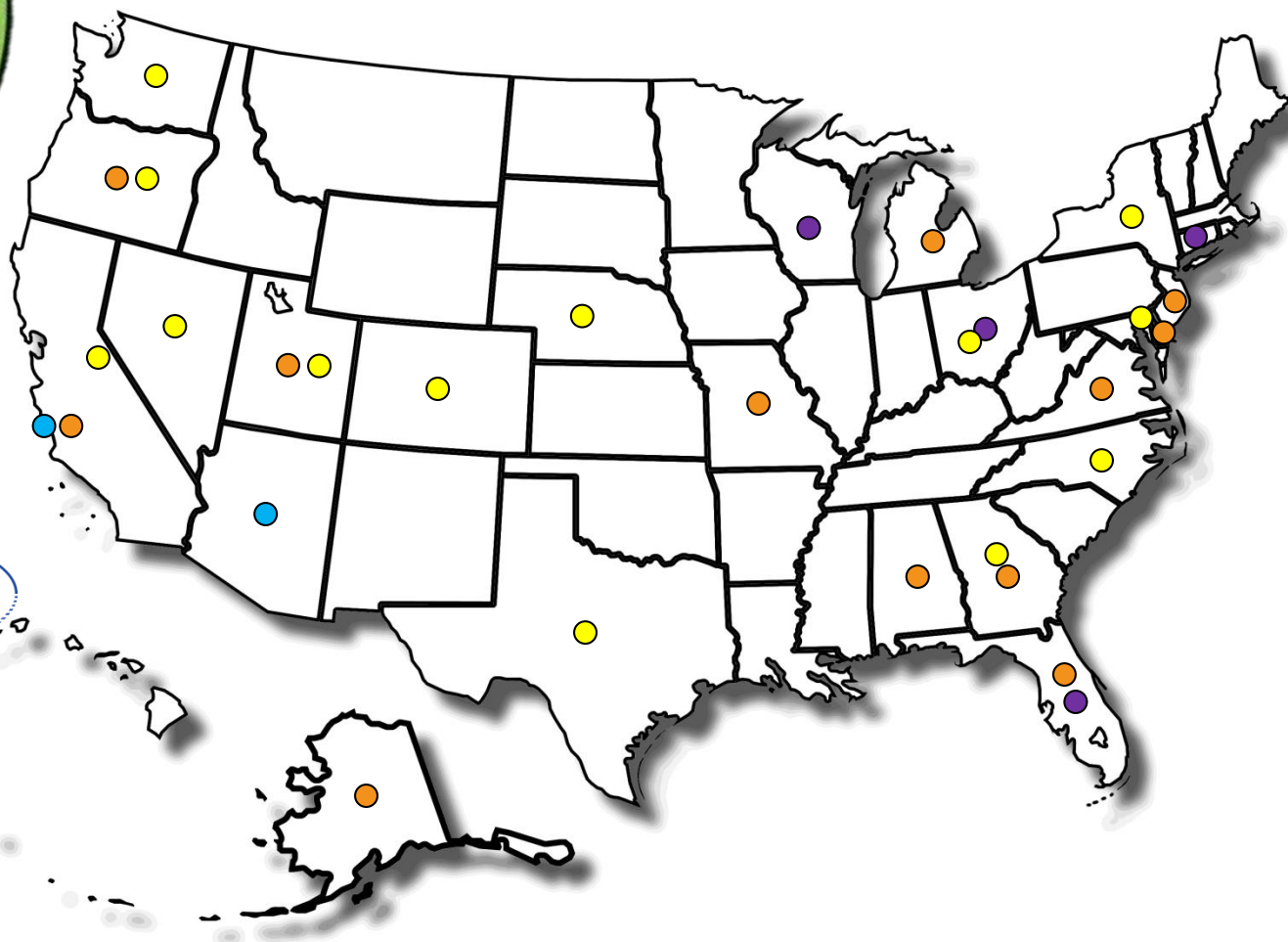
ITRC Guidance Around the Corner



Miami - May 24, 2017



3 yr ~ 150 people
average 75 on the team



If you need to leave now:

- **It works and it's a win-win**
(save \$ AND is protective)
- **Not for all sites**
(but VERY useful when appropriate)
- **Not a “one-size-fits-all” solution**
(sorry)
- **Different strokes for different folks**
(Check the Lead Agency)



We focused on ARSENIC, LEAD, and PAHs

Site-Specific Bioavailability

- Reduce Uncertainty in Exposure Assessment
- Improve Human Health Risk Assessment
- Better Risk Management Decisions
- More Rational Use of Resources

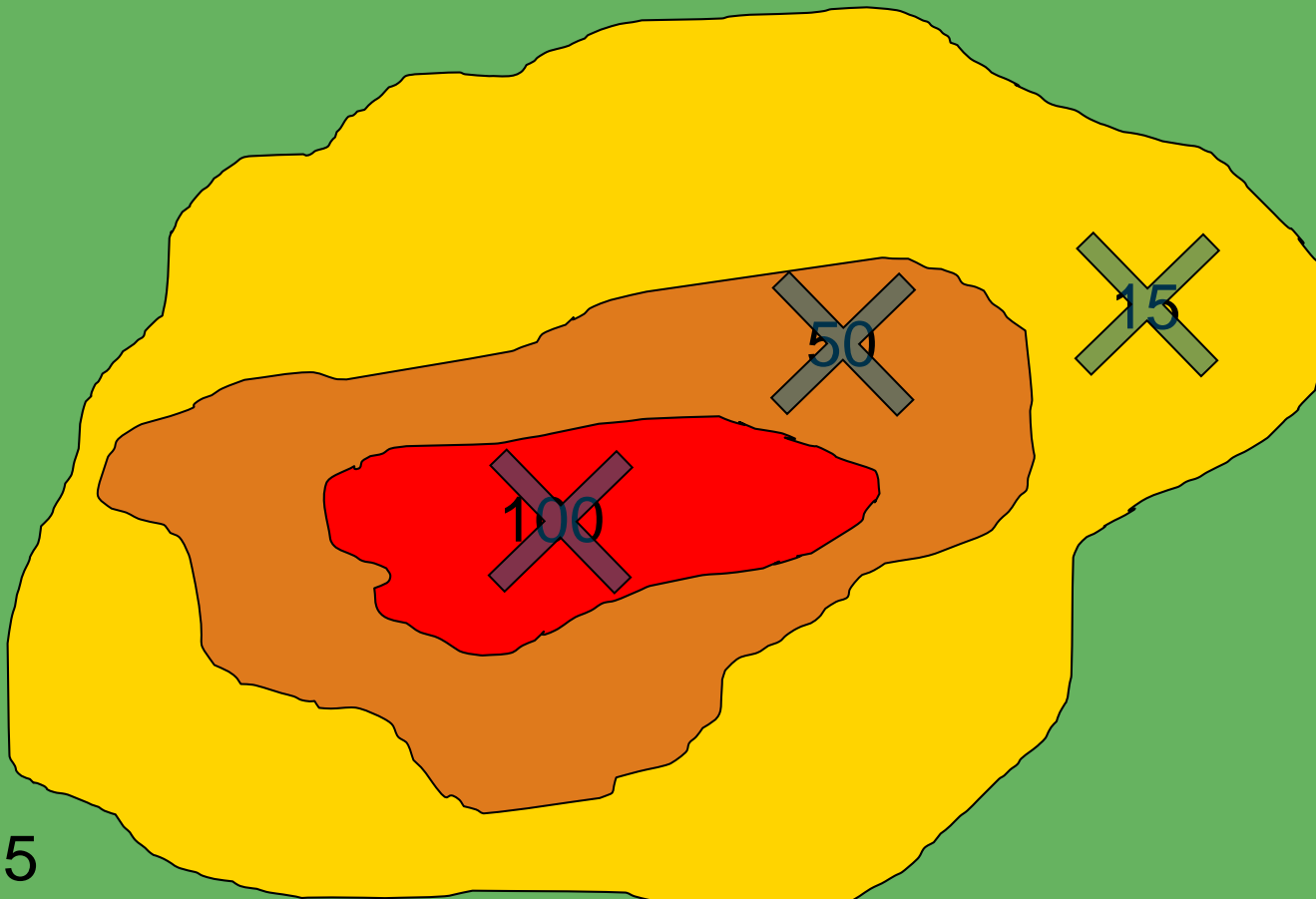


Same Level of Protectiveness

Bioavailability: 100%



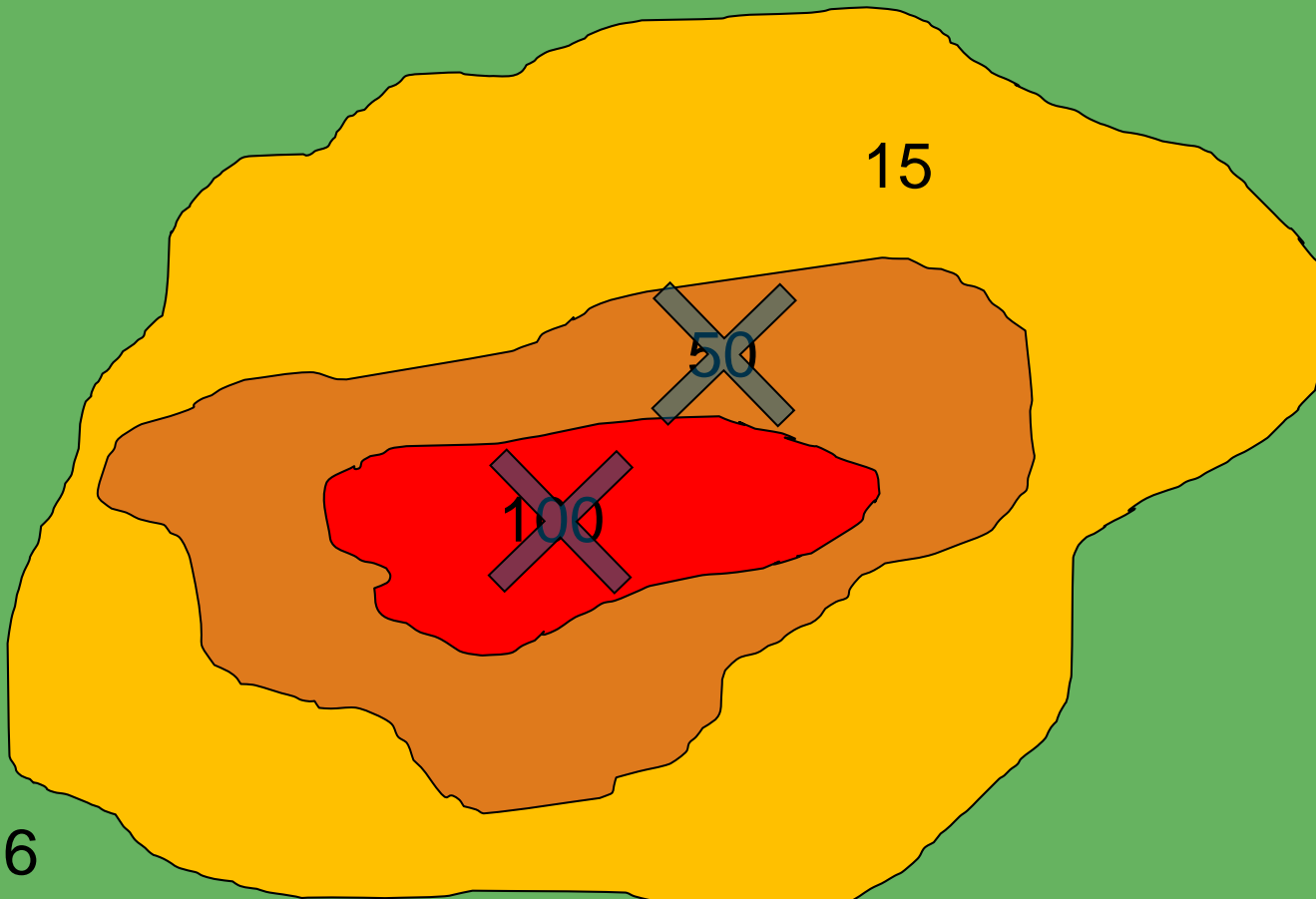
Cleanup Goal 10^{-6} risk = 10 mg/kg



Default Bioavailability: 60%



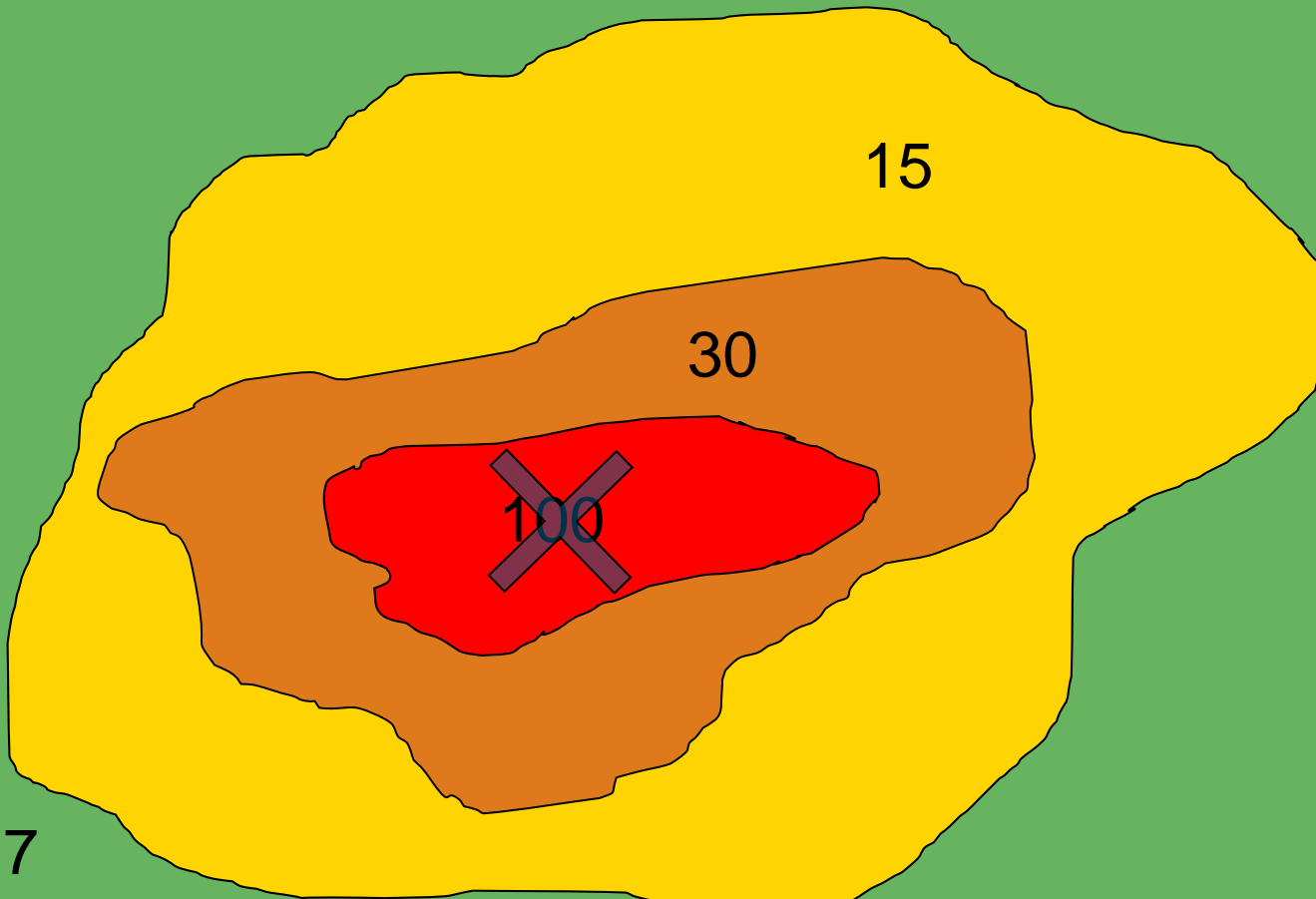
Cleanup Goal 10^{-6} risk = 17 mg/kg



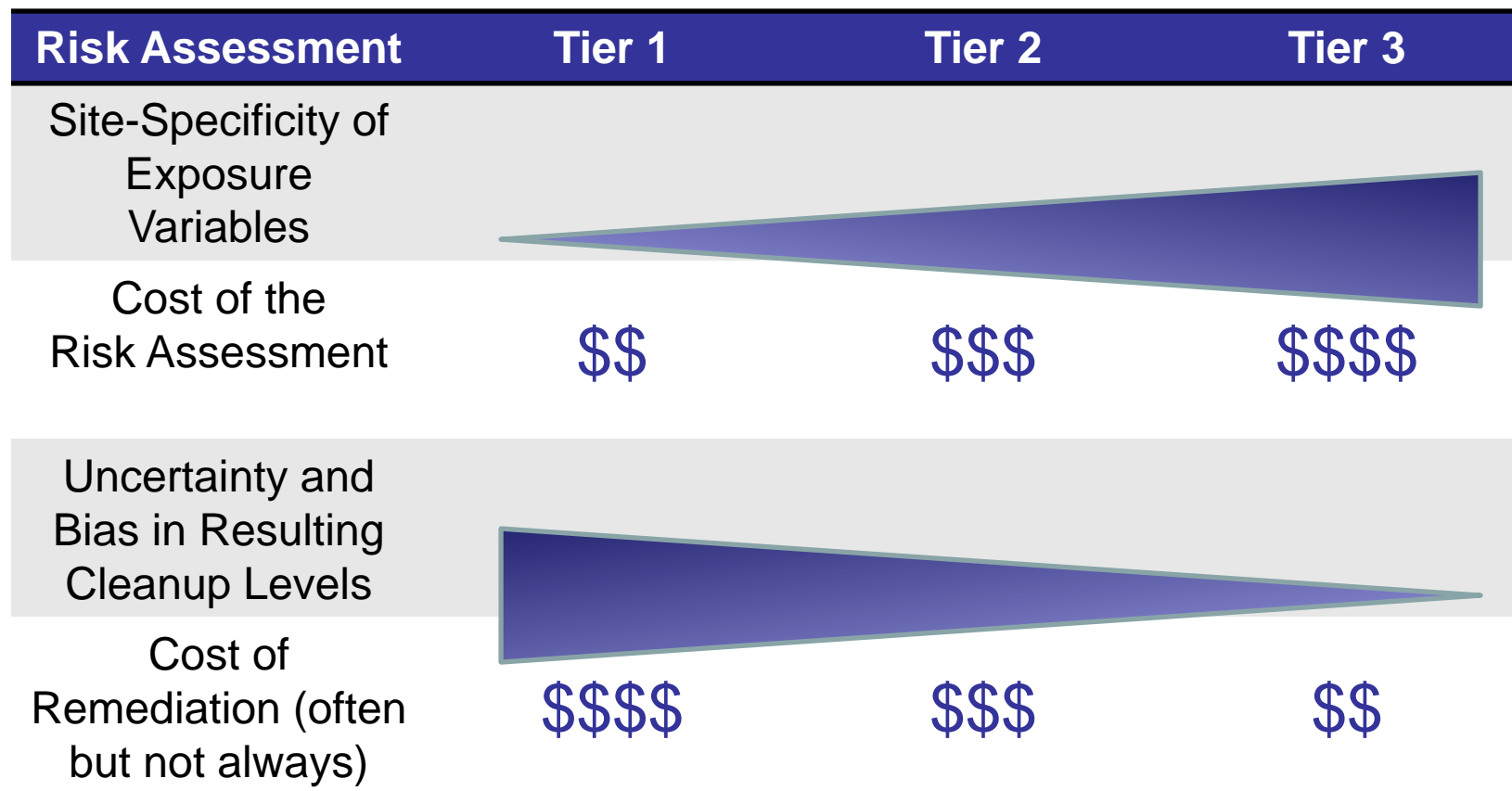
Site-Specific Bioavailability: 25%



Cleanup Goal 10^{-6} risk = 40 mg/kg



An Investment Upfront Can Go a Long Way



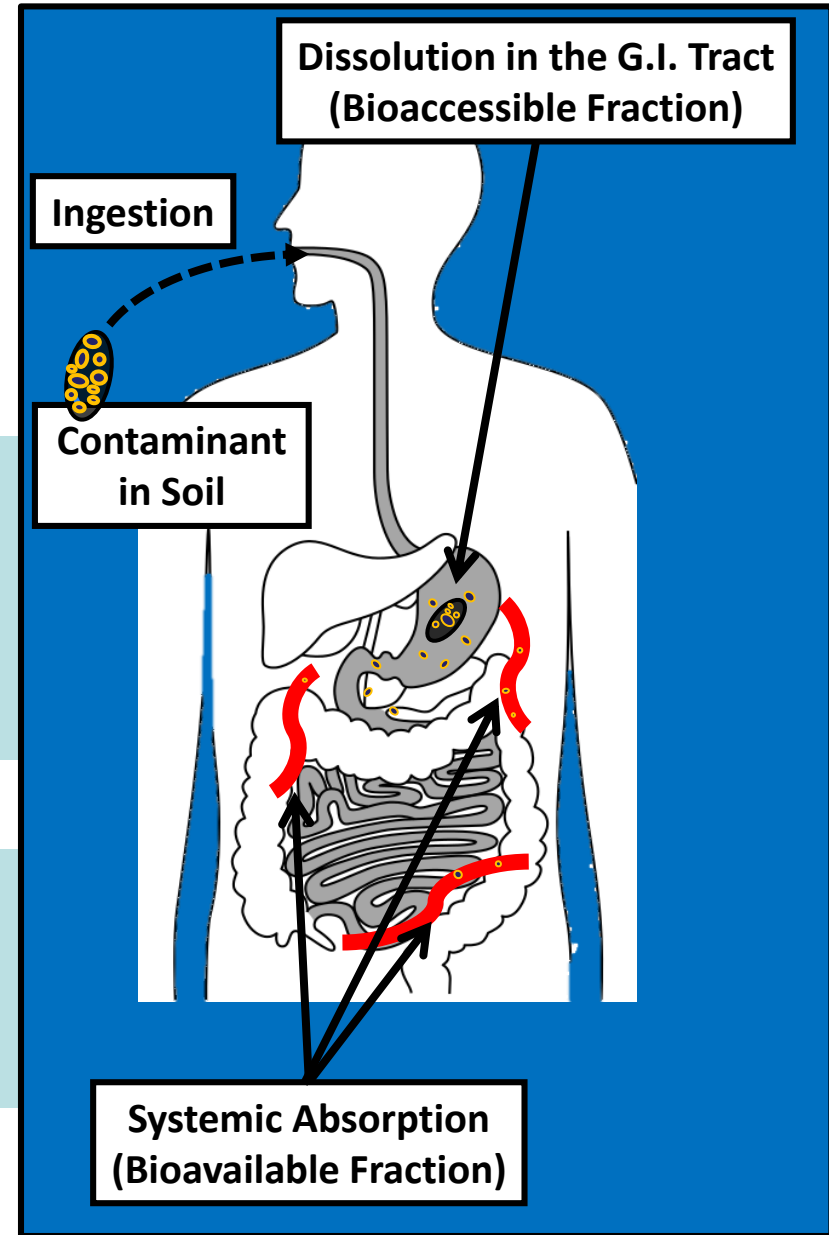
Bioavailability VS Bioaccessibility

Bioavailability:

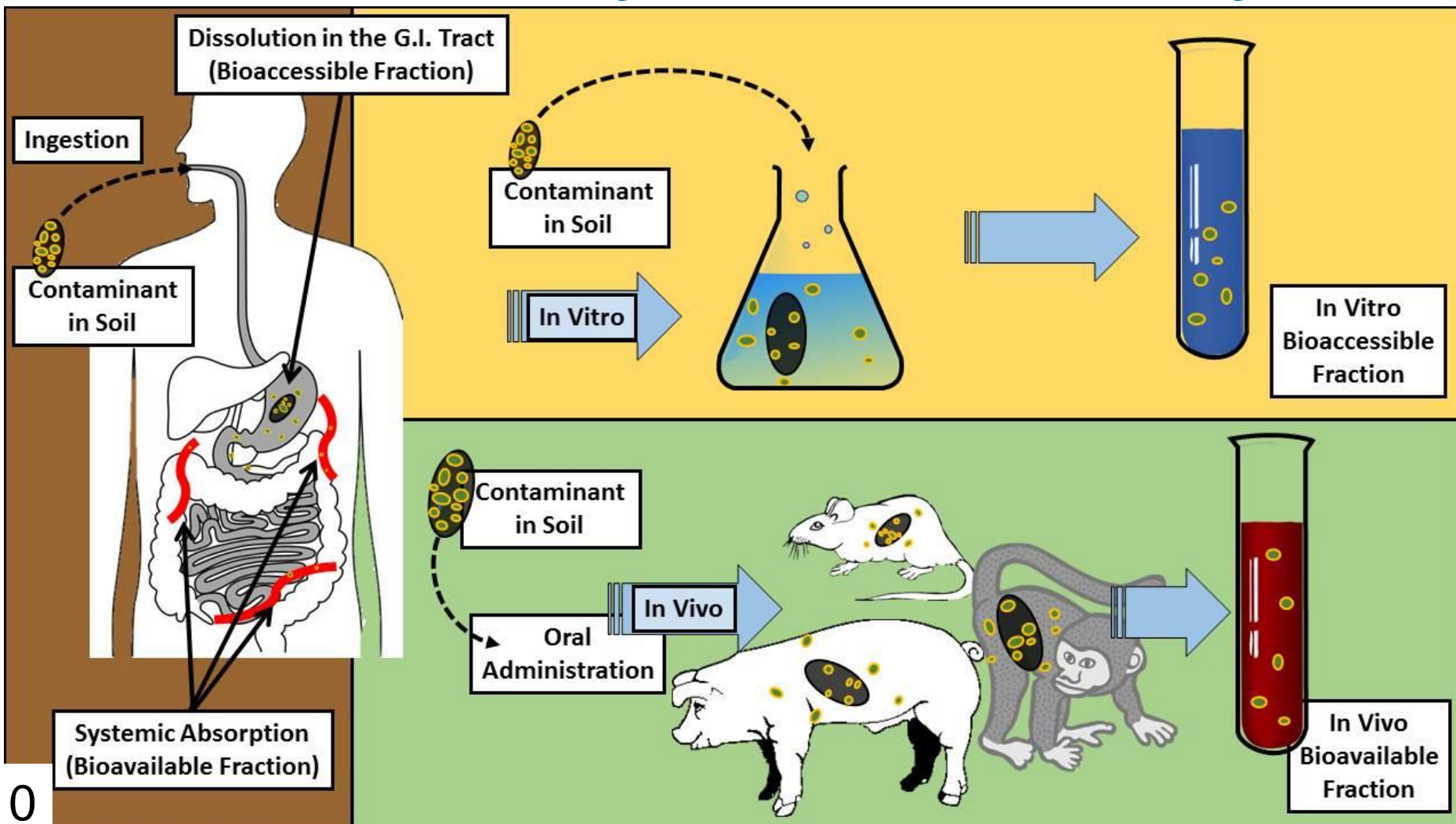
The portion of a chemical that is absorbed by a living organism and reaches the central compartment (blood)

Bioaccessibility:

The fraction of a chemical that may be available for uptake by an organism.



Bioavailability vs Bioaccessibility

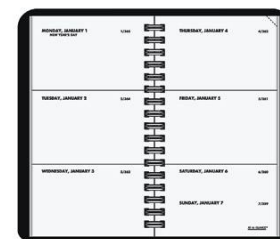
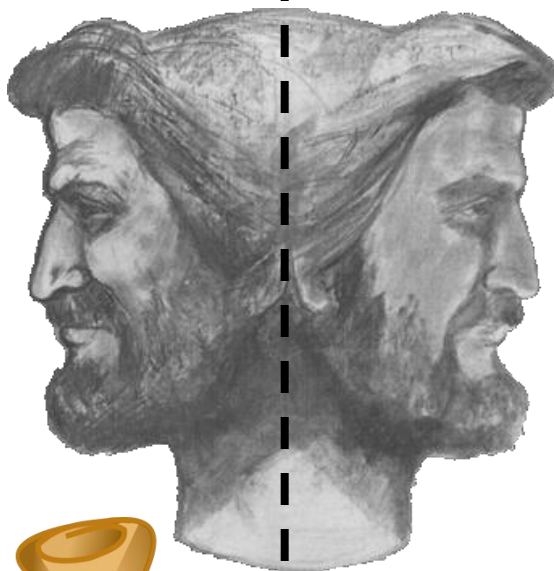
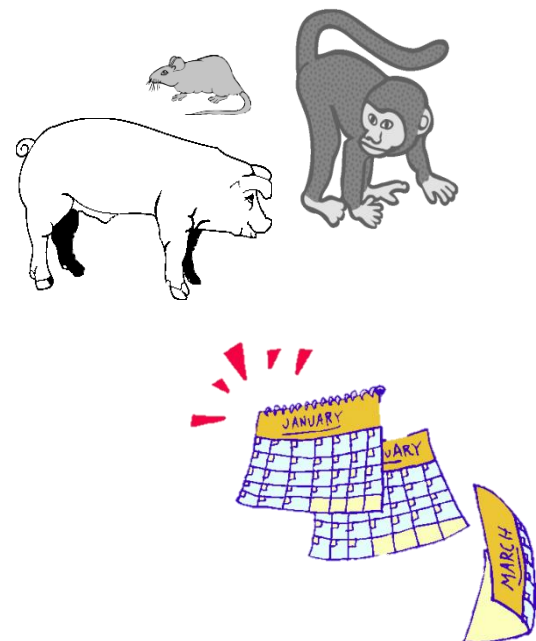


BIOAVAILABILITY

In Vivo

BIOACCESSIBILITY

In Vitro



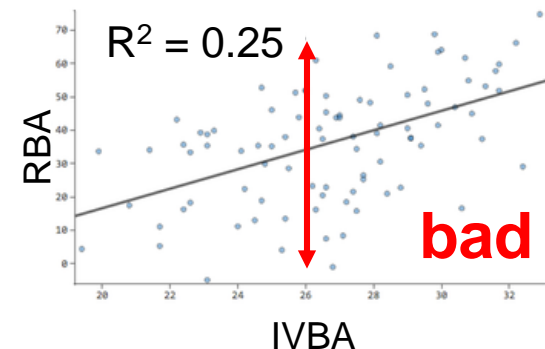
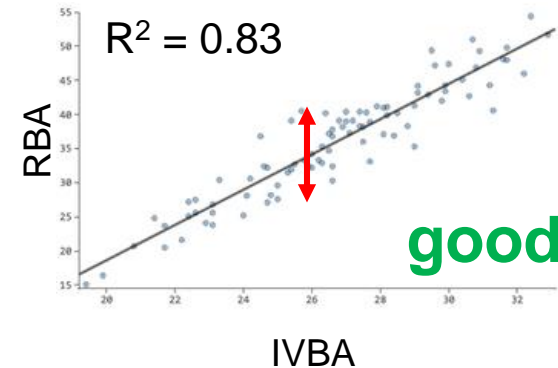
Tens of Thousands

Hundreds

Can Bioaccessibility Predict Bioavailability?

IVIVC: In Vitro-In Vivo Correlation

- wide range of soil types (including yours)
- goodness of fit
- magnitude of prediction error

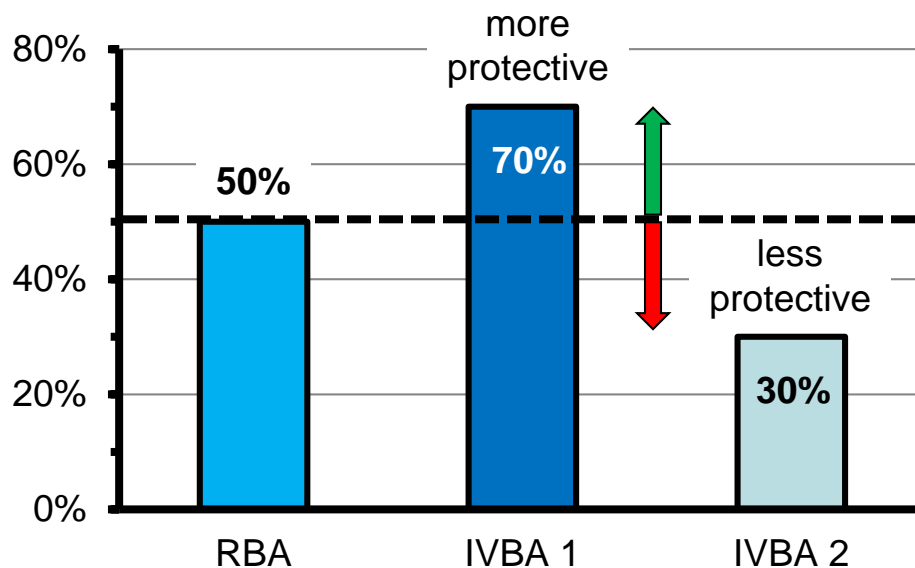


Can Bioaccessibility Predict Bioavailability?

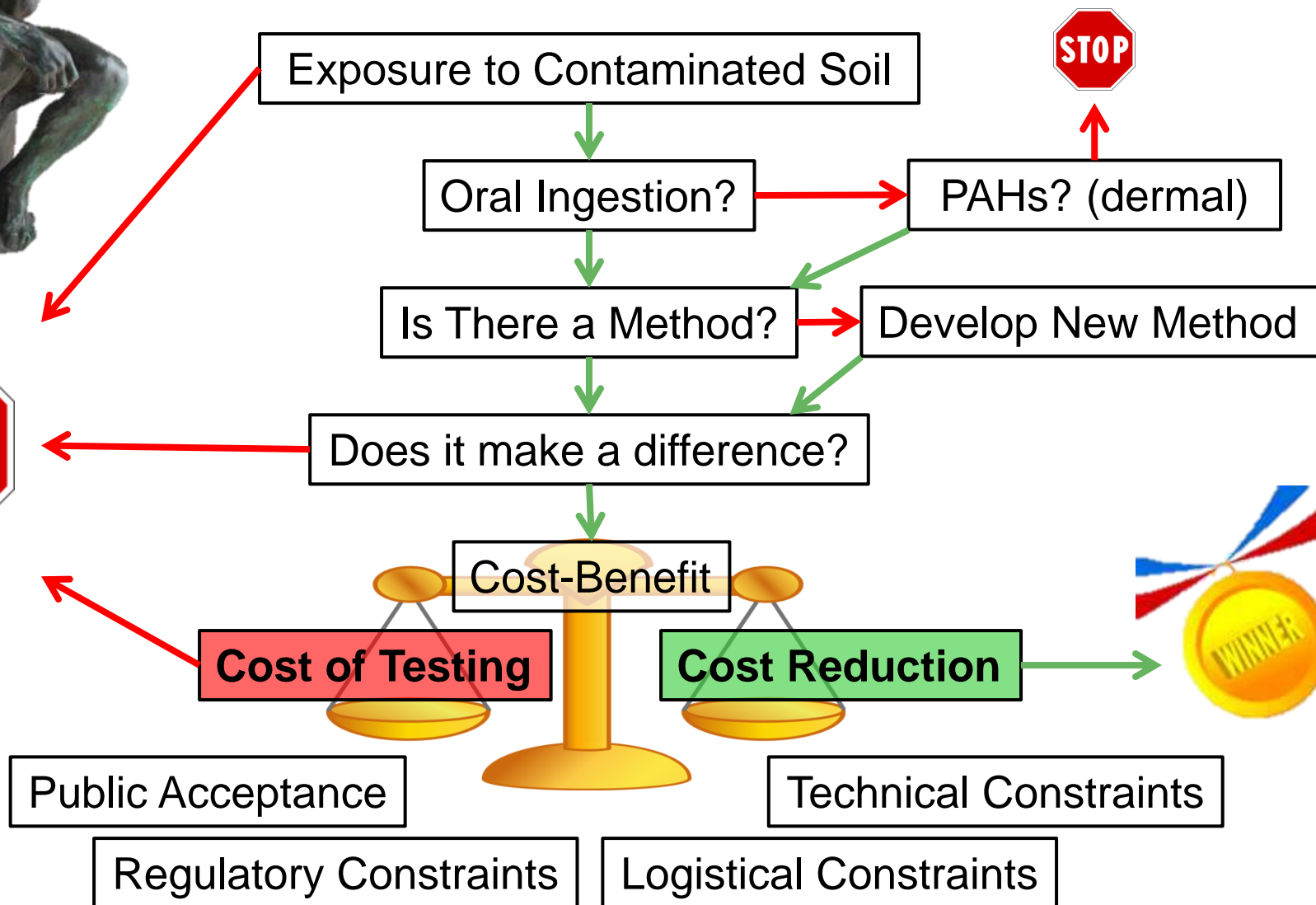
IVIVC: In Vitro-In Vivo Correlation

- results repeatable within and among labs
- over- or under-prediction

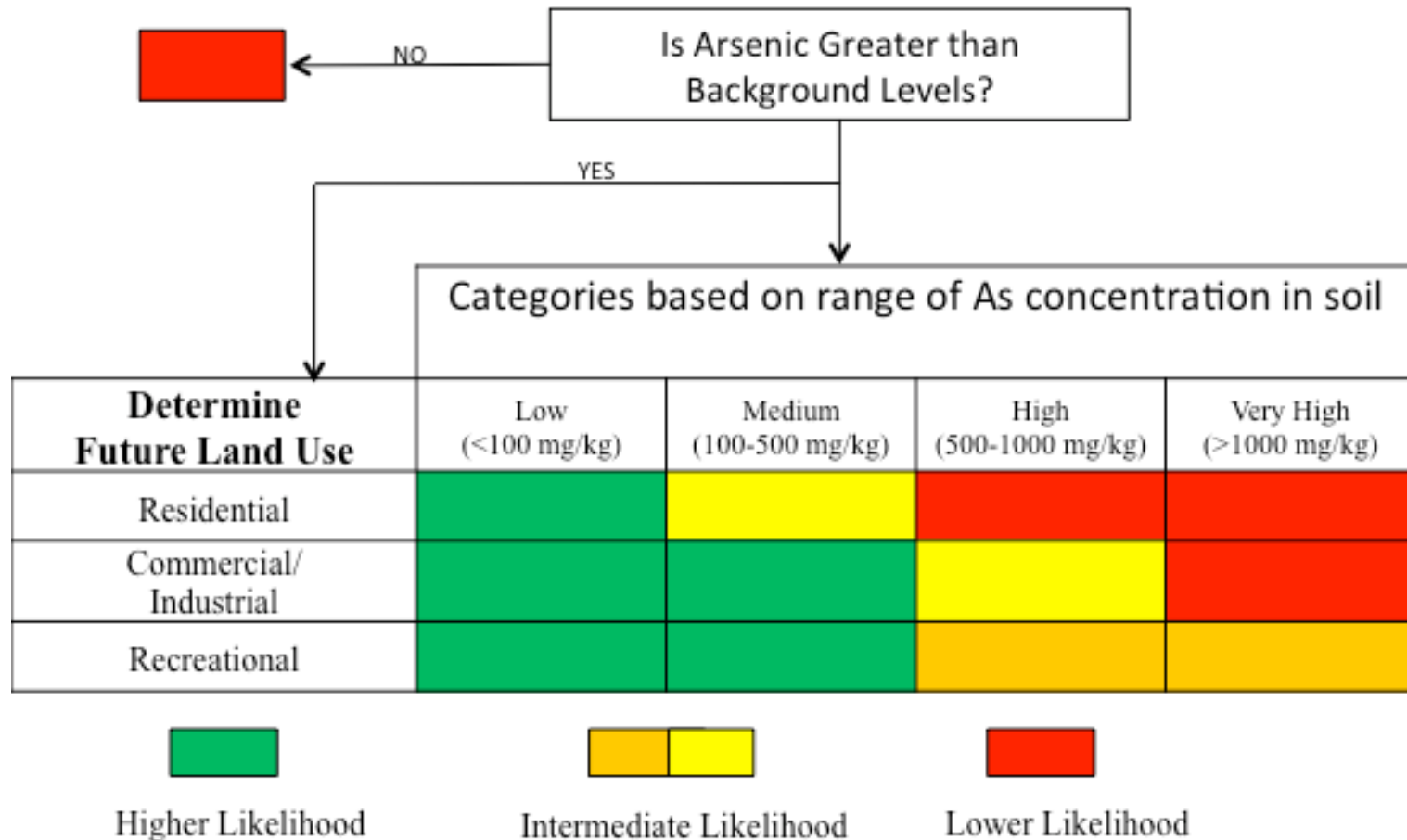
$$\text{RISK} = \frac{C_s \times \text{RBA} \times \text{IR} \times \text{EF} \times \text{ED}}{1/\text{CSF} \times \text{BW} \times \text{AT}}$$



It's NOT for All Sites (How to Decide)



Use Site-Specific Bioavailability When It Can Make a Difference



Engage Stakeholders Early During Planning

- Can be controversial for stakeholders
- Perception that it is in favor of the polluters
- Need buy-in from the regulators
- Not well known/established
- Be transparent and earn trust



What You Should Remember:

- **It works and it's a win-win**
(save \$ AND is protective)
- **Not for all sites**
(but VERY useful when appropriate)
- **Not a “one-size-fits-all” solution**
(sorry)
- **Different strokes for different folks**
(Check the Lead Agency)

We focused on ARSENIC, LEAD, and PAHs

What You Should Remember:

- **Read the Guidance**
(coming in mid-November)
- **Attend Internet-Based Training**
(coming early 2018)



Bioavailability in Contaminated Soil

2016 ITRC Team of the Year



Team Leaders: C. Sorrentino & K. Durant
(CA DTSC) (DE DNREC)

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Norman Forsberg
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Jose Gomez-Eyles
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Barrie Sel
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Geoff Siemering
James Smith
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