

## *Index*

- adaptive management 16
- agriculture 235, 236
- Akaike information criterion (AIC) 143
- Alaska 165
- algorithm 3, 111, 113, 121
  - use in area network selection 124
  - area minimization problem 124, 125, 126
  - heuristic 126
  - heuristic algorithms 126
  - mathematical programming 126, 130
  - meta-heuristic algorithms 126;
  - simulated annealing 127, 210
  - optimal algorithms 126
  - optimization 124, 178
  - representation maximization problem 124, 125, 126
- Amazon 123, 237
- amphibians 215
- Analytical Hierarchy Process (AHP) 180, 182, 183
  - modified Analytical Hierarchy Process (mAHP) 180, 184, 187, 188, 189, 195
- multi-attribute theory (MAVT) 182, 184, 188
- multi-attribute utility theory (MAUT) 182, 184
  - normalization formula 183
- Angola 189
- ANUCLIM 83
- ANUDEM 55
- Asclepias* sp. 44
- assemblages 32, 60, 81, 197, 199, 205 (*and see species assemblage under surrogates*)
- species composition 199
- Australia 21, 42, 52, 92, 115, 137, 197
- Australian Bureau of Meteorology 55
- Bacillus thuringiensis* 45
- Banksia cuneata* 157, 158, 159, 160, 161
- barren-ground caribou 143
- Bayes' rule 163, 164, 166
- Bayesian 162, 163, 164, 166, 231
  - decision analysis 167
  - decision theory 164
  - PVA 164
- beta diversity 114
- Bhutan Himalayas 21
- BIOCLIM 53, 83
- biodiversity 2, 5, 9, 77, 108, 121, 125, 129, 134, 210, 219, 229, 230, 231, 232, 238
  - conservation 169
  - features 2, 19
  - impossible to define 19, 45
  - meaning of 5, 7
  - operational concept 7
- biodiversity targets *see* targets
- biogeographic theory 14, 133
- biological diversity *see* biodiversity
- biological phenomena 7
- biological processes 132
- evolution 134
- habitat modification 134
- metapopulation dynamics 133
- source–sink population structures 134
- spatial autecological requirements 134
- successional pathways 133
- BioRap conservation planning tools 53
- bird habitat 106
- birds 43, 72, 87, 117
- boreal forest 206, 207
- Bradypterus variegatus* 101, 102
- British Isles 117
- bryophytes 31
- Bush Heritage 4
- Buteo lineatus* 149

## 266 · Index

- California 28, 45
- California Channel Islands 209, 226
- Canada 21, 44, 110, 143, 178
- Canadian Central Arctic 142
- Canis lupis* 143
- Cape Floristic Region (CFR) 82, 152, 214, 217, 226, 233
- Cape York Peninsula 74, 92
- central America 21
- climate change 2
- climate data 52
- coastal hardwood forests 63
- Coix gasteenii* 92
- Colombia 110
- common eider 165
- Commonwealth Scientific & Industrial Research Organisation (CSIRO) 54
- communal conservancies 106
- communities (ecological) 71, 81
- complementarity 2, 3, 5, 14, 17, 31, 121, 171, 205, 219
  - by inspection 197
  - precise definition 112
  - use of in area selection 112, 119, 120, 127, 129
- conservation area 105, 112
- conservation area network goals 108
  - economy 108, 111, 112, 127, 129
  - flexibility 121, 122, 130, 231
  - genericity 121, 122, 130
  - irreplaceability 121, 122, 123, 124, 130, 217, 219
  - substitutability 122
  - modularity 121, 122, 130
  - persistence 108, 129
  - representativeness and representation 108, 109, 111, 112, 129, 134, 169
  - transparency 121, 122, 130, 231
- conservation area network selection 108
  - ad hoc* area selection 4, 108, 115
  - adjacency 120
  - rarity 120, 126
  - scoring and ranking procedures 127
  - use of complementarity 112, 119, 120, 126, 127, 129
- conservation area networks 2, 8, 39, 105, 107, 114, 151
  - alignment 13, 15
  - connectivity 13, 15, 170, 178
  - dispersion 13, 15, 170
  - distance to next conservation area 185
  - distance to transformed land 187
  - ecological criteria 15
  - gaps in 14
  - number of areas 185
  - replication 13, 15
  - representative sample and representation 107, 178
  - role of 105, 107, 129
  - spatial design criteria 170
  - shape 13, 15, 170
  - size and area 13, 15, 170, 178, 185, 187
- conservation biology 1, 2, 238
- conservation goals 2, 13, 131
- Conservation International 225, 228, 229, 232
- conservation NGOs 4
- conservation planning 2, 47, 81, 125, 134, 194, 216, 225
  - conservation refugees 9
  - Convention on Biodiversity 230
  - corridors 133, 138
  - cost trade-offs 14
    - analysis 12, 16
  - C-Plan 217
  - Crocuta crocuta* 155
  - cultural 210, 230, 232
- Danaus plexippus* 7, 44
- databases 47, 76
  - areas 47
    - catchments 47
    - grid cells 47
    - habitat remnants 47
    - tenure parcels 47
  - features 47
    - assemblages 47
    - characters 47
    - environmental classes 47
    - species 47
- data collection 12, 47, 50, 131, 227
  - environmental stratification 12
- data sets 50
- data sources 51
  - herbariums 51
  - management agencies 51
    - agriculture 52
    - conservation 52
    - forestry 52
    - museums 51
    - water resource 52
  - new surveys 51

- data treatment for ecological modelling 12, 79, 227
- heuristic models 90
  - BIOCLIM 90, 91, 92, 93, 103
  - DOMAIN 91, 123
  - HABITAT 91, 93
- pattern analysis 80, 83
  - environmental domains 83
  - partial test 90
  - species assemblages 87; two-step method 89; UPGMA 90
- regression models 93
  - Generalized Linear Modeling (GLM) 93, 103
  - Generalized Additive Modeling (GAM) 93, 103
- machine-learning methods 100, 103
  - genetic algorithms 61, 100
  - heuristic models 61
  - maximum entropy techniques 61, 100;
    - Maxent 100
    - neural networks 61, 100
    - over-prediction 103
- decision analysis 150
  - formal decision analysis 162
  - heuristic rules 150
  - quantitative decision analysis 151
    - subjective assessments 150
- decision making 227, 230
- decision support 4, 227, 233
- demographic stochasticity 155, 157
- development 236
- digital elevation models (DEMs) 52, 77
- dispersal 133
- distribution patterns 81
- ecological processes 13, 19, 44
- economic costs 178
- economic losses 170
- economic viability 210
- economically 108
- ecosystem 6, 19
- Ecuador 184
- England 110
- Environmental Diversity (ED) 34
- environmental space 81
- environmental stochasticity 157, 165
- Etosha National Park 189
- Eucalyptus* 63, 71, 181
- Eucalyptus pauciflora* 58
- Eucalyptus radiata* 93, 95, 98, 99
- Eucalyptus regnans* 137
- evolutionary 6
- extinction 1, 2, 136, 137
  - mass extinctions 1
- fish 215
- fisheries 210
- Generalised Dissimilarity Modeling (GDM) 41, 42, 76
- genes 19
- geographic information systems (GIS) 211
- Global Environment Facility (GEF) 53, 123
- governance 232
- Great Barrier Reef Marine Park 105
- grizzly bears 143
- Gulo gulo* 143
- Guyana 123
- Gymnobelideus laebeateri* 137, 140
- habitat viability analysis 141, 142
  - habitat-based population viability analysis 142
  - resource selection functions (RSF) 142, 143, 148, 149
- Hemming distance 26
- hotspots 121
- human population density 219
- human values 1
- humanities 234, 238
- Hyaena brunnea* 152, 155
- Hyena
  - brown 155
  - spotted 155
- implementation 132, 227, 235
- India 107, 109, 169
- institutions 229, 232, 235
- invertebrates 33
- IUCN 110, 205, 208
- Jaccard index 26
- karst 71
- Keoladeo National Park 106, 169
- Koala 48
- Kruger National Park 105
- land tenure 107, 123
- land use change 19
- land use intensity 222

## 268 · Index

- landscapes 228, 233, 234, 235, 237
- Latin America 43
- Leadbeater's possum 137
- lion 155
- lithological substrate 82
- Lorentz World Heritage Area 107
- Macleay valley wetlands 105, 113, 115
- mammals 72, 155, 217
  - small mammals 87
- management 5, 9, 233, 238
- maps
  - raster 52
  - vector 52
- market-based instruments 5
- Marxan 211
- Melanesia 225
- metapopulation 137, 140
- Mexico 44, 45, 110
- Microtus minutus* 101, 102
- minimum viable population (MVP) 135, 136, 143
- monarch butterflies 7, 44
- monitor 16
- multi-criteria analysis (MCA) 12, 15, 170, 172, 173, 175, 176, 194, 230
  - iterative stage procedures or protocols 171
    - alternative 171
    - MultCSync 179, 187, 189
  - non-dominated sets or alternatives (NDS) 172, 175, 176, 178, 179, 180, 185, 195
  - terminal stage procedures or protocols 171, 178, 214
  - valuation framework 172
    - ad hoc* assumptions 175
    - commensurable 172
    - compatible criteria 172
    - incompatible criteria 172
    - measurability 175
    - socio-political criteria 175
  - multiple criteria 169, 185, 230
- Namibia 106, 189
- national parks 105
- natural resource management 1, 232
- nature reserves 105
- New Guinea island 107
- New South Wales 31, 33, 48, 63, 93, 113, 115, 127, 129
- niche 81
- non-government organizations (NGOs) 9, 238
- northern goshawk 143
- Norway 107
- Nova Scotia 178
- Nullarbor region 71, 87, 197, 226
- Nyea Nyea communal conservancy 106
- opportunity costs 14, 181
- Panthera leo* 155
- Papua New Guinea (PNG) 83, 222, 226
  - biodiversity wealth 53
  - conservation plan 219
  - database for conservation planning 53
    - climate surfaces 55; digital elevation model 54; environmental data 54; lithology 55
  - environmental domains 219
  - rare and threatened species 219
  - surrogates 53, 55
  - vegetation types 219
- forest inventory mapping system (FIMS) 54
- opportunity costs 217, 219, 220
  - agricultural potential 220
  - timber volume 220
- resource information system (PNGRIS) 54, 85
- Papua Province, Indonesia 107
- Pareto optimal sets 176
- persistence 15, 105, 129, 131, 132, 151, 166, 230
- Phascolartos cinereus* 48
- planners 16
- planning 2, 50, 105, 228, 233, 238
  - dynamic iterative process 16
- planning protocols 227
- planning tools 4, 53
- plants 32, 33, 72, 157
  - ephemeral 87
  - perennial 87
- PNG Weather Service 55
- policy 114, 227, 228, 233, 238
  - decisions 50
  - mechanisms 235
  - policy-makers 16
- polygons 52
- population viability analysis (PVA) 132, 135, 136, 137, 140, 141, 143, 147, 148
- presence-only data 48, 125, 206

## Index · 269

- presence-absence data 48, 125, 126, 206
- priority areas 2, 4, 12, 13, 14, 223
- Proteaceae 154, 215, 217
- protocols 234, 238
- Québec 34, 36, 37, 43, 118, 205, 206, 207, 226
- Queensland 34, 36, 37, 43, 75, 109
- Rangifer tarandus groenlandicus* 143
- rare species 41, 108
- rarity 120, 121
  - geographical range 120
  - habitat specificity 120
  - local population size 121
- red-shouldered hawk 149
- remotely sensed data 103
- reptiles 72, 87, 215
- reserve network selection 14
- ResNet 185, 189
- resource selection 142
- restoration 235
- richness 112, 197
- ring species 7
- risk assessment 15
- Royal National Park 108
- seascape 233
- sensitivity analysis 188, 194
  - rank order analysis 188
  - single-dimension analysis 188
- Shannon index 100
- SITES 210
- social and economic data 12
- social costs 170, 178
- social sciences 238
- socio-economic 2, 105, 113, 230, 231
- socio-political 232
- software tools 3
- Somateria fischeri* 165
- Sometaria mollissima* 165
- South Africa 152, 155, 214
- South Australia 71
- south-eastern Australia 181
- spatial models 80
  - niche models 82
- species 19
- species at risk 118, 205, 206
- species richness 3, 79
- spectacled eider 165
- stakeholders 8, 9, 13, 15, 131
- statistical models 61
- statistics 162
- Strix occidentalis caurina* 140
- surrogacy assessment 22
  - marginal representation contribution 25
  - marginal representation index 25
  - special congruence analysis 26
  - species accumulation curves 22
  - species accumulation index 22
  - surrogacy graphs 23, 37, 43
    - index 25
  - surrogates – traditional species-based 27
  - conspicuous species 29
  - endangered or threatened species 28
  - focal species 27, 46
  - iconic taxa 28
  - keystone species 27, 46
  - phylogenetic difference 29
  - species assemblages 32, 33
  - umbrella taxa 28, 46
- surrogates 2, 7, 9, 12, 13, 19, 20, 25, 43, 77, 111, 115, 120, 125, 132, 167, 210, 215
  - character or trait diversity 20
  - combinations of surrogates 39, 46
  - environmental classes or domains 32, 37, 219
  - environmental surrogates 34
  - estimability 20
  - estimator surrogates 8, 21, 24, 28, 29, 33, 43, 45, 229, 230
  - habitat types 1, 210
  - landscape pattern 21
  - life zone diversity 21
  - protocol for identifying 43, 44
  - quantifiability 19
  - spatial scale, and 42
  - species assemblage 21
  - species diversity 21
  - true and estimator surrogates 20
  - true surrogates 7, 21, 24, 43, 45, 131
  - vascular plants 31
- survey gap analysis 74
- surveys – biological 56
  - practical issues 62
  - records of field locations 79
  - statistical issues 61
    - computational methods 61
    - pattern analysis 61, 62
    - spatial modelling 61, 62

## 270 · Index

- surveys – biological (*cont.*)
  - survey design 56, 62, 65, 71, 72, 73, 77, 227
  - environmental stratification 52, 63, 71, 73
  - evaluating representativeness 70
  - gradsect 63, 64, 65, 68
  - sample 68
  - sampling strategy 66, 73
  - stratification 62, 72
  - survey adequacy 73
  - theoretical issues 56
  - communities 60
  - community vs continuum concepts 60
  - continuum concept 57, 60, 71
  - niche concept 57; fundamental niche 57; realised niche 57, 58
- Syrjala test 27, 37
- systematic conservation planning 2, 3, 5, 7, 8, 9, 16, 45, 166, 197, 228, 231
  - local expertise 3
  - feedback 17
  - reiteration 17
  - stages in the planning process 131
- targets 13, 111, 115, 120, 131, 152, 153, 155, 157, 158, 160, 161, 167, 216
  - for processes 156
  - edaphic interfaces 156
  - macroclimatic gradients 157
  - riverine corridors 156
  - upland–lowland gradients
  - upland–lowland interfaces 156
  - for representation 151, 162
  - usefulness 13
- Texas 4, 178
- The Nature Conservancy (TNC) 4, 228, 229
- trade-off analysis 180, 181, 195
- trade-offs curve 182
- uncertainty 227, 228, 230, 231
- United States 209
- urbanizing landscapes 236, 237
- Ursus arctos* 143
- vegetation types 83, 86, 219
- vertebrates 32, 33, 75, 155, 217
- viability analysis 135, 230
- viability problem 229
- viable populations 112, 135
- Victoria 137
- vulnerability analysis 135
- vulnerable and vulnerability 16, 105, 129, 131, 170
  - species 41
- Wales 110
- Western Australia 5, 71, 73, 235
- Western Ghats 105
- wilderness 108
- wilderness areas 105
- wolverines 143
- wolves 143
- World Bank 123
- World Wide Fund for Nature (WWF) 110, 205, 208, 225, 228
- Yellowstone National Park 108
- Zambia 110