

Benefits & Costs in Coastal Community Resilience

Session 2d, PNREC 2025

May 9, 2025

Presenter: Cortney Cortez
The Balmoral Group



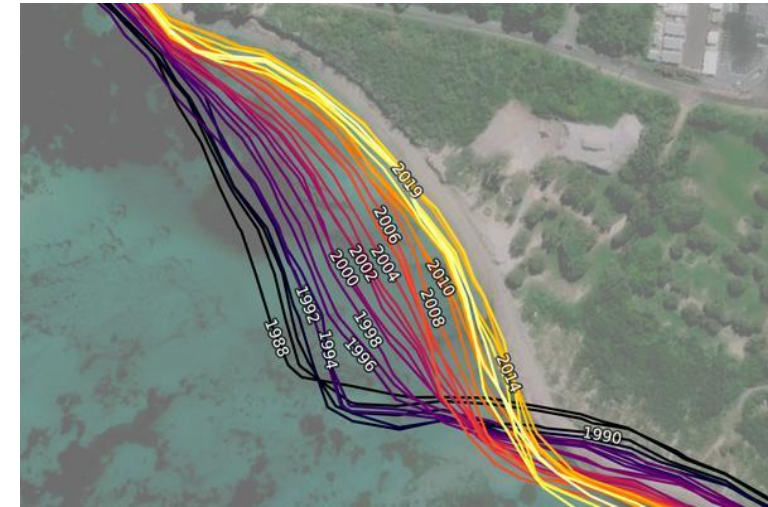
Introduction

prioritizing coastal adaptation interventions, providing transparency, comparability, and economic justification for resilient infrastructure and

This session will explore the practical application of BCA methodologies through four case studies:

- Adaptation strategies for coastal erosion in Old Bar, Australia;
- Mitigation options for coastal erosion challenges in St Johns County, FL;
- SLR-induced flooding adaptation in Monroe County FL,
- Flood resilience in King County, WA

These studies were commissioned by local governments and regional entities to support resilience strategies, grant applications, and long-term planning.



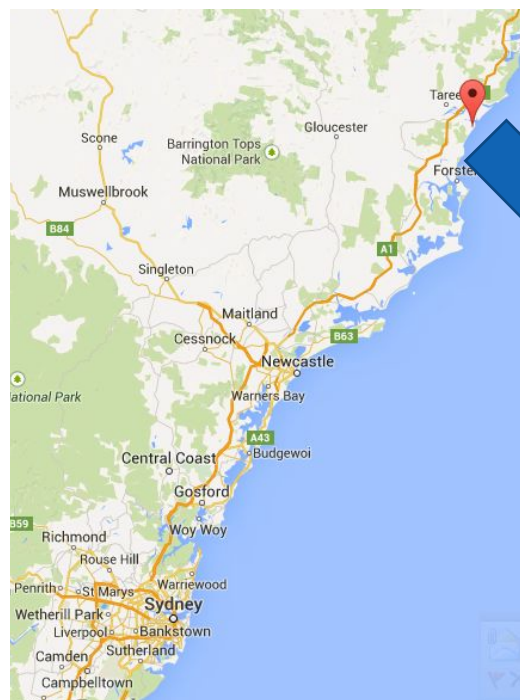
Old Bar, Australia CBA Approach to Coastal Adaptation

Case Study #1



Project Background

- Client = New South Wales (AU) Office of Environment & Heritage (OEH)
- ~ 15 Verified Coastal “Hotspots” for Erosion and Shoreline Recession
- Until 2014, State Policy Opposed to Retreat and in Favor of Armoring
- State Confronted with Significant Engineering and Other Costs (including land)



Project Background Cont.

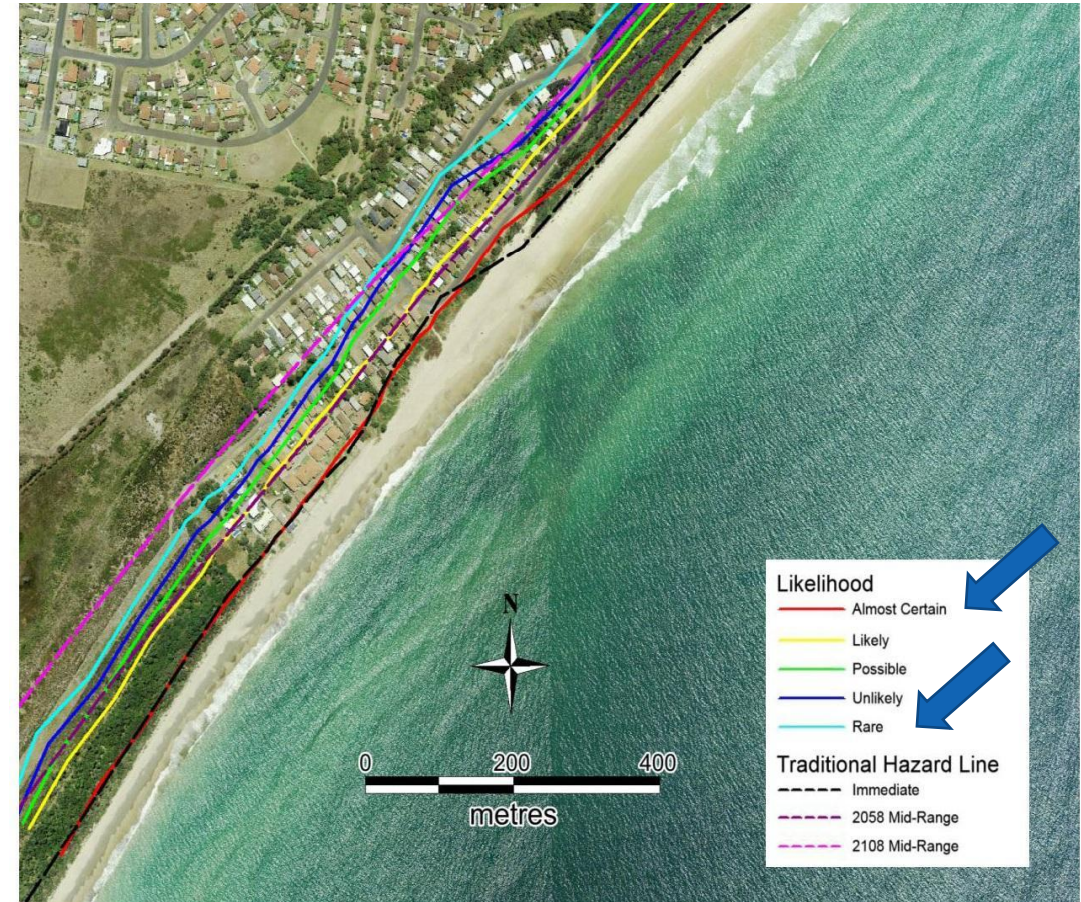


Project Objectives

To assist with finding the most cost effective option, cost benefit analysis was used to determine best options.

Objectives:

- Include Non-Market and Community Economic Considerations
- Reflect Risk Associated with Three “Hazard Lines”
- Adaptive management considerations that “buy time”:
- Address Treasury Guidelines for Sensitivity Analysis (Three Discount Rates)
- Reduce flooding and coastline loss and reduce impacts from flooding on local communities.



Approach

Data Collection

Community Socio-economic Profile;

Engineering Cost &
Technical Information;
Real Property Data;
Council Services,
Infrastructure and
Utility Information
Willingness to Pay
Literature
Hazard Lines (Affirm
Probabilities)

Analysis

GIS Overlays of Risk
Lines
Calculate Rates of
Property Loss
Identify Direct, Indirect
and Non-Market Costs
Classify and Tabulate
Non-Market Benefits
(i.e., Environmental,
Community,
Recreational)

Conclusions

Cost Benefit Analysis
Relative Rankings of
Alternatives
**Informed Choices
for Council and
State**



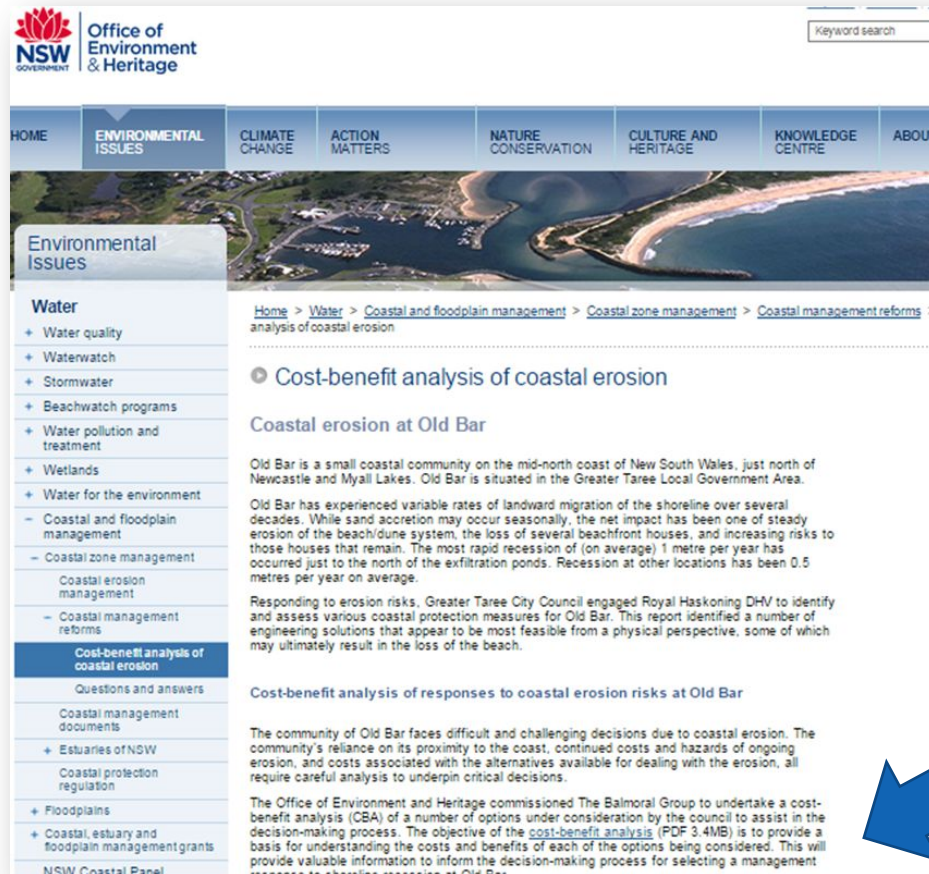
Results

- CBA found that the most cost effective option would be a planned retreat with purchased easements.
- Limited compensation for beachfront properties would be provided.
- Other options such as a sea wall will require generational commitment of resources to maintain.
- The various sea wall options were between 0.7 to 0.8
- Planned retreat:
 - 1.98 on a 20 year horizon
 - 2.22 on a 60 year horizon

OPTION	Net Benefit Millions	Benefit/Cost Ratio
Planned Retreat w/ Easement	34.6	2.49
Planned Retreat	28.6	1.98
Sea Wall Stage I (c)	-9.0	0.83
Sea Wall Stage I (b)	-11.5	0.77
Sea Wall Stage I (a)	-14.1	0.70
Sea Wall Stages I & II (c)	-44.8	0.50
Sea Wall Stages I & II (b)	-47.3	0.46
Sea Wall Stages I & II (a)	-49.9	0.41
Base Case: Business as Usual	-70.6	0.02

Outcomes

- Results were Contentious and Newsworthy
- Results were Adopted



Rock wall for Old Bar scrapped

Tom Lowrey

Updated 28 Sep 2014, 7:45pm

Plans for a rock revetment wall to protect the coastal-erosion hotspot of Old Bar, east of Taree, have been scrapped by the State Government.

The Greater Taree City Council included the \$52 million proposal in its Coastal Zone Management Plan for the region.

The wall would have been two kilometres in length, with construction to begin as soon as possible near Lewis Street.

Environment Minister Rob Stokes approved the broader management plan, but rejected the rock-wall proposal.



PHOTO: Erosion caused by recent heavy swells at Old Bar beach (Greater Taree City Council)

MAP: Old Bar 2430

Planned retreat policy position for Old Bar

Oct. 7, 2014, 8:47 a.m.



Greater Taree City Council staff have met with Office of Environment and Heritage (OEH) staff to discuss the matters that need to be addressed to achieve ministerial certification for the Greater Taree Coastal Zone Management Plan (CZMP).

The discussion last Friday comes following announcement by the minister for the environment, Rob Stokes, that the State will not provide funding for the implementation of protection measures for Old Bar beach.

MANNING RIVER Times

Friday May 22, 2015

News | Local News

Aa Larger / Smaller → Night Mode

"Ill-conceived plan" says Old Bar sand replenishment group

By Anslee Dennis Oct. 1, 2014, midnight

OLD Bar Sand Replenishment Group (OBSRG) branded the State government decision to exclude the revetment wall from the Greater Taree Coastal Zone Management Plan as "a wise decision because it was not the best option for Old Bar."



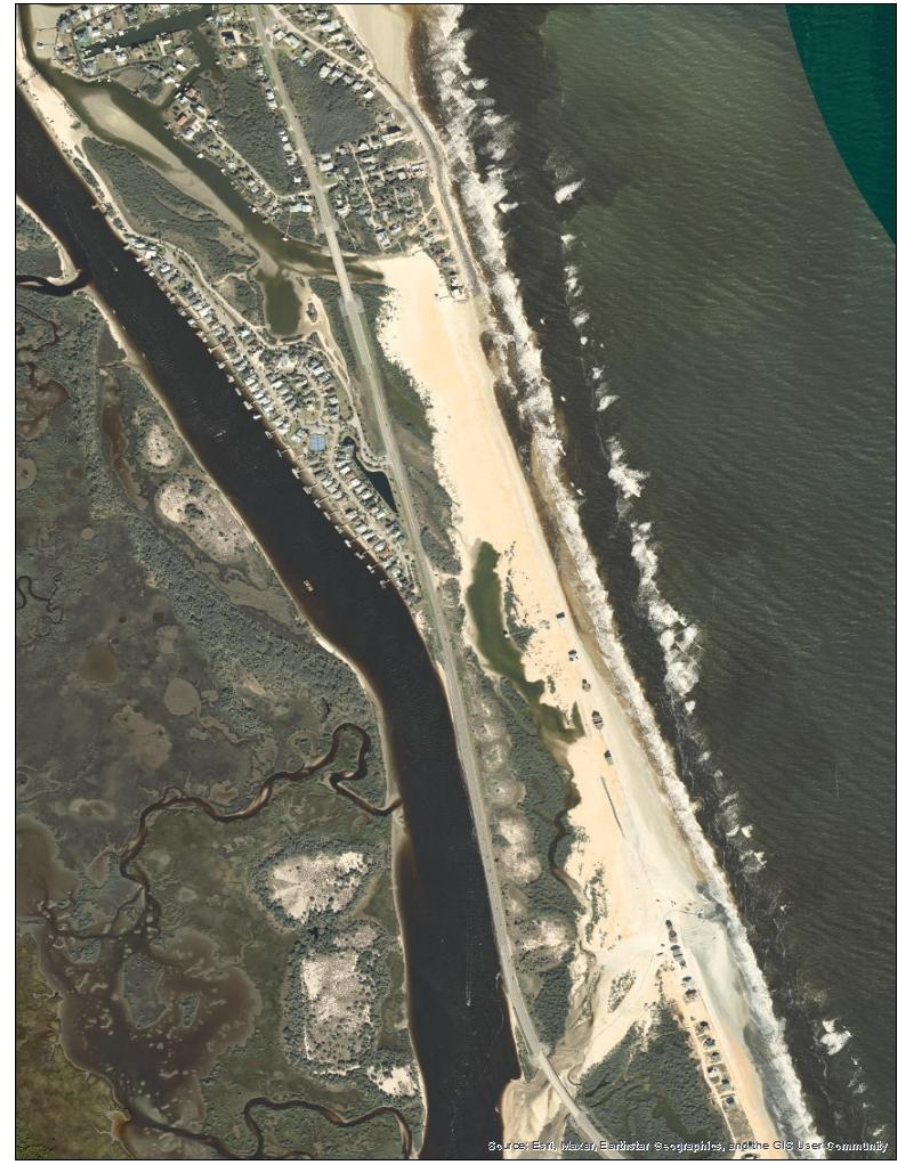
Summer Haven, FL Coastal Engineering to Mitigation

Case Study #2



Project Background

- Summer Haven in St. Johns County, FL, is facing chronic coastal erosion and river closure due to repeated storm impacts.
- Summerhouse Beach and Racquet Club has seen increasing structural risk due to shoreline retreat
- Long-time residents are deeply impacted, with concerns tied to both property and cultural heritage.



Project Background



Approach

Approach

- The County worked with INTERA to evaluate engineering and non-engineering options.
- The Balmoral Group conducted a BCA supported by surveys and local data.
- Analysis factored in both market and non-market values: property, recreation, wildlife habitat, and public quality-of-life benefits.

FINAL REPORT

Study of Summer Haven River and Surrounding Areas

St. Johns County, Florida

Prepared for: St. Johns County Board of County Commissioners

St. Johns County, Florida
500 San Sebastian View
St. Augustine, Florida 32084

Prepared by: **INTERA - GEC**
A joint venture of INTERA and G.E.C.

INTERA-GEC
446 3rd Street, Suite 7
Neptune Beach, Florida 32266

NOVEMBER 22, 2023

Approach

Costs and Scenario Assumptions Source: INTERA Documents



Results

- Currently in draft form, the results were presented Relative to Base Case or 'Do-Nothing'.
- Surveys provide valuable insights: some lack of consensus on the impacts of the river closure and management options;

Costs:

- Engineering estimations, Property value impacts

Benefits:

- Recreational values, Habitat values, amenity values, heritage values, species, properties

Best Practices

- Early, and robust, engagement to align local priorities
- Consultation of engineers to provide credible assumptions
- Restoration can result in unexpected resource costs: non-market benefits can vary significantly between management options





Stillwright Point, Key Largo

Alleviation of Flooding
Impacting in Monroe
County, FL
Case Study #3

Project Background

- Stillwright Point subdivision in Monroe County, FL
- Compound flooding impacting the Key Largo Area.
- USGS Tidal Gauge estimates levels of inundation exceeding 1-foot for more than 7 days within a 3 week period.
- Existing conditions create very difficult circumstances for major modifications to a roadway,
- Engineering: Proposed installation of a pressurized stormwater system, pump station, collection system, treatment unit, and force main and injection wells for disposal.

Nation | Nation & World

Key Largo is so flooded that crocodiles are swimming in the streets

Sep. 30, 2022 at 6:05 am | Updated Sep. 30, 2022 at 8:16 am



1 of 2 | Resident CJ Ferguson walks past a sign that reads "MANDATORY SLOW DEEP SALT WATER" during flooding due to Hurricane Ian at Stillwright Point in Key Largo, Florida, on Thursday, Sept. 29, 2022. (Daniel A. Varela/Miami Herald/TNS)

By David Goodhue
Miami Herald

Objectives

- Analysis that meets the grant criteria of protecting the roadway and nearby homes: Resilient Florida Grant Application Support
- Reduce compound flooding impacting
- Meet the objectives of the County's Vulnerability Assessment by elevating the roadway
- For environmental habitat enhancements or nature-based solutions:
 - Water Quality improvements, a major benefit as the Keys is identified in the Outstanding Florida Waters
- Best Practices: Use of FEMA Guidance & Standard Values

Vulnerability Assessment Update 2023

*Monroe County
Vulnerability Assessment Update 2023
To Support Resilient Florida Grant Applications
Prepared for Monroe County*

August 31, 2023



Kristen Key Szpak, 10/19/20

Approach

- FEMA BCA V6.0
- Consultation with Project Design Engineers & County
- Resilient Florida BCA Guidance

Input/Assumption	Value	Source
Project Area	7 Road Segments totally 1.74 Miles	Concept Development Report
Project Area Environmental Make-up	80% Green Space	Of the total project area, the existing impervious area is 6.2 acres. Engineering estimates that 80% of the 0.4 acres to acquires for the project will remain green-space vegetation.
Project Useful Life	30 Years	In accordance with FEMA Guidance
Existing Level of Protection	None. Regular flooding occurs.	Monroe County Vulnerability Assessment & SLR Analysis for Stillwright Point
Assumed Level of protection (post-mitigation)	No Flood Damage to Roadway Anticipated	Project updates current infrastructure to handle storm events to current FEMA 100-yr storm 5.0' BFE and sea level rise for future storm events.

Results



Benefits Assessed

- Water quality treatment
- Increased Public safety
- Reduced detour trips for drivers
- Improvement in green space
- Vehicle operation cost savings
- Reduction in Flooding



Costs Assessed

- capital costs
- operations and

Best Practices:

- There are direct benefits associated with avoided cost of travel due to delays caused by flooding;
- Improved standards of service, ambulatory, mail, etc. increase benefits to the community
- Infrastructure investments may impact property values

King County, WA

Flood Resilience BCAs as part of Grant Funding Applications

Case Study #3



Project Background & Objectives

King County Department of Local Services, Road Services Division sought assistance for their application to the Fiscal year 2025 Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant



Program Objectives:

- Assess benefits with respect to project requirements listed in RAISE Notice of Funding Opportunity
- Use USDOT guidance for methodologies and tools for a project involving improved culvert crossings
- Utilize information including WDFW State Fish Passage Maps, FEMA Ecosystem Service Values, USDOT Values, Construction Schedules, and Engineering & Design documents

Results

Benefits Assessed



- Reduced maintenance costs over life of project
- Extended residual life of culverts at proposed locations
- Improvement in riparian restoration
- Vehicle operation cost savings
- Increased public safety
- Reduction in travel times
- Reduced flooding



Costs Assessed

- capital costs
- operations and

Best Practices:

- There are direct benefits associated with avoided cost of travel due to delays caused by flooding; but need evidence
- Increasing amount of annual riparian restoration efforts leads to greater non-market societal benefits
- Account for fish passage in culvert replacement

Additional benefits:

Accessibility Benefits

Improvement in Fish Passage to fishers

Improvement in anxiety from flooding incidents



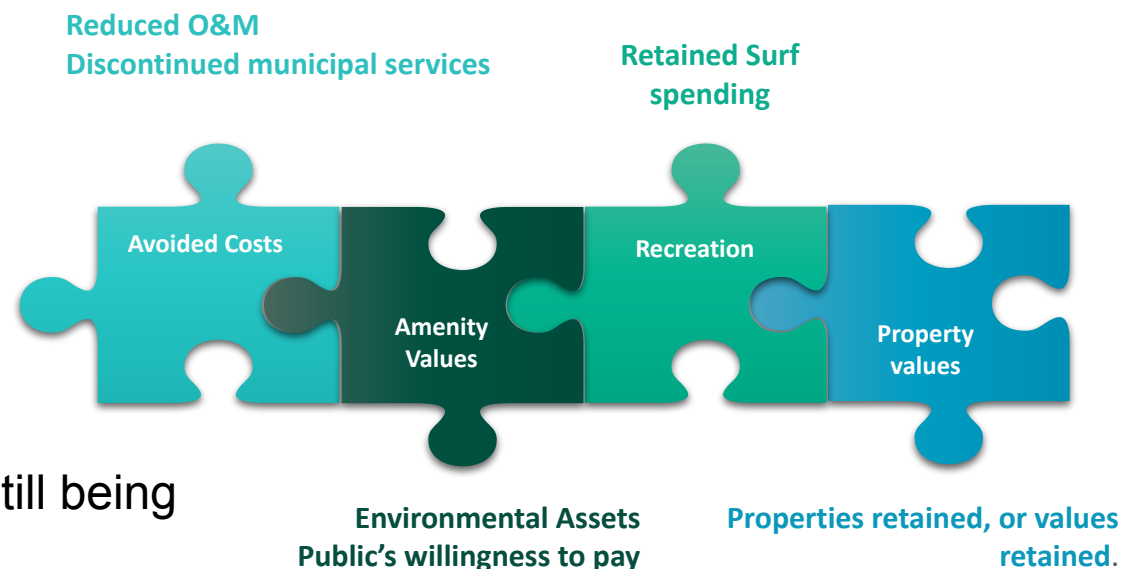
Themes, Takeaways & Conclusion

CBAs for Resiliency & Policy Decisions

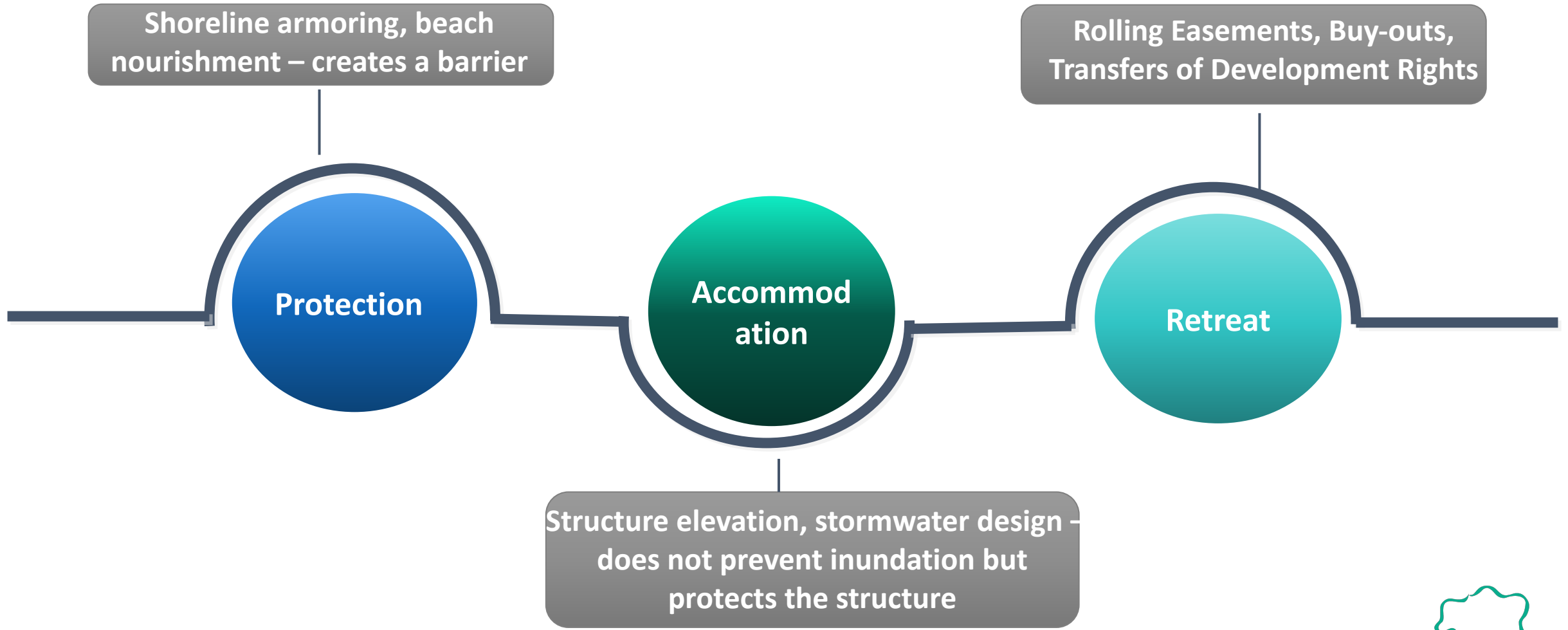
Takeaways & Themes

Despite the geographic and hazard differences, several key themes emerged:

- Early engagement in scoping BCA metrics that align with local priorities is important;
- Balance rigor with accessibility, ensuring credibility, while still being comprehensible to non-technical decision-makers
- The significant influence of non-market benefits in strengthening the economic case for investment. (recreational value, habitat enhancement, or avoided road closure impact)



Decisions - Coastal Options & Location





Questions?

Thank you!

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