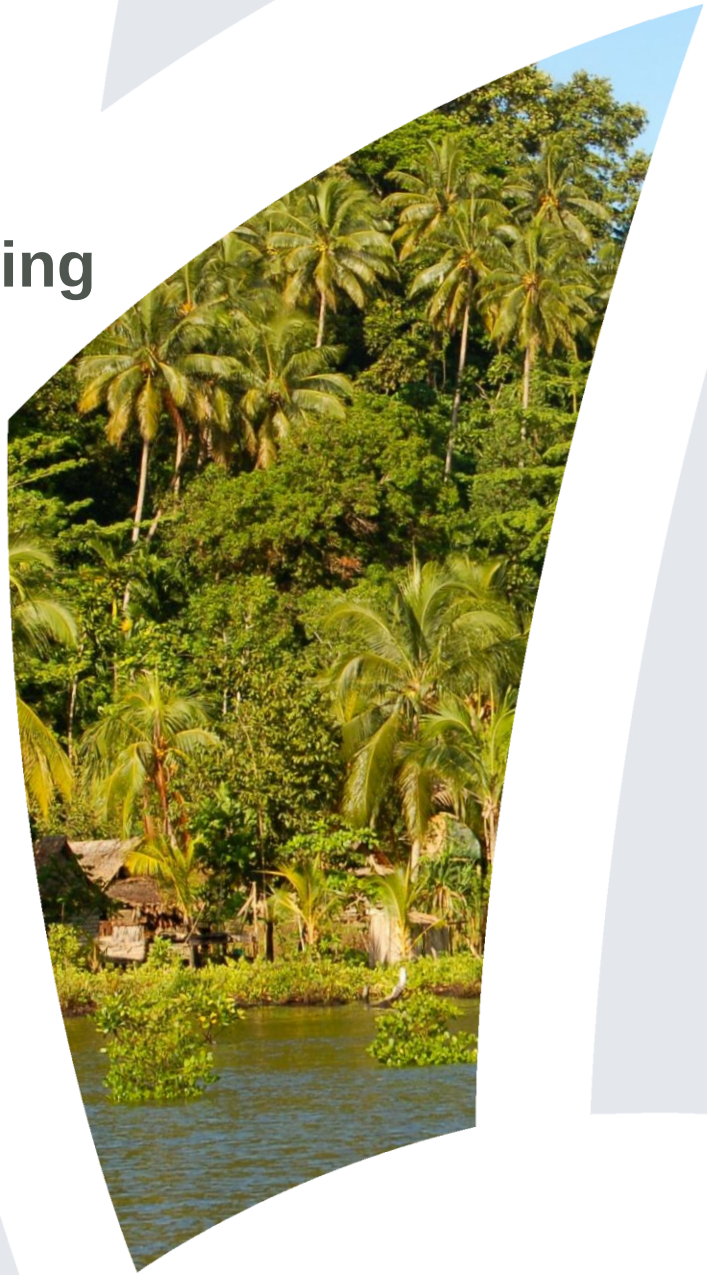
Solomons ESRAM

PEBACC Client-Consultants Meeting



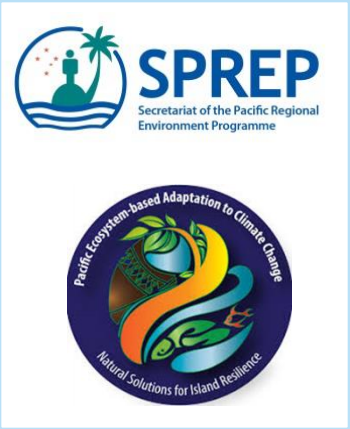
Brisbane – November 2016

BMT WBM

(Dr Beth Toki - beth.toki@bmtwbm.com.au)

Overview

- BMT WBM team
- Broad approach & methodology
- Work to date
- Key EbA issues at project sites
- Highlights & challenges
- Process issues emerging
- Next steps



Who is BMT WBM?

BMT:

'A leading international design, engineering, science and risk management consultancy with a reputation for excellence'

Locations

Australia	Hong Kong	Malaysia	UK
Belgium	India	Netherlands	United Arab Emirates
Brazil	Indonesia	Singapore	
Canada	Kazakhstan	Switzerland	USA

BMT ARGOSS
BMT Asia Pacific
BMT Cadence
BMT Consultants India
BMT Cordah
BMT Defence Services
BMT Design & Technology
BMT Designers & Planners
BMT Fleet Technology
BMT Fluid Mechanics
BMT Group Ltd
BMT Hi-Q Sigma
BMT JFA Consultants
BMT NavCon
BMT Nigel Gee
BMT Oceanica
BMT Reliability Consultants
BMT Scientific Marine Services
BMT Ship & Coastal Dynamics
BMT SMART
BMT Surveys
BMT WBM
Verwelj & Hoebee

BMT WBM:

'A a leading edge consultancy in mechanical, maritime, water, environmental engineering and science'

Water and Environment

BMT WBM has expert knowledge of all aspects of environmental consulting and are committed to using their skills and experience to the benefit of clients, communities and the environment.

BMT WBM specialises in:

- Environmental Assessment and Management
- Flood Modelling and Management
- Coastal Modelling and Management
- Urban Water Management
- Catchment and Receiving Waters
- Climate Change Impacts and Planning
- Specialist Field Investigations and Data Collection
- Information, Spatial and Data Solutions
- Expert Witness Legal Services

Consultant Team

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(key personnel)

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Project Management, ecosystems, ecosystem services, climate change, GIS & mapping

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

UQ

SI Expertise, Ecology and climate change

Dr Simon Albert, Patrick Pikacha (UQ/ESSI)

AITHER

Aither

Economics

Rod Coulton, Joseph Lorima

ecological
Solutions (Solomon Islands)

Key Local Advisers

David Boseto (ESSI) – Ecology & ecosystems

Dr Tammy Tabe – Wagina Is. (Socio-cultural, socio-economic, ecosystem services and marine ecosystems)

Donald Kudu – Stakeholder consultation, planning, settlements, governance

Local consultants

Approach & Methodology

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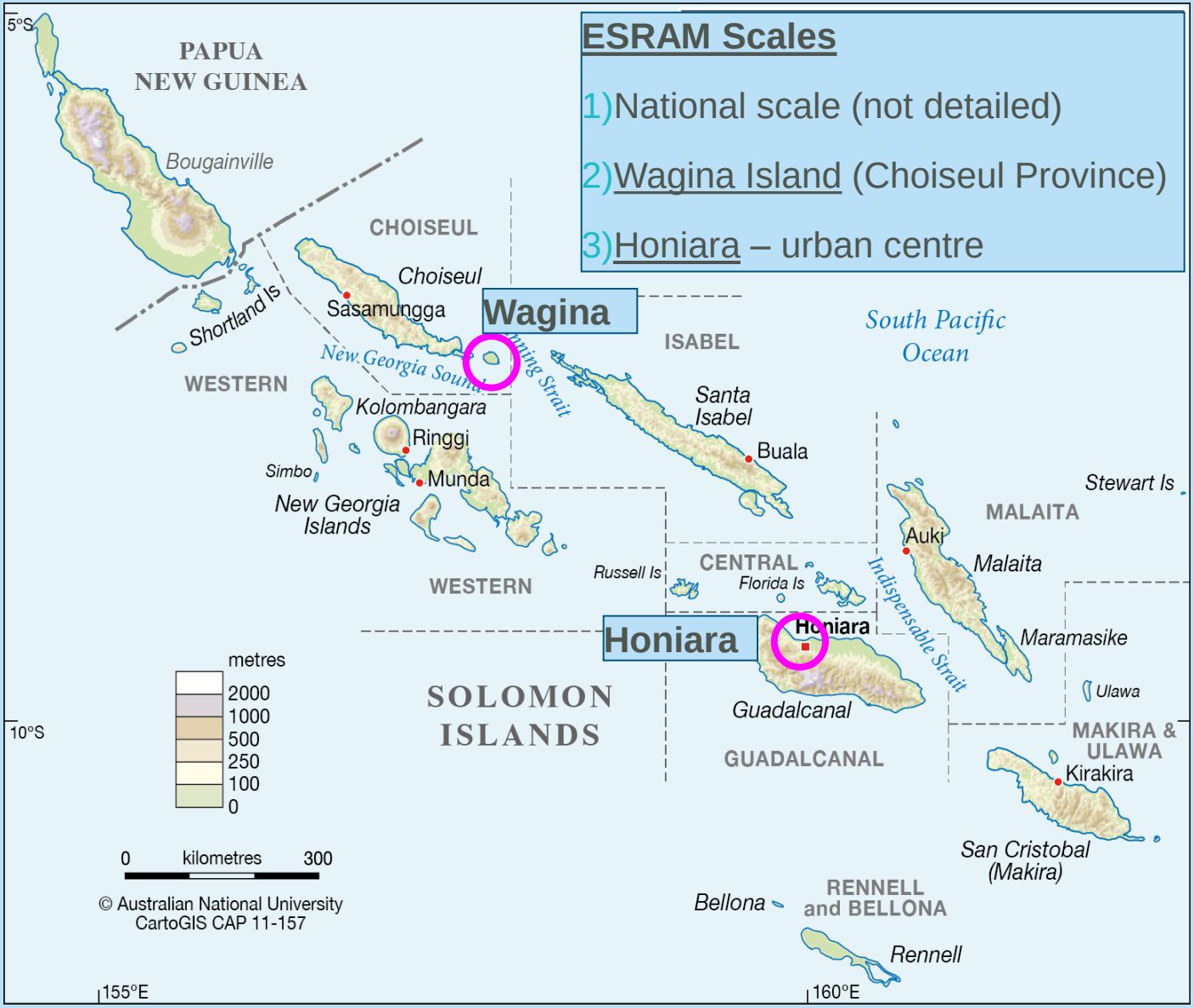
ESRAM Scales
1)National scale (not detailed)
2)Wagina Island (Choiseul Province)
3)Honiara – urban centre
PAPUA NEW GUINEA
Bougainville
CHOISEUL
Choiseul
Sasamungga
Wagina
Shortland Is
New Georgia Sound
Manning Strait
WESTERN
Kolombangara
Ringgi
Munda
Simbo
New Georgia Islands
ISABEL
Santa Isabel
Buala
South Pacific Ocean
Stewart Is
MALAITA
Auki
Malaita
Maramasike
Ulawa
CENTRAL
Russell Is
Florida Is
WESTERN
Honiara
Indispensable Strait
Guadalcanal
SOLOMON ISLANDS
GUADALCANAL
MAKIRA & ULAWA
Kirakira
San Cristobal (Makira)
RENNELL and BELLONA
Bellona
Rennell
metres
2000
1000
500
250
100
0
0 kilometres 300
© Australian National University
CartoGIS CAP 11-157
5°S
10°S
155°E
160°E

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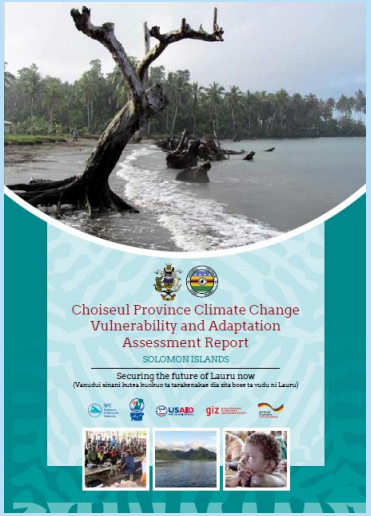
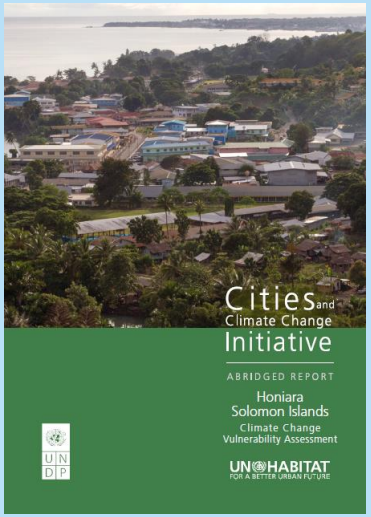
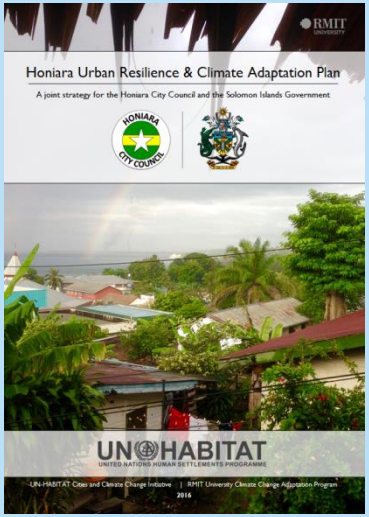
Project Sites & EbA

<u>Building on existing EbA recommendations and initiatives:</u>

- Choiseul Province Vulnerability and Adaptation Assessment 2013
- Choiseul - Existing EbA Implementation (SPREP / USAID)
- Honiara Vulnerability Assessment 2014
- Honiara Urban Adaptation Plan 2016







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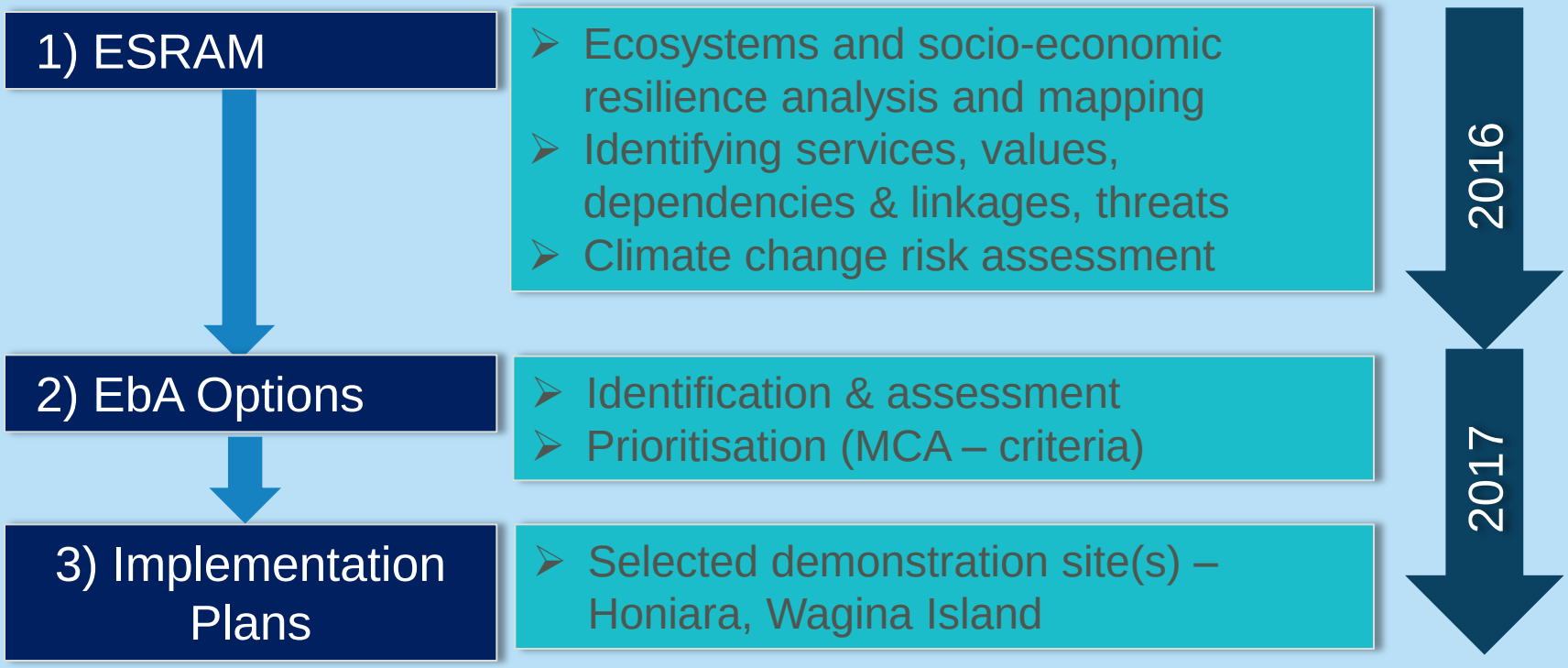
Project Steps



In-country Components

Scale	ESRAM	EbA Options
National	Consultation: Workshop with key stakeholder representatives, primarily national government, to identify key ecosystems, services and threats at a broad national scale, ongoing liaison with key stakeholders Field component: nil	Detailed consultation/field work not planned
Honiara	Consultation: Workshop with key stakeholder representatives (e.g. national government, community and key local project representatives) to identify ecosystem services and ecosystem threats, interactive mapping activities, ongoing liaison with key stakeholders. Field component: Site inspection of communities along Mataniko River, Vura district, White River, Independence Valley and Win Valley, waterfront areas, and other points of interest.	Consultation: Workshop to refine EbA options identification and prioritisation with key stakeholder representatives (e.g. national government, community and key local project representatives); identify preferred demonstration sites Field component: Inspect selected number of potential EbA demonstration sites, incorporating basic community consultation at most likely demonstration sites.
Wagina Island	Consultation: Workshops with each of the four communities to identify ecosystem services and ecosystem threats, interactive mapping activities Field component: Most detailed field component (next slide).	Consultation: Refine EbA options identification and prioritisation with communities on Wagina Island; identify preferred demonstration sites Field component: Inspect selected number of potential EbA demonstration sites

National - Workshop Objectives

- Inputs and advice from representative key stakeholders
- Identify focus - key ecosystem services: what are they and where most important?
- Identify threats
- Identify available information

ESRAM In-country - Honiara

- Workshop with representative key stakeholders
- Site inspections at communities and key points of interest
- Informal community level discussions (opportunistic)

Honiara - Workshop Objectives

- Inputs and advice from representative key stakeholders
- Refine ESRAM extent?
- Three activities:
  1. Identify values & supporting ecosystem services
  2. Mapping – indicative spatial maps
  3. Identify linkages & threats

ESRAM In-country - Wagina

- Detailed community level consultation
- Site inspections and guided tours each village
- Field surveys to map critical locations and qualitatively assess ecosystem condition, particularly at high use areas
- Mapping and water quality (EC/pH) at village wells and other key water sources

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Phase 1 (2016)– ESRAM

a) ESRAM – Inventory & Mapping

- Identify ecosystem services
- Ecosystem dependencies & linkages
- Existing threats

Mapping:

- Existing GIS
- Stakeholder/ community mapping outputs
- Remote sensing

b) Ecosystem Services Valuation

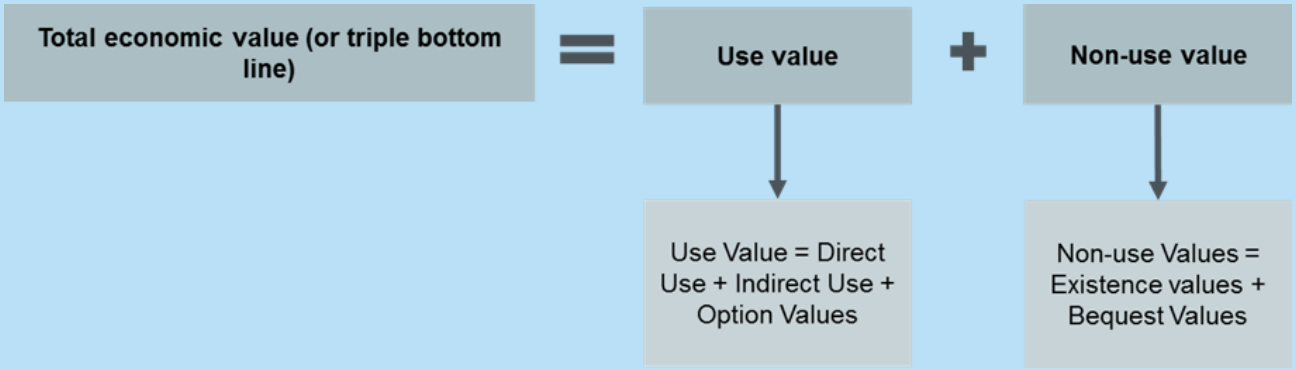
c) Climate Change Risk Assessment

- Climate change impacts – allocation of risks for each service

Phase 1 (2016)– ESRAM

b) Valuing Ecosystem Services

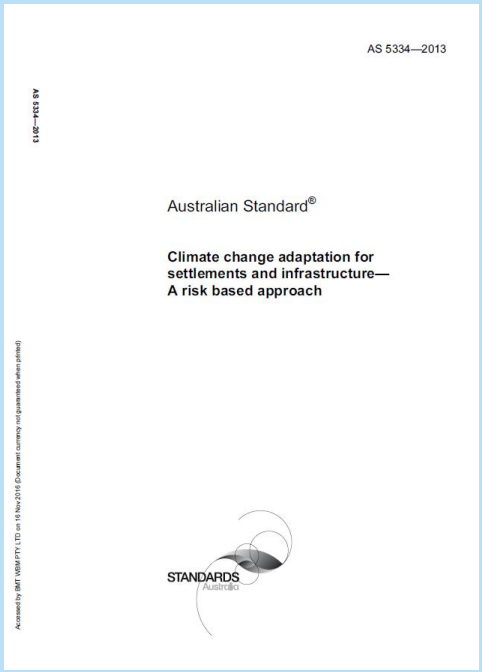
- **Total Economic Value**: full economic value, difficult to execute for services not traded on market (no market value) or with limited data
- **Benefit Transfer**: next best option, utilised the Environmental Valuation References Inventory (EVRI) which is a recognised inventory for benefit transfer
- de Groot et al 2012 Global estimates of the value of ecosystems and their services in monetary units



Phase 1 (2016)– ESRAM

b) Climate Change Assessment

- Risk based approach
- Established frameworks as a guide



- AS/NZS ISO 31000:2009 **'Risk Management Principles and Guidelines'**
- Australian Standard AS 5334—2013: **'Climate Change Adaptation for Settlements and Infrastructure – a risk based approach'**

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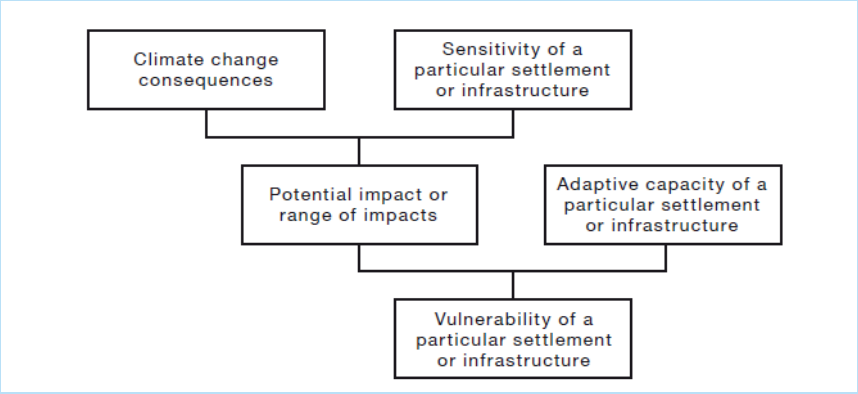
Phase 1 (2016)– ESRAM

b) Climate Change Assessment

- Select future climate scenarios, projections and parameters
- Identify hazards
- Define climate variables and select data
- Risk identification
- Risk analysis and Vulnerability Assessment
- Spatial indication of high risk services / locations



	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	medium	medium	high	extreme	extreme
Likely	low	medium	high	high	extreme
Possible	low	medium	medium	high	high
Unlikely	low	low	medium	medium	medium
Rare	low	low	low	low	medium

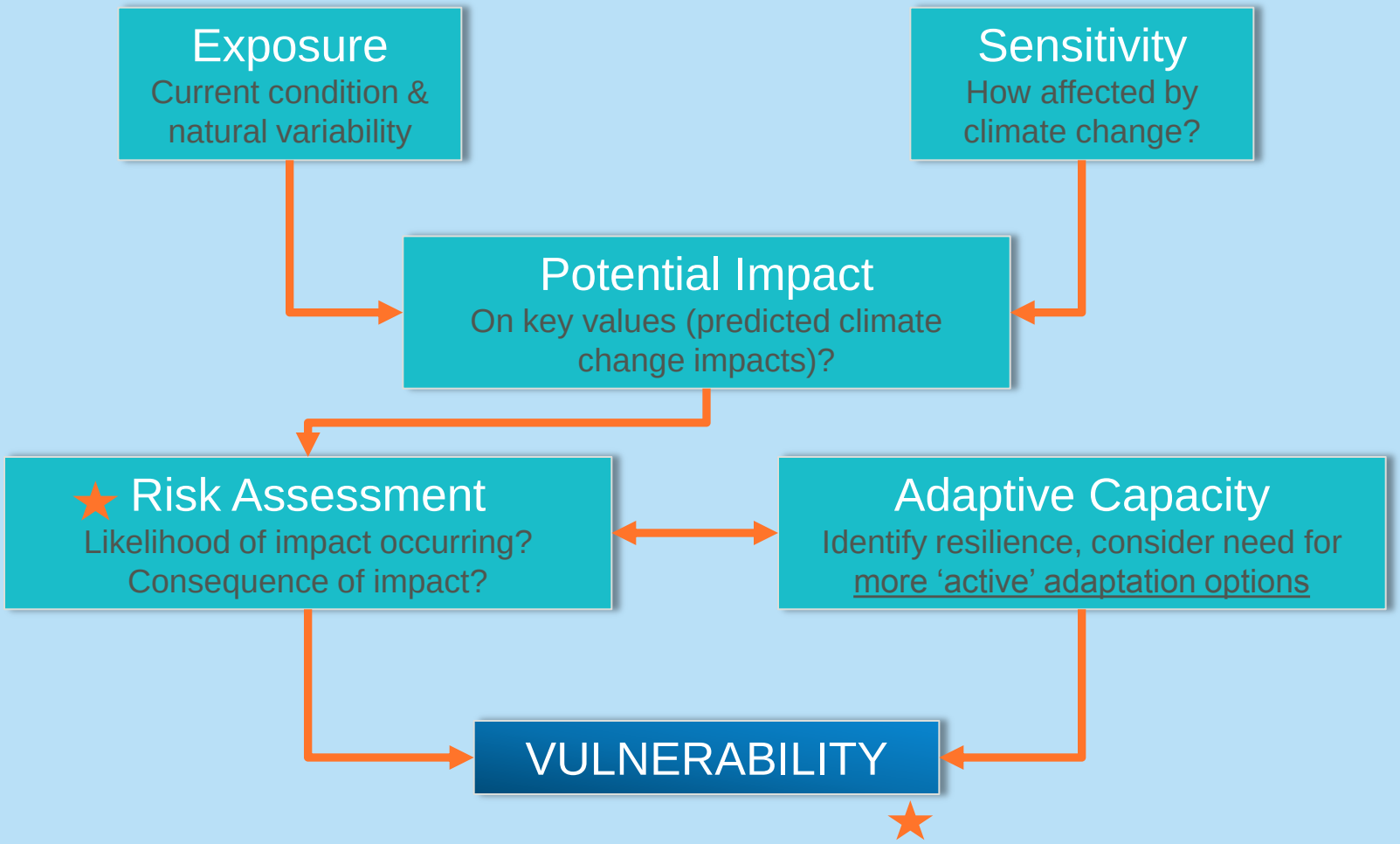
Phase 1 (2016)– ESRAM

b) Climate Change Assessment

- Identification of key hazards (Honiara, Wagina)

Honiara	Wagina
• Hot days • Landslides • Flooding / drought • Tides/storm surge (which increase with SLR) • Cyclones	• Tides/storm surge causing inundation and saltwater intrusion (which increase with SLR) • Drought / decreased rainfall • Flooding / increased rainfall • Coastal erosion (exacerbation of coastal processes) • Hot days • (ocean acidification)

Vulnerability Assessment Framework



Phase 2 (2017)– Options Assessment

'Multi-criteria analysis':

- Tool for considering multiple aspects/criteria
- Transparent record of decision making
- Criteria e.g. :

➢ Land tenure	➢ Cost
➢ Feasibility	➢ Added benefits
➢ Effectiveness	➢ Risk
➢ Logistical constraints	➢ Existing programs

Cost-benefit?

- Consider "do nothing" vs "adaptation"
- Long term benefit > cost!

Progress to Date

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Schedule & Progress

Tasks/Milestones	Jul'16	Aug'16	Sep'16	Oct'16	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17	Apr'17	May'17	Jun'17
Task 1: Project Initiation												
Task 2: Information Collation and Review												
Deliverable 1: Project Inception Report												
Task 3: Establish Criteria for Defining Key Environmental and Social Values and Initial Scope/Methods Statement (Project Inception Report)												
Task 4: Draft Environmental Values, Sensitivity and Threats												
Task 5: In country Consultation and Field Work		ESRAMs							EbA Opti-ons			
Task 6: Ecosystem Economic Valuations												
Task 7: EbA Options Identification and Assessment												
Task 8: Development of Implementation Plans for demonstration sites												
Deliverables 2-5: ESRAM Report, ESRAM Synthesis Report, EbA Options Assessment and Implementation Plans					Draft ESRAMs		Final ESRAMs			EbA Opti-ons		Imple ment. Plans
Task 9: Final project presentation / training												
Deliverables 6-7: Data Dictionary and Capacity Building Report												
Project Management												

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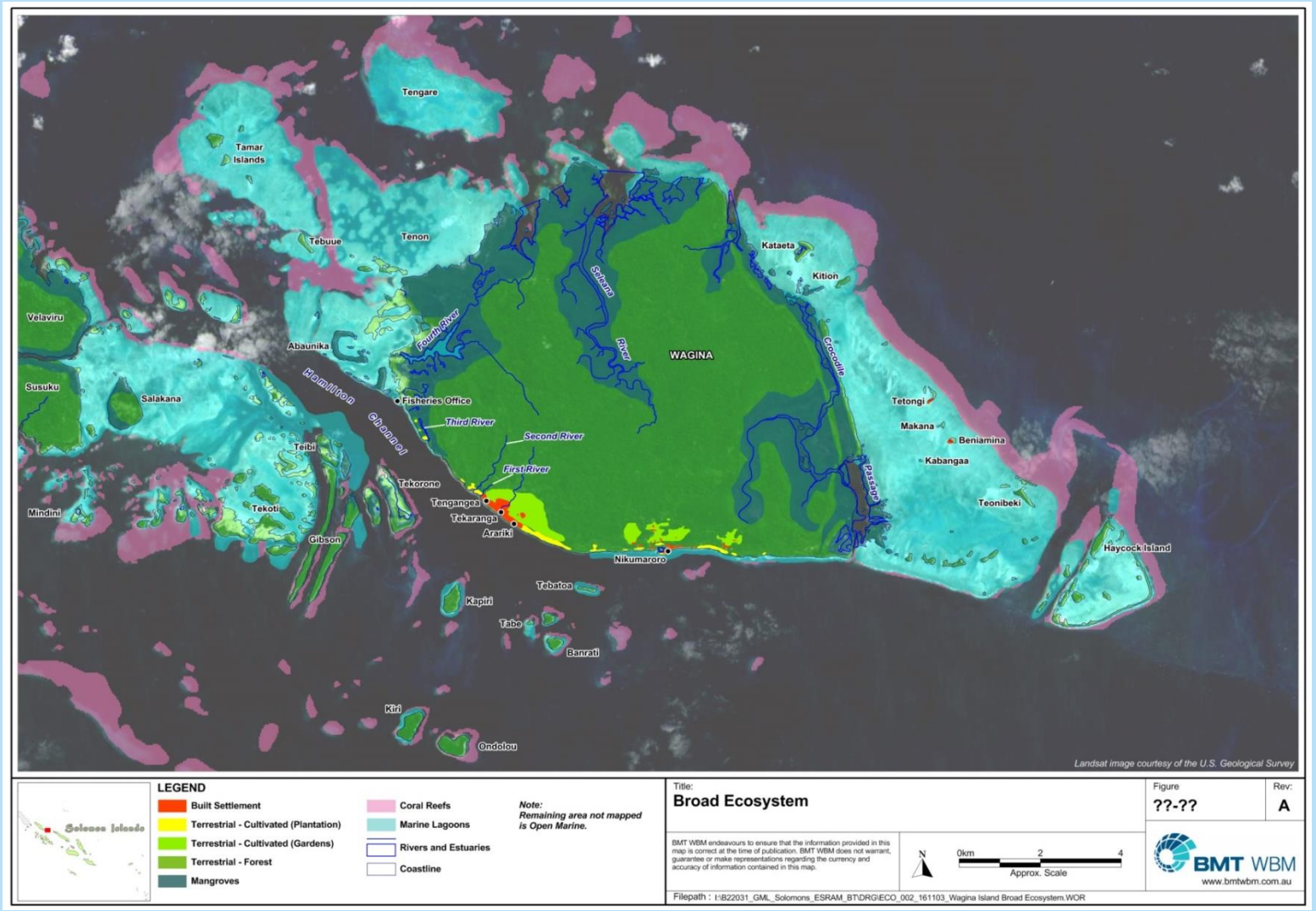
Example Outputs (Wagina Is.)



Summary of Key Ecosystem Services

Community-derived key ecosystems & ecosystem services

Key Ecosystems	Food (land)	Food (sea, river)	Water (drinking)	Water (other)	Building materials	Timber (fuel)	Timber (other)	Mats and other materials	Toilet/sanitation	Transport service	Waste disposal	Industry (seaweed)	Industry (other) / ~~commercial~~ Medicine	Recreation
Terrestrial forest	✓				✓	✓	✓		✓				✓		
Lowland swamps	✓				✓										
Gardens	✓												✓		
Beaches and sand islands	✓				✓					✓					
Other substrates					✓										
Rivers, streams and freshwater springs	✓	✓	✓	✓	✓	✓			✓	✓	✓				
Mangroves		✓			✓	✓	✓					✓			
Marine lagoons		✓										✓	✓		
Groundwater			✓	✓											
Reefs		✓			✓								✓		
Marine (other)		✓											✓	✓	
Terrestrial (Pandanus)	✓				✓			✓						✓	
Terrestrial Plantations	✓				✓			✓					✓		
Terrestrial (other)	✓				✓					✓				✓	✓
Seashore									✓	✓	✓				✓
Other (rainfall)			✓												

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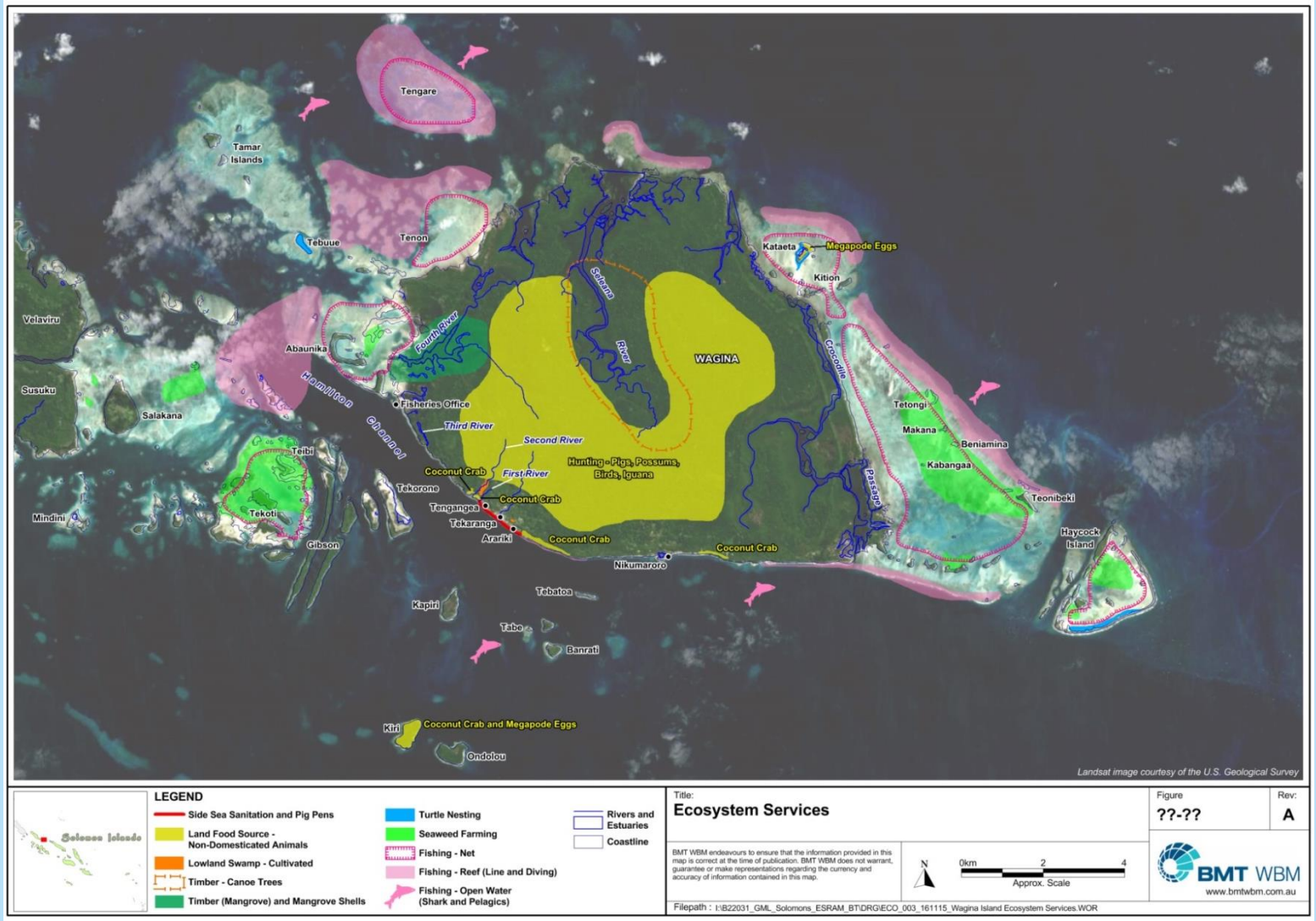
Spatial Representation



Additional Ecosystem Services

Service category	Service
Provisioning services	Food
	Water
	Raw materials
	Genetic resources
	Medicinal resources
	Ornamental resources
	Supporting industry
Regulating services	Air quality regulation
	Climate regulation
	Disturbance moderation
	Regulation of water flows
	Waste treatment
	Erosion prevention
	Nutrient cycling
	Pollination
	Biological control
Habitat services	Biodiversity
	Nursery service
	Habitat connectivity
Cultural services	Aesthetic information
	Education
	Recreation
	Inspiration
	Spiritual experience
	Cognitive development

Service Valuation – Mangrove Example

Local Values

Ecosystem good	Estimate value SBD2008$	Standardised $ values	Source	Method	Additional information
Firewood	$2275 – 4550 per household p.a.	SI$ or US$ 2016	Warren Rhodes et al (2011)	Based on a range of market prices and the cost of purchasing the same amount of goods.	This value constitutes 38%-76% of the average annual cash income.
Building materials	SBD2008 $110 per household p.a.	SI$ or US$ 2016	Warren Rhodes et al (2011)	Based on a range of market prices and the cost of purchasing the same amount of goods.	
Fishing in mangroves	$4012 per household p.a.	SI$ or US$ 2016	Warren Rhodes et al (2011)	Based on a range of market prices and the cost of purchasing the same amount of goods.	Includes total for fish traded and consumed.

Global Values

Service category	Service	Int.$/ha/year, 2007	Standardised $ values
Provisioning services	Water	$1,217.00	SI$ or US$ 2016
	Genetic resources	$10.00	SI$ or US$ 2016
	Medicinal resources	$301.00	SI$ or US$ 2016
Regulating services	Climate regulation	$65.00	SI$ or US$ 2016
	Disturbance moderation	$5,351.00	SI$ or US$ 2016
	Waste treatment	$162,125.00	SI$ or US$ 2016
	Erosion prevention	$3,929.00	SI$ or US$ 2016
	Nutrient cycling	$45.00	SI$ or US$ 2016
Habitat services	Nursery service	$10,648.00	SI$ or US$ 2016
	Genetic diversity	$6,490.00	SI$ or US$ 2016
Cultural services	Recreation	$2,193.00	SI$ or US$ 2016
Total	-	$192,374	SI$ or US$ 2016

Key EbA Issues at Project Sites

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Wagina Island

Water Supply (esp. drinking water)

- Limited rainwater tanks, rely on springs + wells
- Wells in narrow coastal strip – saline intrusion
- Catchment degradation

Waste Management & Sanitation

- Interactions with water supply
- Habitat degradation

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Wagina Island

<u>Pressures on forests (esp. mangroves)</u>

- Require sustainable management of timber resources - for building material, seaweed tables, firewood (plus external harvesting of canoe trees)

<u>Adaptation of garden crops / agricultural practices</u>

- i.e. to changes in water supply, temperatures, extreme climate events

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Wagina Island

Overharvesting of marine resources)

- esp. sharks, turtles, fish (?)
- (compounded by mining proposal?)

Sea level rise

- Coastal inundation / storm surge
- Localised shoreline erosion (limited sandy shores)

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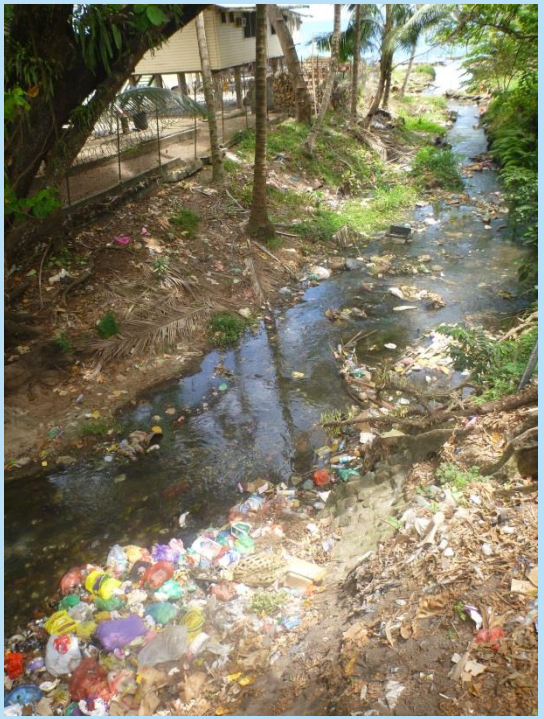
Honiara



Waste Management

- Excellent landfill facility
- Human health risks
- Degradation and contamination of aquatic and marine habitats and biota
- Plastic

Honiara

Water Supply

- (for communities with poor or no access to utilities)
- Interactions with waste management - human health risks (drinking, cooking, fishing, recreation)
- Drought risks

Honiara

Erosion

- Landslides and gully erosion where informal settlements established

- Riparian erosion – bank destabilisation
- Coastal (around settlements)
- Inadequate or problematic protection measures

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Highlights and Challenges

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Highlights

- People – ground-level community interactions and field collaborations
- Value-add benefits of ESRAM project to communities
- Proving how much can be achieved with limited time on the ground (i.e. relying on years of local knowledge, rather than ‘spot’ surveys)

Challenges

- Data & information: balancing quality vs quantity
- Valuing ecosystem services with limited data, and not all ecosystem services can be valued
- Complexity of considering ecosystem services in climate change risk assessment
- Managing time allocation for Phase 1 (i.e. baseline inventory + ecosystem valuations + climate change assessment)

Process Issues Emerging

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Process Recommendations

- **Data & information**:- suggest SPREP have a ‘data and information package’ ready to transfer to future consultants on commencement
- **Data & Information**:- pre-arranged access agreement with key GIS data sources (e.g. national governments)
- **Time schedule (Milestones)**:- suggest greater proportion of timeframe allocated to ESRAM component (as opposed to Options Assessment & Implementation Plan)

Next Steps

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Solomons next steps …

2016:

- **Completion of ESRAM reports!** (… economic valuations and climate change risk assessments, in particular, still underway)

2017:

- Options Assessment, including consultations
- Implementation Plan