At first glance *GIS for Science* (Harder and Wright, 2019) has the look and feel of a coffee table book, one that is occasionally picked up and leafed through to look at the pictures and rarely read. The full-color images and maps are abundant and large and beautifully illustrate the power of spatial imagery. However, this oversized, landscape orientated paperback makes it unwieldy to wrangle, reducing the amount of time a browser might spend examining any of the content details. Having said that, *GIS for Science* is an excellent resource and its usefulness far outweighs the initial awkward handling. This first volume of *GIS for Science* is a compilation of GIS applications at different spatial and temporal scales from a variety of disciplines of both social and physical sciences. Each chapter in this edited volume is written by experts of the subject matter, so the writing style and framework of each chapter is different which keeps a reader's interest. The five-part organization: "How Earth Works," "How Earth Looks," "How We Look at Earth," "Training Future Generations of Scientists," and "Technology Showcase," provide GIS examples from a variety of perspectives. This is useful because the intended audience broadly encompasses professional scientists, citizen scientists, and "anyone interested in geography and science". As an Earth and Environmental Science student, my approach to integrating GIS was as a tool to facilitate interpretation of science. Because I had a previous career in computer programming and data analysis, technology and the science of geographic information were not foreign to me and I quickly realized the power of spatial data science. However, as an educator, I see firsthand the lack of awareness and understanding of the applications of GIS to interpret science both with my colleagues and with students. In fact, my professional interest in this "textbook" was as a potential resource to provide examples of applications and elicit additional interest in our GIS program. This challenge of striking a balance between broad applicability across multiple disciplines and providing discipline-specific applications is what makes GIS so perennially interesting. *GIS for Science* beautifully illustrates current research as well as exciting possibilities for further investigation. The book also links to supplemental digital resources that promote inquiry and provides inspiration for incorporating the book and the digital resources into teaching activities.

On the whole, *GIS for Science* contains a variety of applications that provide detailed background in a particular discipline (see for example *The Anatomy of Supervolcanoes* by Brandmeier) and/or specific information about the use of different GIS components, such as the use of machine-learning in *Predicting Global Seagrass Habitats* by Aydin and Butler. However, there are some inconsistencies in the level of detailed explanations and definitions. For example, in *Global Ecosystem Mapping* by Sayer, an excellent explanation of the development and generalization of categories is
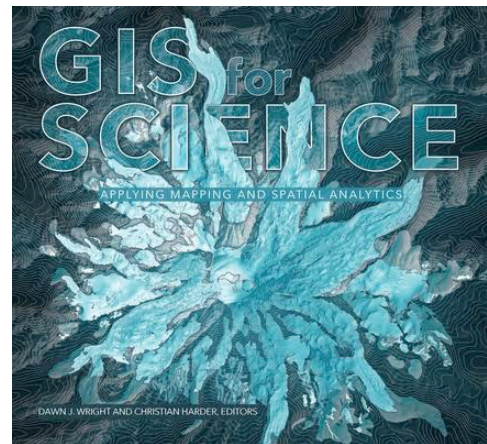
GIS for Science: Applying Mapping and Spatial Analytics

Christian Harder and Dawn J. Wright, Editors.
ESRI Press, Redlands, CA. 2019. 237 pp., diagrams, maps, photos, images. Paperback. $39.99. ISBN 978-1-58948-530-3.

Reviewed by M.Kathryn Rocheford, Assistant Professor, School of Natural Resources and Environment, Lake Superior State University, Sault Ste. Marie, Michigan.

provided but statistical clustering is not explained. Similarly, a detailed description of how Light Detection and Ranging (lidar) works and the subsequent products from the data is provided in *What Lies Beneath* by Coe, but interpolation is undefined. The inclusion of a glossary of GIS terminology would alleviate these issues for readers that are beginning their GIS journey.

If a user were to pick up *GIS for Science* and read one chapter because a particular topic piqued their interest, it would hit or miss as to whether the reader would learn about the wealth of supplemental information that supports this book on the accompanying website, gisforscience.com. This is because some of the individual chapters have no mention of the available digital resources. For example, the background scientific information presented in *Extreme Heat Events and Changing Climate* by Boehnert and Wilhelmi is very well explained, and a specific case study is presented. However, there is no indication that digital materials are available
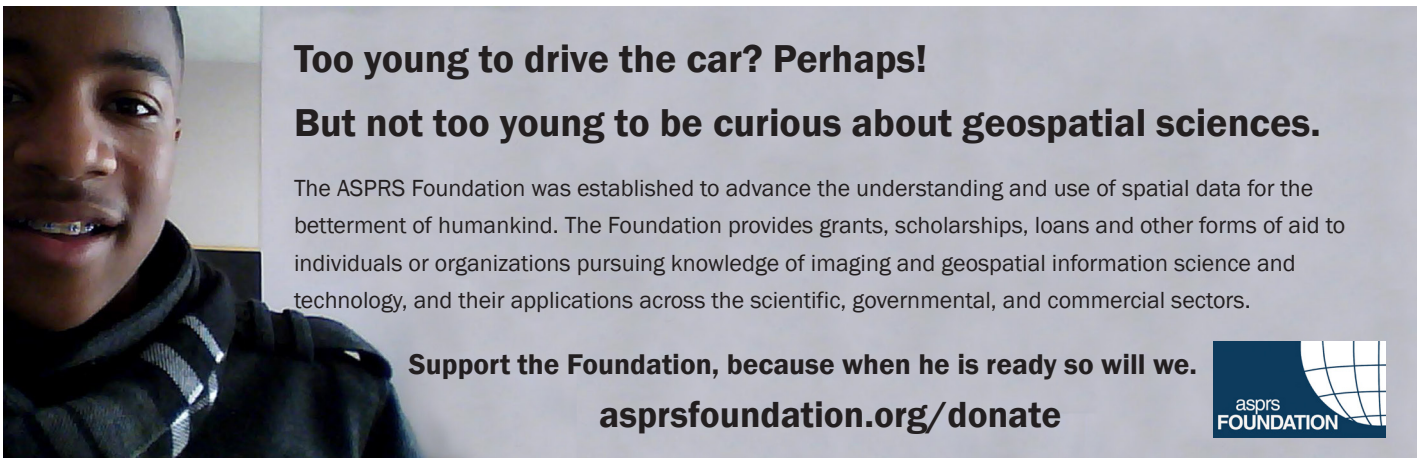
Table 1. Index of topic disciplines and GIS applications by chapter.

Author(s)	Topic Discipline	GIS Component
Sayre	Ecosystems: Land & Marine; Sustainability	Mapping; Classification
Coe	Natural Hazards	LiDAR interpretation
Brandmeier	Volcanology	Machine Learning; Workflow
Aydin & Butler	Oceanography; Biology	Machine Learning; Python Modeling
Wilhelmi & Boehnert	Climate Change: Extreme Heat	Model Builder; Workflow
Griffen & Geraghty	Homelessness	Workflow; Survey 123; Hotspot analysis
Ferdaña et al.	Coastal Resilience	Decision Support System; Machine Learning; 3D Geoprocessing
Bennet et al.	Bird Migration: Climate Change	Modeling; Interactive tools for citizen scientists
Ur & Blossom	Archaeology; Urbanization	Historical Image analysis; UAV
Allenby, Joppa & Jojic	Watershed Conservation	Artificial Intelligence; Satellite Imagery
Klancher, Guenther & Wells	Glaciology; Hydrology	GPR, Kite Aerial Photography
Klooster, Smith & Strout	Conservation; Socioeconomics	UAV; Land cover mapping; watershed risk analysis

to further explore the topic, including the Learn ArcGIS Lessons: "Explore Future Climate Projections" by Frye and "Predict Weather with Real Time Data" by Kerski. Further, it is disappointing that the digital resource "Field Notes" specifically featured in *Global Ecosystem Mapping* by Sayer has either been taken down or did not make it into production.

Finally, the variety of applications across different disciplines is engaging for GIS professionals and scientists, and this volume succeeds in providing the scientific background for each discipline. However, a scientist from a particular discipline (e.g. wildlife ecology) is not likely to utilize this printed volume to learn more about how GIS would assist them with spatial data analysis or aid with student engagement. For readers that may fall in this category, compiled for your edification is an index (Table 1) of the chapters from Parts I-III.

In conclusion, *GIS for Science* is a great resource for the spatially aware reader to enhance their understanding of the science behind the use of GIS components. However, this author finds the details about some of the GIS components to be too vague for a non-spatially aware reader to engage in learning more about GIS. Therefore, missing the mark for the intended audience (professional scientists, citizen scientists, and "anyone interested in geography and science") and relegates the book to coffee table status. I will, however, make full use of the available digital resources to engage my colleagues and students.