



Preface

The planet is a marvelous place: a place with blue skies, wild storms, deep lakes, and rich and diverse ecosystems. The tides ebb and flow, baby animals are born in the spring, and tropical rain forests harbor an astonishing array of life. The Earth sustains living things and provides humans with the resources to maintain a bountiful way of life: water, soil, and nutrients to grow food, and the mineral and energy resources to build and fuel modern society, among many other things.

The physical and biological sciences provide an understanding of the whys and hows of natural phenomena and processes—why the sky is blue and how metals form, for example—and insights into how the many parts are interrelated. Climate is a good example. Among the many influences on the Earth's climate are the circulation patterns of the atmosphere and the oceans, the abundance of plant life, the quantity of various gases in the atmosphere, and even the size and shapes of the continents. Clearly, to understand climate it is necessary to have a basic understanding of several scientific fields and to be aware of how these fields are interconnected.

As Earth scientists like to say, the only thing constant about our planet is change. From the ball of dust, gas, and rocks that came together 4.6 billion years ago to the lively and diverse globe that orbits the Sun today, very little about the Earth has remained the same for long. Yet, while change is fundamental, people have altered the environment unlike any other species in Earth's history. Everywhere there are reminders of our presence. A look at the sky might show a sooty cloud or a jet contrail. A look at the sea might reveal plastic refuse,

oil, or only a few fish swimming where once they had been countless. The land has been deforested and strip-mined. Rivers and lakes have been polluted. Changing conditions and habitats have caused some plants and animals to expand their populations, while others have become extinct. Even the climate—which for millennia was thought to be beyond human influence—has been shifting due to alterations in the makeup of atmospheric gases brought about by human activities. The planet is changing fast and people are the primary cause.

OUR FRAGILE PLANET is a set of eight books that celebrate the wonders of the world by highlighting the scientific processes behind them. The books also look at the science underlying the tremendous influence humans are having on the environment. The set is divided into volumes based on the large domains on which humans have had an impact: *Atmosphere*, *Climate*, *Hydrosphere*, *Oceans*, *Geosphere*, *Biosphere*, and *Polar Regions*. The volume *Humans and the Natural Environment* describes the impact of human activity on the planet and explores ways in which we can live more sustainably.

A core belief expressed in each volume is that to mitigate the impacts humans are having on the Earth, each of us must understand the scientific processes that operate in the natural world. We must understand how human activities disrupt those processes and use that knowledge to predict ways that changes in one system will affect seemingly unrelated systems. These books express the belief that science is the solid ground from which we can reach an agreement on the behavioral changes that we must adopt—both as individuals and as a society—to solve the problems caused by the impact of humans on our fragile planet.