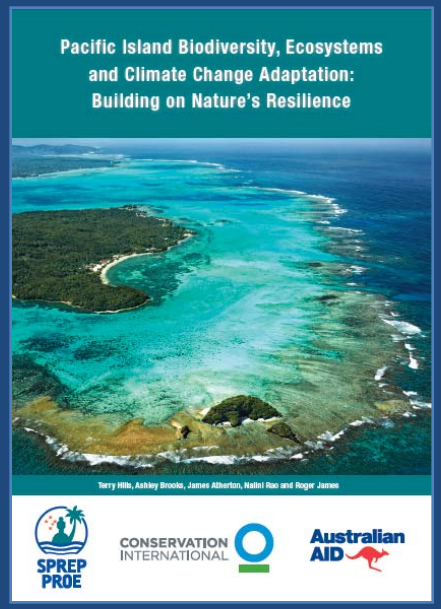
Overview of the Pacific Island Biodiversity, Ecosystems and Climate Change Adaptation Project



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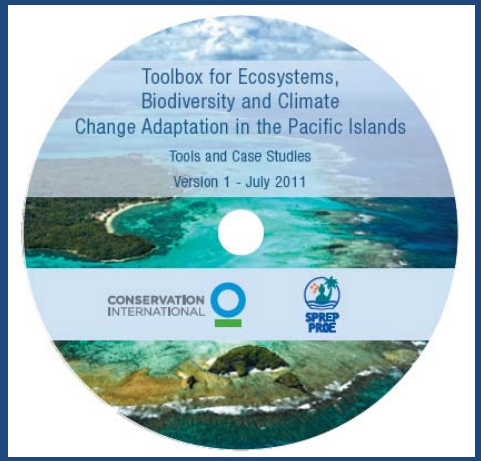

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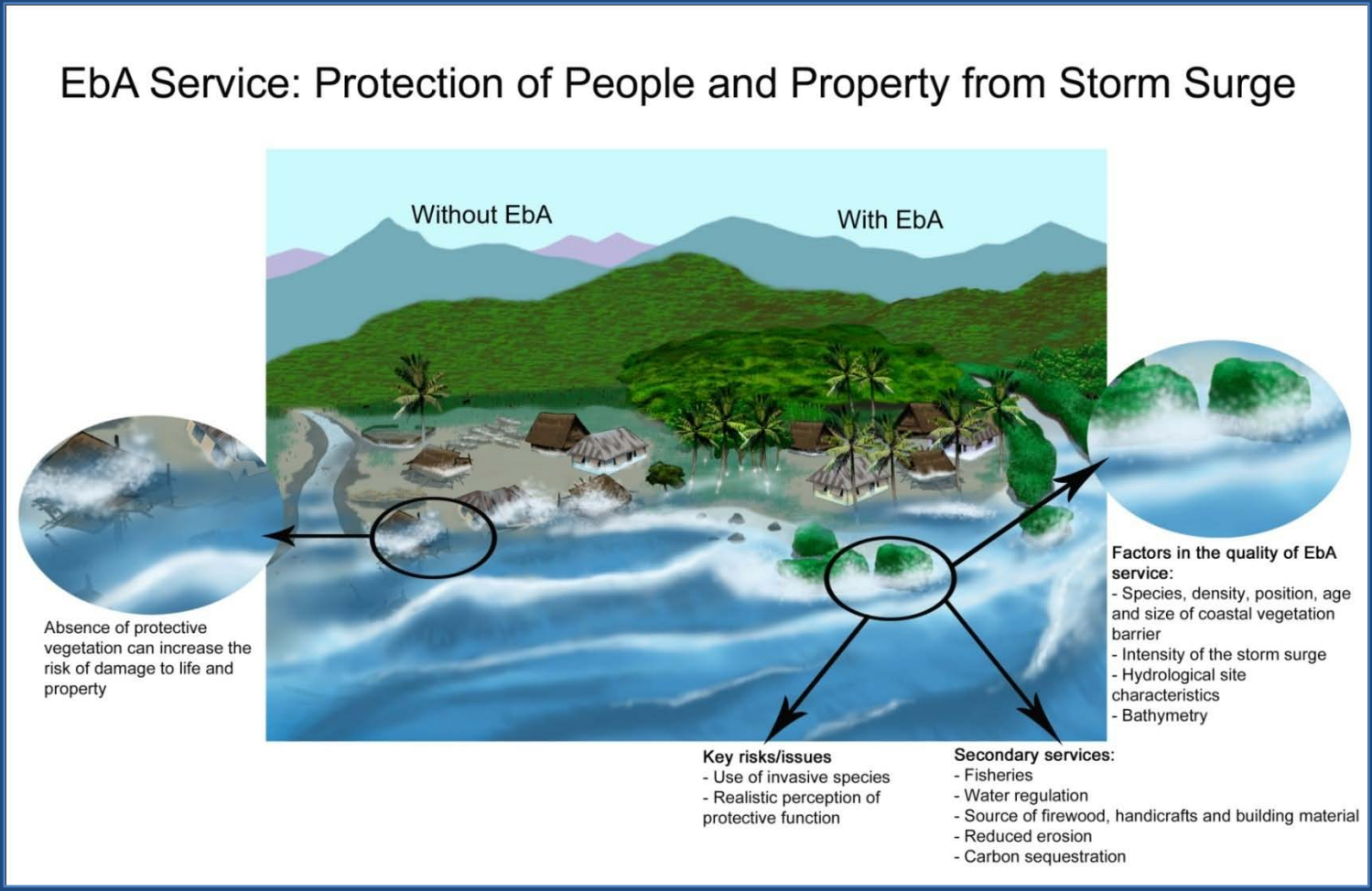
What is Ecosystem-based Adaptation(EbA)?

Adaptation that integrates the use of biodiversity and ecosystem services into an overall strategy to help people adapt to the adverse impacts of climate change (CBD, 2009)

B: What is known about the key EbA relationships for the Pacific Islands?



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Project Objectives

Collate existing information to enable better consideration of the following in the Pacific context:

A – Adaptation options for species and ecosystems particularly vulnerable to climate change.

B – Contribution of ecosystems to 'climate-proofing' human development(EbA):

- Agriculture
- Fisheries
- Disaster Risk Reduction

…and to identify key information gaps.

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Background and Process

- Partnership between SPREP and CI
- Funded under the Australian Government's International Climate Change Adaptation Initiative(ICCAI)

Jan 2011 – Desktop Studies
  - Covering both A and B

March 2011 – Needs Analysis/Participation in PCCR
  - Conducted Basic Needs Survey

May 2011 – Results Workshop (Fiji)
  - Presented draft material and solicited feedback

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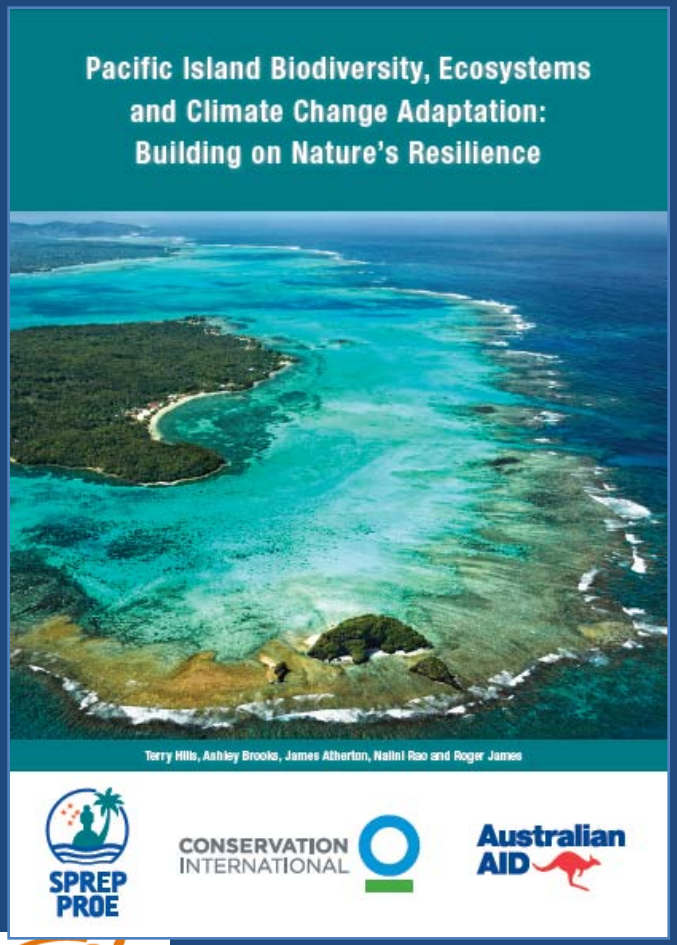
Products: Synthesis Report



Findings:

- Some good country-level examples of integration
- Significant potential to:
  - Link conservation and adaptation planning
  - make better use of ecological infrastructure (EbA)
- Lack of baseline data and knowledge of EbA functions are key barriers

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Products: CD Toolbox

SPREP
Secretariat of the Pacific Regional Environment Programme

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Toolbox for Ecosystems, Biodiversity and Climate Change Adaptation in the Pacific Islands - version 1 (June 2011)

Home | Project documents | EbA decision tree | Other resources | All tools | Search all Tools: | Go

Tool 1D: Degree Heating Weeks system

Introduction to the tool

- The Degree Heating Weeks (DHW) system was developed by the United States National Oceanic and Atmospheric Administration(NOAA) in 2000 to predict and warn of coral bleaching events.
- Corals are sensitive to sea surface temperatures (SST) warmer than 1°C above the highest summertime average in an area. While previous monitoring and satellite imagery was able to map 'hotspots' of reefs at risk, this was unable to account for the accumulation of heat stress on corals over time.
- In response, the DHW system was developed. DHW is defined as the number of weeks in which the SST of an area exceeds its average thermal maximum by 1–2°C.
- DHW is expressed in units of 'degree C-weeks'.
- Generally, a DHW value of >4–5 for an area is considered sufficient to result in extensive coral bleaching, and a DHW of 10 corresponds to massive coral mortality.

Resources for more information

Coral Reef Watch Satellite Coral Bleaching Monitoring – DHW charts

NOAA - Coral Reef Watch

Print/Save Document

Print/save as a pdf (94 kb)

TOOLBOX FOR ECOSYSTEMS BIODIVERSITY AND CLIMATE CHANGE ADAPTATION IN THE PACIFIC

Category 1: Tools to build climate resilience of biodiversity conservation in the Pacific

"What tools are available to help Pacific Island decision-makers build climate change adaptation into their biodiversity conservation planning, and vice versa?"

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Methodology

- NOAA's Coral Reef Watch programme uses remote sensing, and 'in situ' tools, for near-real-time and long term monitoring, modelling and reporting of environmental conditions of coral reef ecosystems.
- The satellite data allows for the identification of areas at risk based on how much heat stress has accumulated over rolling 12 week periods.
- Outputs are global and regional maps where any coloured areas indicate thermal stress to corals in the area (seeFigure). These maps are readily available on the Internet

Figure: Example of an online DHW map for the 12 weeks leading up to 14 April 2011 for the Pacific region (www.osdpd.noaa.gov/ml/ocean/cb/dhw.html).

Usage for biodiversity conservation

- DHW has become a key operational metric for reef monitoring and management and has successfully generated bleaching warnings and alerts.
- The continuous monitoring of SST at various scales has provided researchers and stakeholders with tools to understand, and better anticipate and manage, coral bleaching.
- When conditions are such that coral bleaching may occur, the DHW system has acted as a valuable early-warning system with various benefits. It has: been a trigger for bleaching response plans; helped target field sampling and information for impact assessment; built credibility and support for management actions; and been an important communications tool.
- NOAA's Coral Reef Watch programme also has a satellite bleaching alert system. This is an automated coral bleaching email alert system for reef managers, scientists, and communities.
- The automated alert email is sent to subscribers for a reef site when the status level of thermal stress changes, or when the current DHW value exceeds the historical maximum for that site.

Strengths of the approach for climate change adaptation

- Given that SSTs are predicted to continue to rise across the Pacific, monitoring of SST changes and how these may affect coral reef ecosystems is a key aspect of sustainability regionally.
- The benefit of the DHW system is that it provides near real-time global data at high resolution—at 0.5 degree (50km)—and is readily available to managers and decision-makers.
- The Coral Reef Watch programme's data is updated twice weekly, and includes a Google Maps interface. Animations of the most recent DHW images are also available online.
- Along with the global data, the Coral Reef Watch programme also focuses on representative coral reef locations around the world. These "virtual stations" are based entirely on satellite remote sensing measurements, and users can access time-series graphs and data for each station, and receive automated email alerts for that area.

Limitations of the approach

- In addition to thermal stress, a range of additional factors influence the susceptibility of corals to bleaching, which the DHW system does not account for (i.e. water turbidity and circulation, shading and pre-exposure to elevated temperatures, ultra-violet light levels, taxonomic composition of the coral assemblage, and factors associated with corals and their specific algae).
- DHW maps also do not account for the differential responses or impacts to different coral species. There is substantial variation in the degree that coral bleaching and mortality occurs for corals in the same area, subject to the same stresses.

Resources for more information

Coral Reef Watch Satellite Coral Bleaching Monitoring – DHW charts

NOAA - Coral Reef Watch

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Key Recommendations

Building the knowledge base

- Pacific Ecosystem, Biodiversity and Climate Change Monitoring and Analysis Program
- EbA Data Collection and Analysis
- Test and Refine the Toolbox

Taking action based on existing knowledge

- Capacity building pool for biodiversity and climate change planning
- Community-based Coastal Zone Program
- Establish an EbA Rapid Assessment Program

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A: Analysis of Vulnerability Context for Species and Ecosystem Types

Species-level high vulnerability context and conditions	
General issues	• Threatened/endangered
	• Small populations
	• Narrow climatic tolerance
	• Highly specialised
	• Are exploited for use/under stress from human use
	• Specialised habitat requirements (i.e. spending part of life cycle as a larvae)
Capacity for movement	• Limited geographic range
	• Located on remote islands or mountain peaks
	• Low migratory capacity/poor dispersal
	• Poor colonization potential
Relationship with other species	• Dependent on other species vulnerable to climate change
	• Low competitive capability

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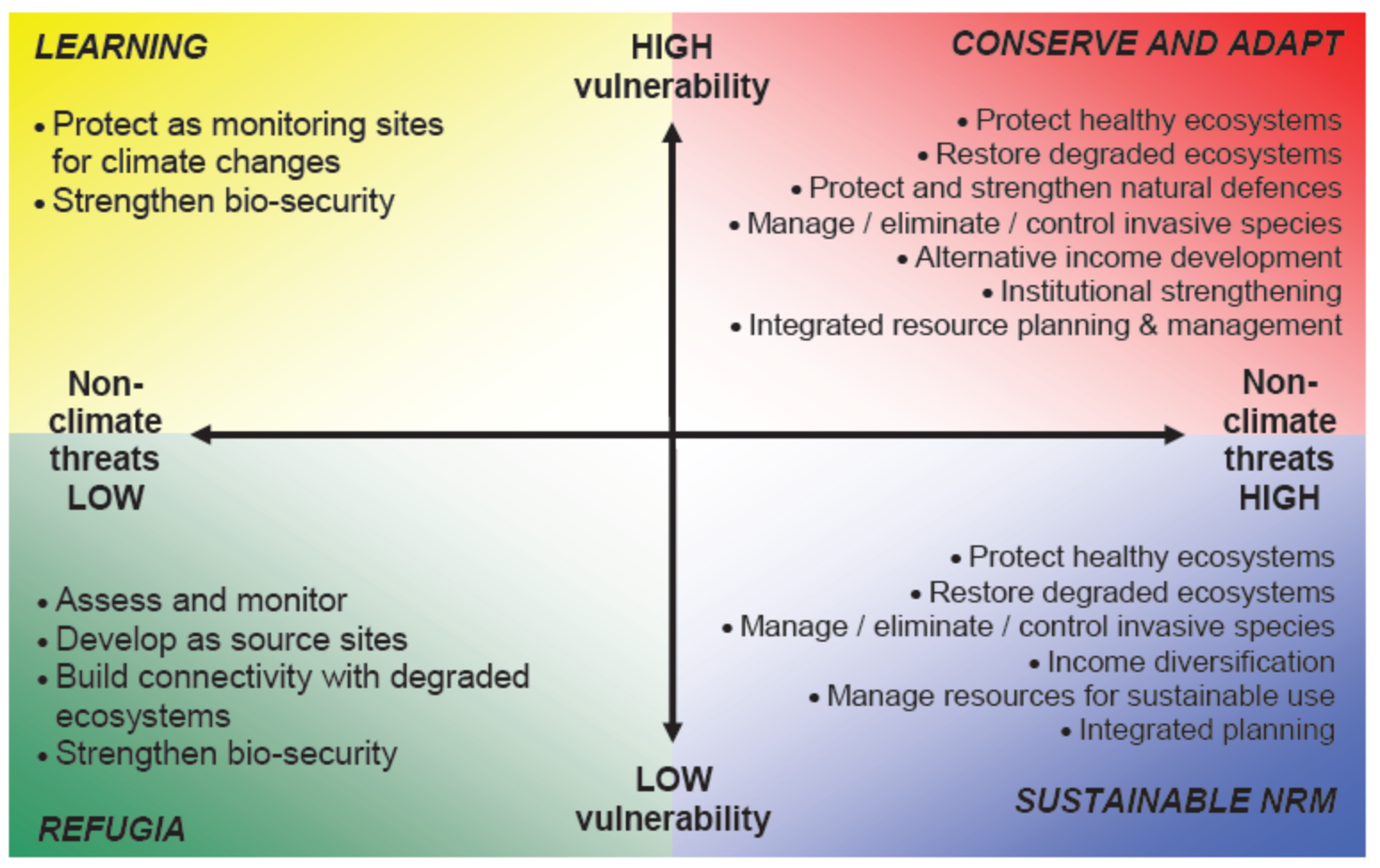
A: Proposed Adaptation Response Framework



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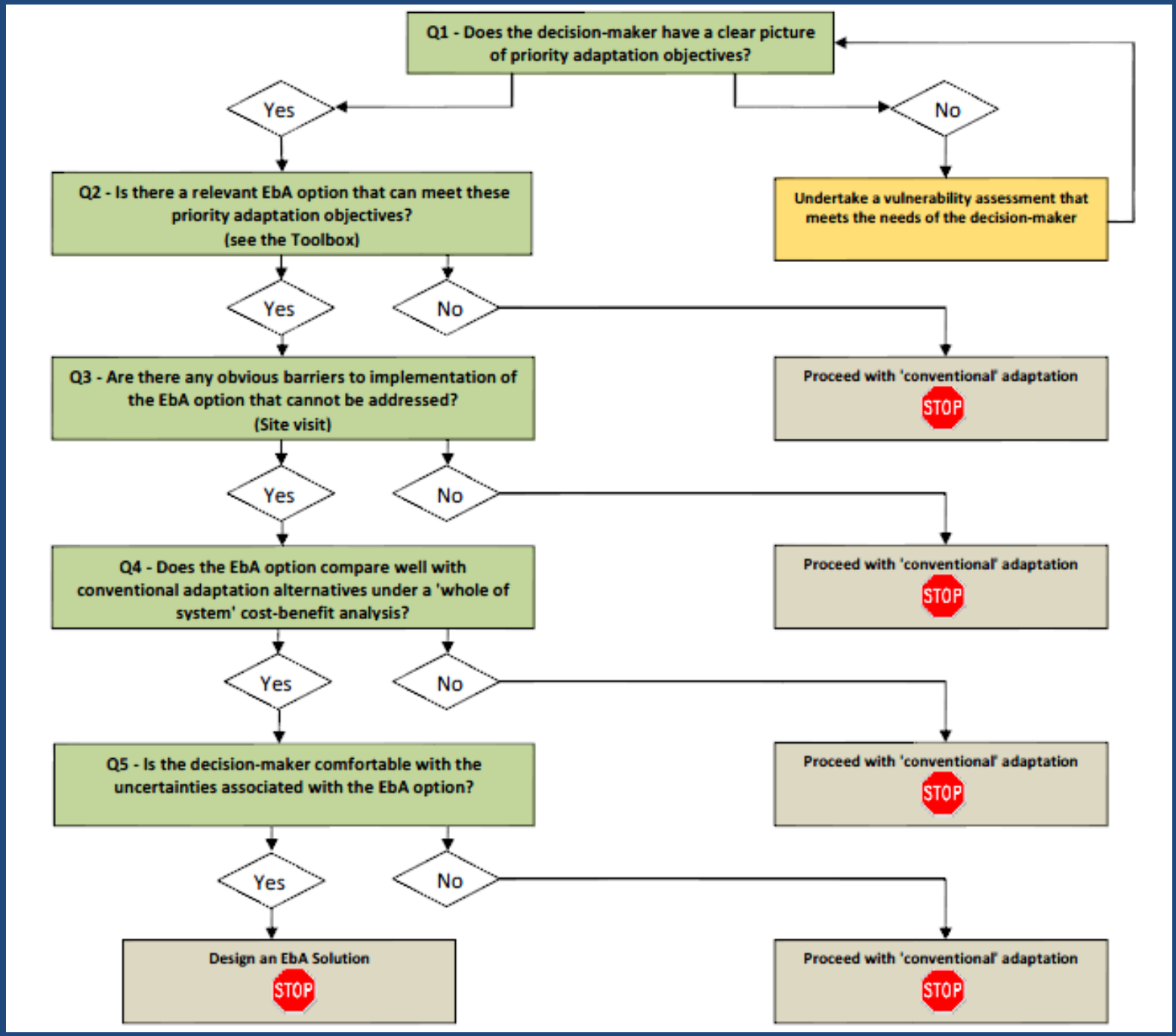
Q1 - Does the decision-maker have a clear picture of priority adaptation objectives?
Yes
No
Undertake a vulnerability assessment that meets the needs of the decision-maker
Q2 - Is there a relevant EbA option that can meet these priority adaptation objectives? (see the Toolbox)
Yes
No
Proceed with 'conventional' adaptation
STOP
Q3 - Are there any obvious barriers to implementation of the EbA option that cannot be addressed? (Site visit)
Yes
No
Proceed with 'conventional' adaptation
STOP
Q4 - Does the EbA option compare well with conventional adaptation alternatives under a 'whole of system' cost-benefit analysis?
Yes
No
Proceed with 'conventional' adaptation
STOP
Q5 - Is the decision-maker comfortable with the uncertainties associated with the EbA option?
Yes
No
Design an EbA Solution
STOP
Proceed with 'conventional' adaptation
STOP

Thank you / Fa’afetai lava

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