

**Federated Sates of Micronesia**

**(FSM)**

**Hot Spot Analysis**

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## Federated States of Micronesia (FSM) Hot Spot Analysis

### Introduction

Hot Spot Analysis on FSM was carried out in consultation with a National Water Committee. An issues analysis identified three major areas of concern in FSM:

*Water supply and sanitation in rural areas.* Requiring a project based around community education and infrastructure, particularly in sanitation. Links in with surface water management and water quality into marine environment.

*Deforestation.* Erosion of hillslopes and sedimentation of river and coastal areas; loss of biodiversity; flooding problems. Requires a project that tries to work with landowners to reduce sediment generation in agricultural areas and promotes biodiversity across the landscape. This would have a large community focus. This could also have a focus on island vulnerability – protection against typhoon damage.

*Water demand management and supplementing current supplies.* The diagnostic report details the Gitam dam in Yap state that can't meet demand. This could be looked at using IWRM approaches that look at supplementing supply (i.e. more water, possibly from groundwater) in conjunction with demand management (i.e. leakage control, consumption patterns, water pricing, community education). Using the joint approach (a classic IWRM methodology) the problem may become solvable.

These three issues were then worked through a hotspot analysis as described in this document

1. **Title: Integration of land management with surface water and ground water management**

**A. Location: Pohnpei (FSM)**

**B. Surface area: ??? sq.km**

**C. Context of the site:**

**D. Main human activities related to the site:**

- Potable water extraction from groundwater
- Household sanitation disposal
- Livestock waste disposal
- Crop growing
- Cemetery

**E. Natural conditions/phenomenon related to the site:**

- Some of the aquifer contains high iron
- High biodiversity values in rainforest (catchment area)
- Closely linked land and lagoon/marine ecosystem

**F. Nature of threats and extent of threats (human and natural):**

- Human health hazard (sickness and death through poor sanitation)
- Possibility of salt intrusion on low areas
- Loss of rainforest in catchment area (high biodiversity)
- Land and water quality degradation impacts on lagoon and marine system

**G. If heavy incidence of pollution, list the type of source (point, non point, diffuse) and pre-identify the exact source(s):**

Diffuse pollution dominates, mainly through sanitation disposal in shallow pits (latrines) and livestock waste.

High measured turbidity in surface waters is linked to deforestation for kava production in the catchment.

Value of the site:	Local	National	Regional/global
Environmental significance	xx	xx	x
Socio-economic significance	xxx	xx	

List any data available in report form:

1. US EPA Sanitary Report of PUC existing water system
2. FSM Biodiversity report
3. FSM report ADB project

Full references needed

**TABLE 1:**

#	Name of the criteria	Weigh(1 – 4)	Rating
1	Size of affected area	1	1- less than 10sqkm 2- 10 to 100 sqkm 3- 100 to 1,000 sqkm 4- <b>1,000 to 10,000 sqkm</b>

			5- over 10,000 sqkm
2	Affected population	3	1- less than 1,000 2- 1,000 to 10,000 <b>3- 10,000 to 100,000</b> 4- 100,000 to 500,000 5- over 500,000
3	Extent to which the natural watershed and any associated coastal and marine resources support the livelihood of local communities (for instance, in the case of tourism, fisheries, etc)	4	5- <b>very important (&gt;80%)</b> 4- important (50-80%) 3- average importance (30-50%) 2- low importance (10-30%) 1- very low importance (<10%)
4	Extent to which the natural watershed, and any associated coastal and marine resources support the national development (for instance, in the case of tourism, fisheries, etc)	2	5- <b>very important (&gt;80%)</b> 4- important (50-80%) 3- average importance (30-50%) 2- low importance (10-30%) 1- very low importance (<10%)
5	Extent to which the site is a government priority (refer to NEAP or other strategic environmental action programme)	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
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, 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
7	Degree of Degradation at the site (e.g. type of degradation)	3	<b>5 – extremely high</b> 4 – high 3 – average 2 – low

			1 – very low
8	Extent of degradation on watershed and any associated coastal and marine resources and systems	2	5 – <b>extremely high</b> 4 – high 3 – average 2 – low 1 – very low

2. **Title: Catchment management and protection in Chuuk state**

**H. Location: Chuuk (FSM)**

**I. Surface area: ??? sq.km**

**J. Context of the site:**

**K. Main human activities related to the site:**

- Potable water extraction from groundwater
- Household sanitation disposal
- Livestock waste disposal
- Crop growing
- Cemetery

**L. Natural conditions/phenomenon related to the site:**

- High biodiversity values in rainforest (catchment area)
- Closely linked land and lagoon/marine ecosystem

**M. Nature of threats and extent of threats (human and natural):**

- Human health hazard (sickness and death through poor sanitation)
- Loss of rainforest in catchment area (high biodiversity)
- Land and water quality degradation impacts on lagoon and marine system

**N. If heavy incidence of pollution, list the type of source (point, non point, diffuse) and pre-identify the exact source(s):**

Diffuse pollution dominates, mainly through deforestation and sediment movement from land through the surface water to the lagoon. High measured turbidity have been measured in surface waters.

Value of the site:	Local	National	Regional/global
Environmental significance	xx	x	
Socio-economic significance	xxx	x	

List any data available in report form:

1. US EPA Sanitary Report of PUC existing water system
2. FSM Biodiversity report
3. FSM report ADB project



Full references needed

**TABLE 2: Chuuk State (catchment management)**

#	Name of the criteria	Weigh(1 – 4)	Rating
1	Size of affected area	1	1- less than 10sqkm 2- 10 to 100 sqkm <b>3- 100 to 1,000 sqkm</b> 4- 1,000 to 10,000 sqkm 5- over 10,000 sqkm
2	Affected population	3	1- less than 1,000 <b>2- 1,000 to 10,000</b> 3- 10,000 to 100,000 4- 100,000 to 500,000 5- over 500,000
3	Extent to which the natural watershed and any associated coastal and marine resources support the livelihood of local communities (for instance, in the case of tourism, fisheries, etc)	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%)
4	Extent to which the natural watershed, and any associated coastal and marine resources support the national development (for instance, in the case of tourism, fisheries, etc)	2	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%)
5	Extent to which the site is a government priority (refer to NEAP or other strategic environmental action programme)	3	5 – yes, very high priority 4- yes, high priority 3- yes, medium priority <b>2 – yes, low priority</b> 1 – no, not a priority
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, 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
7	Degree of Degradation at the site (e.g. type of degradation)	3	5 – extremely high <b>4 – high</b> 3 – average 2 – low 1 – very low
8	Extent of degradation on watershed and any associated coastal and marine resources and systems	2	5 – extremely high 4 – high <b>3 – average</b> 2 – low 1 – very low

3. **Title: Water demand management and supplementing existing supplies**

**O. Location: Yap (FSM)**

**P. Surface area: ?? sq.km**

**Q. Context of the site:**

**R. Main human activities related to the site:**

- a. Potable water extraction from reservoir and surface waters
- b. Household sanitation disposal into groundwater and surface waters
- c. Livestock waste disposal
- d. Crop growing

**S. Natural conditions/phenomenon related to the site:**

- a. Some biodiversity values in rainforest (catchment area for reservoir)

**T. Nature of threats and extent of threats (human and natural):**

- a. Insufficient water for potable water supply
- b. Need for other water supply schemes – possible loss of ecosystems.

**U. If heavy incidence of pollution, list the type of source (point, non point, diffuse) and pre-identify the exact source(s):**

Pollution is not the major issue (water quantity not quality).

Value of the site:	Local	National	Regional/global
Environmental significance	x	x	
Socio-economic significance	x	x	

List any data available in report form:

1. US EPA Sanitary Report of PUC existing water system
2. FSM Biodiversity report
3. FSM report ADB project

**Full references**

**TABLE 3: Yap water augmentation**

#	Name of the criteria	Weigh(1 – 4)	Rating
1	Size of affected area	1	1- less than 10sqkm

			<p><b>2- 10 to 100 sqkm</b></p> <p>3- 100 to 1,000 sqkm</p> <p>4- 1,000 to 10,000 sqkm</p> <p>5- over 10,000 sqkm</p>
2	Affected population	3	<p><b>1- less than 1,000</b></p> <p>2- 1,000 to 10,000</p> <p>3- 10,000 to 100,000</p> <p>4- 100,000 to 500,000</p> <p>5- over 500,000</p>
3	Extent to which the natural watershed and any associated coastal and marine resources support the livelihood of local communities (for instance, in the case of tourism, fisheries, etc)	4	<p>5- very important (&gt;80%)</p> <p>4- important (50-80%)</p> <p><b>3- average importance (30-50%)</b></p> <p>2- low importance (10-30%)</p> <p>1- very low importance (&lt;10%)</p>
4	Extent to which the natural watershed, and any associated coastal and marine resources support the national development (for instance, in the case of tourism, fisheries, etc)	2	<p>5- very important (&gt;80%)</p> <p>4- important (50-80%)</p> <p><b>3- average importance (30-50%)</b></p> <p>2- low importance (10-30%)</p> <p>1- very low importance (&lt;10%)</p>
5	Extent to which the site is a government priority (refer to NEAP or other strategic environmental action programme)	3	<p>5 – yes, very high priority</p> <p>4- yes, high priority</p> <p><b>3- yes, medium priority</b></p> <p>2 – yes, low priority</p> <p>1 – no, not a priority</p>
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, etc.).	2	<p>5 – yes, very high priority</p> <p>4- yes, high priority</p> <p>3- yes, medium priority</p> <p><b>2 – yes, low priority</b></p> <p>1 – no, not a priority</p>
7	Degree of Degradation at the site (e.g. type of degradation)	3	<p>5 – extremely high</p> <p>4 – high</p> <p><b>3 – average Y</b></p> <p>2 – low</p> <p>1 – very low</p>
8	Extent of degradation on watershed and any associated coastal and marine resources and systems	2	<p>5 – extremely high</p> <p><b>4 – high Y</b></p> <p>3 – average</p> <p>2 – low</p> <p>1 – very low</p>

**TABLE 4: Pohnpei rainforest in water catchment areas (sensitive area)**

	<i>Name of the criteria</i>	<i>Weigh(1 – 4)</i>	<i>Rating</i>
1	Size of area at risk	2	less than 10sqkm 10 to 100 sqkm 100 to 1,000 sqkm <b>1,000 to 10,000 sqkm</b> over 10,000 sqkm
2	Population at risk (please define the population)	3	1- less than 1,000 2 - 1,000 to 10,000 <b>3- 10,000 to 100,000</b> 4- 100,000 to 500,000 5- over 500,000
3	Extent to which the natural watershed and any associated coastal and marine resources support the livelihood of local communities (for instance, in the case of tourism, fisheries, etc)	4	<b>5- very important (&gt;80%)</b> 4- important (50-80%) 3- average importance (30-50%) 2- low importance (10-30%) 1- very low importance (<10%)
4	Extent to which the natural watershed, and any associated coastal and marine resources support the national development (for instance, in the case of tourism, fisheries, etc)	4	<b>5- very important (&gt;80%)</b> 4- important (50-80%) 3- average importance (30-50%) 2- low importance (10-30%) 1- very low importance (<10%)
5	Extent to which the site is a government priority (refer to NEAP or other strategic environmental action programme)	3	<b>5 – yes, very high priority</b> 4- yes, high priority 3- yes, medium priority 2 – yes, low priority 1 – no, not a priority
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, 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
7	Biodiversity value of the site	3	<b>5 – extremely high</b> 4 – high 3 – average 2 – low 1 – very low
8	Cultural value of the site	2	<b>5 – extremely high</b>

			4 – high 3 – average 2 – low 1 – very low
9	Extent of involvement of communities in local management	2	<b>5 – extremely high</b> 4 – high 3 – average 2 – low 1 – very low

#### 4. Major Issues and Concerns

Major Concerns	Issues
<b>I. Freshwater shortage</b>	1. Reduction in stream flow
	<b>2. Pollution of existing supplies</b>
	3. Lowering of water table
<b>II. Pollution</b>	<b>4. Microbiological</b>
	5. Eutrophication (harmful algal blooms)
	6. Chemical
	7. Suspended solids
	8. Solid wastes
	9. Thermal
	10. Radionuclide
	11. Spills
<b>III. Habitat and community modification</b>	<b>12. Loss of ecosystems or ecotones</b> <b>Specify ecosystem type:</b> Rainforest
	13. Modification of ecosystems or ecotones, including community structure and/or species composition
<b>IV. Unsustainable exploitation of living resources.</b>	14. Over-exploitation
	<b>15. Impact on biological and genetic diversity</b>
<b>V. Global change</b>	<b>16. Changes in hydrological cycle</b>
	<b>17. Sea level change</b>
	18. Increased UV-b radiation as a result of ozone depletion
	19. Changes in ocean CO <sub>2</sub> source/sink function
<b>VI. Other</b>	20.
	21.
	22.

## 5. Aggregated Scoring Table for Hot Spot Areas

1= Pohnpei; 2= Chuuk; 3= Yap

	<i>criteria</i>	<i>hot-spot</i>	<b>1</b>	<b>2</b>	<b>3</b>
1	Size of affected area		4	3	2
2	Affected population		9	6	3
3	Extent to which the natural watershed and any associated coastal and marine resources support the livelihood of local communities (for instance, in the case of tourism, fisheries, etc)		20	16	12
4	Extent to which the natural watershed, and any associated coastal and marine resources support the national development (for instance, in the case of tourism, fisheries, etc)		10	8	6
5	Extent to which the site is a government priority (refer to NEAP or other strategic environmental action programme)		12	6	9
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, etc.).		8	6	4
7	Degree of Degradation at the site (e.g. type of degradation))		15	12	9
8	Extent of degradation on watershed and any associated coastal and marine resources and systems		10	4	6
	<b>TOTAL SCORE</b> (actual score with multiplications for weighting)		98	61	51
	<b>NORMALISED SCORE</b> (i.e. as a percentage of a possible top score of 100)				

Key issues relevant to the hot-spots:	<p>1- Poor sanitation management leading to contamination of surface and groundwaters and impacting on lagoon/marine ecosystem.</p> <p>2-Lack of protection in catchment areas leading to pollution issues.</p> <p>3-Insufficient water supply for population</p>
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## 6. Aggregated Scoring Table for Sensitive Areas

	<i>Criteria</i>	<i>sensitive area</i>	<b>1</b>	<b>2</b>	<b>3</b>
1	Size of area at risk		8		
2	Population at risk (please define the population)		9		
3	Extent to which the natural watershed and any associated coastal and marine resources support the livelihood of local communities (for instance, in the case of tourism, fisheries, etc)		20		
4	Extent to which the natural watershed, and any associated coastal and marine resources support the national development (for instance, in the case of tourism, fisheries, etc)		20		
5	Extent to which the site is a government priority (refer to NEAP or other strategic environmental action programme)		15		
6	Extent to which the site is of regional and/or global significance and priority (see WWF ecoregions, IUCN categories, etc.).		8		
7	Biodiversity value of the site		15		
8	Cultural value of the site		10		
9	Extent of involvement of communities in local management		10		
	TOTAL SCORE (actual score with multiplications for weighting)		115		
	NORMALISED SCORE (i.e. as a percentage of a possible top score of 125)				

	Key issues relevant to the sensitive area	1- Loss of rainforest ecosystem and changes in hydrological cycle following deforestation (particularly leading to sedimentation in lagoon).
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## 7. Summary Table of Prioritized Hot-Spots and Sensitive Areas

Country: FSM

Total population: 34,000

Major Integrated Water Resource and Wastewater Management Issues:

List Hot-Spots and Sensitive Areas from 1-3 (highest scores first)

Selected Hot-Spots			
	Title	Score	Priority Issue
<b>Hot-Spot 1</b>	Integration of land management with surface water and ground water management (Pohnpei)	98	Poor sanitation management leading to contamination of surface and groundwaters and impacting on lagoon/marine ecosystem.
<b>Hot-Spot 2</b>	Catchment management on Chuuk	61	Lack of protection in catchment areas leading to pollution issues.
<b>Hot-Spot 3</b>	Water augmentation on Yaap	51	Insufficient water supply for population
Selected Sensitive Areas			
	Title	Score	Priority Issue
<b>Sensitive Area 1</b>	Deforestation on Pohnpei	115	Loss of rainforest ecosystem and changes in hydrological cycle following deforestation (particularly leading to sedimentation in lagoon).

Following this hotspot analysis the **National Water Committee** decided to develop a demonstration project based around Hot Spot 1 and Sensitive Area 1. Taking a “Ridgetops to Sea” watershed management approach to controlling surface and groundwater pollution on Pohnpei.