Natural Resource Damage Assessment:

An Economic Perspective

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Matthew A. Freeman
Postdoctoral Researcher
Center for Natural Resource Economics & Policy
Department of Agricultural Economics & Agribusiness
LSU AgCenter/ LA Sea Grant

What is known?

Data available to estimate economic impacts

1. **Baseline data**
   - General economic health of a sector
   - Numbers of harvesters, dealers, processors, captains
   - Individual level economic data:
     - *tax records*
     - *trip ticket data*
   - Aggregate level economic data:
     - *regional landings and prices*
     - *generic budgets, cost-earnings surveys*

2. **Incident data**
   - State and federal closures by location and time
   - Intersection with historical landings and habitat
   - Short-term supply and price dynamics

What is unknown?

Uncertainties regarding economic impacts

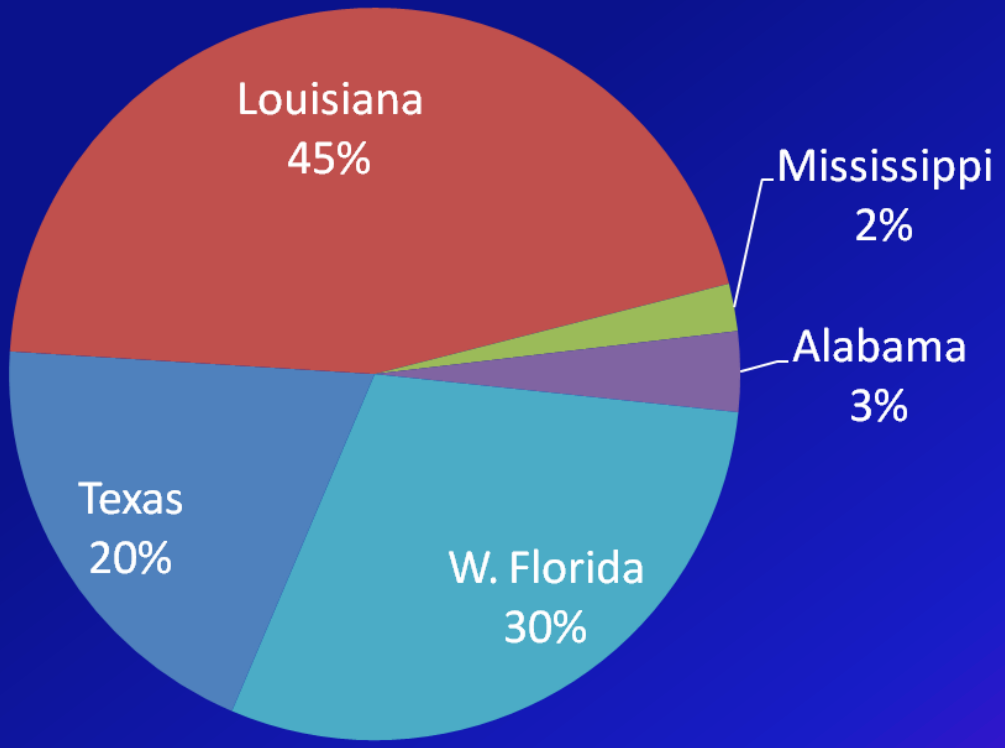
1. **Reduced Demand?**
   - Seafood sampling (FDA, EPA, CDC, NOAA, LDHH)
   - All contaminants testing below thresholds for concern
   - ***Will consumer concern translate to reduced demand?***

2. **Recruitment effects?**
   - Larvae/ Juveniles tracked via independent sampling
   - Large variability, potential offsetting factors, multiple years
   - ***Will recruitment effects be visible, with economic linkages?***

3. **Non-Market Impacts?**
   - Natural Resource Damage Assessment (NRDA)
   - Lost ecological wealth: organisms, habitats, uses
   - ***How will NRDA mitigation and valuation be conducted?***

Coastal Habitat: 17,141 miles

Tidal Shoreline, Percent of Gulf by State (NOAA)



Three Steps in NRDA

- **1. Preliminary Assessment**
  - Natural resource trustees determine whether injury to public trust resources has occurred.
- **2. Injury Assessment/Restoration Planning**
  - Trustees quantify injuries and identify possible restoration projects.
  - Economic and scientific studies assess the injuries to natural resources and the loss of services.
- **3. Restoration Implementation**
  - The final step is to implement restoration and monitor its effectiveness.

http://www.darrp.noaa.gov/about/nrda.html

Economic & Scientific Studies

- In order to assess & quantify the damages done, we have to integrate ecology and economics.

- This allows us to:
  - Know what ecological goods and services are being provided (and how)
  - Value those goods and services

Previous NRDA of Oil Spills

- Helton and Penn (1999)
- Examined 48 oil spills across the U.S.
- NRDA costs averaged 26% of the spill-related expenditures for the responsible parties.

- Important to keep in mind that it's an average, since both geography & environmental conditions play a role in the impact.

What are the methods for valuation?

- Two different approaches:
  - Revealed preference
    - Acts as a surrogate market mechanism
  - Stated preference
    - Completely non-market based mechanism

Revealed Preference

- Travel Cost Method
  - Examines time & travel expenses in relation to distance traveled & trips made.
  - Forms a basis for an implicit demand curve in terms of the willingness-to-pay for that resource.

Revealed Preference

- Hedonic Pricing Method
  - Generally, this uses real estate data as a framework.
  - Location, location, location!
  - Air, water, and noise pollution impact prices.

Stated Preference

- Contingent Valuation Method
  - Elicits information about environmental preferences, primarily through surveys.
  - Directly asks what people are willing to pay for environmental services under various scenarios.
  - Some focus on WTP for environmental improvement; others on WTA for decline in environmental quality.

Replacement Costs

- Cost of replacing an ecological system function with a human engineered system is used as a measure of the economic value of the function itself.

- It can be extremely useful identifying an economic value for a single (or a few) ecosystem services.

- Possible to overvalue a service if individuals get a secondary benefit from the substitute or replacement service.

Replacement Costs

Table 2.2 Average cost for CWPPRA Authorized Projects (n=124)

Type	Obs.	$/AAHU	$/Acre (Enhancement)	$/Acre (Protection)	$/Net Acre			
					μ	σ	Min.	Max.
BI	13	220,080	550,411	1,003,791	289,686	435,947	3,196	1,682,585
MC	23	178,310	335,688	2,496,170	100,795	76,063	4,555	342,593
SP	30	179,639	40,670	86,970	65,717	70,793	500	253,202
FWD/SD	15	67,934	73,486	154,159	37,619	46,877	1,561	182,001
HR	31	39,609	8,216	80,212	31,939	41,165	682	183,144
OM	3	37,021	1,962	36,841	18,391	19,040	5,356	40,241
SNT/TR	4	48,634	48,471	79,054	14,775	13,649	1,258	32,839
MM	2	18,276	2,625	10,827	7,727	3,072	5,555	9,900
HC	1	32,066	N/A	6,414	6,414	N/A	6,414	6,414
VP	2	8,156	19,527	27,176	5,649	118	5,520	5,778

Legend:

BI	Barrier Island Restoration
MC	Marsh Creation
SP	Shoreline Protection
FWD/SD	Freshwater Diversion/ Sediment Diversion
HR	Hydrologic Restoration
OM	Outfall Management
SNT/TR	Sediment and Nutrient Trapping/ Terracing Restoration
MM	Marsh Management
HC	Herbivory Control
VP	Vegetation Planting

Benefit Transfer

- This ‘transfers’ values measured in a previous study to the environmental context you’re examining.
  - Are the previous study’s values reliable?
  - To what extent are those values transferrable?
  - http://www.gecoserv.org/valuationdb.jsp

Questions/Comments?

Matthew Freeman
Louisiana AgCenter & Louisiana Sea Grant
mfreeman@lsu.edu
225-578-4566