

APPLYING MAPPING AND SPATIAL ANALYTICS

DAWN J. WRIGHT AND CHRISTIAN HARDER, EDITORS

CONTENTS

Introduct		viii
GIS for Scie	»ri	ix
Introductioi		X
Reflections		
Part 1= Ho		2
Global Eco;		4
Using advai	; created a high-	
resolution, s	seful for studying	
the impacts	terns provide.	
What Lies I		22
For scientis	3 of Washington,	
lidar image	2 Earth's surface,	
even in plac		
The Anator		42
Working in	use geostatistical	
analysis to:	? South America.	
Predicting		58
Using macl	marine resource,	
scientists a	to flourish under	
differing oc		
Part 2: H		70
Extreme H	AR	72
Extreme he	jd public officials	
in monitor.		
Finding a'		84
This chaph	nd describes how	
GIS can he	nan dilemma.	
Restoring	d Morgan Chow,	104
The Natun	Red Cross	
Mapping t	s to build coastal	
resilience l		
Modeling	n, David Curson,	118
Gary Lane	,udubon Society	
Using geos	^hich habitats will	
be most cr	st what is at stake	
and how tl		

Part 3: How We Look at Earth	140
Mapping Ancient Landscapes-Jason Ur and Jeffrey Blossom, Harvard University	142
Racing against the clock as development encroaches on important Kurdish heritage sites, a team of landscape archaeologists deploys drones and comparative image analysis to capture previously undetected ancient settlements.	
Identifying the Natural Efficient Frontier-Jeff Allenby, Chesapeake Conservancy; and Lucas Joppa and Nebojsa Jovic, Microsoft Research	166
To improve conservation efforts across the entire US, scientists are leveraging artificial intelligence and satellite imagery within GIS across large landscapes to find the very best places for restoration.	
Part framing Future Generations of Scientists	180
A Glacier in Retreat-Jacki Klancher, Todd Guenther, and Darran Wells, Central Wyoming College	182
Wyoming is the third-most glaciated state in the United States after Alaska and Washington. The quest to measure the extent of ice retreat and predict the implications of losing the state's 80-plus glaciers has led a multidisciplinary research team to the Dinwoody Glacier at the base of Gannett Peak—Wyoming's tallest mountain.	
Panamapping: GIS for Conservation Science-Dan Klooster, David Smith, Nathan Strout, University of Redlands; Experience Mamoni; and Fundacion Geoversity	200
Geographic information system (GIS) technology supports conservation goals in Panama by revealing how physical features of the landscape interact with current and historical human uses of the land, allowing conservation managers to visualize and communicate processes of forest change, locate critical areas, and plan conservation activities.	
Part 5: Technology Showcase	214
Emergence of the Geospatial Cloud	216
Equal Earth Projection	218
Science of the Hex	221
Modeling the Footprint of Human Settlement	222
Modeling Green Infrastructure	224
Jupyter™ Notebook Analysis	226
3D Empirical Bayesian Kriging	228
National Water Model	230
A High-Resolution Martian Database	233
Sentinel-2 Imagery Viewer	234
The Power of Storytelling for Science	236