Welcome to the CLU-IN Internet Seminar

Identifying & Evaluating Ecosystem Services at Contaminated Sites Prior to Remediation

Sponsored by: U.S. EPA Technology Innovation and Field Services Division (TIFSD)

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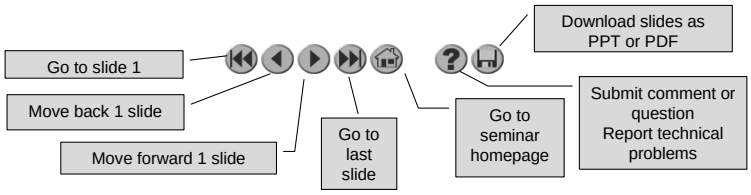
Instructors:
Sarah Slack, EPA National Network for Environmental Management Studies (NNEMS) Fellow, slack.sarah@epa.gov

Moderator: Carlos Pachon, U.S. EPA Office of Superfund Remediation and Technology Innovation, pachon.carlos@epa.gov

Visit the Clean Up Information Network online at www.cluin.org

Housekeeping

- Please mute your phone lines, Do NOT put this call on hold
  - press *6 to mute #6 to unmute your lines at anytime
- Q&A
- Turn off any pop-up blockers
- Move through slides using # links on left or buttons



- This event is being recorded
- Archives accessed for free **http://cluin.org/live/archive/**

Although I'm sure that some of you have these rules memorized from previous CLU-IN events, let's run through them quickly for our new participants.

Please mute your phone lines during the seminar to minimize disruption and background noise. If you do not have a mute button, press *6 to mute #6 to unmute your lines at anytime. Also, please do NOT put this call on hold as this may bring delightful, but unwanted background music over the lines and interupt the seminar.

You should note that throughout the seminar, we will ask for your feedback. You do not need to wait for Q&A breaks to ask questions or provide comments. To submit comments/questions and report technical problems, please use the ? Icon at the top of your screen. You can move forward/backward in the slides by using the single arrow buttons (left moves back 1 slide, right moves advances 1 slide). The double arrowed buttons will take you to 1st and last slides respectively. You may also advance to any slide using the numbered links that appear on the left side of your screen. The button with a house icon will take you back to main seminar page which displays our agenda, speaker information, links to the slides and additional resources. Lastly, the button with a computer disc can be used to download and save today's presentation materials.

With that, please move to slide 3.

Identification & Evaluation of Ecosystem Services at Contaminated Sites

Sarah Slack
NNEMS Fellow
US EPA

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Purpose

- Raise awareness of ecosystem services in the context of contaminated site cleanup
- Discuss options for the creation of a replicable methodology to evaluate ecosystem services
- Alternatives to mitigate impacts & maximize the provision of ecosystem services

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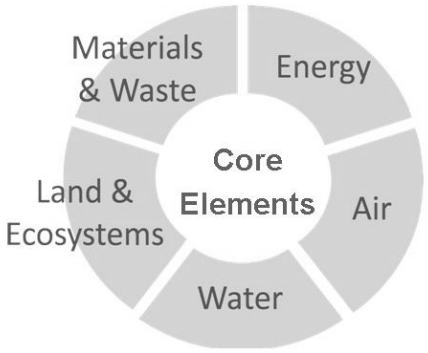
Green Remediation

The practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions.



http://clu-in.org/greenremediation

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Ecosystem Services

The benefits human populations derive from ecosystems.

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Millennium Ecosystem Assessment

Regulating Services:	Supporting Services:
• Climate regulation • Disturbance regulation • Water regulation • Waste treatment	• Nutrient cycling • Pollination • Soil formation • Habitat
Provisioning Services:	**Cultural Services:**
• Food production • Raw materials • Genetic resources • Medicinal resources	• Recreation • Aesthetics • Existence • Science / Education

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Final Ecosystem Services

Disturbance regulation
Water supply
Food production
Raw materials
Genetic & medicinal resources
Cultural services

Climate regulation
Erosion control & sediment retention
Waste treatment
Habitat

(with a few exceptions)

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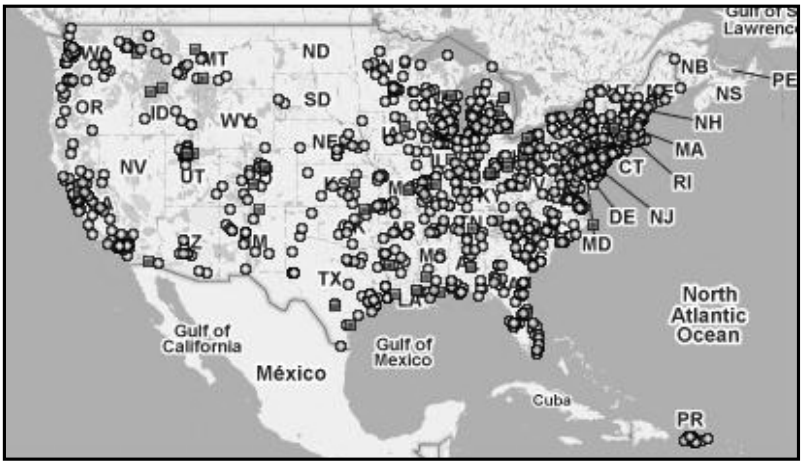
Impacts on Ecosystem Services



○ NPL Sites ■ Proposed Sites

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Ecosystem Services Assessment

- Prior to and throughout the remediation process
- Reuse & revitalization
- Cleanup protectiveness

Service Identification

	Marine	Coastal	Wetlands	Inland Water	Forest & Woodlands	Grasslands & Drylands	Mountain	Urban
Climate regulation								
Disturbance regulation								
Erosion control								
Waste treatment								
Habitat								
Water supply								
Food production								
Raw materials								
Genetic resources								
Medicinal resources								

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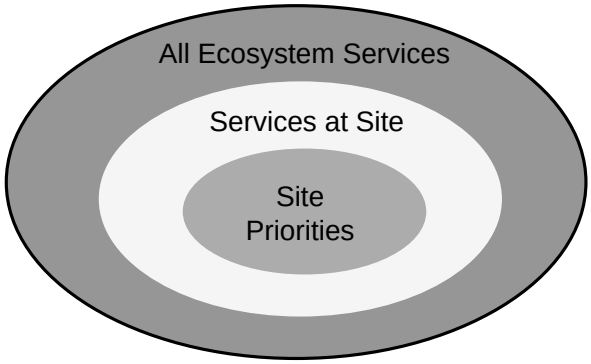
Set Site Priorities



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Things to Consider...

- Scarcity
- Vulnerability
- Reversibility
- Substitutes

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Other Methods

- Community Involvement & Economic Valuation

Method	Background
Benefits transfer	Uses estimations of benefits obtained from a service in one context, to estimate values of service in a different context or site.
Choice modeling	A survey approach in which respondents are asked to choose their preferred option for a set of alternative scenarios.
Contingent valuation	Hypothetical scenarios are posed to the public which involve some valuation of alternatives. They are responses are elicited based on their willingness to pay for each alternative scenario.
Travel cost	For society to utilize a service, it may require travel. The service is valued based on society's willingness to pay to utilize the resource.
Replacement cost	Services may be replaced by a manufactured product or physical structure. The cost to produce this manmade substitute, represents the value of the service provided.
Avoided cost	When services are functioning properly, it allows society to avoid certain costs. The service is valued based on this cost.
Factor income	Values services based on their impact and enhancement of salaries. For example, commercial fisheries will have an increased catch and therefore income when there are available services such as fish habitat and clean water.
Hedonic pricing	The value of a service is derived from its presence / effect on market-priced goods. For example, aesthetic values can be derived from the real estate market by comparing similar properties with and without good views.
Conjoint evaluation	The public is asked to make choices between alternative scenarios with different attributes and prices, in order to derive the marginal value of a service instead of the total value.

Identify Impacts

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How do we mitigate impacts?

Practices to Minimize Ecological Damage

- Work zone & traffic plans
- Minimize excavation & retain existing vegetation
- Phase site work
- Avoid introducing new sources of contamination
- Location of contaminated waste & soil
- Develop & communicate ecological awareness

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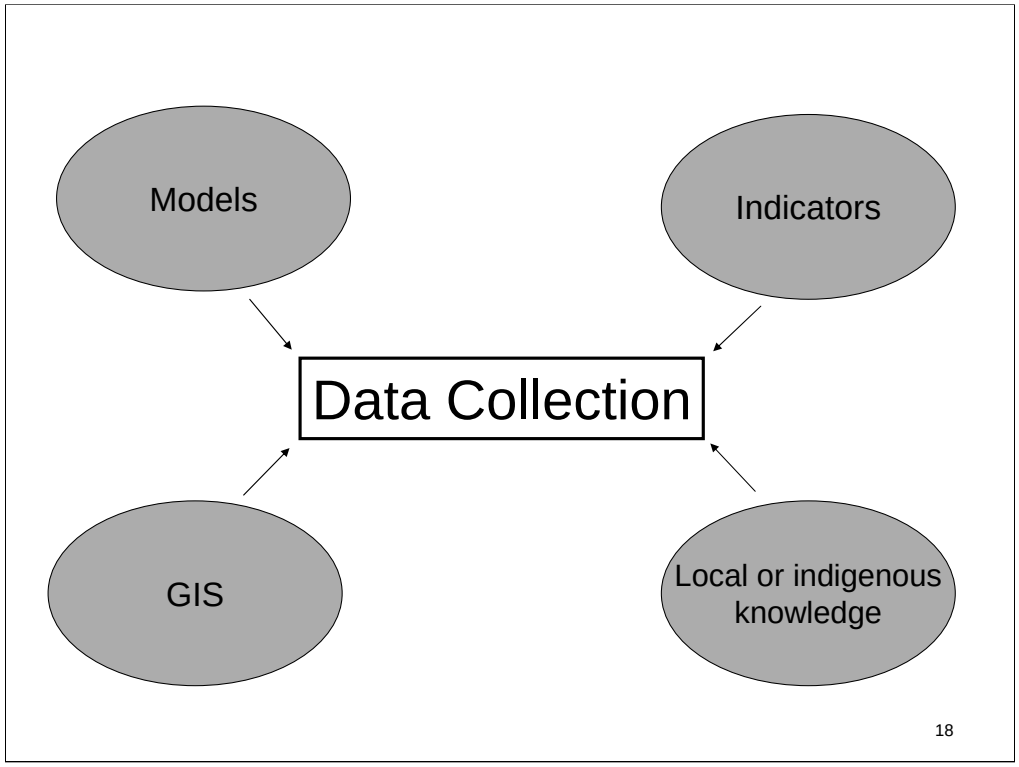
Models
Indicators
Data Collection
GIS
Local or indigenous knowledge
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Potential Data Sources

ERAs

&

NRDAs

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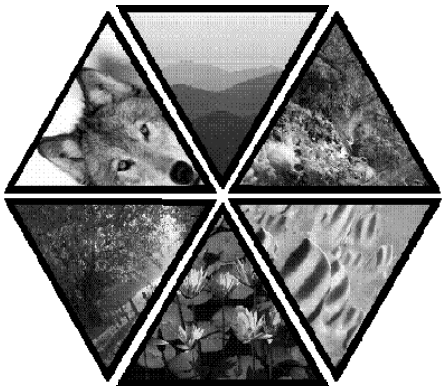
Issues & Concerns

- Ecosystems are complex systems
- Varying temporal & geographic scales



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Issues & Concerns Continued

- Data sources
- Community involvement
- Economic valuation

Rocky Mountain Arsenal...

chemical weapons manufacturing facility

wildlife refuge

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In the future...

Online Resources

http://clu-in.org/greenremediation

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Thank You!

Sarah Slack
slack.sarah@epa.gov
NNEMS Fellow, US EPA

After 09/2010:
sarahaslack@gmail.com
pachon.carlos@epa.gov

Resources & Feedback

- To view a complete list of resources for this seminar, please visit the **Additional Resources**
- Please complete the **Feedback Form** to help ensure events like this are offered in the future

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