The Economics of Coastal Vulnerability and Adaptation: Asking the Right Questions

Robert J. Johnston

Director, George Perkins Marsh Institute & Professor, Department of Economics
Clark University

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Northeast Coastal Vulnerability and Adaptation

- Northeast coastal communities are facing increasing threats from coastal storms, sea level rise and flooding.
- Adaptation requires tradeoffs that affect issues such as—
  - development and infrastructure
  - ecosystem services
  - community character
  - public and private costs
  - property rights
  - equity / fairness
  - and many others…

There Is No One-Size-Fits-All Approach

The Relevance of Economic Information

- Increasingly, economic issues and claims are at the center of debates concerning adaptation.
- Unfortunately, the economic information often used to inform adaptation debates:
  - Addresses the wrong questions (or overlooks some of the most important issues),
  - Begins with incorrect preconceptions
  - Provides partial or misleading guidance
- For economics to provide useful guidance, it must:
  - Begin with the right questions
  - Apply appropriate methods and data

What Are The Right Questions?

- The goals of this presentation are to:
  - Discuss common misconceptions about the economics of coastal adaptation,
  - Identify some useful questions to ask,
  - Describe some of the methods and data that can be used to answer those questions

Questions versus Predetermined Objectives

- Decision-makers often begin with preconceived notions about the economics of coastal adaptation.
  - Objectives that are assumed to be most important from a social perspective or that will provide the greatest economic benefit.
  - Assumed preferences and values of residents.
- These preconceived notions are often wrong.
- It is important to start with economic questions rather than possibly incorrect preconceptions.

Example—Shoreland Development Restrictions

- A recent project quantifies tradeoffs that south coastal Maine residents (Kennebunk, Sanford and Wells) are willing to make to protect vulnerable riparian land.
- Conducted in partnership with the Wells National Estuarine Research Reserve.
- Based on a random sample of 1,223 residents.
- Preconceived notion: Maine residents reject stronger restrictions on shoreland development.
- Actual result: Residents are more likely to support policies with stronger restrictions on development.
- Residents value wider development setbacks and more enforcement of existing restrictions.

Example—It's Not All About Homes

- Ongoing project quantifies economic tradeoffs and values for coastal adaptation in selected Connecticut communities (Old Saybrook and Waterford).
- Supported by Northeast Regional Sea Grant Consortium; conducted in partnership with the Nature Conservancy.
- Preconceived notion: Residents' primary concern is for the protection of coastal homes and infrastructure.
- Actual Result: Average residents are more concerned with the protection of beaches, wetlands, community character, and natural capital.
- Ongoing research is validating and quantifying these initial qualitative results.

Questions versus Predetermined Objectives

- Preconceived notions and predetermined objectives can lead to misguided actions and priorities.
- Common wisdom regarding public values is often grounded in actions of a small number of vocal residents, rather than true values of the public.

Understanding Benefits and Costs

- Informed adaptation also requires decision-makers to understand economic benefits and costs.
- A common assumption is that economic costs and benefits are always related to markets and money transactions (e.g., the replacement cost of homes).
- Neither benefits nor costs require markets.
  - An economic benefit is anything that enhances someone's well-being.
  - An economic cost is anything that reduces someone's well-being (or that uses up a valued resource).
- Economics is about social welfare, whether influenced by market or non-market outcomes.

Simple Typology of Economic Value

Total Value

Market

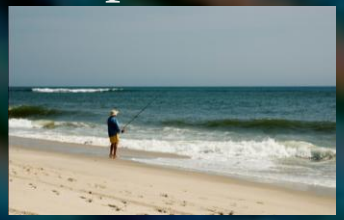
Non-Market

Use

Non-Use
(existence, bequest, altruistic)

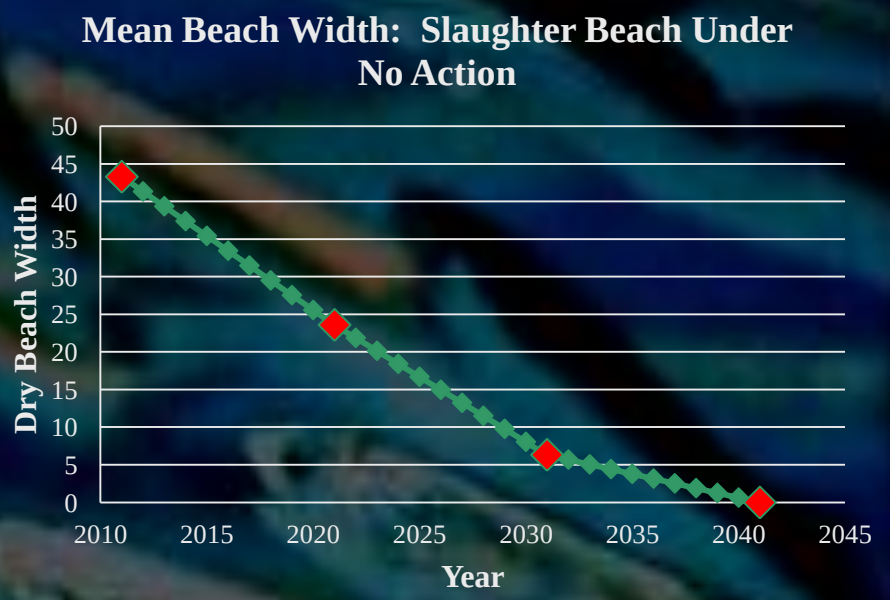
Consumptive

Non-Consumptive



The Economic Value of Natural Capital

- Questions about the economics of adaptation often focus on homes and infrastructure, but protecting natural capital and services can have equal or greater value.
- Example: A 2011 study for the Delaware Dept. of Natural Resources and Environmental Control quantified benefits and costs of management for Delaware Bay Beaches.
- Small, narrow beaches used for local recreation.



Recreational Values of Delaware Bay Beaches Under Adaptation Alternatives

Beach and Visitor Type	Beach Nourishment	Basic Retreat	Enhanced Retreat
Pickering (total)	$659,832	$306,567	$169,168
Kitts Hummock (total)	$625,966	$330,514	$278,198
Bowers (total)	$1,173,049	$579,326	$927,590
South Bowers (total)	$393,726	$82,450	$290,372
Slaughter (total)	$2,391,604	$1,583,761	$2,194,251
Prime Hook (total)	$1,092,704	$63,236	-$365,880
Broadkill (total)	$9,729,112	$7,837,672	$7,268,543
TOTAL ALL BEACHES	**$16,065,994**	**$10,783,525**	**$10,762,243**

Note. All estimates represent Present Value over 2011 to 2041, discounted at 4% and compared to No Action Scenario.

- Changes in non-market recreational values provided by Bay beaches under different adaptation alternatives.
- Such values are totally overlooked by market data.

Comparing Benefits and Costs

- To provide useful insight, economic evaluation of coastal adaptation must consider all primary benefits and costs.
- For example, economic assessments of hard versus soft adaptation cannot be made without understanding the value of affected natural capital and services.
- These evaluations almost always require the coordination of natural and social sciences.
- To avoid misleading conclusions, evaluations must also consider benefits and costs in a consistent manner.
- Just as non-market benefits are often ignored, many things frequently considered to be economic benefits or costs do not measure actual benefits or costs.

Example—Replacement or Damage Costs Do Not Measure Economic Costs

- Among the most commonly cited estimates of economic cost due to coastal hazards are replacement or damage costs to homes and infrastructure.
- Reduction or avoidance of these costs is often reported as an economic benefit of adaptation.
- In some cases these are the primary economic estimates used to guide community decisions.
- But replacement or damage costs are not valid measures of either economic cost or benefit (unless you are an insurance company).
- These costs can either under- or overestimate true benefits or costs; which of these apply is rarely known.

Replacement or Damage Costs Do Not Measure Economic Costs

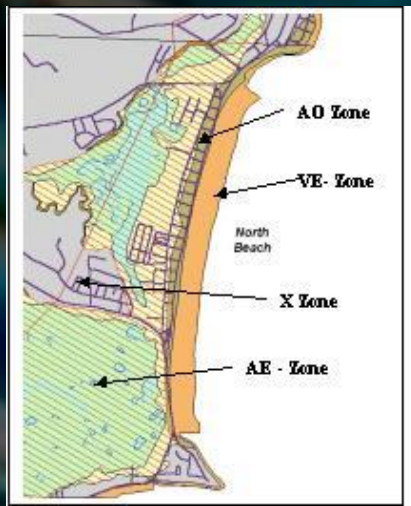
- Example #1: An old and rarely-used road-to-nowhere damaged by a flood.
  - Repairing this road would cost a $100 million dollars.
  - Is the benefit of protecting this road $100 million?
  - No—because the road is worth much less.
- Example #2: A heavily-used road damaged by a flood.
  - Due to flooding emergency vehicles cannot reach elderly residents who require assistance. Other people cannot reach their homes.
  - Repairing this road would cost $100,000.
  - Is the benefit of protecting this road $100,000?
  - No—because the road is worth much more.

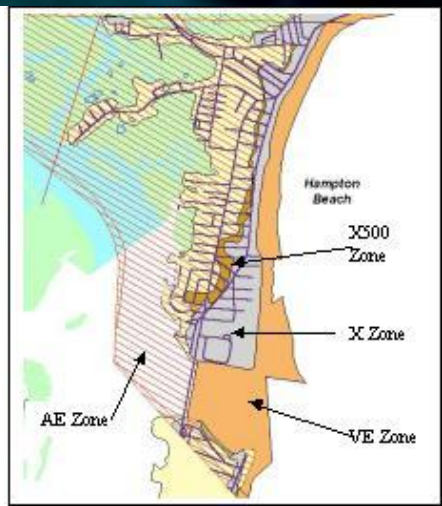
What About the Assessed Value of Homes?

- Many analyses add up the assessed value of homes forecast to flood under future scenarios. This is presented as an estimate of economic loss.
- It is not. Why?
  - Assessed value is not the same as home value.
  - The assessed value of at-risk homes is inflated by subsidized federal flood insurance.
  - Flooding rarely causes total destruction of a home.
  - Home values ignore other benefits and costs.
- The current assessed value of at-risk homes does not approximate the true value of flood protection.

Transfers versus Costs (or Benefits)

- Other outcomes that are commonly considered to be costs are in fact *transfers* from one group to another.
- Measurement of adaptation benefits and costs must distinguish true benefits and costs from transfers.
- Federal flood insurance is a context in which costs and transfers are often confused.
- This confusion has been magnified by media reports regarding effects of the Biggert-Waters Flood Insurance Reform Act (2012).





Transfers and the Flood Insurance Debate

- Since 1968 the National Flood Insurance Program (NFIP) has provided federally-subsidized flood insurance.
- The Program has resulted in a long-term transfer of wealth to owners of vulnerable homes.
- The resulting “new normal” is a case in which covered homeowners do not pay for the true risk of flooding.
- Through NFIP, taxpayers compensate homeowners for much of their flood risk.
- Eliminating these transfers leads to equity concerns and new expenses for coastal homeowners.
- These are not economic costs, but are the elimination of long-standing transfers.

Transfers and the Flood Insurance Debate

- If a homeowner cannot afford to stay in a home without NFIP subsidies, it implies that they cannot afford (or do not want) to pay for the true risk of living in a flood zone.
- Under the new normal, the resulting tradeoff is between social benefit and equity.
- Society is worse off as a result of subsidized flood insurance transfers, because too many homes are built in flood zones, ceteris paribus.
- However, NFIP allows some coastal homeowners to remain in their current homes.

Adaptation Options with the Best Economic Outcomes can be the Least Politically Feasible

- Flood insurance reform is also a policy context in which options with the best overall economic outcomes are sometimes among the least politically feasible.
  - Homeowner Flood Insurance Affordability Act (2014)
- There are many other examples in coastal adaptation.
- Sometimes this is due to misunderstanding of economic benefits/costs by decision-makers.
- In other cases it is because non-economic factors are considered equally or more important.
- In either case, transparency and clarity is critical to understanding why we might choose options that provide less sustainable benefit to society.

Example—Back to Delaware Bay Beaches

Net Benefit by Scenario and Community

Community	Nourishment	Basic Retreat	Enhanced Retreat
	Net Benefit (PV, $mill)	Net Benefit (PV, $mill)	Net Benefit (PV, $mill)
Pickering	-$3.2	-$0.5	-$1.8
Kitts Hummock	-$4.6	-$1.6	-$6.9
Bowers	-$3.1	-$2.9	-$5.8
South Bowers	-$3.8	-$0.4	-$1.4
Slaughter	-$11.6	$0.7	-$8.5
Prime Hook	-$4.6	-$3.4	-$36.4
Broadkill	$6.8	-$21.9	-$53.2
Total	**-$24.1**	**-$29.8**	**-$114.0**

Notes: Net benefits calculated relative to the No Action Scenario. The table reports all figures in 2011 dollars. The reported values are the present value of the stream of annual estimates aggregated across 30 years (from 2011 to 2041) and discounted at 4%.

- The option with the greatest net economic benefit is No Action (beaches erode and homes are continually lost).
- Many consider this the least politically feasible option.

Summary Points

- Coastal adaptation presents a challenging set tradeoffs for which people hold strong and sometimes misleading preconceptions.
- Economics does not always make decisions easier, but it can quantify and clarify benefits, costs and tradeoffs.
- Economics can also identify tradeoffs that are most socially beneficial from the larger set that are biophysically feasible.
- It can also dispel misconceptions about the social benefits and costs of different adaptation strategies.
- This requires asking the right questions and applying appropriate data and methods.

Summary Points

- Informed adaptation requires close coordination among policymakers, stakeholders and natural/social scientists to characterize social tradeoffs, benefits and costs.
- Evaluation of adaptation consequences is often hindered by a lack of required economic or biophysical data, or a lack of coordination between natural and social scientists.
- Misguided decisions can also occur when available information is used incorrectly (e.g., grounding decisions in avoided damage costs).
- Yet even when comprehensive information is available, the best decisions for social benefits are not always the most politically feasible.