

Sediment Monitored Natural Restoration Assessment Elements

1. Characterization of historical contaminant sources and controls
2. Characterization of fate and transport processes
3. Compilation of a sufficient historical record for chemicals of interest to evaluate temporal trends
4. Compilation of historical trends in biological endpoint data to corroborate chemical data
5. Development of an acceptable and defensible predictive tool(s) to allow prediction of future MNR

Characterization of Contamination Sources

Objective: Understand historic and existing contamination sources

1. Are historic contaminant-loading to the site understood?
2. Is the load quantified (e.g., lbs/day)?
3. Have the contaminant-input sources been controlled or eliminated?
4. Is there external source control? Understood/documentated?
5. What was the extent of control?
6. Are there residual internal contaminant sources (e.g. hot spot)?
7. Are internal contaminant sources controlled?
8. What is the extent of internal source control?

Characterization of Fate and Transport Processes

Objective: Establish link between contaminant sources to resulting sediment quality

Sediment Deposition and Stability

1. Sediment transport processes well described?
2. Sediment deposition processes understood /quantified?
3. Depositional areas delineated?
4. What field data on depositional processes are available?
5. Sediment erosion/stability understood? Characterized or quantified?
6. Impacts of episodic events to erosion/stability understood either through monitoring data or models?

Characterization of Fate and Transport Processes (cont)

Contaminant Fate

7. Contaminant fate and transport processes characterized /quantified?
Burial? Dispersion? Partitioning processes? Sorption/desorption?
8. Abiotic and biotic transformation processes understood?
9. Contaminant transformation processes characterized / quantified?
10. Biodegradation demonstrated (e.g., lab, literature, or monitoring) and understood?
11. Contaminant speciation understood?

Historical Record for Contaminant in Sediments

Objective: Confirm using trends in sediment chemical data that reduction in chemical exposure is occurring

1. Surface sediment chemical data trends (≥ 10 yrs) indicate statistically significant reduction in chemical concentrations?
2. How many years of sediment chemical monitoring data are available?
3. Data over time comparable?
4. Sediment coring data corroborate the long-term monitoring data?

Corroborate MNR Based on Biological Endpoint(s) Trends

Objective: Confirm via trends in biological endpoint data that risk reduction is occurring

1. Biological endpoint data (as defined by site specific risk assessment or by regulatory process) available?

Tissue analysis?

Sediment bioassay?

Histopathology?

Community analysis or surveys?

2. Biological endpoint data demonstrate trends?

Development of Acceptable and Defensible Predictive Tools

Objective: Using predictive tools, predict changes in sediment quality and biological endpoints resulting from different MNR (or management) alternatives (including contaminant levels, risk, and confidence in prediction)

1. Fate and transport forecasting model developed for the site?
2. Model validated using site-specific data?
3. Alternative models used?
4. Uncertainty analysis conducted on the model?
5. Risk model linked to the fate and transport model?