Index

ABS data 94, 95, 175
access rights and allocations 39–42, 45
acid sulphate soils 149
Adamson, D. 93
adaptation 110–11, 116–18, 148–9
see also investment as adaptation response
adaptive capacity 183, 188
adaptive management 31, 207
adjustment costs 163
agricultural production see gross value
algae bloom 22, 207
Alston, M. 170, 174
amenities 147, 148
amenity migrants 147–8
Antle, J.M. 114
AusRegion model 67, 74, 76, 78, 80, 207
Australian Bureau of Agricultural and
Resource Economics-Bureau of
Rural Sciences (ABARE-BRS)
(now ABARES) 92, 95, 97, 175,
207, 209
general equilibrium model 207
regional impacts 63, 68, 79
social change and resilience 182, 183,
184
Australian Bureau of Statistics (ABS)
207
Australian Competition and Consumer
Commission (ACCC) 23, 24,
207–208
avoiding (averting) or defensive cost
approaches 148–9
Baldwin, C. 173, 188
Barlow, M. 31
barriers to exit (and entry) 23–4
Basin Plan 1, 12, 26, 27, 69, 80, 82, 208
benefit maximisation from water
resource management 136
investment as adaptation response 101
social change and resilience 173, 182
see also Guide to the Proposed Basin
Plan; regional impacts
Bayesian learning 85, 208–209
benefit transfer 149–50
benefit–cost analysis (BCA) 56, 59, 161,
168
benefit maximisation from water
resource management 136, 149,
150, 151, 152, 153
environmental impacts 165, 166–7
investment as adaptation response 120
social 139–40, 151–2, 162, 164, 233
benefits see maximising benefits
Bennett, J. 144
bias 144
bilateral migratory bird agreements 17
biodiversity 209
biophysical information/models 152,
165
Bjornlund, H. 180
Black, A. 14–15
blue-green algae 149
Brander, L. 141
Brennan, D. 40–41
built/institutional capital 140, 151, 152
Burke, T. 49
‘business as usual’ scenario 68–9
buybacks 25, 32, 37, 42, 52, 209, 210
calibration of models 209
Canada 185–6
cap on diversions 22, 51, 92, 101, 209,
214
long-term cap equivalent (LTCE) 42,
217
capacity sharing 209
carry-over water 41–2, 44, 209
Water policy reform

catchment 209
board 133
cereals sector 69, 72, 73
Chaffey Brothers’ developments 14
Chambers, R. 83, 93, 96, 106
choice modelling methods 142–3, 144, 145
Ciriacy-Wantrup, S. 166
Clarke, H. 9–10
climate change 25, 51, 93, 96, 177, 210
investment as adaptation response 104, 105–106, 107, 122
CoAG reforms 38
Coalition 26, 210, 219
collective decision-making 160–61, 167–8
Commonwealth Environmental Water
Holder (CEWH) 32, 46, 65, 131–2, 195
Commonwealth Scientific and
Industrial Research Organisation
(CSIRO) 210
Sustainable Yields Project 67, 211
Water Resource Observation
Network database 92
community infrastructure 186, 195
community involvement 182
community networks 186
computable general equilibrium (CGE)
see AusRegion model
conflict 50, 159–60, 167–8
Connell, D. 13
Connor, J. 133
construction and services industry
shocks 67, 74
consumptive use 210
contingent valuation 142, 146
contraction phase 13, 22–31, 205–206
barriers to exit (and entry) 23–4
partial solutions 30
perturbations 24
precautionary principle inversion 29–30
punctuated evolution 22–3
reform flaws 24–5
conveyance water 210
Coombs, H.C. 14
cost-based approaches 148–9
cotton sector 16, 69, 72–4, 79–80, 95, 102, 175, 180
Council of Australian Governments 51, 55, 211
Crase, L. 12, 38–9
crisis phase 50–51
cultural and amenity functions of
ecosystem 138
current diversions limits (CDLs) 92, 94, 211
dairy sector 15, 19, 69, 72–4, 95, 178, 180
dam managers 39–40
damage cost methods 148–9
dams 17
Davidson, B.R. 9, 16
delivery water 211
Department of the Environment,
Water, Heritage and the Arts 210
deregulation 19
Desvouges, W. 164
diminishing marginal productivity 105, 111
discount rates 144–5
diversion 211–12
long-term annual diversion limit 217
diversity 113–14, 115–16, 184, 186
drip irrigation 103, 110
drought 11, 22, 50–51, 92–5, 97
investment as adaptation response 103–104, 107, 113
refuge 212
social change and resilience 174, 175, 177
dryland farming 16, 180, 212
DSEWPaC 65, 68–9
Dudley, N. 45
Dyack, B. 146
ecological dynamics 139
ecological theory of adaptation 111
ecological values 212
ecologically sustainable development 212
economic impacts 162, 181–3, 211, 216
economic system 174–5
economic theory of optimisation 111
economic variables 147
ecosystem 212
services 138–9, 212
education levels 175
Index

<table>
<thead>
<tr>
<th>Term</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>empirical (definition)</td>
<td>212</td>
</tr>
<tr>
<td>employment factors</td>
<td>65, 67, 76–8, 80, 147, 174, 181–2</td>
</tr>
<tr>
<td>see also unemployment</td>
<td></td>
</tr>
<tr>
<td>end-of-valley targets</td>
<td>212</td>
</tr>
<tr>
<td>endowment of firms</td>
<td>112–13</td>
</tr>
<tr>
<td>engineering capital</td>
<td>137–8</td>
</tr>
<tr>
<td>entitlement see water access entitlement</td>
<td></td>
</tr>
<tr>
<td>environmental assets</td>
<td>213, 216</td>
</tr>
<tr>
<td>environmental goals</td>
<td>117</td>
</tr>
<tr>
<td>environmental impacts</td>
<td>165–7</td>
</tr>
<tr>
<td>environmental outcome</td>
<td>213</td>
</tr>
<tr>
<td>environmental problems, recognition of</td>
<td>21–2</td>
</tr>
<tr>
<td>environmental quality indices</td>
<td>152</td>
</tr>
<tr>
<td>environmental water</td>
<td>29, 32, 66, 213, 215, 220</td>
</tr>
<tr>
<td>environmental water management</td>
<td></td>
</tr>
<tr>
<td>improvement options</td>
<td>42–3, 129–35</td>
</tr>
<tr>
<td>entitlement-based regime</td>
<td>130–32</td>
</tr>
<tr>
<td>institutional form</td>
<td>133–4</td>
</tr>
<tr>
<td>subsidiarity</td>
<td>132–3</td>
</tr>
<tr>
<td>Environmental Watering Plan</td>
<td>27, 30, 213</td>
</tr>
<tr>
<td>equity issues</td>
<td>160, 167</td>
</tr>
<tr>
<td>Europe</td>
<td>132</td>
</tr>
<tr>
<td>evaporation</td>
<td>213</td>
</tr>
<tr>
<td>expansion phase</td>
<td>12, 15–18, 20, 50, 204–205</td>
</tr>
<tr>
<td>expected utility</td>
<td>106, 107, 213</td>
</tr>
<tr>
<td>expected value of underlying assets</td>
<td>108</td>
</tr>
<tr>
<td>expenditure-based methods</td>
<td>149</td>
</tr>
<tr>
<td>exploration phase</td>
<td>12, 13–15, 204</td>
</tr>
<tr>
<td>external costs</td>
<td>15</td>
</tr>
<tr>
<td>extracted water</td>
<td>213</td>
</tr>
<tr>
<td>family composition changes</td>
<td>175</td>
</tr>
<tr>
<td>financial structure</td>
<td>112–14</td>
</tr>
<tr>
<td>fixed annual charges</td>
<td>14</td>
</tr>
<tr>
<td>flexibility</td>
<td>114, 122, 131, 196</td>
</tr>
<tr>
<td>flood</td>
<td>11, 16, 149</td>
</tr>
<tr>
<td>environmental water management options</td>
<td>129</td>
</tr>
<tr>
<td>irrigation</td>
<td>103</td>
</tr>
<tr>
<td>floodplain</td>
<td>214</td>
</tr>
<tr>
<td>flow:</td>
<td></td>
</tr>
<tr>
<td>-on effects</td>
<td>66</td>
</tr>
<tr>
<td>end-of-system</td>
<td>30</td>
</tr>
<tr>
<td>environmental</td>
<td>213</td>
</tr>
<tr>
<td>event</td>
<td>214</td>
</tr>
<tr>
<td>high</td>
<td>43, 44, 215</td>
</tr>
<tr>
<td>inflow</td>
<td>45, 92, 93, 209, 216</td>
</tr>
<tr>
<td>low</td>
<td>22, 42, 217</td>
</tr>
<tr>
<td>mean annual</td>
<td>217</td>
</tr>
<tr>
<td>minimum flow requirement</td>
<td>196</td>
</tr>
<tr>
<td>natural</td>
<td>219</td>
</tr>
<tr>
<td>outflow</td>
<td>45</td>
</tr>
<tr>
<td>overbank</td>
<td>43, 44, 220</td>
</tr>
<tr>
<td>overland</td>
<td>17, 220</td>
</tr>
<tr>
<td>regimes</td>
<td>149, 214</td>
</tr>
<tr>
<td>regulated</td>
<td>221</td>
</tr>
<tr>
<td>streamflow</td>
<td>57</td>
</tr>
<tr>
<td>variability</td>
<td>196, 197, 214</td>
</tr>
<tr>
<td>Food Bowl Modernization Project</td>
<td></td>
</tr>
<tr>
<td>(Victoria)</td>
<td>56–7, 214</td>
</tr>
<tr>
<td>forestry plantation</td>
<td>214</td>
</tr>
<tr>
<td>Foster, A.</td>
<td>177</td>
</tr>
<tr>
<td>four per cent rule</td>
<td>23–4</td>
</tr>
<tr>
<td>Franke, G.</td>
<td>104, 113</td>
</tr>
<tr>
<td>Freebairn, J.</td>
<td>41</td>
</tr>
<tr>
<td>Frontier Economics</td>
<td>175</td>
</tr>
<tr>
<td>fruit and nuts sector</td>
<td>14–16, 19, 69, 73, 102, 115</td>
</tr>
<tr>
<td>GAMS 97</td>
<td></td>
</tr>
<tr>
<td>with Conopt Solver</td>
<td>91</td>
</tr>
<tr>
<td>Gawne, B.</td>
<td>38–9</td>
</tr>
<tr>
<td>gender factors</td>
<td>175, 177, 184</td>
</tr>
<tr>
<td>geographical factors and valuing the environment</td>
<td>143–4</td>
</tr>
<tr>
<td>gigalitre (GL)</td>
<td>214</td>
</tr>
<tr>
<td>Gillard, J.</td>
<td>54, 56, 58</td>
</tr>
<tr>
<td>glossary</td>
<td>207–27</td>
</tr>
<tr>
<td>Gooch, M.</td>
<td>185</td>
</tr>
<tr>
<td>Goesch, T. X.</td>
<td>3, 45, 63, 107</td>
</tr>
<tr>
<td>Gooday, P. xi.</td>
<td>3, 63</td>
</tr>
<tr>
<td>Gordon, G.</td>
<td>14–15</td>
</tr>
<tr>
<td>gradualism</td>
<td>19–20, 32</td>
</tr>
<tr>
<td>Grand Victorian North-West Canal Company</td>
<td>13</td>
</tr>
<tr>
<td>Grant, S.</td>
<td>85</td>
</tr>
<tr>
<td>gravity fed systems</td>
<td>103</td>
</tr>
<tr>
<td>gross regional product (GRP)</td>
<td>65, 67, 74–6, 77, 214</td>
</tr>
<tr>
<td>gross value of agricultural production (GVAP)</td>
<td>66, 69, 71, 174, 214</td>
</tr>
<tr>
<td>gross value of irrigated agricultural production (GVIAP)</td>
<td>66, 68–9, 71–5, 78–9, 174, 215</td>
</tr>
</tbody>
</table>
groundwater 57, 65, 68–70, 96, 139, 215, 226
Guide to the Proposed Basin Plan 1, 11–12, 18, 37, 49–59, 82, 193, 215
environmental water management options 130–31, 133
history 50–53
infrastructure 56–9
market repurchase from willing sellers 54–6
social change and resilience 170, 172–3, 183, 188
variability and uncertainty 83, 88, 90–91, 97
Ha (hectares) 215
Habitat 215
Hamstead, M. 170–71
Hassall, R.H. 177–8, 180–81, 183–6
Hatton MacDonald, D. 143
hay sector 69, 72, 73, 74
Hayami, Y. 114
hedonic property price approach 146–8, 152
Henry, K. 52
Herreria, E. 184
Hogendyk, G. 30
horticulture sector 16, 18–19, 73, 95, 103, 107, 180
household consumption shocks 67, 74
Howard, J.L. 146
Howard, J. 51–2, 53, 58, 219
Hughes, N. 45
human capital 137–8, 140, 184, 215
hydrologic indicator sites 28, 215
hydrological analyses 82
hydrology 216
Icon Sites 144, 208, 210, 211, 216
income indicators 147, 148
inflows 45, 92, 93, 209, 216
influence analysis methodology 177
information value 119–20, 168
infrastructure:
  community 186, 195
  improvements 56–7
  investment 24, 54, 57, 58, 65
  programs 66
  types 58–9
  innovation 114, 131, 186
institutional capital 137–8, 151
institutional form 133–4
institutional reform 18–19
Intergovernmental Agreement on Murray–Darling Basin Reform 216
international agreements 17–18
investment as adaptation response to water scarcity 101–22
adaptation 110–17
  background risk 111–12
  efficient 117–19
  financial structure 112–14
  markets, role of 114–16
  public policies 116–17
  firms’ response to risk 104–106
  irrigation investment under uncertainty 109–10
  public policy role 119
  real options analysis 107–109
  research and development investment 119–21
  state-contingent analysis 106–107
  irreversibility of ecosystem damage 151
irrigated agriculture 64, 180
  see also gross value
irrigation 12, 14, 15, 16, 17, 18
  infrastructure investments 18, 23, 25–6, 32, 59, 109–10, 194, 216
Jansen, M.J.W. 88
Johnson, F. 164
Keogh, M. 37
Kerin, J. 22
keystone processes 139
Kingwell, R.S. 25, 88, 108
Knight, F.H. 84–5, 105, 106
  knowledge, skills and learning 119–20, 168, 185
Koller, G.R. 88
Kuehne, G. 180
Kulig, J.C. 185
kurtosis 120
Labor Party 26, 54, 58, 208, 219
land use 68–9
leakage and seepage 57
Leslie, J. 22, 30
Index

Living Murray program 22–3, 29, 41, 42, 177, 216
see also Icon Sites
locks 13, 217
long-term annual diversion limit 217
McColl, J. 96
Malcolm, B. 88, 108
Mallawaarachchi, T. ix, xi, 3, 82, 84, 91, 93, 96, 101, 103–104, 107, 109, 114, 120, 177
maps 200–203
marginal utility of wealth 106
market price of water 109
market repurchase from willing sellers 54–6
markets, role of 114–16
Marsden Jacob Associates 32, 180–81, 182, 183, 184–5, 188
Mason, R. 170
maturity phase 12, 18–22, 50–51, 205
maximising benefits 136–53
benefits transfer 149–50
cost-based approaches 148–9
engineering, human/institutional and natural capital 137–8
environmental benefits as ecosystem services 138–9
prospects for better assessment and use 151–3
revealed preferences 145–8
social benefit–cost analysis with complex ecosystem services 139–40
stated preferences 142–5
meat cattle sector 69, 73
median 217
meta-analysis 150
Microsoft Excel Risk Solver 91, 97
mitigating expenditure costs 148–9, 152
mitigating policies 63–4, 67, 71–2, 74, 76, 194, 218
investment as adaptation response 111, 112, 116, 121–2
ML (megalitre) 218
model definition 88
model design 96
model specification 88
modeller subjectivity 97
modelling 218
Monte Carlo analysis 87, 88
Morrison, M. 143
multiple year payments 144–5
Murray–Darling Basin Agreement 51, 193, 222
Murray–Darling Basin Authority (MDBA) 1, 32, 55–6, 65, 68, 92, 218
Assessing Environmental Water Requirements 28, 30
environmental impacts 165
environmental water management options 134
social change and resilience 172, 181–2
Murray–Darling Basin Commission (MDBC) 193, 218
Floodplain Wetland Management Strategy 21, 22
see also Murray–Darling Basin Authority
Murray–Darling Basin (definition) 218
Murray–Darling Basin Reform Intergovernmental Agreement 65
Musgrave, W.F. 12–13, 15, 18, 45
Nancarrow, B. 173, 188
National Action Plan for Salinity and Water Quality 219
National Competition Policy 134
see also Water for the Future program
National Water Commission 51, 58, 219
National Water Plan 54
natural capital 137–8, 140, 151, 152
natural resource management 219
neoclassical theory 105
net present value (NPV) 103, 108
New South Wales 13, 20–21, 23, 24, 30, 217
benefit maximisation from water resource management 144
environmental water management options 131
general security water entitlements 214
high security water entitlement 215
long-term cap equivalent 217
regional impacts 69, 74, 76, 77, 79
Sustainable Yields Projects 211
Water Management Act (2000) 207, 226
water markets, property rights and environmental water reserves management 40, 41–2, 44
water sharing plan 226
Newall 29
non-market environmental valuation techniques 164, 166
non-use values 142–3
one-off payments 144–5
opportunity cost 40, 103–104, 115, 162, 163–4, 197, 220
option pricing models 114
outflows 45
over-allocation 22, 37, 52, 220
over-extraction 220
Pannell, D.J. 88, 108, 198
parameter uncertainty 97
path dependency 10, 196, 220
payment timing 144–5
Pearce, D.W. 153
people–place connections 185
permanent trade see water access entitlement trade
population factors 143–4, 147, 148, 173–4, 175
Portney, P. 164
potable water 220
precautionary principle 196, 220
inversion 29–30
product processing enterprises 181
production shocks 67, 74
Productivity Commission 26, 37, 221
property rights 13, 19, 50, 159–60, 167, 194
protectionism 15, 19
provisioning function of ecosystem 138
public policies 116–17, 119
punctuated evolution 22–3
Queensland 45, 69, 76, 77, 185–6, 211
Quiggin, J. 20, 41, 50, 51, 83, 85, 93, 96, 106
rainfall rejections 17, 221
rainfall variability 13, 15, 16
Ramsar Convention 17, 221
Ramsar sites 29, 208, 210, 211
Randall, A. 18, 50
Rasmussen, S. 107
real options analysis 102–103, 104, 107–109, 114, 121, 221
recreation and tourism sector 38–9, 145, 178, 181
see also amenities
reform flaws 24–5
regional entitlement 133
regional growth models 146–8, 152
regional impacts of Basin Plan and Water for the Future program 63–80
area involved 64–5
Basin level impacts on irrigated agriculture 71–3
Basin Plan 65
broader effects on regional economies 74
data and assumptions 68–70
employment 76–8
gross regional product (GRP) 74–6
local level impacts 78–9
modelling 66–7
regional level impacts on irrigated agriculture 73–4
scenarios 68
Water for the Future (WftF) plan 65–6
regional trust 133–4
regulated (definition) 221
regulated water sources 39
regulating function of ecosystem 138
regulation (definition) 221
regulatory bodies 20
Reid, J.D. 88
reliability 40, 197, 215, 217
‘rents’ 160–61
replacement costs 148–9
research and development (R&D) 16, 117, 119–21, 196, 221
residual error 97
resilience 104–105, 114, 118, 122, 195–6, 197
see also water allocation, social change and resilience
Index

resource allocation 161
resource endowments 113
resource use 160
restoration cost method 148
Restoring the Balance (RtB) program 52–3, 64, 65, 69–70, 221
revealed preferences technique 145–8, 153, 166
rice sector 16, 19, 69, 72–4, 79–80, 95, 102
social change and resilience 175, 178, 180
risk 84–5, 104, 109, 113, 116–17
and adaptive behaviour 111–12
allocation 221–2
aversion 40–41, 112, 113–14
background 113
business 116–17
financial 116
firms’ response to 104–106
labour income 113
long-term high 101
management strategies 108
market 105, 114–15
output variability 106
production 114–15
-seeking 113–14
-sharing principles 54–5
short-term low 101
technological 105
Risk and Sustainable Management
Group water allocation model 222
river health 222
River Murray Commission see Murray–Darling Basin Authority
River Murray Waters Agreement see Murray–Darling Basin Agreement
river red gums 14, 28, 29, 139, 208, 222
riverboat trade 13
Rolf, J. 146
Rose, R. 18
Rosenberg, N. 110
Ross, H. 177, 185
RSMG model adaptation 84, 91–7
limitations 95–6
modelling uncertainty 96–7
water resource allocations changes
modelling 94–5
water resource variability modelling
93–4

Rudd, K. 52
rules-based (deontic) approach to
decision making 165
rules-based water 130
runoff 222
Ruttan, V.W. 114
Safe Minimum Standard (SMS) approach 165–6
salinity 18, 22, 96, 139, 208, 222, 223
regulation services 149
salt interception schemes 223
scarcity 14, 17
Schrobbback, P 96
seasonal allocations 21, 223
seasonal water 209
seasonality 42–3, 45
sedimentation 223
self-insurance 111
self-protection 111–12, 116, 121–2
self-reliance 121
sensitivity analysis 89, 97, 168
sheep sector 69, 73
site selection 152
skewness 120
social capital 186
social change see water allocation,
social change and resilience
social-ecological systems/perspectives
171–2, 177–8
social goals 117
social impacts 161–4
assessments 197
projected 181–3
social infrastructure 58, 195
social utility function 119
social variables 147
social welfare 138
socio-economic advantage and
disadvantage index 176
socio-economic analyses 82
socio-economic impacts 170–71
socio-economic issues 32
socio-economic profile and trends 171,
173–7
South Australia 11, 13, 20, 22–4, 29, 41,
50
benefit maximisation from water
resource management 144, 146
environmental water management options 131
high security water entitlement 215
long-term cap equivalent 217
Murray River improvement levy 145
regional impacts 69, 76
Sustainable Yields Projects 211
spatial equilibrium model 147
specialisation 115
spilla ble water account 41
stated preference technique 166
State Priority Projects 65
state-contingent analysis 83–4, 93–4, 96–7, 104, 106–107, 113–14, 121, 223
stated preferences 142–5, 152–3, 164
Stern report 145
stochastic production function 93
stock and domestic right 223
storage 15, 17, 18, 219
capacity (capacity sharing) 45, 209
streamflows 57
structural adjustment 115, 116, 182
structural water reform 194
subsidia rity 132–3, 224
subsidy programs 117
substitute cost method 148
sunk costs 10–11, 28, 29–30, 224
surface runoff 220
surface water 65, 68, 96, 224, 226, 679
survey-based methods 142–5
sustainable diversion limit (SDL) 24, 27, 30, 46, 52, 64, 194–6, 209, 224
Basin level impacts on irrigated agriculture 71–3
Basin Plan 65
benefit maximisation from water resource management 136
employment effects 77
environmental impacts 165
environmental water management options 130–31, 132, 133, 134
gross value of irrigated agricultural production 75–6
local level impacts 78
long-term average sustainable 217
and mitigating policies scenario 68–75, 77–8
modelling process 67
regional level impacts on irrigated agriculture 74
social change and resilience 170, 181
trade-offs 168
variability and uncertainty 92, 94
Water for the Future program 66
Sustainable Rural Water Use and Infrastructure Program (SRWUIP) 64, 65, 70, 195, 224
Syme, G. 173, 188
Tapsuwan, S. 147
Taylor, M. 1, 53
technical change 16–17
temporary water markets 26, 38, 40–41, 44
threshold 139
timeline of water resource planning and policy 204–206
total economic value (TEV) 136, 141, 224
tourism see recreation and tourism sector
trade-offs 159–69
environmental impacts 165–7
social impacts 161–4
tradeable water rights 51
transaction costs 163, 224
transformation rules 23
transitional arrangements 182
transparency 161
travel cost 145–6, 151
treatment and damage costs 152
Turnbull, M. 23, 58
two per cent rule 23
unbundling 23–4, 224
uncertainty 80, 104, 119, 121, 122, 196
adaptation 111–12, 113, 114, 116–17, 118
firms’ response to risk 104–105
and irrigation investment 109–10
parameter 97
R&D investment 120
real options analysis 107–109
state-contingent analysis 106–107
Type A and Type B 87
see also variability and uncertainty
unemployment 162–4, 170–71
United States 150
Index

unregulated (definition) 225
unregulated water sources 39
UQ Water Policy Workshop 193

Valikangas, L. 104
valuing the environment:
non-respondents 143
variability 42, 44, 45, 80
see also variability and uncertainty
variability and uncertainty 82–97
policy impact analysis of water allocations 90–91
risk 84–5
sources of variability 86–7
state-contingent analysis 83–4
uncertainty assessments for policy 90
uncertainty in economic models 87–90
model design 88
modeller subjectivity 89
parameter uncertainty 88–90
residual error 89–90
see also RSMG model adaptation

variance 120
of expected value 108
vegetables sector 69, 73, 103
Victoria 13, 14–15, 20, 21, 24, 56–7
Dartmouth storage site 50
environmental water management options 131
Food Bowl Modernization Project 56–7, 214
high reliability water share 215
long-term cap equivalent 217
National Party 23–4
regional impacts of Basin Plan and Water for the Future program 63, 69, 72–3, 74, 76, 77, 79
social change and resilience 180
Sustainable Yields Projects 211
water markets, property rights and environmental water reserves management 40, 41–2
vulnerability 183

water access entitlement 32, 33, 46, 130–32, 194, 212, 225
contraction phase 23
‘dozing’ (partially used) 21–2
environmental water management options 129–30
general security 40, 41, 112–13, 131, 214
Guide to the Proposed Plan, failure of 53–4, 58, 59
high security 40, 41, 112–13, 215
investment as adaptation response 110
low security 40, 131
maturity phase 19, 21
portfolio 131, 132, 134, 195, 196
purchasing program 65
regional impacts 66, 76
‘sleeping’ (unused) 21–2
Water Act (2007) 1, 49, 65, 193, 196, 225
Australian Competition and Consumer Commission 208
contraction phase 27, 29, 30
environmental water management options 130–31, 132, 134
expansion phase 17–18
Guide to the Proposed Plan, failure of 49, 52, 53, 58
social change and resilience 181, 182
water allocation 32, 40, 55, 90–91, 104, 107, 207, 225
see also over-allocation; RSMG;
water allocation, social change and resilience
water allocation, social change and resilience 170–89
building social resilience 183–7
Guide proposals and projected social and economic impacts 181–3
implementation of framework 178–81
social-ecological system effects 177–8
socio-economic profile and trends 173–7
Water Charge (Termination Fees) Rules (2009) 208
water entitlement see water access entitlement
Water for the Future program (WfF) 194, 195, 225
Guide to the Proposed Plan, failure of 49, 51–2
regional impacts 64, 65–6, 68, 69–70, 71–2, 77, 78, 79
Water policy reform

Water Market Rules (2009) 208
water markets, property rights and management of environmental water reserves 37–47, 225
access rights and allocations 39–42
environmental water managers 42–3
water rights, dam management and environmental water management 43–5
water purchase program 66
water quality 22, 225
process modelling 152
water recovery 226
water resource 208, 226
allocation 94–5, 226
planning 182
variability modelling 93–4
water rights 38, 45, 46
water savings 226
water sharing plan 226
Water Smart Australia program 65–6
water trade 18, 19–20, 21, 23, 38, 182, 226
Water Trade Model (WTM) 66–7, 71–2, 73, 74, 79, 80, 226
water use 68–9, 71
water utility experts 152
Watson, W. 18
weirs 13, 14, 226
wetlands 18, 21, 44, 227
White Paper 2004 (Victoria) 23, 227
willingness to pay (WTP) 112, 142–4, 147–8, 152, 164, 166–7
Windsor, T. 27
wine grape sector 14, 15, 16, 26, 102, 115, 178, 180–81
wool sector 16
Young, M. 32, 96, 133