

# **HOT SPOT AND SENSITIVE AREAS FOR THE KINGDOM OF TONGA.**

## **1.0 Introduction**

The Hot-Spot Analysis (HSA), for identifying hot-spot/sensitive areas, is just one part of a logical process working towards a full demonstration project design. It is an assessment of what Tonga's priority issues are, ideally to be addressed as soon as possible.

This report presents the findings of the Water Management Steering Committee in identifying Hot-Spot and Sensitive Areas for Tonga as part of the Sustainable Integrated Water Resources and Wastewater Management (IWRM) Project in Pacific Island Countries (PICs) funded by SOPAC and GEF. It outlines and discusses the processes and activities undertaken to achieve the expected outputs with consensus amongst all key stakeholders and the National IWRM Focal Point.

### **1.1 Objectives**

The main objective of this assignment is to:

- organise and facilitate a Hot-spot and Sensitive Area Analysis consultation with members of the Water Management Steering Committee to identify major concerns and issues; and
- to prioritise hot-spot areas for the GEF funded demonstration project.

## **2.0 Methodology**

### **2.1 Consultation Workshops**

A one (1) day consultative workshop was conducted with members of the Water Management Steering Committee (Appendix 1) in April 2007. Majority of the Committee members are with technical and theoretical background. The workshop was facilitated by the National IWRM Focal Point in collaboration with the Head of Environment.

The purpose of the workshop was to provide an overview of the IWRM project, explain the objectives of the current Hot-Spot/Sensitive Analysis, present and discuss the results of the draft diagnostic report, produce a list of priority issues for Tonga and analyse the issues to come up with a consensus on three (3) Hot Spot and Sensitive Areas. One of these areas will be selected to develop a national demonstration project concept.

In order to find what our Areas were, the Committee had spent time in brain storming what major concerns there were for each sector. From each sector's concern, we were able to find the probable cause or the issue for each concern. From the list of issues, the Committee was able to come to an agreement on which issue was of priority.

An evaluation/ranking exercise was carried out, with respect to the issue prioritised, for the Hot Spot and Sensitive Analyses using a template provided by SOPAC. Due to time

constraint, the Focal Point relied on the knowledge and expertise of the Water Management Steering Committee members to conduct this activity. After a long days work of going over results of surveys that were conducted in the past and community consultations, the Committee finally agreed on an area to be selected as a demonstration site (Table 2).

## 2.2 Collation of literature materials

Prior to the consultation workshop, a draft diagnostic report on ‘Sustainable Integrated Water Resources and Wastewater Management Project in the Kingdom of Tonga’ was produced. This was a comprehensive report that was used, together with other relevant documentations that were collected from stakeholders comprising of current and past water sector projects, draft and existing legislation and policies, environmental projects and so forth, to assist in the allocating of the Hot Spot and Sensitive areas.

## 3.0 Results

### 3.1 Determination of Priority Issue

During the consultation process with the various stakeholders, there were a lot of issues raised, but no formal process on how to begin so we may get to the final output. It was then suggested to come up with the major concerns from each sector and then determine what the probable causes may be. From the list of concerns and issues that were produced, the Water Management Steering Committee prioritised the issues shown in Table 1 and it was concluded that Issue No. 2: Groundwater contamination and quantity of existing supplies was of greatest priority nationally.

Table 1: Major concerns and issues for Tonga

Major Concerns	Issues
1. Water demand	1. water wastage 2. groundwater contamination and quantity of existing supplies 3. salinisation of groundwater
2. Pollution	4. chemical 5. solid & liquid wastes 6. oil spills 7. microbiological 8. eutrophication 9. industrial wastes
3. Policy/legislation	10. Water Management Bill 11. regulations/policies to be established
4. Global change	13. changes in hydrological cycle including droughts and cyclonic flooding and damage 14. Sea level change
5. Public health	15. Typhoid
6. Economic productivity	16. Agriculture 17. Tourism 18. Fisheries

### 3.2 Determination of Hot-Spot and Sensitive Areas

In determining the hot-spot and sensitive areas, the Committee came to a consensus to apply the evaluation exercise on the major group of islands in Tonga (Tongatapu, Vava'u, Ha'apai and 'Eua) so it may be nationally represented (Appendix 1.1-1.4 and Appendix 3.1-3.3). The scores for each area were aggregated and are shown in Appendix 2 and 4. Table 2 below shows the summarised prioritised Hot-Spot and Sensitive Areas for Tonga.

Table 2 has summarised the prioritised Hot-Spots and Sensitive Areas for Tonga.

	Selected Hot Spots		
	Title	Score	Priority Issue
<b>Hot Spot 1</b>	Neiafu Aquifer	85%	Groundwater contamination and quantity
<b>Hot Spot 2</b>	Nuku'alofa Aquifer	83%	Groundwater contamination and quantity
<b>Hot Spot 3</b>	Pangai Aquifer	77%	Groundwater contamination and quantity

	Selected Sensitive Areas		
	Title	Score	Priority Issue
<b>Sensitive Area 1</b>	Makave Aquifer	78%	Groundwater contamination and quantity
<b>Sensitive Area 2</b>	Hihifo Aquifer	76%	Groundwater contamination and quantity
<b>Sensitive Area 3</b>	Foa District Aquifer	66%	Groundwater contamination and quantity

### 3.3 Identified Priority Hot-Spot Area

#### HOT SPOT 1: NEIAFU AQUIFER

##### Location:

The Vava'u Group is located to the north of Tongatapu, and composed of the large island of Vava'u and a network of progressively smaller islands and reefs to the south. Most of the islands are raised coral islands with deep rich soils supporting a variety of forest, bush, and crops. Neiafu is located on the main island and is the capital where most industrial, commercial, public and government institutions are located. Neiafu Harbour is the main harbour of the group.

##### Context of the Site:

###### *Main human activities related to the site:*

- Water extraction for domestic, industrial and commercial use.

###### *Natural conditions/phenomenon related to the site:*

- Natural aquifer; and
- Possible threat of inundation from cyclones related to saltwater intrusion

##### Nature of threats and extent of threats (human and natural):

- Salinisation of groundwater;
- Polluted groundwater;
- Integrity of aquifer from development (residential, commercial, tourism)
- Severe degradation of catchment zone

##### Source of Pollution:

###### *Point source:*

- Landfill (solid, chemical, hazardous, hospital, industrial, vehicles, machinery, pesticides, waste oil, bio-hazardous,
- Oil deposit site (on industrial sites, businesses)
- Bore holes (over-extraction)

###### *Non-point source:*

- Septic tanks (sewage, hospital liquid waste, chemical,
- Old bore holes/wells (used for dumping chemical wastes)
- Pit toilets
- Waste water from drains

###### *Diffuse source:*

- Agro-chemical and fertilizer application to crops

Value of the site	Local	National	Regional/global
Environmental	HIGH	HIGH	LOW

significance			
Socio-economic significance	HIGH	HIGH	LOW

#### **4.0 Conclusion**

From the consultation workshop held on April 2007, the national stakeholders agreed on 3 critical and 3 sensitive areas in Tonga. The Hot Spot areas selected were (1) Neiafu Aquifer (2) Tongatapu Aquifer and (3) Pangai Aquifer; the Sensitive Areas were identified as (1) Makave District Aquifer (2) Hihifo District Aquifer and (3) Foa District Aquifer.

The National stakeholders reached a consensus after in-depth analysis on the Neiafu Aquifer as the Demonstrated Project. As there are many projects carried out in Tongatapu, this is a great opportunity to pursue water projects in Vava'u and to be replicated in other islands of this region. A Demonstrated Project Concept has been developed in conjunction with this paper and the Diagnostic Report.

#### **5.0 Appendices**

##### **5.1 Member Organisations of the Water Management Steering Committee**

1. Ministry of Lands, Survey, Natural Resources & Environment
  - Geology
  - Environment
2. Ministry of Agriculture & Food, Forestry & Fisheries
  - Agriculture
3. Tonga Water Board
4. TANGO
5. Disaster Management Authority
6. Tonga Trust

## 5.2 Analysis of Hot-Spot Areas

### Appendix 1.1: Hot-Spot Area - Nuku'alofa Aquifer

#	Name of the criteria	Weighting (1 – 4)	Rating	Score
1	Size of the affected area (as percentage of the total national land area)	1	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	5
2	Affected population (as percentage of national population)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	15
3	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)	4	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	20
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	10
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	15
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites, etc.)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	10
7	Degree of Degradation at the site (e.g. type of degradation)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	9
8	Extent of degradation on watershed/aquifer and any receiving coastal and marine resources and systems	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50%	6

			5 – over 50%	
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### Appendix 1.2: Hot Spot Area - Pangai Aquifer

#	Name of the criteria	Weighting (1 – 4)	Rating	Score
1	Size of the affected area (as percentage of the total national land area)	1	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	1
2	Affected population (as percentage of national population)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	6
3	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)	4	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	20
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	6
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	9
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites, etc.)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	10
7	Degree of Degradation at the site (e.g. type of degradation)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	15
8	Extent of degradation on watershed/aquifer and any receiving coastal and marine resources and systems	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	10

### Appendix 1.3: Hot Spot Area - Neiafu Aquifer

#	Name of the criteria	Weighting (1 – 4)	Rating	Score
1	Size of the affected area (as percentage of the total national land area)	1	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	1
2	Affected population (as percentage of national population)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	12
3	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)	4	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	20
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	8
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	15
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites, etc.)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	10
7	Degree of Degradation at the site (e.g. type of degradation)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	15
8	Extent of degradation on watershed/aquifer and any receiving coastal and marine resources and systems	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	10

Appendix 1.4: Hot Spot Name - 'Eua water catchment

#	Name of the criteria	Weighting (1 – 4)	Rating	Score
1	Size of the affected area (as percentage of the total national land area)	1	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	1
2	Affected population (as percentage of national population)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	3
3	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)	4	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	16
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	8
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	12
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites, etc.)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	8
7	Degree of Degradation at the site (e.g. type of degradation)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	15
8	Extent of degradation on watershed/aquifer and any receiving coastal and marine resources and systems	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	10

### 5.3 Aggregated Scores

Appendix 2: Aggregated scoring table for Hot-Spot Areas

	Criteria Spot	Hot	1 (Neiafu Aquifer)	2 (Nuku'alofa Aquifer)	3 (Pangai Aquifer)
1	Size of affected area (as percentage of total national land area)		1	5	1
2	Affected population (as percentage of national population)		12	15	6
3	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)		20	20	20
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)		8	10	6
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)		15	15	9
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites etc.)		10	10	10
7	Degree of Degradation at the site (e.g. type of degradation)		15	9	15
8	Extent of degradation on watershed/aquifer and any receiving coastal and marine resources and systems		10	6	10
	TOTAL SCORE (actual score with multiplications for weighting)		91	90	77
	NORMALISED SCORE (i.e. as a percentage of a possible top score of 100)		91	90	77

### 5.4 Analyses of Sensitive Areas

Appendix 3.1: Hihifo District, Tongatapu Sensitive Area

	Name of the criteria	Weighting (1 – 4)	Rating	Score
1	Size of affected area (as percentage of total national land area)	2	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	2
2	Affected population (as percentage of national population)	3	1 – less than 1% 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	3
3	Extent to which the natural watershed or		5 – very important (>80%)	

	aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)	4	4 – important (50-80%) 3 – average importance (30-50%) 2 – low importance (10-30%) 1 – very low importance (<10%)	20
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)	4	5 – very important (>80%) <b>4 – important (50-80%)</b> 3 – average importance (30-50%) 2 – low importance (10-30%) 1 – very low importance (<10%)	16
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	3	5 – yes, very high priority <b>4 – yes, high priority</b> 3 – yes, medium priority 2 – yes, low priority 1 – no, not a priority	12
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites etc.)	2	<b>5 – yes, very high priority</b> 4 – yes, high priority 3 – yes, medium priority 2 – yes, low priority 1 – no, not a priority	10
7	Biodiversity value of the site	3	5 – extremely high <b>4 – high</b> 3 – average 2 – low 1 – very low	12
8	Cultural and public health value of the site	2	<b>5 – extremely high</b> 4 – high 3 – average 2 – low 1 – very low	10
9	Extent of involvement of communities in local management	2	<b>5 – extremely high</b> 4 – high 3 – average 2 – low 1 – very low	10

### Appendix 3.2: Foa District, Ha’apai

	Name of the criteria	Weighting (1 – 4)	Rating	Score
1	Size of affected area (as percentage of total national land area)	2	<b>1 – less than 1%</b> 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	2
2	Affected population (as percentage of national population)	3	<b>1 – less than 1%</b> 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	3
3	Extent to which the natural watershed or		<b>5 – very important (&gt;80%)</b>	

	aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)	4	4 – important (50-80%) 3 – average importance (30-50%) 2 – low importance (10-30%) 1 – very low importance (<10%)	20
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)	4	5 – very important (>80%) <b>4 – important (50-80%)</b> 3 – average importance (30-50%) 2 – low importance (10-30%) 1 – very low importance (<10%)	16
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	3	5 – yes, very high priority 4 – yes, high priority <b>3 – yes, medium priority</b> 2 – yes, low priority 1 – no, not a priority	9
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites etc.)	2	5 – yes, very high priority 4 – yes, high priority <b>3 – yes, medium priority</b> 2 – yes, low priority 1 – no, not a priority	6
7	Biodiversity value of the site	3	5 – extremely high 4 – high <b>3 – average</b> 2 – low 1 – very low	9
8	Cultural and public health value of the site	2	5 – extremely high <b>4 – high</b> 3 – average 2 – low 1 – very low	8
9	Extent of involvement of communities in local management	2	<b>5 – extremely high</b> 4 – high 3 – average 2 – low 1 – very low	10

### Appendix 3.3: Makave District, Vava'u

	Name of the criteria	Weighting (1 – 4)	Rating	Score
1	Size of affected area (as percentage of total national land area)	2	<b>1 – less than 1%</b> 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	2
2	Affected population (as percentage of national population)	3	<b>1 – less than 1%</b> 2 – 1 to 5% 3 – 5 to 10% 4 – 10 to 50% 5 – over 50%	3
3	Extent to which the natural watershed or		<b>5 – very important (&gt;80%)</b>	

	aquifer and any associated receiving coastal and marine waters support the livelihood of local communities (e.g. subsistence or commercial farming, forestry, mining, tourism, fisheries)	4	4 – important (50-80%) 3 – average importance (30-50%) 2 – low importance (10-30%) 1 – very low importance (<10%)	20
4	Extent to which the natural watershed or aquifer and any associated receiving coastal and marine waters support the national development (e.g. commercial farming, forestry, mining, tourism, fisheries)	4	5 – very important (>80%) <b>4 – important (50-80%)</b> 3 – average importance (30-50%) 2 – low importance (10-30%) 1 – very low importance (<10%)	16
5	Extent to which the site is a recognized government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	3	5 – yes, very high priority <b>4 – yes, high priority</b> 3 – yes, medium priority 2 – yes, low priority 1 – no, not a priority	12
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites etc.)	2	5 – yes, very high priority <b>4 – yes, high priority</b> 3 – yes, medium priority 2 – yes, low priority 1 – no, not a priority	8
7	Biodiversity value of the site	3	<b>5 – extremely high</b> 4 – high 3 – average 2 – low 1 – very low	15
8	Cultural and public health value of the site	2	<b>5 – extremely high</b> 4 – high 3 – average 2 – low 1 – very low	10
9	Extent of involvement of communities in local management	2	5 – extremely high <b>4 – high</b> 3 – average 2 – low 1 – very low	8

## 5.5 Aggregated Scores for Sensitive Areas

### Appendix 4: Aggregated Scores for Sensitive Areas

	Criteria	Sensitive	1 (Makave District)	2 (Hihifo District)	3 (Foa District)
1	Size of area at risk		2	2	2
2	Population at risk		3	3	3
3	Extent to which the natural watershed or aquifer and any associated coastal and marine waters support the livelihood of local communities (for instance, in the case of tourism, fisheries, etc.)		20	20	20
4	Extent to which the natural watershed or aquifer and any associated coastal and marine waters support the national development (for instance, in the case of tourism, fisheries,		16	16	16

	etc.)			
5	Extent to which the site is a government priority (refer to National Sustainable Development Strategy, or other strategic action plans e.g. NEAPs)	15	12	9
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, UNESCO world heritage sites etc.)	8	10	6
7	Biodiversity value of the site	15	12	9
8	Cultural value of the site	10	10	8
9	Extent of involvement of communities in local management	8	10	10
	TOTAL SCORE (actual score with multiplications for weighting)	97	93	82
	NORMALISED SCORE (i.e. as a percentage of a possible top score of 125)	78	76	66



## **HOT SPOT AND SENSITIVE AREAS FOR THE KINGDOM OF TONGA.**

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