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BOOK REVIEW

Gravel-Bed Rivers in the Environment

Edited by P.C. Klingeman, R.L. Beschta, P.D. Komar and J.B. Bradley, 1998.
Water Resources Publications, LLC, PO Box 260026, Colorado, USA.
832 pages, *ISBN 1-887201-13-0.*
Price: Premium US$129 and Economy US$72.

This book is the fourth in the series of "Gravel-Bed Rivers Workshop" publications (see reviews by Davies 1983, Griffiths 1987 and Warburton 1993 in *Journal of Hydrology (N.Z.) 22(1):68-69, 26(2):215* and *31(1):126-128* respectively). These are collections of papers and discussions resulting from the five-yearly workshops, the first of which was held in 1980. This 1998 publication is the result of the 1995 workshop that was held in Washington, USA. The main theme of the Workshop was *Gravel-Bed Rivers in the Environment*, with three main focus areas that are reflected in the book. Klingeman sets the context for the book in the first chapter by discussing the past Gravel-Bed Rivers (GBR) Workshops and the role of GBR-IV in moving the gravel-bed river community "in the direction of a better understanding of river ecosystems."

The book is comprised of 31 chapters and 7 poster topics written by 60 internationally recognised authors who attended the Workshop. Rather than give a detailed run through of each chapter, a brief summary of each section is provided below.

The first focus topic, *Advances in Fluvial Processes*, is introduced by Parker's review of the progress made in fluvial process understanding over the period 1980-1995 (the lifetime of the GBR Workshops), and some key issues still to be addressed. The following chapters cover topics such as: bedload transport and flow structures in mountain streams; downstream fining of sediments; estimating net bedload transport from changes in channel morphometry; flow, sediment and bedform dynamics for bimodal sediment sizes; and cross-stream variability of bedload in ephemeral channels.

Reiser's review of the effect of sediment variations on in-stream ecology provides an excellent lead in to the second focus topic, *The Environment*. Following chapters concentrate mainly on: the consequences of changes in land-use or riparian vegetation on sediments in the channel; the effects of dredging, gravel extraction, water diversions or large woody debris jams on

the channel; the identification of biotopes and their use in determining 'environmentally acceptable' minimum flows; and the success (or otherwise) of in-stream manipulation to enhance river habitats.

The third focus topic, *Management of Gravel-Bed Rivers*, is introduced by Hey's discussion of management (engineering) and restoration of gravel-bed river environments. Subsequent chapters further explore the areas of: gravel extraction; guidelines for managing braided rivers; the use of physical and numerical models for testing proposed engineering works; calculation of flushing flows from reservoirs; and concepts of river 'restoration' or 'renaturalisation'.

The focus topics are followed by two special interest chapters; in the first Komar compares evidence of catastrophic floods on Earth and Mars (an interesting review for newcomers to Martian geomorphology such as myself), and the second chapter gives details of the case-study that was explored during the half-day field-trip that took place during the workshop – a rather unsatisfactory account as no conclusions are drawn due to 'incomplete review notes'. A chapter by one of the organising committee for the next Gravel-Bed Rivers Workshop – GBR-V, to be held in New Zealand in late 2000 – finishes off the main part of the book, with some rather pertinent comments on communication between researchers and practitioners in the gravel-bed rivers sphere.

Finally, the seven posters cover a variety of topics, including: a new numerical model that incorporates channel adjustment within a model run; flow and sediment transport monitoring; reconstructing historical flood records from river deposits; and the use of GIS to look at decadal scale changes in channel reach morphology.

New Zealand features relatively little in the book, the only New Zealand field sites being Duncan and Laronne (paper and poster) discussing the North Branch Ashburton River, Beschta's case-study of the Kowhai River, and Warburton and Davies who mention the Waimakariri, Ashley, Rakaia, and Waiho Rivers. However this gap will hopefully be addressed in the next such book, resulting from the GBR-V workshop.

As noted by Davies in his review of the first GBR publication, one of the highlights in the book is the inclusion of discussion of the papers, which (in most cases) serves to add a different viewpoint on each paper and hence results in a more balanced piece. Due to the three year gap between the Workshop and this publication, these discussions and authors responses may also serve to update the papers from their 1995 origins.

The references from the main chapters have been collated at the end of the

book, which on one hand makes finding specific references on a chapter topic quite hard, but on the other hand gives a useful, up-to-date collection of gravel-bed rivers references. A brief and not very useful subject index is also included. Because of some printing problems with the first run, the book comes in two print qualities, Premium (US$129 + P&P) and Economy (US$72 + P&P). The main problem with my economy version was the low quality resolution on some of the figures.

In summary, the book provides a good review of the state of knowledge in gravel-bed rivers, and introduces some new and interesting work. Some of the case studies and introductory chapters provide excellent reference material for practitioners. I would recommend that a copy of this book be available for reference by anyone who works in this field, of course alongside the existing excellent GBR series.

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