

Highlighting the Role of Sunlight in Minimizing the Impacts of Aquatic Pollutants

Doug Latch

I am an environmental chemist and am particularly interested in how sunlight breaks down harmful contaminants in the environment. Indeed, the major objective of this project is to highlight the importance of sunlight (i.e. “photochemistry”) in preventing the buildup of harmful pollutants in surface waters. To do so, I intend to write two chapters for books that are in development. One will address broadly the role of photochemistry in the breakdown of aquatic pollutants. This chapter will provide a broad overview of the many different photochemical reaction pathways by which pollutants degrade. The target audience of this book will mostly be environmental engineers in academic and municipal settings. The chapter will be written as a primer on the topic of aquatic photochemistry to those who are not experts in that field. The second chapter will narrow the focus to a particular reactive species, singlet oxygen, that is produced in sunlit surface waters. The target audience for this chapter will have a high level of expertise in environmental science and/or photochemistry. This chapter will trade the significant breadth of the other chapter for much more depth. The production, decay, and reactivity of singlet oxygen will be presented in detail. Issues of environmental justice and sustainability are intimately tied to this project. The book chapters that will result from this project will be useful to scientists and engineers in the design of effective water and wastewater treatment technologies and in prioritizing which surface water contaminants may warrant more scrutiny.