NATIONAL MARINE ECOSYSTEM SERVICE VALUATION

SOLOMON ISLANDS

MACBIO

Marine and Coastal Biodiversity Management in Pacific Island Countries

SPREP
Secretariat of the Pacific Regional Environment Programme

IUCN

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On behalf of:
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
of the Federal Republic of Germany

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Outline

- Definitions
- Approach
- Methods and results
- Summary
- Status and remaining activities
- Discussion

Definitions

- **Economic Value**
  - Contribution of an action or object to **human wellbeing**
  - **Monetary measure** of the **wellbeing** associated with the production and consumption of goods and services, including ecosystem services
  - Value to fishers (profit) = Sales Revenue$ - Fishing Costs$
  - But economic value is **NOT just** what is represented in the **marketplace**

Definitions

- **Ecosystem services**
  - *Human benefits from nature*

- **Total Economic Value (TEV)**
  - *All marketed and non-marketed benefits derived from an ecosystem, including direct, indirect, option and non-use values*

Approach

National scale,

Limited detailed data,

Short timeline

Status-quo analysis,

Simplest measures,

No TEV

"The main point of understanding and valuing natural capital and ecosystem services is improving natural resource decisions."

Natural Capital (Daily, Kareiva, Polasky, Ricketts, & Tallis)

Literature review

- Marine Ecosystem Services Partnership (MESP) "Valuation Library"
- Highlighted and use past efforts in literature review; so not reinventing the wheel!
- Guidance material details the methods used

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The Economics of Ecosystems and Biodiversity

TEEB is a global initiative to help: implement the Convention on Biological Diversity (CBD), meet Aichi targets, and manage resources sustainably and fairly

- **Recognize** the benefits of biodiversity and ecosystems services
- **Demonstrate** the importance of ecosystem services by analyzing the trade-offs of projects and policies
- **Incorporate** the values of ecosystem services into decision-making and provide incentives for sustainable management

ESV applications

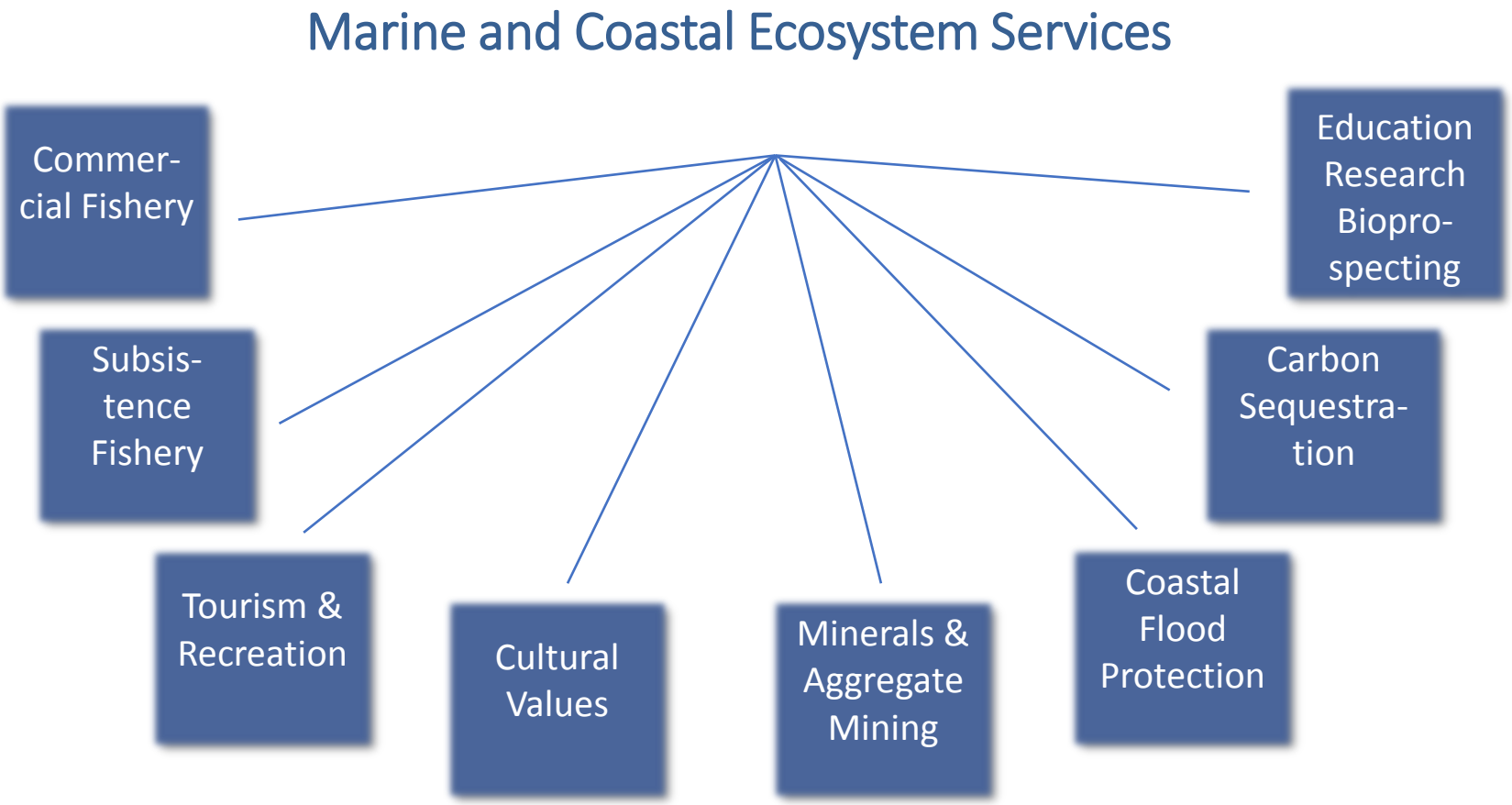
In general

- Help inform projects and policies related to resource management
- Increase awareness of the value of ecosystems using qualitative and quantitative information
- Show trade-offs between different ecosystem services

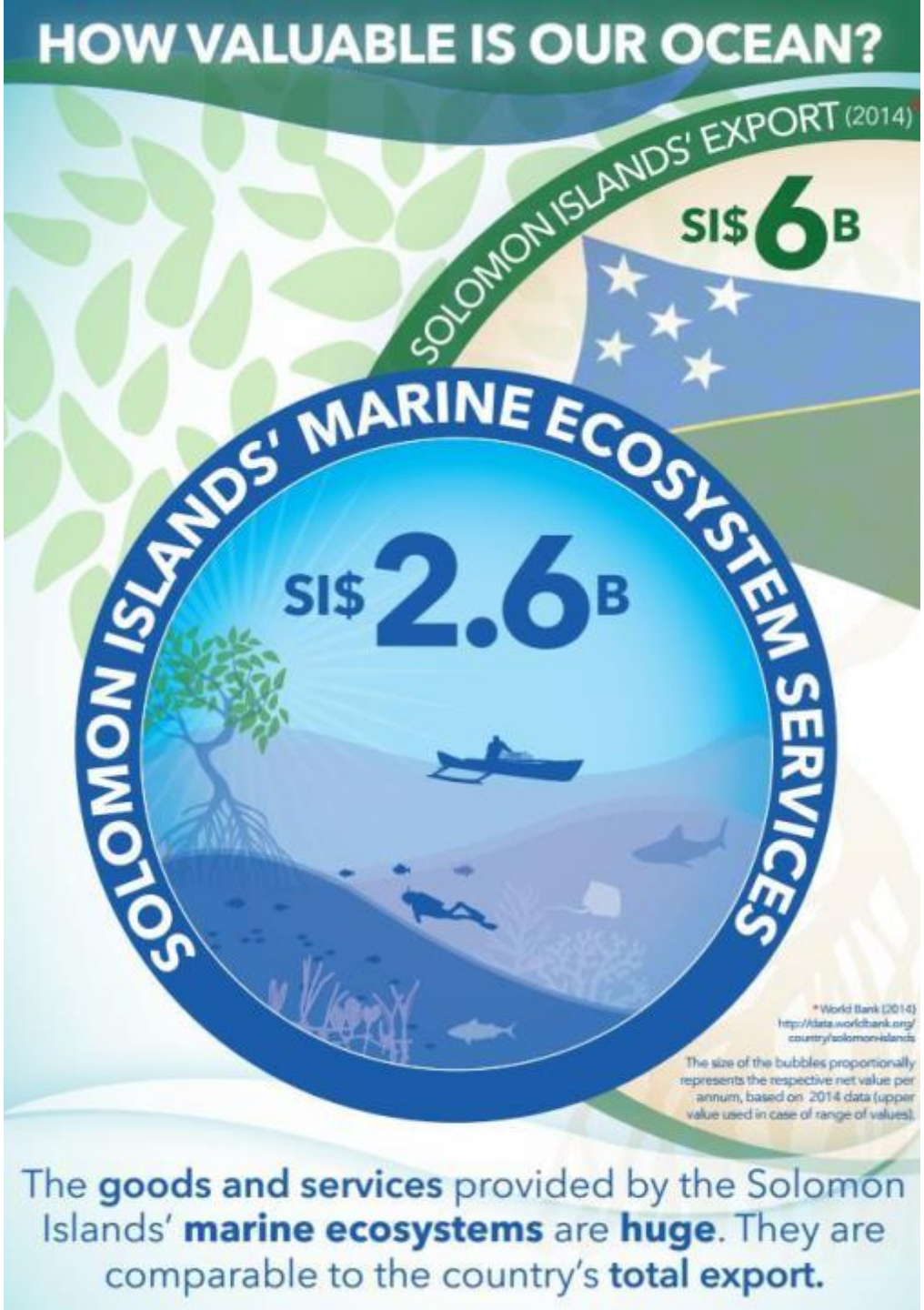
Marine and coastal

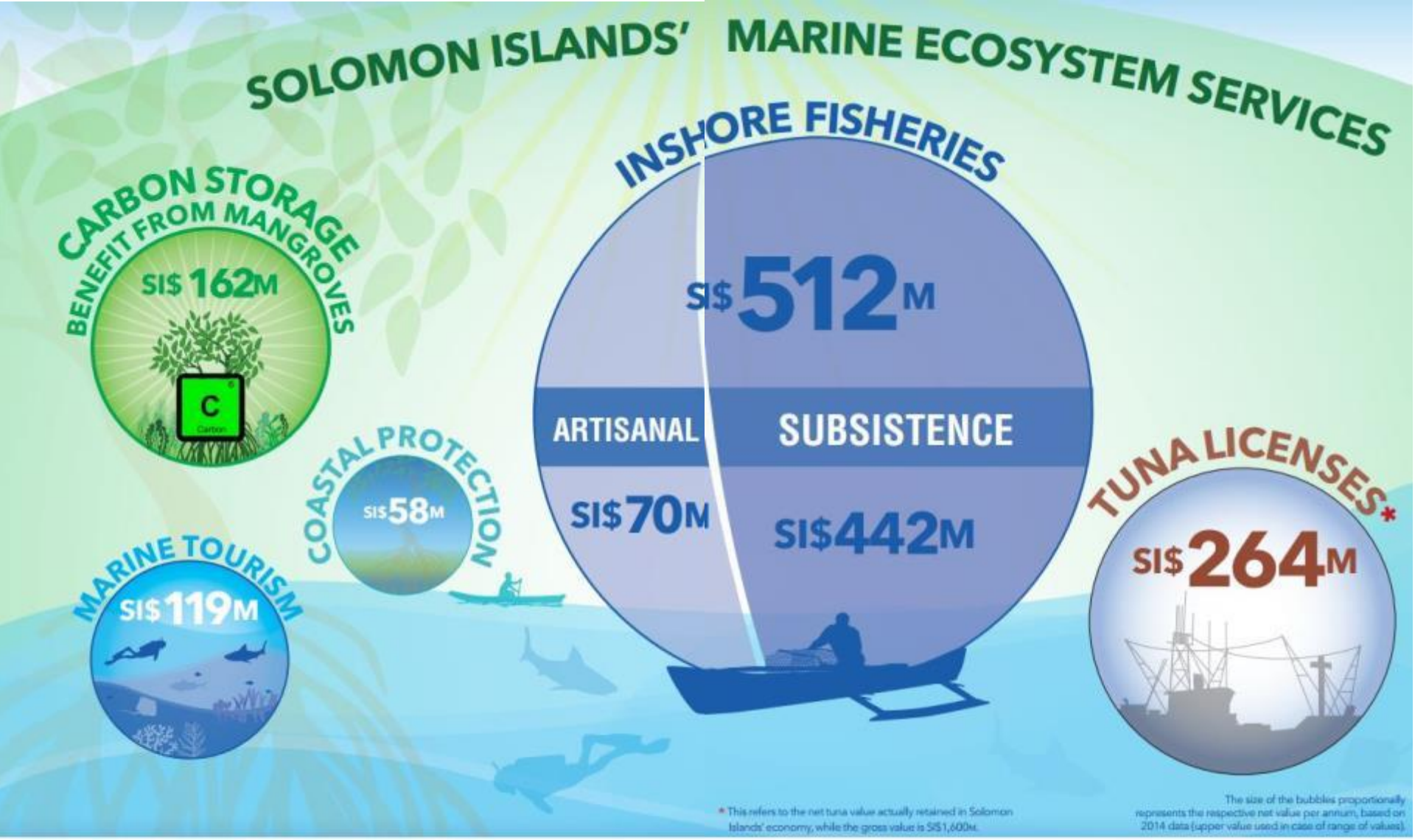
- Quantifying the benefits provided by inshore subsistence fisheries helps focus more attention on inshore fisheries
- Use information in licensing and permit decisions
- Identify proportion of the direct and indirect benefits from offshore fisheries that go to the Solomon Islands vs to foreign countries
- Inform planning decisions
- Identify and showcase the role of ecosystems in non-extractive uses (i.e. tourism or coastal protection)

Methods & Results



Recognizing, demonstrating and balancing values


HOW VALUABLE IS OUR OCEAN?
SOLOMON ISLANDS' EXPORT (2014)
SI$ 6B
SOLOMON ISLANDS' MARINE ECOSYSTEM SERVICES
SI$ 2.6B
* World Bank (2014)
http://data.worldbank.org/country/solomon-islands
The size of the bubbles proportionally represents the respective net value per annum, based on 2014 data (upper value used in case of range of values).
The goods and services provided by the Solomon Islands' marine ecosystems are huge. They are comparable to the country's total export.



Solomon Islands' **marine ecosystem services** are **valuable** and **diverse**, yet often **hidden**.

Solomon Islands' **marine ecosystem services** need to be fully recognized and sustainably managed or they **may be lost forever**.

Subsistence fishing

- In rural areas, about 60% of total artisanal catch is consumed at home
- Average catch/person = 106.78 kg/yr
- Total annual catch = 33,556 tonnes
- Average price = SI$ 19.17/kg (US$2.67/kg)

Subsistence fishing

- Total Economic Value = (total harvest kg x price/kg of replacement food) – fishing costs
- Economic value = SDB 442 million/year (~US$ 58.8 million/year)
- Approximately 5% of annual GDP

Subsistence fishing

Province	Total population	Total value-added per year (SI$)	Value-added per person per year (SI$)	Value-added per km of coast (SI$/km)	Value-added per ha of reef (SI$/ha)
Central	26,051	29,179,088	1,120	19,805	3,033
Choiseul	26,372	32,701,921	1,240	18,093	1,510
Guadalcanal	93,613	74,110,139	792	92,176	7,141
Isabel	26,158	25,885,468	990	8,598	603
Makira-Ulawa	40,419	41,668,128	1,031	47,936	4,963
Malaita	137,596	107,134,394	779	119,136	6,579
Rennell and Bellona	3,041	2,711,692	892	7,629	1,794
Temotu	21,362	25,782,042	1,192	21,456	1,154
Western	76,649	95,688,218	1,248	30,388	2,270
Honiara	64,609	7,405,272	113		
Total	516,147	442,166,362	857	32,584	2,523

Note: value includes all fish and invertebrates caught within and outside the reef.

Commercial fisheries

Small-scale commercial fishing

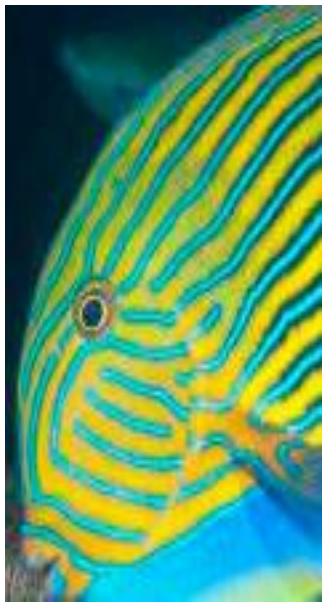
- 41% of artisanal catch is sold (ProcFish 2009), or 22,400 tonnes/year

- Value of commercial artisanal fishing is SI $70 mil/yr (~US$ 9.3 mil/yr)
  - About 0.8% of annual GDP

- May be unsustainable due to
- overfishing and destructive fishing
- practices in some areas

Commercial fisheries

- **Bêche-de-mer**
  - Very inconsistent ecosystem service; over-fishing and moratoriums
  - Record revenue of SI $33 million after ban was lifted in 2013; average export revenue ~SI$ 3.3 mil/yr
  - Important for households
- **Trochus**
  - Consistent, but harvests decreasing
  - Annual average exports ~SI$ 2.13 mil/yr
- **Aquarium Trade**
  - Consistent value in Solomon Islands, average exports ~SI$ 1.2 mil/yr
  - Local benefits are small



Offshore Commercial Fishing

Tuna

- 87% caught by purse-seine.
- 2014 catch was 120,166 tonnes with an economic value of US$ 221,089,000 (~SI$ 1,659,827,300).
- 64% of catch is skipjack, but only 48% of total value.
- Much more value from yellowfin and bigeye, which are also overharvested

Commercial fisheries

Offshore tuna fishing

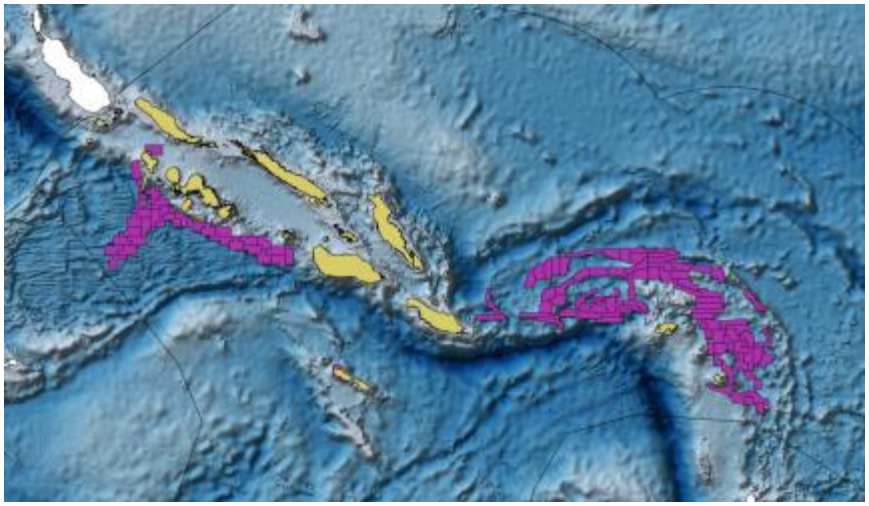
- Exports (including canned and frozen) totaled SI$157 mil in 2007 (US$21 mil); Sol Tuna employs 1,500 people
- License fees earned government SI$ 217 mil in 2014

Total value of fisheries

SI$ 1,145 mil/yr (US$175 mil/yr)

Deep-sea minerals

- Potential value and environmental impacts are unknown. May effect migratory fish and mammals.
- Government earned SI$ 2.74 million in 2012 and SI$ 998,217 in 2013 from prospecting licenses
- Benefits will depend on policy regarding access and benefit sharing (royalties).



Deep Sea Mining Exploration Tenements

Marine and coastal tourism

- Marine ecosystems attract local and international tourists, whose expenditures benefit businesses and their employees
- Government revenue through taxes
- Need to determine how much of tourism revenue is directly related to marine and coastal ecosystems, then subtract costs to provide tourism services

Marine and coastal tourism

Total Visitors	Total Expenditure per day (SI$)	Average number of days	Total tourists expenditure (SI$)	Benefits from ecosystem services
23925	1410	15,3	516 134 025	118 710 826

Marine ecosystems are worth SI $118.7 mil/yr (~US$15 mil/yr) to tourism in Solomon Islands

Carbon Sequestration

Identify

- Mangroves and seagrasses capture CO_2 from the atmosphere and store it in biomass and soil.

- Carbon sequestration benefits the whole world by mitigating climate change. Carbon sequestration may also be marketed and sold in the form of “carbon credits” but there are large transaction costs.

Carbon sequestration

Quantify

- ~56,100 ha mangroves; area of seagrass unknown

Value

- Mangrove carbon sequestration global benefit: SI $161.9 mil/yr (~US$ 21.6 mil/yr).
- Potential carbon credits pending calculations; Need estimated hectares lost per year.
- Additional mangrove benefits: food, fuel, construction, etc. estimated between US$ 350 and US$ 1,501 per household from data collected in Malaita and Choiseul (Warren-Rhodes et al. 2011).

Coastal protection

- Coral reef and mangroves protect properties in Solomon Islands from erosion and flooding

- Coastal protection value of US$ 3.3-5.6 million/yr (SI$ 25-48 million/yr)

Historical Hurricane Tracks for Solomon Islands 1980-2015

Research, education, management

- Grants and aid from overseas = benefit to Solomon Islands
- Fisheries projects alone totaled SI$ 9.2 million (US$1.2 million) in 2013 budget. Some Environment, Education, and Development projects are also related to marine and coastal ecosystems

Turtle tagging Arnavons

Other marine ecosystem services

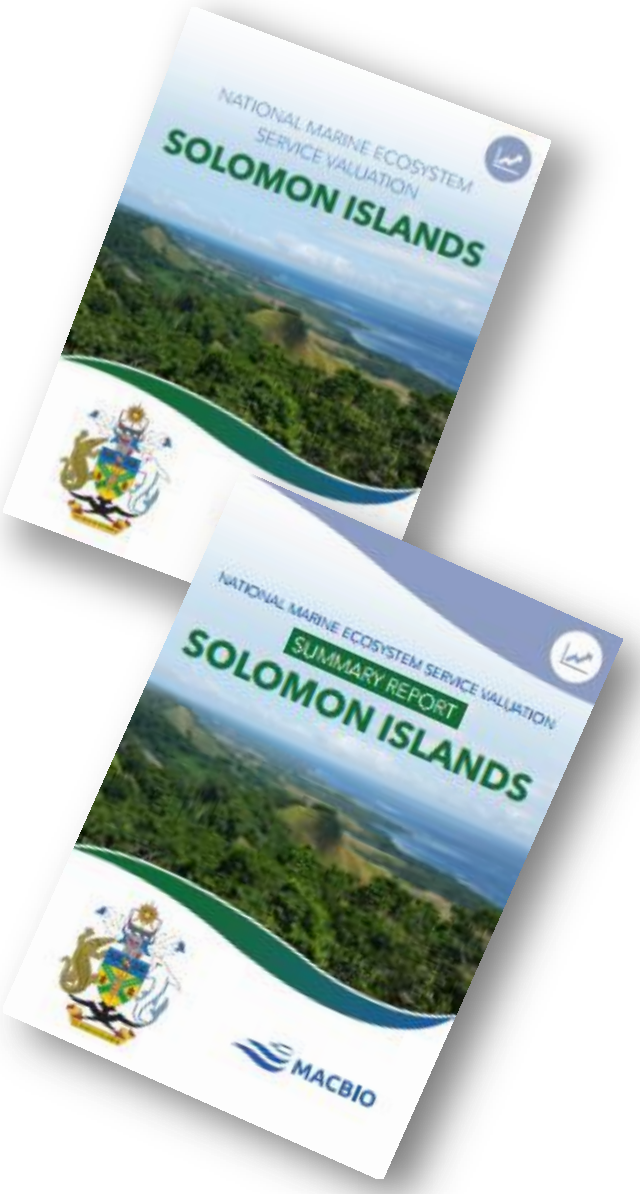
- Traditional practices
- Handicrafts
- Sand mining
- Shark fin
- Mariculture
- Bio-Prospecting

Summary

- Build a greater understanding of marine ecosystem services and integrating recognition of ecosystem services in decision making.
- Describe data required to value the services and point out data gaps.
- Describe who is receiving benefits (distribution).
- Value the status-quo resource use, but try to label it as sustainable, under or over exploited.

Status

- ✓ **Report**
  - ✓ In-depth descriptions of ecosystem services and relevant data
  - ✓ Compares relative magnitudes of ecosystem benefits
  - ✓ Summaries



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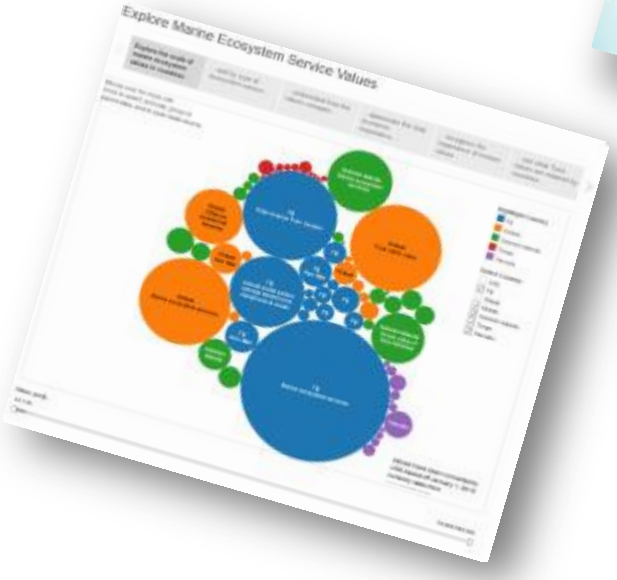
- ✓ **Communication material**
  - ✓ Infographics
  - ✓ 1-pagers
  - ✓ Interactive data explorer
  - ✓ Presentations



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- ✓ **Support material**
  - ✓ Fact sheets
  - ✓ Literature review
  - ✓ Guidance material
  - ✓ Regional expert and network library

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Ongoing

- Data collection: Best available data, and gaps identified
- Support the Solomon Islands in using economic values to inform marine spatial planning and marine and coastal policies and permissions

Discussion

Immediate uses/insights on Ecosystem Service Valuation data

- How do ecosystem management and policy relate to ecosystem benefits?
- Who benefits from the ecosystem service now, and should that change?
- Are these benefits going to increase or decrease with current policies and uses?

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