Approaches, Advantages, and Challenges to Early Restoration

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NRDA Overview

- Release of contaminants causes harm to natural resources – “injury”
- Harm to natural resources can cause a loss of benefits (or services)
  - e.g., biological, cultural
- Losses are addressed through restoration
Early Restoration

- Conduct injury determination and restoration planning in parallel (rather than sequentially)
- Consistent with regulations (DOI and OPA)
  - Assessment Phase (DOI)
  - Restoration Planning Phase (OPA)
Administrative Process (DOI)

- Preassessment Screen
- Assessment Plan
- Assessment Phase
  - Injury determination
  - Injury quantification
  - Damage determination
  - Restoration planning
  - Restoration and Compensation Determination Plan (RCDP)
- Report of Assessment
- Post Assessment Phase
  - Restoration Plan
  - Implementation of restoration
Advantages to Early Restoration

- Goal of NRDA is to restore injured resources in order to make the public whole
- Early restoration provides greater benefits (greater “credit”)
Advantages to Early Restoration (cont.)

- Coordination with response actions
  - Maximize efficiency, minimize costs
- May facilitate implementation of time-sensitive projects
- Provides a “road test” for cooperative assessments
- No commitment required
Approaches to Early Restoration

- Habitat Equivalency Analysis (HEA)
  - Make simplifying assumptions
  - Assume reasonable worst-case scenarios
  - Easier if injuries and damages are relatively small
Challenges to Early Restoration

- RPs typically seek (and deserve) credit for early restoration
- May be difficult to agree on amount and approach prior to completing the NRDA
  - How to quantify benefits and scale prior to determining and fully quantifying injuries?
- May be challenging if multiple parties involved
Challenges to Early Restoration (cont.)

- May be challenging for Trustees to prioritize projects prior to knowing full scope of
  - Injuries (type and spatial, temporal extent)
  - Remedial actions (benefits and timing)
- May be challenging for multi-agency Trustee groups to agree on early restoration priorities
Early Restoration: Summary

- There are advantages and challenges to early restoration
- May not be feasible in all cases
- Provides the possibility for early progress and success, without commitment requirements
Climate Change and NRDA and Restoration
What Climate Change Impacts Should Trustees Worry About?

- Sea level rise
  - Projections for 2100 range from 28 to 150 cm (or more)
  - Storm surges magnify the impacts of sea level rise
  - Impacts on coastal ecosystems, coastal populations, saltwater intrusion into freshwater systems, barrier islands
What Climate Change Impacts Should Trustees Worry About (cont.)?

- Temperature increase
  - Decrease in snow and ice cover
  - Changes in snowmelt timing
  - Changes in species distributions
  - Insect outbreaks
What Climate Change Impacts Should Trustees Worry About (cont.)?

- Changes in precipitation
  - Changes in timing and intensity
  - Intensification of drought cycles
  - Increased flooding risks
  - Changes in surface water and groundwater recharge/discharge
Potential Impacts of Climate Change on NRDAR

- Potential for increased releases of hazardous substances:
  - Pipelines, coastal terminals may be vulnerable to effects of sea level rise, storm surges
  - Flooding/erosion may expose previously sequestered chemicals
  - Capacity exceedences of treatment plants, other facilities
Potential Impacts of Climate Change on NRDAR (cont.)

- Changes in environmental pathways and exposure:
  - Alteration of surface water – groundwater interactions due to precipitation changes, sea level rise
  - Changes in spatial distribution of habitats
  - Alteration of spatial distribution of species
Potential Impacts of Climate Change on NRDAR (cont.)

- Increases in the effects of contaminant exposure:
  - Lower stream flow = higher contaminant concentrations
  - Organism biochemical response to contaminants affected by temperature, changes in salinity, other stressors
  - Contaminants may become more bioavailable (e.g. mercury methylation)
Potential Impacts of Climate Change on NRDAR (cont.)

- Impacts to restoration projects:
  - Restored habitat may become vulnerable to new invasive species as a result of temperature or precipitation changes
  - Sea level rise may result in loss of restored coastal wetlands
Example of Insect Outbreaks in Just 10 Years in Colorado

- Next set of slides shows how insect outbreaks can dramatically change a forest landscape in just 10 years
- Data source: USDA Forest Service aerial survey data
Example: Coastal Marsh Along the Mid-Atlantic Coast

1995 wetland habitat

Projected habitat in 2195 – 1.4 m total sea-level rise
Invasive Species Control

- Remove invasive species (exotics)
- Replant species of tribal importance
- Long-term management
Invasive Species Control

- Santa Clara Pueblo Tribe, New Mexico
- Restoration of watershed damaged by fire
  - Restored watershed with native plants and conifers (Douglas fir, blue stem willow, Douglas spruce)
  - Removed exotics: tamarisk, Siberian elm, and Russian olive
Habitat Improvement

- Stream channel restoration:
  - Restore stream channel sinuosity and complexity
  - Plant trees for shade
  - Incorporate woody debris
  - Enhances habitat for native species of fish
Habitat Improvement

- Confederated Tribes of the Warm Springs Reservation of Oregon
Habitat Improvement

- Restoration of salmonid spawning and fishery
- Plants of tribal importance
  - Longstem bullrush
  - Native chokecherries
- Cultural uses – tribal youth program: sweatlodge along creek
- Capacity building
  - Tribal members involved in construction process