Economic Valuation of the Montego Bay Marine Park

Methodology Test Cases

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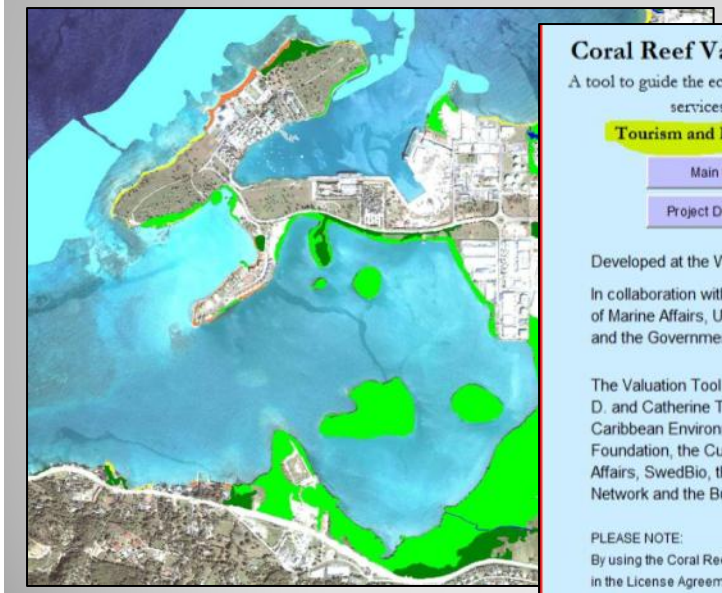
Economic Valuation

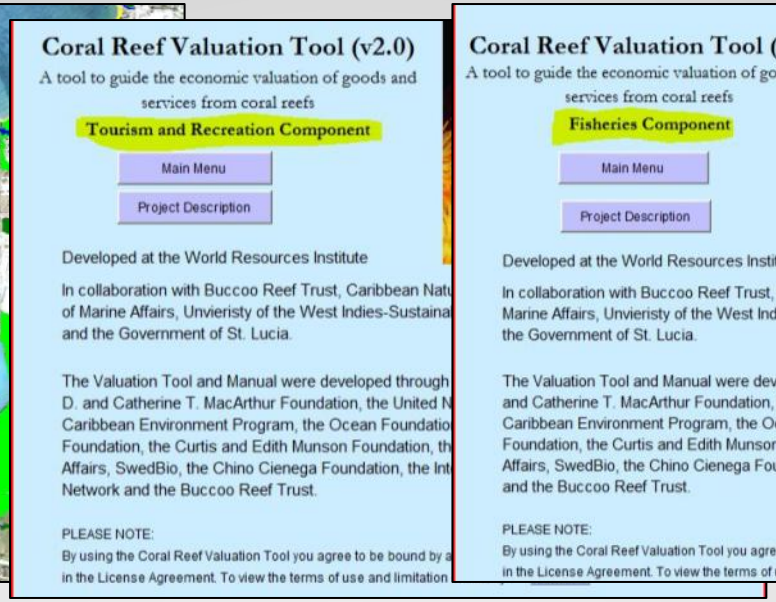
- What?
  - A means to estimate the value of environmental resources
- How?
  - Different methodologies exist
    - Total economic value = direct-use value + indirect-use value + non-use value
      - Direct – Earnings dependent on the resource (tourism, fishing)
      - Indirect – biological support, physical protection
      - Non-Use – option/existence, general knowledge that a resource will still be in place for the next generation
- Why?
  - Consider Conservation vs Development…
  - Development quantified in economic terms; Conservation traditionally qualified in qualitative or scientific terms.
  - Economic Valuation provides us with a means to present environmental values in the same way development projects are presented.
  - Apples for Apples

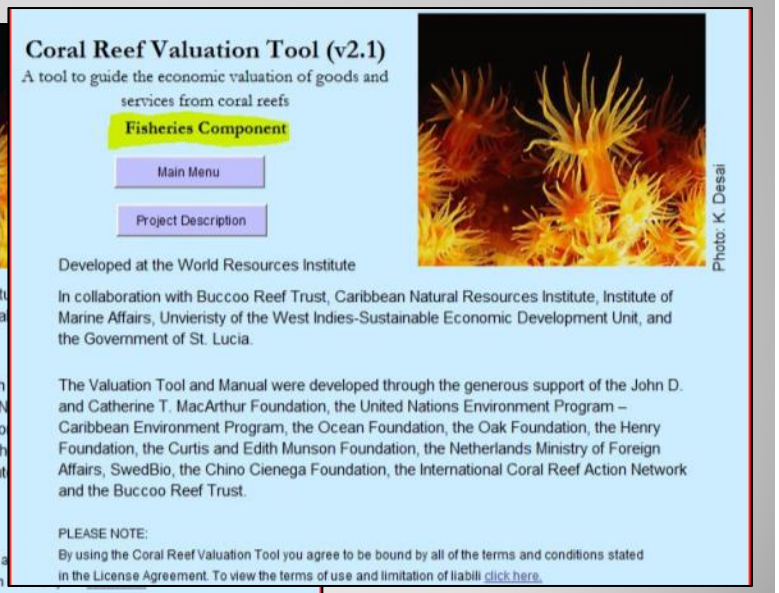
Purpose of the exercise

- *Complete three economic valuation methodologies*
- *Garner peer input*
- *Feed outputs into national/international databases*
- *Adjust tools?*
- *Promote wide-scale adoption of selected methodology*

Methodology	Source
1. Value Transfer - Spatial Distribution of Ecosystem Service Values	Troy/Wilson
2. Coral Reef Valuation - Tourism & Recreation	World Resources Institute
3. Coral Reef Valuation - Fisheries	World Resources Institute







The Methodologies

Similarities

1) **Purpose / Intent** – Quantify the financial value/contribution of ecosystem services towards the local economy

Differences

1) **Scope** – Coral Reef specific vs All habitats
2) **Medium** – Graphic vs Numeric
3) **Inputs** – Research vs indigenous knowledge
4) **Scenarios** – Dynamic analysis vs static assessment

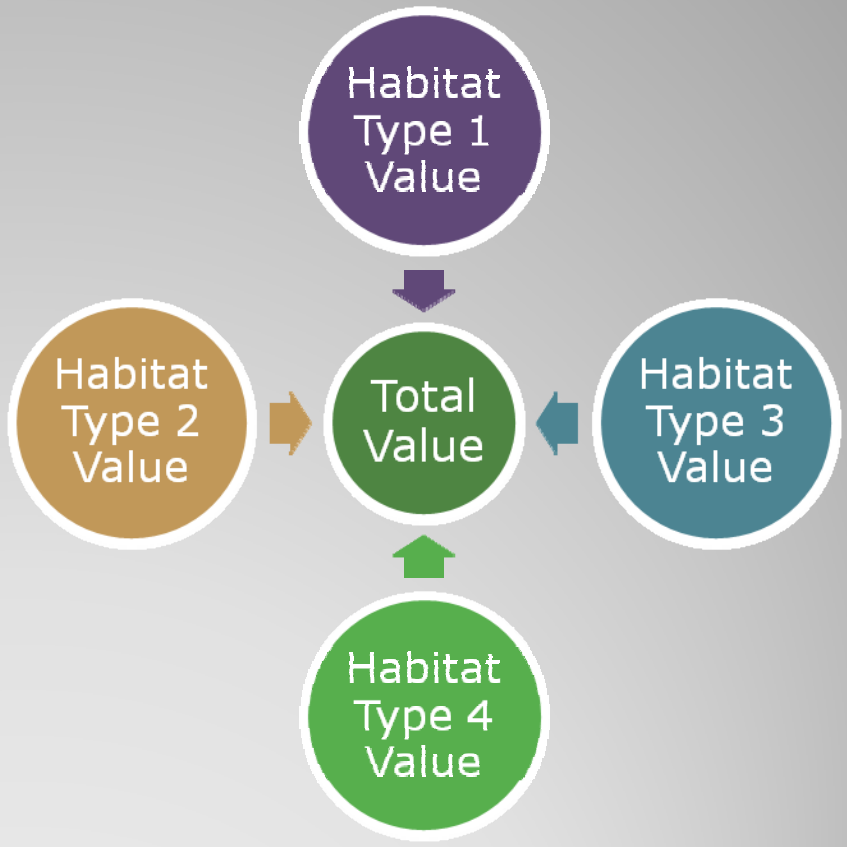
Methodology Comparison

Value Transfer

Adapted from: Austin Troy, Matthew A. Wilson
ECOLOGICAL ECONOMICS
Mapping ecosystem services: Practical Challenges and opportunities in linking GIS & Value Transfer

Theory

- Values of different habitats are determined
- Habitat areas are calculated using GIS
- Total ESV is determined by combining values



Process

- GIS used to outline ecological resource types
- Spreadsheets to multiply resource area against multiplier ($ contribution/hectare/yr)

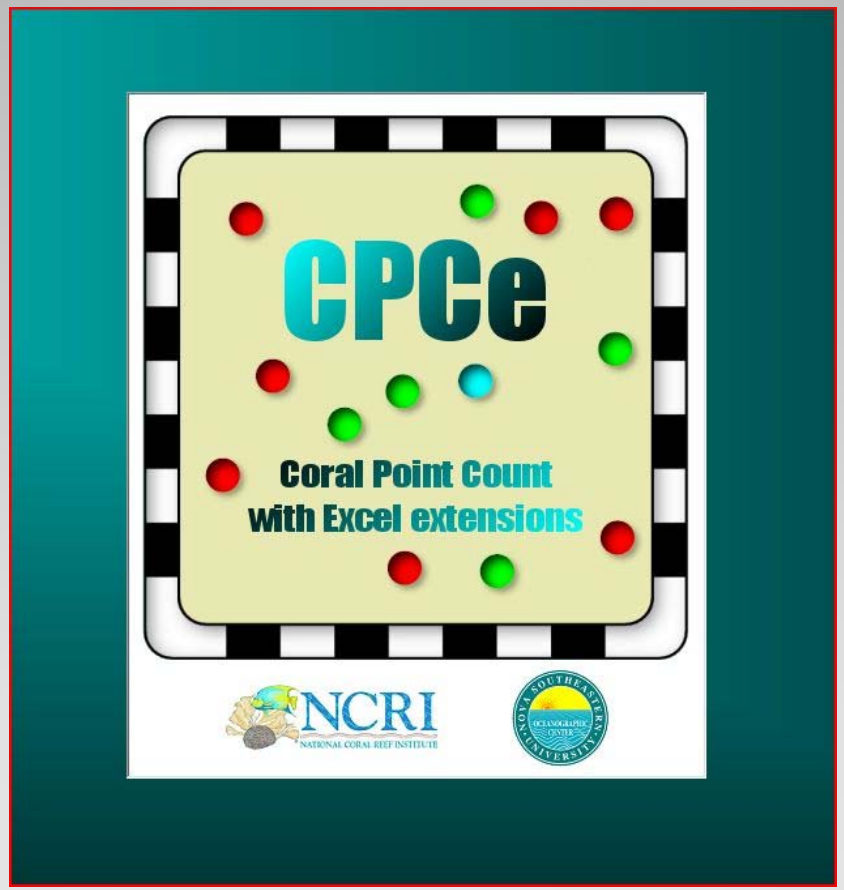
Strengths

- Relative Simplicity
- Tools - Open source (Coral Point Count) vs Commercial (Google Earth Pro; ESRI)
- Data - Not heavily dependent upon external data sources - *"involves the adaptation of existing valuation information to new contexts where valuation data is absent or limited"*
- Visual outputs - Graphic outputs readily interpreted and multi-purposed

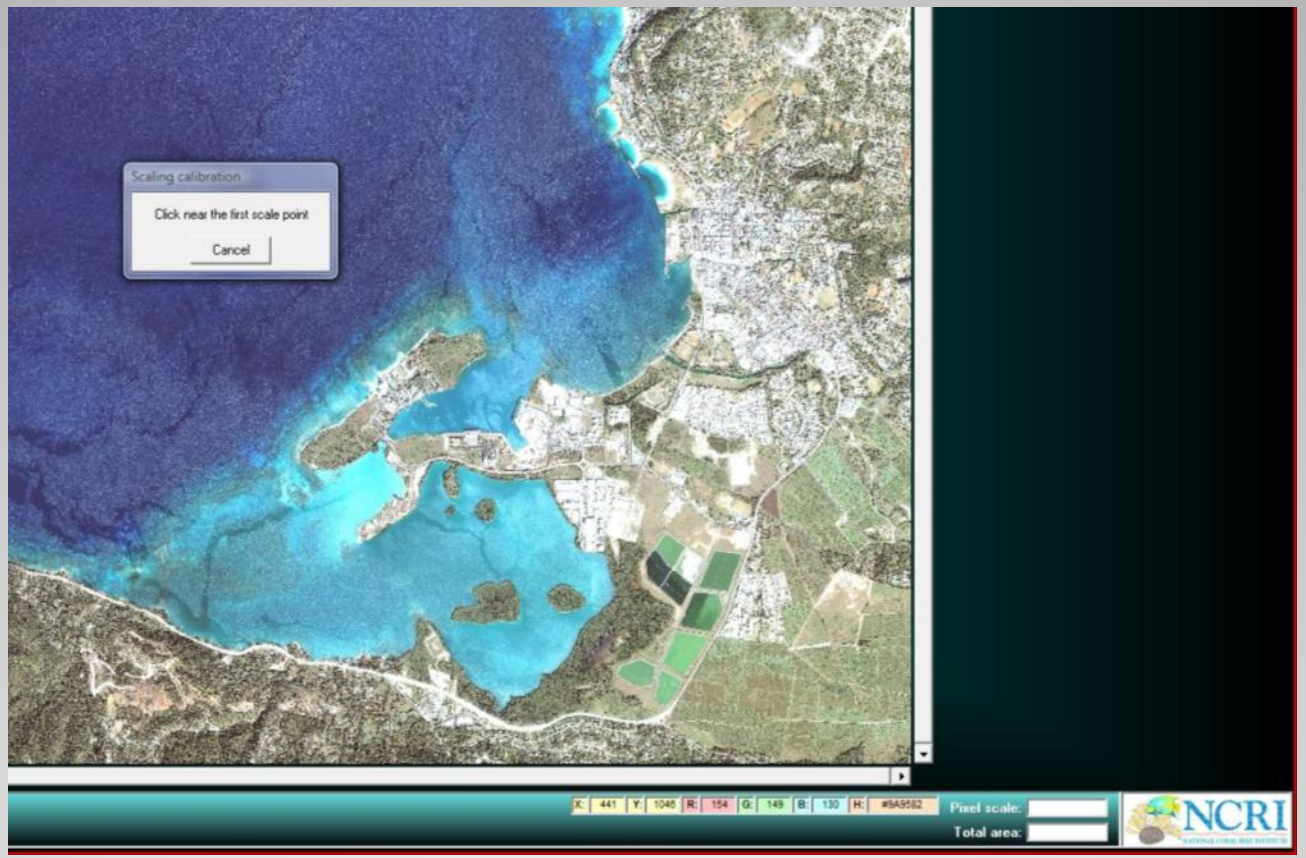
Weaknesses

- Value Multipliers not universally applicable
- Development of new multipliers is an extensive undertaking

Overview



Coral Point Count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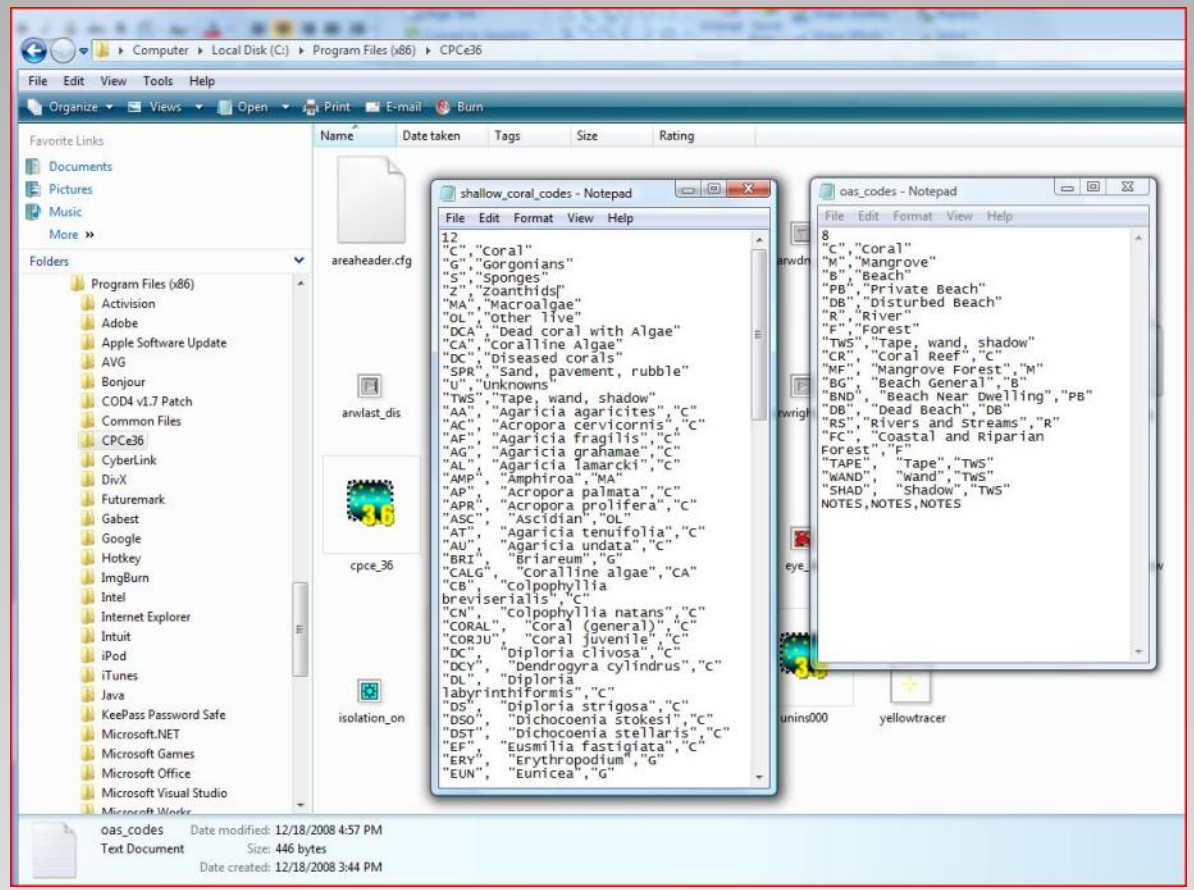
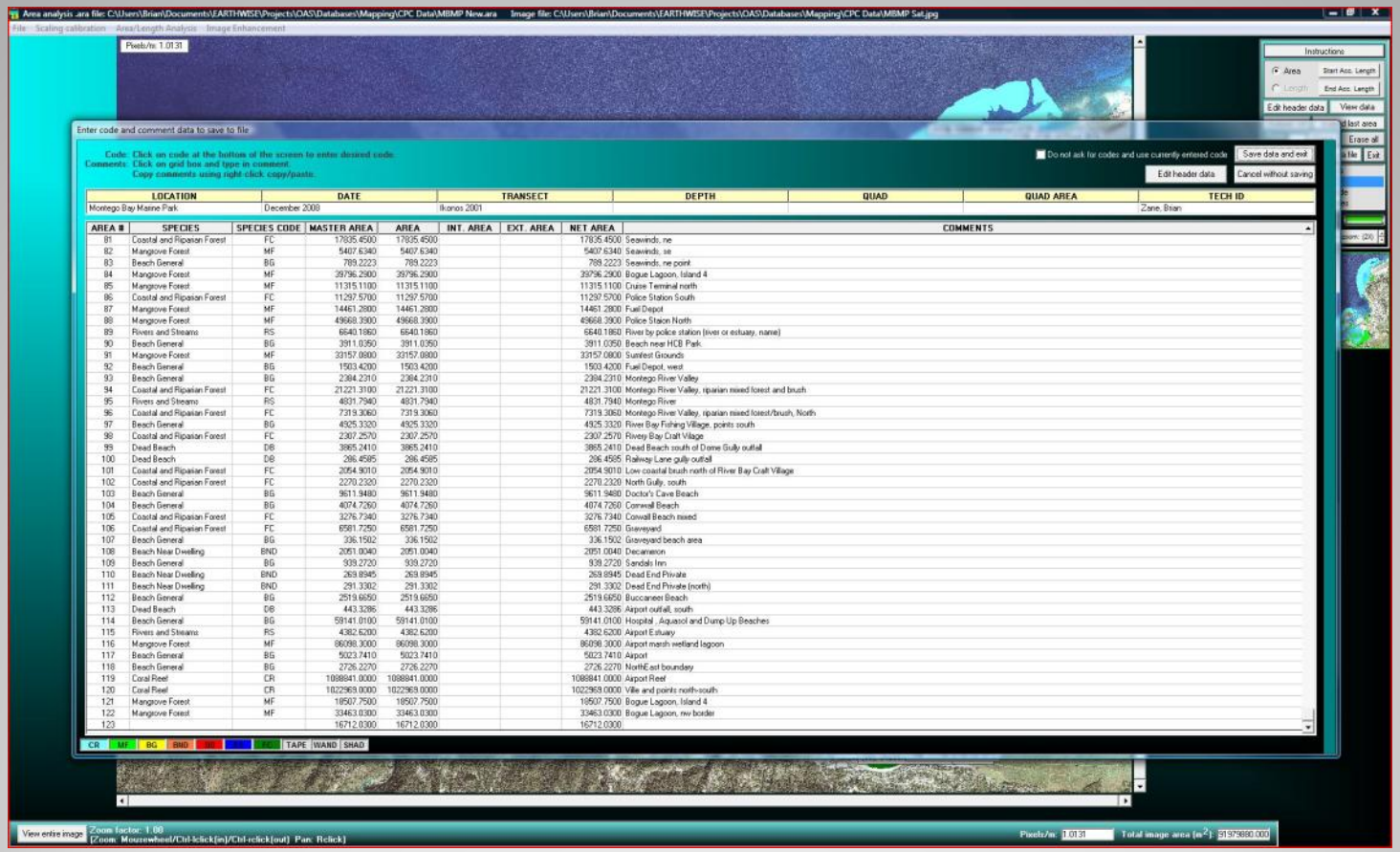
Calibrate



Create categories

Outline Areas

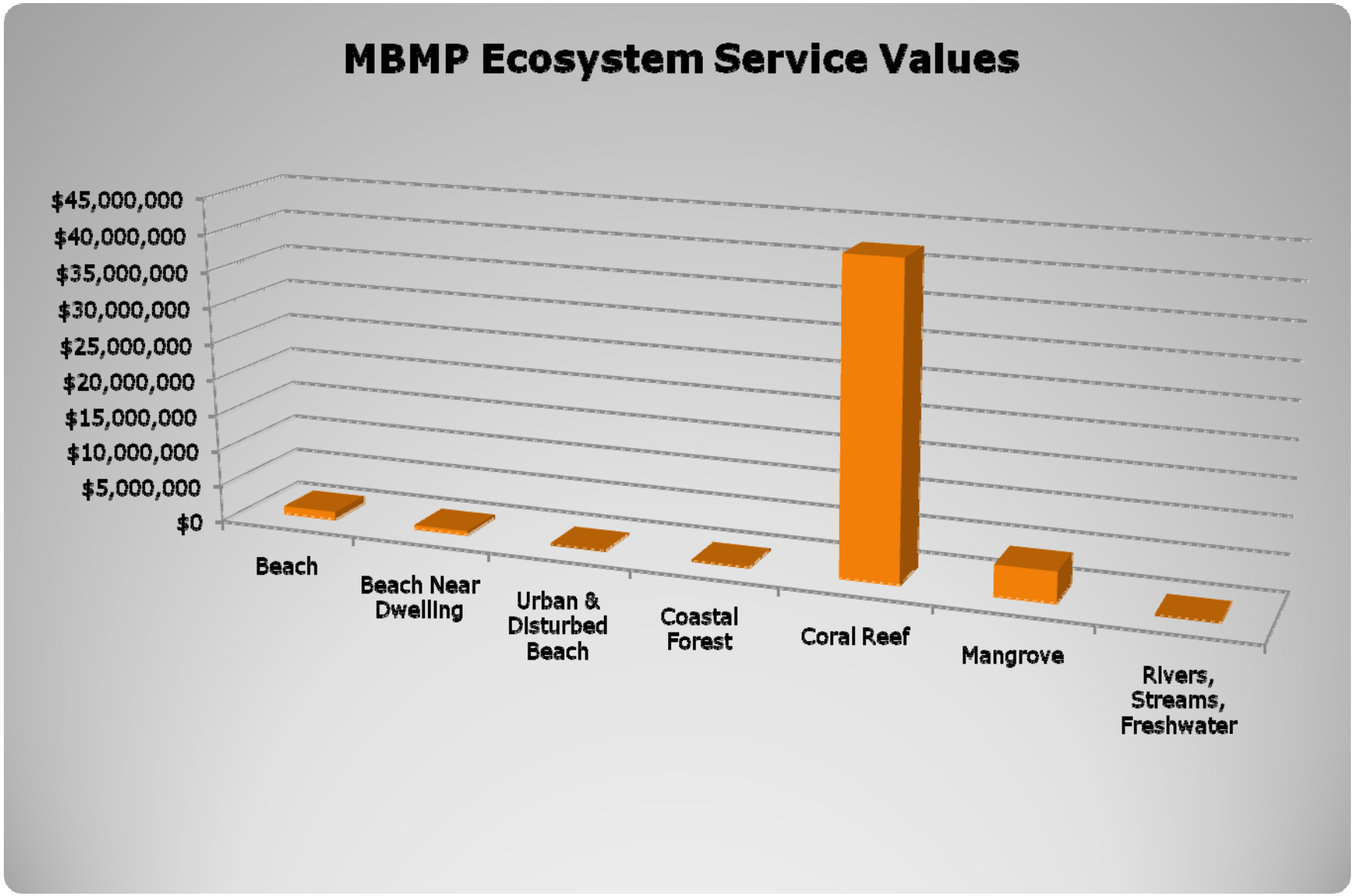


Define Areas

Value Transfer - Results

Ecosystem Type	$/ha/yr	Total Hectares	Total Contribution
Beach	$88,000	10.92	$960,849.54
Beach Near Dwelling	$117,000	3.47	$405,493.69
Urban & Disturbed Beach	$0	0.46	$0.00
Coastal Forest	$1,826	23.41	$42,749.49
Coral Reef	$100,000	422.27	$42,226,522.50
Mangrove	$37,500	108.61	$4,072,913.20
Rivers, Streams, Freshwater	$1,595	2.10	$3,348.74
MONTEGO BAY MARINE PARK - TOTAL ESV			**$47,711,877.16**

Value Transfer - Results



Distribution of Values

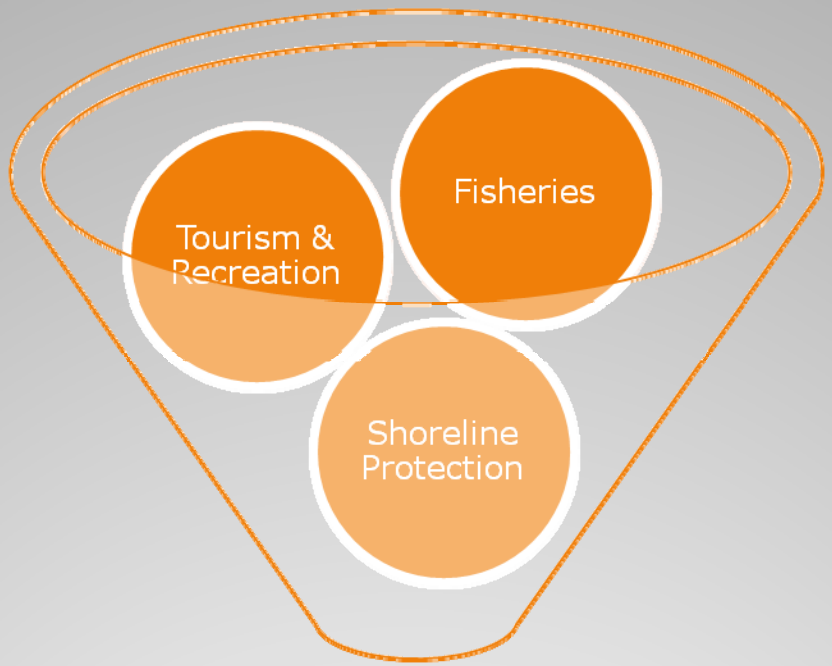
Summary

- Pros
  - User friendly
  - Necessary inputs are free and readily accessible
  - Low dependence on external/hard to locate data sources
  - Produces both graphic and numeric results
- Cons
  - Multipliers (values) developed for NE United States
  - Not all local habitats represented
  - Challenging to develop local values, which are critical to the accuracy and validity of the tool



World Resources Institute

Coral Reef Valuation



Economic Valuation of Coral Reefs

Theory

Process

- Review spreadsheets & manuals
- Analyze Data requirements
- Collect Data
- Enter data, review results, modify, review, modify…
- Calculate scenarios

Strengths

- Highly detailed results
- Triangulates ESV of coral reefs
- Tools – MS Excel

Weaknesses

- Data - Heavily dependent upon external data sources
- Aspects not yet developed (Coastal Protection)
- Dependencies/Assumptions (built into formulas)
- Complexity reduces probability of widespread adoption

Overview

Category	Value
1. Accommodation	$109,425,592
2. Diving	$588,430
3. Snorkeling and Boating	$6,830,932
4. Marine Parks	$0
5. Other Direct Expenditures - Total Value	$0
TOTAL DIRECT ECONOMIC IMPACTS	$116,844,954
6. Total Indirect (secondary) Impacts (from multipliers)	$0
TOTAL DIRECT AND INDIRECT IMPACTS	$116,844,954
7. Un-captured Value	
Local Use of Coralline Beaches	$2,457,000
Local Use from reef recreation	$13,650
TOTAL IMPACT OF REEF-RELATED TOURISM AND RECREATION	**$119,315,604**

Coral Reef Valuation - Tourism

Marine Park Category (Zero Rated) – WHY?

No conventional cost recovery mechanisms (reflected in the tool) are currently implemented in the park.

1. **Visitor Fees**
   - Entrance – No single entry point
   - Diving – No fees in place
   - Snorkeling – No fees in place
   - Concessions – No concessions in operation
2. **Vessel Fees**
   - Entry – Collected & held by Port Authority (no estimate available)
   - Mooring – No fees in place
3. **Other Fees**
   - Fishing Permits (Fisheries Division)
   - Research Licenses (NEPA)

Areas where Park Manager *has* recuperated operational expenses:

1. **Beach Fees**
   - ~US$7,000 (3 or 4 disbursements since park inception)
2. **Management Fee**
   - ~US$40,000/yr (Pegged to management agreement; two years since inception)
3. **National Park Trust Fund**
   - ~US$25k – 35k (every second/third year depending on interest earned by fund)

Each allocation changes in frequency and amount, and doesn't fit into provided categories and therefore was not included.

Anomalies – Marine Park Revenue

Cruise Ships

- Estimated +150,000 visitors to Montego Bay not accounted for
- Cruise Ship calculations not included; tool not yet developed
- Would push overall valuation figure up

Coastal Protection

- Third valuation tool not yet developed
- Would add critical third figure to overall Coral Reef Valuation figure

Multiplier

- Total Indirect Impacts
- Function did not work

Anomalies - Undervaluation

Category	Value
1. Commercial Fisheries	$0
1a. Fish Processing and Cleaning	$0
3. Local Fishing	$1,128,700
TOTAL IMPACT OF REEF-RELATED FISHING	**$1,128,700**

Coral Reef Valuation - Fisheries

WRI Valuation - Totals

Tourism:	**US$119,315,604**
Fisheries:	**US$1,128,748**
Coastal Protection:	**(N/A)**
	$120,444,352

Coral Reef Valuation - Process

- Coral Reef Valuation – Tourism
- Coral Reef Valuation – Fisheries
- Coral Reef Valuation – Coastal Protection

Methodology	Source	Value
Tourism	Spatial	**N/A**
	WRI	**US $119 million**
	WB	**US $210 – 630 million**
Fisheries	Spatial	**N/A**
	WRI	**$1,128,748**
	WB	**US ($1.66m) – $7.49 million**
Coastal Protection	Spatial	**N/A**
	WRI	**N/A**
	WB	**US $65 million**
Value Transfer	Troy/Wilson	**US$47 million**

Results Comparison

- Preferred Methodology?
- Data Requirements
  - Sources
  - Relevance
  - Date
- Considerations for broader use
  - Stakeholders
  - Results Sharing
  - Database Integration
  - Willingness, Value, Application, Acceptance

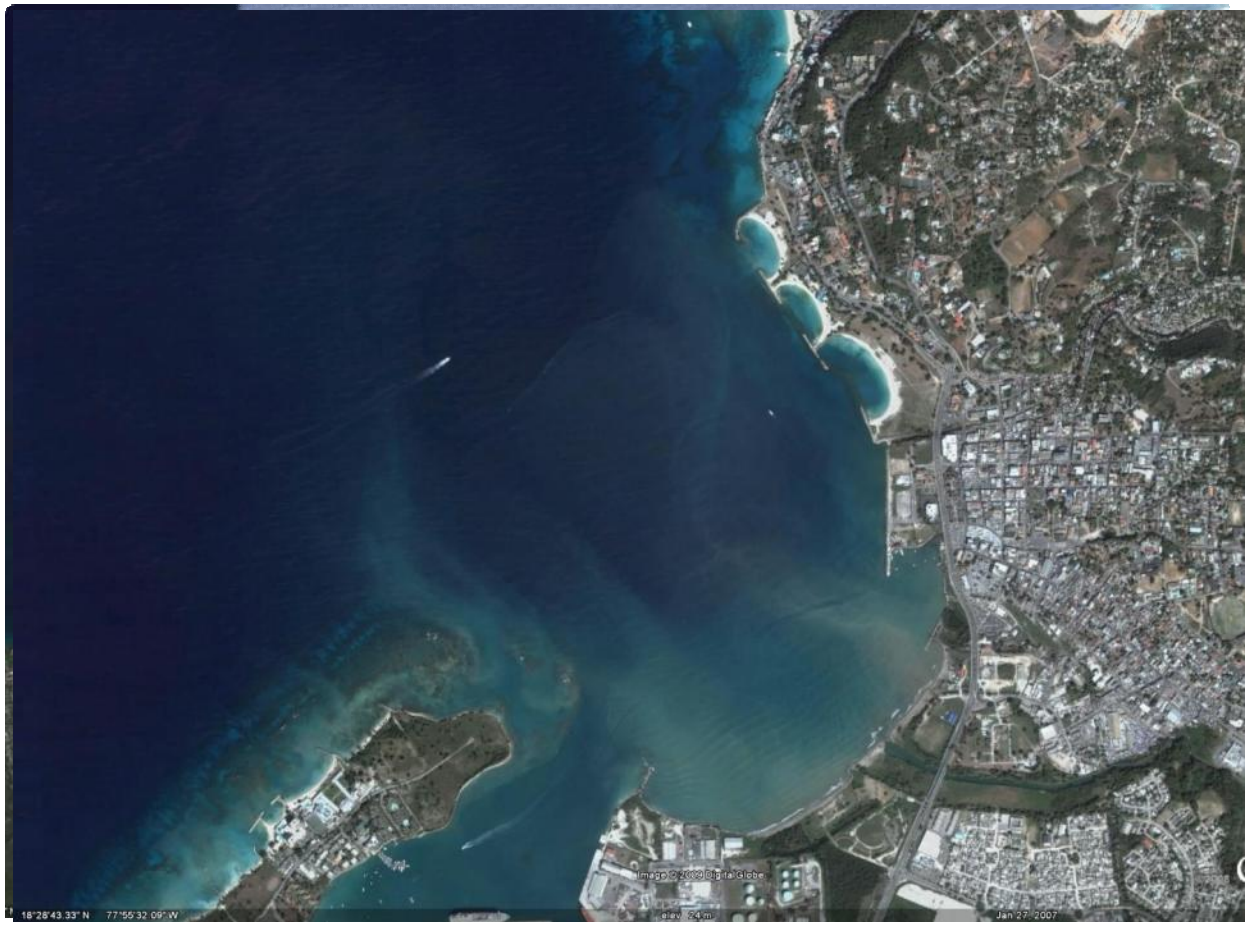
Discussion

Thank you!

Methodology	World Bank	WRI	Value Transfer
Tourism	$210 – 630 million	$119 Million	N/A
Fisheries	($1.66) – $7.49 million	$1,128,748	N/A
Coastal Protection	$65 million	N/A	N/A
Value Transfer	N/A	N/A	US$47 million

* All figures in US Dollars

Results Comparison (Alt. View)



1. Marine Park
2. Bogue Lagoon – Fish Sanctuary
3. Western Boundary of Park (Great River outflow – sediment plume)
4. Urban Gully influences

Montego Bay Marine Park Distinct Features - Google Earth

Brian L. Zane

Bogue Lagoon prior to construction
Freeport during construction
Cruise Terminal
Freeport/Lagoon
1990s

Historical Perspectives

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