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Nota di contenuto	Ecohydraulics; Contents; List of Contributors; 1 Ecohydraulics: An Introduction; 1.1 Introduction; 1.2 The emergence of ecohydraulics; 1.3 Scope and organisation of this book; References; I Methods and Approaches; 2 Incorporating Hydrodynamics into Ecohydraulics: The Role of Turbulence in the Swimming Performance and Habitat Selection of Stream-Dwelling Fish; 2.1 Introduction; 2.1.1 'Standard' ecohydraulic variables; 2.2 Turbulence: theory, structure and measurement; 2.2.1 Statistical descriptions of turbulence; 2.2.2 Coherent flow structures; 2.2.3 Measuring turbulence in the field 2.3 The role of turbulence in the swimming performance and habitat selection of river-dwelling fish2.3.1 Swimming performance; 2.3.2 Habitat selection; 2.4 Conclusions; Acknowledgements; References; 3 Hydraulic Modelling Approaches for Ecohydraulic Studies: 3D, 2D, 1D

and Non-Numerical Models; 3.1 Introduction; 3.2 Types of hydraulic modelling; 3.3 Elements of numerical hydrodynamic modelling; 3.3.1 Mathematical model; 3.3.2 Discretization methods; 3.3.3 Mesh; 3.3.4 Mesh quality; 3.3.5 Boundary conditions; 3.3.6 Initial conditions; 3.3.7 Model parameters; 3.3.8 Model parameterization
3.3.9 Validation3.3.10 Scaling and averaging; 3.4 3D modelling; 3.4.1 Model setup; 3.5 2D models; 3.5.1 Model setup; 3.6 1D models; 3.6.1 1D model setup; 3.7 River floodplain interaction; 3.8 Non-numerical hydraulic modelling; 3.9 Case studies; 3.9.1 1D modelling of the Kootenai River, Idaho, USA; 3.9.2 Pseudo-2D modelling of the Biobio River, Chile; 3.9.3 2D modelling of the Saane River, Switzerland; 3.9.4 3D modelling of salmon redds; 3.10 Conclusions; Acknowledgements; References; 4 The Habitat Modelling System CASiMiR: A Multivariate Fuzzy Approach and its Applications; 4.1 Introduction
4.1.1 Background4.1.2 Physical habitat modelling in general; 4.1.3 Fuzzy logic in ecohydraulic modelling; 4.2 Theoretical basics of the habitat simulation tool CASiMiR; 4.2.1 Background and development; 4.2.2 Functional principle of CASiMiR; 4.2.3 Calibration of the fuzzy approach; 4.2.4 Advantages and limitations of the fuzzy approach; 4.3 Comparison of habitat modelling using the multivariate fuzzy approach and univariate preference functions; 4.3.1 Biota-physical relations: fuzzy approach versus preference functions
4.3.2 Case study: River Aare, Switzerland - simulation of spawning habitats for grayling with the fuzzy approach and preference functions4.4 Simulation of spawning habitats considering morphodynamic processes; 4.4.1 Ecological relevance of morphodynamic processes; 4.4.2 Concept of implementing morphodynamic processes in CASiMiR; 4.4.3 Case study: River Mur, Austria - morphodynamic processes and gravel-spawning fish habitat; 4.5 Habitat modelling on meso- to basin-scale; 4.5.1 Requirements of habitat assessment on larger scales; 4.5.2 Concept of evaluation of mesohabitats using MesoCASiMiR
4.5.3 Case study: River Neckar, Germany - habitat fragmentation and connectivity

Sommario/riassunto

Ecohydraulics: An Integrated Approachprovides a research level text which highlights recent developments of this emerging and expanding field. With a focus on interdisciplinary research the text examines:- the evolution and scope of ecohydraulicsinteractions between hydraulics, hydrology, fluvial geomorphology and aquatic ecologythe application of habitat modelling in ecohydraulic studiesstate of the art methodological developments and approachesdetailed case studies including fish passage design and the management of environmental flow