

The Bear Brook Watershed in Maine—The Second Decade

Preface

Ivan J. Fernandez · Stephen A. Norton

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This special issue of Environmental Monitoring and Assessment (EMA) contains ten papers that describe evidence of biogeochemical change, in a non-stationary physical and chemical climate, in a paired, forested watershed of northern New England, USA, the Bear Brook Watershed in Maine (BBWM). The initial research emphasis at BBWM was to define the terrestrial–aquatic linkages important in governing surface water response to elevated atmospheric sulfur (S) deposition. Both empirical and experimental approaches were used to understand the linkages. The research emphasis almost immediately evolved to include the biogeochemical role of nitrogen (N), an important atmospheric pollutant, and a broadening scope of scientific objectives seeking to discover underlying mechanisms of ecosystem response to environmental change. As the paper by Norton et al. (2010) details, the historical trajectory of science is often strongly influenced by colleagues and collaborators, and the times we live in; the BBWM has been no exception.

The findings presented in this volume build on more than 140 refereed publications from the

BBWM study published in the scientific literature. After the first decade of research (1987–1996), Norton and Fernandez (1999) edited a volume that provided insights and findings not yet reported elsewhere at that time. In 1996, no one knew how long the study would continue. It was clear that our understanding of ecological function in these forested watersheds was incomplete and required the benefit of long-term research to formulate the right questions to ask, let alone to discover their answers. At the end of the second decade (2006), we found ourselves even more convinced of the importance of long-term research and we are pleased to present the collection of papers in this second special volume. These papers provide insights on soils (SanClements et al. 2010; Amirbahman et al. 2010), precipitation and streams (Navrátil et al. 2010; Kim et al. 2010; Laudon et al. 2010; Porcal et al. 2010; Simon et al. 2010), vegetation (Elvir et al. 2010), and an update of the comparison between BBWM and the Fernow Experimental Watershed (Fernandez et al. 2010), a complementary watershed research program and long-term collaborators. Seven of the papers present data and analysis of the 20-year period. In addition, the papers herein direct readers to many other works in the scientific literature that fill in the BBWM story.

If we are to assemble a knowledge base necessary to understand ecosystem function and assure ecosystem services in the changing physical

I. J. Fernandez (✉) · S. A. Norton
University of Maine, 5722 Deering Hall, Orono,
ME 04469, USA
e-mail: ivanjf@maine.edu

and chemical climate of the twenty-first century (IPCC 2007a, b), it will be essential to maintain, and utilize insights from, long-term research. This special issue is an attempt to achieve those objectives as the BBWM project continues into its third decade of research. The need for long-term research is an increasingly common theme in scientific discourse (e.g., Janzen 2009; Richter et al. 2007), yet only time will tell if the existing programs that already enjoy lengthening long-term data sets can be maintained, and if the necessary new initiatives for studying long-term ecological processes will be supported.

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