Green vs. Sustainable Remediation and It's Evolution Around the World

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Presentation Outline

- Introduction and Background
- Definitions
- U.S. Perspectives
- International Perspectives
- Points of Agreement and Challenges
- Future Considerations
- Q and A

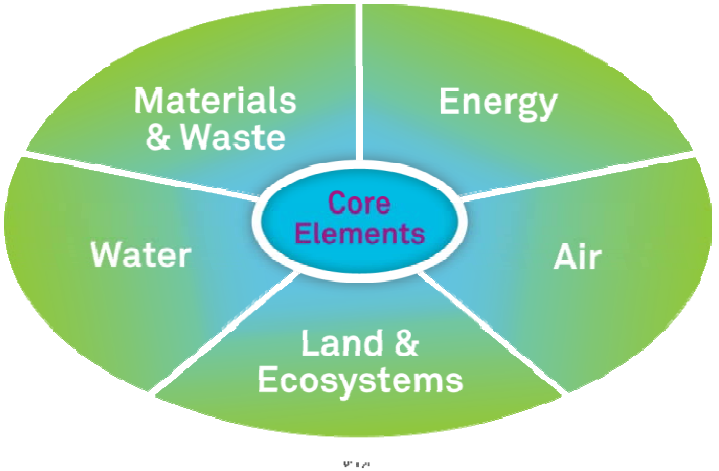
Green Remediation/Sustainable Remediation

Green Remediation – the practice of implementing remedial actions in a manner that attempts to reduce possible environmental impacts after selecting a remedy but does not formally include those considerations in the remedy selection process.

Sustainable Remediation – encompasses green remediation but also includes relatively detailed analyses of environmental, social and economic impacts as part of remedy selection and design.

Green Remediation – US EPA Focus

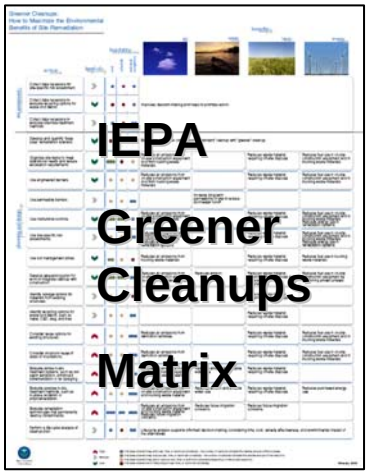
- The goal is not to change the remedy selection criteria, but to incorporate sustainability into the process.
- Should not influence whether to remediate or technology selection but will influence how to implement remediation.
- Focus on 5 Core Elements
- US EPA Charter is to “cleanup” sites
- Practical barriers to GSR change
  - Environmental Policy
  - Lack of regulatory infrastructure
  - Hard to equate results into common metrics
  - Certain applicable metrics are qualitative
  - No standard methodology



U.S. State Perspectives

- Wisconsin Initiative for Sustainable Cleanups (WISC) – SR
- Illinois EPA Greener Cleanups Program – GR/SR
- Minnesota PCA – SR
- New York Green Remediation Policy (DER-31) – GR/SR
- ASTSWMO – SR
- Several other emerging state initiatives

Association of State and Territorial
ASTSWMO
Solid Waste Management Officials

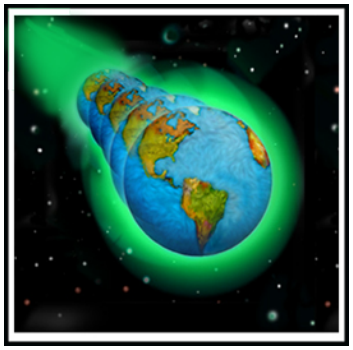


Other U.S. Perspectives

- ITRC – SR
- SURF – SR
- Air Force – SR
- Navy – SR
- Army – SR
- National Guard – SR
- ASTM
  - Struggling with Green track vs. Sustainable Tracks
  - EPA has suggested to proceed with Green track only for now

International Perspectives

- Brazil – SR
- United Kingdom – SR
- Netherlands – SR
- Emerging International Initiatives
  - Japan
  - France
  - China
  - Canada



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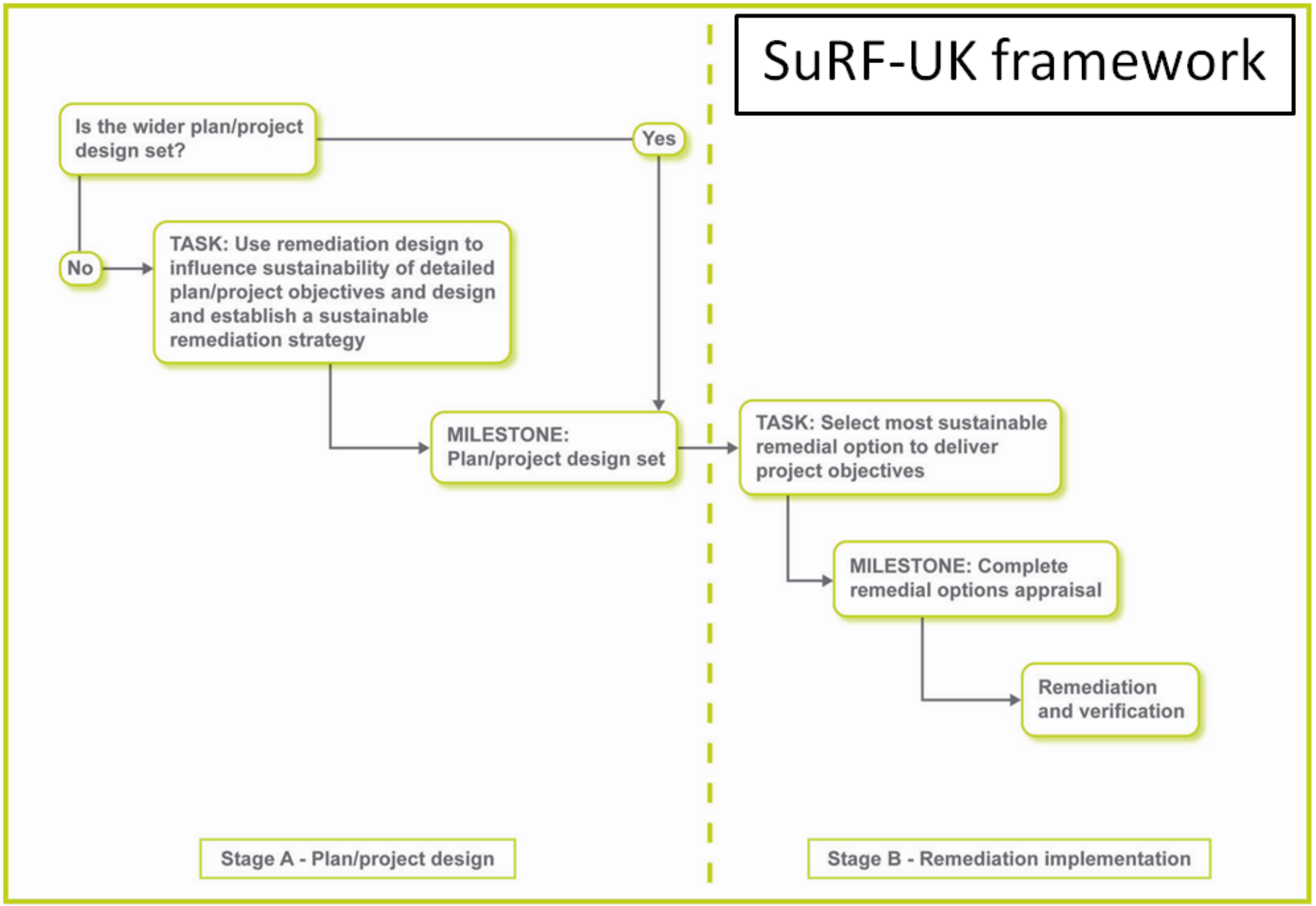
SuRF-UK framework



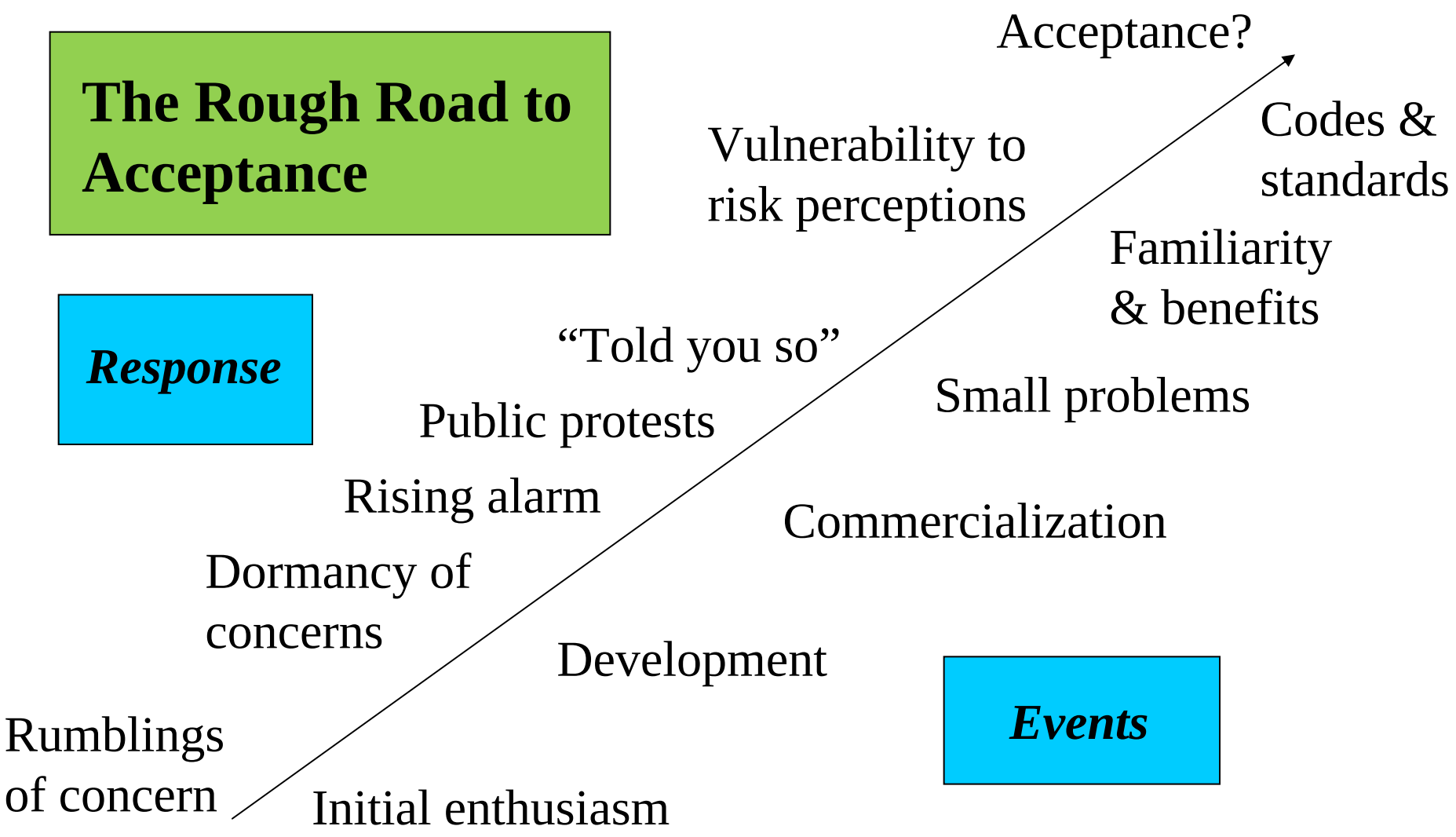
Why Everyone hasn't Adopted SR?

- New paradigms can be controversial and polarizing
- Wide ranging and competing views
- Difficult to equate results in a common metric, some are qualitative
- No standard recognized method for a "sustainable remediation" evaluation

Why Everyone hasn't Adopted SR?

…because some are struggling between the need or perceived need to restore natural resources (i.e. cleanup soil, sediment and groundwater) vs. the resources utilized and unintended consequences that result when accomplishing (or attempting to accomplish) that restoration.
(Hadley and Woodward 2010)

Getting Comfortable with Sustainable Remediation



Green vs. Sustainable - Points of Agreement

- Remediation projects should be conducted in an environmentally responsible manner.
- Green metrics probably have limited role on time critical remediation projects
- Protection of human health is a baseline requirement
- All relevant stakeholders should have say in decision-making
- Goal should be to reduce energy consumption, carbon footprint and other deleterious effects
- We can make better remediation decisions; there are previously unaccounted for considerations

Green vs. Sustainable – Sticking Points

- Health and Safety
- Triple Bottom Line
- Ineffective Remedies
- Timing
- Litigation

Health and Safety

- In the context of sustainability there appears to be no way to avoid these discussions
- Site Accidents/Fatalities vs. modest or no risk reduction
- Voluntary vs. Involuntary risk
- Already addressed in short term effectiveness?
- Simply demands additional mitigation measures?
- SURF White Paper – acknowledged controversy and proposed neutral party assessment
- Look further at sites where risk of remedy influenced outcome

Triple Bottom Line

- Role of societal and economic factors?
- Really they are new and different factors
- BRAC and Brownfield examples where this is already happening - apply to other PRPs?
- Weighting of metrics is the key issue and dramatically effects the outcome!
- Should environmental considerations dominate decisions?
- Note that UECA legislation and Guardian Trusts have resolved most concerns regarding LUR's

Ineffective Remedies

- We are our own worst enemy – resulted in loss of credibility
- We have not acknowledged scientific barriers and limitations
- We defined “successful cleanup” as removing or degrading it all!
- We led the public to believe we could do that
- Is one potential solution Offsets? – SEPs, wetlands example, Funding for long- term wellhead treatment
- We need to better communicate risks and explain what is achievable and necessary to manage risks

Timing

- Should sustainability metrics be evaluated before or after remedy selection?
- Is it better to have a short term significant environmental footprint or extend it over a longer period?
- Does a future carbon constrained world influence timing?
- What is a “reasonable timeframe”? Isn’t that tied to the goal? Who decides? Arbitrary is not sustainable!
- Time-critical vs. non-time critical remediation and the role of sustainability metrics?

Litigation

- Unique in that it is a point of agreement and a sticking point
- Perhaps it is a barrier or impediment to both green and sustainable remediation?
- We are not aware of a case where a more sustainable remedy was not approved because of litigation
- We simply anticipate that GSR could be irrelevant because:
  - Money could be the only driver
  - Diminution of property values could be the driver
  - Many lawsuits are frivolous and unfounded
  - Many settlements involve unnecessary (and unsustainable) resolutions

Conclusions

- Various States, Industry groups and International Groups are embracing Sustainable Remediation
- Geographies with risk-based regulatory frameworks are best suited to embrace Sustainable Remediation
- US EPA has embraced Green Remediation
- Lots of activities, some complementary and some not
- Points of Agreement and Sticking Points
- There are previously unaccounted factors that may influence how to remediate and even whether to remediate!
- Influence of Draft National Research Council Report on EPA's role in Sustainability – will EPA adopt SR?

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Questions?

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GSR Web Resources

- SuRF Canada -
  http://www.surfcanada.org/
- SuRF USA -
  http://www.sustainableremediation.org/
- SuRF UK
  http://www.claire.co.uk/index.php?option=com_content&task=view&id=182&Itemid=78&gclid=CKngy8e_l5YCFQVfFQodXDiU5w
- Illinois EPA Greener Cleanups
  http://www.epa.state.il.us/land/greener-cleanups/index.html
- US EPA Green Remediation
  http://www.epa.gov/greenremediation/
- WDNR WISC
  http://dnr.wi.gov/org/aw/rr/cleanup/wisrr.htm

- NYSDEC DER-31
  www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf
- AFCEE Sustainable Remediation Tool
  http://www.afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation/index.asp
- AFCEE Sustainable Remediation Site
  http://www.afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation/index.asp
- US Army Sustainability Site
  http://www.sustainability.army.mil/