RPI

Christopher R. Locke **Research Planning, Inc.**
GIS/Remote Sensing Analyst

Mr. Locke specializes in the application of Geographic Information Systems (GIS), remotely sensed data, spatial analysis and modeling, and database design and programming, for coastal environmental assessments, oil spill planning and response, and utilities management.

His responsibilities at RPI include serving as data quality control manager for more than 25 Environmental Sensitivity Index (ESI) mapping projects and serving as the satellite and remote sensing projects coordinator. He has been part of the National Oceanic and Atmospheric Administration (NOAA) Scientific Support Team on numerous spill response and Natural Resource Damage Assessments activities. Mr. Locke has a special interest in technological advances for providing spill information to responders.

EDUCATION

M.S., Geography, University of South Carolina, Columbia, SC (1999)
Thesis Title: Estimating Biophysical Properties of Soybeans Using Field Data, Crop Modeling, and Remote Sensing

B.A., Geography, University of South Carolina, Columbia, SC (1996)

Honors
Julian J. Petty Award for Excellence in Scholarship (1996)

PROFESSIONAL EXPERIENCE

2000 to Present: GIS and Remote Sensing Analyst, Research Planning, Inc., Columbia, SC

1995 to 1997: GIS Specialist, Research Planning, Inc., Columbia, SC

Mr. Locke's experience is outlined separately on the following pages in four main areas:

1) Oil Spill and Disaster Response/Assessment
2) ESI/Coastal Resource Mapping
3) Environmental Planning and Technology
4) Utilities and Infrastructure Planning

OIL SPILL AND DISASTER RESPONSE/ASSESSMENT

Emergency Response: Mr. Locke is part of the Scientific Support Team to the U.S. Coast Guard provided by the National Oceanic and Atmospheric Administration (NOAA) for oil and chemical spills. His duties have included analysis of field and remotely sensed data, response database design and implementation, and production of maps, reports, and data streams for responders.

He has provided on- and off-scene support for the Emergency Response and Assessment and Restoration Divisions of NOAA at multiple incidents, including:

2017 *Hurricanes Irma and Maria*: Response activities including marine debris classification and evaluation for NOAA and the Coast Guard using high spatial resolution aerial and satellite imagery.

2010 – 2014 *Deepwater Horizon*: Shoreline Cleanup Assessment Techniques (SCAT) field observations spatial Database Manager. Assisted with the development of the NOAA SCAT database used during the spill and follow up monitoring.

2010-2011 Haiti Earthquake: Response activities including building damage assessments and GIS data prep for international relief agencies and NOAA responders. RPI was working in Haiti when the earthquake struck on the USAID Haiti Watershed Initiative (WINNER).

2007 Bayou Perot, LA: Oil type classification and volume estimation of spilled oil using digital aerial photography for on-scene management.

2005 Hurricane Katrina, LA: Combined LIDAR derived DEMs and priority satellite imagery to produce twelve hour interval flood level estimations in New Orleans.

Damage Assessments: Mr. Locke has worked as a data analyst on multiple post incident Natural Resource Damage Assessment (NRDA) efforts for NOAA as well as similar damage assessment activities for other entities.

2012 *Deepwater Horizon*: SCAT and remotely sensed data preparation and analysis for a variety of NRDA working groups.

2008 *Cosco Busan*, CA: Assisted the Trustees in the NRDA data analysis.

2005 – 2006 M/T *Athos* Spill: Compiled data and methodologies for digital quantitative analysis of shoreline oiling extent and impact.

2005 Hurricane Rita: HAZMAT Debris Analysis. Data acquisition, preparation, and photo interpretation of Hurricane Rita debris issues for the Sabine National Wildlife Refuge.

2005 Ecuadorian Amazonia: Estimation of asphaltic mat volume using imagery, GPS delineation, and field sampling.

2004 – 2005 *Bouchard 120* Spill: Compiled data and methodologies for digital quantitative analysis of shoreline oiling extent and impact.

2002 – 2003 Arabian Gulf UNCC Gulf War Shoreline Survey: Analyzed and quantified oiling degree and extent from field work and remotely sensed imagery.

COASTAL RESOURCE MAPPING FOR OIL SPILL CONTINGENCY PLANNING AND RESPONSE

Environmental Sensitivity Index (ESI) Mapping: Mr. Locke served as the digital data quality control manager on 20+ ESI Projects used for coastal zone management, contingency planning, and hazardous material/natural disaster responses.

As the QA/QC manager for all ESI atlases produced by RPI between 2003 and 2014, Mr. Locke has detailed knowledge of the ESI guidelines, requirements, and digital data structure as well as insight on the challenges of providing timely, relevant, and user-friendly information to spill responders. Prior to serving as data manager, Mr. Locke worked as a GIS specialist on numerous ESI atlases and traveled extensively through Central America for ESI data collection meetings (USAID projects in Honduras, Nicaragua, and Guatemala). He has also presented talks to various state and federal agencies on the technical requirements for ESI atlas production.

ENVIRONMENTAL PLANNING AND TECHNOLOGY

Environmental Assessments: Mr. Locke has worked on a variety of projects using GIS and remote sensing technologies to provide data inputs and analysis for land use characterization, site planning, and environmental impacts monitoring.

2009-2012 Haiti Watershed Initiative (WINNER): GIS support and training of Haitian nationals for watershed modeling and field data collection in support of sustainable agricultural practices. Land use classification of project watersheds from high-resolution satellite imagery.

2004 Buzzards Bay, MA: Inlet protection strategies. Data compilation and creation.

2004 Palmetto Bluff, SC: Marina site suitability study. Current and historical image interpretation for bank erosion analysis.

2003 Florida Power and Light (FPL): Analysis of FPL pipelines that intersect with High Consequence Areas (HCA) for drinking water and sensitive ecological environments.

2003 SIEPAC electrical corridor, Costa Rica: Environmental impact modeling for alternate routing in Costa Rica for a proposed electricity transmission line connecting Mexico and Panama.

Technology in Planning: Building on his experience in planning and response, Mr. Locke has also worked extensively on using technological innovations to assist with environmental decision making.

2015-2016 Programming of visualization tools for use with NOAA's ESI data. Focused on tools to encourage user interaction with the data and to clearly present the information contained in these large data sets.

2009 NOAA Emergency Response Division: Development of visualization tools in Google Earth for presenting NOAA Environmental Sensitivity Index (ESI) data.

2007 NOAA HAZMAT Technologies Overview: Evaluation of existing and emerging technologies for remote data collection from space to underwater for assessments of coral and seagrass damage caused by vessel groundings.

2006-2007 Environmental Data Assessment Tool for American Samoa: Developed on-line tools to assist local users in accessing and utilizing NOAA environmental data sets.

2004 South Carolina DNR soil mapping: Developed semi-automated techniques for soil classification digitizing.

2003-2005 LSU - Coastal Marine Institute: Louisiana coast line delineation and classification. Developed remote sensing techniques for classifying coastal habitats from satellite imagery following Environmental Sensitivity Index guidelines.

2002-2003 NOAA Oil and Gas Infrastructure and Coastal Land Loss Risk Assessment for Louisiana: Programmed spatial risk analysis and software tools to assess risks to coastal oil and gas infrastructure in Louisiana from coastal land loss.

UTILITIES AND INFRASTRUCTURE PLANNING

Mr. Locke has also been involved with a number of projects utilizing GIS and remote sensing technologies for utilities and infrastructure management. In addition to the pipeline and corridor projects listed in the categories above, he has worked on:

2008 Electric Utilities Field Assessments: CAD to GIS data conversion and field data collection tool development for an electrical engineering firm.

2006 Power Utility Assessment Tool: Consultation and Development of GIS tools to aid an electrical engineering firm's utility pole damage assessments post Hurricanes Katrina and Rita in Mississippi.

2003-2004 Harvest Hope Food Bank GIS: Data integration, compilation, and modeling for analysis of service gaps in South Carolina food bank distribution areas.

PUBLICATIONS, REPORTS, AND PROCEEDINGS

Locke, C., M. White, J. Michel, C. Henry, J.D. Sellars, and M. L. Aslaksen, Jr. 2008. Use of Vertical Digital Photography at the Bayou Perot, LA Spill for Oil Mapping and Volume Estimation. Proc. 2008 International Oil Spill Conference, May 5-7 2008, Savannah, GA.

Michel, J., C. Boring, and C. Locke, 2008. Rapid Assessment Protocols for Small Vessel Groundings. Proc. 2008 International Oil Spill Conference, May 5-7 2008, Savannah, GA.

Locke, C. and J. Michel. 2007. Considerations for Using Remote Sensing Technologies to Assess Injury to Benthic Habitats from Vessel Groundings. Prepared for NOAA, Office of Response & Restoration, Seattle, WA.

Locke, C. and J. Michel. 2007. Using AQUAMAP™ and GPS Technologies for Underwater Mapping in Emergency Assessments of Vessel Groundings. Prepared for NOAA, Office of Response & Restoration, Seattle, WA.

Born K., Locke, C., Michel, J., Braud, D. 2004. Using IKONOS Imagery for Mapping Coastal Habitats for Oil Spill Applications. ASPRS 2004 Annual Conference, May 23-28, 2004. Denver, Colorado.

Carbone G, Kiechle W, Locke C, Mearns LO, McDaniel L, and Downton M. 2003. Response of soybean and sorghum to climate change scenarios in the Southeastern United States. Special Issue of Climatic Change: Climate Change and Agriculture in the Southeast, 2003.

Locke, C.R., G. J. Carbone, and E. J. Sadler. 2000. Remote Sensing of Soybean Biophysical Properties. 5th International Conference on Precision Agriculture and Other Precision Resource Management, July 16-19, 2000. Bloomington Minnesota, Precision Agriculture Center, Univ. of Minnesota.

Carbone G, Locke C, Tsvetsinskaya E, Mearns L, McDaniel L. 2000. Responses of CERES and CROPGRO models to coarse and fine spatial resolution climate change scenarios in the southeastern United States. 96th Annual Meeting of the Association of American Geographers, April 6, 2000. Pittsburgh, PA.

Locke, C.R., M. White, J. Horsman, Z. Nixon and, C. Boring. 2017. A GIS Add-In for Creating On-the-fly maps Using NOAA Environmental Sensitivity Index (ESI) Data. International Oil Spill Conference Proceedings: May 2017, Vol. 2017, No. 1, pp. 2017166.