

Book Review: Wildland Fire Smoke in the United States: A Scientific Assessment



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Opinion

Fire is one of the problems for wildlife. Forest fires can occur due to natural or intentional factors by humans. In the book "Wildland Fire Smoke in the United States: A Scientific Assessment", Peterson et al. explain the central fires in studies in America from various perspectives. Even so, a scientific approach to fires in various other places is also presented, a scientific experience in these fires.

The perspectives raised are also quite diverse, which as a whole, are presented in eight chapters, each of which contains comprehensive and relevant subchapters to explain the issues raised in each chapter. Assessment of the science of smoke (Chapter 1) is the opening discussion in this book. In addition, there are other topics such as oil management and prediction for fire prevention and control (Chapter 2); fire behaviour, heat release and modelling (Chapter 3); dynamics and immediate interactions (Chapter 4); emissions (Chapter 5). The other three chapters cover a multidisciplinary approach to understanding smoke science as a preventive or curative measure. Approaches studied such as immediate chemical and toxicological studies (Chapter 6); aspects of social, economic, and health risks (Chapter 7); and the point of view of illegal land managers in fighting fires (chapter 8).

Chapter 1 describes the condition of fires in wildland in the United States. This section also describes the distribution of fires in each state in the United States. In addition, it also discusses general periods or the peak incidence of fires each year.

Chapter 2 explains fuel found in almost all wildlands in the USA. It also includes the importance of mapping the fuel concentration in that area. The mapping results are explained as a form of mitigation and prevention of fire incidents, in addition to

planning the possibility of handling it to avoid the impact of more massive losses due to the fire incident itself.

Chapter 3 explains fire behaviour, which also affects the severity level in a field. This fire behaviour is also influenced by fuel, topography, and weather. These three components are then referred to as the fire behaviour triangle. Therefore, this is also explained in this chapter about the modelling principle. This modelling is for mapping the potential for wildland fires in certain areas.

One of the exciting chapters in this book is Chapter 4, which discusses Smoke Plume Dynamics. This chapter discusses how the smoke that is formed in a forest fire has a very significant effect on decreasing air quality in the affected area, including impaired visibility. This chapter also discusses the role of technological advances in measuring smoke, model development, and operational decision support tools to serve as a basis for decision-making for natural resource managers. Smoke modelling is also important to determine its impact on satellite imagery performance due to the structure and process of complex smoke formation. Later the chemical composition of the smoke will affect its interaction with the atmosphere. Also can be used as material in modelling the effect of smoke on climate change.

Continuing from the next chapter, we further explain the impact of smoke on emissions (Chapter 5) and the chemical characterization of smoke (Chapter 6). These emissions arise from the interaction of smoke with the atmosphere. For this reason, the chapter explains the emission factors in wildland areas. Also explained the relationship of emissions with field observations and laboratory testing. Besides that, the procedure

for forecasting emissions from wildland fires. These emissions are also very much determined by the chemical composition of the smoke produced. The composition of emitting NO_x and VOCs will impact the severity of the pollutants produced and the impact on the environment, especially ozone. The chapter also emphasizes the effect of pollutants from wildland fires which will have a higher impact if they combine with pollutants from urban areas.

This book also adds 3 appendices and two of them as additional information, which also correlates with wildland fire management. Appendix A describes the form of observation and interviews with natural resource management managers in the USA in dealing with fires in their respective areas. Appendix B describes smoke monitoring networks, smoke modelling, and some brief descriptions of tools that can be utilized in smoke assessment in wildlands or other places.

Chapter 7 examines the implications of wildfire incidents on human life. Pollutants, exceptionally articulate matter (PM), and other toxic gases. PM is straightforward to enter the respiratory tract, which is bad for breathing. This book also explains how existing PM can increase respiratory disease risk and can be exacerbated by bacterial and viral infections (pp. 203-204). The opening section also explains the correlation between

the pollutants produced by smoke and the COVID-19 disease. Pollutant exposure to humans, especially in a study in the USA, increases the sensitivity and severity of infection in groups of humans exposed to PM_{2.5} in 2020. The economic impact is direct because the material value of losing commodities has economic value and impacts indirect economic flows, especially tourism.

In summary, this book is exciting material for further understanding fire in the wildland. Not only because the sequence of contents is very comprehensive, but there is also a concluding subsection in each chapter which helps the reader to re-understand the contents of each chapter presented. Further explanation in the appendices regarding handling cases in several regions in the USA presented in the form of interview text becomes exciting case study material for those responsible for wildland management in other countries. From our point of view, this book has areas for improvement. This weakness is that this book needs to fully present studies of mitigation, prevention, management, and post-fire, as well as the impacts caused in one area [1].

References

1. Wildland Fire Smoke in the United States: A Scientific Assessment (2022) In: David L Peterson, Sarah M McCaffrey, Toral Patel-Weynan (Eds.), Published by Springer; ISBN 978-3-030-87044-7 ISBN 978-3-030-87045-4 (eBook), p. 339.



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