## Contents

*List of contributors* viii

**Introduction** 1

*Paulo A.L.D. Nunes, Pushpam Kumar and Tom Dedeurwaerdere*

### PART I  SETTING THE SCENE: THE NEED FOR ECOSYSTEM SERVICE VALUATION

1. Comprehensive wealth accounting: measuring sustainable development  
   *Glenn-Marie Lange and Esther Naikal*  
   15

2. The protective value of estuarine and coastal ecosystems  
   *Edward B. Barbier*  
   27

3. Cruising for a bruising: challenges in sustainable capture of ecosystem service values from cruise ship tourism in Belize  
   *Andrew Seidl, Lawrence Pratt, Martha Honey, William H. Durham, Geraldine Slean and Amos Bien*  
   40

4. Climate change effects on the economics and management of marine fisheries  
   *U. Rashid Sumaila, William W.L. Cheung and Vicky W.Y. Lam*  
   61

5. The economic impacts of ocean acidification  
   *Luke M. Brander, Daiju Narita, Katrin Rehdanz and Richard S.J. Tol*  
   78

6. Estimating the welfare loss of climate change impact on corals  
   *Pushpam Kumar and Hongyan Chen*  
   93

### PART II  EMERGING ECONOMIC VALUATION METHODS, INCLUDING THE USE OF DELIBERATIVE, MACRO AND SPATIALLY EXPLICIT ECONOMIC VALUATION

7. The behavioral argument for an expanded valuation framework for biodiversity and ecosystem services  
   *John M. Gowdy and Sarah Parks*  
   113

8. Valuing ecosystem services in macroeconomic settings  
   *Rodney B.W. Smith and Masahiko Gemma*  
   130

9. Exploring the use of a macro–micro-based approach to value biodiversity productivity impacts on the agricultural sector  
   *Ruslana Rachel Palatnik and Paulo A.L.D. Nunes*  
   153
vi  Handbook on the economics of ecosystem services and biodiversity

10  Quantifying and valuing ecosystem services: an application of ARIES to the San Pedro River Basin, USA 169
    Kenneth J. Bagstad, Darius Semmens, Ferdinando Villa and Gary W. Johnson

11  Optimal selection of clustered conservation lands using integer programming: the case of Fort Stewart in Georgia, USA 193
    Sahan T.M. Dissanayake, Hayri Önal, James D. Westervelt and Harold E. Balbach

12  QUICKScan: a pragmatic approach for decision support in ecosystem services assessment and management 208
    Manuel Winograd, Marta Pérez-Soba and Peter Verweij

PART III  ECOSYSTEM SERVICES AND CONSERVATION POLICY

13  Ecosystem service valuation and the allocation of land 233
    R. David Simpson

14  Biodiversity prospecting over time and under uncertainty: a theory of sorts 252
    Amitrajeet A. Batabyal and Peter Nijkamp

15  Game theory and marine protected areas: the effects of conservation autarky in a multiple-use environment 264
    Maarten J. Punt, Hans-Peter Weikard and Ekko C. van Ierland

16  The valuation of ecosystem services and their role in decision-making: constraints and ways forward 278
    Anil Markandya and Marta Pascual

17  Optimal species preservation policy in a symbiotic relationship between species 302
    Shiri Zemah-Shamir, Benyamin Shitovitz and Mordechai Shechter

18  Biodiversity, poverty and development 318
    Charles Palmer and Salvatore Di Falco

19  Biodiversity conservation and ecosystem services provision: a tale of confused objectives, multiple market failures and policy challenges 337
    Jessica Coria, Elizabeth Robinson, Henrik G. Smith and Thomas Sterner

PART IV  SHEDDING LIGHT ON NON-MARKET VALUES OF ECOSYSTEM SERVICES

20  A choice experiment to value the recreational benefits of coral reefs: a case study of Ras Mohammed National Park, Egypt 367
    Rady T. Tawfik and R. Kerry Turner

21  Using ecological information in choice experiments to value ecosystem services restoration programmes in East Asia 391
    Yohei Mitani and Ståle Navrud
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>A one-and-one-half bound contingent valuation survey to estimate the benefits of restoring a degraded coastal wetland ecosystem: the case study of Capo Feto, Italy</td>
<td>Giovanni Signorello, Joseph C. Cooper, Giuseppe Cucuzza and Maria De Salvo</td>
</tr>
<tr>
<td>23</td>
<td>A micro-econometric approach to deriving use and non-use values of in situ groundwater: the Vosvozis case study, Greece</td>
<td>Phoebe Koundouri, Vassilis Babalos, Mavra Stithou and Ioannis Anastasiou</td>
</tr>
<tr>
<td>24</td>
<td>The economic feasibility of the creation of the Jardines de la Reina National Park</td>
<td>Tamara Figueredo Martín, Fabián Pina-Amargós and Jorge Angulo-Valdés</td>
</tr>
<tr>
<td>25</td>
<td>Valuation of ecosystem services provided by man-made wetlands</td>
<td>Nico B.P. Polman, Arianne T. de Blaeij, C. Martijn van der Heide, Vincent Linderhof and Stijn Reinhard</td>
</tr>
<tr>
<td>26</td>
<td>The contribution of non-use values to inform the management of groundwater systems: the Rokua esker, Northern Finland</td>
<td>Phoebe Koundouri, Mavra Stithou, Eva Kougea, Pertti Ala-aho, Riku Eskelinen, Timo Karjalainen, Björn Klöve, Manuel Pulido-Velazquez, Kalle Reinikainen and Pekka M. Rossi</td>
</tr>
<tr>
<td></td>
<td><strong>PART V</strong>  THE ROLE OF GOVERNANCE AND SCIENCE–POLICY–BUSINESS INTERFACE IN BRINGING VISIBLE ECOSYSTEM VALUES</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Governance is critical to managing coastal and marine resources: effects of marine management areas</td>
<td>Giselle Samonte, Daniel Suman, Juan Maté, Diego Quiroga, Carlos Mena, Adele Catzim-Sanchez, Patrick Fong and Xuanwen Wang</td>
</tr>
<tr>
<td>28</td>
<td>Strengthening the science–policy interface: lessons from the Intergovernmental Platform on Biodiversity and Ecosystem Services</td>
<td>Anantha Kumar Duraiappah</td>
</tr>
<tr>
<td>29</td>
<td>Governance of the transition to a green economy – responding to the values of nature</td>
<td>Patrick ten Brink, Leonardo Mazza, Tomáš Badura, Marianne Kettunen and Sirini Withana</td>
</tr>
<tr>
<td>30</td>
<td>New business decision-making aids in an era of complexity, scrutiny, and uncertainty: tools for identifying, assessing, and valuing ecosystem services</td>
<td>Sissel Waage</td>
</tr>
<tr>
<td></td>
<td><strong>Index</strong></td>
<td></td>
</tr>
</tbody>
</table>