

PRESENTATION

Site Prioritization



JAMES SPURGEON

Ecosystem Valuation Specialist,
Sustain Value





Aim & Method

To select 'priority' sites from set of 'candidate' sites*

Comprehensive, systematic & transparent approach + stakeholder involvement

A Multi-criteria analysis

- Selected criteria (broad & mutually exclusive)
- 4 categories - 13 criteria
- Criteria scored 1 to 5 (+ evidence)
- Criteria weighted (5 or 10)
- Score x weight

B Workshop with stakeholders

- Presented MCA results
- Discussion with stakeholders
- Stakeholders decided on sites

**Except for the Solomon Islands – site pre-selected*

Category	Criteria
Risks	Flooding
	Wind
	Human Disturbances
Corals & biodiversity	Extent of corals
	Condition of coral
	Biodiversity value
Socio-economic value	Local population in area
	Coastal Protection
	Tourism
	Diving/ snorkelling
	Fisheries
Governance	Organisations potentially supporting implementation
	Protected area/coastal management status

Results

- 1 Municipality selected in Philippines
- 2 sites selected in Indonesia & Fiji for valuation
- Many other sites have good potential
 - There is no threshold score

Municipalities in Siargao, Philippines

Site	Ranking	Score
General Luna	1	330
Socorro	2	280
Dapa	3	275
Del Carmen	3	275
Pilar	5	263
Sta. Monica	6	225
San Isidro	7	220
San Benito	8	213
Burgos	9	210

Out of 400

Sites in Indonesia

Site	Ranking	Score
Nusa Penida	1	370
Rote Ndao	2	363
Raja Ampat	3	345
Wakatobi	4	343
Makassar City	5	338
Berau	6	328
Pandeglang	7	288

Out of 500

Sites in Fiji

Site	Ranking	Score
Denarau / Nadi (& Mamanuca islands)	1	334
Suva Reef / Navakavu	2	305
Sanasana / Natadola	3	288
Labasa (Great Sea Reef)	4	286
Laucala-Taveuni islands	5	237

Out of 500

PRESENTATION



Valuation and Cost Benefit Analysis

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Aims



A) Valuation

- Estimate economic value of coral reefs at Priority sites
- Consider status and threats to corals
- Investigate current and potential management
- Identify key stakeholder beneficiaries
- Identify potential funding opportunities

B) Cost Benefit Analysis

- Assess economic viability of coral restoration
- Compare restoration benefits to costs



**To inform business case for coral restoration,
improved risk management
& parametric insurance**

Valuation methodologies applied



Ecosystem Service	Valuation approach	Core source
Fishing (direct & indirect)	Catch (tons) x price x % coral dependence	Gov Statistics & academic papers
Seaweed farm protection	Volume produced (tons) x market price	Gov Statistics
Coast protection	Replacement cost (Protection length x sea wall cost) <u>OR</u> ORRAA CRI tool (flood damages avoided)	GoogleEarth & literature <u>OR</u> CRI tool
Diving and snorkelling	Diver/snorkeler #s x local expenditure x % coral dependence	Interviews, questionnaire surveys & GoogleEarth
Surfing	Surfer #s x local expenditure x % coral dependence	Stakeholders/ Google Earth
Non-use	Adult population x US\$ willing to pay/person/yr (or trip)	Survey or Value transfer

RESULTS

Philippines – General Luna

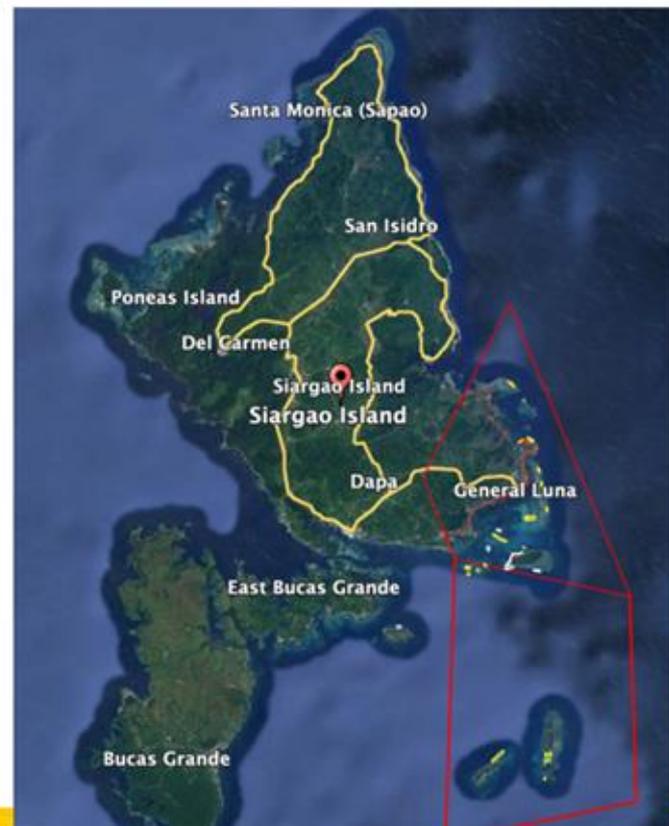


- USD 11.5 million per year
- 450 Ha coral
- WTP survey for tourism & non-use values
- Coast protection & surfing highest
- Values/m² highly 'activity-location' specific

Ecosystem service	Annual value (1000s USD/yr)	
Fisheries	38	
Coast protection	4,214	
Tourism	Diving	649
	Snorkelling	1,766
	Surfing	3,951
Non-use/ Conservation	Foreign tourists	207
	Domestic tourists	615
	G.Luna Residents	13
Total value	11,453	

Exchange rate 1 USD = 58 PHP

Average USD/m ² /yr	Based on activity area USD/m ² /yr
0.01	0.01
0.9	1.9
0.1	12
0.4	11
0.9	61
0.0	0.7
0.1	2.2
0.0	0.05
	n/a



RESULTS

Indonesia – Nusa Penida

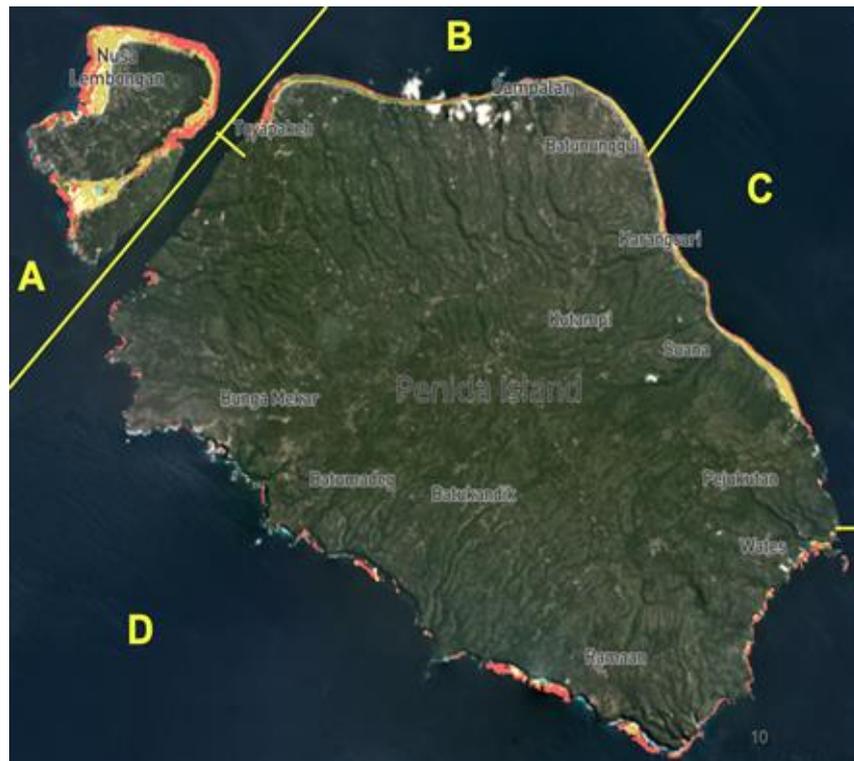


- USD 44.3 million per year
- 412 Ha coral
- Values vary a lot by Coastal Section (A – D)
- Diving & snorkelling highest

Ecosystem Service	A) Nusa Lembongan (1000s USD/yr)	B) North Penida (1000s USD/yr)	C) East Penida (1000s USD/yr)	D) West & South Penida (1000s USD/yr)	Total (1000s USD/yr)
Direct fishery	12	8	-	-	21
Indirect fishery	45	5	10	30	90
Seaweed farm protection	2,064	257	38	-	2,360
Coast protection	617	868	115	-	1,600
Diving & snorkelling	8,144	6,892	1,474	22,928	39,437
Surfing	739	-	-	-	739
Total value	11,622	8,030	1,637	22,958	44,247

Exchange rate 1 USD = 16,667 IDR

USD/m ² /yr	5.4	16	4.4	20	11
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RESULTS

Fiji – Denarau, Nadi & Mamanuca Islands

- USD 117 million per year
- 2,750 Ha corals
- Tourism & coast protection

Ecosystem Service	Annual value (1000s USD/yr)
Fishery	No data
Coast protection	6,600
Tourism	110,880
Non use/conservation	No data - but important
Total value	117,480



RESULTS

Solomon Islands – ACMP

(Arnavons Community Marine Park)

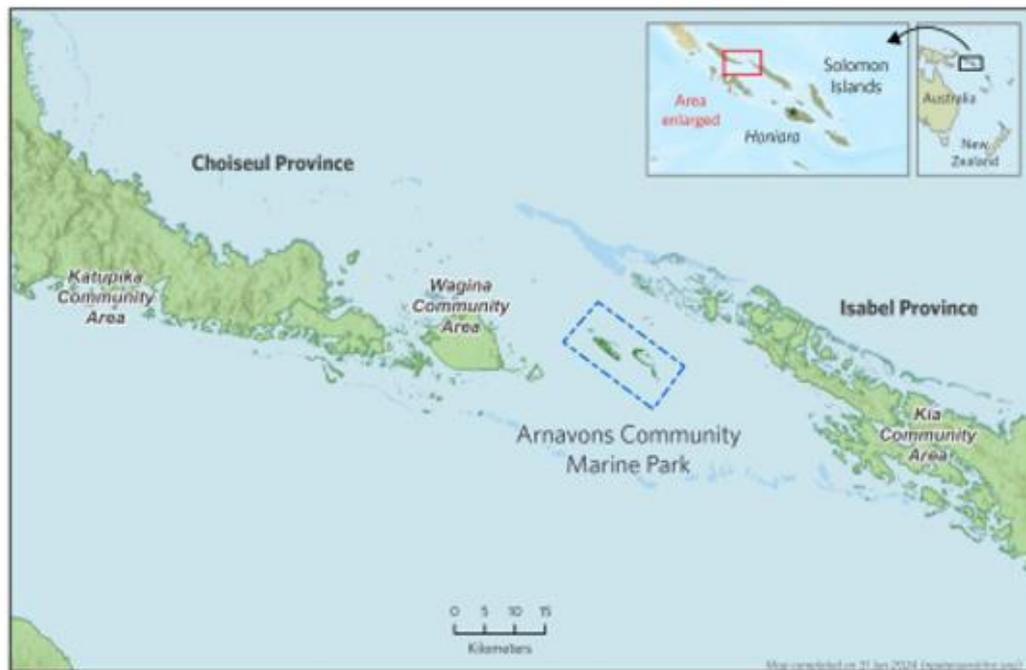


- USD 3.9 million per year - ACMP
- 118 & 4,070 Ha coral
- Non-use highest for ACMP
- But highly 'indicative only'

Ecosystem service		ACMP (1000s USD/yr)	Wider Arnavon (1000s USD/yr)
Fishery		53	2,672
Seaweed farm protection		0	1,236
Coast protection		4	373
On Island tourism		38	1,189
Boat tourism		236	236
Non-use/ Conservation	Solomons residents	53	1
	International tourists	42	1
	Australians	1,372	7
	Global	2,052	2
Total		3,902	5,718

Exchange rate 1 USD = 8.49 SBD

ACMP (box in middle) and 'Wider Arnavon' (whole figure)



Method

- Restoration costs (pre- and post event) estimated over 5-year period
 - E.g. equipment, training, impact assessment, restoration, monitoring & spawning
- Restoration benefits = $\frac{\text{Ecosystem service value (Rp/m}^2\text{/year)}}{\text{Area of hard corals restored (m}^2\text{)}} \times \text{Difference in years of restoration plan vs natural recovery (years)}$
- 'Present value' costs & benefits calculated - over natural recovery period
 - Applying 'discount rates' of 0, 5 and 10%
- If Benefit to Cost Ratio (BCR) >1 = economically viable

Results

Philippines	Indonesia	Fiji	Solomon Islands
1.3 to 55	1.1 to 83	1.6 to 2.4	1 to 1.6

- Restoration economically viable at all sites
- When values linked to location they occur!
- Restoring larger areas is more efficient.
- Prioritise restoration:
 - = good restoration potential + higher BCR



Lessons learned

- 1. Coral values & restoration CBRs highly location specific - even within sites!**
- 2. ORRAA's coast protection tool useful - but not always sufficiently accurate.**
- 3. Non-use/conservation value can be highly significant - more studies should focus on it.**
- 4. Tourist revenue collection could be vastly improved at some sites - to finance management.**
- 5. Minor reef impacts should be continuously monitored - and corals re-attached/litter cleared.**
- 6. Stakeholders should decide if worth buying coral insurance or self insuring to restore corals.**