

Dr. Kimberly Elaine Baldwin

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Education

- 2013 Post Graduate Certificate: University Teaching and Learning
University of the West Indies, Cave Hill, Barbados
- 2012 PhD. Environment Studies; *'A Participatory Marine Resource & Space-use Information System for the Grenadine Islands: An ecosystem approach to collaborative planning for management of transboundary marine resources'*
University of the West Indies, Cave Hill, Barbados
Centre for Resource Management and Environmental Studies (CERMES)
- 2003 MSc. Coastal and Marine Resource Management
University of the West Indies, Cave Hill, Barbados
Centre for Resource Management and Environmental Studies (CERMES)
- 1999 BSc. Aquatic Biology (Pre-Medicine)
University of California, Santa Barbara (UCSB)

Expertise

I am a marine biologist with specialised skills in collaborative resource management and geoinformatics; focusing on the utility of stakeholder engagement, participatory research and information technologies to create useful information to support a holistic ecosystem approach to environmental management. My research interests include: participatory marine habitat, resource, space-use and indigenous knowledge mapping, monitoring and impact assessments; geoinformatics: GIS, UAS and remote sensing mapping applications, spatial modelling, geodatabase construction and advanced spatial analyses, including Marine Spatial Planning applications. Wide experience teaching, supervising post-graduate students and conducting GIS, advanced spatial analyses and UAS 'drone' monitoring and mapping training courses for NGOs, public and private sectors across the Caribbean.

Professional Experience

- 2013-present **Principal**
[Marine Spatial Information Solutions, Inc.](#), St. James, Barbados. An environmental management company providing practical solutions to connect people, technology and information. Specialities include: marine management and spatial planning applications; participatory GIS, research and training initiatives; habitat, resource and space-use mapping; GIS data conversion and geodatabase construction, spatial modelling and analysis; UAS mapping and information technologies; impact assessment and monitoring services facilitation for a variety of Caribbean and global projects.
- 2015–present **Post-Doctoral Research Associate**
Coastal marine mapping techniques and the creation of ecosystem-based information.
[Centre for Resource Management and Environmental Studies](#), University of the West Indies, Cave Hill, Barbados.
- 2008-present **Part-time Lecturer**
Geoinformatics for Environmental Management (ENVT 6101). MSc. Programme. [Centre for Resource Management and Environmental Studies](#), University of the West Indies, Barbados. Teaching and supervision of several MSc Research students.
- 2006-2013 **GIS Analyst**
CERMES, University of the West Indies, Barbados. Specialising in data collection, conversion and Participatory GIS applications; habitat, resource, space-use and livelihood mapping; marine spatial planning and management; fisheries and marine modelling; geodatabase construction; and spatial analyses for projects throughout the Caribbean and other global ocean initiatives.

- 2011-2012 **Mentor**
Compton Foundation Mentor Fellowship, San Francisco, California.
Supervision of a research fellow to expand the Grenadines Marine Resource and Space-use Information System (MarSIS) geodatabase with important historical, cultural, and ecological heritage sites to support the designation of the area as an UNESCO transboundary marine mixed (ecological/cultural) World Heritage Site.
- 2005-2012 **Teaching Assistant/Demonstrator**
Centre for Resource Management & Environmental Studies (CERMES), University of the West Indies, Barbados. Assist the MSc Environmental Management teaching and research programme courses: Biodiversity of Coastal and Marine Resources; Measurement and Analysis in Natural Resource Management; and Fisheries Biology.
- 2003-2010 **Marine Research Assistant**
Office of Research, Environmental Impact Assessment (EIA) Program, University of the West Indies, Cave Hill, Barbados. Responsibilities include conducting marine monitoring requirements for EIAs for development projects including: marine habitat mapping, benthic and fish surveys, water quality testing, statistical analyses and GIS.
- 2004-2005 **Eastern Caribbean Marine Coordinator**
The Amadis Project. Responsible for the planning, training and implementation of a community-based marine monitoring program (Reef Check) in association with the Fisheries Divisions' of the countries of Barbados, St. Lucia and St. Vincent and the Grenadines.
- 2002-2003 **Research Assistant**
Ministry of Agriculture and Rural Development, Fisheries Division, Barbados.
Responsible for the design and conduction of an alternative fish trap research project with emphasis on social and economic implications and the participation of fishers.
- 2001 **Program Leader**
I Love a Clean San Diego NGO, San Diego, California.
Responsible for the design and implementation of environmental educational materials and awareness programs for schools, community groups, businesses and civic organizations in conjunction with the City and County of San Diego's Environmental Grant Program.
- 1999-2001 **Waterfront Teaching Assistant**
Center for Marine Resource Studies, School for Field Studies, South Caicos, Turks and Caicos Islands. Responsible for teaching marine field identifications in situ (via snorkel and SCUBA), supervision of field research projects and the management of a dive shop, several boats and research equipment for the field station.
- 1999-2000 **Research Assistant**
Department of Environmental and Coastal Resources, South Caicos, Turks and Caicos Islands.
Research involved the preliminary assessment of queen conch stocks and associated benthic habitats across the Caicos Bank.

Graduate research thesis co-supervisor

- Lindy Knowles (2015) MSc, CERMES. Marine habitat mapping for Barbados: Ground-truthing surveys and analysis to support remote sensing.
- Jehroum Wood (2014) MSc, CERMES. Incorporating GIS into Socioeconomic Monitoring for Coastal Managers (SocMon) in Barbados and St. Vincent.
- Ayelo White (2012) MSc, CERMES. A vulnerability assessment of the proposed, St. Vincent and the Grenadines South Coast Marine Conservation Area.
- Shamal Connell (2012) MPhil, CERMES. Land based impacts on coral reefs on the west coast of Barbados.
- Eugene Williams (2008) MSc, CERMES. Land based sources of marine pollution in the Grenadines.

Additional Experience

- Reviewer: Environmental Management; Coastal Management; Environment, Development and Sustainability; and Applied Geography

National GIS Working Group: Government of Barbados Sustainable Land Management Project (2010-12)
National Ocean Committee: Government of St. Vincent & the Grenadines (2011–present)

GIS Training

Introduction to ArcGIS I
Advanced Application of ArcGIS II
ArcGIS Pro
Creating and Integrating Data for Natural Resource Applications
Coastal Applications of ArcGIS (NOAA Coastal Services Center, USA)
3D Analyst
Spatial Analyst
Building, Editing and Managing Geodatabases
Working with Rasters in ArcGIS
Creating and Analyzing Surfaces Using ArcGIS Spatial Analyst
Marxan and Marxan with Zones Conservation Planning Software (PacMARA)

Other Skills / Training

UAS applications: DJI (Inspire 1/Pro, Phantom 3/4, Mavic) and 3DR (Solo)
UAS image reconstruction & modelling software: Pix4D, Drone Deploy, Maps Made Easy, Drone2Map
Trained Facilitator: Technology of Participation (ToP)
SocioEconomic Monitoring (SocMon); and Spatial SocMon
Participatory Community Resource Assessment (PCRA)
Integrated Ecosystem Services (IES) Approach – ValuES
Basic computer skills: Google Earth, Adobe Suite, Microsoft, Statistical Package for Social Sciences (SPSS), GPS/Sonar, Sqaurespace, Wix, Tumblr, Yahoo & Google Groups
Small UAS Licenses: USA (FAA Part 107 – Commercial Remote Pilot) and Barbados (CAA)
Divemaster (NAUI); Rescue Diver (PADI)
Lifeguard (including First Aid, CPR and DAN Oxygen Administration)
Navigation; Boating and Seamanship certified (US Coast Guard)
Conversational Spanish

Publications and Presentations

- In press Fanning, L., R. Mahon, **K. Baldwin** and S. Douglas. *A global assessment of governance architecture in transboundary Large Marine Ecosystems*. Marine Policy
- 2017 **Baldwin, K.** *Unmanned Aerial System (UAS) Policy and Operations Manual*. Centre for Resource Management and Environmental Studies (CERMES), Faculty of Science and Technology, University of the West Indies, Cave Hill Campus, Barbados.
- 2017 **Baldwin, K.** Spatial Data Management Protocol. CERMES, University of the West Indies, Cave Hill Campus, Barbados.
- 2016 **Baldwin, K.** *Drones for Conservation: Lessons learned from Antigua and Barbuda*. 13th December. YouTube Webinar: <https://youtu.be/Yz-ft3CoS-o>
- 2016 **Baldwin, K.** *Unmanned Aerial Systems (UAS) Policy and Operations Manual*. Department of Environment, Ministry of Health and Environment, Government of Antigua and Barbuda.
- 2016 **Baldwin, K.** *UAS data acquisition, processing and mapping methods in Cades Bay Marine Reserve, Antigua*. Department of Environment, Ministry of Health and Environment, Government of Antigua and Barbuda.
- 2016 **Baldwin, K.** *Data management protocol for the Environmental Information Management and Advisory System (EIMAS)*. For the Department of Environment, Ministry of Health and Environment, Government of Antigua and Barbuda.
- 2016 **Baldwin, K.**, H. Oxenford, S. Purkis and L. Knowles. *Marine habitat mapping for Barbados: Developing a benthic habitat classification scheme and island-wide map based on remote sensing and comprehensive ground-truthing*. Centre for Resource Management and Environmental Studies Technical Report, University of the West Indies, Barbados.
- 2016 **Baldwin, K.** and R. Mahon. Fisheries Strategic Action Plan for the Jamaican Seascape: Pedro Bank and Southwest Coast. Caribbean Marine Biodiversity Program: Jamaica Fisheries Sector Assessment and Action Plan. For The Nature Conservancy, Jamaica.

- 2015 Knowles, L. **Baldwin, K.** and H. Oxenford. *Marine habitat mapping for Barbados: Development of a habitat classification scheme and application of remote sensing and ground-truthing video-surveys*. 68th Gulf and Caribbean Fisheries Institute, Panama.
- 2015 **Baldwin, K.** *Marine zoning design and moorings plan for the South Coast Marine Management Area (SCMMA), St. Vincent*. For the Government of St. Vincent and the Grenadines. Under the CATS Component 2: CARHPA, GOPA. St. Lucia.
- 2015 **Baldwin, K.** *Marine spatial information assessment and mapping and for the potential development of offshore renewable energy in Barbados*. The Energy and Telecommunications Division, Office of the Prime Minister, Government of Barbados.
- 2015 **Baldwin, K.** and R. Mahon. *Rapid Fishery Sector Assessment of the Jamaican Seascape*. Caribbean Marine Biodiversity Program: Jamaica Fisheries Sector Assessment and Action Plan. For The Nature Conservancy, Jamaica.
- 2015 **Baldwin, K.** *Marine spatial planning for the Pedro Bank, Jamaica*. Final Report. For the Nature Conservancy and NEPA, Government of Jamaica.
- 2015 L. Fanning, R. Mahon, **K. Baldwin** and S. Douglas. Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean, Volume 1: Transboundary Large Marine Ecosystems. IOC-UNESCO, Paris. IOC Technical Series, 119.
- 2015 Velez, **et al.** *Blue Solutions from Latin America and the Caribbean: Oceans, Coasts and Human Well Being*. *Transboundary Marine Spatial Planning*. German Environment Ministry (BMUB), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), GRID-Arendal, International Union for Conservation of Nature (IUCN), and the United Nations Environment Programme.
- 2014 **Baldwin, K.**, S. Schill, N. Zenny and D. Blake. *Developing ecosystem-based information for marine spatial planning on the Pedro Bank, Jamaica*. 67th Gulf and Caribbean Fisheries Institute, Barbados.
- 2014 R. Pomeroy, **Baldwin, K.** and P McConney. *Marine Spatial Planning in Asia and the Caribbean: Application and Implications for Fisheries and Marine Resource Management*. *Desenvolvimento e Meio Ambiente*. Volume 32: 151-162.
- 2014 **Baldwin, K.** and R. Mahon. *Spatial analysis of ocean governance at the global level: Spatial data availability, accuracy, coordinate systems and considerations for practice*. Centre for Resource Management and Environmental Studies, The University of the West Indies, Cave Hill Campus, Barbados, CERMES Technical Report No 74.
- 2014 Wood, J., **K. Baldwin**, M. Pena and P. McConney. 2014. *Incorporating GIS into Socio-Economic Monitoring for Coastal Managers (SocMon)* in 'Enhancing Stewardship in Small-Scale Fisheries: Practices and Perspectives. Too Big To Ignore (TBTI)' Eds. McConney, P., R. Medeiros and M. Pena. Centre for Resource Management and Environmental Studies, The University of the West Indies, Cave Hill Campus, Barbados. CERMES Technical Report No. 73
- 2014 **Baldwin, K.** and R. Mahon. *A geospatial framework to support marine spatial planning and management for the transboundary Grenadine Islands*. *Electronic Journal of Information Systems for Developing Countries*. Volume 63 No 7.
- 2014 **Baldwin, K.** *Training exercise and rapid assessment of the proposed South Coast Marine Park, St. Vincent, St. Vincent and the Grenadines*. GEF through UNEP, Ministry of Health, Wellness and the Environment, Government of St. Vincent and the Grenadines
- 2014 **Baldwin, K.** and H. Oxenford. *A participatory approach to marine habitat mapping in the Grenadine Islands*. *Coastal Management* 42 (6): 36-58.
- 2013 **Baldwin, K.**, McConney, P. and R. Mahon. *Benefits of a participatory GIS approach for strengthening marine governance in SIDS*. *Natural Resources Forum* 37 (4): 257-268.
- 2013 Doyle, E., C. Morrall and **K. Baldwin**. 2013. *An Inventory of the Geographical Distribution and Conservation Status of Marine Turtles and Sharks in the Wider Caribbean and Relationship to Fisheries*. Commissioned by WWF-MAR. 173 pp.
- 2013 **Baldwin, K.**, H. Oxendford, and R. Mahon. *Demonstrating the effectiveness of a participatory geographic information systems (PGIS) approach in supporting ecosystem-based marine management for fisheries*. 66th Gulf and Caribbean Fisheries Institute, Corpus Christi, Texas.

- 2013 DeGraff, A. and **Baldwin, K.** *Participatory mapping of heritage sites in the Grenadine Islands*. CERMES Technical Report No. 65. University of the West Indies, Barbados.
- 2012 Margles, S., **K. Baldwin**, and J. Knowles. *Participatory marine spatial planning using Marxan with Zones: Case studies from the Eastern Caribbean*. URISA Caribbean GIS Conference, Montego Bay, Jamaica, 12-16 November.
- 2012 **Baldwin, K.** *A Participatory Marine Resource & Space-use Information System for the Grenadine Islands: An ecosystem approach to collaborative planning for management of transboundary marine resources*. PhD Diss. Barbados: University of the West Indies.
- 2012 Stewart, M.E., and **Baldwin, K.** *Workshops, community outreach and KML for visualization of marine resources in the Grenadine Islands*, in Whitmeyer, S.J., Bailey J.E. De Paor, D.G. and Ornduff, T., eds., *Google Earth and Virtual Visualizations in Geoscience Education and Research*: Geological Society of America 492, p. 63-76.
- 2012 DeGraff, A. and **K. Baldwin**. *Expanding on the Marine Resource and Space Use Information System for the Grenadine Islands with important historical, cultural, and ecological heritage sites*. 15th Annual Society for Conservation GIS Conference, 'Building Resilience', Monterey, CA, 19-22 July.
- 2012 **Baldwin, K.** *Developing a Framework for a Comprehensive Marine Multi-use Zoning Plan for the Grenadine Islands*. For The Nature Conservancy, Eastern Caribbean Program. CERMES, University of the West Indies, Barbados.
- 2011 **Baldwin, K.** and R. Mahon. Best student paper award. *A geospatial framework to support ecosystem based management and marine spatial planning for the transboundary Grenadine Islands*. CoastGIS 2011, Oostende, Belgium 4-8 Sept.
- 2011 Butler, M., P. Boudreau, C. LeBlanc and **K. Baldwin**. *Spatial data infrastructure in support of EBM and the ecosystem approach to fisheries in the Caribbean* in 'Towards marine ecosystem-based management in the Wider Caribbean'. Edited by Fanning, L. R. Mahon and P. McConney. Amsterdam: Amsterdam University Press.
- 2011 Stewart, M. and **K. Baldwin**. *Mapping the Grenadine Islands with GIS, Sharing the Data with Google Earth*. Geological Society of America Penrose Conference: Google Earth: Visualizing the Possibilities for Education, Mountain View, CA, 5 Jan.
- 2009 **Baldwin, K.** *Development of the Grenadines Marine Resource Space-use Information System (MarSIS)*. ESRI International Users GIS Conference. San Diego, California, 12-17 July.
- 2008 **Baldwin, K.** and S. Punnett. *A Preliminary Investigation of the Queen Conch Fishery in St. Vincent & the Grenadines*. 61st Gulf and Caribbean Fisheries Institute, Guadalupe.
- 2008 Oxenford, H.A., R. Roach, A. Brathwaite, L. Nurse, R. Goodridge, F. Hinds, **K. Baldwin** and C. Finney. *Quantitative observations of a major coral bleaching event in Barbados, southeastern Caribbean*. *Climatic Change* 87: 435-449.
- 2007 **Baldwin, K.**, R. Mahon, P. McConney, and H.A. Oxenford. Student Award Winner. *Stakeholder engagement in the development of a participatory GIS for the Grenadine Islands*. 60th Gulf and Caribbean Fisheries Institute. Punta Cana, Dominican Republic.
- 2007 **Baldwin, K.**, R. Mahon & H.A. Oxenford. *Participatory Mapping for the Grenadines Marine Resource Space-use Information System*. 45th Urban and Regional Information Systems Association (URISA) GIS Conference. Washington D.C. 20-23 August.
- 2007 **Baldwin, K.** *Participatory Mapping for the Grenadines Marine Resource Space-use Information System*. ESRI International Users GIS Conference. San Diego, California.
- 2006 **Baldwin, K.**, D. Gill, A. Cooke, T. Staskiewicz, D. Lizama, R. Mahon, P. McConney and H.A. Oxenford. *A socio-economic and space-use profile of Grenadine marine resource users*. For The Nature Conservancy, Eastern Caribbean Program. CERMES, University of the West Indies, Barbados.
- 2006 **Baldwin, K.**, R. Mahon, H. Oxenford, A. Cooke, D. Gill, T. Staskiewicz. *A profile of marine resource users in the Grenadines*. 59th Gulf and Caribbean Fisheries Institute. Belize City, Belize.
- 2005 **Baldwin, K.**, S. Punnett and C. Smith. *Involving communities in the implementation of Reef Check: Strategies for co-management of marine resources in St. Vincent and the Grenadines*. 58th Gulf and Caribbean Fisheries Institute. San Andres, Columbia.

- 2005 Hunte, W., **Baldwin, K.**, and Goodridge, R. *Temporal Changes in Coral Reef Communities on the West and South Coasts of Barbados: 1987-2002*. Technical Report for the Coastal Zone Management Unit, Government of Barbados.
- 2003 **Baldwin, K.** *Comparing Catch Rates among Conventional and Alternative Fish Trap Designs and their Implications for Fishers*. M.Sc. Thesis. CERMES, University of the West Indies, Barbados.
- 2002 **Baldwin, K.**, H. Oxenford, C. Parker and G. Franklin. *Comparing Juvenile Catch Rates among Conventional Fish Traps and Traps Designed to Reduce Fishing Mortality on Juvenile Reef Fishes*. 55th Gulf and Caribbean Fisheries Institute. Xel-Ha, Mexico.
- 2001 Danylchuk, A.J., M. Rudd, M. Giles and **K. Baldwin**. *Size dependent habitat use of queen conch (*Strombus gigas*) in East Harbour Lobster and Conch Reserve, Turks and Caicos Islands, BWI*. 54th Gulf and Caribbean Fisheries Institute. Providenciales, Turks and Caicos Islands.

Selected Projects

Research Drones: Development of an UAS policy, operations manual and data management protocol for the University of the West Indies. (2017-2018). CERMES, University of the West Indies (UWI), Cave Hill Campus, Barbados.

Drones for Conservation: Recommendations for UAS policy and operating procedures, mapping methods and data management effectiveness. (2016 - 2017). GEF/World Bank funded implemented by The Nature Conservancy & CERMES, UWI for the Department of Environment, Ministry of Agriculture, Government of Antigua and Barbuda.

Development of a habitat classification scheme and benthic habitat mapping of the coastal marine waters of Barbados. (2015-2016). IDB funded, implemented by CERMES, UWI together with Baird for the Coastal Zone Management Unit (CZMU), Government of Barbados.

Jamaica Fisheries Sector Assessment and Strategic Action Plan. (2015 – 2016). USAID funded as part of The Nature Conservancy's - Caribbean Marine Biodiversity Project (2014-2019).

Zoning design and moorings plan for the South Coast Marine Park, St. Vincent (2015). For the Government of St. Vincent and the Grenadines. Under the CATS Component 2: CARHPA, GOPA. St. Lucia.

Marine geodatabase construction and spatial mapping for the offshore renewable energy potential in Barbados. (2015). IDB funded for the Energy & Telecommunications Division, Office of the Prime Minister, Barbados.

Developing a marine multi-use zoning design for the Pedro Bank, Jamaica (2014-2015). Project manager, MSP specialist, GIS analyst. GEF-LGP, through UNDP under a MOU with the National Environment and Planning Agency (NEPA) of Jamaica implemented by The Nature Conservancy.

Transboundary Waters Assessment Program. GIS Spatial Analyst. (2014-2015). Collection, compilation and production of marine regime feature geodatabase and advanced spatial analyses for the Large Marine Ecosystem Program and Open Oceans Assessment Program. <http://www.geftwap.org>

Grenadines Marine Resource and Space-use Information System (MarSIS) (2006-2012)

PhD in Environmental Studies, the Centre for Resource Management and Environmental Studies, University of the West Indies, Barbados. My dissertation included the development of the Grenadines MarSIS, a transboundary marine Participatory GIS (PGIS) (www.grenadinesmarsis.com) of the coastal and marine environment of the Grenadine Islands (to the 60 meter depth contour) under the jurisdiction of two countries: Grenada and St. Vincent and the Grenadines. The MarSIS geodatabase was built using ArcGIS and Google Earth files have also been produced for greater public access and distribution of spatial data information. The MarSIS was collaboratively developed with a range of stakeholders (including both governments, NGOs, marine resource users) and included more than four years of data collection. Key spatial information includes: marine habitats (reefs, mangroves, seagrass beds, beaches), infrastructure (seaports, jetties, desalination plants), marine resource users (dive shops, day-tours, yachting, fishing, ships, communities), associated space-use patterns (anchorages, dive sites, fishing grounds, shipping lanes, recreation areas), biological (sea turtle nesting, seabird roosting sites) and conservation areas (marine protected areas, nursery grounds, historical sites, shipwrecks) and areas of threat (sand-mining, beach erosion, dumping, land-based sources of pollution, mangrove cutting). The MarSIS can be used to progressively identify the locations of spatial importance for marine conservation and livelihoods as well as highlight emergent areas which are currently or potentially high for space-use conflict.

Developing a framework for marine multi-use zoning plan for the Grenadine Islands (2010-2012)

Worked with the Sustainable Grenadines Inc. (SusGren) NGO to develop a marine spatial zoning design for the transboundary Grenada Bank. The project builds on pre-existing initiatives occurring in St. Vincent, the Grenadines and Grenada (e.g. Grenadines MarSIS geodatabase, the Protected Area Systems Plans) to increase the effectiveness of marine protected areas. The project was funded by the National Ocean and Atmospheric Administration (NOAA) and the Global Environment Facility Small Grants Programme (GEF-SGP).

Assessment and mapping of the South West Region of Antigua for the ‘Reef to Ridge’ demonstration project (2010-2012)

Worked with the Island Resources Foundation NGO to implement a GEF-LGP project of the Sustainable Island Resource Management Mechanism (SIRMM) of the Government of Antigua to assess and map of the South West Watershed of Antigua as a demonstration area to support an integrated ‘Ridge to Reef’ management framework. The results of this project provide support for the creation of an integrated management zoning plan with multiple use options to ensure the protection of key marine and terrestrial ecosystems, species and landscapes as well as to sustain livelihood and economic benefits for the surrounding communities. I conducted the coastal and marine habitat and space-use mapping aspects and provided GIS analyses for the project.