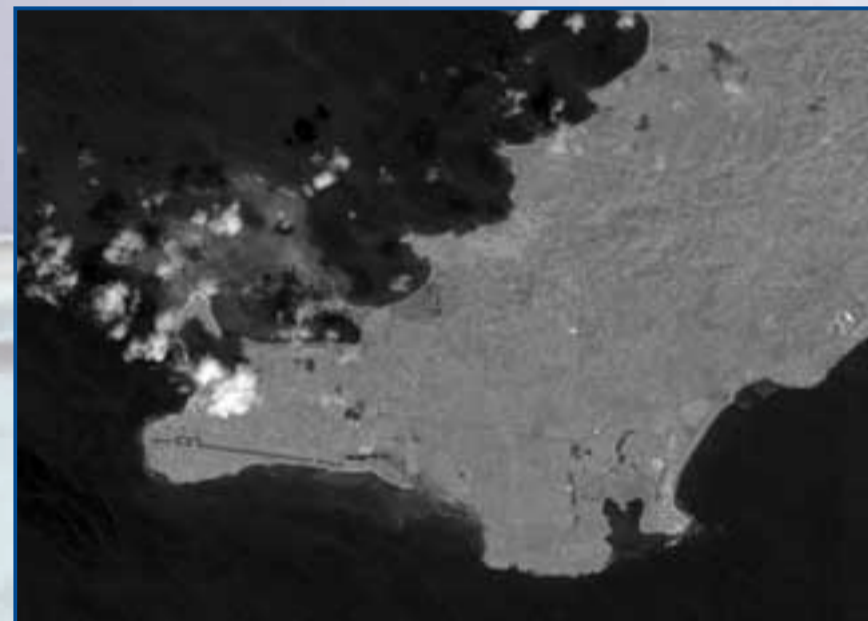


INTEGRATING GIS AND SATELLITE IMAGERY AS A MANAGEMENT TOOL FOR THE BUCCOO REEF MARINE PARK, TOBAGO

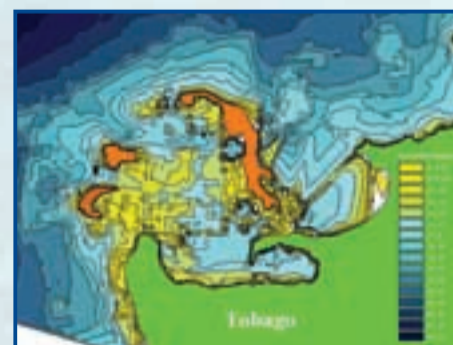
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Introduction

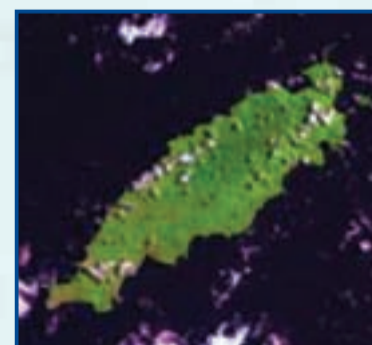
New approaches to mapping the spatial extent of coastal habitats, resources and their species are urgently needed to identify, monitor and mitigate potentially damaging anthropogenic activities. Geographical information systems (GIS) and remote-sensing satellite technologies deliver more accurate and detailed spatial information to the coastal zone user than conventional methods (boat and shore-based surveys), because they limit their dependence on extrapolating site-specific data. However, these technologies should be viewed as an integral part of conventional field-based methods rather than its alternative. GIS and satellite imagery offer a cost-effective approach to developing tools for collaborative coastal management by providing managers with the flexibility to input additional information whether model-based, textual, graphical or tabular. Maps are visually intuitive and therefore effective aids in relating complex issues to decision-makers and the public, regardless of their scientific understanding and background.



Ikonos satellite 1m panchromatic image of southern Tobago



Digitised depth contours of the Buccoo Reef and surrounding areas held within a GIS



Landsat satellite image of Tobago

The Buccoo Reef problem

Buccoo Reef is the largest of Tobago's numerous fringing coral reefs and one of its most ecologically and economically valuable natural assets. Over the years, however, this famous reef has been damaged by a number of contributory factors, which are mostly the direct effects of human activity. These factors include eutrophication of coastal waters from wastewater discharges and agricultural run-off, reef walking and damage from boat anchors. The Buccoo Reef Marine Park is now the focus of a Management Plan to be implemented by the Tobago House of Assembly with assistance from NGO's, such as the Buccoo Reef Trust, and the community of South-West Tobago.



Partners



ABP Marine Environmental Research (ABPmer) has expertise and a multi-disciplinary approach to delivering services for estuarine and coastal environments. This encompasses specialist knowledge in GIS,

habitat mapping, ecological modelling, eutrophication studies and development of PC-based software for risk assessment and management. ABPmer's involvement will strengthen the projects capacity to deliver GIS-based management tools for the coastal zone.



QinetiQ have considerable expertise and experience in remote-sensing technologies, providing highly specialised capabilities and solutions for both Naval and Commercial interests. They are ideally

placed to develop new applications for exploring coastal habitat mapping, ocean-scale processes, and monitoring of the marine environment.



TOBAGO HOUSE OF ASSEMBLY

Tobago House of Assembly (THA) is the governing body on the island of Tobago in the Republic of Trinidad and Tobago. The Department of Marine Resources and Fisheries of the THA is directly responsible for the management of the marine environment of Tobago and the implementation of the Buccoo Reef Marine Park Management Plan.



BUCCOO REEF TRUST
research education conservation

Buccoo Reef Trust is a non-profit company created to assist in the responsible development of Tobago's marine tourism and the conservation of its natural resources. The trust is building an international Marine Research Centre on Tobago, and views its alliance

with the proposed project's partners as an opportunity to strengthen its scientific reputation and promote collaborative management practices.

The GIS and satellite mapping project in Tobago

The project centres on collaboration between, ABP Marine Environmental Research, QinetiQ, Tobago House of Assembly, Buccoo Reef Trust and CEFAS. The aim is to provide a GIS-based habitat/resource map of the Buccoo Reef Marine Park using satellite imagery, field surveys and archive information of the parks anthropogenic activities. Its intention is to promote community awareness of environmental management and conservation, whilst developing a greater understanding amongst stakeholders of the opportunities and benefits of collaborative management.

Ikonos satellite 4m multispectral (4 channels) and 1m panchromatic imagery will be used to provide high-resolution information of the reef and surrounding watershed. Geometric, radiometric and water column corrections are applied to satellite imagery, which is then ground-truthed using irradiance measurements and survey information on reef habitats and their species. Volunteers from the community/stakeholders will participate in fieldwork and receive training on species identification and survey techniques. These data will be integrated into a GIS platform to create an interactive map. The project also



Examples of Buccoo Reef habitat: Elkhorn stand (top) and the seagrass *Thalassia* (bottom).
Photos: B. Lapointe

includes an MSc study, which will model interactions between the watershed and the hydrodynamics of the Buccoo Reef to evaluate run-off pathways that may contribute to eutrophication. All the project outputs will be disseminated via the worldwide web to promote standardisation of shared data and a provision for remote-access by end-users.



CEFAS is an executive agency of the UK government and has a broad range of expertise in fisheries, policy and

environmental related issues. CEFAS provided the initial platform for the project by supporting a secondment opportunity to Tobago.

This poster is being used as a management tool to facilitate stakeholder involvement.