



# Shell Beach Protected Area General Management Plan Appendices

2015 – 2019

Volume 2, FINAL – DECEMBER 15, 2014





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Cover photo credits: Suresh V. Kandaswamy

Author: Suresh V. Kandaswamy

Contributors: Anouska A Kinahan  
Asma Sharief  
Chuvika Harilal  
Cornelius von Furstenberg  
Patricia Fredericks  
Persia Martindale  
Rae Smith  
Schanace Odwin  
Tana Yussuff

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Organization of Plan: The management plan is presented in Volume 1. The management plan is supported by Appendices, presented in Volume 2.

# Appendix 1

## Logical Framework





<b>Shell Beach Protected Area Management Plan – Logical Framework</b>				
<b>Structure</b>	<b>Intervention</b>	<b>Objectively Verifiable Indicators of Achievement</b>	<b>Source and Means of Verification</b>	<b>Assumption</b>
<b>Programme 1</b>	<b>Operations and Adaptive Management</b>			
<b>Goal</b>	1. Ensure the effective and adaptive management of SBPA, its biodiversity and its resources	<p>10% annual increase in overall METT scores (using World Bank/WWF Management Effectiveness Tracking Tool (METT) 2007)</p> <p>A positive population trend in key game and threatened species from baseline survey, as per species specific monitoring plan</p> <p>A reduction in % and number of high and threats noted as “not applicable” (pressures) in METT</p>	<p>METT Assessment</p> <p>Conservation target and pressure monitoring (CTPM) annual reports</p> <p>METT Assessment</p>	<p>There continues to remain political and community support for PA management</p> <p>Pressures are tractable</p>
<b>Objectives / Outcomes</b>	1.1 To manage SBPA using appropriate and effective management structures and systems	An increase of 25% in METT planning process, outputs and outcomes between baseline Year 1 and Year 5	METT Assessment	Required budget is made available
	1.2 To promote management relevant research and its use for evidence-based decision making	<p>100% of urgent management research needs from research priority list developed in Year 1 carried out or ongoing by Year 5</p> <p>50% of all relevant recommendations / key findings used for management purposes</p>	<p>Research database</p> <p>Research Reports; Annual operational plans and reports</p>	Knowledge and best practice is feasible and appropriate for SBPA context

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<b>Structure</b>	<b>Intervention</b>	<b>Objectively Verifiable Indicators of Achievement</b>	<b>Source and Means of Verification</b>	<b>Assumption</b>
	1.3 To conserve and monitor species at risk	Populations maintained or increasing by end of Year 5	Conservation target and pressure monitoring (CTPM) annual reports	A species specific monitoring plan is developed and approved
	1.4 To establish an effective system for law enforcement and monitoring of illegal activities	An annual reduction against baseline in the number, type and extent of illegal activities detected inside SBPA	Patrol monitoring reports	There remains support for conservation and collaboration by relevant authorities  Ability to hire and retain adequate staff for patrol activities
	1.5 To establish a system for effective communication and information exchange between PAC and stakeholders	Reductions in delays regarding information shared and increase in timely communications	Protocol agreements, communications and information exchange logs	Stakeholders are willing to collaborate and share information
<b>Outputs / Deliverables</b>	1.1.1 Appropriate financial and administrative systems for managing PA in place	1 Standard Operating Procedures (SOP) by end of Year 1 1 SBPA Health and Safety Plan (H&S); 1 Environmental Management Plan by end of Year 1 5 Annual operation plans, budgets and reports submitted; 1 revenue generation plan for PAC by end of Year 2	SBPA files SOP H&S Plan Environment Management Plan Annual operating plans Annual reports Revenue generation plan	Predicted funds are available for activities
	1.1.2 Site level human resource (HR) needs met	10% of staff posts filled by end of Year 1, 100% by end of Year 3	Human resource list	Suitably qualified persons apply for positions
	1.1.3 PA management infrastructure and equipment needs met	40% of infrastructure and equipment needs met by end of Year 3; 60% by end of Year 5	Fixed assets register Annual reports	Inflation rates remain stable

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	1.1.4 Monitoring, evaluation and feedback systems developed and implemented	3 databases and M&E SOP developed by end of Year 2	PAC reports, databases	Database is available and user friendly
	1.2.1 Research priorities identified and actively promoted nationally and internationally	100% of urgent management research needs from research priority list developed in Year 1 carried out or ongoing by Year 5  10 institutions, local and international, receiving research priority list annually	Research database Research reports with recommendations  SBPA records/email/correspondence Acknowledgement receipt	National and international research institutions are willing to collaborate
	1.2.2 Research database and system established to improve feedback to management and access to information for stakeholders	1 SBPA research Standard Operating Procedures (SOP) developed by end of Year 1  1 Database functional by end of Year 1  5 Annual research reports	Research SoP  Database  Site and research records	
	1.2.3 Partnerships with local and international research, conservation, and educational institutions formalized	4 institutions with formal agreements for carrying out research in SBPA by Year 3; additional 2 by Year 5	SBPA files	
	1.2.4 Feasibility and model for international recognition of SBPA by an international body understood and appropriate action taken (e.g UNESCO designation as a World Heritage Site, Biosphere reserve)	Recommendation report submitted to PAC by end of Year 4  Recommended action initiated within 1 months of report	Feasibility Report  SBPA files	International listing is a feasible and optimal way forward for SBPA



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	1.3.1 Plans for conservation and monitoring of species at risk developed and implemented	<p>1 marine turtle conservation and monitoring plan available by end of Year 1 and is used for monitoring</p> <p>1 conservation target and pressure monitoring plan (CTPM) for other species at risk available by end of Year 3 and is used for monitoring</p>	<p>SBPA files Marine turtle monitoring reports</p> <p>SBPA files CTPM reports</p>	Adequate data is available to develop the plans
	1.4.1 Law enforcement and monitoring plan developed and implemented	<p>1 Law enforcement and monitoring plan available by end of Year 1</p> <p>100% of patrol hours completed and priority areas covered as per law enforcement and monitoring plan</p> <p>100% of infrastructure and equipment needed for law enforcement met by Year 5</p> <p>100% of rangers hired as per operational plan</p>	<p>SBPA files</p> <p>Patrol reports</p> <p>Purchase and SBPA asset records</p> <p>HR files</p>	Law enforcement agencies are willing to collaborate and there remains support for the SBPA and the PA Act
	1.4.2 Effective implementation of regulations in partnership with other law enforcement agencies and institutions	Increase in annual % of successful prosecutions against illegal activities	Court records, agency reports	

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	1.4.3 Law enforcement and monitoring feedback system established	1 database and monitoring system established by end of Year 1  Monthly reports being provided starting middle of Year 1	Database  Monthly reports	
	1.5.1 Internal communications protocol developed and accepted for use among PAC management, and SBPA staff at headquarters and in the field  1.5.2 External communications protocol developed and accepted for use among PAC, agencies, and communities in order to facilitate efficiency, collaboration, and information exchange  1.5.3 PAC and agencies implementing communication protocol	Communication protocol approved by PAC and understood and implemented by all levels of PAC and SBPA organizational structure  Communication protocol signed by all key natural resource and law enforcement agencies and communities  Increase in annual % of information requests fulfilled versus that requested  Annual improvement in timely delivery of documents for review to communities (minimum 30 days prior to review deadline and meeting dates)	SBPA files  SBPA files  SBPA communications tracking database and files  SBPA communications tracking database, correspondence, and files	PAC management and staff are willing follow protocol  Agencies are willing to share information and in a timely manner  Information is available or authorized for sharing  Documents and reports may not be available to send 30 days in advance
<b>Programme 2</b>	<b>Land Use and Sustainable Natural Resource Management</b>			
<b>Goal</b>	2. Sustainably manage land and natural resource use within the SBPA and in adjacent lands	Resource uses are within recommended sustainability levels as per the Sustainable Natural	Monitoring reports, CTPM reports	Sustainable levels of resource use can be determined



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	2.1.4 Community land and resource use plans (CLRUP) developed and effectively implemented by communities with support of PAC	At least 4 stakeholder communities have a CLRUPs compatible with SBPA goals by Year 5  Annual reduction in illegal activities within stakeholder community lands	Community patrol records  Conservation target and pressure monitoring (CTPM) annual reports	develop and implement CLRUPs  Communities are supportive of SBPA, CLRUP, and village rules Communities are cooperative and provide information  Impacts of sustainable use of resource are evident within the timeframe
<b>Programme 3</b>	<b>Benefits Sharing and Livelihood Development</b>			
<b>Goal</b>	3. Improve benefits to communities through livelihood development and equitable benefit sharing mechanisms	Increase in no. of beneficiaries - women, men, youth, households, and villages - benefiting economically from SBPA from baseline to Year 5	Social survey Community benefits Database  Employment, financial records from groups and individuals; Surveys	Communities are willing to not only engage in opportunities identified but also willing to identify and share those opportunities  Communities maintain records
<b>Objectives/ Outcomes</b>	3.1 To increase conservation compatible sustainable livelihood and income generating opportunities for SBPA adjacent communities	Increase in number of livelihood opportunities that are sustainable from baseline to Year 5  Annual Increase in income from strategies from baseline to Year 3, and end of year 5	Livelihood project reports; employment and financial records  Financial records from groups and individual; survey	Communities do not make use of opportunities or do not have the skills to manage initiatives supported



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	3.2 To promote equitable sharing of benefits from SBPA among all communities adjacent to SBPA and their members	<p>The no. of villages participating in or receiving benefits from PA increased by 30% from baseline to Year 3, and by 70% by Year 5</p> <p>No. of women and youth, from each community, participating and receiving benefits from SBPA related income generation or livelihood opportunities increased by 20% by Year 3 and 40% by Year 5</p>	<p>Survey Databases</p> <p>Survey Databases</p>	Villages and community members take advantage of SBPA related opportunities and initiatives
<b>Outputs/ Deliverables</b>	3.1.1 Local communities engaged in temporary or permanent employment with SBPA	60% of SBPA staff employed from local communities by Year 5	Staff lists	Communities are using lesson learnt and implementing suggested systems for effective livelihood development
	3.1.2 Relevant livelihood and income generating opportunities are identified and initiatives supported	<p>Increase in number of livelihood projects from baseline, to Year 3, and end of Year 5</p> <p>100% of potential projects undergo assessment prior to project approval and implementation</p>	<p>SBPA files; Site and community records</p> <p>Feasibility studies</p>	
	3.1.3 Livelihood projects feedback systems developed and lessons learnt disseminated	100% of livelihood initiatives hold annual learning and feedback meetings, and prepare project implementation reports	Meeting minutes/ Lessons learnt; Annual reports; project implementation reports	<p>Communities willing to share experiences with neighbouring villages</p> <p>Groups and individuals maintain records</p>
	3.2.1 Protocol for respecting and addressing benefits sharing as a result	Benefit sharing and Intellectual Property Rights Protocol developed	Protocol document PAC record of agreement	Communities cannot agree on content of the protocols

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	<p>of Amerindian intellectual property rights (IPR) and traditional knowledge sharing developed</p> <p>3.2.2 Opportunities for inclusion of all adjacent villages in SBPA related opportunities and initiatives promoted</p> <p>3.2.3 Opportunities for inclusion of all community members as beneficiaries in SBPA related opportunities and initiatives promoted</p>	<p>and agreed upon by all communities by Year 3</p> <p>100% of villages adjacent to SBPA are aware of and provided the opportunity to participate in SBPA related opportunities and initiatives. 30% of villages participating in opportunities and initiatives by Year 3, and 70% by Year 5</p> <p>A 70% increase in the number of households, women and youth by Year 5, who are aware of and provided the opportunity to participate in SBPA related opportunities and initiatives by Year 5</p>	<p>Communication materials SBPA files meeting records Site and community records</p> <p>Communication materials SBPA files Meeting records Site and community records</p>	<p>Villages and community members receive communications and are willing to participate.</p>
<b>Programme 4</b>	<b>Education, Awareness, and Outreach</b>			
<b>Goal</b>	<p>4. Promote and raise awareness so as to ensure a shared vision and understanding of the value of SBPA and its resources by key stakeholders for its long-term protection and sustainable development</p>	<p>Increase in support for the SBPA from baseline to Year 5</p> <p>Increase in PA funds available from baseline to Year 5</p> <p>Increase in number of visitors to the PA</p>	<p>Surveys</p> <p>Donor funding agreements</p> <p>SBPA visitor registration records</p>	<p>Stakeholders are interested and have the time to participate in surveys</p>
<b>Objectives/ Outcome</b>	<p>4.1 To raise local and regional awareness of SBPA, its values and benefits in order to increase support</p>	<p>An increase in local support for SBPA and its programmes among SBPA associated communities and</p>	<p>Survey of communities and key regional stakeholders</p>	<p>Communities are willing to participate in surveys</p>

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	for its conservation and sustainable development goals	regional stakeholders between baseline and Year 5		All relevant stakeholders are identified
	4.2 To increase national and international awareness and support for conserving SBPA’s biodiversity and ecosystems	<p>Funds received from third party sources for PA management and income generated for PAC and communities through tourism increased by 25% between baseline and Year 3, and 50% by Year 5</p> <p>An annual increase in the number of positive national and international media products on SBPA</p> <p>An annual increase in the number of social media interactions (e.g. Facebook likes, and website hits)</p>	<p>PAC, community survey</p> <p>SBPA files; Media archives</p> <p>Facebook, website</p>	An increase in tourism will result in an increase in income to stakeholders
<b>Outputs/ Deliverables</b>	4.1.1 Education, awareness, and outreach for adults implemented	<p>Increase in KAP scores between baseline and Year 5</p> <p>1 community version of management plan and FAQ booklet by beginning of Year 1; 2 SBPA related livelihood &amp; conservation booklets by end of Year 1; 1 sustainable resource use booklet by end of Year 4</p> <p>Video on SBPA Management Planning process prepared for</p>	<p>KAP scores</p> <p>SBPA files; publications</p> <p>Digital media; PAC files</p>	Adult KAP can be changed

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	4.1.2 Education, awareness and outreach for natural resource sector and law enforcement agencies implemented	community and outreach purposes by end of Year 1  Increase in knowledge and awareness questionnaire scores between pre and post workshops  1 booklet on management plan by mid-Year 1; 1 booklet on law enforcement end of Year 1	SBPA workshop questionnaires  SBPA files; publications	Natural resource sector and law enforcement agencies willing to participate
	4.1.3 Education, awareness, and outreach for local youth implemented	1 SBPA related booklet and 2 thematic posters developed by end of Year 1; 1 school book by end of Year 3  35% schools in SBPA adjacent villages have environmental/ wildlife clubs by Year 3 and 70% by Year 5  2 nature-based activity per year relating to SBPA and conservation being carried out by each school's environmental/ wildlife club  An increase in school children's knowledge of SBPA and its resource from baseline to end of Year 5  Teaching of protected areas and conservation related curriculum at	SBPA files; publications  School records; survey  School/ club records; survey  Pre-and post workshop survey; KAP scores  National primary and secondary school curriculum	Schools and teachers are willing to participate in education, awareness, and outreach activities  Ministry of Education and the National Centre for Educational Resource Development (NCERD) are willing to support and



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		the primary and secondary school level by Year 5		consider curriculum changes
	4.2.1 SBPA promoted using various media (e.g. Facebook, website, signage, radio, TV, etc.)	1 Facebook page and website developed by end of Year 1	Internet	Ability to keep Facebook and website updated.
		5 billboards and signage installed at strategic locations in urban areas by Year 3	SBPA files; billboards and signage	
		1 documentary produced by Year 4	Digital media available	
	4.2.2 Public Relations materials developed targeting donor and tourism audiences	1 positive article per year about SBPA in national and/or international newspapers/radio /TV	SBPA files/Media archives	Tourism is feasible, tourism infrastructure is available, and tourism packages are identified
		1 summary booklet of infrastructure and management programme investment needs for SBPA developed by end of Year 1	SBPA files; document	
		1 preliminary information booklet by Year 2; 1 detailed information booklet and 1 guidebook for tourists and/or tour operators developed by Year 5	SBPA files; documents	
	4.2.3 SBPA lessons learned and management outputs shared	2 scientific publications, 3 presentations, 2 lessons learned documents produced	Publications, conference records, documents available	

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<b>Programme 5</b>	<b>Capacity Building</b>			
<b>Goal</b>	5. Increase capacity of staff and communities to achieve SBPA vision and goals	100% of outputs achieved by Staff by Year 5  100% of community relevant output achieved by Year 5  An increase in METT scores between baseline and 5 years	M&E reports   METT Assessment	Staff are willing to learn and adopt new information. Communities have the time and are willing to participate
<b>Objectives / Outcomes</b>	5.1 To increase staff capacity to support SBPA management	100% of staff have a score above 75% for skills capacity by Year 5  An increase in staff performance scores between baseline, mid-term review and Year 5	Training and capacity assessments  Performance reviews	Capacity gaps are adequately identified
	5.2 To increase community capacity to effectively participate in and benefit from SBPA and its goals	An increase in the number of people generating income and other benefits from livelihood opportunities and initiatives from baseline to Year 5	Community benefits database  Surveys	Community members have access to opportunities and are involved in the initiatives
<b>Outputs / Deliverables</b>	5.1.1 Staff training and capacity needs assessed and plan developed	100% of SBPA staff have completed their training and capacity needs assessment	Needs assessment forms	Staff are willing to be honest with their self-assessments and capacity needs.
	5.1.2 Staff training and capacity needs plan implemented	1 plan developed for each PA staff at beginning of employment, Year 3, and Year 5	Training plan	PAC has the resources to provide training

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		100% of urgent priority capacity needs met for all staff within 1 year of employment, and high priority needs within 2 years of employment	Capacity assessments scores	Staff are willing to take the initiative to increase their capacity
	5.2.1 Build capacity for sustainable livelihood and income generation plan development, implementation, and management	<p>Assessment of training and capacity building needs completed for each community in relation to planning and implementation of sustainable livelihoods and income generation projects by end of Year 2 and Year 4</p> <p>Increase in knowledge and ability to develop proposals</p> <p>Number of projects successfully implemented and managed from baseline to Year 5</p> <p>An increase in the number of villages and community members engaging in sustainable livelihood development activities from baseline to Year 5</p>	<p>Capacity needs assessment report</p> <p>Community benefits database</p> <p>Community surveys Annual project reports</p> <p>Community surveys Annual project reports</p>	<p>Communities are honest and willing to share their capacity deficiencies and needs.</p> <p>Community members have the time and are willing to participate in capacity building workshops and use the knowledge gained</p>
	5.2.2 Build capacity for community participation in SBPA related management activities	Assessment of training needs completed for each community in relation to community participation in monitoring at SBPA by end of Year 2	Capacity needs assessment report	

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	5.2.3 Build capacity of communities in sustainable land and resource use	<p>Increase in number of persons supporting SBPA monitoring activities and supporting researchers in their work from baseline to Year 5</p> <p>Assessment of training needs completed for each community in relation to sustainable land and resource use</p> <p>Increase in number of villages engaged in community-based monitoring, reporting, and verification (CMRV) from baseline to Year 5</p> <p>Increase in number of individuals who have an understanding of sustainable land and resource uses from baseline to Year 5</p>	<p>Community benefits database</p> <p>Capacity needs assessment report</p> <p>Community benefit database</p> <p>Pre and post workshop questionnaire</p>	

# Appendix 2

## Monitoring and Evaluation Framework

2a. Goals and Objectives

2b. Outputs/Deliverable



Note: No baseline data for SBPA is currently available.

<b>Appendix 2a</b>					
<b>SBPA Management Impact: Achieving Management Plan Goals and Objectives</b>					
<b>Monitoring and Evaluation Framework</b>					
<b>Intervention</b>	<b>Indicator</b>	<b>Targets</b>	<b>Method of data collection</b>	<b>Frequency</b>	<b>Responsibility</b>
<b>Goals</b>					
<b>1. Ensure the effective and adaptive management of SBPA, its biodiversity and its resources</b>	METT Score (using World Bank/WWF Management Effectiveness Tracking Tool (METT) 2007)	10% increase in Overall METT score per annum	METT Assessment	Annually	PAC, SBPA-HQ-Staff, SBPA-Field-Staff
	Population trends of key species	Populations maintained or increasing as per Conservation target and pressure monitoring (CTPM) plan	as per CTPM plan	as per CTPM plan	PAC; SBPA-HQ-Staff, SBPA partners
	Threat levels as per METT	Annual reduction in the % of high threats occurring and annual % increase in "not applicable" threats in METT	METT Assessment	Annually	PAC, SBPA-HQ-Staff, SBPA-Field-Staff; SBPA partners
<b>2. Sustainably manage land and resource use within the SBPA and in adjacent lands</b>	Use levels	Use levels are equal or less than the defined sustainable use levels as per Sustainable Natural Resource Management (SNRM) plans	CTPM reports	as per CTPM plan	PAC; SBPA-HQ-Staff, SBPA-Field-Staff
<b>3. Improve benefits to communities through livelihood development and equitable</b>	Increase in beneficiaries benefiting economically	Increase in beneficiaries as a result of SBPA activities by 50% from baseline to Year 5	Social Surveys; community benefits database	Baseline, end of 5 years	PAC; SBPA-HQ-Staff, SBPA-Field-Staff; SBPA

## Appendix 2a

### SBPA Management Impact: Achieving Management Plan Goals and Objectives Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
benefit sharing mechanisms					communities
<b>4. Promote and raise awareness so as to ensure a shared vision and understanding of the value of SBPA and its resources by key stakeholders for its long-term protection and sustainable development</b>	Stakeholder awareness	An increase in awareness about the PA from baseline to Year 5	KAP surveys	Baseline, end of 5 years	PAC; SBPA-HQ-Staff, SBPA-Field-Staff
	Stakeholder engagement	Increase in stakeholder engagement, support, and visitorship from baseline to Year 5	SBPA files SBPA visitor registration records	Quarterly/Monthly	PAC; SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
<b>5. Increase capacity of staff and communities to achieve SBPA vision and goals</b>	% of outputs achieved	100% of outputs achieved by Staff by Year 5; 100% of community relevant outputs achieved by Year 5	M&E reports	Year 3 and Year 5	PAC ; SBPA-HQ-Staff
	METT Score	An increase in METT scores between baseline and Year 5	METT Assessment	Annually	PAC, SBPA-HQ-Staff, SBPA communities
<b>Objectives</b>					
<b>1. Ensure the effective and adaptive management of SBPA, its biodiversity and its resources</b>					
1.1 To manage SBPA using appropriate and effective management structures and systems	METT Sub scores	An increase in 25% for planning, processes, outputs and outcomes between Year 1 and Year 5	METT Assessment	Annually	PAC, SBPA-HQ-Staff, SBPA partners
1.2 To promote management	No. of research	100% of urgent research priorities	SBPA database	Ongoing	PAC; SBPA-



## Appendix 2a

### SBPA Management Impact: Achieving Management Plan Goals and Objectives Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
relevant research and its use for evidence-based decision making	conducted from priorities identified	developed in Year 1, carried out, or ongoing by Year 5; Target of 20% of urgent research priorities initiated annually.			HQ-Staff
	% research recommendations; findings adopted; used by management	50% of all relevant recommendations/ key findings used for management purposes	Research Reports, Annual operational plans and reports	Ongoing	PAC
1.3 To conserve and manage species at risk	Population trends of key species	Populations maintained or increasing by end of Year 5	CTPM report	Annually	PAC
1.4 To establish an effective system for law enforcement and monitoring of illegal activities	No., type, and extent of illegal activities inside SBPA	An annual reduction in the no., type and extent of illegal activities detected inside SBPA	Patrol monitoring records	Monthly	PAC
1.5 To establish a system for effective communication and information exchange between PAC and stakeholders	Protocol agreement and no. of information needs and requests met	Reductions in delays regarding information shared and increase in timely communications.	Communications and information exchange logs	Ongoing	PAC
<b>2. Sustainably manage land and natural resource use within the SBPA and in adjacent lands</b>					
2.1 To ensure stakeholders use and manage land and resources in a manner that is compatible with the goals of the SBPA	Stakeholder awareness Illegal activities Pressure	Increased awareness and buy-in for sustainable land and resource use management within SBPA and adjacent lands from baseline to Year 5; and a resulting reduction in illegal activities and pressure on resources by Year 5	KAP score; CTPM reports; community surveys; Monitoring report	Baseline, end of 5 years; as per CTPM plan Law enforcement and monitoring plan	PAC; SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
<b>3. Improve benefits to communities through livelihood development and equitable benefit sharing mechanisms</b>					
3.1 To increase conservation	No. of sustainable	Increase in number of sustainable	Livelihood projects	Baseline, end of	PAC; SBPA-

## Appendix 2a

### SBPA Management Impact: Achieving Management Plan Goals and Objectives Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
compatible sustainable livelihood and income generation opportunities for SBPA adjacent communities	livelihood and income generating projects	livelihood projects from baseline to Year 5	report; lessons learned	5 years	HQ-Staff; SBPA community
	Income generated by livelihoods	Annual increase in income from SBPA related opportunities	Community financial records; survey	Ongoing	SBPA-HQ-Staff; SBPA community
	No. of people employed as a result of SBPA related opportunities	50% increase in number of local people employed as a result of SBPA related opportunities from baseline to Year 5	Community survey and staff lists	Baseline, end of 5 years	PAC; SBPA community
3.2 To promote equitable sharing of benefits from SBPA among all communities adjacent to SBPA and their members	No. of villages participating in or receiving benefits from PA	No. of villages participating in or receiving benefits from PA increased by 30% from baseline to Year 3 and by 70% by Year 5	Community surveys, Database	Baseline, end of 5 years	PAC; SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
	Equitable access to benefits	No. of women and youth participating and receiving benefits increased by 20% by Year 3 and 40% by Year 5	Community surveys, Database	Baseline, end of Year 3 and Year 5	PAC; SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
<b>4. Promote and raise awareness so as to ensure a shared vision and understanding of the value of SBPA and its resources by key stakeholders for its long-term protection and sustainable development</b>					
4.1 To raise local and regional awareness of SBPA, its values and benefits in order to increase support for its conservation and sustainable development goals	Increased support	An increase in local support for SBPA and its programmes increased by 50% from baseline and Year 5.	Surveys	Baseline, end of 5 years	PAC; SBPA-HQ-Staff; SBPA-Field-Staff

## Appendix 2a

### SBPA Management Impact: Achieving Management Plan Goals and Objectives Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
4.2 To increase national and international awareness and support for conserving SBPA's biodiversity and ecosystems	Increased funding support and tourism income	Funds received from third party sources for PA management and income generated for PAC and communities through tourism increased by 25% between baseline and Year 3, and 50% by Year 5	PAC /SBPA files, financial reports, Surveys	Baseline, end of 5 years	PAC
	No. of media sources	An annual increase in the number of positive national and international media products on SBPA	PAC and media archives, internet searches	Annually	PAC; SBPA-HQ-Staff
	No. hits/ likes on social media	An annual increase in the no. of website hits/facebook likes	Internet	Monthly	SBPA-HQ-Staff
<b>5. Increase capacity of staff and communities to achieve SBPA vision and goals</b>					
5.1 To increase staff capacity to support SBPA management.	Capacity scores	All staff with a score above 75% for skills capacity by Year 5	Training and Capacity Needs assessments	Baseline, mid term, 5 years	PAC
	Performance scores/appraisals	An increase in staff performance scores between baseline, mid-term review, and Year 5	Performance reviews	Annually	PAC
5.2 To increase community capacity to effectively participate in and benefit from SBPA and its goals	No. of people obtaining benefits from SBPA	An increase in the number of people generating income and other benefits from livelihood opportunities and initiatives from baseline to Year 5	Community benefit database, Survey	Annually	PAC; SBPA-HQ-Staff



<b>Appendix 2b</b>					
<b>SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables</b>					
<b>Monitoring and Evaluation Framework</b>					
Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
<b>1. Operations and Adaptive Management Programme</b>					
<b>1.1 To manage SBPA using appropriate and effective management structures and systems</b>					
1.1.1 Appropriate financial and administrative systems for managing PA in place	No of administrative and operational plans	1 SOP, 1 H&S, 1 Environmental Management Plan by end of Year 1, 1 Revenue generation plan by Year 2	SBPA files	One off	PAC; SBPA-HQ-Staff
	No. of annual plans; No of annual reports	1 annual operating plan, 1 annual report each year	SBPA files	Annually	PAC; SBPA-HQ-Staff
	No. of feedback and management meetings for operational planning	5 meetings per year	Meeting minutes	per meeting	PAC; SBPA-HQ-Staff; SBPA-Field-Staff
1.1.2 Site level HR needs met	% positions filled	10% of positions filled by Year 1, 100% by Year 3	HR list	Ongoing	PAC
1.1.3 PA management infrastructure and equipment needs met	% of needs met	40% by end of Year 3, 60% of needs met by Year 5	Fixed asset register; Annual reports	Baseline, Year 3, and Year 5	PAC
1.1.4 Monitoring, evaluation and feedback mechanisms developed and implemented	No. of databses; M&E SOPs	3 databses; 1 M&E SoP by end of Year 2	SBPA files; SBPA database	One off	SBPA-HQ-Staff
<b>1.2 To promote management relevant research and its use for evidence-based decision making</b>					
1.2.1 Research priorities identified and actively promoted nationally and internationally	% of urgent research priorities being carried out	100% of urgent management research needs from research priority list by Year 5; Target 20% initiated annually	SBPA database	Annually	SBPA-HQ-Staff

## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
	No. of institutions receiving research priority list	10 per year	sent emails; correspondence acknowledging receipt	Annually	SBPA-HQ-Staff
1.2.2 Research database and system established to improve feedback to management and access to information for stakeholders	SOPs for research in SBPA	1 Research SOP by end of Year 1	SBPA database	One off	SBPA-HQ-Staff
	No. of databases	1 by end of Year 1	SBPA database	One off	SBPA-HQ-Staff
	No. of annual reports	1 annual research report per year	SBPA files	Annually	SBPA-HQ-Staff
1.2.3 Partnerships with local and international research, conservation, and educational institutions formalized	No. of MoUs	4 by Year 3; Additional 2 by Year 5	MoUs on file	Ongoing	PAC
1.2.4 Feasibility and model for international recognition of SBPA by an international body understood and appropriate action taken (e.g UNESCO designation as a World Heritage Site, Biosphere reserve)	Feasibility report	1 recommendation report by end of Year 4; Recommended action initiated within 1 month of report	Recommendation on file Recommended action initiation records on file	One off	PAC; SBPA-HQ-Staff
<b>1.3 To conserve and monitor species at risk</b>					
1.3.1 Plans for conservation and monitoring of species at risk developed and implemented	Marine turtle conservation and monitoring plan; annual monitoring reports	1 marine turtle conservation and monitoring plan available by end of Year 1; 1 annual report per monitoring season	SBPA files	One off	PAC; SBPA-HQ-Staff; SBPA-Field-Staff

<b>Appendix 2b</b>					
<b>SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables</b>					
<b>Monitoring and Evaluation Framework</b>					
<b>Intervention</b>	<b>Indicator</b>	<b>Targets</b>	<b>Method of data collection</b>	<b>Frequency</b>	<b>Responsibility</b>
	Conservation Targets and Pressure Monitoring Plan (CTPM)	1 CTPM available by end of Year 3	SBPA files	One off	PAC; SBPA-HQ-Staff
<b>1.4 To establish an effective system for law enforcement and monitoring of illegal activities</b>					
1.4.1 Law enforcement and monitoring plan developed and implemented	Law enforcement and monitoring plan	1 Law enforcement and monitoring plan by end of Year 1	SBPA files	One off	PAC; SBPA-HQ-Staff
	No. of patrol hours, area covered	100% as per law enforcement and monitoring plan	Patrol monitoring records	Monthly	SBPA-Field-Staff
	No. of Ranger outposts	100% of site infrastructure in place by Year 5	Infrastructure and equipment report	Ongoing	PAC
	Rangers equipped	100% of equipment needs	Infrastructure and equipment report	Ongoing	PAC
	No. of Rangers hired	100% as per law enforcement operational plan	HR list	Ongoing	PAC
1.4.2 Effective implementation of law enforcement in partnership in partnership with other law enforcement agencies and institutions.	% of successful prosecutions	Increase in annual % of successful prosecutions against illegal activities	Court records; agency reports	Ongoing	PAC, other law enforcement agencies
1.4.3 Law enforcement and monitoring feedback systems established	Database	1 database for law enforcement and monitoring feedback system	SBPA database	One off	SBPA-HQ-Staff
	Patrol and law enforcement monitoring reports	54 reports	Patrol monitoring records	Monthly	SBPA-HQ-Staff; SBPA-Field-Staff

## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
<b>1.5 To establish a system for effective communication and information exchange between PAC and stakeholders</b>					
1.5.1 Internal communications protocol developed and accepted for use among PAC management, and SBPA staff at headquarters and in the field	Internal protocol document	1 PAC internal protocol document approved by end of Year 1	PAC files	One off	PAC
1.5.2 External communications protocol developed and accepted for use among PAC, agencies, and communities in order to facilitate efficiency, collaboration, and information exchange	External protocol document	1 inter-agency/community protocol document by end of Year 1	PAC/SBPA files	One off	PAC
	Communications protocol agreements	100% of stakeholder agencies and communities sign the protocol within 6 months of preparing the protocol	PAC/SBPA files	One off	PAC
1.5.3 PAC and agencies implementing communication protocol	Information needs and requests met	% increase in annual information requests fulfilled	SBPA database, correspondence, and files	Ongoing	SBPA-HQ-Staff; partners
	Community information needs met	70% of the time, communities receive documents for review 30 days in advance of comment deadlines or meeting dates	SBPA database, correspondence, and files	Ongoing	SBPA-HQ-Staff; SBPA-Field-Staff
<b>2. Land Use and Sustainable Natural Resource Management Programme</b>					
<b>2.1 To ensure stakeholders use and manage land and resources in a manner that is compatible with the goals of the SBPA</b>					
2.1.1 Community use of land and resources understood	No. maps	1 resource map by end of Year 1	SBPA files	One off	SBPA-HQ-Staff



## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
2.1.2 Resource use and conservation zoning plan developed	Zoning plan	1 zoning plan by Year 4	SBPA files	One off	SBPA-HQ-Staff
2.1.3 Strategy for sustainable community use of the SBPA and its resources developed through a participatory process and implemented	Sustainable Natural Resource Management Plan	1 Sustainable Natural Resource Management Plan document by end of Year 3	SBPA files	One off	SBPA-HQ-Staff
	% of communities and relevant natural resource agencies agreeing to the Sustainable Natural Resource Management Plan	100% by Year 4	SBPA files	One off	PAC
	Resource status	Resource status inside the PA showing positive or stable trends	CTPM reports	as per CTPM plan	SBPA-HQ-Staff; SBPA-Field-Staff
	Illegal activities	Reduction in illegal use of natural resources	Monitoring reports	Annually	SBPA-HQ-Staff; SBPA-Field-Staff
2.1.4 Community land and resource use plans (CLRUP) developed and effectively implemented by communities with support of PAC	No. of CLRUPs	4 CLRUPs by end of Year 5	Community records	Annually	SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
	No., type and extent of illegal activities within community lands	Annual reduction in No., type and extent of illegal activities occurring on community lands	Community patrol records	Monthly	SBPA communities

## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
	Resource status	Resource status outside the PA showing positive or stable trends from baseline to Year 5	Community monitoring records	Annually following baseline assessment	SBPA communities
<b>3. Benefits Sharing and Livelihood Development Programme</b>					
<b>3.1. To increase conservation compatible sustainable livelihood and income generating opportunities for SBPA adjacent communities</b>					
3.1.1 Local communities engaged in temporary or permanent employment with SBPA	% SBPA associated local community members employed by PAC	60% of SBPA staff employed from SBPA associated local communities by Year 5	Staff lists	Ongoing	PAC
3.1.2 Relevant livelihood and income generating opportunities are identified and initiatives supported	No. of livelihood opportunities and initiatives supported	Increase in number of livelihood projects from baseline to end of Year 5	Site and community records; SBPA database	Baseline, Year 3, and Year 5	SBPA-HQ-Staff
	No. of feasibility studies conducted	100% of potential projects undergo assessment prior to project approval and implementation	Feasibility reports; SBPA files	Ongoing	SBPA-HQ-Staff
3.1.3 Livelihood projects feedback systems developed and lessons learnt disseminated	Feedback meetings Lessons Learnt document	100% of new livelihood initiatives hold annual feedback meetings.  Lessons learnt documented for each livelihood project and shared annually	Meeting minutes; Interviews	Annually	SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
<b>3.2 To promote equitable sharing of benefits from SBPA among all communities adjacent to SBPA and their members</b>					
3.2.1 Protocol for respecting and addressing benefits sharing as a	Benefits sharing protocol document	1 benefit sharing protocol developed by Year 3	PAC files	One off	PAC

## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
result of Amerindian intellectual property rights and traditional knowledge sharing developed	Agreement reached	100% of communities agree on the benefits sharing protocol by end of Year 3	PAC files	One off	PAC
3.2.2 Opportunities for inclusion of all adjacent villages in SBPA related opportunities and initiatives promoted	No. of villages reached	100% of villages are aware of SBPA related opportunities and initiatives and participating in information sessions and workshops. 30% of villages participating in opportunities and initiatives by Year 3, and 70% by Year 5	Communications materials; workshop reports; site and community records; Surveys;	Ongoing	SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
3.2.3 Opportunities for inclusion of all community members as beneficiaries in SBPA related opportunities and initiatives promoted	No. of households and people reached	70% increase in no. of households, women, and youth reached and participating in information sessions and workshops relating to SBPA opportunities and initiatives by Year 5	Surveys Workshop reports	Ongoing	SBPA-HQ-Staff; SBPA-Field-Staff; SBPA communities
<b>4. Education, Awareness and Outreach Programme</b>					
<b>4.1 To raise local and regional awareness of SBPA, its values and benefits in order to increase support for its conservation and sustainable development goals</b>					
4.1.1 Education, awareness, and outreach for adults implemented	KAP score	Increase in KAP from baseline to end of Year 5	KAP survey	Baseline, Year 3, Year 5	SBPA-HQ-Staff
	Educational Materials	1 community version of management plan and FAQ	Publications; SBPA files	One off	SBPA-HQ-Staff

## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
		booklet by beginning of Year 1; 2 SBPA related livelihood & conservation booklets by end of Year 1; 1 sustainable resource use booklet by end of Year 4			
	Video	1 video on SBPA management planning process by end of Year 1	Video; SBPA files	One off	SBPA-HQ-Staff
4.1.2 Education, awareness, and outreach for natural resource sector and law enforcement agencies implemented	Questionnaire score	Increase in questionnaire scores from baseline to Year 5	Questionnaire	Baseline, Year 3, Year 5	SBPA-HQ-Staff
	Educational Materials	1 booklet on management plan by mid-Year 1; 1 booklet on law enforcement end of Year 1	Publications; SBPA files	One off	SBPA-HQ-Staff
	Educational materials	1 SBPA related booklet; 2 thematic posters developed by end of Year 1; 1 school book by end of Year 3	Publications: SBPA files	One off	SBPA-HQ-Staff
4.1.3 Education, awareness, and outreach for local youth implemented	No of environmental/wildlife clubs	35% of schools in SBPA adjacent villages have clubs by Year 3; 70% by Year 5	Survey; school records	Annually	SBPA-HQ-Staff; SBPA-Field-Staff
	No. activities	2 nature-based activity per year with respect to SBPA and conservation being carried out by each school nature group	Survey; school records	Annually	SBPA-HQ-Staff; SBPA-Field-Staff
	KAP score	An increase in school children's knowledge of SBPA and its	KAP survey	Baseline, Year 3, end of year 5	SBPA-HQ-Staff

## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
		resource from baseline to end of Year 5.			
	Curriculum Update	Protected areas and conservation related curriculum in primary and secondary school by Year 5	Ministry of Education; NCERD; school curriculum	Ongoing	SBPA-HQ-Staff
<b>4.2 To increase national and international support for conserving SBPA's biodiversity and ecosystems</b>					
4.2.1 SBPA promoted using various media (e.g. facebook, website, radio, TV, etc.)	Social media	1 Facebook page and website developed by end of Year 1	Internet	Annually	SBPA-HQ-Staff
	Billboards and signage	5 billboards and signage installed at strategic urban locations by Year 3	SBPA files; pictures	One off	SBPA-HQ-Staff
	Documentary	1 documentary produced by Year 4	Digital media available	One off	PAC; SBPA-HQ-Staff
	Articles	1 positive articles about SBPA in national and/or international newspapers/radio /TV annually	SBPA files/Media Archives	Annually	PAC; SBPA-HQ-Staff
4.2.2 PR materials developed targeting donor and tourism audience	published material	1 summary booklet of investment needs developed by end of Year 1; updated annually	SBPA files	Annually	PAC
	published material	1 preliminary information booklet by end of Year 1; 1 detailed information booklet and 1 guidebook for tourists and/or tour operators developed by Year 5	SBPA files	One off	SBPA-HQ-Staff
4.2.3 SBPA lessons learned and management outputs shared	Scientific published	1 scientific publications by end of Year 3 and 1 by end of Year 5	SBPA files; journals	Ongoing	SBPA-HQ-Staff

<b>Appendix 2b</b>					
<b>SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables</b>					
<b>Monitoring and Evaluation Framework</b>					
<b>Intervention</b>	<b>Indicator</b>	<b>Targets</b>	<b>Method of data collection</b>	<b>Frequency</b>	<b>Responsibility</b>
	Presentations	1 presentation by Year 2; 1 by Year 3; and 1 by Year 5	SBPA files; presentation records	Ongoing	SBPA-HQ-Staff
	Lessons learned documents	1 document by Year 3 and 1 by end of Year 5	SBPA files	Ongoing	SBPA-HQ-Staff
<b>5. Capacity Building Programme</b>					
<b>5.1. To increase staff capacity to support SBPA management</b>					
5.1.1 Staff training and capacity needs assessed and plan developed	Training and Capacity Needs Assessment	1 training and capacity needs assessment completed for each of the staff at beginning of employment or start of Year 1 for existing staff	Training and capacity needs assessment forms/reports	Beginning of employment, Year 3 and Year 5	PAC SBPA-HQ-Staff SBPA-Field-Staff
	Staff training and capacity needs plan	1 plan developed for each PA staff at beginning of employment, Year 3, and Year 5	Training and capacity needs assessments	Beginning of employment, Year 3 and Year 5	PAC
5.1.2 Staff training and capacity needs plan implemented	% capacity needs met	100% of urgent priority capacity needs met for all staff within 1 year of employment, and high priority needs within 2 years of employment	Training and capacity needs assessment scores	Baseline, mid term, year 5	PAC
<b>5.2 To increase community capacity to effectively participate in and benefit from SBPA and its goals</b>					
5.2.1 Build capacity for sustainable livelihood and income generation plan	Training and capacity needs assessment	An assessment for each community in relation to sustainable livelihoods and income generation project	Community workshop reports; Survey	During planning and implementation of projects	SBPA-HQ-Staff

## Appendix 2b

### SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables Monitoring and Evaluation Framework

Intervention	Indicator	Targets	Method of data collection	Frequency	Responsibility
development, implementation, and management		completed by end of Year 2 and Year 4			
	No of proposals developed by communities	Increase in knowledge and ability to develop proposals from baseline to Year 5	Quality of proposals; Surveys	Annually	SBPA-HQ-Staff
	No. of successful projects	Increase in no. of projects successfully implemented and managed from baseline to Year 5	Site and community records; Livelihood projects report; Surveys	Annually	SBPA-HQ-Staff SBPA communities
	No. of people participating	Increase in no. of people making use of SBPA related opportunities and initiatives from baseline to Year 5	Site and community records; Surveys	Annually	SBPA-Field-Staff; SBPA communities
5.2.2 Build capacity for community participation in SBPA related management activities	Training and capacity needs assessment	An assessment for training and capacity needs conducted to facilitate participation by Year 2	Community workshop report; Survey	Prior to commencement of training	SBPA-HQ-Staff
	No. of people participating	Increase in no. of people supporting SBPA related monitoring activities and supporting researchers in their work from baseline to Year 5	Site and community records; Surveys	Annually	SBPA-Field-Staff; SBPA communities
5.2.3 Build capacity of communities in sustainable land and resource use	Training and Capacity Needs Assessment	An assessment for training and capacity needs conducted for sustainable land and resource use by end of Year 2	Community workshop report; Survey	Prior to commencement of training	SBPA-HQ-Staff SBPA Community

**Appendix 2b**

**SBPA Management Plan Implementation Progress: Achieving Outputs/Deliverables  
Monitoring and Evaluation Framework**

<b>Intervention</b>	<b>Indicator</b>	<b>Targets</b>	<b>Method of data collection</b>	<b>Frequency</b>	<b>Responsibility</b>
	No. of villages	Increase in the no. of villages engaged in community-based monitoring, reporting, and verification (CMRV) from baseline to Year 5	Site and community records	Baseline, Year 3, and Year 5	SBPA-HQ-Staff
	No. of people	Increase in the no. of people with an understanding of sustainable land and resource use from baseline to Year 5	Pre-and post workshop questionnaire	Baseline, Year 3, and year 5	SBPA-HQ-Staff



# Appendix 3

## 5-Year Operational Plan



- Dark gray in the timeline column indicates an activity or task that is to be initiated and completed during those periods
- Light gray in the timeline column indicates an activity that involves monitoring and/or implementation

<b>Appendix 3: 5-Year Operational Plan Framework</b>					
<b>Key Activities</b>	<b>Time frame (Year)</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Programme 1: Operations and Adaptive Management</b>					
<b>Objective 1.1: To manage SBPA using appropriate and effective management structures and systems</b>					
<b><i>Output 1.1.1 Appropriate financial and administrative systems for managing PA in place</i></b>					
1.1.1.1 Develop annual plans, budgets, and reports	Dark Gray	Dark Gray	Dark Gray	Dark Gray	Dark Gray
1.1.1.2 Develop and implement Standard Operating Procedures (SOP)	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.1.3 Develop and implement SBPA Health and Safety Plan (H&S)	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.1.4 Develop and implement a SBPA Environmental Management Plan	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.1.5 Develop and implement a revenue generation plan for SBPA	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.1.5 Prepare detailed annual costing of MP implementation	Dark Gray	Dark Gray	Dark Gray	Dark Gray	Dark Gray
<b><i>Output 1.1.2 Site level human resource needs met</i></b>					
1.1.2.1 Hire staff as per PAC staffing structure	Dark Gray	Dark Gray	Dark Gray	Dark Gray	Dark Gray
<b><i>Output 1.1.3 PA management infrastructure and equipment needs met</i></b>					
1.1.3.1 Asses and update infrastructure and equipment needs	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.3.2 Put in place site infrastructure needs	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.3.3 Identify locations for SBPA signage and install signage	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.3.4 Procure and maintain appropriate equipment	Dark Gray	Dark Gray	Dark Gray	Dark Gray	Dark Gray
<b><i>Output 1.1.4 Monitoring, evaluation and feedback systems developed and implemented</i></b>					
1.1.4.1 Develop M&E SOP	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.4.2 Develop M&E Databases	Light Gray	Light Gray	Light Gray	Light Gray	Light Gray
1.1.4.3 Implement M&E framework and include responsibilities in monthly and annual work plans	Dark Gray	Dark Gray	Dark Gray	Dark Gray	Dark Gray
<b>Objective 1.2: To promote management relevant research and its use for evidence-based decision making</b>					
<b><i>Output 1.2.1 Research priorities identified and actively promoted nationally and internationally</i></b>					
1.2.1.1 Identify / update research needs and priorities	Dark Gray	Dark Gray	Dark Gray	Dark Gray	Dark Gray
1.2.1.2 Approach local and international research, conservation, and educational institutions and discuss research opportunities	Dark Gray	Dark Gray	Dark Gray	Dark Gray	Dark Gray

<b>Appendix 3: 5-Year Operational Plan Framework</b>					
<b>Key Activities</b>	<b>Time frame (Year)</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.2.1.3 Carry our research priorities					
<b><i>Output 1.2.2 Research database and system established to improve feedback to management and access to information for stakeholders</i></b>					
1.2.2.1 Develop research Standard Operating Procedures (SOP)					
1.2.2.2 Develop centralized database to support gathering, storage, analysis, use, and sharing of information					
1.2.2.3 Collate all existing biodiversity and baseline information and data					
1.2.2.4 Develop site level forms and protocols for researchers and monitoring ongoing research					
1.2.2.5 Make research information and research findings accessible to stakeholders					
1.2.2.6 Prepare annual research report					
<b><i>Output 1.2.3 Partnerships with local and international research, conservation, and educational institutions formalized</i></b>					
1.2.3.1 Engage with institutions and assess feasibility of formal research relationships					
1.2.3.2 Establish formal partnerships with appropriate partners and prepare MoUs					
<b><i>Output 1.2.4 Feasibility and model international recognition of SBPA by an international body understood and appropriate action take</i></b>					
1.2.4.1 Prepare feasibility study for international recognition of SBPA					
1.2.4.2 Seek PAC board and government approval to submit application for international recognition of SBPA					
1.2.4.3 If approved, prepare application based on feasibility study, receive approval from relevant authorities, and submit to appropriate international body					
<b>Objective 1.3: To conserve and monitor species at risk</b>					
<b><i>Output 1.3.1 Plans for conservation and monitoring of species at risk developed and implemented</i></b>					
1.3.1.1 Develop marine turtle conservation and monitoring plan					
1.3.1.2 Implement marine turtle conservation and monitoring plan					
1.3.1.3 Develop Conservation Targets and Pressure Monitoring Plan (CTPM)					
1.3.1.4 Implement CTPM Plan					
<b>Objective 1.4: To establish an effective system for law enforcement and monitoring of illegal activities</b>					

<b>Appendix 3: 5-Year Operational Plan Framework</b>					
<b>Key Activities</b>	<b>Time frame (Year)</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b><i>Output 1.4.1 Law enforcement and monitoring plan developed and implemented</i></b>					
1.4.1.1 Develop law enforcement and monitoring plan					
1.4.1.2 Implement law enforcement and monitoring plan					
<b><i>Output 1.4.2 Effective implementation of law enforcement in partnership with other law enforcement agencies and institutions</i></b>					
<b><i>Output 1.4.3 Law enforcement and monitoring feedback system established</i></b>					
1.4.3.1 Develop and implement database for law enforcement and monitoring					
1.4.3.2 Prepare monthly patrol and law enforcement reports					
<b>Objective 1.5: To establish a system for effective communications and information exchange between PAC and stakeholders</b>					
<b><i>1.5.1 Internal communications protocol developed for use among PAC management, SBPA staff at HQ and the field</i></b>					
1.5.1.1 Develop and accept internal communications protocol					
1.5.1.2 Implement internal communications protocol					
<b><i>1.5.2 External communications protocol developed and accepted for use among PAC, agencies, and communities in order to facilitate efficiency, collaboration and information exchange</i></b>					
1.5.2.1 Develop external communications protocol					
1.5.2.2 Communication protocol accepted by all agencies and communities					
<b><i>A1.5.3 PAC and agencies implementing communication protocol</i></b>					
<b>Programme 2: Land Use and Sustainable Natural Resource Management</b>					
<b>Objective 2.1: To ensure stakeholders use and manage land and resources in a manner that is compatible with the goals of the SBPA</b>					
<b><i>Output 2.1.1 Community use of land and resources understood</i></b>					
2.1.1.1 Community resource use maps completed					
<b><i>Output 2.1.2 Resource use and conservation zoning plan developed</i></b>					
2.1.2.1 Identify areas for biodiversity conservation and protection, traditional resource use, livelihood activities, and other uses					
2.1.2.2 Develop and implement guidelines, as part of zoning, outlining activities and levels of permitted use					
2.1.2.3 Seek agreement on zoning and guidelines for permitted use from communities and other natural resource agencies					

<b>Appendix 3: 5-Year Operational Plan Framework</b>					
<b>Key Activities</b>	<b>Time frame (Year)</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b><i>Output 2.1.3 Strategy for sustainable community use of the SBPA and its resources developed through a participatory process and implemented</i></b>					
2.1.3.1 Develop sustainable natural resource management plan		■	■		
2.1.3.2 Seek agreement on sustainable use of SBPA and its resources from communities and other natural resource agencies			■		
2.1.3.3 Implement sustainable natural resource management strategy				■	■
<b><i>Output 2.1.4 Community land and resource use plans (CLRUP) developed and effectively implemented by communities with support of PAC</i></b>					
2.1.4.1 Identify communities for CLRUP development	■	■			
2.1.4.2 Support community development of CLRUPs		■	■	■	■
2.1.4.3 Support community implementation of CLRUPs			■	■	■
2.1.4.4 Monitor implementation and share lessons learned.			■	■	■
<b>Programme 3: Benefits Sharing and Livelihood Development</b>					
<b>Objective 3.1: To increase conservation compatible sustainable livelihood and income generation opportunities for SBPA adjacent communities</b>					
<b><i>Output 3.1.1 Local communities engaged in temporary or permanent employment with SBPA</i></b>					
3.1.1.1 Fullfill staffing needs from local communities	■	■	■	■	■
<b><i>Output 3.1.2 Relevant livelihood and income generating opportunities are identified and initiatives supported supported</i></b>					
3.1.2.1 Identify means to improve past livelihood projects (GPAS Phase 1) from 2013 livelihood projects report	■	■			
3.1.2.2 Conduct survey to identify community livelihood needs and priorities	■				
3.1.2.3 Conduct feasibility study for livelihoods priorities	■	■	■		
3.1.2.4 Compile project funding opportunities and criteria	■	■	■	■	■
3.1.2.5 Inform all stakeholder communities about the livelihood and income generating oportunities	■	■	■	■	■
3.1.2.6 Implement new livelihood or improvement projects		■	■	■	■
<b><i>Output 3.1.3 Livelihood projects feedback systems developed and lessons learned disseminated</i></b>					
3.1.3.1 Conduct feedback meetings		■	■	■	■
3.1.3.2 Prepare project implementation reports			■	■	■

<b>Appendix 3: 5-Year Operational Plan Framework</b>					
<b>Key Activities</b>	<b>Time frame (Year)</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
3.1.3.3 Implementation lessons learned and success stories documented and disseminated					
<b>Objective 3.2: To promote equitable sharing of benefits from SBPA among all communities adjacent to SBPA and their members</b>					
<b><i>Output 3.2.1 Protocol for respecting and addressing benefits sharing as a result of intellectual property rights (IPR) and traditional knowledge sharing developed</i></b>					
3.2.1.1 Develop protocol for benefits sharing					
3.2.1.2 Seek agreement from communities on the protocol					
3.2.1.3 Implement protocol					
<b><i>Output 3.2.2 Opportunities for inclusion of all adjacent villages in SBPA related opportunities and initiatives promoted</i></b>					
<b><i>Output 3.2.3 Opportunities for inclusion of community members as beneficiaries in SBPA related opportunities and initiatives promoted</i></b>					
<b>Programme 4: Education, Awareness, and Outreach</b>					
<b>Objective 4.1: To raise local and regional awareness of SBPA, its values and benefits in order to increase support for its conservation and sustainable development goals</b>					
<b><i>Output 4.1.1 Education, awareness, and outreach for adults implemented</i></b>					
4.1.1.1 Conduct KAP survey					
4.1.1.2 Prepare and distribute community version of management plan and FAQ booklets					
4.1.1.3 Prepare and distribute SBPA related livelihood and conservation booklets					
4.1.1.4 Prepare and distribute sustainable resource use booklet					
4.1.1.5 Produce video on SBPA management planning process					
4.1.1.6 Conduct workshops in association with distribution of educational, awareness, and outreach materials					
<b><i>Output 4.1.2 Education, awareness, and outreach for natural resource sector and law enforcement agencies implemented</i></b>					
4.1.2.1 Prepare and distribute booklet on management plan					
4.1.2.2 Prepare and distribute booklet on law enforcement					
4.1.2.3 Conduct workshops to raise awareness of management plan and law enforcement requirements					

<b>Appendix 3: 5-Year Operational Plan Framework</b>					
<b>Key Activities</b>	<b>Time frame (Year)</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
4.1.2.4 Administer questionnaire to assess awareness					
<b><i>Output 4.1.3 Education, awareness, and outreach for local youth implemented</i></b>					
4.1.3.1 Prepare and distribute SBPA related booklet and thematic posters for youth					
4.1.3.2 Prepare and distribute a school book					
4.1.3.3 Develop and or improve environmental/wildlife clubs					
4.1.3.4 Conduct KAP survey					
4.1.3.5 Collaborate with and produce PA and conservation related curriculum for primary and secondary school level					
<b>Objective 4.2 To increase national and international support for conserving SBPA's biodiversity and ecosystems</b>					
<b><i>Output 4.2.1 SBPA promoted using various media (e.g. facebook, website, radio, TV, etc.)</i></b>					
4.2.1.1 Develop Facebook and webpage for SBPA					
4.2.1.2 Install billboards and signage in urban areas					
4.2.1.3 Produce documentary on SBPA					
4.2.1.4 Prepare articles for different media					
<b><i>Output 4.2.2 Public Relations materials developed targeting donor and tourism audience</i></b>					
4.2.2.1 PR materials for donor on infrastructure and management programme investment needs					
4.2.2.2 Preliminary Information booklets for tourists/tour operators					
4.2.2.3 Detailed information booklet and guidebook for tourists/tour operators					
<b><i>Output 4.2.3 SBPA lesson learned and management outputs shared</i></b>					
4.2.3.1 Scientific publications					
4.2.3.2 SBPA related presentations at regional and international fora					
4.2.3.3 Lessons learned documentation					
<b>Programme 5: Capacity Building</b>					
<b>Objective 5.1: To increase staff capacity to support SBPA management</b>					
<b><i>Output 5.1.1 Staff training and capacity needs assessment carried out and plan developed</i></b>					
5.1.1.1 Conduct staff training needs assesment					
5.1.1.2 Training plan developed for each staff					
<b><i>Output 5.1.2 Staff training and capacity building plan implemented</i></b>					



<b>Appendix 3: 5-Year Operational Plan Framework</b>					
<b>Key Activities</b>	<b>Time frame (Year)</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Objective 5.2: To increase community capacity to effectively participate in and benefits from SBPA and its goals</b>					
<b><i>Output 5.2.1 Build capacity for sustainable livelihood and income generating strategies development and management</i></b>					
5.2.1.1 Conduct community training and capacity needs assessment					
5.2.1.2 Conduct workshops for proposals writing and development					
5.2.1.3 Conduct workshops and training for project implementation, management, and follow-up monitoring					
5.2.1.4 Conduct workshops and training for project specific need and skills					
<b><i>Output 5.2.2 Build capacity for community participation in SBPA related management activities.</i></b>					
5.2.2.1 Conduct training and capacity needs assessment					
5.2.2.2 Conduct training to support monitoring activities					
<b><i>Output 5.2.3 Build capacity of communities in sustainable land and resource use</i></b>					
5.2.3.1 Conduct training and capacity needs assessment relating to sustainable land and resource use					
5.2.3.2 Conduct training to enable community based monitoring, reporting, and verification					
5.2.3.3 Conduct workshops in sustainable land and resource use					

# Appendix 4

## Detailed Estimation of Capital Costs



## APPENDIX 5

### Detailed Estimates of Capital Costs for Implementation of SBPA 5 Year Management Plan

	Unit	Unit Cost	2015		2016		2017		2018		2019		Unit	Total
			Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost		
<b>Infrastructure</b>				<b>66,125,000</b>		<b>25,750,000</b>		<b>27,375,000</b>		<b>2,375,000</b>		<b>2,375,000</b>		<b>124,000,000</b>
Administrative Office with Site Manager Housing	Each	40,000,000	1	40,000,000		-		-		-		-	1	40,000,000
Warden Stations	Each	25,000,000	1	25,000,000	1	25,000,000	1	25,000,000		-		-	3	75,000,000
Trails and Bridges	km	1,000,000		-		-	2	2,000,000	2	2,000,000	2	2,000,000	6	6,000,000
SBPA & boundary signage	Each	75,000	15	1,125,000	10	750,000	5	375,000	5	375,000	5	375,000	40	3,000,000
<b>Transportation</b>				<b>5,450,000</b>		<b>12,450,000</b>		<b>3,800,000</b>		<b>3,800,000</b>		<b>7,000,000</b>		<b>32,500,000</b>
Vehicle - 4x4 pickup	Each	7,000,000		-	1	7,000,000		-		-	1	7,000,000	2	14,000,000
ATV 4x4 (650cc)	Each	2,000,000	1	2,000,000	1	2,000,000	1	2,000,000	1	2,000,000		-	4	8,000,000
Boat and Engine (200hp)	Each	3,450,000	1	3,450,000	1	3,450,000		-		-		-	2	6,900,000
Boat and Engine (75hp)	Each	1,800,000					1	1,800,000	1	1,800,000		-	2	3,600,000
<b>Office Equipment</b>				<b>1,660,000</b>		<b>1,540,000</b>		<b>770,000</b>		<b>770,000</b>		<b>100,000</b>		<b>4,840,000</b>
Computers	Each	170,000	2	340,000	2	340,000	1	170,000	1	170,000		-	6	1,020,000
Software	Each	140,000	2	280,000	2	280,000	1	140,000	1	140,000		-	6	840,000
Database software	Each	400,000	1	400,000		-		-		-		-	1	400,000
UPS for computers	Each	40,000	2	80,000	1	40,000	1	40,000	1	40,000		-	5	200,000
Printer/Copier/Scanner (H Capacity)	Each	240,000		-	1	240,000		-		-		-	1	240,000
Printer/Copier/Scanner (L Capacity)	Each	120,000	1	120,000		-	1	120,000	1	120,000		-	3	360,000
Networking	Each	100,000		-	2	200,000		-		-		-	2	200,000

## APPENDIX 5

### Detailed Estimates of Capital Costs for Implementation of SBPA 5 Year Management Plan

	Unit	Unit Cost	2015		2016		2017		2018		2019		Unit	Total
			Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost		
Desk	Each	60,000	3	180,000	3	180,000	1	60,000	1	60,000		-	8	480,000
Chairs	Each	20,000	3	60,000	3	60,000	2	40,000	2	40,000		-	10	200,000
Other Office Furniture (filing cabinets/cupboards)	Est.	100,000	1	100,000	1	100,000	1	100,000	1	100,000		-	4	400,000
Misc (First Aid Kit etc)	Each	100,000	1	100,000	1	100,000	1	100,000	1	100,000	1	100,000	5	500,000
<b>Communication Equipment</b>				<b>3,170,000</b>		<b>3,705,000</b>		<b>2,405,000</b>		<b>355,000</b>		-		<b>9,635,000</b>
Cell Phone	Each	15,000	2	30,000	1	15,000	1	15,000	1	15,000		-	5	75,000
Smartphone for use of monitoring apps	Each	40,000	1	40,000	1	40,000	1	40,000	1	40,000		-	4	160,000
Internet (Satellite)	Each	600,000		-	1	600,000	1	600,000		-		-	2	1,200,000
Radio (complete with Antenna)	Each	1,000,000	1	1,000,000	2	2,000,000	1	1,000,000		-		-	4	4,000,000
Mobile Radios	Each	750,000	2	1,500,000	1	750,000	1	750,000		-		-	4	3,000,000
Satellite Phone	Each	300,000	2	600,000	1	300,000		-	1	300,000		-	4	1,200,000
<b>Field Equipment</b>				<b>1,720,000</b>		<b>1,580,000</b>		<b>1,300,000</b>		<b>840,000</b>		<b>900,000</b>		<b>6,340,000</b>
GPS Recievers	Each	80,000	2	160,000	2	160,000	2	160,000		-		-	6	480,000
Field Laptop	Each	280,000	1	280,000	1	280,000		-		-		-	2	560,000
Binoculars	Each	70,000	4	280,000	2	140,000	2	140,000	2	140,000		-	10	700,000
Ranger Kits	Each	100,000	6	600,000	6	600,000	6	600,000	6	600,000	6	600,000	30	3,000,000
Handheld Radios	Each	150,000	2	300,000	2	300,000	2	300,000		-	2	300,000	8	1,200,000
Digital Camera	Each	100,000	1	100,000	1	100,000	1	100,000	1	100,000		-	4	400,000
<b>Power Generation</b>				<b>560,000</b>		<b>5,280,000</b>		<b>2,780,000</b>		<b>2,500,000</b>		-		<b>11,120,000</b>

## APPENDIX 5

### Detailed Estimates of Capital Costs for Implementation of SBPA 5 Year Management Plan

	Unit	Unit Cost	2015		2016		2017		2018		2019		Unit	Total
			Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost		
Photovoltaic	Each	2,500,000		-	2	5,000,000	1	2,500,000	1	2,500,000		-	4	10,000,000
Generator	Each	280,000	2	560,000	1	280,000	1	280,000		-		-	4	1,120,000
<b>TOTAL (G\$)</b>				<b>78,685,000</b>		<b>50,305,000</b>		<b>38,430,000</b>		<b>10,640,000</b>		<b>10,375,000</b>		<b>188,435,000</b>
1 US\$ = 200 GY\$		Total (US\$)		393,425		251,525		192,150		51,325		51,875		940,300

# Appendix 5

## Detailed Estimation of Operations (Recurring) Costs





## APPENDIX 6

### Detailed Estimates of Recurrent Costs for Implementation of SBPA 5 Year Management Plan

			2015		2016		2017		2018		2019		Total
	Unit	Unit Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	
<b>Human Resource</b>				<b>7,830,000</b>		<b>11,340,000</b>		<b>14,256,000</b>		<b>14,256,000</b>		<b>14,256,000</b>	<b>61,938,000</b>
<i>Salaries</i>													
SBPA Officer (1)	Prsn/Mths	250,000	12	3,000,000	12	3,000,000	12	3,000,000	12	3,000,000	12	3,000,000	15,000,000
Site Level Manager (1)	Prsn/Mths	170,000	10	1,700,000	12	2,040,000	12	2,040,000	12	2,040,000	12	2,040,000	9,860,000
Warden / Rangers (6)	Prsn/Mths	60,000	10	600,000	36	2,160,000	72	4,320,000	72	4,320,000	72	4,320,000	15,720,000
Support Staff (2)	Prsn/Mths	50,000	10	500,000	24	1,200,000	24	1,200,000	24	1,200,000	24	1,200,000	5,300,000
<i>Sub-Total</i>				<i>5,800,000</i>		<i>8,400,000</i>		<i>10,560,000</i>		<i>10,560,000</i>		<i>10,560,000</i>	45,880,000
<i>Fringe Benefits (35% of Salaries)</i>													
SBPA Officer (1)	Months	87,500	12	1,050,000	12	1,050,000	12	1,050,000	12	1,050,000	12	1,050,000	5,250,000
Site Level Manager (1)	Months	59,500	10	595,000	12	714,000	12	714,000	12	714,000	12	714,000	3,451,000
Warden / Rangers (6)	Months	21,000	10	210,000	36	756,000	72	1,512,000	72	1,512,000	72	1,512,000	5,502,000
Support Staff (2)	Months	17,500	10	175,000	24	420,000	24	420,000	24	420,000	24	420,000	1,855,000
<i>Sub-Total</i>				<i>2,030,000</i>		<i>2,940,000</i>		<i>3,696,000</i>		<i>3,696,000</i>		<i>3,696,000</i>	16,058,000
<b>Rent</b>				<b>1,440,000</b>		<b>840,000</b>	-	-	-	-	-	-	<b>2,280,000</b>
Office Rental	Month	100,000	12	1,200,000	6	600,000		-		-		-	1,800,000
Facility Rental at Almond Beach	Month	40,000	6	240,000	6	240,000		-		-		-	480,000
<b>Services</b>				<b>870,000</b>		<b>2,132,000</b>		<b>3,476,000</b>		<b>4,324,000</b>		<b>4,324,000</b>	<b>15,126,000</b>
Cellular phone credits	Month	12,000	16	192,000	48	576,000	60	720,000	72	864,000	72	864,000	3,216,000

## APPENDIX 6

### Detailed Estimates of Recurrent Costs for Implementation of SBPA 5 Year Management Plan

			2015		2016		2017		2018		2019		Total
	Unit	Unit Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	
Internet (Satellite)	Month	100,000		-	6	600,000	18	1,800,000	24	2,400,000	24	2,400,000	7,200,000
Satellite phone credits	Year	52,000	4	208,000	6	312,000	6	312,000	8	416,000	8	416,000	1,664,000
Radio	Year	100,000	1	100,000	2	200,000	2	200,000	2	200,000	2	200,000	900,000
Cleaning	Month	25,000	10	250,000	12	300,000	12	300,000	12	300,000	12	300,000	1,450,000
Water supply	Month	2,000	10	20,000	12	24,000	12	24,000	12	24,000	12	24,000	116,000
Electricity	Month	10,000	10	100,000	12	120,000	12	120,000	12	120,000	12	120,000	580,000
<b>Office and Meetings</b>				<b>550,000</b>		<b>1,050,000</b>		<b>1,100,000</b>		<b>1,100,000</b>		<b>1,100,000</b>	<b>4,900,000</b>
Stationery	Month	50,000	2	100,000	3	150,000	4	200,000	4	200,000	4	200,000	850,000
Meetings	Each	75,000	6	450,000	12	900,000	12	900,000	12	900,000	12	900,000	4,050,000
<b>Travel</b>				<b>1,888,000</b>		<b>3,558,000</b>		<b>4,248,000</b>		<b>4,848,000</b>		<b>4,848,000</b>	<b>19,390,000</b>
Fuel and Lubricants	Liters	300	3,000	900,000	6,000	1,800,000	6,000	1,800,000	8,000	2,400,000	8,000	2,400,000	9,300,000
Overland travel (fuel, lubricants)	Litres	300	400	120,000	1,500	450,000	2,000	600,000	2,000	600,000	2,000	600,000	2,370,000
Overland travel to GT	Round trip	20,000	12	240,000	24	480,000	42	840,000	42	840,000	42	840,000	3,240,000
Air travel (GT to Mabaruma)	Round trip	29,000	12	348,000	12	348,000	12	348,000	12	348,000	12	348,000	1,740,000
Accommodation and Meals	Trips (2D)	20,000	14	280,000	24	480,000	33	660,000	33	660,000	33	660,000	2,740,000
<b>Contractual</b>				-		-		-		-		-	-
Consultancies	Prsn/Mths	500,000		-		-		-		-		-	-

## APPENDIX 6

### Detailed Estimates of Recurrent Costs for Implementation of SBPA 5 Year Management Plan

			2015		2016		2017		2018		2019		
	Unit	Unit Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	Amt	Cost	Total
<b>Infras. &amp; Equip. Maintenance &amp; Depreciation</b>				<b>9,036,833</b>		<b>15,696,333</b>		<b>20,244,333</b>		<b>21,878,000</b>		<b>23,835,500</b>	<b>90,691,000</b>
Infrastructure	Year			6,612,500		9,187,500		11,925,000		12,162,500		12,400,000	52,287,500
Transportation Equipment	Year			1,090,000		3,580,000		4,340,000		5,100,000		6,500,000	20,610,000
Office Equipment	Year			332,000		640,000		794,000		948,000		968,000	3,682,000
Communication Equipment	Year			317,000		687,500		928,000		963,500		963,500	3,859,500
Field Equipment	Year			573,333		1,100,000		1,533,333		1,813,333		2,113,333	7,133,333
Power Generation Equipment	Year			112,000		501,333		724,000		890,667		890,667	3,118,667
<b>TOTAL (G\$)</b>				<b>21,614,833</b>		<b>34,616,333</b>		<b>43,324,333</b>		<b>46,406,000</b>		<b>48,363,000</b>	<b>194,325,000</b>
1 US\$ = 200 GY\$		Total (US\$)		108,074	-	173,082	-	216,622	-	231,843	-	241,630	971,250

## Appendix 6

# Agenda which Guided the Management Planning Process



## Shell Beach Protected Area Management Planning Schedule

	1			2			3			
	2014 / Month									
	M	A	M	J	J	A	S	O	N	D
Activity	1	2	3	4	5	6	7	8	9	10
1.1 Prepare <b>literature review</b> on appropriate Management Models for the Shell Beach Protected Area.										
1.2 Develop <b>draft management plan framework</b> .										
1.3 Meetings with key agencies and national stakeholders. (Week of March 16)										
1.4 Conduct initial <b>stakeholder workshop</b> with Key Stakeholders to plan the co-management Planning process and define data and other needs. (March 27 and 28)										
1.5 Identify data gaps through analysis of existing data compiled for boundary delineation.										
1.1 Gather all necessary data to fill gaps including maps.										
1.7 Conduct <b>technical workshop</b> to discuss and get preliminary consensus on content of management plan. (May 14 and 15)										
1.8 Prepare <b>first draft management plan</b> and circulate among stakeholders. (June 26)										
2.1 Conduct stakeholders' <b>forum with Key Stakeholders</b> to review first draft of management plan. ( July 17 and 18)										
2.2 Organize and support <b>community consultation meetings</b> on draft management plan. (August 11 to 24). Visits to 16 communities where all communities including satellites had the opportunity to be provide feedback.										
2.3 Modify draft management plan based on Community and regional stakeholders' feedback.										

	1			2			3			
	2014 / Month									
	M	A	M	J	J	A	S	O	N	D
Activity	1	2	3	4	5	6	7	8	9	10
2.4 Prepare draft monitoring and evaluation framework (Implementation of Plan and Protected Area Management).										
3.1 Produce <b>final draft management plan</b> and circulate among stakeholders for information purposes. (September 30)										
3.2 Final draft management plan <b>presented to communities</b> in Santa Rosa. (October 9)										
3.2 Submit final draft management plan to the PAC Board of Directors. (October 17)										
4.1 PAC Board approval for publication of public notice in the gazette. (October 29)										
4.2 Public Notice for public review published in the Gazette (November 1) and published in 2 newspapers (week of November 2)										
4.3 Public Meeting for presentation of final draft management plan (November 14)										
4.4 Deadline for public comments (December 5)										
4.5 <b>Final management plan</b> submitted to the PAC Board for approval (December 17)										

## Appendix 7

### Participants in the Development of the Management Plan





# 1 Stakeholder Consultations

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This management plan has been developed in consultation with all communities adjacent to the Shell Beach Protected Area (SBPA) and national stakeholders. Consultations with stakeholders included four stakeholder workshops, which included a technical workshop, and several opportunities to review draft versions of management plan.

An initial stakeholder workshop was held in March 2014 in Santa Rosa. The purpose was to provide a background on the National Protected Areas System in Guyana (NPAS); provide an update on what is taking place at SBPA; provide an outline of the proposed planning process, schedule, and table of contents of the plan; provide opportunities for communities to express their concerns and expectations; and to discuss and decide how to ensure communities will be represented in process.

The technical workshop was held in May 2014 in Georgetown. The purpose was to solicit technical information and input from the various stakeholders to support the development of the management programmes and the draft management plan for the SBPA. During this process, stakeholders analyzed the strengths, weaknesses, opportunities and threats to SBPA, helped develop the vision for the SBPA and the goals and objectives for the management plan, updated the management programmes, strategies, and timelines, and discussed options for monitoring and evaluation. A preliminary draft of the management plan was provided to stakeholders prior to the workshop to facilitate discussion.

A follow-up stakeholder workshop/forum was held in July 2014 in Santa Rosa. The purpose was to provide an update on the status of the management planning process and to solicit feedback from stakeholders on the first draft management plan. Through facilitated sessions and group sessions, stakeholders provided feedback on the vision and goals, and management programmes. In addition, communities presented updates to the community resource use map.

The Shell Beach Management Planning Team held 16 community meetings from August 11 to 23, 2014. The purpose was to seek feedback from community members on the first draft of the management plan, which was developed with the support of community and national stakeholder representatives. It was also an opportunity to provide communities with a background on the National Protected Areas System in Guyana; past planning processes associated with the SBPA, including the delineation process; an outline of the SBPA management planning process, and the various management programmes. Communities also had the opportunity to share their concerns and recommendations.

A stakeholder meeting was held on October 2014 in Santa Rosa. The purpose of this meeting was to share the final draft management plan, provide an opportunity for stakeholders to discuss additional comments, and to outline the next steps and public review process.

In addition, an exchange visit to Region 9 for a few community representatives was organized in April 2014. The purpose of the exchange visit was to learn from the Kanuku Mountain Community Representative Group about their experiences with the Kanuku Mountain Protected Area Management Planning process and to get insights into various livelihood and tourism initiatives promoted or developed by the North Rupununi District Development Board, Iwokrama, Surama, and Yupukari.

Details of presentations, discussions, and participants list can be found in the respective stakeholder workshop or meeting reports.

Community stakeholders represented at the meetings included Almond Beach, Assakata, Father's Beach, Kwebanna, Morawhanna, Manawarin, Santa Cruz (also referred to as Little Kanuballi), Three Brother's, Warapoka, Waramuri and its satellite Haimaracabra, and Santa Rosa and its 11 satellites communities - Cabora, Huridiah, Kamwatta, Karaburi, Koko and Islands, Kumaka, Moracupha, Parakese Islands, Rincon, Santa Rosa and Islands (also sometimes referred to as Karie and Islands), and Wallaba. Additionally, Unity Grant attended the October stakeholder meeting.

National stakeholders represented by key Ministries, agencies, and non-governmental organizations at the stakeholder meetings included the Ministry of Agriculture – Department of Fisheries, Ministry of Amerindian Affairs, Ministry of Natural Resources and the Environment, Guyana Defence Force, Guyana Defence Force – Coast Guards, Guyana Forestry Commission, Guyana Geology and Mines Commission, Guyana Lands and Surveys Commission, Guyana Police Force, Regional Democratic Council, Region 1, Conservation International-Guyana, Guyana Marine Turtle Conservation Society, and World Wildlife Fund.

The Shell Beach Protected Area management planning and facilitation team was represented at the stakeholder meetings and community visits by the following:

The Protected Areas Commission: Mr. Damian Fernandes, Protected Areas Commissioner; Ms. Chuvika Harilal, Senior Protected Areas Officer; and Ms. Tana Yussuff, Protected Areas Officer (Shell Beach Protected Area)

The Environmental Protection Agency, Protected Areas Unit: Ms. Bibi Asma Sharief, Senior Environmental Officer, Mr. Rae Smith, Environmental Officer; and Ms. Schanace Odwin, Environmental Officer,

Appendix 7: Participants in the Development of the Management Plan– SBPA Management Plan - Final, December 2014

SBPA Management Planning Project Team: Mr. Suresh V. Kandaswamy, Project Coordinator; Ms. Persia Martindale, Project Assistant; Ms. Patricia Fredericks, Community Engagement Specialist & Workshop Facilitator.

Consultants: Odacy Davis, Community Engagement Specialist; Cornelius von Furstenberg, GFA Protected Area Specialist.

Appendix 8

Photographs

Photo credits: Suresh V. Kandaswamy, Tana Yussuff, Persia Martindale

# 1 Initial Stakeholder Workshop

The Initial Stakeholder Workshop was held on March 27 and 28, 2014 in Santa Rosa, Region 1. The workshop was conducted at the Savannah View, also referred to as Flavy's, in Cabucalli, Santa Rosa. The following are some photographs from the workshop. **(Refer to the Initial Stakeholder Workshop Report for the list of participants).**



Prayer before start of workshop



Day 1 of the Workshop, Commissioner Fernandes explains the role of the PAC



Participants paying keen attention to the facilitator of the moment



A community member from Santa Rosa shares a resource and boundary map drawn up by her community



KMCRG representative presenting on the Kanuku Mountains management planning process



A participant introducing herself





Mr. Suresh Kandawamy (Project Coordinator) presenting on the Management Planning Process



Participants engaged in group work to express and outline their concerns and expectations in relation to the protected area



Participants engaged in group work to express and outline their concerns and expectations in relation to the protected area



Member from Morawahanna presenting his group's concerns and expectations



A participant presenting a group's concerns and expectations



Commissioner Fernandes presenting on the plan outline based on information collected from participants on Day 1



## 2 Technical Workshop

The Technical Workshop was held in Georgetown on May 14 and 15, 2014 at the Guyana Forestry Commission Multipurpose Auditorium. The following are some photographs from the workshop. **(Refer to the Technical Workshop Report for the list of participants)**



Commissioner Fernands sharing opening remarks with the workshop participants



Technical Workshop participants listening to the main Facilitator, Ms. Patricia Fredericks



A group on Day 1 of the workshop is discussing and drawing up the vision and goals for the protected area



One of the participants shares the vision and goals on behalf of her group





Presentation of the vision and goals by a participant



Another group working on the vision and goals for the protected area



A group on Day 2 discussing the resource uses of the area and interventions needed to best manage these resources



A group discussing a management programme



Representative from Almond Beach and the GMTCS presents management programmes developed by his group



Regional Chairman of Region 1, speaks to the gathering about the KMCRG/Shell Beach exchange



### 3 July Stakeholder Workshop/Forum

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A follow-up Stakeholder Workshop was held in Santa Rosa on July 17 and 18, 2014 at Savannah View in Cabucalli, Santa Rosa. The following are some photographs from the workshop/forum. **(Refer to July Stakeholder Workshop Report for the list of participants)**



Damian Fernandes, Commissioner of the PAC, giving opening remarks



Suresh Kandaswamy, Project Coordinator, presenting the Management Plan



Workshop participants listening to the presentations



Representative from Assakata presenting his community's resource use map



Representatives from Warapoka presenting their community resource use map



Representatives from Santa Cruz presenting their community resource use map



A group discussing the management programmes and noting down suggestions



A group discussing the management programmes and noting down suggestions



Representative of Manawarin presents his group's discussion of the management programmes



Representative of the GDF presents his group's discussion of the management programmes



Presentation by RDC Chairman and Waramuri Toshao on the KMCRG Exchange



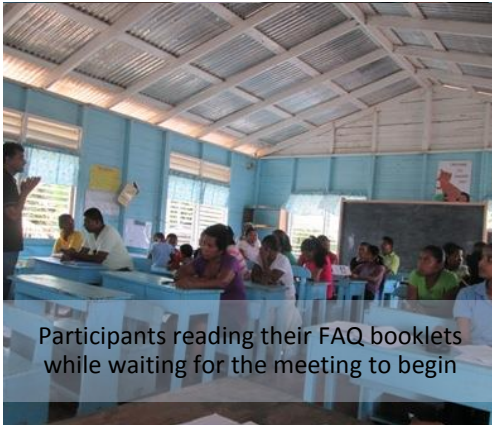
Group Picture of workshop participants



## 4 August Community Visits

The Shell Beach Management Planning Team held 16 community meetings between August 11 and 23, 2014. Two teams disbursed to the region. The following are some photographs from the community visits. **(Refer to August Community Visits Report for the list of communities and participants)**

### 4.1 Morawhanna



Participants reading their FAQ booklets while waiting for the meeting to begin



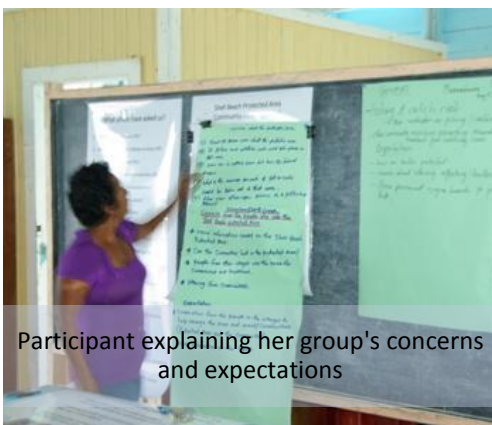
Ms. Chuvika Harilal discussing the Community Resource Map with participants



Participants from Morawhanna



Group breakout session to discuss concerns and expectations



Participant explaining her group's concerns and expectations



Ms. Asma Sharief explaining the Management Plan

## 4.2 Almond Beach



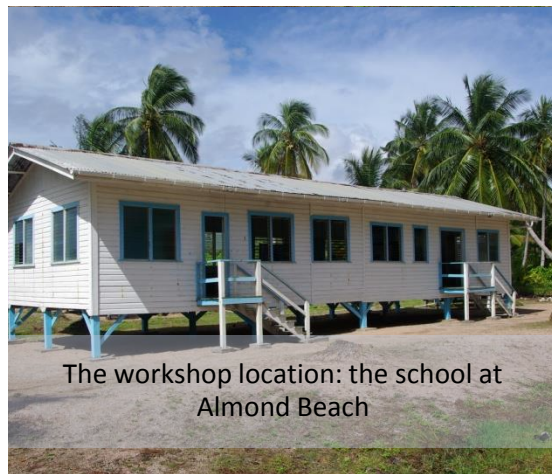
Baby leatherback hatchling making its way to the ocean during the team's visit



Welcome to Almond Beach



Preparing for registration of participants



The workshop location: the school at Almond Beach



Participants taking a look at the Resource Use Map



Suresh Kandawamy, Project Coordinator, presenting at the meeting





Group breakout session to discuss concerns and expectations



Community member presenting his group's concerns and expectations



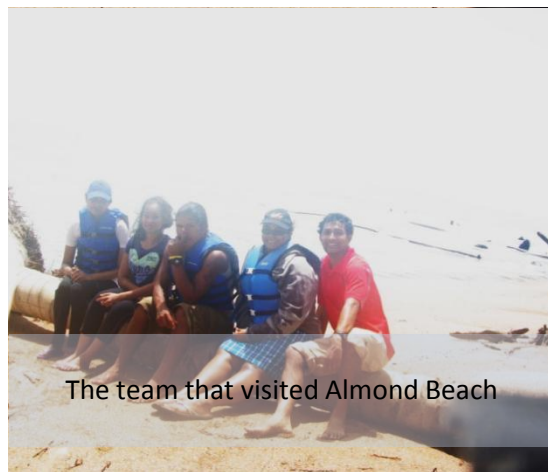
Coconut trees on the farthest plantation destroyed due to erosion of the beach



Almond Beach, heading back towards the mouth of the Waini, where new beach is building up



A fishing vessel spotted in the No-Netting Zone



The team that visited Almond Beach

### 4.3 Three Brothers



The landing where the community gets cellphone reception



St. John's multipurpose building where the meeting was held



Registration of meeting participants



The meeting participants



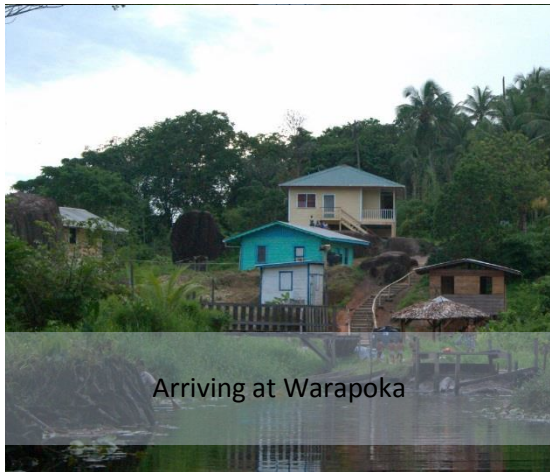
Group breakout session to discuss community concerns and expectations



Group member presenting on her group's concerns and expectations



## 4.4 Warapoka



Arriving at Warapoka



Ms. Chuvika Harilal presenting to the community members in attendance



A group of community members discussing their concerns and expectations



A group member presenting her groups's concerns and expectations



A group member presenting her group's concerns and expectations



A group member presenting his groups's concerns and expectations



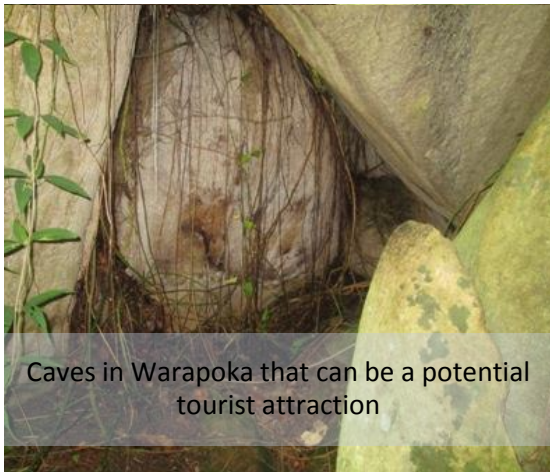
Appendix 8: Photographs— SBPA Management Plan - Final, December 2014



Community members listening to the facilitator. A group member presenting the concerns and expectations of her group



Participants enjoying a conversation



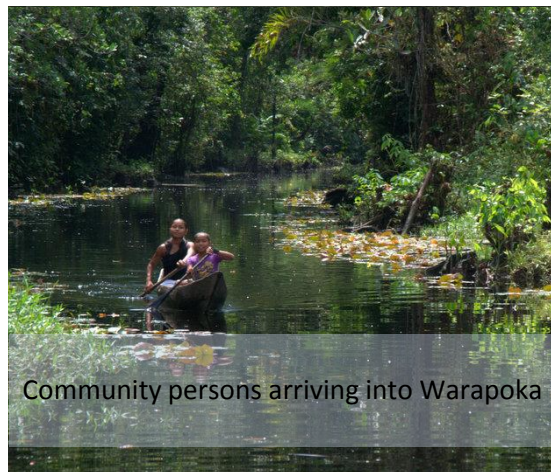
Caves in Warapoka that can be a potential tourist attraction



Cassava plantation



Harvested Heart of Palm



Community persons arriving into Warapoka



## 4.5 Santa Cruz



The sharp turns of the Big Kanuballi Creek



A participant asking the facilitators a question



Ms. Chuvika Harilal presenting on the Management Plan



A group of community members noting down their concerns and expectations



A community member presenting on the concerns and expectations of his group



A community member presenting on the concerns and expectations



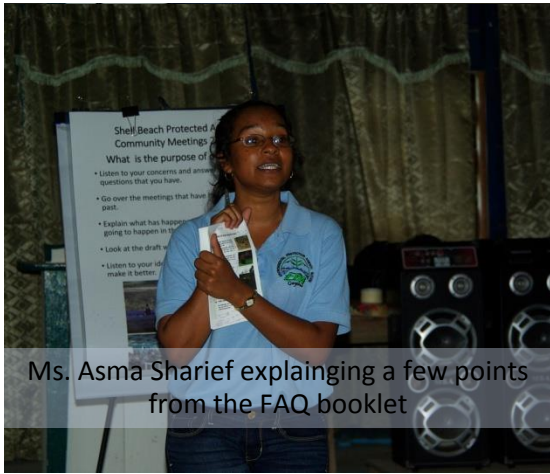
Appendix 8: Photographs— SBPA Management Plan - Final, December 2014



Community members view pictures from the past stakeholder meetings



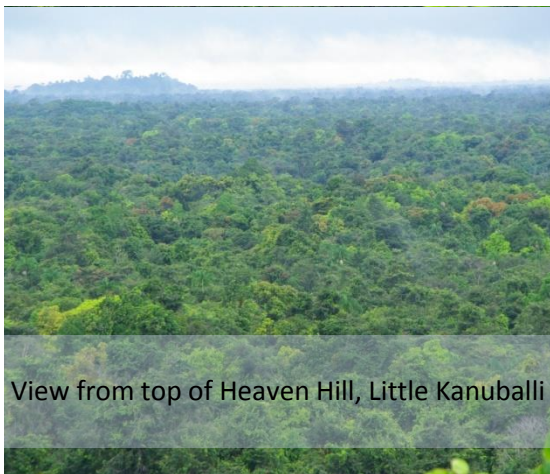
A community member reading the FAQ booklet



Ms. Asma Sharief explaining a few points from the FAQ booklet



Ms. Persia Martindale closing the meeting by sharing the next steps



View from top of Heaven Hill, Little Kanuballi



Manicole palm plantation



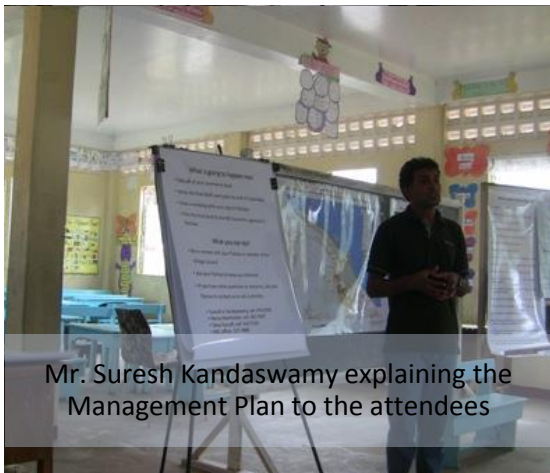
## 4.6 Kwebanna



Registration of meeting participants



Ms. Chuvika Harilal explaining one of the management programmes



Mr. Suresh Kandaswamy explaining the Management Plan to the attendees



Community member presenting the concerns and expectations discussed by her group



The still active and fruitful citrus project initiated under the GPAS phase I



Cut wood waiting to be shipped



## 4.7 Unity Grant



Registration of the Unity Grant community members



Attendees read through their FAQ booklet



Community members share their views



The Shell Beach Management Planning Team listens



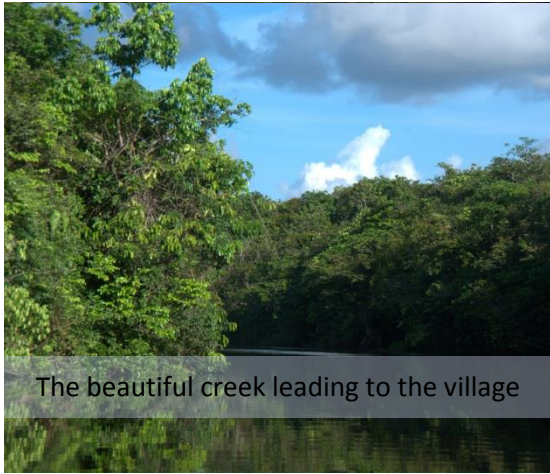
The community is developed over swamp land, as seen here from the Nortons' home



Leaving Unity Grant



## 4.8 Manawarin



The beautiful creek leading to the village



The Multi-purpose building where the meeting was held



The Manawarin school, visible from the Multi-purpose building



Community members in attendance at the meeting



The former Toshao of Manawain welcomes the team in the absence of the current Toshao



Participants paying attention to a facilitator



Appendix 8: Photographs— SBPA Management Plan - Final, December 2014



Group of community members discussing their concerns and expectations



A group discussing their concerns



Community member presenting on the concerns and expectations of his group



Community member presenting concerns



Cassava and catacuri: an authentic Amerindian lunch prepared for the meeting



View of the landing at Manawarin



## 4.9 Father's Beach



Poster developed by Father's Beach school children on the Shell Beach Protected Area



The poster displaying all the previous workshops



Ms. Patricia Fredericks discussing the Management Plan with the participants



Ms. Odacy Davis presenting to the community members



A child attending the meeting looking at the FAQ booklet

## 4.10 Assakata



The team arriving at the Assakata landing



The school where the workshop was held



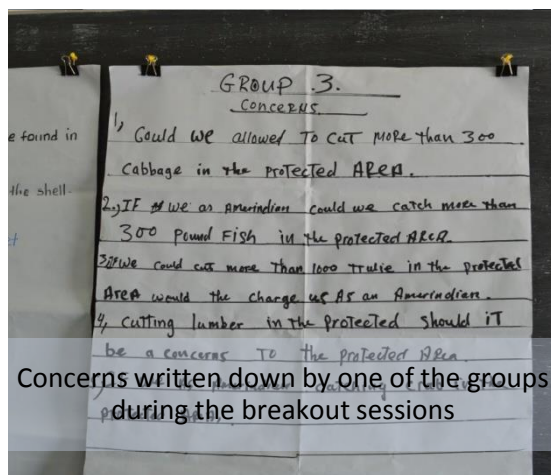
Community attendees looking at the Community Resource Use map



Group discussing their concerns and expectations



A community member explaining the expectations and concerns of his group



Concerns written down by one of the groups during the breakout sessions

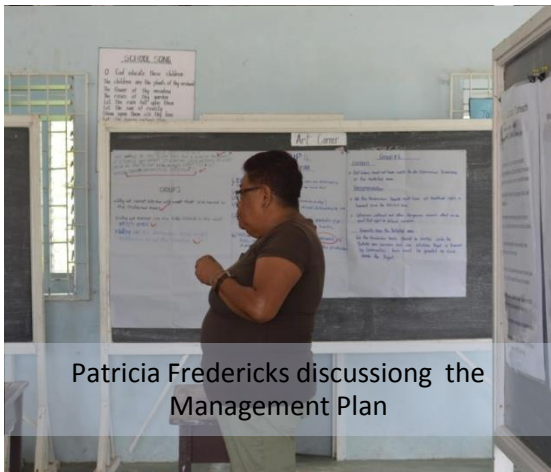




Community members reading through their FAQ booklet



Ms. Tana Yussuff presenting to the attendees



Patricia Fredericks discussing the Management Plan



Community member briefing the participants about the management planning process

## 4.11 Waramuri/Haimaracabra



Community participant looking at the Community Resource Use map



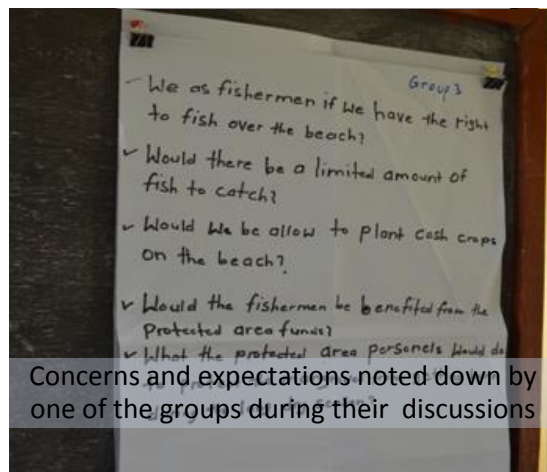
More community members discuss the Community Resource Use map



Community members in attendance



Group discussing their concerns and expectations during group breakout session



Concerns and expectations noted down by one of the groups during their discussions



## 4.12 Santa Rosa

### 4.12.1 *Kamwatta*



Educational shed located in the school compound with WWF Information posters on sea turtles.



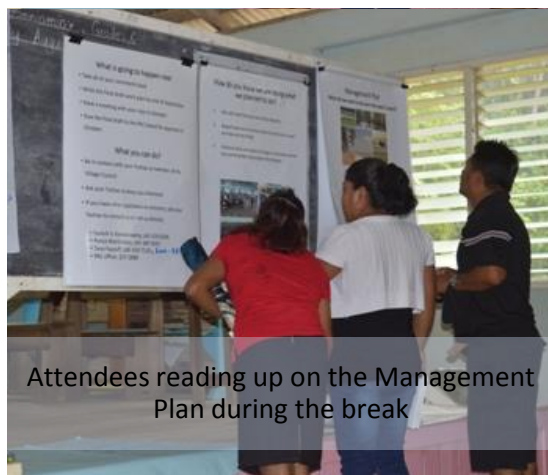
Rae Smith explains the Community Resource Use map to meeting participants



Community members presenting their concerns and expectations



A community member presenting the concerns and expectations of her group



Attendees reading up on the Management Plan during the break

### 4.12.2 Karaburi



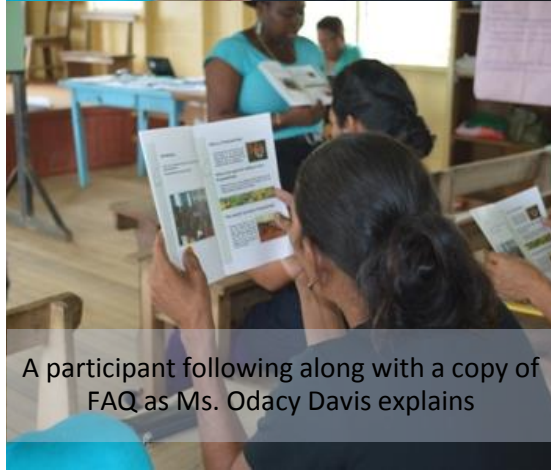
Cassava being prepared for the day's lunch



The team outside the Karaburi Primary School where the meeting was held



The meeting participants listening to Ms. Patricia Fredericks



A participant following along with a copy of FAQ as Ms. Odacy Davis explains



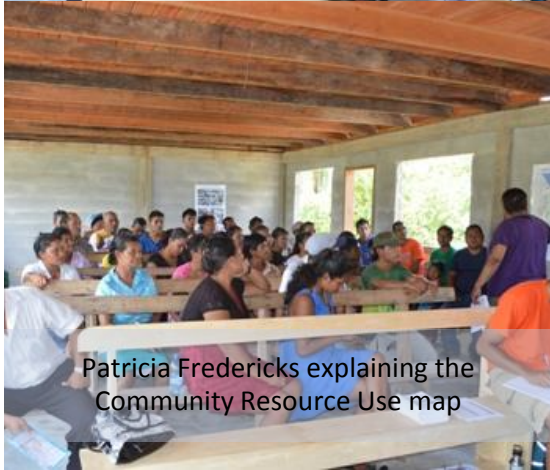
Community participants working on their concerns and expectations during a group breakout session



Community Members presenting their concerns and expectations discussed by their groups during the group discussions.



### 4.12.3 *Moracupha*



Patricia Fredericks explaining the Community Resource Use map



Community members in discussions at the meeting



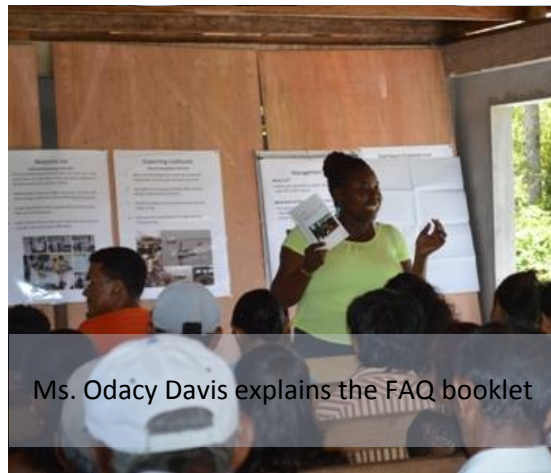
Group breakout session to discuss concern and expectations



Group breakout session to discuss concerns and expectations



Community member explain the concerns and expectations of her group

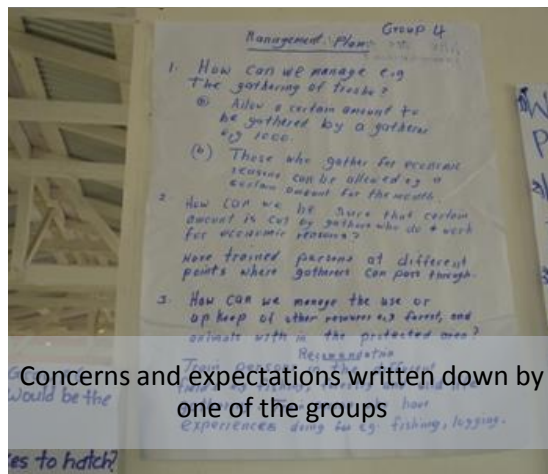


Ms. Odacy Davis explains the FAQ booklet

### 4.12.4 Koko



Welcome put together by the community for the team



Concerns and expectations written down by one of the groups



### 4.12.5 Santa Rosa Central and Islands



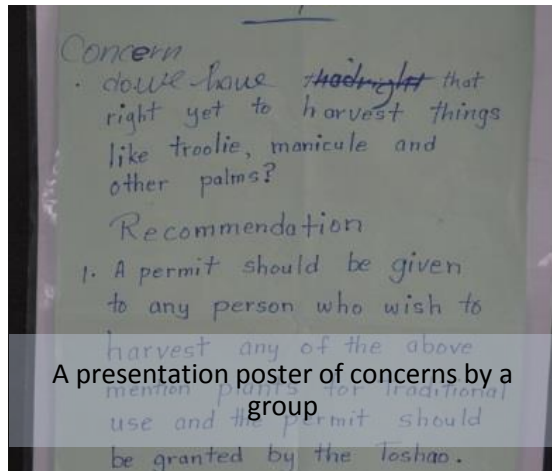
Groups presenting their discussion



A group discussing their concerns



The community observing as a facilitator presents on the plan to them



A presentation poster of concerns by a group

## 5 October Workshop

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The October Workshop took place on October 9<sup>th</sup> in Santa Rosa Region 1 and saw participation from National Stakeholders and 10 of the 11 Communities involved in the process. This meeting also welcomed the community of Unity Grant into the process as it was brought to the team’s attention during the planning process, that this was a small, untitled community located in the Protected Area. The following are a few pictures from the workshop. **(See the October Meeting Final Report for the full list of participants)**



Suresh Kandaswamy setting up the PowerPoint Presentations for the workshop



Patricia Fredericks waiting for participants to be registered to begin the workshop



Toshao Basil Cornelius of Santa Rosa shares some opening remarks and welcome



Mr. Carl Norton of Unity Grant introduces himself and his community as first time participants



Appendix 8: Photographs— SBPA Management Plan - Final, December 2014



Mr. Damian Fernandes, Commissioner of the Protected Areas Commission presenting on the Management Plan and Programmes



Ms. Tana Yussuff, Protected Areas Officer, presenting on Enforcement Action taken by the PAC



A community representative, Rudolph Joseph of Assakata, sharing his appreciation



Mahendra Saywack sharing closing remarks on behalf of the Ministry of Natural Resources and the Environment



The EPA and PAC representatives taking notes during the workshop



A group picture of the workshop attendees

# Appendix 9

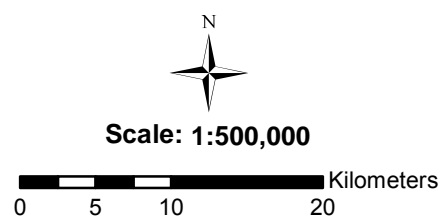
## Thematic Maps





# REPUBLIC OF GUYANA

## MAP SHOWING BOUNDARY OF THE SHELL BEACH PROTECTED AREA



### SHEET HISTORY

This Map was produced in the Land Information and Mapping Division of the Guyana Lands & Surveys Commission, and is based on the Administrative Map of Region 1, produced by the Land Information and Mapping Division of the Guyana Lands and Surveys Commission 2008. Additional information and field data supplied by the Guyana Marine Turtle Conservation Society and Protected Areas Commission.

The Regional boundaries are presented according to Act 12 of 1980. Geographical base is compiled from planimetric maps of Guyana at scale 1:50,000 edition 1960-1964 and topographic maps of Guyana at scale 1:50,000 edition 1974-1980.

Users noting corrections to this map are asked to mark them on the map and send to the Commissioner of Guyana Lands and Surveys Commission, 22 Upper Hadfield Street Lodge, Georgetown, Guyana.

This Map is not an Authority on International Boundaries.

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**Legend**

- Protected Area Boundary
- Amerindian Land Titles

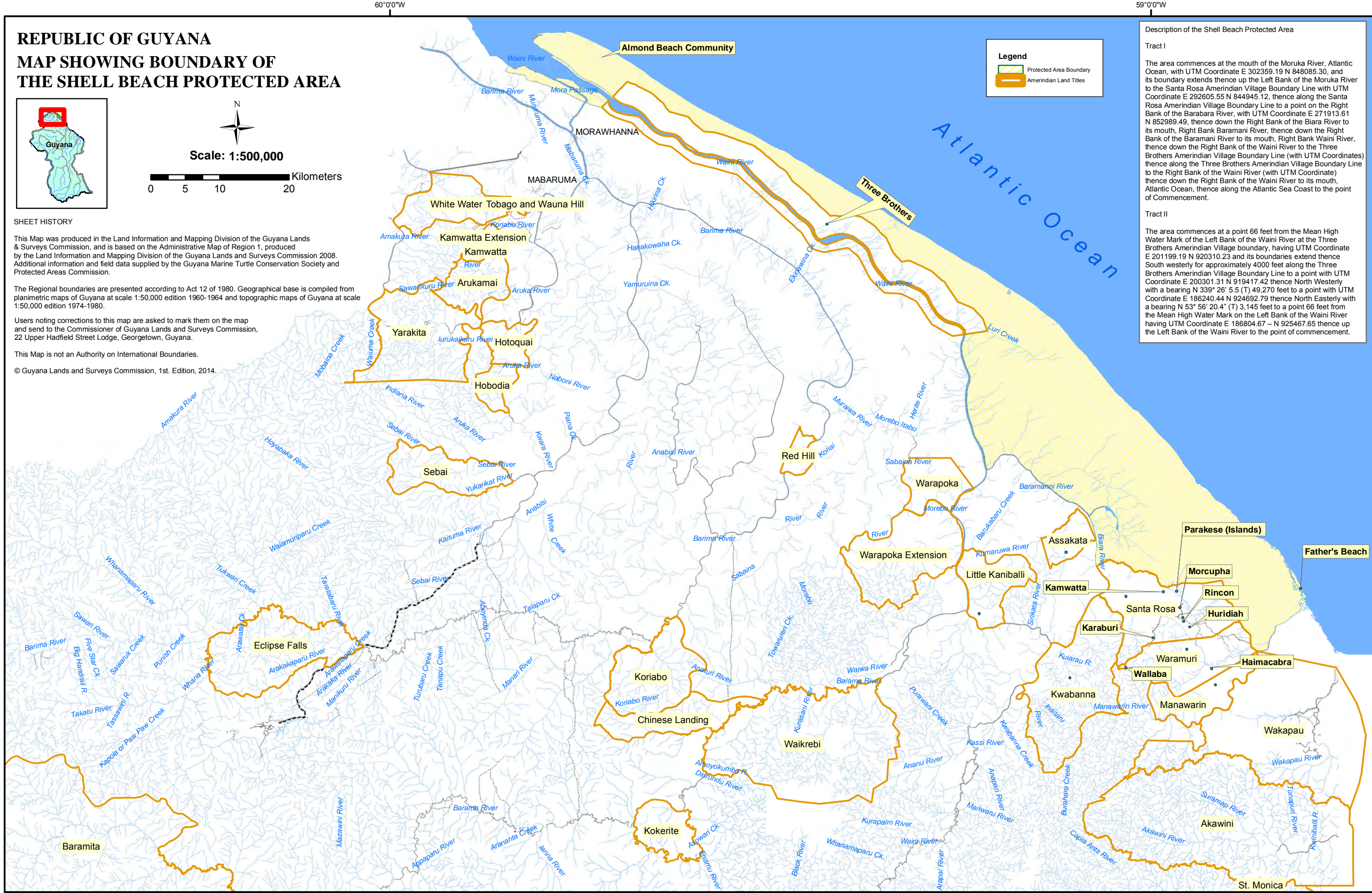
**Description of the Shell Beach Protected Area**

**Tract I**

The area commences at the mouth of the Moruka River, Atlantic Ocean, with UTM Coordinate E 302359.19 N 848085.30, and its boundary extends thence up the Left Bank of the Moruka River to the Santa Rosa Amerindian Village Boundary Line with UTM Coordinate E 292605.55 N 844945.12, thence along the Santa Rosa Amerindian Village Boundary Line to a point on the Right Bank of the Barabara River, with UTM Coordinate E 271913.61 N 852989.49, thence down the Right Bank of the Biara River to its mouth, Right Bank Baramani River, thence down the Right Bank of the Baramani River to its mouth, Right Bank Waini River, thence down the Right Bank of the Waini River to the Three Brothers Amerindian Village Boundary Line (with UTM Coordinates) thence along the Three Brothers Amerindian Village Boundary Line to the Right Bank of the Waini River (with UTM Coordinate) thence down the Right Bank of the Waini River to its mouth, Atlantic Ocean, thence along the Atlantic Sea Coast to the point of Commencement.

**Tract II**

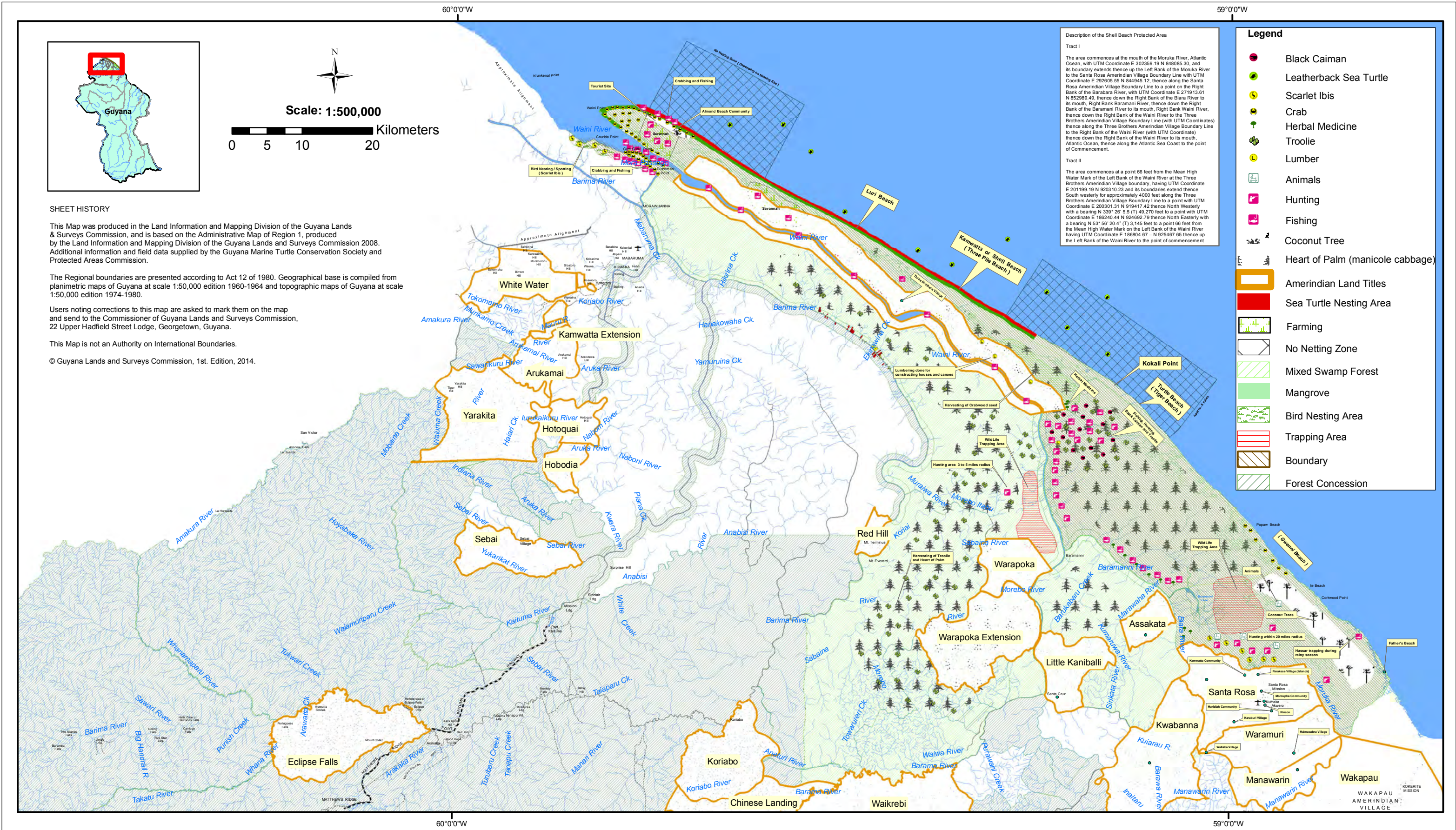
The area commences at a point 66 feet from the Mean High Water Mark of the Left Bank of the Waini River at the Three Brothers Amerindian Village boundary, having UTM Coordinate E 201199.19 N 920310.23 and its boundaries extend thence South westerly for approximately 4000 feet along the Three Brothers Amerindian Village Boundary Line to a point with UTM Coordinate E 200301.31 N 919417.42 thence North Westerly with a bearing N 339° 26' 5.5 (T) 49,270 feet to a point with UTM Coordinate E 186240.44 N 924692.79 thence North Easterly with a bearing N 53° 56' 20.4" (T) 3,145 feet to a point 66 feet from the Mean High Water Mark on the Left Bank of the Waini River having UTM Coordinate E 186804.67 - N 925467.65 thence up the Left Bank of the Waini River to the point of commencement.





# REPUBLIC OF GUYANA

## MAP SHOWING BOUNDARY OF THE SHELL BEACH PROTECTED AREA AND COMMUNITY RESOURCE USE



### SHEET HISTORY

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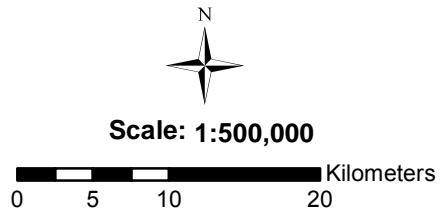
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# REPUBLIC OF GUYANA MAP SHOWING BOUNDARY OF THE SHELL BEACH PROTECTED AREA AND LAND COVER



## SHEET HISTORY

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## Legend

- Protected Area Boundary
- Amerindian Land Titles

## Land Cover

- Coconut Palms
- Halophytic Swamp
- Herbaceous Swamp
- Mangroves
- Mixed Agriculture
- Mixed Swamp Forest
- Open Water
- Sandy Beaches
- Typha Swamp

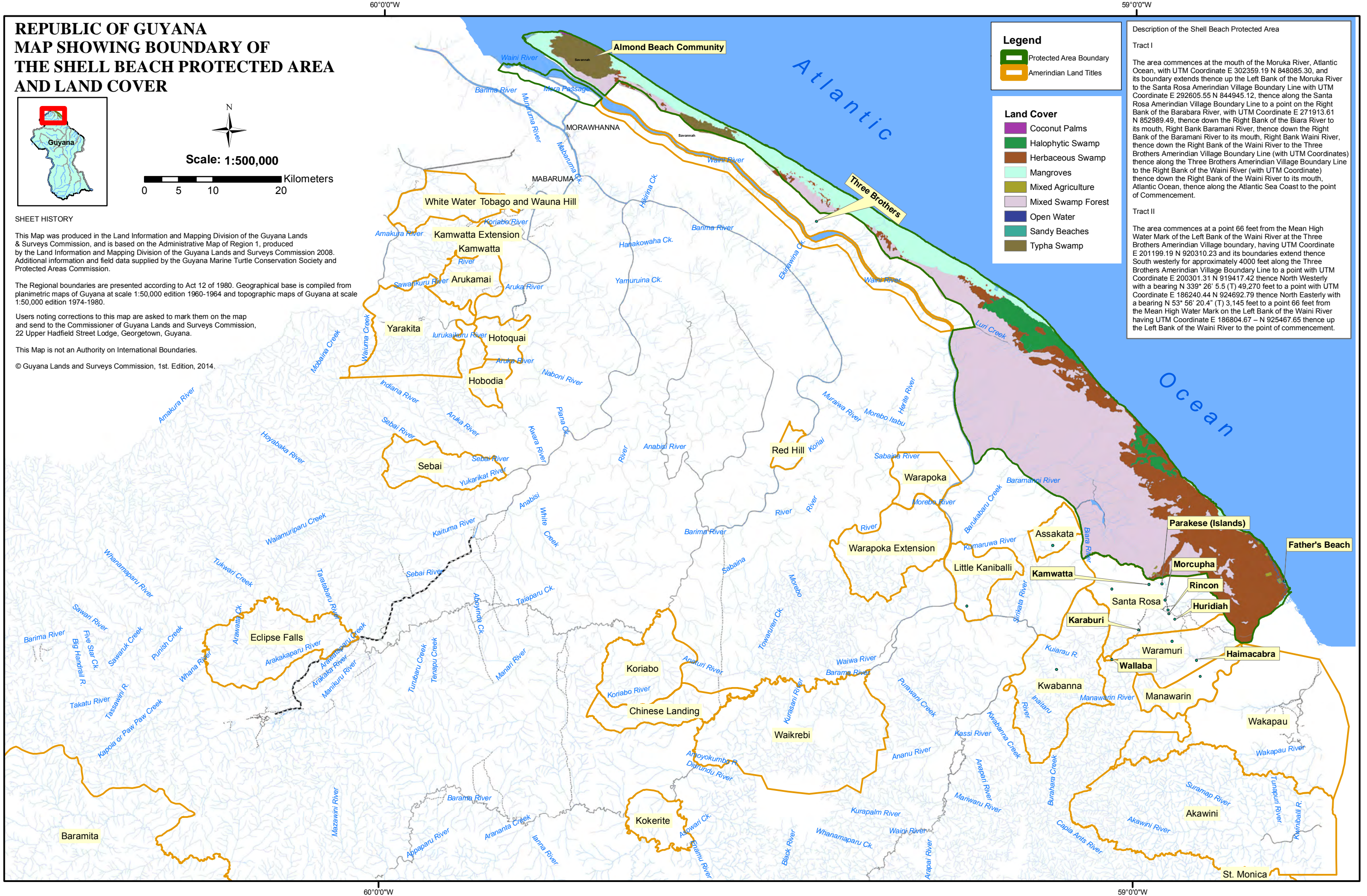
## Description of the Shell Beach Protected Area

### Tract I

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### Tract II

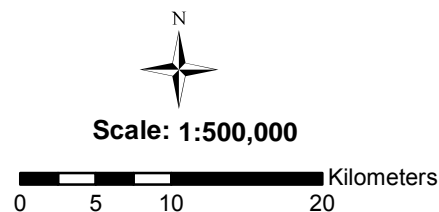
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# REPUBLIC OF GUYANA

## MAP SHOWING BOUNDARY OF THE SHELL BEACH PROTECTED AREA AND BURNED MANGROVE



### SHEET HISTORY

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### Legend

- Protected Area Boundary
- Amerindian Land Titles
- Burned Mangrove

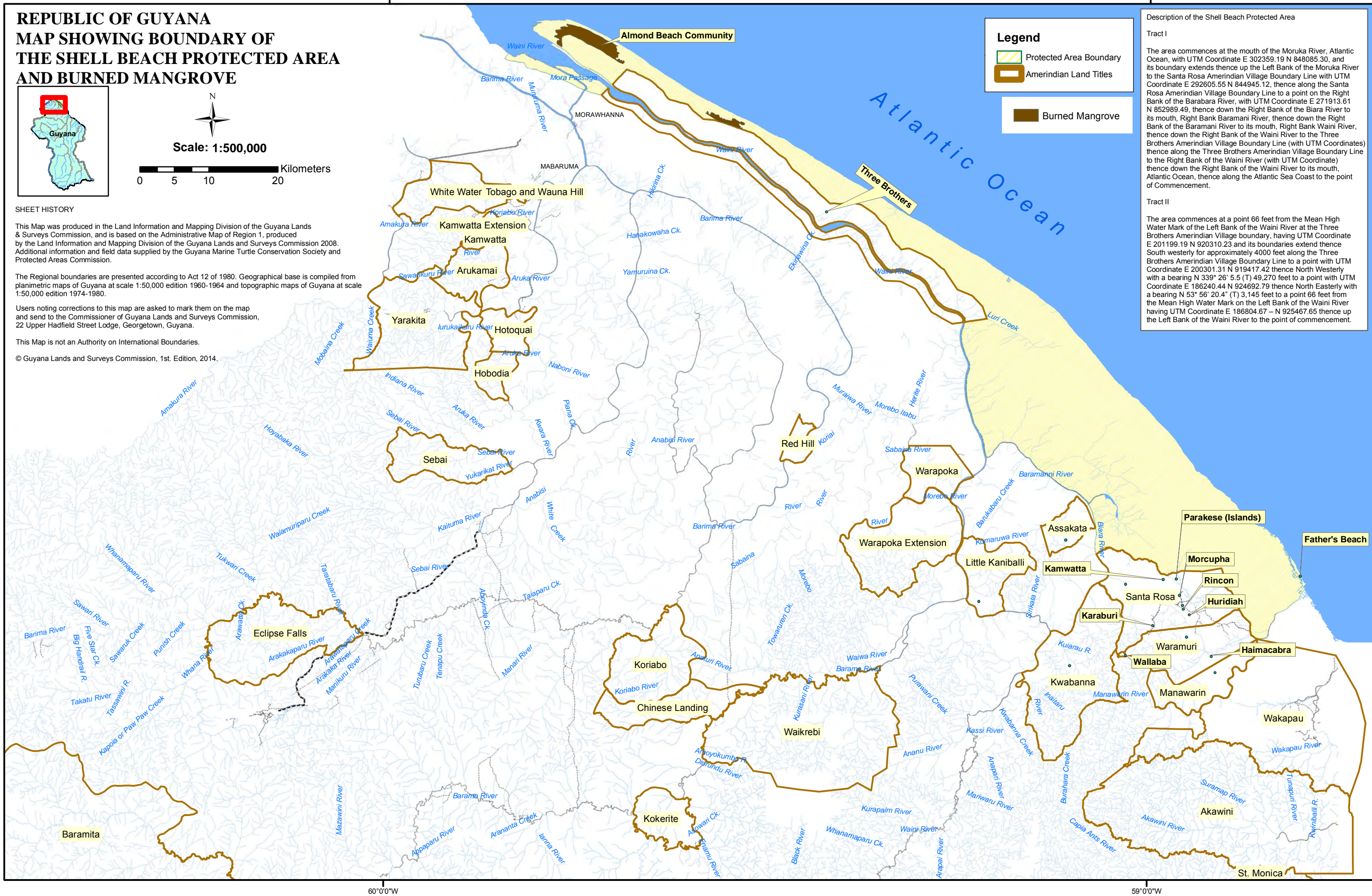
### Description of the Shell Beach Protected Area

#### Tract I

The area commences at the mouth of the Moruka River, Atlantic Ocean, with UTM Coordinate E 302359.19 N 848085.30, and its boundary extends thence up the Left Bank of the Moruka River to the Santa Rosa Amerindian Village Boundary Line with UTM Coordinate E 292605.55 N 844945.12, thence along the Santa Rosa Amerindian Village Boundary Line to a point on the Right Bank of the Barabara River, with UTM Coordinate E 271913.61 N 852989.49, thence down the Right Bank of the Biara River to its mouth, Right Bank Baramani River, thence down the Right Bank of the Baramani River to its mouth, Right Bank Waini River, thence down the Right Bank of the Waini River to the Three Brothers Amerindian Village Boundary Line (with UTM Coordinates) thence along the Three Brothers Amerindian Village Boundary Line to the Right Bank of the Waini River (with UTM Coordinate) thence down the Right Bank of the Waini River to its mouth, Atlantic Ocean, thence along the Atlantic Sea Coast to the point of Commencement.

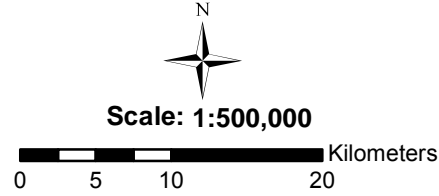
#### Tract II

The area commences at a point 66 feet from the Mean High Water Mark of the Left Bank of the Waini River at the Three Brothers Amerindian Village boundary, having UTM Coordinate E 201199.19 N 920310.23 and its boundaries extend thence South westerly for approximately 4000 feet along the Three Brothers Amerindian Village Boundary Line to a point with UTM Coordinate E 200301.31 N 919417.42 thence North Westerly with a bearing N 339° 26' 5.5 (T) 49,270 feet to a point with UTM Coordinate E 186240.44 N 924692.79 thence North Easterly with a bearing N 53° 56' 20.4" (T) 3,145 feet to a point 66 feet from the Mean High Water Mark on the Left Bank of the Waini River having UTM Coordinate E 186804.67 - N 925467.65 thence up the Left Bank of the Waini River to the point of commencement.





# REPUBLIC OF GUYANA MAP SHOWING BOUNDARY OF THE SHELL BEACH PROTECTED AREA AND FOREST CONCESSIONS



## SHEET HISTORY

This Map was produced in the Land Information and Mapping Division of the Guyana Lands & Surveys Commission, and is based on the Administrative Map of Region 1, produced by the Land Information and Mapping Division of the Guyana Lands and Surveys Commission 2008. Additional information and field data supplied by the Guyana Marine Turtle Conservation Society and Protected Areas Commission.

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## Legend

- Protected Area Boundary
- Amerindian Land Titles

## Forest Concessions

- North West State Forest Permits
- Timber Sale Agreements & Wood Cutting Leases

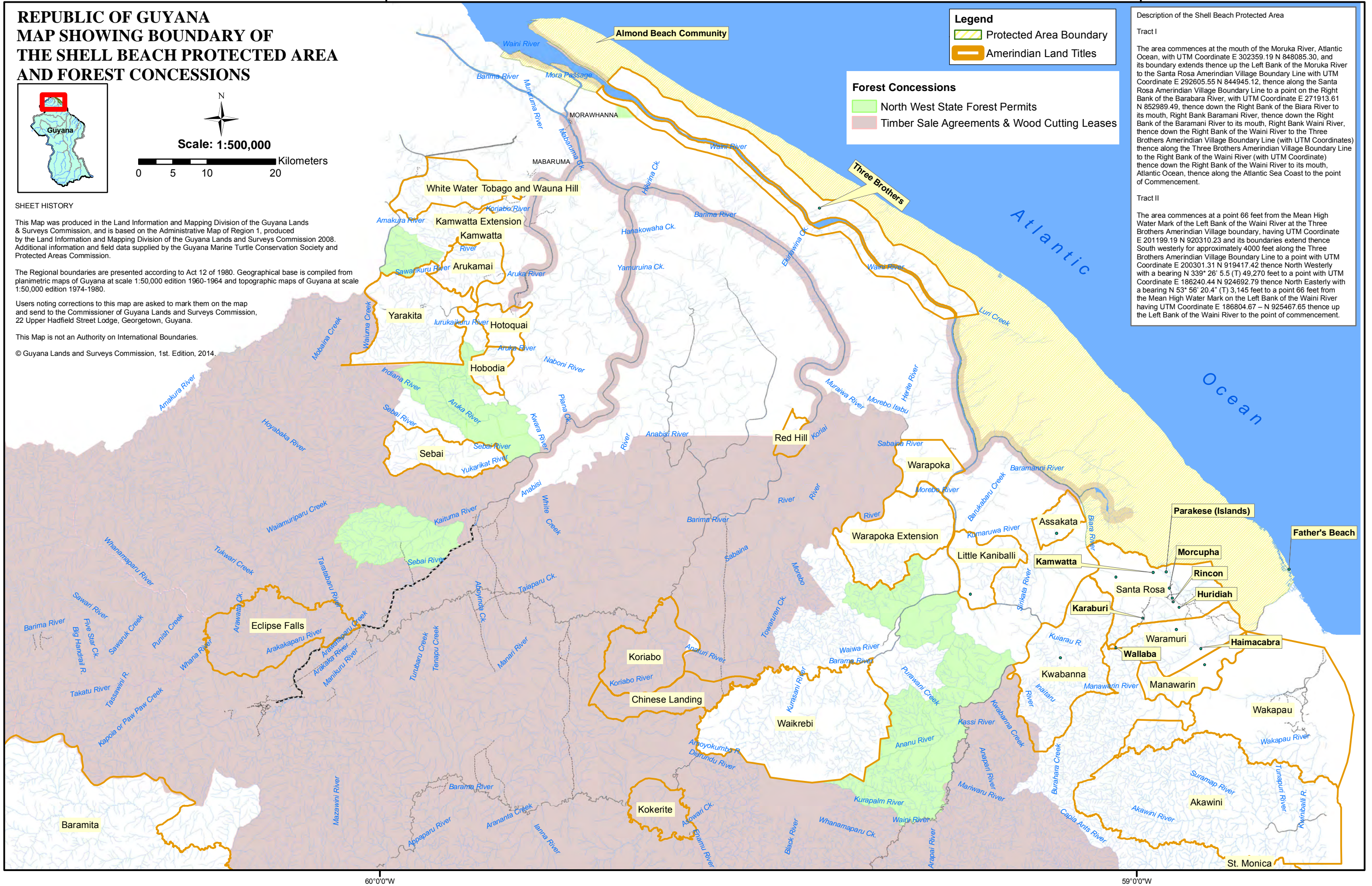
## Description of the Shell Beach Protected Area

### Tract I

The area commences at the mouth of the Moruka River, Atlantic Ocean, with UTM Coordinate E 302359.19 N 848085.30, and its boundary extends thence up the Left Bank of the Moruka River to the Santa Rosa Amerindian Village Boundary Line with UTM Coordinate E 292605.55 N 844945.12, thence along the Santa Rosa Amerindian Village Boundary Line to a point on the Right Bank of the Barabara River, with UTM Coordinate E 271913.61 N 852989.49, thence down the Right Bank of the Biara River to its mouth, Right Bank Baramani River, thence down the Right Bank of the Baramani River to its mouth, Right Bank Waini River, thence down the Right Bank of the Waini River to the Three Brothers Amerindian Village Boundary Line (with UTM Coordinates) thence along the Three Brothers Amerindian Village Boundary Line to the Right Bank of the Waini River (with UTM Coordinate) thence down the Right Bank of the Waini River to its mouth, Atlantic Ocean, thence along the Atlantic Sea Coast to the point of Commencement.

### Tract II

The area commences at a point 66 feet from the Mean High Water Mark of the Left Bank of the Waini River at the Three Brothers Amerindian Village boundary, having UTM Coordinate E 201199.19 N 920310.23 and its boundaries extend thence South westerly for approximately 4000 feet along the Three Brothers Amerindian Village Boundary Line to a point with UTM Coordinate E 200301.31 N 919417.42 thence North Westerly with a bearing N 339° 26' 5.5 (T) 49,270 feet to a point with UTM Coordinate E 186240.44 N 924692.79 thence North Easterly with a bearing N 53° 56' 20.4" (T) 3,145 feet to a point 66 feet from the Mean High Water Mark on the Left Bank of the Waini River having UTM Coordinate E 186804.67 - N 925467.65 thence up the Left Bank of the Waini River to the point of commencement.

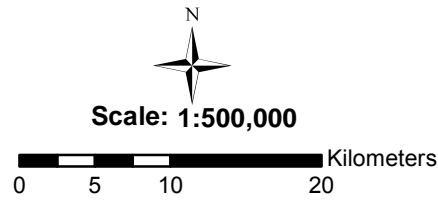


60°0'0"W

59°0'0"W



# REPUBLIC OF GUYANA MAP SHOWING BOUNDARY OF THE SHELL BEACH PROTECTED AREA AND MINING CONCESSIONS



## SHEET HISTORY

This Map was produced in the Land Information and Mapping Division of the Guyana Lands & Surveys Commission, and is based on the Administrative Map of Region 1, produced by the Land Information and Mapping Division of the Guyana Lands and Surveys Commission 2008. Additional information and field data supplied by the Guyana Marine Turtle Conservation Society and Protected Areas Commission.

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## Legend

- Protected Area Boundary
- Amerindian Land Titles

## Mining Concessions

- Largescale current
- Claim licence recommended
- Mineral licences current
- Special mining permit current

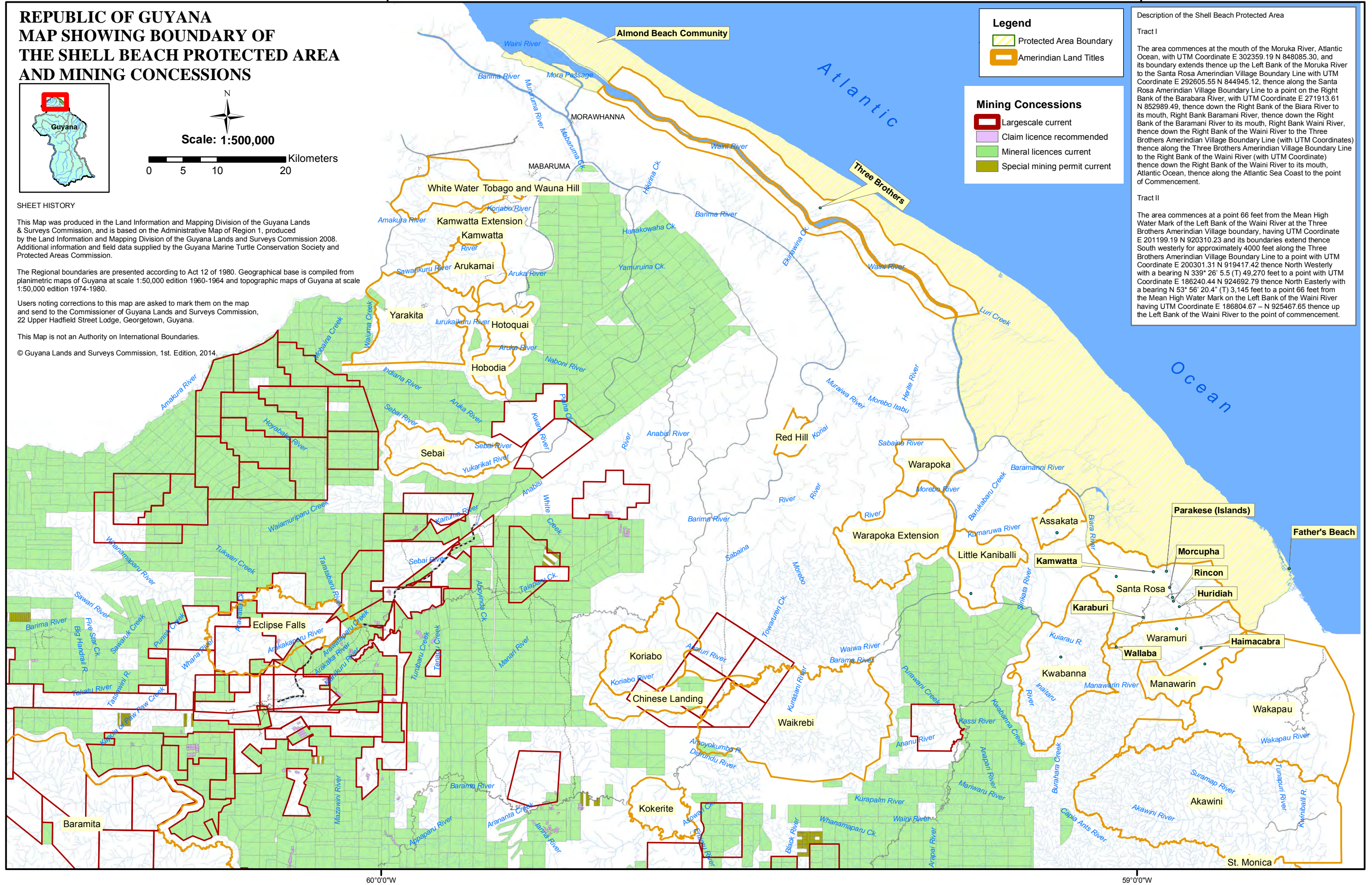
## Description of the Shell Beach Protected Area

### Tract I

The area commences at the mouth of the Moruka River, Atlantic Ocean, with UTM Coordinate E 302359.19 N 848085.30, and its boundary extends thence up the Left Bank of the Moruka River to the Santa Rosa Amerindian Village Boundary Line with UTM Coordinate E 292605.55 N 844945.12, thence along the Santa Rosa Amerindian Village Boundary Line to a point on the Right Bank of the Barabara River, with UTM Coordinate E 271913.61 N 852989.49, thence down the Right Bank of the Biara River to its mouth, Right Bank Baramani River, thence down the Right Bank of the Baramani River to its mouth, Right Bank Waini River, thence down the Right Bank of the Waini River to the Three Brothers Amerindian Village Boundary Line (with UTM Coordinates) thence along the Three Brothers Amerindian Village Boundary Line to the Right Bank of the Waini River (with UTM Coordinate) thence down the Right Bank of the Waini River to its mouth, Atlantic Ocean, thence along the Atlantic Sea Coast to the point of Commencement.

### Tract II

The area commences at a point 66 feet from the Mean High Water Mark of the Left Bank of the Waini River at the Three Brothers Amerindian Village boundary, having UTM Coordinate E 201199.19 N 920310.23 and its boundaries extend thence South westerly for approximately 4000 feet along the Three Brothers Amerindian Village Boundary Line to a point with UTM Coordinate E 200301.31 N 919417.42 thence North Westerly with a bearing N 339° 26' 5.5 (T) 49,270 feet to a point with UTM Coordinate E 186240.44 N 924692.79 thence North Easterly with a bearing N 53° 56' 20.4" (T) 3,145 feet to a point 66 feet from the Mean High Water Mark on the Left Bank of the Waini River having UTM Coordinate E 186804.67 - N 925467.65 thence up the Left Bank of the Waini River to the point of commencement.





# Appendix 10

## Physiographic and Biological Features





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## Acronyms and Abbreviations

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°C	degree Celcius
GL&SC	Guyana Lands and Surveys Commission
GMTCS	Guyana Marine Turtle Conservation Society
ha	Hectares
kms	Kilometers
km <sup>2</sup>	square kilometer
m	Meter
mm	Millimeter
PAC	Protected Areas Commission
SBPA	Shell Beach Protected Area



## 1 Climate

---

As a country located in the equatorial region, the country is influenced by the equatorial trough and the seasonal movements of the intertropical convergence (Snow 1976 in Hollowell, 2009). The mean annual temperature for the coastal zone of Guyana is approximately 26.5 °C with only about 1 °C to 1.5 °C difference between the mean temperature of the warmest and coolest months. There are two dry seasons and two wet seasons per year. The primary wet season runs from April to August and the secondary wet season from November to February. The mean annual rainfall is approximately 2,500 millimeter (mm) to 3,400 mm per year in the coastal area of the Northwest District (Hollowell, 2009). June and January are considered to be the wettest months. Observations by Hollowell indicate that rain often develops several kilometers inland of the Waini Peninsula while it might remain dry on the coast. Increased surface roughness from the ocean is considered to be the cause of the more inland precipitation.

## 2 Physical Features

---

The Shell Beach Protected Area (SBPA) is located in the northwest part of Guyana, in Region 1, stretching over 120 kilometers (kms) of beach and mudflats. It covers an approximate area of 120,300 hectares (ha) (1,203 km<sup>2</sup>; 297,268 acres). The SBPA is relatively flat with elevation ranging from less than 1 meter (m) to 25m (GFA Consulting Group, 2009). The area gets its name from the presence of beach composed of fragmented mollusks, bivalved, and univalved shells. Mudflats are present in front of the shells, mangroves are found inland of the shells, and swamp forests inland of the mangroves (Charles *et. al.*, 2004).

The Shell Beach area is considered to be geologically young. Even though sea levels rose in much of the world during the past 17,000 years inundating shorelines, it was different along the coastal areas affected by drainage in the Guiana Shield. The silt from the many rivers resulted in new lands being formed along the coastline. This new land formation was stabilized by the emergence of mangrove forests (Charles *et. al.*, 2004).

The Guiana Shield is a natural geological unit characterized by ancient bedrock with sandstone and igneous highlands. It is bound by the Atlantic Ocean to the east, the Orinoco River to the north and west, and the Negro and Amazon Rivers to the South. The Shield is one of the three cratons of the South American Plate and is considered to be a 1.7 billion years old Precambrian geological formation. It lies beneath much of Guyana, Suriname, French Guiana, and parts of Columbia, Venezuela, and Brazil.

Hollowell (2009), provides a description of soils in the Waini Peninsula based on information derived from various sources. The authors noted in the the soils description are the original

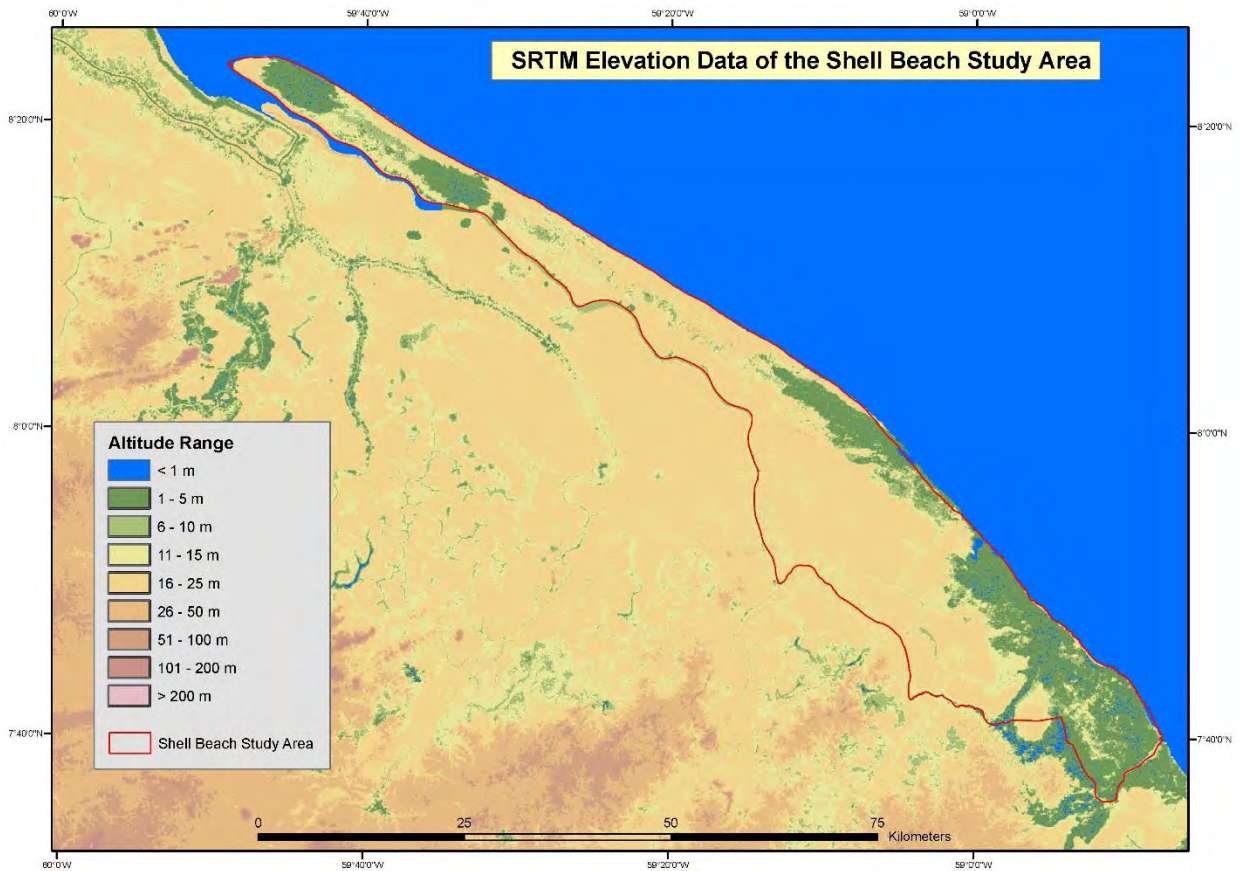
authors cited by Hollowell. The soils of the Waini Peninsula are formed from accretion of fine sediments in very deep layers over recent geological time (Brinkman and Pons, 1968; Gibbs and Barron, 1993). The soils are classified as Demerara Series, Coronie deposits, of the Comowine phase, which are marine clays with high base saturation, deposited less than 1000 years ago. The soils could also be classified as Vetrisolts since they meet the requirements of forming cracks on a regular basis (Soil Survey Staff, 1998). The horizon layer of organic materials ranges from 5-15 cm in thickness. Most of the mangrove swamps are reported to have had organic horizons in similar thickness. The inland Mixed Freshwater swamps had organic horizon thickness ranging from 15-20 cm thick but was minimal in areas where fires had burned the soils in 1998. The organic layers were reported to be shallow compared with the “pegasse” peat, which is several meters deep, in the coastal plain swamps found further inland, for example in the plam savannas in the Santa Rosa area (van Andel, 2000).

The beach ridges and cheniers are composed of fine shell fragments with minimal coarse sand. These very young soils can be classified as typic Psammaquents or Psammments (Soil Survey Staff, 1998), with fine shell materials derived from both riverine and marine sources (Brinkman and Pons, 1968). The offshore mudflats could possibly be classified as Halic typic Hydraquents, although they are thought to be unsuitable for colonization by plants (Soil Survey Staff, 1998). Since the offshore mudflats are often inundated and/or unstable to support plant growth, Hollowell notes that these mudflats could be considered to be non-soil.

Most of the sediments are considered to originate from the Amazon with minor amounts from the Essequibo, Waini and the Orinoco Rivers. The south to north current carry and deposit the sediments along Guyana’s coast. The sediments form a deltaic environment with a wide coastal shelf made up of fine sediments (Hollowell, 2009). Silt continues to accrete even to this day even though sea levels stabilized about 6000 years ago (Charles *et. al.*, 2004).

As part of the erosion and deposition cycle, coarser sand and shell fragments are released from the sediments to form beach ridges which often isolate sections of mangrove forests from the sea. Almond Beach at the time of the GFA study in 2009 was said to have had the widest beach ridge on the Waini Peninsula at 160m wide.

Figure 1: Elevation Data for the Shell Beach Area



GFA Consulting Group (2009)

## 2.1 Water bodies

SBPA is surrounded by water. The waterways that surround the SBPA are the Moruca River starting at the Atlantic Ocean in the southern boundary of SBPA; Barabara River, Biara River, Baramanni River, and the Waini River which flows into the Atlantic Ocean in the northern part of SBPA bordering Venezuela (**Appendix 9**).

The SBPA is bordered on the northeastern side by the Atlantic Ocean from the mouth of the Waini River to the mouth of the Moruca River to the southeast. The most significant open water area is the Baramanni Lake in the southern part of the SBPA. Baramani Lake was one of the 23 wetlands identified and characterized by World Wildlife Fund-Guianas as part of their baseline study in 2012 (WWF-Guianas, 2012). The study did not however provide details on the health of the wetland. Fed by many tributaries, Waini River covers a large area and is considered to play an important role for the ecosystems of the SBPA (GFA Consulting Group, 2009).

## 2.2 Coastline changes and sea water intrusion

The coastline is constantly changing under the influence of natural forces such as wind, waves and sea currents. Past data showed considerable erosion along the beaches. Satellite data from 2007 showed that in certain sections of the coastline there has been regression of up to 1,100 m from 1987 to 2007 (GFA Consulting Group, 2009). It has been noted by the Guyana Marine Turtle Conservation Society (GMTCS) and Almond Beach community members over the past few years, and by the management planning team in August 2014 (SBMPT, 2014) that beach erosion at Almond Beach is taking place at a fast pace. SBMPT also noted that the beach is accreting further northwest of Almond Beach towards the Waini mouth.

**Picture 1: Beach Erosion at Almond Beach**



(Photo credit: Suresh V. Kandaswamy)

There are concerns that climate change and resulting sea level rise is also causing beach erosion along the coast. However, it is to be noted that accretion and decretion occur naturally over time. In the context of marine turtle conservation, erosion of beaches which serve as nesting grounds might be cause for concern. The impact of beach movement on marine turtles is currently unknown.



**Picture 2: Beach Accretion North of Almond Beach**



(Photo credit: Suresh V. Kandaswamy)

The GFA Consulting Group (2009) report also noted that there was sea water intrusion into the middle section of the SBPA. The report considers coastal erosion over the past 20 years as a cause for increased intrusion of sea water. It is noted that during extreme tides, waves are frequently spilling sea water into the swamp. Sea water inlets were also visible from the air. Intrusion of sea water was visible on all satellite images since 1987.

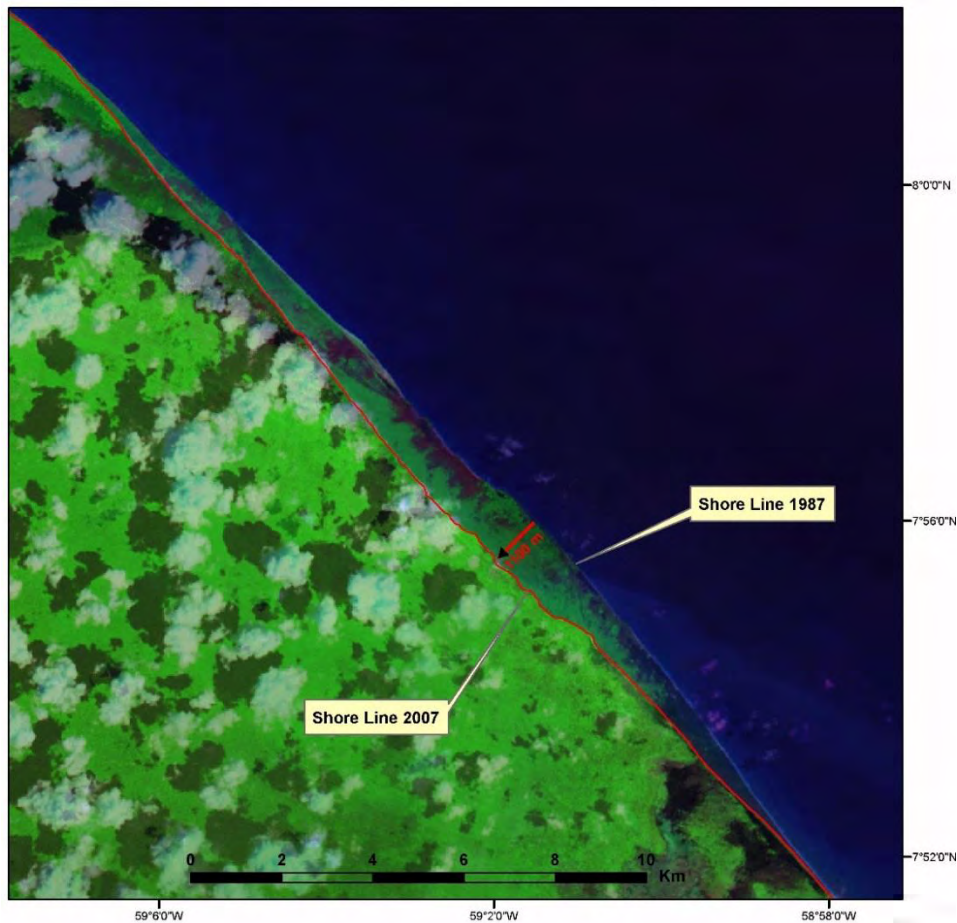
The slow migration of the mud banks along the coast leads to cycles of shore erosion and redeposition that is unlike typical coastal dynamics that would produce relatively straight coastlines. As noted previously, these cycles of erosion and deposition result in coarser sand and shell fragments being released from the sediments and deposited to form beach ridges that may accumulate up to 200 meters in width (Hollowell, 2009). Hollowell notes that during the time of his field visit between 1997 and 2001, the beach ridge at Almond Beach was 160 meters wide and shell deposits about 2 meters deep. However, as noted previously, with erosion, this is not the case at the present time.



The GFA study noted that accumulation of mud along the coastline was generating new spits of land. Spits are considered to be unstable, which disappear after some years. But at the tip of the Waini peninsula it was noted that such accumulations have become stable and the new land was supported by *Avicennia* growth. This process is considered to be ongoing (GFA Consulting Group, 2009).

Older beach ridges occur within the coastal mangrove swamps on the Waini peninsula. These run approximately parallel to the present shoreline. Such ridges are evidence of long-term coastal accretion, as they represent former shorelines (Hollowell, 2009).

**Figure 2: Shoreline Regression**



(GFA Consulting Group, 2009).

### 2.3 Climate Change and the Ecosystem

Climate change is a major problem for states with coastal zones. Intergovernmental Panel on Climate Change (IPCC)'s (IPCC 2001) Third Assessment Report predicted a sea level rise in the range of 0.09 to 0.88m by the year 2100. IPCC's 2013 Fifth Assessment Report revised the predictions to show that global sea levels are expected to rise even higher between 0.52 to 0.98m

by 2100 if emissions continue to rise, and by 0.28 – 0.61m if emission are cut significantly (Church, *et. al.*, 2013).

Rising sea levels is particularly a problem for Guyana since much of the coastal areas are below sea level or low lying. Given that elevation is low along much of SBPA coastland, SBPA is vulnerable to environmental impacts arising from future predicted sea level rise. Increased sea levels, reduced salinity, and increased water temperatures, can have unpredictable impacts on mangrove forests and inter-tidal species (GFA Consulting Group, 2009). Climate related research and impacts on the ecosystem, as well as climate mitigation and adaptation measures will be important as part of the management programme to conserve the mangrove forests and aquatic species. GFA's report also suggests incorporating sea defense measures as a means to mitigate sea water intrusion into SBPA.

## 3 Biological Features

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### 3.1 Land cover

SBPA and its surroundings is rich in biodiversity with relatively intact and productive ecosystems. The inaccessibility of the region has generally been responsible for keeping the region relatively intact. It includes mangroves, mixed swamp forests, herbaceous swamp, and seasonally flooded *(Mauritius)* palm savannahs. A land cover map is included in **Appendix 9** within Volume 2. The proportion of the land cover include:

**Table 1: Land Cover Types within SBPA**

Land Cover Type	Area (km <sup>2</sup> )	Percentage
Mangrove Forest	156.7	13.02
Mixed Swamp Forest	665.1	55.28
Herbaceous Swamp	275.2	22.87
Typha Swamp	46.3	3.85
Halophytic Swamp (Salt water)	53.2	4.42
Mixed Agriculture	1.9	0.16
Coconut Palms	0.7	0.06
Sandy Beaches	2.5	0.21
Open Water	1.5	0.13

<b>Total Area</b>	<b>1203.1</b>	<b>100</b>
-------------------	---------------	------------

(GFA Consulting Group, 2009; Updated land cover types based on official SBPA boundary provided by Guyana Lands and Surveys Commission (GL&SC)).

**Table 2: Forested and Non-Forested Areas of the SBPA**

<b>General land cover</b>	<b>Area (km<sup>2</sup>)</b>	<b>% of total area</b>
Forest areas	821.8	68.30
Swamp areas	374.7	31.14
Other	6.6	0.56
<b>Total</b>	<b>1203.1</b>	<b>100</b>

(GFA Consulting Group, 2009; Updated land cover types based on official SBPA boundary provided by GL&SC).

### 3.2 Mangrove Forest

Region 1 has a large intact mangroves ecosystem along the coast between Pomeroon and Waini Rivers, which falls predominantly within the Shell Beach Protected Area. The Waini peninsula is also the site of the majority of Guyana’s remaining mangrove swamps (Hallowell, 2009). Mangrove forests occur in a narrow belt of a few kilometers wide along the Atlantic coast, along the lower reaches and mouth of the Waini River and in a small portion along the Moruca River. The coastal mangrove occurrence is the last remaining coherent mangrove area of Guyana. 13 percent of SBPA’s land cover comprises of mangrove forests covering an area of 15,670 ha (156.7 km<sup>2</sup>). The extent of mangrove forests in Region 1 is estimated at 49,100 ha compared with the national total of 80,432 ha, which is 61 percent of the total. Given that the rest of the mangrove forests along the coast east of the Pomeroon River to the border with Suriname have been cut, drained, and developed, this remaining and relatively intact mangrove forest is of significant ecological importance and value.

The importance of mangrove forests to Guyana is seen in the development of a National Mangrove Management Action Plan (NMMAP). The goals of the NMMAP is “to respond to climate change and to mitigate its effects through the protection, rehabilitation and wise use of Guyana’s mangrove ecosystem through processes that maintain their protective functions, values and biodiversity while meeting the socio-economic development and environmental protection needs in estuarine and coastal areas” (MAP, 2010:6).

Mangroves are highly productive ecosystems supporting diverse biodiversity and socio-economic activity and is important in the Shell Beach Protected Area context. They provide many ecosystem services. Mangroves act as sediment traps which lead to accretion of coastal sediments and protection of low-lying areas. They serve as a sea defence mechanism. Mangroves also contribute to carbon sequestration to an estimated amount of 17 metric tonnes of carbon per ha/year. The vast mangrove forests also serve as nurseries for a variety of fish species. Mangroves in the global context are known to economically benefit fisherpersons, however in Guyana's context, the economic contribution of mangroves to the fishing industry is not known (MAP, 2010). Economically, mangroves also contribute products such as timber, firewood, tannins, and honey (MAP, 2010).

### 3.2.1 Coastal Mangrove Swamp Vegetation

The coastal mangroves spread along the Atlantic coast in brackish waters. The canopy ranges from 12 to 25m. The vegetation of the coastal mangrove swamps is primarily made up of black mangrove, *Avicennia germinans*, and some mixed mangrove forest species. The mixed swamp vegetation include the red mangrove, *Rhizophora mangle*, and the white mangrove, *Laguncularia racemosa*. Other species include the golden leather fern, *Acrostichum aureum*, found among the *Avicennia germinans* and inland leather fern, *Acrostichum danaeifolium*, found more inland of the swamp. Button mangrove, *Conocarpus erectus*, is also found in the swamp environment. Further inland mangrove species mix with *Euterpe oleracea* palms and such trees as Sangre de Drago, *Pterocarpus officinalis* (GFA Consulting Group, 2009).

According to Hollowell (2009) there are sometimes beach ridges separating swamps from tidal inundation, although waves at high tide often wash over narrower beach ridges and flow directly into the mangrove swamp. Those swamps behind beach ridges can also be referred to as occluded swamps, due to their separation from the sea. Inlets into tidal streams are not frequent on the Waini Peninsula and can become blocked by sediment deposits, forming lagoons behind the beach ridges.

### 3.2.2 Riverine Mangrove Swamp Vegetation

The swamps that line the tidal Waini River are inundated twice daily with brackish river water, since there are no barriers to tides similar to the beach ridges isolating many Coastal Mangrove swamps. Red mangrove, *Rhizophora racemosa*, is dominant as a fringe species along the Waini River and extends inland on the soft, muddy substrate to the tidal limit. This species resembles the red mangrove, *Rhizophora mangle*. The understory of this swamp is primarily made up of young *Rhizophora* saplings and golden leather fern, *Acrostichum aureum*. The palm *Nypa fruticans* is also a common species in this swamp type (GFA Consulting Group, 2009).

**Picture 3: Mangroves along Waini River**



(Photo credit: Suresh V. Kandaswamy)

### 3.3 Mixed Swamp Forest

Mixed swamp forest is the dominant land cover class in the study area covering an area of 66,510 ha (665.1 km<sup>2</sup>) or approximately 55.3 percent of the SBPA. Swamp forest is at least 20m high and two storeys are distinguishable in this freshwater environment (GFA Consulting Group, 2009).

Prominent vegetation species found in this classification type include *Ficus – Euterpe* forest and *Pterocarpus* forest within which there are several understory species. The main component of the *Ficus-Euterpe* forest is the wild figs, *Ficus amazonica*, *Ficus eximia*, *Ficus oleracea* and *Ficus citrifolia*. As one moves further inland up to the transition zone of the Riverine Mangrove swamps the corkwood, *Pterocarpus officinalis*, is very common. There is also some amount of *Avicennia germinans* at the junction just before the riverine mangrove vegetation becomes dominant. Understory species include Murta, *Cassipourea guianensis*, Maconcona, *Ilex guianensis*, *Malouetia tamaquarina* and several ferns including saw fern, *Blechnum serrulatum*, sharp break, *Pteris pungens* and broad sword fern, *Nephrolepis biserrata* (GFA Consulting Group, 2009).



Epiphytes are also found in this type of forest and include wild bromeliad, *Aechmea nudicaulis*, and star bromeliad, *Guzmania lingulata*. Royal palm, *Roystonea oleracea*, is also a component of Mixed Freshwater forests (Hollowell, 2009). The GFA report notes that while trees in the Coastal Mangrove swamps host a few epiphytes, probably due to salinity from the ocean, several epiphytic species were found in the Mixed Freshwater swamps (GFA Consulting Group, 2009).

### 3.4 Open Swamps

Open swamps without forest cover occupy approximately 31 percent of the SBPA. Open swamps were classified into three broad categories and include freshwater/brackish swamps, salt water swamps, and herbaceous swamps that were dominated by a single species following fires that burned forest areas in the northwestern Waini peninsula (GFA Consulting Group, 2009).

#### 3.4.1 Herbaceous Swamps

Herbaceous swamps cover an area of 27,520 ha (275.2 km<sup>2</sup>) or approximately 22.9 percent of SBPA land cover. The southeastern part of the Shell Beach area is dominated by herbaceous swamps in freshwater and brackish water. Important species in this area are Bizzy Bizzy, *Eleocharis interstincta*, giant beachsedge, *Rhynchospora gigantea*, and burr sedge, *Lagenocarpus gianensis* (GFA Consulting Group, 2009).

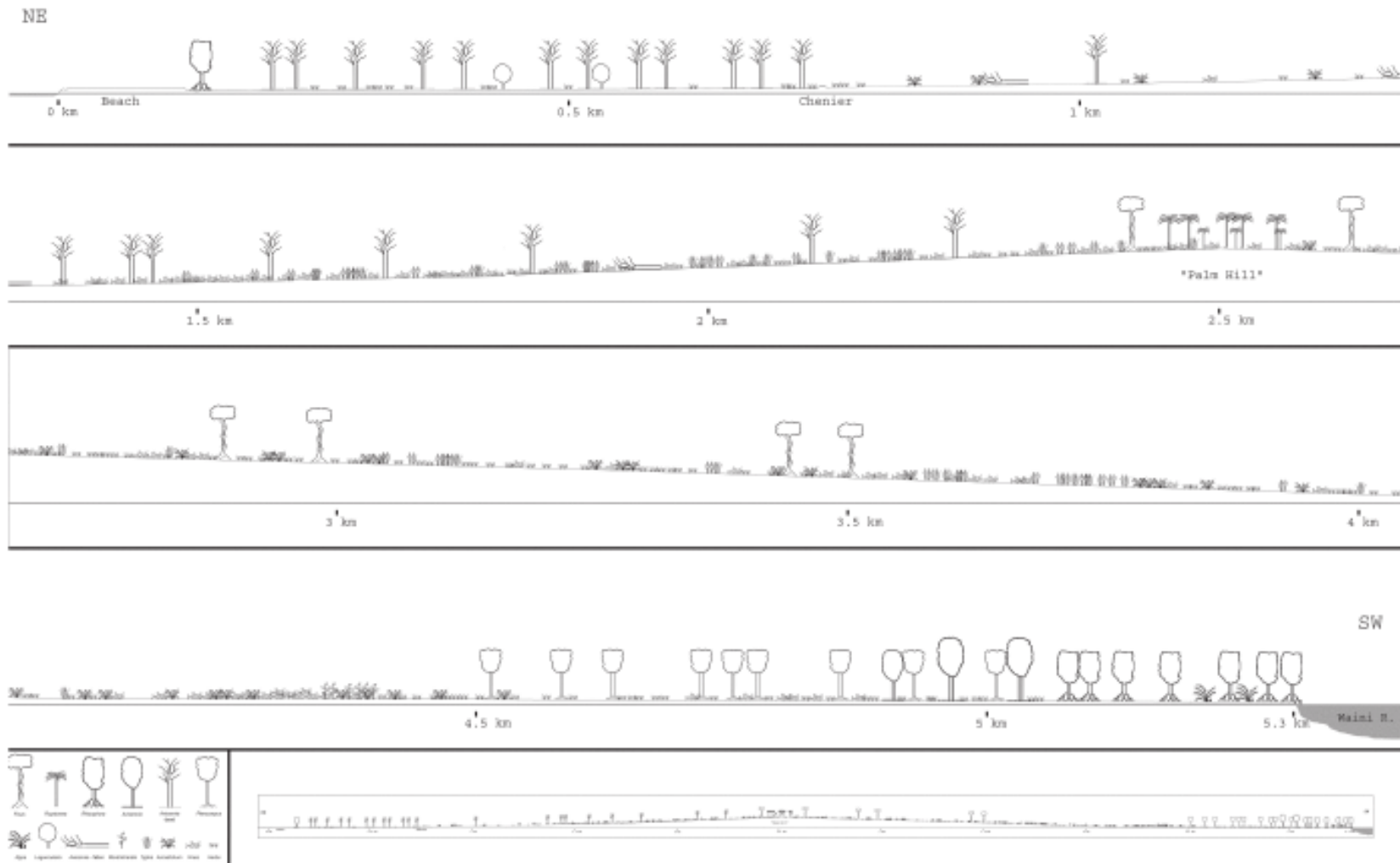
An irregular herbaceous swamp zone is found in the transition zone between the brackish mangrove belt and the mixed freshwater swamp forest. Lindermann (1953) noted the swamps to be dominated by angled spikerush, *Eleocharis mutata*. *Avicennia germinans* trees and *Rhizophora* trees are also occasionally present in the area (Hollowell, 2009; GFA Consulting Group, 2009).

#### 3.4.2 Typha Swamps

Typha swamps cover an area of 4,630 ha (46.3 km<sup>2</sup>) or approximately 3.8 percent of SBPA land cover. The northwestern part of the Shell Beach area was previously covered by mangroves and swamp forest. The fires of 1998 have converted these forested areas into open swamp areas. According to the GFA study, these areas were being dominated by quickly spreading *Typha* species (e.g. cattail, *Typha domingensis*) which are dense with little subgrowth. The limits of the burned area were still visible from the air even 11 years after the 1998 fire, indicating a lack of natural forest regeneration (GFA Consulting Group, 2009).

An isolated population of royal palm, *Roystonea oleracea*, was found in the burned area at the tip of the Waini peninsula. The population had survived the 1998 fires while most of the surrounding vegetation was killed. This find is considered special since no species of the genus *Roystonea* had been previously recorded in the Guianas outside of cultivation and the remote location of the find suggests that it was not likely planted by people (GFA Consulting Group, 2009).

Figure 3: Plant Community Profile Diagram Across the Waini Peninsula at Almond Beach



(Hollowell, 2009)

### 3.4.3 Salt Water Swamps

Salt water or halophytic swamps cover an area of 5,320 ha (53.2 km<sup>2</sup>) or approximately 4.4 percent of SBPA's land cover. Sea water intrusion forming shallow open salt water lagoons can be seen as large dark areas on satellite image and from an airplane. Though not verified, the GFA report speculates that the species in that area could be widgeon grass, *Ruppia maritime*, and spiral ditchgrass, *Ruppia cirrhosa*, halophytic vegetation of *Sesuvium virginicus*, turtleweed, *Batis maritima*, marine couch, *Sporobolus virginicus* and salt tolerant ferns, grasses and sedges like carpet grass, *Paspalum vaginatum*, angled spikerush, *Eleocharis mutata* or, jointed flatsedge, *Cyperus articulatus* (GFA Consulting Group, 2009).

### 3.5 Sandy Beaches

Sandy beaches cover an area of 250 ha (2.5 km<sup>2</sup>) or approximately 0.21 percent of SBPA's land cover. The beach ridges range from a few meters to over 150m in width. Beach vegetation is composed mainly of vines, herb and shrub species. Species of vines include the beach morning glory, *Ipomoea pescaprae*, beach bean, *Canavalia rosea*, and wild passion fruit, *Passiflora foetida*, which are found upto the high water mark. Shoreline Sea Purslane, *Sesuvium portulacastrum*, a herb, is found in the fore-beach area. Shrubs include buttonwood, *Conocarpus erectus*, sea hibiscus, *Talipariti tiliaceum*, and physic nut, *Thespesia populnea*. Mangrove species, black mangrove, *Avicennia germinans*, and burr sedge, *Laguncularia racemosa*, are sometime found interspersed on the beach. Wild plum, *Spondias mombin*, monkey apple, *Annona glabra*, and noni bush, *Morinda citrifolia*, are found occasionally. *Spondias mombin* L., *Annona glabra* L. and *Morinda citrifolia* L can be found at the back beach towards the mangrove swamps (GFA Consulting Group, 2009).

**Picture 4: Beach Vegetation**



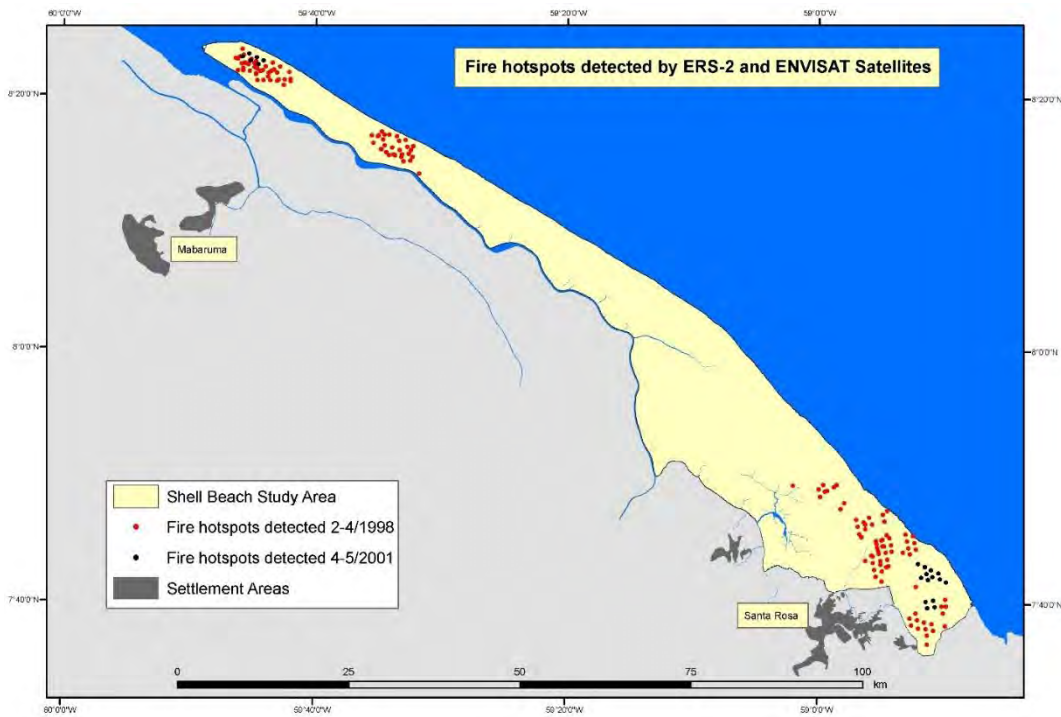
(Photo credit: Suresh V. Kandaswamy)

### 3.6 Influence of Fire

The fires of 1998 and to a lesser extent, the fire of 2001 had an important role in shaping the current land cover within the SBPA. The 1998 fire was influenced by severe droughts caused by El Niño. The fires at the Waini peninsula are thought to have started as a result of agricultural fires at settlements along the beach ridges (Hollowell, 2009). The fires burned for several months from late 1997 until April 1998. Trees over large areas of mixed swamp forest and mangroves were completely destroyed. The 2001 fire, which was smaller, caused fires in the open swamp areas of the southeastern part of SBPA and the tip of the Waini peninsula where two extensive forested areas were completely burned. The Almond Beach burn impacted areas northwest starting from the Almond Beach community and the Kamwatta burn occurred about 20 kilometers southeast of Almond Beach (GFA Consulting Group, 2009).

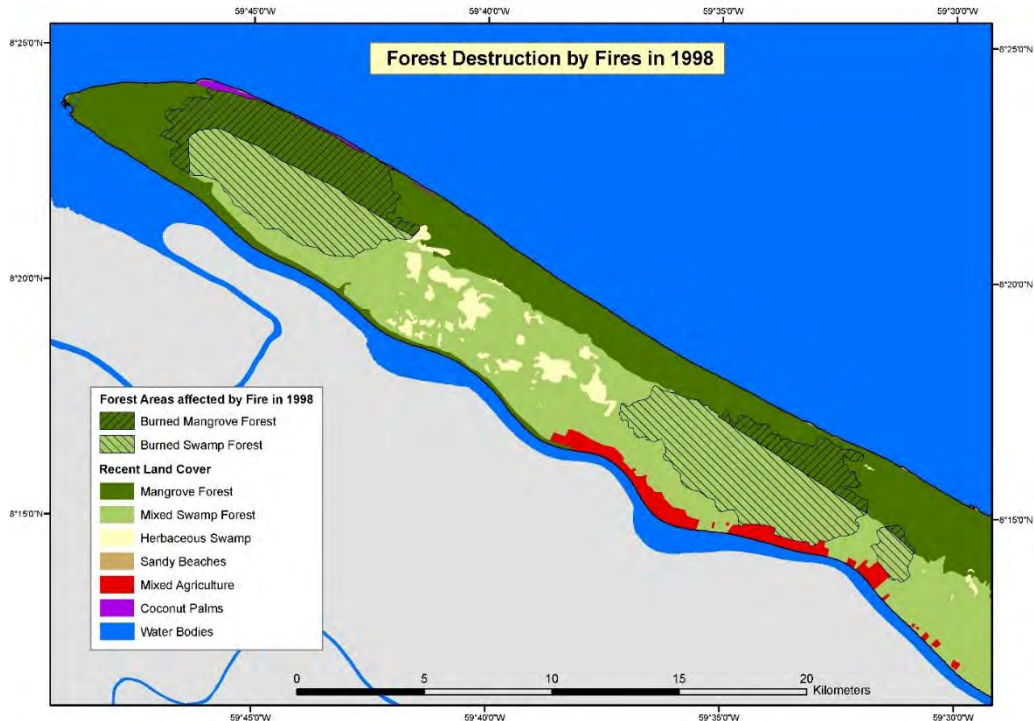


Figure 4: Fire Hotspots



(GFA Consulting Group, 2009)

Figure 5: Forest Destruction by Fire



(GFA Consulting Group, 2009).

The extensive tree mortality resulted from the high fire sensitivity of mangrove plants and the manner in which the fires passed through the area. The first pass is said to have burnt the upper organic soil horizons at Almond Beach and second pass was fuelled by fallen leaves and trees (Hollowell, 2009).

The total burned area in 1998, calculated from satellite images, was 68.5 km<sup>2</sup>, which means 6.5 % of the total forest areas of the GFA study area, which included the Three Brothers community. The calculated area exceeds the burned area estimated at 64.6 km<sup>2</sup> by Hollowell (2009). Of that area, about 23.3 km<sup>2</sup> were classified as mangrove swamp, making the fire disturbance much larger than any previously reported for mangroves. Table 3 below shows the calculated results of the affected forest areas, which includes the Three Brothers community.

**Table 3: Forested and Non-Forested Areas of the Shell Beach Area**

Type of burned forest	Burned area	% of total forest type in the study area
Swamp Forest	45.2 km <sup>2</sup>	5.2 %
Mangrove Forest	23.3 km <sup>2</sup>	12.5 %
<b>Total burned forest</b>	<b>68.5 km<sup>2</sup></b>	<b>6.5 %</b>

(GFA Consulting Group, 2009)

A recalculation by the staff of GL&SC in 2014 based on SBPA boundary shows that of the total burnt mangroves forest, 20.7 km<sup>2</sup> lies within the SBPA. The burned swamp forest mentioned in the table above is completely within the Three Brothers community lands.

In many locations, the initial regrowth after the fires was dominated by vines, most notably *Ipomoea tiliacea* (Willd.) Choisy, *Mikania micrantha* Kunth, *Cydista aequinoctialis* (L.) Miers and *Entada polystachya* (L.) DC. Other areas were dominated by dense, sometimes monospecific stands of herbaceous species such as *Acrostichum* ferns or *Typha* (Hollowell, 2009).

According to the GFA report (GFA Consulting Group, 2009), forest regeneration in the swamp areas will be difficult after its complete destruction by fire. Based on Landsat satellite images from 1987, it is assumed that older fire events have also been responsible for other deforested herbaceous swamp areas in areas northwest of Almond Beach towards the Waini River.

### 3.7 Species Diversity

SBPA is rich in floral and faunal diversity. It is an area known for its marine turtle nesting grounds. Four species of marine turtles fall under IUCN's threatened list of species. The Leatherback

(*Dermochelys coriacea*) and Olive Ridley (*Lepidochelys olivacea*) are listed as vulnerable, with the Leatherback moving from critically endangered to vulnerable in 2013, and Green turtle (*Chelonia mydas*) is listed as endangered, and the Hawksbill (*Eretmochelys imbricata*) is listed as critically endangered. They typically arrive at certain portions of the beach along the Atlantic to nest annually between February and August.

**Picture 5: Leatherback turtle on Almond Beach**



(Photo credit: Suresh V. Kandaswamy)

In addition to marine turtles, it is also home to manatees (*Trichechus manatus*), tapirs (*Tapirus terrestris*), deer (*Mazama americana*), jaguars (*Panthera onca*), and howler monkeys (*Alouatta seniculus*). Ecological surveys conducted in the Shell Beach area identified 28 reptilian (Table 4), 13 amphibian (Table 5), 27 mammalian (Table 6), and 59 fish (Table 7) (Kalamandeen and DaSilva, 2005; Prince, *et. al.*, 2004), and 27 macro-invertebrate species (Table 8) (Kalamandeen and DaSilva, 2005).

The SBPA is also rich in coastal and migratory birds. Over 200 bird species have been recorded (Table 9) (Mendonca *et. al.*, 2006). As a result of its diversity, the area has been proposed as an Important Bird Area (IBA), a programme of the BirdLife International, which seeks to “identify,

protect and manage a network of sites that are significant for long term viability of naturally-occurring bird populations” (BirdLife International, 2014)

GFA report (GFA Consulting Group, 2009) identifies over 50 plant species in different ecosystems within SBPA (Table 10). Thirty Three plant species (Table 11) were identified by Kalamandeen and DaSilva (2005) and Prince, *et. al.*, (2004). Hollowell (2009) documented 118 species of plants (Table 12) in the Waini Peninsula of the Shell Beach area. Additionally, he compiled a preliminary list of 1,449 species of vascular plants for the Northwest District (Hollowell, 2009).

The following table provide lists of flora and faunal diversity in the area.

## 3.8 Herpetofauna of Shell Beach

**Table 4: Reptiles of Shell Beach**

(Kalamandeen and DaSilva, 2005 and Prince *et. al.*, 2004).

### 3.8.1 Reptiles

<b>Common Name</b>	<b>Scientific Name</b>
Ameiva lizard	<i>Ameiva ameiva</i>
Anaconda	<i>Eunectus marinus</i>
Anolis lizard	<i>Anolis spp</i>
Blind snake	<i>Leptotyphlops spp</i>
Boa constrictor	<i>Constrictor constrictor</i>
-	<i>Cnemidophorus gramivagus</i>
Cooks Tree-boa	<i>Corallus hortulanus</i>
Gecko	<i>Gonatodes humeralis</i>
Gecko	<i>Gonatodes spp</i>
Green turtle	<i>Chelonia mydas</i>
Hawksbill turtle	<i>Eretmochelys imbricata</i>
-	<i>Hydropis spp</i>
Green Iguana	<i>Iguana iguana</i>
-	<i>Kentropyx calcarata</i>
Labaria	<i>Bothrops atrox</i>
Labaria turtle	<i>Rhinoclemmys punctularia</i>
Leatherback turtle	<i>Dermochelys coriacea</i>
Mabuya	<i>Mabuya mabuya</i>
Mud turtle	<i>Kinosternon scropiodes</i>
Spectacle Caiman	<i>Caiman crocodilus</i>
Tegu	<i>Tupinambis negropunctatus</i>
Tiger snake	<i>Drymarchon corais</i>
Tree lizard	<i>Plica plica</i>
Turnip tail Gecko	<i>Thecadactylus rapicauda</i>
Water labaria	<i>Helicops angulatus</i>



Common Name	Scientific Name
Water snake	<i>Liophis cobella</i>
Whiptail lizard	<i>Cnemidorphous lemniscatus</i>
Yakman snake	<i>Chironius spp</i>

### 3.8.2 Amphibians

**Table 5: Amphibians of Shell Beach**

(Kalamandeen and DaSilva, 2005 and Prince *et. al.*, 2004).

Common Name	Scientific Name
<i>Hyla crepitans</i>	
<i>Hyla marmorata</i>	
<i>Hyla minuta</i>	
<i>Hyla spp1</i>	
<i>Hyla spp2</i>	
<i>Hyla spp3</i>	
<i>Hyla spp4</i>	
<i>Leptodactylus mystaceus</i>	
<i>Leptodactylus spp</i>	
Paradox frog	<i>Psuedes paradox</i>
<i>Scinax rubra</i>	
Surinamese Toad	<i>Pipa pipa</i>
Toad	<i>Rhaebo marinus</i>

### 3.9 Mammals of Shell Beach

**Table 6: Mammals of Shell Beach**

(Kalamandeen and DaSilva, 2005 and Prince *et. al.*, 2004).

Common Name	Scientific Name
Wedge capped capuchin	<i>Cebus olivaceus</i>
Agouti	<i>Dasyprocta agouti</i>
-	<i>Artibeus obscurus</i>
-	<i>Artibeus spp</i>
-	<i>Artibeus spp 2</i>
Brown Capuchins	<i>Cebus apella</i>
Bulldog bat	<i>Noctilio leporinus</i>
Coati	<i>Nasua nasua</i>
Common long-tongue bat	<i>Glossophaga soricina</i>
Common Tent-making Bat	<i>Uroderma bilobatum</i>
Deer	<i>unidentified genera</i>

<b>Common Name</b>	<b>Scientific Name</b>
Giant River Otter	<i>Pteronura brasiliensis</i>
Jaguar	<i>Panthera onca</i>
Long nose bat	<i>unidentified genera</i>
Manatee	<i>Trichechus manatus</i>
Porpoises	<i>Inia geoffrensis</i>
Raccoon	<i>Procyon cancrivorus</i>
Rat	<i>unidentified genera</i>
Red Howler monkey	<i>Alouatta seniculus</i>
Southern River otter	<i>Lontra longicaudis</i>
Southern Tamandua	<i>Tamandua tetradactyla</i>
Spider Monkey	<i>Ateles paniscus</i>
Squirrel monkey	<i>Saimiri sciureus</i>
Tayra	<i>Eira barbara</i>
Three-toe sloth	<i>Bradypus tridactylus</i>
Two-lined riverside bat	<i>Saccopteryx bilineata</i>
White face Saki	<i>Pithecia pithecia</i>

### 3.10 Fishes of Shell Beach

**Table 7: Fishes of Shell Beach**

(Kalamandeen and DaSilva, 2005; Prince *et. al.*, 2004)

<b>Common Name</b>	<b>Scientific Name</b>
Anafouk	<i>unidentified genera</i>
Banga mary	<i>Macrodon ancylodon</i>
<b>Common Name</b>	<b>Scientific Name</b>
Basha	<i>Plagioscion sp</i>
Black pirai	<i>Pygocentrus niger</i>
Blinker	<i>unidentified genera</i>
Butterhead	<i>unidentified genera</i>
Cassi	<i>Pimelodus blochii</i>
Catfish	<i>Bagre marinus</i>
Catfish	<i>Cathorops spixii</i>
Cock-a-net	<i>unidentified genera</i>
Couvalli	<i>Caranx hippos</i>
Cow stingray	<i>Dasyatis sp</i>
Crocer basha	<i>Plagioscion squamosissimus</i>
Cuffum	<i>Megaalops ottonticus</i>
Cuma Cuma/Black Cuirass	<i>unidentified genera</i>
Curimai	<i>Brycon falcatus</i>
Flounder	<i>Bothus ocellatus</i>

Foureye	<i>Anableps anableps</i>
Gillbacker	<i>Ariuz herzbergii</i>
Gillbacker	<i>Hexanematichthys parkeri</i>
Grey Angelfish	<i>Pomacanthus arcuatus</i>
Grey Snapper	<i>Cynoscion ocoupa</i>
Guppy	<i>Poecilia reticulata</i>
Guppy	<i>unidentified genera</i>
Hardhead Courass	<i>unidentified genera</i>
Hasser	<i>Hoplosternum sp.</i>
Highwater	<i>unidentified genera</i>
Houri	<i>Hoplias malabaricus</i>
Imeri	<i>Parauchenipterus galeatus</i>
Jewfish	<i>Epinephelus itajara</i>
Katabac	<i>Myleus rubripinnis</i>
Kavalli	<i>Caranx hippos</i>
Kokwari	<i>Hexanematichthys proops</i>
Lukanani	<i>Cichla ocellaris</i>
Mackerel	<i>Scomberomorus brasiliensis</i>
Manta Ray	<i>Manta birostris</i>
Mullet	<i>Mugil cephalus</i>
Pacu	<i>unidentified genera</i>
Pargee	<i>Lobotes surinamensis</i>
Patwa	<i>Cichlasoma sp</i>
Quamina	<i>unidentified genera</i>
Red Snapper	<i>Lutjanus campechanus</i>
Rock head	<i>unidentified genera</i>
Sabakoua stingray	<i>Dasyatis sp</i>
Sea patwa	<i>Diapterus rhombeus/Caitipa mojarra</i>
Seahassa	<i>unidentified genera</i>
Shark	<i>Heptranchias perlo</i>
Snapper	<i>Lutjanus griseus</i>
Snook	<i>Centropomus undecimalis</i>
Spadefish	<i>unidentified genera</i>
Spring Courass	<i>Cathorops spixii</i>
Sunfish	<i>Crenicichla sp.</i>
Swordfish	<i>Boulengerella cuvieri</i>
Tampocker	<i>unidentified genera</i>
Trout	<i>Cynoscion virescens</i>
Trout	<i>Oncorhynchus mykiss</i>
Wabaru	<i>unidentified genera</i>

Yadaro	<i>Pseudodoras (Oxydoras) niger</i>
Yarrow	<i>Hoplerythrinus unitaeniatus</i>

### 3.11 Macro-invertebrates of Shell Beach

**Table 8: Macro-Invertebrates of Shell Beach**

(Kalamandeen and DaSilva, 2005).

<b>Common Name</b>	<b>Scientific Name</b>
Bee	<i>unidentified genera</i>
Blue Morpho	<i>Morpho menelaus</i>
Bug	<i>unidentified genera</i>
Bundari crab	<i>Cardisoma guanhumi</i>
Butterfly	<i>Euedes spp</i>
Butterfly	<i>Eurema spp</i>
Butterfly	<i>Parides spp</i>
Butterfly	<i>Euptichia spp</i>
Centipede	<i>unidentified genera</i>
Coconut worm	<i>unidentified genera</i>
Dragonfly	<i>unidentified genera</i>
Fiddler crab	<i>Uca rapax</i>
Field cricket	<i>unidentified genera</i>
Flies	<i>unidentified genera</i>
Ghost crab	<i>Ocypode quadrata</i>
Grasshopper	<i>Thepusa spp</i>
Lady bug	<i>unidentified genera</i>
Machusi Ant	<i>Atta spp</i>
Millipede	<i>unidentified genera</i>
Monarch	<i>Danaus plexipus</i>
Mosquito	<i>unidentified genera</i>
Roach	<i>unidentified genera</i>
Sand wasp	<i>unidentified genera</i>
Scorpion	<i>unidentified genera</i>
Spider	<i>unidentified genera</i>
Tarantula	<i>Avicularia spp</i>
Tree crab	<i>Aratus pisonii</i>

### 3.12 Avifauna of Shell Beach

**Table 9: Avifauna of Shell Beach**



(Mendonca *et. al.*, 2006 in GMTCS, 2011).

<b>Common Name</b>	<b>Scientific Name</b>
Amazilia Hummingbird	<i>Amazilia spp.</i>
Amazon Kingfisher	<i>Chloroceryle amazona</i>
American Flamingo	<i>Phoenicopterus ruber</i>
American Kestrel	<i>Falco sparverius</i>
American Pgymy Kingfisher	<i>Chloroceryle aenea</i>
Anhinga	<i>Anhinga anhinga</i>
Bananaquit	<i>Coereba flaveola</i>
Barn Swallow	<i>Hirundo rustica</i>
Barred Antshrike	<i>Thamnophilus doliatus</i>
Barred Forest-Falcon	<i>Micrastur ruficollis</i>
Bat Falcon	<i>Falco ruficularis</i>
Bicolored Conebill	<i>Conirostrum bicolor</i>
Black Caracara	<i>Daptrius ater</i>
Black Skimmer	<i>Rynchops niger</i>
Black Vulture	<i>Coragyps atratus</i>
Blackbellied Cuckoo	<i>Piaya melanogaster</i>
Blackbellied Whistling-duck	<i>Dendrocyna autumnalis</i>
Black-collared Hawk	<i>Busarellus nigricollis</i>
Black-crested Antshrike	<i>Sakesphorus canadensis</i>
Blackcrowned Night-heron	<i>Nycticorax nycticorax</i>
Blackface Ant-thrush	<i>Formicarius analis</i>
Blacknecked Aracari	<i>Pteroglossus aracari</i>
Blackthroated Antbird	<i>Myrmeciza atrothorax</i>
Blackthroated Antshrike	<i>Frederickena viridis</i>
Blue & Gold Macaw	<i>Ara ararauna</i>
Blue Ground-Dove	<i>Claravis prestiosa</i>
Blue-black Grassquit	<i>Volatinia jacarina</i>
Blue-chinned Sapphire	<i>Chlorestes notatus</i>
Blue-crowned Motmot	<i>Momotus momota</i>
Blue-gray Tanager	<i>Thraupis episcopus</i>
Blue-headed Parrot	<i>Pionus menstruus</i>
Boat-billed Flycatcher	<i>Megarynchus pitangua</i>
Boat-billed Heron	<i>Cochlearius cochlearius</i>
Bridled Tern	<i>Sterna anaethetus</i>
Bright-rumped Attila	<i>Attila spadiceus</i>
Brown Pelican	<i>Pelecanus occidentalis</i>
Buff throated Woodcreeper	<i>Xiphorhynchus guttatus</i>
Buff-breasted Wren	<i>Thryothorus leucotis</i>
Buff-throated Woodcreeper	<i>Xiphorhynchus guttatus</i>
Carib Grackle	<i>Quiscalus lugubris</i>

<b>Common Name</b>	<b>Scientific Name</b>
Cattle Egret	<i>Bubulcus ibis</i>
Cayenne Jay	<i>Cyanocorax cayanus</i>
Channel-billed Toucan	<i>Ramphastos vitellinus</i>
Chestnut-bellied Seedeater	<i>Oryzoborus angolensis</i>
Cocoi Heron	<i>Ardea cocoi</i>
Collared Plover	<i>Charadrius collaris</i>
Common Black Hawk	<i>Buteogallus anthracinus</i>
Common Parakeet	<i>Nyctidromus albicollis</i>
Common Piping-guan	<i>Pipile pipile</i>
Common Tody-flycatcher	<i>Todirostrum cinereum</i>
Coraya Wren	<i>Thryothorus coraya</i>
Crane Hawk	<i>Geranospiza caerulescens</i>
Cream-colored Woodpecker	<i>Celeus flavus</i>
Crested Eagle	<i>Morphnus guianensis</i>
Crested Oropendula	<i>Psarocolius decumanus</i>
Crimson-hooded Manakin	<i>Pipra aureola</i>
Dark-billed Cuckoo	<i>Coccyzus melacoryphus</i>
Dull-colored Grassquit	<i>Tiaris obscura</i>
Dusky Antshrike	<i>Cercomacra tyrannina</i>
Fasciated Antshrike	<i>Cymbilaimus lineatus</i>
Forest Elaenia	<i>Myiopagis gaimardi</i>
Forktailed Flycatcher	<i>Tyrannus savana</i>
Forktailed Palm-Swift	<i>Tachornis squamata</i>
Giant Cowbird	<i>Scaphidura oryzivora</i>
Glittering-throat Emerald	<i>Amazilia fimbriata</i>
Gray-fronted Dove	<i>Leptotila rufaxilla</i>
Gray Hawk	<i>Asturina nitida</i>
Gray Kingbird	<i>Tyrannus dominicensis</i>
Gray-breasted Martin	<i>Progne chalybea</i>
Gray-breasted Sabrewing	<i>Campylopterus largipennis</i>
Grayish Saltator	<i>Saltator coerulescens</i>
Gray-necked Woodrail	<i>Aramides cajanea</i>
Great Egret	<i>Ardea alba</i>
Great Horned-owl	<i>Bubo virginianus</i>
Great Pootoo	<i>Nyctibius grandis</i>
Great Tinamou	<i>Tinamus major</i>
Greater Ani	<i>Crotophaga major</i>
Greater Kiskadee	<i>Pitangus sulphuratus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Green & Rufous Kingfisher	<i>Chloroceryle inda</i>
Green Honeycreeper	<i>Chlorophanes spiza</i>

<b>Common Name</b>	<b>Scientific Name</b>
Green Ibis	<i>Mesembrinibis cayennensis</i>
Green Kingfisher	<i>Chloroceryle americana</i>
Green Oropendula	<i>Psarocolius viridis</i>
Grosbeak	<i>Pitylus spp</i>
Gull-billed Tern	<i>Sterna nilotica</i>
Harpy Eagle	<i>Harpia harpyja</i>
Helmeted pygmy Tyrant	<i>Lophotriccus galeatus</i>
King Vulture	<i>Sarcoramphus papa</i>
Large-billed Tern	<i>Phaetusa simplex</i>
Laughing Falcon	<i>Herpetotheres cachinnans</i>
Laughing Gull	<i>Larus atricilla</i>
Least Sandpiper	<i>Calidris minutilla</i>
Least Tern	<i>Sterna antillarum</i>
Lesser Kiskadee	<i>Philohydor lictor</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Lineated Woodpecker	<i>Dryocopus lineatus</i>
Little Blue Heron	<i>Egretta caerulea</i>
Little Chacalaca	<i>Ortalis motmot</i>
Little Cuckoo	<i>Piaya minuta</i>
Longtailed Hermit	<i>Phaethornis superciliosus</i>
Longtailed Woodcreeper	<i>Dendrocyna longicauda</i>
Long-winged Harrier	<i>Circus buffoni</i>
Magnificent Frigatebird	<i>Fregata magnificens</i>
Magpie Tanager	<i>Cissopis leveriana</i>
Maguari Stork	<i>Ciconia maguari</i>
Marbled Woodquail	<i>Odontophorus gujanensis</i>
Moriche Oriole	<i>Icterus chryscephalus</i>
Mouse-coloured Antshrike	<i>Thamnophilus murinus</i>
Muscovy Duck	<i>Cairina moshata</i>
Neotropical Cormorant	<i>Phalacrocorax brasilianus</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
Nothern Scrub-Flycatcher	<i>Sublegatus arenarum</i>
Orange-winged Parrot	<i>Amazona amazonica</i>
Osprey	<i>Pandion haliaetus</i>
Pale breasted Thrush	<i>Turdus leucomelas</i>
Palm Tanager	<i>Thraupis palmarum</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Piculet	<i>Picumus spp</i>
Pied Plover	<i>Hoploxypterus cayanus</i>
Pied Water-Tyrant	<i>Fluvicola pica</i>
Plumbeous Pigeon	<i>Columba plumbea</i>

<b>Common Name</b>	<b>Scientific Name</b>
Purplethroated Fruitcrow	<i>Querula purpurata</i>
Pygmy Antwren	<i>Myrmotherula brachyura</i>
Pygmy Kingfisher	<i>Chloroceryle aenea</i>
Red & Green Macaw	<i>Ara chloropterus</i>
Red-bellied Macaw	<i>Ara manilata</i>
Red-billed Toucan	<i>Ramphastos tucanus</i>
Redbreasted Blackbird	<i>Sturnella militaris</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Red-rumped Cacique	<i>Cacicus haemorrhous</i>
Red-shouldered Macaw	<i>Ara nobilis</i>
Red-throated Caracara	<i>Ibycter americanus</i>
Ring kingfisher	<i>Ceryle torquata</i>
River Warbler	<i>Phaeothlypis flaveola</i>
Roadside Hawk	<i>Buteo magnirostris</i>
Royal Tern	<i>Sterna maxima</i>
Ruddy Ground-dove	<i>Columbina talpacoti</i>
Ruddy Pigeon	<i>Columba subvinacea</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Rufescent Tiger Heron	<i>Tigrisoma lineatum</i>
Rufous Crab-hawk	<i>Buteogallus aequinoctialis</i>
Rufous-breasted Hermit	<i>Glaucis hirsuta</i>
Rusty-margined Flycatcher	<i>Myiozetetes cayanensis</i>
Scarlet Ibis	<i>Eudocimus ruber</i>
Screaming Piha	<i>Lipaugus vociferans</i>
Semipalmated Sandpiper	<i>Calidris pusilla</i>
Short-crested Flycatcher	<i>Myiarchus ferox</i>
Silverbeak Tanager	<i>Ramphocelus carbo</i>
Slaty Antwren	<i>Cercomacra spp</i>
Smooth-billed Ani	<i>Crotophaga ani</i>
Snail Kite	<i>Rostrhamus sociabilis</i>
Snowy Egret	<i>Egretta thula</i>
Solitary Sandpiper	<i>Tringa solitaria</i>
Sora Crake	<i>Porzana carolina</i>
Southern beardless Tyrantlet	<i>Camptostoma obsoletum</i>
Southern Housewren	<i>Troglodytes aedon</i>
Southern Lapwing	<i>Vanellus chilensis</i>
Spectacled Owl	<i>Pulsatrix perspicillata</i>
Spix's Guan	<i>Penelope jacquacu</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Spotted Tody-flycatcher	<i>Todirostrum maculatum</i>
Squirrel Cuckoo	<i>Piaya cayana</i>



Common Name	Scientific Name
Straight-billed Woodcreeper	
Streaked Flycatcher	<i>Myiodynastes maculatus</i>
Striated Heron	<i>Butorides striatus</i>
Striped Cuckoo	<i>Tapera naevia</i>
Sun Grebe	<i>Heliornis fulica</i>
Sunbittern	<i>Eurypga helias</i>
Swainson's Flycatcher	<i>Myiarchus swainsoni</i>
Swallow-tailed Kite	<i>Elanoides forficatus</i>
Swallow-wing Puffbird	<i>Chelidoptera tenebrosa</i>
Tricolored Heron	<i>Egretta tricolor</i>
Tropical Kingbird	<i>Tyrannus melancholicus</i>
Tropical Screech-Owl	<i>Otus choliba</i>
Turkey Vulture	<i>Cathartes aura</i>
Turquoise Tanager	<i>Tangara mexicana</i>
Violaceous Euphonia	<i>Euphonia violacea</i>
Wattled Jacana	<i>Jacana jacana</i>
Wedge billed wood creeper	<i>Glyphorhynchus spirurus</i>
Whibrel	<i>Numenius phaeopus</i>
White bearded Manakin	<i>Manacus manacus</i>
White-headed Marsh Tyrant	<i>Arundinicola leucocephala</i>
White-Chested Emerald	<i>Amazilia chionopectus</i>
White-eared Conebill	<i>Conirostrum leucogenys</i>
White-lined tanager	<i>Tachyphonus rufus</i>
White-necked Heron	<i>Ardei cocoi</i>
White-tail Hawk	<i>Elanus leucurus</i>
Whitetailed Trogon	<i>Trogon viridis</i>
White-tipped Dove	<i>Leptotila verreauxi</i>
White-winged Swallow	<i>Tachycineta albiventer</i>
Wilson's Plover	<i>Charadrius wilsonia</i>
Wing-banded Antbird	<i>Myrmornis torquata</i>
Yellow bellied Elania	<i>Elaenia flavogaster</i>
Yellow billed Jacamar	<i>Galbula albirostris</i>
Yellow chinned Spinetail	<i>Certhiaxis cinnamomea</i>
Yellow Oriole	<i>Icterus nigrogularis</i>
Yellow Warbler	<i>Dendroica aestiva</i>
Yellow-billed Tern	<i>Sterna superciliaris</i>
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>
Yellow-crowned Parrot	<i>Amazona ochrocephala</i>
Yellow-headed Caracara	<i>Milvago chimachima</i>
Yellow-headed Vulture	<i>Cathartes burrovianus</i>
Yellow-hooded Blackbird	<i>Agelaius icterocephalus</i>

Common Name	Scientific Name
Yellow-rump Cacique	<i>Cacicus cela</i>
Yellow-throated Spinetail	<i>Certhiaxis cinnamomea</i>
Yellow-tufted woodpecker	<i>Melanerpes cruentatus</i>

### 3.13 Plants of Shell Beach

**Table 10: Plants of Shell Beach Ecosystems**

(GFA Consulting Group, 2009)

Common Name	Scientific Name
<b>Coastal Mangrove Swamp</b>	
Black Mangrove	<i>Avicennia germinans</i>
Red Mangrove	<i>Rhizophora mangle</i>
Red Mangrove	<i>Rhizophora racemosa</i>
White Mangrove	<i>Laguncularia racemosa</i>
Golden Leather Fern, Mangrove Fern	<i>Acrostichum aureum</i>
Inland Leather fern	<i>Acrostichum danaeifolium</i>
Button Mangrove	<i>Conocarpus erectus</i>
Palm	<i>Euterpe oleracea</i>
Sangre de Drago	<i>Pterocarpus officinalis</i>
<b>Riverine Mangrove Swamp</b>	
Red Mangrove	<i>Rhizophora racemosa</i>
Red Mangrove	<i>Rhizophora mangle</i>
Golden Leather Fern, Mangrove Fern	<i>Acrostichum aureum</i>
Palm	<i>Nypa fruticans</i>
<b>Mixed Swamp Forest</b>	
Wild Fig	<i>Ficus amazonica</i>
Wild Fig	<i>Ficus eximia</i>
Wild Fig	<i>Ficus oleracea</i>
Wild Fig, Wild banyantree	<i>Ficus citrifolia</i>
Corkwood	<i>Pterocarpus officinalis</i>
Murta	<i>Cassipourea guianensis</i>
Maconcona	<i>Ilex guianensis</i>
--	<i>Malouetia tamaquarina</i>
Saw Fern, Swamp Fern	<i>Blechnum serrulatum</i>
Sharp Break	<i>Pteris pungens</i>
Borad Sword Fern, Giant Sword Fern	<i>Nephrolepis biserrata</i>

<b>Common Name</b>	<b>Scientific Name</b>
Wild Bromeliad, Bromeliad Lily	<i>Aechmea nudicaulis</i>
Star Bromeliad	<i>Guzmania lingulata</i>
Royal Palm	<i>Roystonea oleracea</i>
<b>Herbaceous Swamps</b>	
Bizzy Bizzy	<i>Eleocharis interstincta</i>
Marsh Grass, Giant Beachsedge	<i>Rhynchospora gigantea</i>
Marsh Grass, Burr Sedge	<i>Lagenocarpus guianensis</i>
Marsh Grass, Angled Spikerush, Scallion Grass	<i>Eleocharis mutata</i>
<b>Salt water swamps</b>	
Sea Grass - Widgeon Grass	<i>Ruppia maritima</i>
Sea Grass - Spiral Ditchgrass	<i>Ruppia cirrhosa</i>
Succulent	<i>Sesuvium virginicus</i>
Turtleweed	<i>Batis maritima</i>
Marine Couch, Water Couch	<i>Sporobolus virginicus</i>
Carpet Grass	<i>Paspalum vaginatum</i>
Marsh Grass - Angled Spikerush, Scallion Grass	<i>Eleocharis mutata</i>
Jointed Flatsedge	<i>Cyperus articulatus</i>
<b>Typha Swamps</b>	
Cattail	<i>Typha domingensis</i>
Royal Palm	<i>Roystonea oleracea</i>
<b>Sandy beaches</b>	
Beach Morning Glory, Goat's Foot	<i>Ipomoea pescaprae</i>
Beach Bean	<i>Canavalia rosea</i>
Wild Passion Fruit	<i>Passiflora foetida</i>
Shoreline Sea Purslane	<i>Sesuvium portulacastrum</i>
Buttonwood, Button Tree	<i>Conocarpus erectus</i>
Sea Hibiscus	<i>Talipariti tiliaceum</i>
Physic Nut, Portia Tree	<i>Thespesia populnea</i>
Black Mangrove	<i>Avicennia germinans</i>
Marsh Grass, Burr Sedge	<i>Laguncularia racemosa</i>
Wild Plum, Creole Plum	<i>Spondias mombin</i>
Monkey Apple	<i>Annona glabra</i>
Noni Bush	<i>Morinda citrifolia</i>
<b>After fire</b>	
Vines	<i>Ipomoea tiliacea</i> (Willd.) Choisy

Common Name	Scientific Name
--	<i>Mikania micrantha</i> Kunth
--	<i>Cydista aequinoctialis</i> (L.)
--	<i>Miers and Entada polystachya</i> (L.) DC.
--	<i>Acrostichum</i> ferns or <i>Typha</i>

**Table 11: Plants of Shell Beach**(Kalamandeen and DaSilva, 2005 and Prince *et. al.*, 2004)

Common Name	Scientific Name
Almond trees	<i>Terminalia catappa</i>
Back Mangrove	<i>Avicennia germinans</i>
Bloodwood	<i>Vismia spp</i>
-	<i>Caesalpinia bonduc</i>
-	<i>Canvalia rosea</i>
-	<i>Carica papaya</i>
-	<i>Cecropia spp.</i>
-	<i>Ceiba pentandra</i>
-	<i>Cissus verticillatus</i>
Coconut trees	<i>Cocos nucifera</i>
Corkwood	<i>Pterocarpus spp</i>
Crab-wood	<i>Carapa guianensis</i>
-	<i>Cucurbita moschata</i>
-	<i>Cuscuta umbellata</i>
-	<i>Cyperus spp</i>
Dukalli	<i>Parahancornia spp</i>
-	<i>Hibiscus pernambucensis</i>
-	<i>Ipomea pes-caprae</i>
Ite Palms	<i>Mauritia flexuosa</i>
-	<i>Jatropha gossypifolia</i>
Kabukalli	<i>Goupia glabra</i>
Kakaralli	<i>Eschiwella spp</i>
Kaunta	<i>Chrysobalanus spp</i>
Manicole	<i>Euterpe spp</i>
-	<i>Manihot esculenta</i>
Mora	<i>Mora excelsa</i>
Noni trees	<i>Morindra citrifolia</i>
Papaya trees	<i>Carica papaya</i>
Red Mangroves	<i>Rhizophora mangle</i>
-	<i>Sesuvium portulacastum</i>



<b>Common Name</b>	<b>Scientific Name</b>
Soft Wallaba	<i>Eperu falcata</i>
-	<i>Thespesia populnea</i>
White Mangrove	<i>Languncularia racemosa</i>

**Table 12: Plant Species listed for the Waini Peninsula with Synonymy**

(Hollowell, 2009)

**CHLOROPHYTES (Green Algae)**

**Cladophoraceae**

*Rhizoclonium africanum* Kützing

**PTERIDOPHYTES**

**Blechnaceae**

*Blechnum serrulatum* Rich.

**Lygodiaceae**

*Lygodium venustum* Sw.

**Oleandraceae**

*Nephrolepis biserrata* (Sw.) Schott

*Nephrolepis rivularis* (Vahl) Mett. ex Krug

**Parkeriaceae**

*Ceratopteris thalictroides* (L.) Brongn.

**Polypodiaceae**

*Campyloneurum phyllitidis* (L.) C. Presl

**Pteridaceae**

*Acrostichum aureum* L.

*Acrostichum danaeifolium* Langsd. & Fisch.

*Pteris pungens* Willd.

**DICOTILEDONEAE**

**Aizoaceae**

*Sesuvium portulacastrum* (L.) L.

**Amaranthaceae**

*Alternanthera sessilis* (L.) R. Br. ex DC.

*Amaranthus australis* (A. Gray) J.D. Sauer

*Amaranthus dubius* Mart. ex Thell.

*Blutaparon vermiculare* (L.) Mears

**Anacardiaceae**

*Spondias mombin* L.

**Annonaceae**

*Annona glabra* L.

**Apocynaceae**

*Allamanda cathartica* L.

*Malouetia tamaquarina* (Aubl.) A. DC.

*Rhabdadenia biflora* (Jacq.) Müll. Arg.

**Aristolochiaceae**

*Aristolochia trilobata* L.

**Asclepiadaceae**

*Sarcostemma clausum* (Jacq.) Schult.

**Asteraceae**

*Bidens alba* (L.) DC.

*Cyanthillium cinereum* (L.) H. Rob.

*Eclipta prostrata* (L.) L.

*Mikania micrantha* Kunth

*Pluchea odorata* (L.) Cass.

**Avicenniaceae**

*Avicennia germinans* (L.) Stearn

**Bignoniaceae**

*Cydista aequinoctialis* (L.) Miers

**Cactaceae**

*Epiphyllum phyllanthus* (L.) Haw.

*Rhipsalis baccifera* (J.S. Muell.) Stearn

**Caricaceae**

*Carica papaya* L.

**Cecropiaceae**

*Coussapoa asperifolia* Trécul

**Ceratophyllaceae**

*Ceratophyllum muricatum* Cham.

**Clusiaceae**

*Clusia palmicida* Rich. ex Planch. & Triana

**Combretaceae**

*Conocarpus erectus* L.

*Laguncularia racemosa* (L.) C.F. Gaertn.

*Terminalia catappa* L.

**Convolvulaceae**

*Ipomoea pes-caprae* (L.) R. Br.

*Ipomoea tiliacea* (Willd.) Choisy

*Ipomoea violacea* L.

*Merremia cissoides* (Lam.) Hallier f.

*Merremia umbellata* (L.) Hallier f.

**Cucurbitaceae**

*Melothria pendula* L.

**Cuscutaceae**

*Cuscuta umbellata* Kunth

**Euphorbiaceae**

*Euphorbia hirta* L.

*Manihot esculenta* Crantz (cultivated)

**Fabaceae-Caesal.**

*Caesalpinia bonduc* (L.) Roxb.

**Fabaceae-Mimos.**

*Entada polystachya* (L.) DC.

*Inga ingoides* (Rich.) Willd.

*Zygia latifolia* (L.) Fawc. & Rendle

**Fabaceae-Papil.**

*Aeschynomene sensitiva* Sw.

*Canavalia rosea* (Sw.) DC.

*Machaerium lunatum* (L. f.) Ducke

*Pterocarpus officinalis* Jacq.

*Sesbania sericea* (Willd.) DC.

*Vigna luteola* (Jacq.) Benth.

**Hippocrateaceae**

*Hippocratea volubilis* L.

**Lauraceae**

*Cassytha filiformis* L.

**Malpighiaceae**

*Stigmaphyllon bannisterioides* (L.) C.E.

Anderson

**Malvaceae**

*Hibiscus bifurcatus* Cav.

*Talipariti tiliaceum* (L.) Fryxell

*Thespesia populnea* (L.) Sol. ex CorrLa

**Moraceae**

*Ficus amazonica* (Miq.) Miq.

*Ficus eximia* Schott

*Ficus maxima* Mill.

**Myrtaceae**

*Calyptanthes* sp.

*Psidium guajava* L.

**Nyctaginaceae**

*Boerhavia diffusa* L.

**Onagraceae**

*Ludwigia affinis* (DC.) H. Hara

*Ludwigia leptocarpa* (Nutt.) H. Hara

**Passifloraceae**

*Passiflora foetida* L.

**Piperaceae**

*Peperomia glabella* (Sw.) A. Dietr.

**Polygalaceae**

*Securidaca diversifolia* (L.) S.F. Blake

**Rhizophoraceae**

*Cassipourea guianensis* Aubl.

*Rhizophora mangle* L.

*Rhizophora racemosa* G. Mey.

**Rubiaceae**

*Morinda citrifolia* L.

**Sapindaceae**

*Paullinia pinnata* L.

**Scrophulariaceae**

*Capraria biflora* L.

**Solanaceae**

*Physalis angulata* L.

*Solanum stramonifolium* Jacq.

**Vitaceae**

*Cissus verticillata* (L.) Nicolson & C.E. Jarvis

**MONOCOTILEDONEAE**

**Araceae**

*Anthurium gracile* (Rudge) Schott

*Monstera adansonii* Schott

*Montrichardia linifera* (Arruda) Schott

*Philodendron acutatum* Schott

*Syngonium podophyllum* Schott

**Arecaceae**

*Cocos nucifera* L. (cultivated)

*Desmoncus orthacanthos* Mart.

*Euterpe oleracea* Mart.

*Nypa fruticans* Wurmb.

*Roystonea oleracea* (Jacq.) O.F. Cook

**Bromeliaceae**

*Aechmea nudicaulis* (L.) Griseb.

*Bromelia plumieri* (E. Morren) L.B. Sm.

*Guzmania lingulata* (L.) Mez

**Costaceae**

*Costus arabicus* L.

**Cyperaceae**

*Cyperus ligularis* L.

*Cyperus odoratus* L.

*Cyperus polystachyos* Rottb.

*Eleocharis mutata* (L.) Roem. & Schult.

*Fimbristylis cymosa* R. Br.

**Dioscoreaceae**

*Dioscorea polygonoides* Humb. & Bonpl. ex Willd.

**Heliconiaceae**

*Heliconia psittacorum* L.f.

**Hydrocharitaceae**

*Limnobium laevigatum* (Humb. & Bonpl. ex Willd.) Heine

**Lemnaceae**

*Lemna aequinoctialis* Welw.

**Liliaceae**

*Crinum erubescens* L. f. ex Sol.

**Orchidaceae**

*Dimerandra elegans* ? (H. Focke) Siegerist

*Epidendrum ciliare* L.

*Prosthechea aemula* (Lindl.) W.E. Higgins

*Trichocentrum lanceanum* (Lindl.) M.W.

Chase & N.H. Williams

**Poaceae**

*Echinochloa polystachya* (Kunth) Hitchc.

*Leptochloa scabra* Nees

*Paspalum distichum* L.

*Sporobolus virginicus* (L.) Kunth

**Smilacaceae**

*Smilax cumanensis* Humb. & Bonpl. ex

Willd.

**Typhaceae**

*Typha domingensis* Pers.

**Zingiberaceae**

*Renalmia alpinia* (Rottb.) Maas



**SYNONYMY**

*Achyranthes sessilis* (L.) Desf. ex Steud. =

*Alternanthera sessilis*

*Acnida australis* A. Gray = *Amaranthus*

*australis*

*Acnida cuspidata* Bertero ex Spreng. =

*Amaranthus australis*

*Acrostichum guineense* Gaudich. =

*Acrostichum aureum*

*Acrostichum lomarioides* (Jenman) Jenman

[nom. illeg.] = *Acrostichum*

*danaeifolium* *Acrostichum thalictroides*

L. = *Ceratopteris thalictroides*

*Agrostis littoralis* Lam. = *Sporobolus*

*virginicus*

*Agrostis virginica* L. = *Sporobolus virginicus*

*Alpinia tubulata* Ker Gawl. = *Renealmia*

*alpinia*

*Annona palustris* L. = *Annona glabra*

*Anthurium scolopendrinum* (Ham.) Kunth =

*Anthurium gracile*

*Arum liniferum* Arruda = *Montrichardia*

*linifera*

*Asclepias clausa* Jacq. = *Sarcostemma*

*clausum*

*Aspidium biserratum* Sw. = *Nephrolepis*

*biserrata*

*Aulizia ciliaris* (L.) Salisb. = *Epidendrum*

*ciliare*

*Avicennia nitida* Jacq. = *Avicennia*

*germinans*

*Avicennia tomentosa* Jacq. = *Avicennia*

*germinans*

*Banisteria ovata* Cav. = *Stigmaphyllon*

*bannisterioides*

*Bidens pilosa* forma radiata Sch. Bip. =

*Bidens alba*

*Bignonia aequinoctialis* L. = *Cydista*

*aequinoctialis*

*Bignonia picta* Kunth = *Cydista*

*aequinoctialis*

*Bihai silvestris* Gleason = *Heliconia*

*psittacorum*

*Blechnum indicum* auct. non Burm. f. =

*Blechnum serrulatum*

*Boerhavia paniculata* Rich. = *Boerhavia*

*diffusa*

*Boerhavia surinamensis* Miq. = *Boerhavia*

*diffusa*

*Brachypterys borealis* A. Juss. =

*Stigmaphyllon bannisterioides*

*Bromelia karatas* L. = *Bromelia plumieri*

*Bryonia guadalupensis* Spreng. =

*Melothria pendula*

*Cacalia cinerea* (L.) Kuntze = *Cyanthillium*

*cinereum*

*Cactus caripensis* Kunth = *Rhipsalis*

*baccifera*

*Cactus phyllanthus* L. = *Epiphyllum*

*phyllanthus*

*Calliandra latifolia* (L.) Griseb. = *Zygia*

*latifolia*

*Calonyction tuba* (Schltdl.) Colla =

*Ipomoea violacea*

*Cameraria tamaquarina* Aubl. = *Malouetia*

*tamaquarina*

*Campyloneurum costatum* (Kunze) C. Presl

= *Campyloneurum phyllitidis*

*Canavalia maritima* Thouars = *Canavalia*

*rosea*

*Canavalia obtusifolia* DC. = *Canavalia*

*rosea*

*Capraria hirsuta* Kunth = *Capraria biflora*

*Caraguata lingulata* (L.) Lindl. = *Guzmania*

*lingulata*

*Caraguata splendens* Planch. = *Guzmania*

*lingulata*

*Caraxeron vermicularis* (L.) Raf. =

*Blutaparion vermiculare*

*Carica sativa* Tussac = *Carica papaya*

*Cassia paramariboensis* Miq. =

*Aeschynomene sensitiva*

*Cassipourea belizensis* Lundell =

*Cassipourea guianensis*

*Cassipourea elliptica* (Sw.) Poir. =

*Cassipourea guianensis*

- Cassipourea macrodonta* Standl. =  
*Cassipourea guianensis*
- Cassipourea podantha* Standl. =  
*Cassipourea guianensis*
- Cassytha americana* Nees = *Cassytha*  
*filiformis*
- Cassytha baccifera* Sol. ex J.S. Muell. =  
*Rhipsalis baccifera*
- Ceratophyllum demersum* L. var. *cristatum*  
(Spruce) K. Schum. = *Ceratophyllum*  
*muricatum*
- Ceratophyllum lleranae* Fassett =  
*Ceratophyllum muricatum*
- Cereus caripensis* (Kunth) DC. = *Rhipsalis*  
*baccifera*
- Chamaesyce hirta* (L.) Millsp. = *Euphorbia*  
*hirta*
- Chrysodium aureum* (L.) Mett. =  
*Acrostichum aureum*
- Chrysodium lomarioides* Jenman =  
*Acrostichum danaeifolium*
- Cissus cordifolia* L. = *Cissus verticillata*
- Cissus sicyoides* L. = *Cissus verticillata*
- Conocarpus racemosa* L. = *Laguncularia*  
*racemosa*
- Convolvulus caracassanus* Roem. & Schult.  
= *Merremia umbellata*
- Convolvulus cissoides* Lam. = *Merremia*  
*cissoides*
- Convolvulus pes-caprae* L. = *Ipomoea*  
*pes-caprae*
- Convolvulus riparius* Kunth = *Merremia*  
*cissoides*
- Convolvulus tiliaceus* Willd. = *Ipomoea*  
*tiliacea*
- Convolvulus umbellatus* L. = *Merremia*  
*umbellata*
- Conyza cinerea* L. = *Cyanthillium cinereum*
- Conyza cortesii* Kunth = *Pluchea odorata*
- Conyza odorata* L. = *Pluchea odorata*
- Coreopsis alba* L. = *Bidens alba*
- Coronilla sericea* Willd. = *Sesbania sericea*
- Costus discolor* Roscoe = *Costus arabicus*
- Costus niveus* G. Mey. = *Costus arabicus*
- Costus ramosus* Woodson = *Costus*  
*arabicus*
- Crinum commelyni* Jacq. = *Crinum*  
*erubescens*
- Crinum guianense* M. Roem. = *Crinum*  
*erubescens*
- Crinum lancei* Herbert ex Sweet = *Crinum*  
*erubescens*
- Crinum lindleyanum* Schult. f. ex Seub. =  
*Crinum erubescens*
- Cynanchum clausum* (Jacq.) Jacq. =  
*Sarcostemma clausum*
- Cyperus eggersii* Boeck. = *Cyperus*  
*odoratus*
- Cyperus macrocephalus* Liebm. = *Cyperus*  
*odoratus*
- Desmoncus apureanus* L.H. Bailey =  
*Desmoncus orthacanthos*
- Desmoncus horridus* Splitg. ex Mart. =  
*Desmoncus orthacanthos*
- Desmoncus multijugus* Steyerl. =  
*Desmoncus orthacanthos*
- Desmoncus palustris* Trail = *Desmoncus*  
*orthacanthos*
- Desmoncus velezi* L.H. Bailey & H.E.  
Moore = *Desmoncus orthacanthos*
- Digitaria disticha* (L.) Fiori & Paol. =  
*Paspalum distichum*
- Digitaria paspalodes* Michx. = *Paspalum*  
*distichum*
- Dimerandra isthmii* Schltr. = *Dimerandra*  
*elegans* ?
- Dioscorea kegeliana* Griseb. = *Dioscorea*  
*polygonoides*
- Diplachne scabra* (Nees) Nicora =  
*Leptochloa scabra*
- Dolichos luteolus* Jacq. = *Vigna luteola*
- Dolichos maritimus* Aubl. = *Canavalia*  
*rosea*
- Dolichos roseus* Sw. = *Canavalia rosea*
- Drepanocarpus lunatus* (L. f.) G. Mey. =  
*Machaerium lunatum*

- Echinochloa polystachya* var. *spectabilis*  
(Nees ex Trin.) Mart. Crov. =  
*Echinochloa polystachya*  
*Echinochloa spectabilis* (Nees ex Trin.) Link  
= *Echinochloa polystachya*  
*Echites biflora* Jacq. = *Rhabdadenia biflora*  
*Eclipta alba* (L.) Hassk. = *Eclipta prostrata*  
*Elsota diversifolia* (L.) S.F. Blake =  
*Securidaca diversifolia*  
*Encyclia aemula* (Lindl.) Carnevali & I.  
Ramírez = *Prosthechea aemula*  
*Encyclia ciliaris* (L.) Lemée = *Epidendrum*  
*ciliare*  
*Encyclia fragrans* (Sw.) Lemée var. *aemula*  
(Lindl.) Dressler & G.E. Pollard =  
*Prosthechea aemula*  
*Entadopsis polystachya* (L.) Britton =  
*Entada polystachya*  
*Epidendrum aemulum* Lindl. = *Prosthechea*  
*aemula*  
*Epidendrum fragans* auct. non Sw. 1788 =  
*Prosthechea aemula*  
*Epidendrum fragans* Sw. var. *aemulum*  
(Lindl.) Barb. Rodr. = *Prosthechea*  
*aemula*  
*Epiphyllum hookeri* Haw. = *Epiphyllum*  
*phyllanthus*  
*Epiphyllum phyllanthus* (L.) Haw. var.  
*hookeri* (Haw.) Kimnach = *Epiphyllum*  
*phyllanthus*  
*Eupatorium denticulatum* Vahl = *Mikania*  
*micrantha*  
*Euterpe badiocarpa* Barb. Rodr. = *Euterpe*  
*oleracea*  
*Euterpe beardii* Bailey = *Euterpe oleracea*  
*Euterpe edulis* auct. = *Euterpe oleracea*  
*Feuilleea ingoides* (Rich.) Kuntze = *Inga*  
*ingoides*  
*Ficus angustifolia* (Miq.) Miq. = *Ficus*  
*amazonica*  
*Ficus expansa* Pittier = *Ficus eximia*  
*Ficus foveata* Pittier = *Ficus eximia*  
*Ficus foveolata* Pittier = *Ficus eximia*  
*Ficus glandulosa* Pittier = *Ficus eximia*  
*Ficus glaucescens* (Liebm.) Miq. = *Ficus*  
*maxima*  
*Ficus guanarensis* Pittier = *Ficus eximia*  
*Ficus parkeri* Miq. = *Ficus maxima*  
*Ficus radula* Humb. & Bonpl. ex Willd. =  
*Ficus maxima*  
*Ficus surinamensis* Miq. = *Ficus amazonica*  
*Ficus turbinata* Pittier = *Ficus eximia*  
*Fimbristylis cymosa* R. Br. subsp.  
spathacea (Roth) T. Koyama =  
*Fimbristylis cymosa*  
*Fimbristylis glomerata* (Retz.) Urb. =  
*Fimbristylis cymosa*  
*Fimbristylis obtusifolia* (Vahl) Kunth =  
*Fimbristylis cymosa*  
*Fimbristylis spathacea* Roth = *Fimbristylis*  
*cymosa*  
*Funastrum clausum* (Jacq.) Schltr. =  
*Sarcostemma clausum*  
*Gomphrena sessilis* L. = *Alternanthera*  
*sessilis*  
*Gomphrena vermicularis* L. = *Blutaparon*  
*vermiculare*  
*Guilandina bonduc* L. = *Caesalpinia bonduc*  
*Guzmania lingulata* (L.) Mez var. *minor*  
(Mez) L.B. Sm. & Pittendr. = *Guzmania*  
*lingulata* *Guzmania minor* Mez =  
*Guzmania lingulata*  
*Heliconia ballia* Rich. = *Heliconia*  
*psittacorum*  
*Heliconia cannoidea* Rich. = *Heliconia*  
*psittacorum*  
*Heliconia humilis* (Aubl.) Jacq. = *Heliconia*  
*psittacorum*  
*Heliconia schomburgkiana* Klotzsch =  
*Heliconia psittacorum*  
*Heliconia silvestris* (Gleason) L.B. Sm. =  
*Heliconia psittacorum*  
*Hibiscus elatus* Sw. = *Talipariti tiliaceum*  
*Hibiscus pernambucensis* = *Talipariti*  
*tiliaceum*  
*Hibiscus populneus* L. = *Thespesia*  
*populnea*  
*Hibiscus tiliaceus* L. = *Talipariti tiliaceum*

*Hippocratea laevigata* Rich. = *Hippocratea volubilis*  
*Hydromystria laevigata* (Humb. & Bonpl. ex Willd.) Díaz-Mir. & Philcox = *Limnobium laevigatum*  
*Hydromystria laevigata* (Willd.) Hanzeker = *Limnobium laevigatum*  
*Ilex acuminata* Willd. = *Ilex guianensis*  
*Ilex celastroides* Klotzsch ex Garcke = *Ilex guianensis*  
*Ilex cumanensis* Turcz. = *Ilex guianensis*  
*Ilex macoucoua* Pers. = *Ilex guianensis*  
*Inga latifolia* (L.) Willd. = *Zygia latifolia*  
*Ipomoea cissoides* (Lam.) Griseb. fma. *viscidula* Meisn. = *Merremia cissoides*  
*Ipomoea macrantha* Roem. & Schult. = *Ipomoea violacea*  
*Ipomoea mollicoma* Miq. = *Merremia umbellata*  
*Ipomoea polyanthes* Roem. & Schult. = *Merremia umbellata*  
*Ipomoea tuba* (Schltdl.) G. Don = *Ipomoea violacea*  
*Iresine vermicularis* (L.) Moq. = *Blutaparon vermiculare*  
*Isochilus elegans* H. Focke = *Dimerandra elegans* ?  
*Jatropha manihot* L. = *Manihot esculenta*  
*Jussiaea affinis* DC. = *Ludwigia affinis*  
*Jussiaea aluligera* Miq. = *Ludwigia leptocarpa*  
*Jussiaea hexamera* Miq. = *Ludwigia affinis*  
*Jussiaea leptocarpa* Nutt. = *Ludwigia leptocarpa*  
*Jussiaea leptocarpa* Nutt. var. *aluligera* (Miq.) Jonker = *Ludwigia leptocarpa*  
*Jussiaea leptocarpa* Nutt. var. *genuina* Munz = *Ludwigia leptocarpa*  
*Jussiaea leptocarpa* Nutt. var. *meyeriana* (Kuntze) Munz = *Ludwigia leptocarpa*  
*Jussiaea surinamensis* Miq. = *Ludwigia leptocarpa*  
*Jussiaea variabilis* G. Mey. var. *affinis* (DC.) Kuntze = *Ludwigia affinis*

*Jussiaea variabilis* G. Mey. var. *meyeriana* Kuntze = *Ludwigia leptocarpa*  
*Karatas plumieri* E. Morren = *Bromelia plumieri*  
*Lemna paucicostata* Hegelm. = *Lemna aequinoctialis*  
*Leptochloa langloisii* Vasey = *Leptochloa scabra*  
*Leptochloa liebmannii* E. Fourn = *Leptochloa scabra*  
*Limnobium spongia* (Bosc) Steud. subsp. *laevigatum* (Humb. & Bonpl. ex Willd.) Lowden = *Limnobium laevigatum*  
*Limnobium stoloniferum* (G. Mey.) Griseb. = *Limnobium laevigatum*  
*Lophiaris fragrans* Raf. = *Trichocentrum lanceanum*  
*Lophiaris lanceana* (Lindl.) Braem = *Trichocentrum lanceanum*  
*Lygodium mexicanum* C. Presl = *Lygodium venustum*  
*Lygodium polymorphum* auct. non (Cav.) Kunth = *Lygodium venustum*  
*Macoucoua guianensis* Aubl. = *Ilex guianensis*  
*Malouetia furfuracea* Spruce ex Müll. Arg. = *Malouetia tamaquarina*  
*Malouetia guianensis* (Aubl.) Miers = *Malouetia tamaquarina*  
*Malouetia obtusiloba* A. DC. = *Malouetia tamaquarina*  
*Malouetia odorata* DC. = *Malouetia tamaquarina*  
*Malpighia bannisterioides* L. = *Stigmaphyllon bannisterioides*  
*Manihot diffusa* Pohl = *Manihot esculenta*  
*Manihot dulcis* Pax = *Manihot esculenta*  
*Manihot utilissima* Pohl = *Manihot esculenta*  
*Mariscus ligularis* (L.) Urb. = *Cyperus ligularis*  
*Melothria fluminensis* Gardner = *Melothria pendula*



<i>Melothria guadalupensis</i> (Spreng.) Cogn. = <i>Melothria pendula</i>	<i>Piper glabellum</i> Sw. = <i>Peperomia glabella</i>
<i>Mikania denticulata</i> (Vahl) Willd. = <i>Mikania micrantha</i>	<i>Pithecellobium latifolium</i> (L.) Benth. = <i>Zygia latifolia</i>
<i>Mikania orinocensis</i> Kunth = <i>Mikania</i> <i>micrantha</i>	<i>Pluchea cortesii</i> (Kunth) DC. = <i>Pluchea</i> <i>odorata</i>
<i>Milium distichum</i> (L.) Muhl. = <i>Paspalum</i> <i>distichum</i>	<i>Polygala diversifolia</i> L. = <i>Securidaca</i> <i>diversifolia</i>
<i>Mimosa bipinnata</i> Aubl. = <i>Entada</i> <i>polystachya</i>	<i>Polypodium phyllitidis</i> L. = <i>Campyloneurum phyllitidis</i>
<i>Mimosa ingoides</i> Rich. = <i>Inga ingoides</i>	<i>Polypodium rivulare</i> Vahl = <i>Nephrolepis</i> <i>rivularis</i>
<i>Mimosa latifolia</i> L. = <i>Zygia latifolia</i>	<i>Portulaca portulacastrum</i> L. = <i>Sesuvium</i> <i>portulacastrum</i>
<i>Mimosa polystachia</i> L. = <i>Entada</i> <i>polystachya</i>	<i>Pothos gracilis</i> Rudge = <i>Anthurium gracile</i>
<i>Moutouchi suberosa</i> Aubl. = <i>Pterocarpus</i> <i>officinalis</i>	<i>Pothos scolopendrinus</i> Ham. = <i>Anthurium</i> <i>gracile</i>
<i>Musa humilis</i> Aubl. = <i>Heliconia</i> <i>psittacorum</i>	<i>Pteris biaurita</i> var. <i>pungens</i> (Willd.) H. Christ = <i>Pteris pungens</i>
<i>Oncidium lanceanum</i> Lindl. = <i>Trichocentrum lanceanum</i>	<i>Pteris longicauda</i> H. Christ = <i>Pteris</i> <i>pungens</i>
<i>Oplismenus polystachyus</i> Kunth = <i>Echinochloa polystachya</i>	<i>Pterocarpus draco</i> L. = <i>Pterocarpus</i> <i>officinalis</i>
<i>Orelia grandiflora</i> Aubl. = <i>Allamanda</i> <i>cathartica</i>	<i>Pterocarpus lunatus</i> L. f. = <i>Machaerium</i> <i>lunatum</i>
<i>Panicum bonplandianum</i> Steud. = <i>Echinochloa polystachya</i>	<i>Pterocarpus suberosa</i> (Aubl.) Pers. = <i>Pterocarpus officinalis</i>
<i>Panicum spectabile</i> Nees ex Trin. = <i>Echinochloa polystachya</i>	<i>Pycreus polystachyos</i> (Rottb.) P. Beauv. = <i>Cyperus polystachyos</i>
<i>Paullinia hostmannii</i> Steud. = <i>Paullinia</i> <i>pinnata</i>	<i>Renealmia exaltata</i> L. f. = <i>Renealmia</i> <i>alpinia</i>
<i>Pharmacosycea guyanensis</i> Miq. = <i>Ficus</i> <i>maxima</i>	<i>Rhipsalis cassutha</i> Gaertn. = <i>Rhipsalis</i> <i>baccifera</i>
<i>Phaseolus luteolus</i> (Jacq.) Gagnep. = <i>Vigna</i> <i>luteola</i>	<i>Rhipsalis minutiflora</i> K. Schum. = <i>Rhipsalis</i> <i>baccifera</i>
<i>Philodendron cyclops</i> A.D. Hawkes = <i>Philodendron acutatum</i>	<i>Rhizophora americana</i> Nutt. = <i>Rhizophora</i> <i>mangle</i>
<i>Philoxerus vermicularis</i> (L.) R. Br. = <i>Blutaparon vermiculare</i>	<i>Rhizophora mangle</i> var. <i>racemosa</i> (G. Mey.) Engl. = <i>Rhizophora racemosa</i>
<i>Phyllocactus phyllanthus</i> (DC.) Link = <i>Epiphyllum phyllanthus</i>	<i>Rhizophora mangle</i> var. <i>samoensis</i> Hochr. = <i>Rhizophora mangle</i>
<i>Physalis capsicifolia</i> Dunal = <i>Physalis</i> <i>angulata</i>	<i>Rhizophora samoensis</i> (Hochr.) Salvoza = <i>Rhizophora mangle</i>
<i>Physalis lanceifolia</i> Nees = <i>Physalis</i> <i>angulata</i>	<i>Roystonea venezuelana</i> L.H. Bailey = <i>Roystonea oleracea</i>

*Salvinia laevigata* Humb. & Bonpl. ex Willd. = *Limnobium laevigatum*  
*Sarcostemma cumanense* Kunth = *Sarcostemma clausum*  
*Sarcostemma pubescens* Kunth = *Sarcostemma clausum*  
*Scirpus glomeratus* Retz. = *Fimbristylis cymosa*  
*Scirpus mutatus* L. = *Eleocharis mutata*  
*Scirpus obtusifolius* Vahl = *Fimbristylis cymosa*  
*Sesuvium acutifolium* Miq. = *Sesuvium portulacastrum*  
*Smilax globifera* G. Mey. = *Smilax cumanensis*  
*Smilax hostmanniana* Kunth = *Smilax cumanensis*  
*Smilax pirarensis* Kunth & M.R. Schomb. = *Smilax cumanensis*  
*Smilax surinamensis* Miq. = *Smilax cumanensis*  
*Solanum demerareense* Dunal = *Solanum stramonifolium*  
*Solanum toxicarium* Rich. = *Solanum stramonifolium*  
*Solanum trichocarpum* Miq. = *Solanum stramonifolium*  
*Spondias lutea* L. = *Spondias mombin*  
*Sporobolus littoralis* (Lam.) Kunth = *Sporobolus virginicus*  
*Stigmaphyllon ovatum* (Cav.) Nied. = *Stigmaphyllon bannisterioides*  
*Tillandsia lingulata* L. = *Guzmania lingulata*  
*Torulium ferax* (Rich.) Urb. = *Cyperus odoratus*  
*Torulium odoratum* (L.) S.S. Hooper = *Cyperus odoratus*  
*Typha angustifolia* var. *domingensis* (Pers.) Hemsl. = *Typha domingensis*  
*Typha tenuifolia* Kunth = *Typha domingensis*  
*Typha truxillensis* Kunth = *Typha domingensis*

*Urostigma amazonicum* Miq. = *Ficus amazonica*  
*Urostigma angustifolium* Miq. = *Ficus amazonica*  
*Verbesina alba* L. = *Eclipta prostrata*  
*Verbesina prostrata* L. = *Eclipta prostrata*  
*Vernonia cinerea* (L.) Less. = *Cyanthillium cinereum*  
*Vigna repens* (L.) Kuntze = *Vigna luteola*  
*Vilfa virginica* (L.) P. Beauv. = *Sporobolus virginicus*  
*Vitis sicyoides* (L.) Baker = *Cissus verticillata*  
*Wedelia psammophila* Poepp. = *Eclipta prostrata*  
*Willoughbya micrantha* (Kunth) Rusby = *Mikania micrantha*  
*Willoughbya scandens* Kuntze var. *orinocensis* (Kunth) Kuntze = *Mikania micrantha*

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# Appendix 11

## Socio-Economic Context



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Photo credit: Suresh V. Kandaswamy

## 1 Region One

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Shell Beach Protected Area is located within Region One (1), also known as the Barima-Waini Region. Region 1 is in the northwestern part of Guyana and covers an area of 20,339 km<sup>2</sup>. The region is bordered to the north by the Atlantic Ocean, to the south by Region 7, Cuyuni-Mazaruni, to the east by Region 2, Pomeroon-Supenaam, and to the west by Venezuela. The regional administrative centre is Mabaruma. It is considered to be a hinterland region by the Guyana Bureau of Statistics. The population of the region in 2002 was 24,275. In 2012 it had risen to 26,941, which is 3.60 percent of Guyana's population of 747,884 (Bureau of Statistics, 2014). The gender distribution for Region 1 is 14,150 males (52.5 percent) and 12,791 females (47.5 percent). Population density is 1.3 persons per km<sup>2</sup>. Average household size in Region 1 is 5.5 persons (Bureau of Statistics, 2014). The complete 2012 census analysis is currently not available therefore, statistics from 2002 has been used where applicable.

## 2 Communities

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There are eight Amerindian titled communities and three Community Development Councils (CDC) adjacent to or within the Shell Beach Protected Area. Titled communities include Three Brother's, Warapoka, Santa Cruz (also sometimes referred to as Little Kanuballi), Kwebanna, Assakata, Santa Rosa, Waramuri, and Manawarin. CDCs include Almond Beach, Father's Beach, and Morawhanna. Santa Rosa is the largest Amerindian community in Guyana and has 11 satellite communities namely Cabora, Huridiah, Kamwatta, Santa Rosa and Islands (also sometimes referred to as Karie and Islands), Koko and Islands, Kumaka, Moracupha, Parakese Islands, Karaburi, Rincon, and Wallaba. Waramuri also has a satellite community, Haimaracabra. Additionally, Unity Grant, comprising of four families, located on the Waini River near Warapoka, is neither a titled community nor a CDC; it is also not tied to any titled community or CDC. All of these villages, including satellite communities, are considered as stakeholders due to their proximity and use of resources adjacent to or within the protected area. The total estimated population of the communities is 11,328 (**Table 1**).

Almond Beach, Father's Beach, and Unity Grant communities as well as some families of Kamwatta community are situated within the SBPA. None of the communities or settlement within the SBPA are titled.

Amerindian communities comprise a mix of the Arawak, Carib, and Warau tribes. The names reflect the three language families. Historically, of the three language families, the Arawak is considered to be the most extensive and predominant. They were mostly agriculturalists with matrilineal societies and complex social structures. The Carib were considered to be a powerful



warrior tribe by early European colonizers who fished, farmed and hunted game. The numbers of Caribs were greatly reduced by the time the British occupied Guyana and some had settled into farming. The Warau were boat builders. The Waraus had their own language but also spoke both Carib and Arawak (MRG, 2005).

The current population of the communities was difficult to ascertain. The SBPA Management Planning team during their community visits in August 2014 did not have access to the village register and therefore relied on numbers provided by the interviewees. The 2002 census data does not delineate population by villages named in the list below. The census identifies some villages, however most are grouped together by an area between two locations, for example, Baramanni River to Santa Cruz or Waini Mouth to Moruca River, and is therefore not useful for identifying population of stakeholder communities.

**Table 1: Estimated Population of Stakeholder Communities**

<b>Community</b>	<b>Population Estimate 2014</b>	
Almond Beach		70
Assakata		400
Father's Beach		68
Kwebanna		800
Morawhanna		62
Manawarin		1,550
Santa Cruz/Little Kanuballi		315
Santa Rosa (5,613)		5,613
Cabora	362	
Huridiah	269	
Kamwatta	680	
Karaburi	765	
Koko and Islands	615	
Kumaka	793	
Moracupha	497	
Parakese Islands	450	
Rincon	540	
Santa Rosa and Islands	442	
Wallaba	200	
Unity Grant		42
Three Brothers		313
Waramuri		661
Haimaracabra		884
Warapoka		550
<b>Approximate Population</b>		<b>11,328</b>

## 3 Social Infrastructure and Services

### 3.1 Communications

Communication is difficult in the region. Getting printed materials to communities in a timely manner is difficult. It is necessary to coordinate package delivery through people or agencies which serve or have an opportunity to visit the communities. A lead time of two weeks is often required to ensure information gets to communities in a timely manner. Communities have asked that information be sent to them at least one month in advance of a meeting so that they can be prepared.

Digicel is the only cellular telecommunications provider in the Region. Several communities have access to cellular connection. A rapid survey of communities by the SBPA Management Planning Team during community visits in August 2014 provided the information in Table 3 on communications.

In addition, radio equipment is available at community health centres, which could serve as an emergency means of communication.

Internet access via DSL, cable, or satellite is not available in SBPA stakeholder communities with the exception of Kumaka village, which has a satellite internet access at the secondary school. This makes internet based communications such as emails and electronic delivery of documents to communities not possible. Where cell reception is available, internet is available through cell phone data plans.

**Table 2: Communications**

Community	Cell Phone	Mobile Internet	Land line	DSL/Satellite
Almond Beach	No (but available in two spots)	No (but available in two spots)	No	No
Assakata	Yes	Yes	No	No
Father's Beach	Yes	Yes	No	No
Kwebanna	Yes	Yes	No	No
Morawhanna	Yes - sometimes	Yes	No	No
Manawarin	Yes	Yes	No	No
Santa Cruz/ Little Kanuballi	No (but available at a couple of spots– school compound and on top of Heaven Hill)	No (but available in few spots)	No	No

Community	Cell Phone	Mobile Internet	Land line	DSL/ Satellite
Santa Rosa Village				
Cabora	Yes (signal not reliable always)	Yes	No	No
Huridiah	Yes	Yes	No	No
Kamwatta	Yes	Yes	No	No
Karaburi	Yes	Yes	No	No
Koko and Islands	Yes	Yes	No	No
Kumaka	Yes	Yes	No (except of line at GECOM and Red Cross office)	Yes Satellite (at Secondary School)
Moracupha	Yes	Yes	No	No
Parakese Islands	Yes	Yes	No	No
Rincon	Yes	Yes	No	No
Santa Rosa and Islands	Yes	Yes	No	No
Wallaba	Yes	Yes	No	No
Three Brothers	Yes – in some places	No	No	No
Unity Grant	Yes	Yes	No	No
Waramuri	Yes	Yes	No	No
Haimaracabra	Yes	Yes	No	No
Warapoka	Yes (in some places)	Yes	No	No

### 3.2 Transportation

Transportation to the region is challenging. The southeastern part of Shell Beach Protected Area, the Moruca District, can be accessed via a combination of road and boat transportation from Georgetown. It can also be accessed from the northwestern portion of the protected area via boat. The northwestern portion of SBPA can be accessed from Moruca via boat or from Georgetown by air from Ogle city airport.

To reach Kumaka in Santa Rosa Village in the Moruca District, one needs to take a bus or other road transportation from Georgetown to Parika in Region 3, then a speed boat or ferry from Parika across the Essequibo River to Supenaam in Region 2, then a trip via road with a bus or taxi to Charity and from Charity to Kumaka in Santa Rosa Village, Region 1, via speed boat that takes you over the Pomeroon River, a 15 minute ride on the Atlantic Ocean along the coast, and back inland via the Moruca River to Kumaka. The journey from Georgetown to Kumaka takes approximately 4 hours. It is possible to charter a flight to Kumaka, which has an airfield.

Access to the northwestern part of Shell Beach Protected Area and its communities is possible through Mabaruma, the administrative center for the Region. The flight from Georgetown Ogle Airport takes about an hour to Mabaruma. From Mabaruma, communities of Morawhanna, Almond Beach, Three Brothers, Warapoka, Unity Grant, Santa Cruz/Little Kanuballi, Kwebanna can be accessed via boat. Morawhanna is downstream of Mabaruma on the Aruka River. Aruka River flows into the Waini River via the Mora Passage. Almond Beach is on the Atlantic Ocean and can be accessed from the mouth of the Waini River. Three Brothers, Unity Grant, Warapoka, Santa Cruz/Little Kanuballi, and Kwebanna are on the Waini River.

The Baramanni River connects Moruca with the Waini River and its communities. Access to Santa Rosa from the communities on the Waini River is possible via boat. There is also road access to Santa Rosa Village from Kwebanna.

There is also a ferry service from Georgetown to Morawhanna and to Mabaruma once a week. This ferry also bring various supplies to communities in the region.

### 3.3 Medical Facilities

Medical facilities in communities surrounding the SBPA Area are available at the following location. The Health Centres are also equipped with radios that can be used for communication.

**Table 3: Medical Facilities**

<b>Community</b>	<b>Facility</b>
Almond Beach	Health Centre but no health worker
Assakata	Health Centre
Father's Beach	Health Centre
Kwebanna	Health Centre
Mabaruma (Regional Administration)	Regional Hospital
Morawhanna	Health Centre
Manawarin	Health Centre
Santa Cruz/ Little Kanuballi	Health Centre
Santa Rosa Village	
Cabora	Health Centre
Huridiah	None
Kamwatta	Health Centre
Karaburi	Health Centre
Koko and Islands	Health Centre
Kumaka	Sub-Regional Hospital
Moracupha	None
Parakese Islands	Health Centre
Rincon	None
Santa Rosa and Islands	None

Community	Facility
Wallaba	Health Centre
Three Brothers	2 Health Centres
Unity Grant	None
Waramuri	Health Centre
Haimaracabra	Health Centre
Warapoka	Health Centre

### 3.4 Community Facilities

The infrastructure at various communities is limited. A brief survey was conducted by the SBPA Management Planning Team during community visits in August 2014 (SBMPT, 2014) to identify community facilities. The information has been categorized into Schools (Table 4), Administration and Law enforcement (Table 5), and Other Community Facilities (Table 6).

**Table 4: Schools**

Community	Facility
Almond Beach	<ul style="list-style-type: none"> <li>Primary school, teachers' quarters, feeding program building</li> </ul>
Assakata	<ul style="list-style-type: none"> <li>Primary school, teachers' quarters, school kitchen</li> </ul>
Father's Beach	<ul style="list-style-type: none"> <li>Primary school, teachers' quarters</li> </ul>
Kwebanna	<ul style="list-style-type: none"> <li>Nursery school, primary school, teachers' quarters</li> </ul>
Morawhanna	<ul style="list-style-type: none"> <li>Primary school</li> </ul>
Manawarin	<ul style="list-style-type: none"> <li>Nursery school, primary school, teachers' quarters</li> </ul>
Santa Cruz/Little Kanuballi	<ul style="list-style-type: none"> <li>Nursery school, primary school, teachers' quarters</li> </ul>
Santa Rosa Village	
Kamwatta	<ul style="list-style-type: none"> <li>Primary school</li> </ul>
Karaburi	<ul style="list-style-type: none"> <li>Nursery school, primary school, secondary school department, teachers' quarters, nursery school</li> </ul>
Koko and Islands	<ul style="list-style-type: none"> <li>Nursery school</li> </ul>
Kumaka	<ul style="list-style-type: none"> <li>Secondary school, teachers quarters, Education Building (Administer schools in sub-region)</li> </ul>
Parakese Islands	<ul style="list-style-type: none"> <li>Nursery school</li> </ul>
Santa Rosa and Islands	<ul style="list-style-type: none"> <li>Nursery school, primary school</li> </ul>
Wallaba	<ul style="list-style-type: none"> <li>Primary school, teachers' quarters</li> </ul>
Three Brothers	<ul style="list-style-type: none"> <li>3 primary schools</li> </ul>
Unity Grant	None
Waramuri	<ul style="list-style-type: none"> <li>Primary (top) school, nursery school, teachers' quarters</li> </ul>
Haimaracabra	<ul style="list-style-type: none"> <li>Primary school</li> </ul>
Warapoka	<ul style="list-style-type: none"> <li>Nursery school, primary school, feeding program kitchen</li> </ul>



**Table 5: Administration and Law Enforcement**

Community	Facility
Almond Beach	<ul style="list-style-type: none"> <li>Guyana Marine Turtle Conservation Society administration building</li> </ul>
Kwebanna	<ul style="list-style-type: none"> <li>Village office</li> <li>Guyana Forestry Commission outpost</li> </ul>
Manawarin	<ul style="list-style-type: none"> <li>Village council office</li> </ul>
Santa Cruz/Little Kanuballi	<ul style="list-style-type: none"> <li>Village office</li> <li>Police outpost (yet to be opened)</li> </ul>
Santa Rosa Village	
Kumaka	<ul style="list-style-type: none"> <li>Village office</li> <li>RDC branch office/administration building</li> <li>Police station</li> </ul>
Warapoka	<ul style="list-style-type: none"> <li>Village office</li> </ul>

Note: only communities with administrative and law enforcement facilities are identified in Table 5.

**Table 6: Other Community Facilities**

Community	Facility
Almond Beach	<ul style="list-style-type: none"> <li>Tourist guest house</li> <li>Guyana Marine Turtle Conservation Society administration building</li> <li>Playground</li> </ul>
Assakata	<ul style="list-style-type: none"> <li>Water supply</li> <li>1 church</li> </ul>
Kwebanna	<ul style="list-style-type: none"> <li>Guest house</li> <li>Medics' quarters</li> <li>Computer hub (in progress)*</li> <li>5 churches</li> </ul>
Manawarin	<ul style="list-style-type: none"> <li>Multi-purpose building/guest house (from GPAS Phase 1 Small Grants Project)</li> <li>Village well (water supply)</li> <li>Computer hub (in process of completion, no computer yet)*</li> <li>8 Churches</li> </ul>
Santa Cruz/Little Kanuballi	<ul style="list-style-type: none"> <li>Computer hub (under construction)*</li> <li>3 churches</li> </ul>
Santa Rosa Village	

<b>Community</b>	<b>Facility</b>
Huridiah	<ul style="list-style-type: none"> <li>• Computer hub (new; needs to be furnished)*</li> </ul>
Kamwatta	<ul style="list-style-type: none"> <li>• Multipurpose building/guest house (from GPAS Phase 1 Small Grants Project)</li> <li>• Computer hub</li> </ul>
Karaburi	<ul style="list-style-type: none"> <li>• Multi-purpose building</li> <li>• Computer hub being prepared inside multi-purpose building (no computers yet)*</li> <li>• 5 churches</li> <li>• Playground</li> </ul>
Koko and Islands	<ul style="list-style-type: none"> <li>• Community shop</li> <li>• Church</li> <li>• Sports pavilion</li> </ul>
Kumaka	<ul style="list-style-type: none"> <li>• Multipurpose building/ guest house (from GPAS Phase 1 Small Grants Project)</li> <li>• Resource Centre for students (computers, library, conduct teaching sessions)</li> <li>• Amerindian hostel, APA office</li> <li>• Airfield</li> <li>• 2 churches</li> <li>• Playground, sports pavilion</li> </ul>
Moracupha	<ul style="list-style-type: none"> <li>• Community center</li> <li>• Computer hub (no computers or internet access yet)*</li> <li>• Ball field</li> </ul>
Parakese Islands	<ul style="list-style-type: none"> <li>• 2 churches</li> </ul>
Santa Rosa and Islands	<ul style="list-style-type: none"> <li>• Computer hub (Building not completed yet)*</li> <li>• 1 church</li> </ul>
Wallaba	<ul style="list-style-type: none"> <li>• Computer hub (Building not completed yet)*</li> <li>• 1 church</li> </ul>
Three Brothers	<ul style="list-style-type: none"> <li>• Multi-purpose building/guest house (from GPAS Phase 1 Small Grants Project)</li> <li>• Computer hub (proposed)*</li> <li>• 1 Church; 1 church service at the multi-purpose building</li> </ul>
Unity Grant	None
Waramuri	<ul style="list-style-type: none"> <li>• Computer hub</li> <li>• Sport club</li> <li>• 4 churches</li> </ul>
Haimaracabra	<ul style="list-style-type: none"> <li>• Computer hub (Building not completed yet)*</li> <li>• 4 churches</li> </ul>
Warapoka	<ul style="list-style-type: none"> <li>• Multi-purpose building/guest house (from GPAS Phase 1 Small Grants Project)</li> </ul>

Community	Facility
	<ul style="list-style-type: none"> <li>• 5 churches</li> <li>• Playground, sports pavilion</li> </ul>

\* Computer hubs are being funded by the Ministry of Amerindian Affairs and are in various stages of building completion and furnishings. These hubs do not have computers installed yet. It is intended that there will be internet access, in the future, made possible through satellite connection.

## 4 Livelihood and Economic Activities

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Historically, Amerindian communities have utilized natural resources found in the area for their livelihoods. They engaged in fishing, crabbing, hunting, palm and timber harvesting, and using various materials to make craft and other articles. These natural resources continue to provide an important means for meeting their livelihood needs. Subsistence agriculture is also a major activity with some agro-processing taking place on a small scale. Tourism activity is limited. Table 7 provides a list of communities and livelihood activities as noted in the 2011 delineation report (GMTCS, 2011) and updated during the management planning process in 2014. Previously created community resource map was also updated with community input and was spatially referenced (**Appendix 9**).

### 4.1 Fishing, Crabbing, Hunting, Trapping

Fishing and crabbing is an important subsistence activity for many communities. Communities catch crabs from July to September and also collect snails. Communities have also hunted turtles for their meat and collected eggs from March to April (Charles et. al., 2004). According to GMTCS, while, Amerindian and non-Amerindian fisherpersons collected turtle eggs from the coast to be consumed locally or sold commercially, this practice has declined considerably as a result of education and awareness activities conducted by them during the past decade. As well, fishing for hassar in the swamps and aquarium fish is being conducted (Charles et. al., 2004).

Hunting and bird trapping is also noted by communities as an activity they traditionally pursued (**See Community Resource Use Map - Appendix 9**). The extent of game or birds taken is not known.

Fisherpersons from Charity and Pomeroon in Region 2 also utilize the area between Corkwood Creek and the mouth of the Moruca River for fishing. Fishing and transportation vessels also utilize the area at the Waini River mouth and the Waini River.

Communities have noted that much of the take from fishing, crabbing, hunting, and trapping is to meet family needs. Some excess take is sold to those mostly within the community (Tables 8 and 9).

## 4.2 Timber and Forest Materials

Communities rely on trees and materials on the lands to support construction of canoes, hammocks, furniture, etc. (Charles *et.al.*, 2004). Troolie, a large palm leaf, is gathered to thatch roofs. It was however noted during community visits in August 2014 that increasingly houses and other buildings in larger communities are being built with metal roofs.

Discussions with communities also revealed that they use various plants and trees for medicinal purposes (Personal communication, 2014).

In Three Brothers community, Crabwood seeds are collected to make crabwood oil, soaps, and creams (Personal communication, 2014). As part of the GPAS Phase I initiatives, a Crabwood seed dryer project was initiated and completed (Pitamber and Spitzer, 2013). Their report notes that the initiative is operational and generating income.

In and around Manawarin, there are large portions of land covered with Ite palm. It was noted that it used to be previously used by communities to make craft, hammocks, bags, hats, and purses, but it is no longer harvested to make these things (SBMPT, 2014).

Communities such as Kwebanna and Warapoka have timber concessions on titled land and on State land that they harvest and sell. Kwebanna has long been a logging community and has a saw mill as well.

The only forestry concession within the SBPA is the Amazon Caribbean Guyana Ltd (AMCAR) manicole farming concession. AMCAR is an established agro-processing company that exports Heart of Palm derived from the manicole palms. Heart of Palm is locally called cabbage. AMCAR has concessions to harvest manicole palm that runs along the Waini River for 1.6 km (1 mile) inland, starting from Baramanni Lake up to Waini Point at the mouth of Waini River. Other than the portion that falls within the Three Brothers land title, the rest of the concession falls within the SBPA. However, it was noted by the Guyana Forestry Commission that the lease on the AMCAR concession within the protected area would be terminated.

AMCAR does provides employment for local Amerindian communities. However, residents do not strictly adhere to harvesting within this area alone and would also venture outside the boundaries of the concession to harvest cabbage. Regardless of whether AMCAR concession continues to exist, Amerindian communities can continue to harvest cabbage for their livelihoods. Sustainable levels of harvest is yet to be determined.

### 4.3 Agriculture

About one percent of the then Shell Beach study area (GFA Consulting, 2009) was classified as mixed agriculture. The study area at the time included the Three Brothers Amerindian community. The study notes that the important locations of cultivated land were on the Three Brother's side of the Waini River. Other small spots of agriculture can be found in the Santa Rosa area north of the boundary of the proposed SBPA. North of the Moruca River, near Fathers' Beach, extensive plantations could be identified inside the SBPA. It is noted that most of the agricultural activities in the area are for subsistence. Cassava and a variety of vegetables are cultivated for community use (GFA Consulting, 2009). Cultivation is made possible with the help of drainage systems.

Three Brothers and Santa Rosa are titled communities and are therefore excluded from the protected area. Therefore, the only mixed agriculture activity within the Protected Area is at Father's Beach.

At Kwebanna, a GPAS Phase I community project helped plant citrus saplings. According to the report on its implementation, there was varying degree of success with some farms having stunted and delayed growth. However, visits by the Shell Beach Management Planning Team to three farms in August 2014 showed that the trees were bearing fruit.

Most communities have some form of subsistence agriculture. They cultivate for personal consumption and to sell locally. This includes ground provisions like cassava and eddoes, garden vegetables, and fruits. Some also rear chicken. At Manawarin, the community is currently constructing a Cassava processing building where they will make cassava bread, starch, and casareep, which is a thick liquid made from cassava root and is used in Amerindian dishes, especially pepperpot. GPAS Phase I initiative provided assistance to farmers in Assakata, Wallaba, and Little Kanuballi by supplying equipment. At Assakata, the intervention is reported to have increased the acreage farmed, improvement in livelihood and food security; at Little Kanuballi, the interventions resulted in increased farming, harvest, and source of household income; and at Wallaba, the intervention is reported to have improved income generation as a result of larger farms. Markets have not however expanded beyond the local area (Pitamber and Spitzer, 2013).

### 4.4 Coconut Harvest

There are extensive plantations of coconut trees, *Cocos nucifera*, along the beach, especially on the northwestern part of the Waini peninsula in and around Almond Beach. The crop grows well in the shell substrate over rich mud. The first plantations have been established since about 1990. Most of the coconuts are exported to Trinidad (GFA Consulting, 2009). Copra and production of fibres are some of the benefits of the plantations (Charles et. al., 2004). However a report of the GPAS Phase I initiative that provided a tractor to Almond Beach community to collect water



coconut noted that markets collapsed and the cost of transportation were high (Pitamber and Spitzer, 2013). The tractor is now in disrepair.

While there is no longer leases issued, there are several families that continue to own sections of the plantation along the beach.

A visit by the Shell Beach Management Planning Team in August 2014 noticed large number of coconut trees lying on the beach; uprooted due to erosion of the shell beach. The shells are accreting further northwest resulting in a broad shell beach area. There was evidence of new coconut plantations on the recently formed shell beach.

## 4.5 Tourism

Tourism is not well developed in the region. The main tourism attraction is the Turtles on Almond Beach between the months of March and July and is perhaps the only organized seasonal tourism activity, which is conducted by GMTCS. There are local festivals such as the Heritage Month and Moruca Expo that brings together various communities and visitors from within the region and elsewhere. However, as a tourism activity, these are yet to be developed.

Transportation is available mostly by boat throughout the region and via air to Mabaruma. There are no regular flights to Kumaka, Santa Rosa, but it is possible to charter a flight. It is expensive to travel in the region since beyond Kumaka, much of the travel has to be chartered.

**Picture 1: Accommodations at Warapoka, Three Brothers, Manawarin, and Almond Beach**



Other than gateway communities such as Santa Rosa, Mabaruma, Kwebanna, and Santa Cruz, ability to shop and obtain supplies is generally limited.

Accommodation infrastructure for tourism is limited. The following among stakeholder communities have facilities that could potentially cater to tourists.

**Table 7: Accommodations**

<b>Community</b>	<b>Accommodation</b>
Almond Beach	Guest House with 3 rooms that can host approximately 8 people. Several more can be accommodated in the open space and using hammocks.
Kwebanna	Guest house with three rooms that can accommodate 6 persons. The facility is still to be developed.
Kamwatta	Multi-purpose building with 6 rooms with a capacity to host 12 people. This project was completed as part of GPAS Phase 1 initiatives. Pitamber and Spitzer (2013) note that the facility is in good condition, but required some repairs. However, it was noted that there was generally a lack of visitors to the area. It has 6 rooms with a capacity to host 12 people.
Manawarin	Multi-purpose building with 6 rooms with a capacity to host 12 people. This project was completed as part of GPAS Phase 1 initiatives. The facility appears to be in good condition but not well used. There is a lack of visitors to the area (Pitamber and Spitzer, 2013)
Santa Rosa – Kumaka	Multi-purpose building with 6 rooms with a capacity to host 12 people. This project was completed as part of GPAS Phase 1 initiatives. The facility is well maintained and well used (Pitamber and Spitzer, 2013).  There are several other private accommodation facilities in and around Kumaka that includes the communities of Aquero and Cabucali.
Three Brothers	Multi-purpose building with 6 rooms with a capacity to host 12 persons and kitchen. This project was completed as part of GPAS Phase 1 initiatives. The facility is in need of repairs and maintenance.

Warapoka	Multi-purpose building with 6 rooms with a capacity to host 12 persons and a kitchen. This project was completed as part of GPAS Phase 1 initiatives. The facility is in good condition and is maintained and well used. Pitamber and Spitzer (2013), note that the facilities are well used by guests and the community.
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## 4.6 Other Activities

Amerindian people are also engaged in various other activities and are employed as teachers, drivers, labourers, shop keepers and petty traders, boat captains and boat hands, and in building and construction (Charles et. al., 2004), and in local and national government services. Table 7 summarizes the livelihood activities communities engage in.

**Table 8: Current Community Livelihood Activities**

Community	Livelihood Activities
Almond Beach	Fishing along the coast from Almond Beach to Tiger Beach, and along the swamps and creeks along the coast; crab catching along the Waini River and also on the sea coast; farming on the beaches along the coast and inland of Almond Beach; coconut harvest; craft making; and tourism.
Father's Beach	Fishing within the vicinity of Father's Beach, up to Tiger Beach; Hunting at the back of Father's Beach Community up to the Moruca River junction; Wildlife trapping occurs within a 32.2 km (20 miles) radius at the back of Father's Beach; crabbing; and farming.
Morawhanna	Fishing in the estuary of the Waini River and also in the ocean as far as Kamwatta Beach to about seven miles offshore; crab catching along the Waini River; and harvesting of mangrove bark in the Waini River. Activities in the community include farming and rearing of chicken.
Three Brothers	Fishing in the estuary of the Waini River and also in the seas as far as Kamwatta Beach; fishing and hunting along the Waini River and in creeks within the SBPA; gathering heart of palms throughout the Waini River as far as Baramani River, timber harvesting from several creeks in and around the SBPA and adjacent to the Waini River; and crab catching at the mouth of the Waini River. Activities within the community includes farming ground provisions, corn, ginger, plantain, and banana; and processing crabwood seeds to make crabwood oil.

Community	Livelihood Activities
Warapoka	Gathering heart of palms along the Waini and Baramani Rivers; hunting and wildlife trapping within a 32.2 km (20 miles) radius within the Gwenni Beach - Dog Creek area; lumber and troolie gathering in creeks along the Waini River; and fishing in the sea along Gwenni Beach and the Moruca sea coast. Activities within the community include farming for personal use and to sell small amounts; cabbage cutting; and making handicrafts.
Santa Cruz/ Little Kanuballi	Fishing in the estuary and in creeks along the Waini River; crab catching along the lower Waini River; and wildlife trapping within a 32.2 km (20 miles) radius of the Gwenni Beach – Dog Creek area. Activities within the community include fishing, hunting, lumbering, and farming for personal use and for selling in the community. Farming includes cassava, plantain, eddoes, yam, bananas, watermelon, beans, okra, pumpkin, and coconut. Manicole cabbage cutting is also done.
Kwebanna	Fishing in the estuary of the Waini River and also in the seas along the Almond Beach area; Crab catching along the lower Waini River; Fishing in creeks in the Waini River; wildlife trapping within a 32.2 km (20 miles) radius of Gwenni Beach - Dog Creek area; activities within the community include logging within the titled lands and leased concessions and processing logs at a saw mill in the community.
Assakata	Crabbing at Honey Point along the coast of Shell Beach; fishing along Baramani Lake; manicole palm harvesting at the back of Gwenni Beach (Dog Creek); fishing at Gwenni Beach; and farming.
Santa Rosa	Fishing and crabbing along the entire coast of SB; fishing in Mokobunya Creek and Konoko Creek (situated in Three Brothers' titled lands); hunting in creeks situated in Three Brothers' titled lands; fishing in Luri Creek; canoe making along the right bank of Baramanni River, Baramanni Lake, and the Barabara River; and hunting at the back of Gwenni Beach.
Waramuri	Fishing and crabbing along the right bank of the Waini River. Activities within the community also include farming.
Manawarin	Fishing and crabbing at Corkwood Creek along the coast of Shell Beach. Activities within the community include cassava processing making cassava bread, starch, and casareep (a processing building is currently under construction), lumbering, and farming.

(GMTCS, 2011; SBMPT, 2014).

**Table 9: Livelihoods Activities in Satellite Communities**

<b>Community</b>	<b>Livelihood Activities in Satellite Communities</b>
Santa Rosa Village	
Cabora	Farming of cash crops (cucumbers, corn, cassava, yam, eddoes, pannie); fishing. Both farming and fishing is for personal use and sell some to the community. May also supply school feeding programme. Some people rear chicken and creole birds.
Huridiah	Farming cash crops like provisions and plantain, fishing and crabbing at a small scale for home use, chicken rearing at small scale.
Kamwatta	Farming; fishing; small businesses.
Karaburi	Farming; hunting; fishing; small businesses.
Koko and Islands	Farming; boat building; chicken rearing; mining in other areas.
Kumaka	Fishing (small scale), farming (small scale – cassava, corn, eggplant, beans, okra, pumpkin), people work for mining companies, and do small scale lumbering for own use.
Moracupha	Farming (cassava, pepper, greens) – some sell but mostly for personal use; fishing (for selling at a small scale and home use); small businesses. Most work out in bush, mine.
Parakese Islands	Farming cash crops
Rincon	Fishing (sell at small scale), farming – cassava, eddoes, plantain for selling in community and home use, sowing of clothes by women, small businesses (3 shops)
Santa Rosa and Islands	Farming (kitchen gardens for home use), fishing for home use and for selling to community.
Wallaba	Farming.
Unity Grant	Farming (cassava, beans, okra, plantain, banana, eddoes); cabbage cutting; fishing; crabbing (small quantities).
Haimaracabra	Farming; fishing.

(SBMPT, 2014)



Picture 2: Fishing, crabbing, and coconut harvest at Almond Beach



Picture 3: Lumber waiting to be shipped; Citrus plantation at Kwebanna







Picture 4: Heart of Palm (Warapoka); manicole palm plantation (Little Kwabanna)



Picture 5: Cassava plantation at Warapoka



## 4.7 Mining

There are currently no gold or diamond mining concessions within the boundaries of SBPA, but residents of Mabaruma and Morawhanna report cases of water pollution by small scale mining activities upriver of Aruka River, which affect water quality for human use and biodiversity. There is also a potential establishment of a wharf for the Reunion Manganese Company on the Waini River.

## 4.8 Oil and Gas Exploration

According to the summary of petroleum operations along Guyana's coast and maritime zone provided by the Petroleum Division of the Guyana Geology and Mines Commission (GGMC) (Lynch, 2014), licenses have been issued to ESSO, Anadarko, CGX, and REPSOL. The licenses are approximately 160 kms (100 miles), 210 kms (130 miles), 97 kms (60 miles), and 160 kms (100 miles), respectively, offshore north to northeast from the SBPA. The main exploration activities that have impacts are seismic and drilling.

Further it is noted that onshore along the coast, prospects are restricted if there is no presence of sediments. Sediments covering basement vary and is less than 200m in the vicinity of the mouth of the Waini River. The delineation of the 150m depth to basement contour is an arbitrary depiction of the landward limit for prospects and is used for the landward limit of the several Areas, including Area 6 and 7, within which the boundary of the SBPA falls.

It is expected that shallow water seismic acquisition would occur along the coast and transition zone seismic acquisition may also be considered in the swamps behind the beaches. It is noted that petroleum exploration activities on the beaches of Guyana have been discouraged and any effects of offshore exploration actions are considered to be minimal and transient and the operational periods can be regulated. The major exploration activities that have impacts are seismic and drilling. Some licencees are completing preliminary exploration exercises and it is expected that some companies will start major exploration work within the next few years (Lynch, 2014).

It was stated that all future exploration programmes will continue to provide Oil Spill Response Plans, Emergency Response Plans, Environmental Impact Assessments, Strategic Environmental Assessments, and Environmental and/or Social Management Plans.

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## Appendix 12

# Legal and Institutional Context and Roles of Organizations and Agencies



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## Acronyms and Abbreviations

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CBD	Convention on Biological Diversity
CI-Guyana	Conservation International - Guyana
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
COP	Conference of Parties
EPA	Environmental Protection Agency
EP Act	Environmental Protection Act
GDF-CG	Guyana Defence Force – Coast Guard
GFC	Guyana Forestry Commission
GGB	Guyana Gold Board
GGMC	Guyana Geology and Mines Commission
GL&SC	Guyana Lands and Survey Commission
GMTCS	Guyana Marine Turtle Conservation Society
GoG	Government of Guyana
GPF	Guyana Police Force
IUCN	International Union for Conservation of Nature
KMCRG	Kanuku Mountain Community Representative Group
LCDS	Low Carbon Development Strategy
MAP	Mangrove Action Plan
MoA	Ministry of Agriculture
MoAA	Ministry of Amerindian Affairs
NBAP	National Biodiversity Action Plan
NGOs	Non-Government Organization



NMMAP	National Mangrove Management Action Plan
NPC	National Parks Commission
PAC	Protected Areas Commission
REDD	Reducing Emission from Deforestation and Degradation
RDC	Regional Democratic Council
SBPA	Shell Beach Protected Area
SCBD	Secretariat for the Convention on Biological Diversity
TEDs	Turtle Excluder Devices
UNCBD	United Nations Convention on Biological Diversity
UNFCCC	United Nations Framework Convention on Climate Change
WMA	Wildlife Management Authority
WWF	World Wildlife Fund

# 1 International Frameworks

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There are several international frameworks and treaties that Guyana is party or is applicable to the mandate of the Protected Areas Commission and the management of Guyana’s Protected Areas Systems. This section outlines the relevant international frameworks.

## 1.1 Convention on Biological Diversity

Guyana is party to the Convention on Biological Diversity (CBD). In 1992, 153 countries signed the United Nations Convention on Biological Diversity (UNCBD) in Rio de Janeiro, Brazil. Guyana ratified the Convention in August 1994. The convention requires signatories to develop action plans and to take steps towards achieving the objectives of the Convention. The EPA is the national focal agency for the implementation of the UNCBD in Guyana.

Article 1 of the Convention on Biodiversity states the objectives as “...the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding” (United Nations, 1992:3).

Articles 6 to 14 of the Convention are directly relevant to this discussion and include:

Article 6, “General Measures for Conservation and Sustainable Use”, requires development of national strategies, plans or programmes to support conservation and sustainable use of biological diversity as well as its integration into other relevant sectoral policies, plans and programmes.

Article 7, “Identification and Monitoring”, requires identifying important biodiversity, monitoring to identify conservation and sustainable use priorities, identifying activities that may have an impact on the convention objectives, and maintaining relevant data.

Article 8, “In-situ Conservation”, requires the establishment of a system of protected areas; development of guidelines for establishment and management of protected areas; development of necessary legislations and regulations to protect threatened species and populations; regulate and manage biological resources inside and outside of protected areas, protect ecosystems; natural habitats and maintain viable populations of species; promote environmentally sound and sustainable development in areas surrounding the protected area; rehabilitate and restore degraded ecosystems; promote recovery of threatened species; and prevent and control invasive species; preserve and maintain indigenous knowledge, practices, and lifestyles necessary for conservation and sustainable use.

Article 9, “Ex-Situ Conservation”, requires the establishment of measures and facilities to support ex-situ conservation; regulation and management of biological resource collection from natural habitats and to prevent damage and threats to in-situ ecosystems and species.

Article 10, “Sustainable Use of Components of Biological Diversity”, requires nations to integrate the Convention objectives into decision-making; adopt measures to ensure sustainable use of resources; encouraging traditional use of resources that are compatible with the Convention’s objectives; support local initiatives for remediation of degraded area; support private-public cooperation for sustainable use of biological resources.

Article 11, “Incentive Measures”, requires nations to develop economic and social incentives to support achievement of the Convention objectives.

Article 12, “Research and Training”, requires nations to develop programmes and training and encourage research in relation to conservation and sustainable use of biodiversity.

Article 13, “Public Education and Awareness”, supports the promotion of understanding, awareness and education on the importance of biodiversity and its conservation through various media and programmes.

Article 14, “Impact Assessment and Minimizing Adverse Impacts”, requires introduction of measures and procedures for impact assessment of projects, programmes, and policies; promote arrangements for emergency response to activities or events that have the potential to affect biodiversity.

The Convention applies directly to the work of the Protected Areas Commission (PAC). PAC being an agency of the government, which is a party to the Convention, has an obligation to implement the provisions Convention. The PAC through the use of the management plan for Shell Beach Protected Area (SBPA) will work to address the Convention’s objectives and relevant Articles noted above. Impact assessments are a purview of the Environmental Protection Agency (EPA), however, any activities that have the potential to cause impacts to the protected area will require PAC intervention.

## 1.2 Aichi Biodiversity Targets 2011-2020

The United Nations General Assembly declared 2011 – 2020 as the United Nations Decade on Biodiversity. The tenth meeting of the Conference of the Parties of the Convention on Biodiversity, held in October 2010, in Nagoya, Aichi Prefecture, Japan, adopted a revised strategic plan for biodiversity, including the Aichi Biodiversity Targets for the 2011-2020 period.

The revised Strategic Plan 2011-2020’s vision is "Living in Harmony with Nature" where "By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people" (CBD, 2010).

The Aichi Biodiversity Targets supports 5 strategic goals and targets to be achieved by 2020. These include:

1. Addressing the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
2. Reducing the direct pressures on biodiversity and promote sustainable use;
3. Improving the status of biodiversity by safeguarding ecosystems, species, and genetic diversity;
4. Enhancing the benefits to all from biodiversity and ecosystem services; and
5. Enhancing implementation through participatory planning, knowledge management and capacity building.

As a party to the Convention on Biodiversity, the Aichi targets are directly relevant to Guyana, PAC, and SBPA. Through the development and implementation of a management plan and its management programmes, PAC seeks to directly address the Aichi targets by incorporating mechanisms in the management plan for reducing pressures and promoting sustainable use, conducting baseline research and putting in place law enforcement measures to improve status of biodiversity, and seeking ways to share benefits, and strengthening conservation through participatory planning, adaptive management, knowledge sharing, and capacity building.

### 1.3 Nagoya Protocol

The Nagoya Protocol on “Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization” (ABS) was adopted at the tenth meeting of the Conference of the Parties on October 29, 2010, in Nagoya, Japan. It strengthens the legal basis surrounding genetic resources, sharing of traditional knowledge, and the sharing of benefits. It protects both the provider and user of such resources and information. The protocol strengthens the ability of communities to benefit from their knowledge, innovations, and practices and in turn strengthen conservation of biodiversity and human well-being (SCBD, 2011).

Relevant articles of note are: Article 5: fair and equitable benefit-sharing; Article 6: access to genetic resources; Article 7: access to traditional knowledge associated with genetic resources; Article 9: contributions to conservation and sustainable use, Article 10: global multilateral benefit-sharing mechanism; Article 11: transboundary cooperation; Article 12: traditional knowledge associated with genetic resources; Article 14: access and benefit-sharing clearing-house and information-sharing; Article 17: monitoring the utilization of genetic resources; Article 20: codes of conduct, guidelines, and best practices and/or standards; Article 21: awareness-raising; and Article 23: technology transfer, collaboration and cooperation.

Guyana acceded to the Protocol on April 22, 2014. The ABS protocol is relevant to SBPA and protected areas in general since much of the country’s biodiversity is still intact and knowledge

about its genetic resources is still at its infancy. In addition, many Amerindian communities utilize the areas inside and outside of the protected areas for traditional subsistence and medical uses and therefore have specialized knowledge. As such, an ABS is necessary not only to protect Guyana’s genetic resources and knowledge derived from thereof, but also to protect Amerindian traditional knowledge so that benefits derived from the use of the knowledge can be shared fairly. In order to address this, one of the outputs of the SBPA management plan is to develop protocols that protect Amerindian peoples and their knowledge. A draft national Access and Benefit Sharing (ABS) regulation has been prepared by the Environmental Protection Agency (EPA) and is being finalized at the present time. Once it is finalized, it will be used in the protected area context as well.

## 1.4 Convention on Wetlands

The Ramsar Convention, also known officially as the Convention on Wetlands of International Importance especially as Waterfowl Habitat, was adopted on February 2, 1971 and entered into force in 1975. As of September 2014, there are 168 contracting parties to the Convention. Currently that are 2,186 wetlands that are considered to be of international importance under the Convention covering over 208 million hectares (Ramsar Convention Secretariat, 2014). The mission of the Convention is “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world” (Ramsar Convention Secretariat, 2013: 7). The Convention broadly defines wetlands as “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which at low tide does not exceed six metres (Ramsar Convention Secretariat, 2013: 7). The Convention recognizes 1) marine, estuarine, lacustrine, riverine, and palustrine wetland types. To date, Guyana is not a signatory to the Ramsar Convention (Ramsar Convention Secretariat, 2014).

Wetlands are some of the most productive ecosystems. They have a significant influence on hydrological functions and flood control, protect coastal communities, support high levels of biodiversity, stabilize river banks and shorelines, and purify water (WWF-Guianas, 2012). They also serve as large stores of carbon (WWF-Guianas, 2012). Since most of SBPA land cover is made up of swamps and mangrove forests, both freshwater and salt water, the goals of this Convention is relevant to SBPA even if Guyana is not a signatory. Conservation of important ecosystems, such as the swamp and mangrove forests, is an important goal of SBPA.

## 1.5 CITES

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade in specimens of wild flora and fauna does not threaten their survival. CITES was signed in March 1973 and entered into force on July 1, 1975. There are



now 180 nations that have ratified the treaty (CITES, 2014). CITES not only includes all of those species threatened with extinction but also species that may face threats of extinction if trade in such species is not regulated and controlled (CITES, 1979). Guyana became a signatory to this Convention on August 25, 1977.

Trade in wild fauna and flora is an important livelihood and economic activity in Guyana. Recent data is not available, however, a presentation with 2001 data indicated that revenue from wildlife accounted for approximately US\$ 50 million (Mangal, 2014). Illegal trade in wild flora and fauna, however, can have impacts on the biodiversity and conservation goals of the SBPA. Therefore, as a signatory to the Convention, understanding livelihood and commercial resource uses through research and preventing illegal activities through enforcement will be important. Provisions for research and enforcement have been included in the SBPA management plan.

## 1.6 Convention on Migratory Species

The Convention on Migratory Species (CMS), also called the Bonn Convention, was adopted in 1979 and entered into force in 1983. As of May 2014, the CMS has 120 parties (CMS, 2014). CMS aims to conserve migratory species, their habitat and routes on a global scale. The Convention requires parties to collaborate and support research relating to migratory species and to work to afford immediate protection for such species. Appendix I provides a list of endangered species and Appendix II provides a list of species that would benefit from international cooperation, agreements and management. Guyana is not a signatory to the Convention, however, it is considered a range state. "Range State" refers to any State that exercises jurisdiction over any part of the range of a migratory species, or a State, flag vessels of which are engaged outside national jurisdictional limits in taking that migratory species" (CMS, 2003).

Guyana, the SBPA and its surrounding area is important for migratory birds (Mendonca *et. al.*, 2006; WWF-Guiana, 2012). It has also been recommended as an Important Bird Area by Birdlife International. Guyana, even though it is not a signatory to the Convention, plays an indirect and important role in the conservation of migratory bird diversity. With the establishment of SBPA, it has become possible to take a direct and proactive role in the protection of migratory birds.

## 1.7 Cartagena Convention

Cartagena Convention and its Protocols, also called the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region, was adopted in 1983 and entered into force in 1986 (UNEP, 2012). It is a regional legal framework for protecting and developing the Caribbean region. The Convention requires the parties to address the following in pursuit of better coastal and marine management: 1) pollution from ships; 2) pollution caused by dumping; 3) pollution from land-based sources; 4) pollution from sea-bed activities; 5) airborne pollution; and 6) specially protected areas.

Three protocols were developed: 1) Protocol concerning co-operation in combating oil spills in the wider Caribbean region. This was adopted in 1983 and entered into force in October 1986. 2) Protocol concerning specially protected areas and wildlife to the Convention for the protection and development of the marine environment of the wider Caribbean region. This was adopted in January 1990 and entered into force in June 2000; and 3) Protocol concerning pollution from land-based sources and activities. This was adopted in October 1999 and entered into force in August 2010. The Convention and all three protocols have been ratified by Guyana.

SBPA has a significant marine component. It has a shoreline length of 120 kms and parts of the shoreline serves as the nesting grounds for four species of turtles listed on the IUCN list of threatened species. The coastal and marine environment is also important for numerous species that people depend on for their livelihoods. These protocols are relevant for addressing marine pollution and for ensuring the conservation and maintenance of a healthy ecosystem on land and water along and off SBPA's coastline.

## 2 National Framework

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Several laws, regulations, and action plans provide the basis for addressing international treaties and obligations and national strategies. The following Acts and Regulations are relevant to protected areas management: The Protected Areas Act (2011); Amerindian Act (2006); Wildlife Management and Conservation Regulations (2013); Wildlife Import and Export Regulations (2009); the Forests Act (2009); Fisheries Act (2002); and Sea Defence Act (1998).

Various plans support the implementation of the country strategy to meet national and international obligations. This includes the National Biodiversity Action Plan (1999-2004 and 2007-2011; 2012-2020); National Forest Policy (2011); National Forest Plan (2011); the Fisheries Management Plan (2013), and National Mangrove Management Action Plan (2010), the Code of Practice for the Utilisation of Mangroves (2011); and Low Carbon Development Strategy (2009).

### 2.1 National Legislative Framework

#### 2.1.1 Protected Areas Act 2011

The Protected Areas Act 2011 (Act No. 14 of 2011) was passed into law in 2011. The Act was created “to provide for the protection and conservation of Guyana’s natural heritage and natural capital; the ecosystem services of national and global importance including climate regulation; the establishment of a protected areas commission; the establishment and management of a protected areas trust fund; the fulfillment of Guyana’s international environmental responsibilities; public participation in protected areas and conservation; and related purposes.”

Part I, Section 3 outlines the objectives of the Act, which are as follows:

- a) To provide for the conservation of biological diversity, natural landscapes, seascapes and wetlands;
- b) To safeguard ecosystem services;
- c) To establish a national protected areas system;
- d) To provide for the recognition of the intrinsic value of biodiversity and associated spiritual and cultural values;
- e) To enhance national pride in and encourage stewardship of Guyana’s natural heritage at the national, regional, local, community and individual levels of society;
- f) To assist in safeguarding Guyana’s sovereignty over its natural heritage and to regulate access to the nation’s biological resources;
- g) To give appropriate recognition to the conservation efforts and achievements of Amerindian Villages and Amerindian Communities;
- h) To promote ecologically sustainable development;
- i) To assist in the implementation of Guyana’s international environmental responsibilities to conserve the nation’s natural heritage;
- j) To promote the rehabilitation of degraded areas and the restoration of ecological integrity; and
- k) To promote the recovery and rehabilitation of species which are vulnerable, threatened, or endangered.

The Protected Areas Act (PA Act) outlines the 1) establishment and functions of the commission; 2) the national protected areas system and its objectives; 3) mechanisms for establishing protected areas; 4) mechanisms for Amerindian village lands to be recognized as a protected area; 5) guidelines on protected areas management, including development of management plans every five years; 6) mechanism for declassification of a protected area; and 7) the establishment of a protected areas trust.

Amerindian rights within the Protected Areas Act are directed by the Amerindian Act of 2006. Section 72 and 73 of the Protected Areas Act outlines the mechanism for Amerindian communities or villages and PAC to protect and address claims to traditional rights.

### 2.1.2 Amerindian Act 2006

The Amerindian Act 2006 (Act No. 6 of 2006) was created “to provide for the recognition and protection of the collective rights of Amerindian Villages and Communities, the granting of land to Amerindian Villages and Communities and the promotion of good governance within Amerindian Villages and Communities.”

The Act outlines some of the important considerations that could have implications for the Protected Areas System, which includes the Shell Beach Protected Area. The Amerindian Act describes who is considered to be an Amerindian or a resident, what is meant by an Amerindian

community or village, and what is considered to be traditional rights and mining privileges. The Act notes that Amerindian communities generally have traditional rights over State lands and forests and that a protected area may not be established on village lands without the consent of the Village. As well, the act states that if a protected area is established on lands occupied or used by an Amerindian Community, there must be adequate consultation with the community regarding the management of the land and traditional rights will not be altered or taken away unless the community which has the right gives its consent in writing. The Amerindian Act provides the basis for engaging with Amerindian communities, respecting traditional rights to land and resource use, addressing land titling matters, and providing access to the protected area.

### 2.1.3 Environmental Protection Act 1996

The Environmental Protection Act 1996 (No. 11 of 1996) governs the management of Guyana's environment. The Environmental Protection Agency's functions include:

- 1) the management of natural environment to ensure the conservation, protection, and sustainable use of Guyana's natural resources;
- 2) ensure integration of environmental concerns into activities planning;
- 3) establish, monitor, and enforce environmental regulations;
- 4) prevent or control environmental pollution;
- 5) ensure assessment of impacts prior to commencement of activities, where necessary;
- 6) coordinate and maintain a programme for conservation of biodiversity and its sustainable use;
- 7) establish and maintain a wildlife protection management programme;
- 8) promote awareness of the social and economic benefits of the natural environment; and
- 9) play a coordinating role in the preparation and implementation of cross-sectoral programmes of environmental content.

As such the Environmental Protection Act is also applicable for environmental management and compliance within the protected areas. The EPA continues to be the focal point for the Convention on Biodiversity and has the lead role with regards to conservation of biodiversity and its sustainable use. Sustainable use of biodiversity is the focal point of the Biodiversity and Wildlife Unit within the Biodiversity Management Division of the EPA. The Protected Areas Commission is the lead agency for coordinating the establishment and maintenance of urban parks and the protected areas system that supports the conservation of biodiversity and its sustainable use.

### 2.1.4 Wildlife Management and Conservation Regulations 2013

The Wildlife Management and Conservation Regulations (No. 6 of 2013) made under the Environmental Protection Act (No. 11 of 1996) has been prepared to provide regulatory guidance for "the management and conservation of wildlife, to regulate the capturing, gathering,

collecting, hunting, killing, or taking of wildlife, for any purpose and use, including but not limited to bushmeat, scientific research, medicinal; and to make appropriate arrangements for the classification of wildlife and areas in Guyana” (GoG, 2013). Schedule 1 lists species of wildlife in Guyana deemed ‘protected’ and are sited under the following categories: critically endangered species (Part I), endangered species (Part II), and vulnerable (Part III). Schedule 3 prescribes penalties for offences. This regulation will therefore guide enforcement with regard to wildlife within and outside of the SBPA.

### 2.1.5 The Forests Act 2009

The Forests Act 2009 (No. 6 of 2009) provides for the management of Guyana’s forest resources. Part 2 of the Act deals with Sustainable Forest Management of State Forests; Part 3 with Forest Conservation; and Part 4 with Forest Operation and Activities Relating to Forest Produce.

Part 3 provides for the protection and conservation of forests including the 1) conservation of biodiversity; 2) protection of specific trees and plants; 3) conservation of soils and water resources; and 4) protection of forests against degradation, fires, pests, and diseases.

The part also states that nothing in the Part applies to Iwokrama Rainforest; Kaieteur National Park; or any other area designated as a conservation area. While, the Forests Act does not have jurisdiction over conservation areas, it can provide for the sustainable management of forests and conservation of biodiversity outside of and adjacent to protected areas, which serve as critical buffer zones.

Some of the provisions relating to fire management is relevant for protected areas. Section 25, 27, 28 describe the establishment of fire protection areas and requirements for persons to report fires and to assist in containing and extinguishing of the fire. Section 30 allows the Commission to protect specific species of trees and plants. Section 31 provides provision for declaring conservation areas on private land. Section 32 outlines provisions for dealing with invasive species, pests, and diseases.

### 2.1.6 Fisheries Act 2002

Fisheries Act 2002, Cap 71:08, directs the promotion, management, and development of fisheries in Guyana. Fish in the act refers to any aquatic animals, including shellfish, turtle, mollusk, crustacean, coral, sponge, echinoderm, holothurian, its young and its eggs. According to the Act, besides officers of the fisheries department, members of the Guyana Defence Force, Police Force, Officers of Customs and Revenue Authority may also be considered as fisheries officers. Part VIII titled Marine Reserves and Fishing Priority Areas allows the Ministry to declare an area of fisheries waters and any adjacent or surrounding land as a marine reserve. This can be done to provide protection to the flora and fauna of the area and to preserve breeding ground and habitats of aquatic life, especially those in danger of extinction, to allow for regeneration of



depleted areas, to promote scientific study and research, and to preserve and enhance the natural beauty of such areas. The Act provides provisions for licensing and registration of fishing vessels, allowable fishing methods, and related enforcement. Since, the SBPA is surrounded by marine and fresh water bodies, which is important for marine turtles and fisheries, this act provides the basis for management, enforcement, and protection of fish as defined in the act.

### 2.1.7 Wildlife Import and Export Bill

The Wildlife Division drafted a Wildlife Import and Export Bill. It is expected that the legislation will focus on international trade of wildlife and movement of wildlife into and out of Guyana. It will address permitting, record keeping, commercial activities, transportation of wildlife, holding requirements and specifications and enforcement. Since wildlife trading is an important activity in Guyana, this bill will provide the basis for managing export of wildlife and illegal trade. The existing Species Protection Regulation (1999) is to be repealed once this new piece of legislation is enacted.

## 2.2 National Policies and Action Plans

### 2.2.1 Guyana's National Biodiversity Action Plan

In keeping with the obligation of the Convention on Biodiversity, Guyana has prepared various National Biodiversity Action Plans (NBAP). These include the NBAP 1999-2004 (EPA-Guyana, 1999); NBAP 2007 – 2011 (EPA-Guyana, 2007); and more recently the NBAP 2012 – 2020 (EPA-Guyana, 2014). The 2012-2020 Plan, having gone through public consultations, is awaiting approval from the Ministry of Natural Resources and the Environment.

The relevant strategic objectives of the NBAP 2012-2020 are to improve status of biodiversity; promote conservation, sustainable use and value of biodiversity; expand and improve awareness and appreciation for biodiversity and ecosystems; work with wider national, regional, and international partners to achieve conservation goals; improve biodiversity monitoring at the national level; and strengthen knowledge base and capacity for conservation, management and sustainable use of biodiversity.

The SBPA management plan's management programmes aim to address all of the strategic objectives outlined above.

### 2.2.2 National Forest Policy and Plan

The overall objective of the National Forest Policy is “the conservation, protection, management and utilization of the nation's forest resources, while ensuring that the productive capacity of the forests for both goods and services is maintained or enhanced” (GFC, 2011a). The specific objectives relating to sustainable management, sustainable yields, biodiversity and ecosystems conservation, prevention of degradation of forests, soil and water, and promotion of

regeneration, afforestation and reforestation, as well as the prevention of fires and pests support the goals of protected areas.

Among the many activities the National Forest Plan (GFC, 2011b) focuses on, the following are actions relevant in the protected areas context. These include: compiling forest inventory and analysis; mapping of forest types; addressing data gaps through field survey; developing prescriptions for sustainable management of forest types and code of practice for harvesting; monitoring and regulation of environmental, ecological, and social impacts; monitoring of small scale operations, developing strategy for monitoring and regulating commercial use of non-timber forest products; developing a forest research plan; coordinating research with relevant stakeholders; developing a central database; developing training opportunities for hinterland communities; conducting outreach and monitoring visits to communities; and supporting the implementation of the mangrove management action plan.

These actions directly or indirectly have an impact on protected areas, including SBPA. Management of forests and harvests, monitoring of activities, coordinating research and sharing information, training and outreach activities, and implementation of the mangrove action plans all have an influence on the health of the ecosystem and conservation goals of SBPA.

### 2.2.3 Fisheries Management Plan

The Fisheries Department has completed a fisheries management plan for 2013 – 2018 (Ministry of Agriculture, 2013). Among the key fisheries is an artisanal fishery industry involving multiple gear types with catch estimated at 16,300 tonnes in 2012.

Some of the key issues identified for artisanal fisheries is the lack of data on catch, effort and stock status, unlicensed fishermen, lack of awareness of management issues, piracy, and possible catch of endangered turtles. Industrial fleet in Guyana target shrimp and prawns. The regulatory framework for shrimp and prawn fisheries include having Turtle Excluder Devices (TEDs). When identifying issues of concern for different stakeholders, it was noted that environmental awareness, marine turtles, and climate adaptation were not an issue for the fishermen. However, generally, availability of resources for fisheries management, piracy, data collection and analysis were of concern for all stakeholders – the Government, NGOs, and fishermen. NGOs were the only stakeholder group that raised marine turtles as an issue. It was also noted by NGOs that they would like exclusion zones for large-mesh gillnets in front of main nesting beaches from April to June.

A few of the objectives of the management plan are to raise environmental awareness and management issues through outreach programmes, ban large-mesh gillnetting offshore of nesting beaches in Region 1 from April 1 to June 30 each year, inform and educate fishing communities in the coastal area about the ban, and continue to maintain TED enforcement

activities. However, it requires working with Cabinet and ministerial approval to prepare and approve a regulation to close zones to large-mesh gillnetting for the turtle nesting period. As part of its strategy to implement the closed season, the Fisheries Department is expected to support GMTCS and the Coast Guard in soliciting resources for enforcement.

The Fisheries Management Plan provides an important means for protecting the marine environment, particularly those detrimental to turtle conservation. Working in collaboration with the Fisheries department and other relevant stakeholders such as the Coast Guards will be necessary to achieve common conservation objectives, awareness goals, and to enforce no netting policies during turtle nesting periods.

#### 2.2.4 National Mangrove Management Action Plan

The overall objective of the National Mangrove Management Action Plan (NMMAP) is “to respond to climate change and to mitigate its effects through the protection, rehabilitation and wise use of Guyana’s mangrove ecosystem through processes that maintain their protective functions, values and biodiversity while meeting the socio-economic development and environmental protection needs in estuarine and coastal areas” (MAP, 2010:6). Mangroves are highly productive ecosystems supporting diverse biodiversity and socio-economic activity and is important in the Shell Beach Protected Areas context. Much of the SBPA and its surroundings comprise of mangrove forests. They are also important in the context of climate change and as a means for sea defence (MAP, 2010; WWF-Guianas, 2012). Mangroves act as sediment traps which lead to accretion of coastal sediments and protection of low-lying areas (MAP, 2010).

While there are many agencies involved directly or indirectly in the management of mangroves in Guyana, the principal agencies are the Sea and River Defence Department, Department of Fisheries, Guyana Forestry Commission, and the Environmental Protection Agency. It is noted that there is a large intact tracts of mangroves ecosystem, along the coast between Pomeroon and Waini Rivers, which falls predominantly within the Shell Beach Protected Area. As part of its management plan, it recommends a need for greater understanding and protection of the intact ecosystem and that the Shell Beach area in Region 1 be used as a control group for the study of mangrove loss as it relates to the presence of sea defence.

Protection of mangrove forests and its ecosystem is an important part of the SBPA. Therefore, it will be important to have collaboration among various agencies interested in protection of mangrove ecosystems, including the PAC, for doing research, monitoring, law enforcement, and management.

#### 2.2.5 Code of Practice for Mangrove Harvesting

The Code of Practice for Mangrove Harvesting (Bovell, 2011) is also a useful document for the responsible and sustainable management of mangroves in Guyana while ensuring minimal

impact on the forests. The code is meant to balance commercial, social, and environmental values in relation to utilization of mangrove forests. Article 3 of the code articulates “exclusion area and buffer strips”. It states that is important in the management of Mangrove forests to exclude certain areas from harvesting. Areas to be excluded include conservation and protected areas, areas of cultural importance, and those required for community needs, as well as buffer strips around watercourses, and coastline. The document outlines the minimum required buffer depending on the location of the mangrove forest.

Since harvesting of mangroves is part of Amerindian subsistence and livelihood activity both within the SBPA and outside, and unsustainable commercial practices outside the SBPA can have an impact on SBPA, outreach activities in support of responsible and sustainable harvest of mangroves would be prudent measure in support of SBPA conservation goals.

### 2.2.6 Low Carbon Development Strategy

Guyana’s Low Carbon Development Strategy (LCDS) initiated in 2009 (OPRG, 2013) aims to promote sustainable economic growth while at the same time minimizing the carbon footprint. The goal of the LCDS is to provide a mechanism to help combat climate change. The LCDS through the REDD+ programme supports the conservation of forests as a mechanism for fighting climate change. REDD, or Reducing Emission from Deforestation and Degradation (Parker, et. al., 2009), and REDD +, which includes the role of conservation, sustainable management of forests and enhancement of carbon stocks in developing countries, are important programmes that are integral to the LCDS. REDD and REDD+ programmes provide compensation for avoided deforestation which not only helps maintain carbon stocks but also maintains biodiversity and ecosystem services.

Since mangrove forests and swamps, which comprise much of the SBPA, are huge sinks of carbon, destruction of wetlands and forests will be contrary to the LCDS. By protecting mangrove forests and wetlands, SBPA, contributes to the goals of the LCDS.

### 2.2.7 Climate Change Action Plan

Guyana is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC). The objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system."

The Climate Change Action Plan (GoG, 2001) recognizes that Guyana’s coastal regions are most vulnerable to the effects of climate change. It also recognizes that Guyana is a country which results in net sink of carbon and therefore needs to focus more on adaptation. Implementing measures and programmes to facilitate adaptation and mitigation in relation to climate change are important goals of the plan.

Mitigation includes protection of mangrove forests. Response measures for adaption include sectors such as coastal zones, and forestry and land use, and assessment of sediment losses on the coastal areas and identification of action to prevent land erosion. Adaptation options in coastal zones include fortification of sea and river defences in accordance with sea level rise in vulnerable communities. Adaptation options for forestry and land use include using impact and vulnerability assessment to identify vegetation shifts and vulnerability to fires during dry seasons. In terms of erosion, the plan calls for studies on loss of sediment and rate of erosion so measures can be taken to prevent the loss.

Coastal erosion is already a problem at Shell Beach. Erosion can have impacts on mangrove forests, agricultural plantations, and on turtle nesting. Sea level rise can also impact shorelines and water quality of inland wetlands. In order to address climate related concerns, the management plan has identified erosion, hydrometeorological and tidal data collection, risks of climate change on ecological, social, economic aspects of SBPA, and potential of future fires as necessary data collection and research areas.

### 3 Institutional Framework

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There are many institutions - governmental, non-governmental, and academic - that are relevant and have a significant role to play in helping to meet the goals of the SBPA and the management plan. Collaboration, partnership, and sharing of information and resources among these institutions will be essential for successful implementation of the management plan and improvement of SBPA management. The institutions are listed below.

#### 3.1 Ministry of Natural Resources and the Environment

The Ministry of Natural Resources and the Environment (MoNRE) was created in 2011 to facilitate a greater role in environmental governance and coordination among the various natural resource and environmental sector agencies. Eight agencies were brought under the purview of the Ministry. These include the Protected Areas Commission (PAC), National Parks Commission (NPC), Environmental Protection Agency (EPA), Guyana Geology and Mines Commission –other than Petroleum Division- (GGMC), Guyana Gold Board (GGB), Guyana Forestry Commission (GFC), Guyana Lands and Survey Commission (GLSC), and the Wildlife Management Authority (WMA). The National Parks Commission is to be merged with the Protected Areas Commission. The MoNRE provides the policy and strategic platform that supports the work of the Protected Areas Commission. The Strategic Framework for the MoNRE 2013-2018 (MoNRE, 2013) and the National Biodiversity Strategy & Action Plan 2012-2020 (EPA-Guyana, 2014) provide the basis for national strategy with regard to conservation and protection of biodiversity and other natural resources.



### 3.2 Protected Areas Commission

The Protected Areas Commission (PAC) was established through the Protected Areas Act, 2011. The PAC is responsible for the establishment, management, maintenance, promotion and expansion of the national protected areas system; ensuring the protection of representative ecosystems and habitats; ensuring viable populations of indigenous species; regulating activities and use of resources within protected areas; preparing and updating management plans; promoting natural heritage and the national protected areas system through education and awareness; engaging stakeholders in decision-making processes; promoting conservation outside of protected areas to serve as buffer zones; conducting research; coordinating the exchange of information among stakeholders; providing advice on necessary regulations, guidelines, and procedures; providing advice on new protected areas, development of Amerindian protected areas, and Guyana’s international obligations; monitoring effectiveness of the implementation of management plans; and ensuring enforcement of laws, regulations, and rules.

### 3.3 Environmental Protection Agency

The Environmental Protection Agency (EPA) was established on World Environment Day, June 5, 1996. The then Acting President of Guyana, the Honourable Samuel Hinds, assented to the Environmental Protection Act (No 11, 1996) (EP Act).

The functions of the EPA can be classified into three broad categories, namely: 1) Regulation, which obligates it to monitor and enforce the EP Act and associated regulations. This function of the EPA ensures that development integrates measures for environmental impact avoidance, mitigation, remediation and protection; 2) Coordination, where the EPA has a major coordinating function with regard to the sustainable use and conservation of Guyana’s natural resources; and 3) Promotion of public awareness and participation in environmental protection. EPA has a responsibility to promote the participation of the public in the process of integrating environmental concerns in planning for sustainable development. It is also responsible for developing standards and codes of practice and for investigation and enforcement. There therefore is a need for EPA and PAC to collaborate to ensure environmental management issues such as pollution from various sources and waste management are addressed in a timely manner.

### 3.4 Guyana Forestry Commission

The Guyana Forestry Commission (GFC) is responsible for advising the Minister on issues relating to forest policy, forestry laws and regulations. The Commission is also responsible for the administration and management of all State Forest land. The work of the Commission is guided by a Draft National Forest Plan that has been developed to address the forest policy. The Commission develops and monitors standards for forest sector operations, develops and

implements forest protection and conservation strategies, oversees forest research and provides support and guidance to forest education and training. As an agency responsible for Guyana's state forests, collaboration between the GFC and PAC will be necessary to ensure protection of mangrove forests, regulation of commercial forestry, communication of any new developments in the vicinity of the SBPA, prevention of illegal logging, and management of fires that might have an impact on the SBPA and its goals.

### 3.5 Guyana Geology and Mines Commission

The Guyana Geology and Mines Commission (GGMC) was created in 1979 from the Department of Geological Surveys and Mines which itself was the successor to the Geological Survey of British Guiana. Currently GGMC is divided into the following technical divisions: 1) Geological Services; 2) Mines; 3) Environment; 4) Petroleum; and 5) Land Management. The primary role of GGMC is to develop and regulate the mining sector; support economic development; conduct research relating to exploration; mining, and utilization of mineral products; issue mining and prospecting licences, permits, and concessions; and collection of fees and royalties. As an agency responsible for Guyana's mining and petroleum industry, collaboration between GGMC and PAC will be necessary to ensure proper communication and regulation with regard to mining and petroleum activities in the vicinity of SBPA, taking necessary action against illegal mining activities within and adjacent to SBPA boundaries, and assessing, monitoring, preventing, and mitigating potential and real environmental impacts resulting from mining and petroleum activities.

### 3.6 Guyana Lands and Surveys Commission

The Guyana Lands and Surveys Commission (GL&SC) was created through an Act of Parliament on June 1, 2001, through the implementation of its Act, Act No. 15 of 1999. The establishment of the Commission replaced the former Lands and Surveys Department of the Ministry of Agriculture. The Commission was created to administer land, to maintain a land register and cadastral records, to optimize land use, to maintain a land information system, and to provide surveying and Geographic Information System (GIS) services. The Commission is the custodian of all State and Government lands in Guyana. Collaboration between GL&SC and PAC will be necessary to ensure accuracy of boundaries and managing boundary discrepancies as they arise between SBPA, Amerindian communities, and other stakeholders, and to ensure there is timely communication with regard to agricultural and other leases that might have an impact on the SBPA.

### 3.7 Ministry of Amerindian Affairs

The mission of the Ministry of Amerindian Affairs (MoAA) is to enhance the quality of life of Amerindian People in Guyana through the formulation and implementation of policies and

programmes which facilitate cultural, social and economic development, promote equity and advance of the rights of Amerindian people. It oversees the implementation of the Amerindian Act 2006. Since the PAC works with Amerindian communities adjoining the SBPA, it will collaborate closely with the MoAA to ensure its activities are carried out in compliance with the Amerindian Act.

### 3.8 Ministry of Agriculture, Dept. of Fisheries

The mission of the MoA is to ensure the formulation and implementation of policies and programmes which facilitate the development of agriculture and fisheries in Guyana, thereby contributing to the enhancement of rural life, the sustainable improvement of incomes of producers and other participants in the agricultural production and marketing chain. It is also responsible for the maintenance of a sound physical and institutional environment for present and future productive activities.

The Fisheries Department is responsible for managing, regulating and promoting the sustainable development of the nation's fishery resources for the benefit of resource users and the national economy. The Fisheries Act of 2002 and the Fisheries Management Plan of 2013 provide the framework for the department's work. The Fisheries Department is also responsible for establishing and enforcing the no-netting zone off the coast of SBPA. As the SBPA has a significant marine and inland water component, which is important for biodiversity including marine turtles and fisheries, it will be necessary for PAC to collaborate with the Fisheries Department to manage and protect marine turtles and fisheries and enforce any marine and inland water regulations and management zones.

### 3.9 Guyana Police Force

The objects of the Guyana Police Force (GPF) are the prevention and detection of crime, preservation of law and order, preservation of peace, protection of property, apprehension of offenders and enforcement of laws and regulations with which it is charged. The GPF is required to assist other law enforcement agencies as needed. As well, the Police Act makes provision for appointment of Rural Constables, who support the police force as an auxiliary force, in discharging law enforcement duties. Rural Constable also have the powers to serve and execute summons, warrants, other processes issued by a magistrate or justice of peace.

PAC will collaborate with the GPF to manage law enforcement activities within and adjacent to the SBPA. GPF can provide enforcement assistance when required. As well, the GPF, through Rural Constable training and appointment, can train and empower staff as law enforcement officers.

### 3.10 Guyana Defense Force -Coast Guard

The Guyana Defence Force-Coast Guard (GDF-CG) came into being in February 1990. The Defence (Amendment) Act 1990 also referred to as the Coast Guard Act was responsible for its creation. Relevant role of the Coast Guard is 1) To conduct Maritime Surveillance of Guyana’s Exclusive Economic Zone (EEZ); and 2) To enforce all Maritime Laws on and under the high seas and waters subject to the jurisdiction of Guyana.

Among the various duties, the Coast Guard is tasked with various responsibilities that are relevant to protected areas, in particular Shell Beach Protected Area, in Guyana. They are responsible for conducting fisheries protection patrols; coastal surveillance; monitoring riverine small boat operations; monitoring of maritime pollution; and conducting maritime traffic management. As such the PAC will collaborate with the GDF-CG to monitor and protect the marine and inland waterways from activities and incidences that might have an impact on the SBPA.

### 3.11 Regional Democratic Council, Region 1

The role of the Regional Democratic Council (RDC) is outlined in the Local Democratic Organs Act, 1998. A Regional Democratic Council is a local democratic organ established for a region. As such the RDC represents all of the Amerindian communities in the region. There are 23 titled Amerindian Villages and 36 untitled Villages in Region 1. In relation to the Shell Beach Protected Area, there are 8 titled Amerindian communities and their satellites, three Community Development Councils (CDC’s) and one community, Unity Grant, that is not titled or a CDC. Some of the responsibilities of a democratic organ include the maintenance and protection of public property; protection and improvement of the physical environment; promotion of the social and cultural life of the people; preservation of law and order; and the safeguarding of the rights of the people. As the regional representative for Amerindian people and other stakeholders, it will be necessary for PAC to collaborate with the RDC to ensure regional communication, awareness, buy-in, and support for SBPA, its activities, and programmes.

### 3.12 World Wildlife Fund – Guyana

WWF has been active in the Guianas since the sixties, starting with conservation work around the marine turtles. The WWF-Guianas office has been operating since 1999. WWF's mission is to conserve nature and ecological processes, to seek the sustainable use of natural resources, and to promote the reduction of pollution and wasteful consumption while recognizing and respecting human needs and livelihoods. Its aim is to slow down, and eventually reverse, the accelerating degradation of our planet's natural environment and to help build the future in which people live in harmony with nature. WWF’s Guyana office is actively involved in the conservation of marine turtles at Shell Beach. PAC will collaborate with WWF and its other

partners such as GMTCS to conserve marine turtles at SBPA. PAC will also benefit from WWF’s past and present involvement in management planning for protected areas in Guyana.

### 3.13 Conservation International – Guyana

“Building upon a strong foundation of science, partnership and field demonstration, Conservation International empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the well-being of humanity” (CI-Guyana, 2014).

Conservation International-Guyana (CI-Guyana) has worked across Guyana to support the conservation and promotion of sustainable livelihoods initiatives. It has been actively involved in the promotion of protected areas in Guyana and the development of the protected areas legislation. CI-Guyana brings experience in managing an experimental conservation forest concession, the first of its kind in Guyana. In 2009, CI-Guyana was the lead agency that helped develop the Kanuku Mountains Management Plan in collaboration and consultation with Kanuku Mountain Community Representative Group. At that time, Kanuku Mountains was not yet a protected area. CI-Guyana has worked extensively in Region 9 with various Amerindian communities, including the Wai Wai indigenous group, which manages the Kanashen Conservation Area. PAC will work with CI-Guyana to secure their expertise in conservation planning, management planning, and working with Amerindian communities in Guyana.

### 3.14 Guyana Marine Turtle Conservation Society

The Guyana Marine Turtle Conservation Society (GMTCS) was formed as a result of the early marine turtle conservation programme at Shell Beach in Region 1, Guyana. It was registered as a NGO in April 2000 with membership comprising of volunteers from organizations. The founding members of the GMTCS were Dr. Peter Pritchard, Audley James, and Romeo De Freitas. GMTCS works in five thematic areas namely marine turtle conservation; community development and capacity building; education and awareness; protected area; and scientific research. GMTCS has been instrumental in collecting marine turtle data over the past decade and developing education and awareness programmes that have resulted in reduced turtle and turtle egg hunting in the area. GMTCS was the lead agency enlisted to help with the boundary delineation process leading to the establishment of the Shell Beach Protected Area in 2011. PAC will continue to engage with GMTCS at various levels in support of marine turtle monitoring and conservation and education and awareness programmes.

### 3.15 University of Guyana

Given the University of Guyana’s leading role in research in Guyana, it plays an important role in facilitating research and information gathering –biological, social, cultural, and economic- for the Shell Beach Protected Area. The School of Earth and Environmental Sciences, Faculties of Agriculture and Forestry, Natural Sciences, and Social Sciences are ideal places to seek faculty



and student researchers who can support the work of the PAC and Guyana’s National Protected Areas System. Therefore, PAC will engage will researchers at University of Guyana to fulfill its research needs.

In addition, the Centre for the Study of Biological Diversity, a non-governmental organization, located at University of Guyana, dedicated to the study, documentation, and conservation of nature, can play a vital role in research as well.

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