Vegetation is likely the most natural, self-sustaining, and cost-effective method for protecting exposed soils, slopes and, streambanks from the erosive forces of raindrops, the tractive forces of flowing water, and the exfiltration of subsurface water.

Vegetative measures for stabilization purposes have developed rapidly during the past three decades, and have been applied frequently in practice to stabilize stream banks and restore watersheds so too have the use of related measures to stabilize upland slopes. Several guidance manuals and “how to do it” books have been published during this time period. However, to date no detailed compilation of the results of projects has been published. Bioengineering Case Studies: Sustainable Stream Bank and Slope Protection addresses this need. The book describes many different types of case histories of biostabilization projects and their outcomes including the restoration and maintenance of geomorphic and ecological functions.

In this book two experienced practitioners along with the principal author of two prior books on biotechnical engineering have collaborated to share a diverse set of project case studies from several regions of the USA. These projects were developed for different purposes and by project owners with distinct needs, constraints, and preferences. The projects described in this book were selected in order to reflect not only sound application of typical treatments but also to convey some more nuanced variations and innovations that reflect the practice of bioengineering in the twenty-first century.

The main purpose of Bioengineering Case Studies: Sustainable Stream Bank and Slope Protection is twofold, namely, to build upon the wealth of information provided in prior guidance manuals (such as the 2005 report 544, Environmentally Sensitive Channel and Bank Protection Measures, by the National Cooperative Highway Research Program (NCHRP)), and to describe different types of projects using functional living vegetation and evaluate their performance. The original NCHRP 544 report provided a detailed literature review of available knowledge and methods relating to environmentally sensitive channel and stream bank protection practices and their use by different practitioners and agencies. The NCHRP report mainly targets highway design engineering criteria. This book, on the other hand, focuses more on short- and long-term performance history, maintenance issues, and lessons learned from actual projects.

This book is a retrospective compilation of case studies. It is not intended to provide design procedural descriptions nor does it attempt to train practitioners on the many disciplines of science, engineering, construction, horticulture, and regulatory compliance that underlie each project. The objective is to help people visualize how projects have been configured in the past, and to understand precedents and examples so the approach will come across as both attractive and manageable. There are many guidance manuals for the reader to refer to; several are listed in the appendices or in the references at the end of each case study.

We would like to acknowledge the assistance of the following persons who helped directly in the preparation and review of the book. Horst Schor, HJ Schor Consulting, Anaheim, CA reviewed the write-ups of the Asaayi Lake (#10) and Hollywood Hills (#11) projects that he also designed. Alan Kropp, Alan Kropp & Assoc., Berkeley, CA provided useful information about the Pacifica (#16) project. Dr. F.D. Shields, Jr., USDA-ARS Natl. Sedimentation Lab, Oxford, MS provided helpful
information and photo documentation about the Little Topashaw (#24) project. Prof. T.H. Wu, Dept. Civil Engr., Ohio State University, Columbus, OH provided useful information about the New Concord (#25) project that he directed. Molly Robinson, Manager, Water Treatment Services, City of Ann Arbor, reviewed the write-up and provided helpful information about the Argo Cascades (#9) project. Todd Swackhamer, Project Manager, MacMahon and Mann, Consulting Engineers, provided a write-up for the Creek Road (#35) project. Duke Bitsko, Corey Schutzman, Danielle Kelleher, and Amanda Bibbins from Bioengineering Group all provided valuable support hunting for project information from archives, selecting useful photographs, and editing text to shape multiple project documents into succinct case studies. The staff of Salix Applied Earthcare provided much useful information for the case studies. They sometimes worked as Project Managers for the Sacramento Watersheds Action Group (SWAG). This nonprofit watershed restoration group restored over 2-miles of Sulphur Creek (Proj #20) by soliciting grant funding, acquiring environmental permits, implementing the projects, and then monitoring effectiveness.

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Bioengineering Case Studies
Sustainable Stream Bank and Slope Stabilization
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2014, XIX, 244 p. 190 illus., 184 illus. in color., Hardcover
ISBN: 978-1-4614-7995-6