Valuing Natural Resource Damages

How to Use Empirical Data and Estimation Techniques to Build Positions, Claims, and Leverage

American Bar Association, Section of Environment, Energy, and Resources

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Agenda

- What are natural resource (NR) damages?
- Methods for calculating damages
- Often-disputed technical issues
- Fox River/Green Bay example
What Are NR Damages?
What Are NR Damages?

- Cost or value: enough NR restoration to make public whole for NR losses (resulting from hazardous substance releases): “restore, replace, or acquire the equivalent”
Chronology of NR Injury and Service Losses

- Resource service level
- Incident date
- Start primary restoration
- Time

- Interim losses
- Baseline
- Recovery path with primary restoration
Service Losses

No Action — Natural Recovery

Time

Services
Service Losses (cont.)

- No Action — Natural Recovery
- Response Action
Service Losses (cont.)

No Action — Natural Recovery

NRDA Restoration

Response Action

No Action — Natural Recovery

Time

Services
Physical Injuries vs. Economic Damages

**Injuries:**
- Impaired land, air, water, biota
- Measured directly (e.g., death from acute poisoning)
- Estimated indirectly (e.g., bio-markers, predicted effects)
- Definition/assumed (e.g., WQS, consumption advisories)

**Damages:**
- Reduced public use, enjoyment, appreciation
- Measured directly (e.g., observed actions/RP and surveys/SP)
- Estimated indirectly (e.g., benefits transfer)
- Values assumed (e.g., many HEA/REAs)
Economic Damages vs. Legal Claims

**Economic damages:**
- Damages = value of NR loss or costs to restore
- Damages determined by public’s losses
- *Typically* expressed in $ for convenience
- Developed by economists

**Legal claims:**
- Damages = a measure of a legal claim
- Damages determined by plaintiff’s action
- *Will* be converted to $ by PRPs, courts
- Developed by attorneys
NR Damages vs. Cleanup Costs

- Residual to cleanup/response
- NR
- NR trustees
- Must succeed legally first
- Actual injuries
- Cleanup-like actions to break pathways; more often based on habitats

- Cleanup/response is primary
- Human health, environment
- EPA, USCG, State EPAs
- Superfund and orders
- Risk
- More authority, more case law, more money, more accepted for cleanup
CERCLA Damage Determination

- Damages (for restoration) include (43 CFR Part 11)
  - **Baseline restoration**: cost (or value) to restore NR & services to baseline
  - **Compensable value**: interim losses until baseline (or restoration)
  - **Assessment costs**: reasonable (i.e., value justifies cost)
OPA Damage Determination

- Restoration (or damages) includes (value of) (15 CFR Part 990)
  - **Primary restoration**: return injured NR & services to baseline
  - **Compensatory restoration**: interim losses until NR baseline
  - **Assessment costs**: reasonable (i.e., value justifies cost)
Methods for Calculating Damages
Calculating Damages: Equivalency Methods

Public losses from NR injuries

Public gains from NR restoration
Restoration Cost vs. Valuation

- Restoration practical, cost-effective & valuable
  - Cost to fix injuries (e.g., clean oil off of bird)
  - Cost to replace (e.g., wetland acre oiled)
  - Cost of equivalent (HEA, REA, VEA)
    - Resource equivalence (e.g., bird-years)
    - Habitat equivalence (e.g., acre-years)
    - Ecological equivalence (service-acre-years)
    - Value equivalence (e.g., dollars, utility)
    - Discounting over time
Restoration Cost vs. Valuation (cont.)

- **Value**: of public losses from releases, or of sufficient restoration to offset losses
  - Revealed preference: human behavior (especially money spent): travel cost/RUM, hedonic pricing, market price
  - Stated preference: surveys (CVM, conjoint analysis)
Analysis for Settlement

- Restoration costs based on HEA
  - Assumptions if data limited
  - Equivalence: injured and restored habitats
  - Relationships
    - Toxicity and %-service-loss
    - Restoration and %-service-gain
    - Different habitats or services (ecological and/or economic equivalence)
Analysis for Settlement (cont.)

- Valuation based on economics studies
  - Benefits transfer if data are limited
    - Average willingness to pay (WTP)
    - Number of people with the average WTP
    - Similarities and differences between sites, circumstances, human populations
Litigation-Quality Measurement

- Level of proof needed relates to total amount trustees claim
  - Small claims (absolute, or relative to PRP’s CNTS value): extrapolate (“back-of-envelope”)
  - Large claims: even highly credible analyses will be strongly and thoroughly scrutinized
  - Also applies to release, pathway, exposure, injury, and restoration analysis
Any damage calculation method can be useful

- First, estimate damages: available information (e.g., HEA, REA, benefits transfer)
- If damages significant, refine, collect data, and apply additional techniques
- If interest on damages exceed litigation costs, do not rely on backs of envelopes!
Litigation-Quality Measurement (cont.)

- Any method can be criticized
- To prevail in expert negotiations or litigation:
  - CVM with sufficient response rates and carefully worded and tested surveys
  - Travel cost study of correct population, with appropriate substitutes
  - HEA includes measures of how injury/loss relates to restoration/gain, and cost to value
Often-Disputed Technical Issues
Often-Disputed Technical Issues

- **Releases**: what happened at facilities before environmental measurements of contamination?
- **Pathways**: how likely are injuries in or from deep sediments or groundwater?
- **Exposure**: how important are regulatory injuries like WQS violation?
- **Injury**: how important are biological injuries that don’t measurably impact populations?
Often-Disputed Technical Issues (cont.)

- **Damages**: how much difference between total values and current, active use values?
- **Restoration**: how much discretion do trustees enjoy in choosing restoration that may cost more than its public value?
Fox River/Green Bay Example
Fox River/Green Bay Site (cont.)
Fox River/Green Bay Site (cont.)
### Fox River/Green Bay Site (cont.)

<table>
<thead>
<tr>
<th>Cost &gt; Value</th>
<th>Cost ≈ Value</th>
<th>Cost &lt; Value</th>
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<tbody>
<tr>
<td>Sediment removal (trustees)</td>
<td>Habitat restoration (trustees)</td>
<td>Recreational facilities (PRPs)</td>
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<tr>
<td>Cost</td>
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<tr>
<td>$111 billion</td>
<td>$111-268 million</td>
<td>$7 million</td>
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<tr>
<td>Value</td>
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<tr>
<td>$610 million</td>
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In theory

- Trustees could seek $111 billion to restore sediments of Green Bay (but less authority than cleanup, and cost = 180x value)
- Popular park could be cheap and valuable (but merry-go-rounds are not NR)

Therefore: cost-effective, relevant NR restoration, fairly and accurately valued