

Development of a Watershed Management Plan for the Demerara Sub-Watershed in Guyana

Paper presented
By

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Outline of Presentation

Context

- Climate change
- Local situation

Synopsis of the Watershed Management Plan (WMP)

- Issues
- Process
- Product

Enabling Environment-Imperatives for Guyana

Context

- Climate change will affect temperature and rainfall : for the Caribbean 7-8% decline for the rainy season, a 6-8% increase for the dry season, and a projected increase in frequency of intense rainfall by 20% (Trotz, 2008).
- Attention of Caribbean policy makers, water managers and civil society drawn to water scarcity and water security issues.
- Caribbean water resources are constantly threatened by limited size, geology and topography, plus changes and variation in climate, especially rainfall.
- Situation worsened by **DRIVERS**: rapid rate of population growth and urbanization, growth of tourism, pollution caused by waste disposal and agricultural, inappropriate land-use practices, and watershed degradation (GWP-Caribbean, 2008)

Context

Threats to water resources and WM in Guyana as perceived by key institutions:

- Poor waste management practices by industries (sawmills, lumberyards and manufacturing firms);
- Unregulated sand, gold and bauxite mining;
- Climate Change and associated impacts, such as temperature increase and flooding;
- Unplanned Expansion of human settlements (forest clearance for housing and livelihood activities, plus drilling of wells); and
- Agriculture (farming and livestock rearing) and wastes generation.

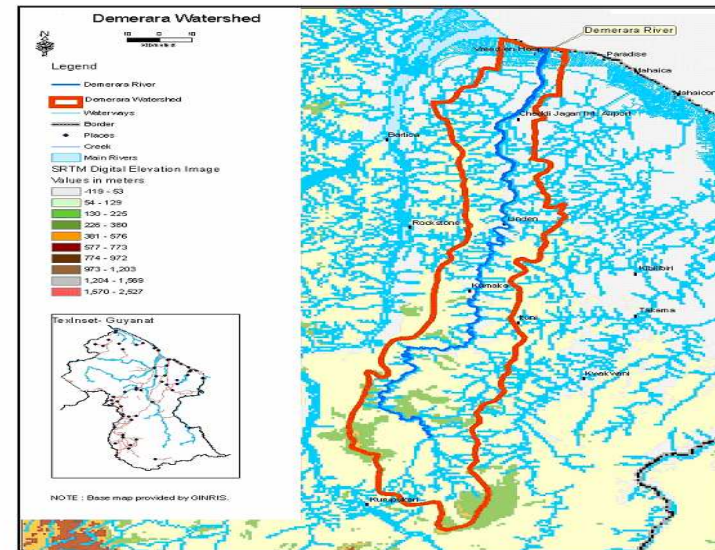
National Development Strategy (NDS) (2001-2010)	Flood Control
Integrated Coastal Zone Management Plan (2000)	Sustainable development of coastal resources
Guyana Climate Change Action Plan (2001)	Water conservation and management
Guyana National Environmental Action Plan (2001-2005)	Water conservation and the maintenance of ecological processes
Poverty Reduction Strategy Paper (2005) (Provision of Safe Water supply)	Provision of safe water supply
National Biodiversity Action Plan (NBAP) II (2007-2011)	Watershed management
National Action Plan for Combating Land Degradation (2006)	Protection of watershed, situational analysis, local participation in management
Guyana's Low carbon Development Strategy (2010)	Protection of forests

Context

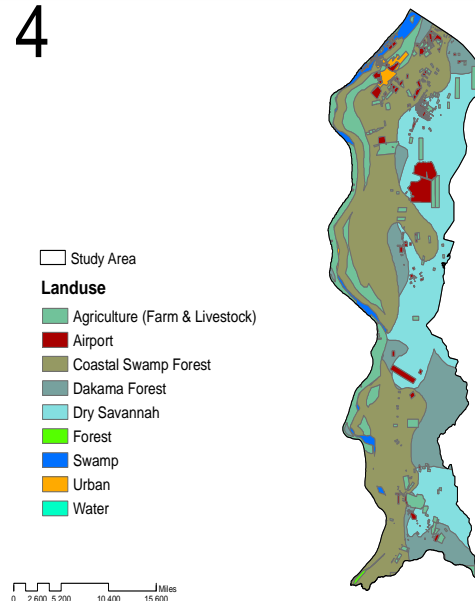
Water and Sewerage Act (2002)	National water standards and a National Water Council
Mining (Amendment) Regulations (2005)	Mitigating actions that lead to the contamination of rivers, creeks and other waterways affecting various life-forms.
East Demerara Water Conservancy Act (1998)	Establishment of East Demerara Conservancy Board for the purpose of making better provision for the supply of water, and to provide for the management of the Conservancy
The Environmental Protection Act (1996)	Umbrella legislation that mandates the undertaking of a number of measures to safeguard the environment and its resources, including water resources.

The Watershed Management Plan: Issues

- Demerara sub watershed: 166,720 acres
- 7 major settlements and 18 small communities (10,000 people)
- Land uses: forestry, sand mining, and farmsteads and homesteads, eco-tourism facilities and timber extraction
- The assessment of the Demerara sub-watershed has revealed that there are four main issues:
 - Maintaining water percolation (PERC) ;
 - Managing surface runoff contribution to stream-flow (SURQ);
 - Decreasing sediment flow (SYLD); and
 - Deceasing nutrient loads (Organic Nitrogen (ORGN) and Organic Phosphorous (ORGP).



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The Watershed Management Plan: Process

- Situational analysis
- Computer aided assessment (SWAT) of water quality and quantity
- Stakeholders' engagement (interviews, training workshops, consultations)
- Process was very inclusive

Process: stakeholders

Participants were drawn from the seventeen (17) institutions :

- Civil Defence Commission;
- Environmental Health Unit, Ministry of Health;
- Environmental Protection Agency;
- Guyana Forestry Commission ;
- Guyana Geology and Mines Commission;
- Guyana Lands and Survey Commission;
- Guyana Shields Initiative;
- Guyana Water Incorporated;
- Hydrometeorological Division, Ministry of Agriculture;
- Iwokrama International Centre for Forest Conservation and Development;
- Ministry of Local Government;
- National Agriculture Research Institute;
- National Drainage and Irrigation Authority;
- Regional Democratic Council, Region #4;
- School of Earth and Environmental Sciences, University of Guyana;
- United Nations Development Programme (Georgetown Office); and
- Wildlife Division, office of the President.

WMP: the Product (Pilot!)

- The Watershed Management Plan can be described as the most logical ‘blueprint’ for planning optimal development of water resources at various levels.
- It adopts a holistic approach and underscores the need for integration between land, water and biomass, and importantly, the participation and collective action of local people.

WMP: the Product

Vision Statement

- **Fostering water secure community development through the sustainable and integrated management of watershed resources **by the year 2020.****

WSP: the Product

Improvement Goals	Improvement Goals	Management Objectives
Hydrology	Maintain the integrity of the aquatic ecosystems	<p>To reduce unplanned land use activities and excessive and inappropriate development in the watershed</p> <p>To maintain the linkages among the aquatic ecological systems (for the basins) within the watershed</p>
Bio-Physical Habitats	Restore the environment	<p>To encourage and support re-forestation and backfilling of mined out areas</p> <p>To reduce sediment load from upland sources; improve riparian vegetation, and limit livestock access to stabilize stream banks</p>

Improvement Goals	Improvement Goals	Management Objectives
Water quality	Minimize or mitigate non-point source pollution of both surface and groundwater in the watershed	<p>To manage the sources and transport of untreated waste water , hazardous or other industrial wastes, as well as nutrients to limit ground and surface water contamination</p> <p>To reduce erosion and sedimentation from human activities</p> <p>To manage/decrease nutrient load to receiving waters</p>
Local Communities and Other Stakeholders	Enhance communication and collaboration between local and national institutions (agencies and ministries)	<p>To identify key stakeholders and their roles and responsibilities with respect to watershed management</p> <p>To promote stakeholders' dialogue</p>
	Improve public education to promote stewardship of watershed resources	To raise awareness of and educate public on the importance of watershed and the consequences of

WMP-the Strategies

- Pollution management
- Re-vegetation
- Aquatic and terrestrial management
- Protection and policy
- Information, Education and Stakeholder Involvement and Stewardship

WMP-The Principles

- **Community Health and Safety:** Protect community health and safety.
- **Sustainability:** Implement and support watershed actions in a manner that is self-sustaining in the long term and is consistent with maintaining the ecological integrity of the watershed.
- **Cost Effectiveness:** Implement and support watershed actions in ways that are cost-effective and efficient, taking into consideration local, regional and national economic goals, indirect costs, externalities.
- **Partnerships and Shared Responsibility:** Implement and support watershed actions in a coordinated manner that fosters and utilizes community partnerships.
- **Public Education:** Provide education to the public about important watershed issues.

Aquatic and Terrestrial Enhancement

- Rehabilitation to the topography of the original landscape for example by backfilling, where practicable
- Provide adequate solid waste disposal facilities
- Ensure compliance with current WHO water quality standards
- Monitor population changes of bio-indicators such as native plant and animal species

Information, Education and Stakeholder Involvement and Stewardship: Actions

- Promote watershed awareness among stakeholders, including local communities, businesses and students
- Provide pollution prevention education to water users associations, households and businesses
- Promote corporate social responsibilities among businesses
- Provide information on environmentally friendly technologies to industries and businesses
- Execute workshops and seminars on watershed management among local communities to build human resource capacity
- Integrate watershed management into the school's curriculum

This was followed by:

the identification of short term, medium term and long term actions, plus key partners for the implementation of the actions.

Partners include community organisations (Water Users Associations) , local businesses, natural resource sector agencies/ministries (agriculture, tourism mining, forestry) Environmental Protection Agency (EPA); Guyana Bureau of Standards; educational institutions and the National Water Council.

WMP: Monitoring

- **Cause and Effect Monitoring of** effects of specific actions on the water quality constituents, for example, timber harvesting and suspended sediments concentrations or sediment loads.
- **Base-line Monitoring:** continuous or periodic measurements and recording of existing and changing conditions of a particular environmental parameter within the watershed; for example, changes in water quality parameters over time.
- **Compliance Monitoring** to ensure businesses and other activities are in compliance with specific regulations and standards, for example, water turbidity.
- **Inventory Monitoring:** observe and record the existing conditions of environmental components of the watershed, for example, the biodiversity or the nutrient loads of the waterway.

Creating and Enabling Environment

- Development and Implementation of a National Water Policy
- Establishment of the National System of Protected Areas
- Land Use Policy
- Public Education and Participation
- Information and Knowledge Sharing
- Strategic Environmental Assessment
- Partnership and Collaborative Management

Water is life!

Thanks for listening !!!!