Caribbean Planning for Adaptation to Global Climate Change

Regional Project Implementation Unit

Cermes Bldg., Cave Hill Campus, Barbados

INVENTORY OF COASTAL RESOURCES AND USES (Component 3)

DATA CATEGORIES FOR COASTAL RESOURCE INFORMATION SYSTEM

2(a) BIOPHYSICAL

CATEGORY	VARIABLE	DATA TO BE RECORDED	IMPORTANCE AND/OR USES OF DATA
OCEANOGRAPHIC	Waves	Height (m); Direction; Period (s^{-1})	Waves constitute the primary agent of coastal change. They are largely responsible for energy transfer along coasts, and significantly influence patterns of accretion and erosion.Wave characteristics are also critical in engineering design.
	Tides	Mean daily high (m); Mean daily low (m); Range: mean and extreme (m)	Tides exert a direct influence on coastal water levels, affecting both the occurrence and severity of erosion. High wter levels produce flooding along low-lying coasts, causing landward migration of the surf zone, thus rendering backshore property more vulnerable. An accurate time series of tide data is critical for making sea-level rise projections.
	Currents	Nearshore, including littoral (alongshore) and Oceanic (surface and bottom): direction; velocity (cms^{-1})	Currents continually move and distribute sand and other materials along coasts. They also drive the water circulation process, and aid in the dispersion and diffusion of pollutants.
WATER QUALITY	General Parameters	Temperature (^0C); Salinity (ppm or ppt); pH; Dissolved Oxygen	These parameters provide a measure of general water quality. Significant departures from ambient conditions

		(mg/L); Biological Oxygen Demand (mg/L); Suspended Particulate Matter (mg/L) as a measure of water clarity	usually indicate the influence of point or non-point sources which may require special monitoring and/or mitigation measures. The health status and viability of many marine organisms can also be impacted by variations in these parameters.
	Nutrients	Nitrate-nitrite-nitrogen (NO_3-NO_2-N, mg/L) ; phosphate-phosphorus (PO_4-P, mg/L); chlorophyll a (mg/L)	These are now accepted as excellent indicators of eutrophication. Tropical benthic communities such as corals and seagrasses are susceptible to raised nutrient levels. Generally, their health status deteriorates with increasing eutrophication.
	Sewage indicators	total coliform (colonies/100ml); faecal coliform (colonies/100ml); faecal streptococci (colonies/100ml)	These have serious implications for human health, particularly in relation to the quality of recreational (bathing) waters, and seafood harvesting.
BEACH MORPHOLOGY	Shoreline Change	Beach Profiles; Nearshore Bathymetry (isobaths in m); location and areal extent of beachrock (m); location and areal extent and height of dunes	Beach profiles are used to quantitatively establish seasonal and annual beach response to wave nergy changes, and to determine beach recovery rates. They also provide reliable information on long-term beach change trends. Profile data are also a critical input in the design of coastal structures. Nearshore bathymetry affects wave run up and the focusing and distribution of wave energy along coasts. It is a vital input to numerical/process modeling for waves and currents. The presence of beach rock is strongly indicative of continuing sand loss, and

			may highlight a need for special studies within certain coastal segments. Sand dunes help to protect the backshore (and property located there) from erosion, and provide a source of sand for natural beach building during and after storms.
	Sediments	Grain Size; composition; density;	These provide information about the source and availability of beach sediment, and can also be used in making inferences about wave energy distribution. Certain beach profile characteristics, such as slope, are also dependent on these variables.
MARINE/ COASTAL COMMUNITIES and HABITATS	Corals and coral reefs	% cover hard and soft species; % sponges; location and areal extent of nearshore and offshore reefs; % algae (as index of reef health); location and areal extent of coral rubble	Reefs function as a habitat and nursery for fish and other marine organisms. They provide a source of sand for many Caribbean beaches, and absorb, reflect and dissipate incident wave energy . To that extent, they are vital in helping to reduce the incidence of coastal erosion.
	Seagrasses	Location and a real extent by species.	Seagrasses provide habitat, nursery and forage grounds for many species of fish and other organisms. They also trap resuspended sediment, thereby promoting accretion and improved water transparency.
	Mangroves/Wetlands; other vegetation	Location; floristic composition (species); areal extent	These function as a habitat for a variety of coastal organisms (including avian fauna), many of which are commercially important species. Wetlands also help to trap and filter nutrients and other contaminanats, thus reducing such loadings to the nearshore. Coastal and

			strand vegetation help to stabilize mobile sands and dunes.
RARE/THREATENED/ENDANGERED/ ENDEMIC SPECIES	Flora; Fauna (nesting/roosting/breeding)	Location (including nesting sites of marine turtles); species name; estimated stock	These are an indication of coastal and marine biodiversity. The information yielded will be used to inform management decisions on issues such as protection (for rare/ endangered/threatened species), exploitation and resource optimization.
OTHER	----------	----------	----------

2(b) USES

CATEGORY OF ACTIVITY/USE	VARIABLE	DATA TO BE RECORDED	IMPORTANCE AND/OR USE OF DATA
FISHING	Commercial Deep Sea; Commercial Pelagic; Artisinal; Recreational	Location of landing sites; total catch (weight in kg); catch effort (no. Of landings); type of gear; boat-building/repair locations.	These data will help to provide a sound basis for comprehensive fisheries management in individual countries.
AGRICULTURE	Arable; livestock	no., location and size of units; waste volumes; disposal methods.	These data will give an indication of the importance of agriculture as a coastal land use, and provide some indication of their possible contribution as a source of marine pollution.
HOUSING	Private Residences	Lot size (ha/m^2); land Values ($/$m^2$)	This information will provide an indication of the importance of housing as a coastal land use activity, and its contribution to the overall coastal asset.
TOURISM	Hotel/Guest House/Condominium/ Apartment; Restaurants/Beach Bars etc.	Location; no. of rooms/units;	These data provide an index of the importance of the tourism industry as a coastal activity, while portraying a reliable picture of the type and spatial distribution of accommodation and related service facilities.
RECREATION	Water Sports (e.g.	Location; other	Intended to provide an

	swimming, water skiing, sailing, surfing, hiking, picknicking etc.); snorkeling; scuba-diving	data, if available or desirable (e.g. no. of registered craft/ jet skis/ glass-bottom boats; no. of dives per annum, etc.)	accurate picture of the range of watersports activities practised, their location and potential for generating user conflict. The information may also be used in conjunction with other data, to determine ranges of carrying capacity for these activities.
INDUSTRIAL	Manufacturing; Refining; Mining; Power/Energy Production	No. and location of facilities; production/ output/ per annum, where available	These data will generate an inventory of industrial and manufacturing activity, which can be used as a basis for resolving conflict with other existing and future activities. The information would also be useful for informing decisions about the management of wastes, which could impact negatively on the quality of the coastal resource.
INFRASTRUCTURE	Port (sea and air); Marina; Jetty/Wharf/Pier; Drainage Works	No. and location; type of structure (e.g. permeable or impermeable); length and orientation; elevation above mean sea level.	Such information will be used to assemble as complete a picture as possible, of critical installationas and structures which may impact on wave and sediment transport processes.
	Coastal Highway	Length/routing (km); Distance from mean high water mark	These data will be invaluable in the assessment of vulnerability of this vital infrastructure to high

		(MHWM); elevation relative to mean sea level	energy events (e.g. storms and storm surges) and sea level rise. The data can also be used to inform future coastal highway planning and maintenance.
COASTAL /SEA DEFENSE	Groyne; Revetment; Seawall; Breakwater	No. and location; type of structure (e.g. vertical, sloping, rubble mound etc.); dimensions (e.g. height, width, length, orientation)	This information, which constitutes part of the shoreline structures inventory, is necessary for conducting a full assessment of shoreline erosion and accretion trends. The data will also be used as a comprehensive basis for evaluating the functionality of the structures. The results of the analyses will in turn be used to inform the conditions under which such structures will be permitted in the future.
WASTE DISPOSAL	Solid; Liquid; Industrial/Commercial; Residential	No. and location of outfalls and disposal sites; type of discharge (e.g. stormwater, sewage; thermal effluent, factory waste etc.); rate/frequency of discahrge; treated/partially treated/untreated	The information will be vital for designing comprehensive waste management options for the coastal zone, taking into consideration the specific ecosystems likely to be impacted. Determination of appropriate standards for discharge and disposal (in the case of solid waste) would also be dependent on these data.

RESERVES; PARKS	Coastal; Marine	Location; areal extent; brief description of reserve/park/sanctuary including rationale for designating area; main species of flora/fauna; habitats; whether rare, threatened, endangered	Such data can be used in the planning process to ensure that existing or future activities will not lead to deterioration of, and/or encroachment on these specially protected zones. In this way, actions which would be in conflict with the objectives of the reserve/park could be avoided.
OTHER	----------	----------	----------