BENEATH THE SURFACE: A BOOK TO PROVIDE AN UNDERSTANDING OF NATURE

Kenneth W. Able, Rutgers University Marine Field Station

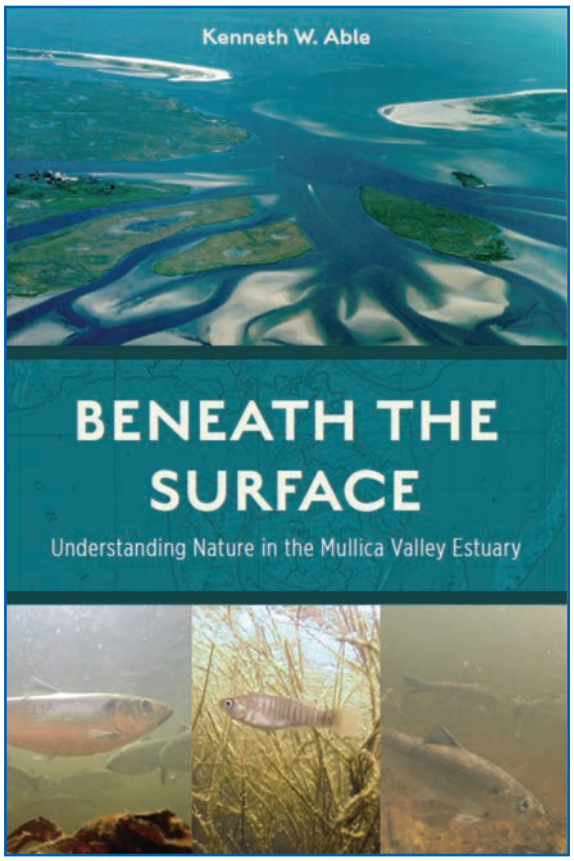


Figure 1.

The Mullica Valley estuary, its watershed, and tributaries (Fig. 1, 2), are among the cleanest along the east coast of the United States. This 365,000-acre ecosystem, which is bordered by Ocean, Atlantic, and Burlington counties, benefits from a combination of protected watershed, low human-population density, and general lack of extensive development. This is often hard for many people to believe because it is embedded in the most densely populated state in the U.S. with hundreds of years of intense development in the state's history. But once people have seen the system and understand the connectivity of protected waters, from freshwaters to the ocean, they appreciate its unique nature. The importance of this estuary has been well substantiated because the waters of the Mullica River - Great Bay are a central part of the Jacques Cousteau National Estuarine Research Reserve. All of these attributes and facilities make this estuary an exceptional baseline from which to figure out the natural history of aquatic animals and plants and how natural estuaries function. Further, this watershed is likely to remain that way into the future because of numerous federal and state holdings that provide protection from development.

In *Beneath the Surface*, marine scientist Ken Able helps the reader penetrate the surface and gain insights into the kinds of habitats, plants, and animals that make up an invisible part of the planet, the underwater estuary that few people see or understand. Further, natural history events in the estuary are highly seasonal. This book will provide a monthly overview of the critical environmental changes including temperatures, dissolved oxygen, pH, and turbidity. During the same months, the representative fish, invertebrates, birds, mammals, and reptiles that penetrate or live below the water's surface are followed. In addition, this book points out that the distribution of animals and plants is embedded in their landscapes. This applies equally well to the terrestrial and underwater portions of the landscape; in fact, these are often intertwined. Where this is not obvious, it is likely because we have not looked hard enough. This is the rationale for mapping the landscape of the Mullica Valley and its estuarine waters. In today's world and that of the last couple of centuries, we cannot understand this part of the natural history without including humans in the landscape.

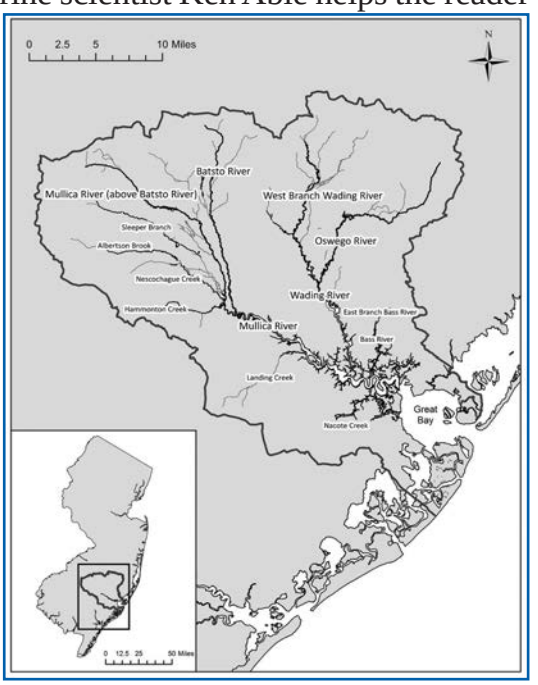


Figure 2.

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The seemingly pristine Mullica Valley of today has experienced a number of insults since Eric Mullica moved into the region over 300 years ago. This book recounts the "industrialization" of the terrestrial part of the Pine Barrens watershed by multiple activities (lumbering, charcoal making, glassworks, fish factories) and the underwater portions by the same activities. Other impacts have resulted from invasive species of plants (common reed) and animals (Japanese shore crab) and the threat of others (stinging nettles). The most insidious is the ongoing changes and future threat of sea level rise in the watershed. All of these insults and impacts in the relatively undisturbed Mullica Valley make this watershed an ideal sentinel site for understanding change in estuaries.

As a result of the above, readers of this book will gain a better understanding of the importance of these shallow waters; how the amount of salt in the water determines where animals and plants are found in estuaries; the day-night, seasonal, and annual variation in when they are present, and how change is occurring as the result of climate variation. Throughout the book are insightful short stories telling intimate accounts of where various animals came from and where they are going as they travel through the estuary on their way to and from other portions of the East Coast of the U.S. These stories focus on the early life histories of animals such as that for horseshoe crabs, diamondback terrapins, and winter flounder because their survival during this period that influences how many individuals will contribute to the next generation. Some stories rely on photo-identification of individual bottlenose dolphins to follow their seasonal migrations and site fidelity. Other stories are based on traditional tagging techniques, such as banding of ospreys and eagles to determine how and when they use the Mullica Valley and their underwater prey. Others emphasize what we have learned from tracking individual fish over weeks, months and years with and underwater "E-Z Pass" system. All of these stories illuminate the underwater lives of these animals in ways that were not previously known. *Beneath the Surface,* published by Rutgers University Press, is an extensive treatment of 304 pages that includes 140 color images and 69 black and white images.

Ken Able is a Distinguished Professor Emeritus in the Department of Marine and Coastal Sciences at Rutgers University and was the former Director of the Rutgers Marine Field Station (RUMFS) for over 30 years. He is the author of three previous books: two on the life history and ecology of estuarine fishes in the Mid-Atlantic region. A third covered the history of the facilities and research in the vicinity of RUMFS. He has lived in the Mullica River watershed for over 30 years, and can be in his kayak on the river in 15 minutes from his home and has taken that opportunity over the years, in all seasons.