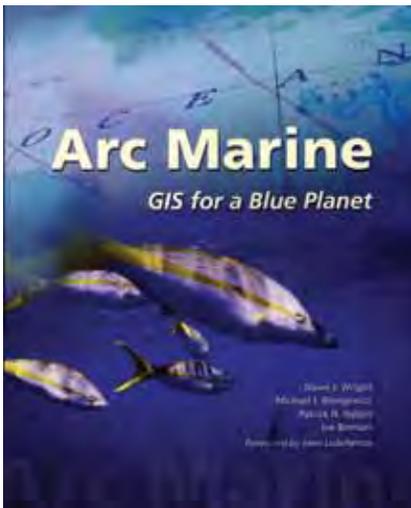# Book Review

Arc Marine: GIS for a Blue Planet

Dawn J Wright, Michael J. Blongewicz, Patrick N. Halpin, and Joe Breman

ESRI Press: Redlands, CA. 2007. xi and 202 pp., diagrams, maps, photos, index

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The marine world is infinitely complex, largely unexplored, and constantly changing, which makes creating GIS representations of marine phenomena very difficult. Data models are the constructs used to organize geographic features into a digital database. Common data models used in GIS were originally created for geographic features on land and they are therefore limited in their application to the marine environment. With the development of more sophisticated object-orientated data models, such as ESRI's geodatabases, users and designers now can integrate properties, methods, and relationships for each geographic object in a database. These new features have allowed GIS practitioners to further extend the common point, line, polygon, and raster models to more industry-specific geographic data models, such as Arc Marine.

The book *Arc Marine: GIS for a Blue Planet* is an introduction to the development, components, and implementation of the Marine Data Model. The Marine Data Model is a marine-focused geospatial database structure that allows for more accurate representations of marine geographic phenomena. The model is a significant leap forward in representing marine datasets by permitting the integration of many dimensions and attributes not easily represented in a traditional data model, such as time and depth. This book represents the culmination of six years of effort by many leading Marine GIS professionals and researchers. It is targeted at GIS professionals working in the marine/coastal environment who are looking to extend commonly used geographic data models. In addition, this book is useful in a GIS classroom for introducing ESRI's geodatabase design and implementation, especially in concert with the companion website (http://dusk2.geo.orst.edu/djl/arcgis/index.html). The website contains valuable supplementary materials including: additional and more complete data model diagrams, populated databases, PowerPoint presentations from the authors, tools that are highlighted in the text, additional information about the case studies, and a tutorial with an example dataset. The authors use real-world applications of the data model, through featured case studies to show the practicality, functionality and flexibility of the Arc Marine data model through each researcher's or organization's experience. Each case study chapter presents a few common marine data types, which are clearly described through layer descriptions at the beginning and more detailed class definitions at the end of each chapter, with an extensive reference list. The book is well laid out and the color images, figures, and tables excellently illustrate many of the concepts behind this model.

One of the key reasons the authors state for implementing Arc Marine is to build the ontology of the current Marine GIS field. This is illustrated in Chapter 1, which defines the common terminology used in the book and by GIS practitioners. The reader will benefit from the comprehensive explanation of the benefits of using a common data model, such as Arc Marine. Thinking beyond the point, line, polygon, and raster data models takes some time for GIS users to digest, so the authors pull together a detailed description of common data types in Chapter 2 and provide general examples of the geographic data that would be represented by this object in a database. In addition to the general examples, specific properties and how the relationships are built between different objects are described throughout the chapter. As with any GIS concept, it is always better to have hands-on experience, and the authors tackle this by using many different and diverse case studies -- the content of chapters 3-7. These case studies highlight the common marine data objects and relationships, as well as how the general data objects were customized to fit specific needs in each project. The case studies cover many relevant geographic data objects that GIS professionals in the marine field work with on a daily basis, such data collection points and transects that measure many different attributes at varying depths and relating these to the associated cruise trackline (Chapter 3); displaying and analyzing marine animal locations (Chapter 4); integrating data that vary in time and depth, such as data from CTD instruments and buoy measurements (Chapter 5); understanding near-shore and coastal patterns of marine management areas, beach erosion, sediment transport, and shoreline change (Chapter 6); and, integrating results from models that vary over time, space, and depth (Chapter 7). GIS has many limitations that require workarounds or modules specifically written for certain tasks, and Chapter 8 touches on sophisticated tools and data formats that can be integrated into Arc Marine. The Epilogue (Chapter 9) focuses on the future of GIS and data models, including improved metadata searches, web-based services, and integrating multiple data models.

Arc Marine: GIS for a Blue Planet is an essential reference and re-

source for any professional in the Marine GIS field. One of the most important outcomes of this book and project is the development of a common language and ontology for the Marine GIS field, as this will allow easier collaboration and communication between organizations and individuals. In addition, the integration of dynamic space, time, and depth into a GIS database is essential for the future of GIS to become the main visualization, analysis, and storage tool for marine scientists. This book and the data model are ESRI ArcGIS focused, which makes practical sense because ESRI is a GIS industry leader and ESRI's current object-orientated data model, the geodatabase, fits the Arc Marine schema well. However, this can be limiting for some GIS professionals not currently using this software. The authors have notably addressed this limitation and are hosting the model schemas in XMI (xml interchange) and now GML format to ease use in other applications, but most of the supporting text, case studies, and tutorials are ESRI focused.

   This book is a valuable resource and comparable to other industry-related data model books, such as Arc Hydro, the hydrology data model. The authors are leaders in the Marine GIS field, the topics and case studies are cutting edge, and the book has an engaging presentation and appearance. One of the more unique aspects of this book is the companion website that is consistently being updated with new interfaces, schemas, presentations, links, and supporting tools. This book is a great starting point for marine GIS professionals converting from georelational data models (ESRI shapefiles and coverages) to the more robust and customizable object-orientated data model or for students who want to learn about ESRI's geodatabase format.

ASPRS Meeting Schedule

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The William T. Pecora Memorial Symposium
November 17 – 20, 2008
Adams Mark Hotel, Denver, Colorado

ASPRS 2009 Annual Conference
75th Anniversary of ASPRS
March 8 – 13, 2009
Baltimore Marriott Waterfront Hotel, Baltimore, Maryland

ASPRS/MAPPS 2009 Fall Conference
November 16 – 19, 2009
Crowne Plaza Hotel, San Antonio, Texas

ASPRS 2010 Annual Conference
April 26 – 30, 2010
Town and Country Hotel, San Diego, California

ASPRS 2011 Annual Conference
May 1 – 5, 2011
Midwest Airlines Center/Hyatt Hotel, Milwaukee, Wisconsin

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