

---

# **Biodiversity, Ecosystem Functioning, and Human Wellbeing**

An Ecological and Economic  
Perspective

---

EDITED BY

**Shahid Naeem,  
Daniel E. Bunker,  
Andy Hector,  
Michel Loreau,  
and  
Charles Perrings**

**C 259380**

**OXFORD**  
UNIVERSITY PRESS

---

# Contents

---

<b>List of contributors</b>	<b>viii</b>
<b>Preface</b>	<b>xi</b>
<i>Shahid Naeem, Daniel E. Bunker, Andy Hector, Michel Loreau, and Charles Perrings</i>	
<b>Acknowledgments</b>	<b>xiv</b>
<b>Part 1: Introduction, background, and meta-analyses</b>	<b>1</b>
<b>1 Introduction: the ecological and social implications of changing biodiversity. An overview of a decade of biodiversity and ecosystem functioning research</b>	<b>3</b>
<i>Shahid Naeem, Daniel E. Bunker, Andy Hector, Michel Loreau, and Charles Perrings</i>	
<b>2 Consequences of species loss for ecosystem functioning: meta-analyses of data from biodiversity experiments</b>	<b>14</b>
<i>Bernhard Schmid, Patricia Balvanera, Bradley J. Cardinale, Jasmin Godbold, Andrea B. Pfisterer, David Raffaelli, Martin Solan, and Diane S. Srivastava</i>	
<b>3 Biodiversity-ecosystem function research and biodiversity futures: early bird catches the worm or a day late and a dollar short?</b>	<b>30</b>
<i>Martin Solan, Jasmin A. Godbold, Amy Symstad, Dan F. B. Flynn, and Daniel E. Bunker</i>	
<b>Part 2: Natural science foundations</b>	<b>47</b>
<b>4 A functional guide to functional diversity measures</b>	<b>49</b>
<i>Owen L. Petchey, Eoin J. O’Gorman, and Dan F. B. Flynn</i>	
<b>5 Forecasting decline in ecosystem services under realistic scenarios of extinction</b>	<b>60</b>
<i>J. Emmett Duffy, Diane S. Srivastava, Jennie McLaren, Mahesh Sankaran, Martin Solan, John Griffin, Mark Emmerson, and Kate E. Jones</i>	
<b>6 Biodiversity and the stability of ecosystem functioning</b>	<b>78</b>
<i>John N. Griffin, Eoin J. O’Gorman, Mark C. Emmerson, Stuart R. Jenkins, Alexandra-Maria Klein, Michel Loreau, and Amy Symstad</i>	

<b>7 The analysis of biodiversity experiments: from pattern toward mechanism</b>	<b>94</b>
<i>Andy Hector, Thomas Bell, John Connolly, John Finn, Jeremy Fox, Laura Kirwan, Michel Loreau, Jennie McLaren, Bernhard Schmid, and Alexandra Weigelt</i>	
<b>8 Towards a food web perspective on biodiversity and ecosystem functioning</b>	<b>105</b>
<i>Bradley Cardinale, Emmett Duffy, Diane Srivastava, Michel Loreau, Matt Thomas, and Mark Emmerson</i>	
<b>9 Microbial biodiversity and ecosystem functioning under controlled conditions and in the wild</b>	<b>121</b>
<i>Thomas Bell, Mark O. Gessner, Robert I. Griffiths, Jennie McLaren, Peter J. Morin, Marcel van der Heijden, and Wim van der Putten</i>	
<b>10 Biodiversity as spatial insurance: the effects of habitat fragmentation and dispersal on ecosystem functioning</b>	<b>134</b>
<i>Andrew Gonzalez, Nicolas Mouquet, and Michel Loreau</i>	
<b>Part 3: Ecosystem services and human wellbeing</b>	<b>147</b>
<b>11 Incorporating biodiversity in climate change mitigation initiatives</b>	<b>149</b>
<i>Sandra Díaz, David A. Wardle, and Andy Hector</i>	
<b>12 Restoring biodiversity and ecosystem function: will an integrated approach improve results?</b>	<b>167</b>
<i>Justin Wright, Amy Symstad, James M. Bullock, Katharina Engelhardt, Louise Jackson, and Emily Bernhardt</i>	
<b>13 Managed ecosystems: biodiversity and ecosystem functions in landscapes modified by human use</b>	<b>178</b>
<i>Louise Jackson, Todd Rosenstock, Matthew Thomas, Justin Wright, and Amy Symstad</i>	
<b>14 Understanding the role of species richness for crop pollination services</b>	<b>195</b>
<i>Alexandra-Maria Klein, Christine Müller, Patrick Hoehn, and Claire Kremen</i>	
<b>15 Biodiversity and ecosystem function: perspectives on disease</b>	<b>209</b>
<i>Richard S. Ostfeld, Matthew Thomas, and Felicia Keesing</i>	
<b>16 Opening communities to colonization – the impacts of invaders on biodiversity and ecosystem functioning</b>	<b>217</b>
<i>Katharina Engelhardt, Amy Symstad, Anne-Helene Prieur-Richard, Matthew Thomas, and Daniel E. Bunker</i>	

<b>17 The economics of biodiversity and ecosystem services</b>	<b>230</b>
<i>Charles Perrings, Stefan Baumgärtner, William A. Brock, Kanchan Chopra, Marc Conte, Christopher Costello, Anantha Duraiappah, Ann P. Kinzig, Unai Pascual, Stephen Polasky, John Tschirhart, and Anastasios Xepapadeas</i>	
<b>18 The valuation of ecosystem services</b>	<b>248</b>
<i>Edward B. Barbier, Stefan Baumgärtner, Kanchan Chopra, Christopher Costello, Anantha Duraiappah, Rashid Hassan, Ann P. Kinzig, Markus Lehman, Unai Pascual, Stephen Polasky, and Charles Perrings</i>	
<b>19 Modelling biodiversity and ecosystem services in coupled ecological–economic systems</b>	<b>263</b>
<i>William A. Brock, David Finnoff, Ann P. Kinzig, Unai Pascual, Charles Perrings, John Tschirhart, and Anastasios Xepapadeas</i>	
<b>Part 4: Summary and synthesis</b>	<b>279</b>
<b>20 TraitNet: furthering biodiversity research through the curation, discovery, and sharing of species trait data</b>	<b>281</b>
<i>Shahid Naeem and Daniel E. Bunker</i>	
<b>21 Can we predict the effects of global change on biodiversity loss and ecosystem functioning?</b>	<b>290</b>
<i>Shahid Naeem, Daniel E. Bunker, Andy Hector, Michel Loreau, and Charles Perrings</i>	
<b>References</b>	<b>299</b>
<b>Index</b>	<b>357</b>