

Mediated Modeling

A System Dynamics Approach to Environmental Consensus Building



Marjan van den Belt

Island Press

Washington • Covelo • London

Contents

Foreword	xiii
Preface	xvii
Acknowledgments	xix
CHAPTER 1: Introduction	1
Bounded Rationality	4
Decision Making	5
Knowledge Accumulation by Experts	6
Stakeholder Participation	6
Adaptive Management	8
Building Environmental Consensus	9
The Role of Mediated Modeling	10
Conclusion	11
CHAPTER 2: The Role of Mediated Modeling	15
Participatory Modeling	15
Mediated Modeling	17
Intellectual Roots of Mediated Modeling	21
Decision Support Tools	30
Decision-Making Tools	33
Deliberation Tools	35
Mediated Modeling as a Starting Point or as a Complementary Tool	37
Conclusion	38
CHAPTER 3: The Mediated Modeling Process	40
Why Should a Mediated Modeling Project Be Undertaken?	41
Outline of a Mediated Modeling Process	45
Adaptive and Collaborative Management	46
Participants and Roles	47

The Mediated Modeler	49
Time Frame	53
What Results Are to Be Expected?	54
Conclusion	57
 CHAPTER 4: Conducting a Mediated Modeling Process	 59
Step 1: Preparation	60
Step 2: Workshops	69
Step 3: Follow-up and Tutorial	95
Project Length	96
Conclusion	97
 CHAPTER 5: Decision Support for Watershed Management in the Upper Fox River Basin, Wisconsin, U.S.A.	 99
Stakeholders	102
The Upper Fox Modeling Process	103
Practicing Model Presentation	130
Follow-up Survey	130
What Has Happened Since 1998 in the Upper Fox GMU?	132
<i>Discussion Questions</i>	134
 CHAPTER 6: Using Mediated Modeling to Facilitate Collaborative Learning Among Residents of the San Antonio Watershed, Texas, U.S.A.	 136
Socioenvironmental Complexity in the San Antonio River Basin	137
Collaborative Learning	143
Modeling Approaches	145
Mediated Modeling as a Learning Tool	147
Lessons Learned	162
<i>Discussion Questions</i>	163
 CHAPTER 7: Future Planning: Banff National Park	 164
Banff National Park	165
The Banff-Bow Valley Study	168

The Modeling Process	169
The Resulting Model	172
Results	177
Conclusion	185
<i>Discussion Questions</i>	186
 CHAPTER 8: Sage Grouse Populations in Southeastern Idaho, U.S.A.: Effect of Sheep Grazing and Fire	 187
Modeling Process	190
The Resulting Model	193
Conclusion	203
<i>Discussion Questions</i>	204
 CHAPTER 9: Decision Support in Coastal Zone Management in the Ria Formosa, Portugal	 205
The Key Issues	207
How the Mediated Modeling Process in the Ria Formosa Got Started	208
The Ria Formosa Modeling Process	210
Recommendations	226
<i>Discussion Questions</i>	229
 CHAPTER 10: Lessons Learned	 230
Strengths and Weaknesses of the Mediated Modeling Processes	232
How Does Mediated Modeling Help to Resolve Conflicts?	235
The Down Side of Mediated Modeling	237
Improvements to the Mediated Modeling Process	240
Contributions of Mediated Modeling	241
Conclusion	244
 APPENDIX 1: Comparison of the Case Studies	 245
APPENDIX 2: Contact Information; System Dynamics Modeling Software	267
APPENDIX 3: Ranked Participant Statements from the Upper Fox "After" Questionnaire	 268

APPENDIX 4: Full Answers to the Upper Fox “After” Survey	270
APPENDIX 5: Participant Rating of Upper Fox Model Parameters	274
APPENDIX 6: The Ria Formosa Model: Structure and Equations	276
APPENDIX 7: Participant Rating of Ria Formosa Model Parameters	293
APPENDIX 8: Assumptions for Banff-Bow Valley Futures Model Indicators	295
APPENDIX 9: Symbol Definition and Mathematical Algorithms for All Model Components in the Banff-Bow Valley Study Futures Model	302
APPENDIX 10: An Example to Illustrate the Software	316
APPENDIX 11: R-squared Template	319
References	320
About the Author	331
Contributors	332
Index	333