

Index

- Abies* spp. 16
 A. amabilis 318
 A. balsamea 186, 254, 393
 A. lasiocarpa 393
 absolute sensitivity 97
 abstraction 50
Acacia spp. 133
Acer spp. 26, 260
 A. saccharum 196, 354
 A. pseudoplatanus 26
 acid rain 4
 aerial videography 317
 Africa 181
 animals 109
 birds 131
 Botswana 136
 chevrotain 109
 dung beetles 135
 elephant 20
 aggradation phase of tropical forests 194,
 197
 agouti 109
 agroecosystems 333
 Alaska, USA 40, 42
 Barrow 25
 albedo 453, 455
 allelopathy 43
 allocation patterns 198
 allometry 339
 allopatry 117
Alnus sp. 18
Alphitonia excelsa 250
 altitudinal gradient 138
 Amazonia 454
 Amazon Basin 453
 amensalism 79
 amphistomatous plants 152

 amplifiers 272
 animal
 abundance 286
 population 404
 richness 286
 annuals 52
 anthropogenetic
 CO₂ fluxes 462
 climate change 27
 APAR, *see* PAR
 Archaic Indians 24
 Arctic Circle 40
 Aristotle 45
 Arizona, USA 130
 asymptotic stability *see* stability
 Atherton Tableland, Australia 22
 atmosphere 458
 attenuators 272
 attributes, functional 301
 Austin, USA 154
 Australia 24, 66, 135, 181, 279
 Alps 391
 Atherton Tableland 22
 Brisbane 324
 Canberra 420
 marsupials 135
 rain forests 240
 Snowy Mountains 393
 Sydney 324
 Tasmania 301
 avalanche 394
 AVHRR (Advanced Very High Resolution
 Radiometer) 134, 428

 balance of nature 32
Baloghia lucida 250
 Barrow, Alaska 25

524 · Index

- Batesian mimicry 79
 BATS model 325–6, 328, 453, 455
 Beer–Lambert equation 228
 Beerling 135
Betula spp. 16, 18, 260
 B. alleghaniensis 196
 B. lutea 354
 B. papyrifera 196, 378
 B. populifolia 196
 biochemical pathways 152
 biochemical processes 431
 BIOCLIM model 136, 356
 bioclimatic models 344
 biodiversity 446, 466
 biogeocoenosis 45–8, 55
 biogeographical models 436
 biological complexity 208
 biological trade-off 269
 biomass dynamics for an idealised landscape 200
 biomass 351
 dynamics 199, 201, 253–4, 275–6
 response 363
 BIOMASS model 420
 biome
 shifts 350
 tundra 451
 types 346
 BIOME model 167–8
 BIOME II model 436, 442
 BIOME–BGC model 420, 436, 441–2
 biophysical model 420
 biostatic phase 194, 198
 biotemperature 157, 159
 biota
 diversity of 103, 451
 evolution of 55
 reserves of 449
 biotope 121
 birds
 flocking behaviour 211
 managing diversity 128
 pests 131
 riparian species 128, 130
 territorial behaviour 127
 wintering grounds 406
 boreal forest 15, 17, 378
 deforestation 45
 mammals 450
 Botswana, Africa 136
 bottlenecks 282
 box diffusion, *see* compartment modelling
 breeding territories 406
 BRIND model 234, 241–2, 363–4
 Brisbane, Australia 324
 brocket deer 109
Bromus mollis 388
brousse tigrée, *see* tiger bush
 bucket hydrology model 452

 C₄ pathway 151–2
 California thrasher 105
Calluna vulgaris 181
 Calvin Benson cycle 151, 432
 Canada
 Hudson Bay 393
 New Brunswick 379
 Newfoundland 379
 cannibalism 210
 cannibalistic interactions 212
 canopy
 gap 193
 geometry 226
 canopy process model 322, 399, 415, 425, 436
 capybara 109
 carbon 333, 459
 assimilation 433
 cycling 96, 460
 global cycle 467
 net flux 411
 source 352
 storage 371, 374, 458, 423
 carbon–nitrogen interactions 376, 418
 carboxylation 432, 434
 cardinal minimum temperatures 151, 170–1
 carrying capacity 72, 79
Carya 260
 Cascade Range, USA 317, 393
Castanea dentata 239, 270
 cattle 403
 distribution 404
 grazing 402
 CCM output 358
 cellular automata 396
 CENTURY model 333–5, 420, 423, 436, 441–2
 CH₄ (methane) 28
chablis 192, 195
 chamaephyte 161
 Changbai Mountain, China 308
 Changbaishan Biosphere Program 308
 character displacement 115, 118
 character release 119
 charcoal 23

- Chihuahuan Desert, Mexico 181
 Chile 191
 chilling 151, 170–1
 China 262, 307, 308
 chlorofluorocarbon 28
 circularity of the model tests 372
 Clements, F. E. 34, 137, 153–4
 climate 176
 adaptations to 151, 172
 change 31, 263, 360, 372, 419, 423
 change scenarios 409, 423
 change simulation 374
 characteristic cycles 53
 classifications 150
 long-term variation 10
 maps 156
 response functions 359
 scenarios 347
 spatial interactions 445
 vegetation response to 143, 467
 warming 346, 352, 448–9
 see also greenhouse effect, global warming
 climatope 47
 climax community 39
 climax 156
 cloud, alterations in 392
 CO₂ 30, 321–2, 325–6, 339, 359, 430
 air-borne fraction 460
 altered concentrations 348
 atmospheric 24, 430, 460
 change 372, 420
 concentration 25, 429
 direct effects 362, 464
 doubled 344, 351 371, 374, 435, 465
 elevated 397, 419, 425
 enrichment 381
 fertilisation 363
 indirect effects of change 464
 induced climate changes 373
 induced fertilisation effects 365
 net assimilation 431
 from weapons testing 96
 coastal dune ecosystems 311
 colonisation 286
Colophospermum mopane 203
 Colorado River, USA 129
 Columbia, USA 248
 Columbus 455
 commensalism 79
 commonness of species 37, 121
 communities 37
 community 34, 104
 concept 47, 104, 155–6
 theory 110, 142
 comparisons of different gap models 243
 compartment modelling 84, 101
 box diffusion 461
 formulation 85
 notation 86
 competition 6, 43, 79, 99–100, 141, 146,
 154, 229, 268, 287
 equations 74
 evidence for 120
 experiments 111, 119
 for light 211
 indices 314
 interactions 77, 210
 Lotka–Volterra equations 76, 107, 142,
 285
 competitive exclusion principle 75, 106,
 110, 112–13
 competitor strategy 145
 computer
 power 61
 software 61
 concavities 391
 conceptual models 62
 Connell, J. H. 120
 consistency test 360
 continental glaciation 14
 continuum concept 137–9, 156
 convection 323
 flow of heat 152
 convection–diffusion equation 402
 convergence 109
 functional hypothesis 429
 convexities 391
 coral reefs 203
 Costa Rica 158, 248
 Cowles, H. C. 31
 crassulacean acid metabolism (CAM)
 151
 Cretaceous Period 11
 curved isoclines 78
Cuvieronius sp. 21

Dacroides–Sloanea forests 242
 Darlington's law 284
 Darwin, C. 71
 Darwin's finches 115
 deciduousness 150
 decline of forests 379
 decomposing litter 375

526 · Index

- decomposition 375
 - dynamics 376
- deforestation
 - Amazonia 453
 - clearing 455
 - irreversible feedback 455
- degradation phase 194
- demographic stochasticity 208
- density-dependents
 - factors 72
 - mortality 405
- desert locust 135
- desert 346
- deterministic features 69
- development of agriculture 463
- diameter of trees
 - distribution 241, 386
 - increment 223, 226
- die-back 256, 258
 - of trees 4
- difference equation 68
- differential equation 68, 86, 299, 304, 332
- diffuse radiation 316
- diffusion 210
- digital imagery 318
- dinosaurs 11
- direct beam radiation 316
- direct gradients 139
 - analysis 124
- discriminant function analysis 124–5
- dispersal 379
 - long-distance 153
- displacements 113
- distance-weighted size ratios 314
- distribution
 - contraction 53
 - expansion 53
- disturbance 43, 54, 145, 175, 228, 279, 315
 - in plant strategies 146
 - regime 176
- diversity 291
 - managing bird 128
 - of species 283, 287, 394
 - of vegetation 55
- Dokuchaev, V. V. 45
- DOLY model 336, 338–9, 431, 434–6, 442
- domesticated animals 402
- doubled CO₂ *see* CO₂, doubled
- drought 463
- drying 347
- DUNE model 311–12
- dynamic change 68
- dynamics 61
- Earth
 - energy balance 28
 - reversibility of changes 467
- eastern North America 393
- Echinochloa* 131
- ecoclimatic zone 446
- ecoenergetics 36
- ecology
 - differentiation 115
 - modelling 7, 61, 64, 93, 99
 - patterns 56
 - succession 39–42, 147
- ecophysiology 43
- ECOSIEVE 163–4
- ecosystem 33–5, 37, 45–6, 48–9, 52, 55–6, 62, 85, 99, 137, 292
 - change 3
 - concept 33–4, 45, 50
 - dynamics 343
 - functional types 269, 292
 - monitoring 446
 - spatial distribution 343
 - structure 445
 - studies 1
 - as a system of definition 48
- ecotone 392
 - dynamics 390
- eco-unit 194
- edaphotope 47
- edges 383
- edge-to-area ratio 383
- electron transport rate 433–4
- element cycling 85, 321
- elephant 20, 401
- Elephas maximus* 20
- elevated atmospheric CO₂, *see* CO₂, elevated
- elevations 448
- ELM 332
- Elton, C. S. 78, 140, 154
- Eltonian niche 104, 106, 108, 141, 143
- emergent properties 49
- empirical functions 425
- empty niches, *see* niches
- endangered species 279
- Endotheca parasitica* 239
- Endothia parasitica* 270
- energetics 35
- energy 85, 322
 - flow 35, 89
- England 26, 191

- environment
 - disturbance regimes 55
 - gradients in 138
 - human alterations of 24
 - pathways in 417–18
 - problems 3
- epiphyte 44
- equilibrium-seeking behaviour 415
- equilibrium 77, 86, 91, 156, 193, 283
 - evaluations 353
 - steady state 86
- ergodic systems 63
- error analysis 97
- establishment 223, 232, 379
- Eucalyptus* spp. 22, 130, 136, 234, 241–2
 - die-back 259
 - E. deglupta* 258
 - E. delegatensis* 275, 279
 - E. grandis* 136
 - E. maculata* 131, 399–400, 435
 - E. marginata* 255
 - E. muellerana* 131
 - E. pauciflora* 131–2, 392–3
 - E. rossii* 131
 - E. sieberi* 131
 - E. tereticornis* 136
- Euphydryas editha bayensis* 390
- Europe 393
- European birds 354
- evaporation 323
- evapotranspiration 349, 435, 452
- even-aged forest 258
- evergreenness 150
- evolution 106
 - of the biota 55
- evolutionarily stable migration strategies 407
- EXE 243
- exponential equation 73
- extinction 9, 11, 210, 286, 388
 - events 11
 - of large mammals 15
- facultative CAM plants 151
- Fagus* spp. 260
 - F. grandifolia* 196, 250, 265, 354, 359
 - F. silvatica* 179–80, 354, 359
- Fallopia japonica* 135, 359
- fallout 418
- FATE model 298, 300, 302
- feedback 14, 455
 - positive interaction 80
- fertilisation 364
- fertility 228
- Festuca ovina* 180
- Ficus* spp. 41
 - F. cunninghamii* 44
- finite-state automata 63–4, 67–8, 102
- finite-state system 65–6
- fir waves 203
- fire 17
 - frequencies 24
 - mosaic 378
- first-order Markov process 283
- fitness 173
- flocking behaviour, birds 211
- Florida, USA 89
- Flourensia cernua* 185
- flow diagram 334
- flowering 52
- food
 - chain 38, 84
 - webs 38, 84
 - cycle 36
- FORAR model 233, 363–4
- forced response 90
- forcings 91
- FORCLIM model 225, 243–5
- FORCLIM-E/P model 246
- FORECE model 242, 244–5
- FORENA model 243, 373
- forest 346
 - Amazonia clearance 453
 - biology 213
 - clearing 455
 - composition 202, 240
 - Dacroides–Slonea* spp. 242
 - decline 379
 - diameter distribution 241, 386
 - diameter increment 223, 226
 - die-back 4, 256, 258
 - dynamics 192
 - dynamics models 215
 - even aged 258
 - fire 279
 - irreversible feedback in deforestation 455
 - light environment 193
 - mature 201
 - mosaic 195
 - in Quebec 374
 - rain forest 22–3
 - response to pollutants 368
 - size variation 214
 - stand basal area 394
 - stocking densities 235

528 · Index

- forest (*cont.*)
 thinning 214
 tree growth 366
 tree suppression 223
 Wisconsin 374
 yield 214
- FOREST model 314, 318, 320, 383–4
 FOREST-BCG model 326, 329, 330
 FORET model 219, 250, 266, 273, 308,
 363–5, 367, 372
 FORFLO model 242
 FORICO model 242, 363–4
 formulation of compartment models 85
 FORSKA model 242
 fossil fuel 461, 468
 combustion 366, 459
 fossil pollen 15
 fragmented landscapes 388
Fraxinus americana 196
 free response 90
 freezing 151
 frequency domain 51, 270
 frequency response 271
 functional attributes of plants 301
 functional convergence hypothesis 429
 functional landscape response 413
 functional niche 108
 functional types
 of trees 317
 of vegetation response 176, 249
 fundamental niche 121
 fusion weapons 96
- Galapagos Islands 115–16
 gamblers versus strugglers 188
 Game of Life 396
 gap 178
 dynamics 190
 filling 202
 regeneration 187
 size 195, 315
 gap models 217, 219, 221, 223, 227, 239,
 242, 245, 248, 261, 274, 304, 316, 377
 comparisons 243
 dynamics 265
 gap-phase cycle 197
 gap-phase dynamics 193
 Gause, G. F. 70, 78, 110
 Gause's principle 112
 General Circulation Models (GCMs) 28, 30,
 325–6, 345, 352, 356, 376, 378, 423–4,
 446, 453–4
- generality concept 414
 geographic ranges 355
 geographical patterns 435
Geospiza spp. 115–16
G. conirostris 116
G. scandens 116
 germination 52
 giant armadillo 109
 GIS 150, 304, 307–8
 glaciated earth 350
 glaciation 351
 glaciers 45
 Gleason, H. A. 137
 global attributes
 carbon budget 350, 408, 456, 458, 463
 carbon cycle 461, 467
 carbon transient dynamics 410
 changes 7, 463–4
 environmental change 452
 ice volume 13
 mean temperature 13
 pattern of vegetation 150
 terrestrial carbon budgets 351
 warming 298, 420, 450
 Grand Canyon of Arizona 18–19
 grassland 333, 346–7
 grazing 402
 Great Basin, USA 450
 Great Depression 459
 greenhouse effect 4, 28, 350
 runaway 350
 greenhouse gas 28, 30
 Greenland ice core 13
 grey squirrel 113
 Griesbach, A. H. R. 298
 Grime, J. P. 144
 Grinnell, J. 104, 140, 154
 Grinnellian niche 104–6, 121, 123, 126, 141,
 143, 151, 170, 282, 353
 qualifications 122
 grizzly bears 135
 gross photosynthesis 427
 growing-space polygons 314
 growth 223
 and yield 465
 equation 226
 rate formulations 227, 364
- habitat
 fragmentation 449
 and niche concept 140
 reductions 406

- Haplomastodon* 21
 Harper, J. L. 172
 Harrington, J. B. 21
 Hawaii 255, 459
 heat
 balance 151, 173
 storage 323
 heathlands 203
 heavy metals 366
 hemicryptophyte 161
 hemlock decline 23
 herbaceous perennials 52
 herbivores 38
 grazing 400
 heterogeneity 274
 hierarchical systems 56
 organisational 50
 hierarchy theory 50
Hierodula crassa 209
 high frequencies 52
 Holdridge life zone system 157, 344, 346,
 378, 447
 Holdridge, L. R. 158–9
 Holdridge map 377
 Holocene Epoch 14, 20
 homeostatic feedback 350
 homogeneity 207
 homogeneous landscape models 321, 442
 homogenous landscapes 295
 homogenous model 416
 Horn, H. S. 297
 Hudson Bay, Canada 393
 Huffaker, C. B. 83
 human society 463
 effect on environment 24
 Humboldt, A. von 160, 298
 Hutchinson, G. E. 120, 140
 Hutchinsonian niche model 107
 HYBRID model 336–7, 339, 365, 370, 372,
 397
Hydrobia ulvae 117
Hydrobia ventrosa 117
 hydrogen fluoride 366
 hydrology 95, 453
 bucket model 452
Hylocichla mustelina 108
 hyperspace niche concept 121, 126
 hypostomatous 152

 IBP models 331, 333
 Ice Age 14
 ice cover 12

 Icelandic temperature 463
 idealised landscape, biomass dynamics 200
 impulse response 90
 indirect effects of increased CO₂ 464
 indirect gradients 139
 individual-based models 62, 207, 209, 214,
 245, 402, 444
 individualist concept 139
 individualistic continuum concept 155
 individualistic hypotheses 154
 Indonesia 42
 Industrial Revolution 25, 458–9
 influence-zone indices 314
 innovation phase 194, 197
 insect dispersal 211
 interacting populations 79, 111
 interactions among co-occurring species
 106
 interactive landscape models 294, 383
 interception 323
 interglacials 15
 International Biological Programme (IBP)
 330, 420
 models 331, 333
 interspecific competition 287
 intraspecific adaptations 106
 irreversible feedback in deforestation 455
 isocline 75, 80
 isotopes 331
 stable oxygen species 12
 see also radioactive isotopes

 J distribution, inverse 385
 JABOWA model 218–19, 224–6, 236, 242,
 373
 JABOWA II model 392
 JABOWA/FORET approach 315
 Japan 185
 Jefferson, Thomas 9

K species 175
 KIAMBRAM model 250, 363–4
 KOPIDE model 308–9
 Küchler, A. W. 160

 Lake Chad 133
Lamdina fiscellaria 22
 Landsat Multispectral Scanner 404
 landscape
 functional response 413
 interactions 399
 models 343

Cambridge University Press

978-0-521-56523-3 - Terrestrial Ecosystems in Changing Environments

Herman H. Shugart

Index

[More information](#)

530 · Index

- landscape (*cont.*)
 - mosaic 178
 - scale 383
 - spatial dynamics 310
 - spatial heterogeneity 120
- land–surface interactions 426, 452
- Laplace, P. S. de 69
- large mammal extinction 15
- Larix sibirica* 16
- Lasthenia californica* 388
- late successional trees 52
- leaf
 - area 325, 336, 348–9, 399
 - area predictions 435
 - gas exchange 52
 - morphology 153
 - phenology 148
 - size 173–4
 - structure 162
 - type 162
 - water-use efficiency 27
 - width 145
- lethal temperatures 152
- life forms 148
- life history 173, 176
- life zone system 157, 159
- light conversion 433
- lignin 333, 376
- lignin: nitrogen ratio 375
- limiting or critical factors 230, 415
- limnologists 49
- Lindeman, R. L. 34
- linear dynamic system 51
- linear stability analyses 98
- linear system 52, 93
- LINEAR model 332
- linearity 94
- LINKAGES model 243, 376
- Liquidambar* sp. 260
- Liriodendron* sp. 260, 264
 - L. tulipifera* 196, 250, 368–9
- litter decomposition 464
- logistic equation 72, 224
- logistic population growth 80, 82
- long-distance dispersal, *see* dispersal
- longevity 148
- longwave radiation, *see* radiation
- loop analysis 98
- Lotka, A. J. 74, 110
- Lotka–Volterra competition equations 76,
 - 107, 142, 285
- Lotka–Volterra 74
- low frequencies 52
- Loxia pytyopsittacus* 356
- Loxodonta africana* 20
- Lyapunov stability concepts 100
- Lyapunov, A. M. 98
- MacArthur, R. H. 121, 140
- macroscopic approach 451
- maintenance respiration 427
- Malawi, Africa 136
- Malaysia 42
- Malthus, R. 71
- mammals 20
 - extinction 15
- mammoths 21
- Mammut* 20–1, 401
- Mammuthus* spp. 401
 - M. columbi* 20
 - M. meridionalis* 21
 - M. primigenius* 20–1
- management in bird diversity 128
- Man and the Biosphere programme 447
- MAPPS model 436, 442
- marine communities 203
- Markov model 102, 295–9, 304, 310
 - first-order process 283
- Markovian simulators 261
- mass extinctions 10
- mastodon 21
- material transfer models 329, 415
- material transfer 419, 436
- material-flow models 445
- matrix representation 88
- Mauna Loa, Hawaii 25, 460
 - Observatory 459
- MBL-GEM model 420
- mechanistic models 425
- Mediterranean climates 144
- megafauna 18
- megaherbivore 402
- Megalonyx* 9
- Melanesian islands 284
- Menestor 45, 147
- metapopulations 390
- methane 28
- Metrosideros polymorpha* 255, 257
- Mexico 181, 395
- Michaelis rates 432
- Michigan, USA 304
- micro-biocoenose 47
- microconditions 197
- microcosm 62, 272

- microhabitat 287–9
- migration 292
 - of birds 404–5
 - pathways 406
 - seasonal 404
 - of seeds 202
 - strategies 407
 - wintering grounds 406
- Milankovitch theory 12
- Minnesota, USA 22
- missing sink 461–2
- mobility of populations 404
- Möbius, K. 45
- model
 - comparisons 338
 - tests on gap models 236–7
 - validation 234, 236
 - verification 233
 - testing mode 7
 - see also individual models*
- moisture gradient 269
- moisture-transfer properties 453
- monitoring habitat change with satellites
 - 131
- monolayer 189
- Montana, USA 65
- montane landscapes 392
- montane mammal fauna 450
- Monte Carlo procedure 97
- morphological character displacement 119
- morphology 148
- mortality 223, 231, 366, 405
- mosaic concept of vegetation dynamics 178, 187
- mosaic dynamics 190, 202–4
 - two phase 183–4
- mosaic landscape models 294–5, 310, 343, 361, 445
- mosaic-scale biomass dynamics 198
- Mozambique 136
- Müeller-Dombois, D. 256
- Müllerian mimicry 79
- multilayer 189
- multilayer-monolayer dichotomy 190
- multivariate statistics 121, 124, 128
- mutualism 100, 274
 - mutualistic interaction 80
 - mutualists 80
 - obligatory or facultative 79
- Mycenaean 463
- natural chain 9
- natural fluctuations 466
- natural selection 106, 172–3
- nature reserve systems 446
- NDVI (normalised difference vegetation index) 134, 329–30, 429–30
 - dynamics 430
 - index 427
- Neotoma* spp. 18
- Neotropical 109
- New Brunswick, Canada 379
- New Guinea, Australia/Indonesia 284
- New Hampshire, USA 23, 196
- New South Wales, Australia 234
- Newfoundland, Canada 379
- niche 289
 - concept 103, 138, 140, 245
 - Eltonian 104, 106, 108, 141, 143
 - empty 110
 - functional 108
 - Grinnellian 104–6, 121–3, 126, 141, 143
 - and habitat concept 140
 - Hutchinsonian 107
 - hyperspace concept 121, 122, 126
 - realised niches 121, 130, 132
 - response surface 123
 - theory 7, 103, 128
- Niger 394
- nitrogen cycling 376
- nitrogen oxides 366
- nitrogen 333, 424–5
- non-equilibrium landscapes 279–81
- non-game animals 126
- non-linear models 329
- North America 356
 - see also* Canada, USA
- north-facing slopes 42
- Nothofagus* 191, 258
- NO_x 28
- nuclear weapons 461
 - testing 92, 416, 418
- null hypothesis 5
- null model 288
- numerical methods 90
- nutrient limitation 365
- nutrients 85, 375–6
- Nyssa* sp. 260
- O₃ 28
- Oak Ridge National Laboratory 385
- obligatory or facultative mutualism, *see* mutualism

Cambridge University Press

978-0-521-56523-3 - Terrestrial Ecosystems in Changing Environments

Herman H. Shugart

Index

[More information](#)

532 · Index

- ocean 458
 - currents 30
 - islands 286
- Odum, E. P. 36, 87
- 'Ohi'a 256
- oil embargo (of 1973) 459
- Oldeman, R. A. A. 179
- operators 66
- optimisation
 - of form 173
 - of leaf size 173
 - of shape 172
- optimality concept 415
- Opuntia* 135
- Oregon, USA 317
- organic matter 375
 - production 376
- organisational hierarchy 50
- ovenbird, *see* *Seiurus aurocapillus*
- oxygen, stable isotopes 12

- paca 109
- Pacific Northwest 374
- packrat middens 18–19
- palaeoecological studies 353, 356, 451
- palynological evidence 372
- Panama 248, 317, 384, 416
- Panicum* 131
- Papua New Guinea 258
- PAR 427
 - absorbed PAR 426, 428, 442
- Paramecium* 110
- parasitism 79, 274
- park managers 66
- parsimony 239
- pattern of mortality 198
- pedogenesis and soil respiration 408
- Penman–Monteith 422
- perennation 148
 - in plant tissue 160
- periodicity
 - changes 12
 - vibrations 271
- permafrost 42
- Permian period 11
- pest bird 131
- pesticides 419
- phanerophyte 161
- phenomenological scale 50
- Phillips, J. 34
- phosphorous 333
- photorespiration 371, 431
- photosynthate
 - allocation of 326, 467
 - production 364
- photosynthesis 149, 322, 431, 433, 467
 - acclimation of 149
 - C₄ pathway 151–2
 - gross 427
 - models 422
 - net values 189
 - rate 226
 - ribulose biphosphate limiting 434
 - Rubisco limiting 434
- photosynthetic habit 162
- physiognomic adaptations 175
- physiognomy 160, 170–1, 185
- phytocoenose 47
- phytogeography
 - models 344
 - algorithms 350
- Phytophthora cinnamomi* 255
- phytoplankton 210
- Picea* spp. 16
 - P. abies* 246, 393
 - P. engelmannii* 393
 - P. glabra* 393
 - P. glauca* 378
 - P. marina* 378
 - P. rubens* 371
- pigmy hippopotamus 109
- Pinus* spp. 16
 - P. banksiana* 217
 - P. contorta* 370
 - P. koraiensis* 307–8
 - P. radiata* 136, 217, 420
 - P. sylvestris* 253–4, 354, 420
 - P. taeda* 233, 275
- pipe model 227
- Plagithmsus bilineatus* 255
- plant
 - abundance 269
 - adaptations 62
 - canopies 428
 - canopy model 325
 - classification systems 156
 - energy balance models 348
 - form 160
 - functional types 147, 265, 269, 292
 - geographers 150
 - life forms 161
 - morphologies 144, 177
 - processes 53
 - strategies 148, 267

Cambridge University Press

978-0-521-56523-3 - Terrestrial Ecosystems in Changing Environments

Herman H. Shugart

Index

[More information](#)

Index · 533

- plate tectonics 55
- Plato 45
- Pleistocene Epoch 14, 450, 452
- PnET-CN model 420
- point models 330, 442
- pollen diagrams 16
- pollutants 4, 366
 - stress 368
- population
 - densities 79, 406
 - fecundity 389
 - intrinsic rate of increase 71
 - mobility 404
 - regulation 106
 - source 389
 - subgroups 447
- population dynamics models 69
- Populus* spp. 16, 260
 - P. fremontii* 129–30
 - P. grandidentata* 196
 - P. tremuloides* 196, 378
- potential evapotranspiration ratio 157–9
- potential vegetation 157
- power spectral density 273
- precipitation 157, 159, 452
- predation 79, 99, 210, 274
- predator–prey interactions 100, 210
- predator–prey system 83
- predators 213
- prediction of habitat availability 129
- prey 213
- Priestly–Taylor coefficient 167
- primary production 428
 - net values 38, 336, 338, 371, 423, 428, 435
- principal components 289, 385, 388
 - analysis 126
- principle of limiting similarity 115
- principle of species individuality 105
- principle of superposition 94
- probability of mortality 231
- proboscideans 21
- processes 49
- productivity 405, 452
 - of the Earth 426
- Project Plowshare 418
- Prosopis glandulosa* 130, 185
- proximate factors 127
- Pseudotsuga* sp. 318
 - P. menziesii* 217
- Puerto Rican 242
- PWNEE 332
- Q model 420
- quantitative modelling 5
- quasi-equilibrium landscape 201, 277, 279–80
- Quaternary Period 12, 14, 20, 160
 - forests 360
- Quebec 379
 - forests 374
- Quelea quelea* 131, 133, 134
- Quercus* spp. 260, 277
 - Q. alba* 270, 370
 - Q. prinus* 270
 - Q. robur* 26
 - Q. rubra* 196
 - Q. velutina* 368–9
- QUTENIQUA model 241
- r* species 175
- radiant balance, net 323
- radiation
 - diffuse 316
 - longwave 27
 - shortwave 27
- radioactive isotopes 101, 416, 418–19
 - pollution 92
 - as tracers 84
- radioecology 92, 331
- rain forest 22–3
- rainfall 323
- random niche model 290
- range boundary 354
- rareness 37, 121
- rate constant 86, 88
- Raunkiaer, O. 160–1, 298
- Raunkiaer life forms 161
- realised niche 121
 - of the snow gum 132
 - of tree species 130
- Recent Epoch 14
- red squirrel 113
- regeneration 232
 - cycle 256
- relative plant size 162
- replacements 113–14
 - patterns in 259
- reproduction 148
- resource
 - division 106
 - gradients 139
 - limitation 80
 - supply 148
 - utilisation function 121–2

534 · Index

- resource-ratio hypothesis 147
- respiration 467
 - rate 226
 - loss 333
- response surfaces 357
- reversibility of Earth surface changes 467
- Rhamnus catharticus* 26
- ribose bisphosphate 434
- Rift Valley fever disease 135
- riparian bird species 130
 - habitats 128
- Rocky Mountains 393
- roles 261
 - of plant species 187
 - of tree species 251
- ROPE model 262
- roughness 453
- Routh–Hurwitz criteria 98
- royal antelope 109
- Rübel, E. F. 160
- Rubisco 432, 434
- ruderal strategy 145
- Rumex crispus* 26
- runaway greenhouse effect 350

- Sahara Desert 390
- Sahel 390, 455
- Salix gooddingii* 130
- Samoa, American 25
- sand dune 312
- sapling regeneration 193
- Sassafras* 260
- satellite remote sensing 403, 429
- scale 150, 207
 - of the atmospheric processes 54
 - of disturbances 280
 - of landscapes 280
- Scandes, Sweden 393
- Schimper, A. F. W. 160
- Schistocerca gregaria* 135
- Schoener, T. W. 120
- Sciurus* spp.
 - S. carolinensis* 113
 - S. vulgaris* 113
- scorch heights 65
- Scotland 393
- sea level 350
 - change 351
- seasonal migration 404
- Second Law of Thermodynamics 38
- sedentary species 405
- seed dispersal 15
- seedlings 153
- Seiurus aurocapillus* 126
- self-organised moving patterns 182
- semi-Markov models 295
- semivariances 317
- semivariograms 318–19
- sensitivity
 - analysis 96–7
 - normalised 96
 - relative 96
- separatrix 81
- shade intolerance 249
 - of plants 291, 383
 - of trees 317
- shade tolerance
 - of plants 291
 - of trees 317
 - versus shade-intolerant species 188
- sheep 402
- shifting-mosaic steady state 201, 278
- shifts in the potential vegetation cover 446
- shortwave radiation, *see* radiation
- SiB model 326, 455
- Silver Springs, USA
 - ecosystem 87
- similarity 113
- simulation 208
- singularity functions 95
- sink
 - missing 461–2
 - populations 390
- site index 217
- snails 117
- SO₂ 367
- soil
 - moisture 228, 374, 400
 - organic matter 333
 - organic matter dynamics 375
 - water deficit 324
- Solomon Islands 42
- Sorghum* 131
- SORTIE 227
- source populations 389
- South Africa 136
- South America 328
- South Pacific 284
- South Pole 25, 460
- south-facing slopes 41
- space scale 52, 54
- space-for-time substitution 63
- spatial distribution of species 138

Cambridge University Press

978-0-521-56523-3 - Terrestrial Ecosystems in Changing Environments

Herman H. Shugart

Index

[More information](#)

Index · 535

- spatial dynamics of landscapes 310
- spatial ecosystems 343
- spatial heterogeneity of landscapes 120
- spatial interactions of climate and vegetation 445
- spatial models 310, 312, 411
- spatial scale 33, 50, 227
- spatially interactive landscape models 382
- species
 - composition 374
 - co-occurring 106
 - geographical range 106
 - introduced 136
 - richness 451
 - spatial distribution
- Spencer, H. 37
- spruce pollen 357
- stability
 - analysis 97
 - asymptotic 99
 - Lyapunov 99
 - of systems 99
- stand of trees 394
- state classification schemes 297
- state space 69, 70, 78, 82–3
 - dynamics 81
- state transitions 311
 - matrix 64, 66
- state variables 68, 75, 84, 209
 - approaches 69
- Stegomastodon* 21
- stem profiles 218
- stochastic processes 64
- stocking densities of trees 235
- stoichiometry 415
- stomata 25, 322, 427
 - amphistomatous plants 152
 - conductance 349
 - densities 26
 - opening 52
 - resistances 325
- storage of carbon 423
- strangler fig 41
- stress 145
- stress-tolerator strategy 145
- strontium 418
 - ⁹⁰Sr 92
- structural classifications 175
- structural type 162
- structure of vegetation 445
- strugglers versus gamblers 188
- subpopulations 447
- subsistence farmers 131
- succession 6, 43, 287
 - models 299, 306
 - sequences 268
 - states 67
 - theory 39
- succulent species 152
- SUCSIM model 225
- Sukachev, V. 46
- sulphur 366
 - oxides 366
- sun angle 196, 252
- supercooling 171
- super-organism concept 46
- suppression of trees 223
- SWAMP model 225
- Sweden 420
 - Scandes 393
- Swiss Alps 242
- Sydney, Australia 324
- sympatry 117
- synchronous mortality 255, 258
- system linearity 101
- system response 51
- systems of definition 48
- Tachigalia versicolor* 248
- Tamarix chinensis* 130
- Tansley, A. G. 33, 37, 137
- Tasmania, Australia 301
- TEM model 423–4, 436, 441
- temperature 228, 433
 - response function 432
- temporal scale 33, 50
- Tennessee, USA 127
- terrestrial landscapes 56
- terrestrial pangolin 109
- territory size 127
- tests of gap models 232
- Theophrastus 45, 150
- theory of evolution 37
- thermonuclear war 416
- therophyte 161
- Thomomys botta* 388
- throughfall 323
- Thuja plicata* 318
- tiger bush 181, 203, 394, 397, 398
- Tilia* 260
- Tilman, D. 147
- time and space scales 5–6
- time constant 87
- time scale 31, 52, 54

Cambridge University Press

978-0-521-56523-3 - Terrestrial Ecosystems in Changing Environments

Herman H. Shugart

Index

[More information](#)

536 · Index

- tolerances to shading 188
- TOPOG model 399
- Total Ozone Mapping Spectrometer 428
- Toxostoma redivivum* 105
- tracers
 - experiments 84
 - kinetics 84
 - see also* radioactive isotopes
- trade-offs 147
- transfer of energy 35, 87
- transient dynamics 408
- transmutation across scale 389
- transpiration 322–3, 422
- tree
 - demographics 213
 - diameter 223, 226, 241, 386
 - die-back 4, 256, 258
 - establishment 232
 - functional types 317
 - geometry 190
 - height 226
 - late-successional 52
 - mortality 20, 195
 - size 213
 - species migration 15
 - suppressed growth 223
 - temperaments 188–90
 - see also* forests
- treeline 391
- triose phosphate utilisation 433–4
- trophic functions 35
- trophic interactions 213
- trophic levels 36–7
- trophic–dynamic concept 35–6
- Tsuga* spp. 260
 - T. canadensis* 22, 196, 354
 - T. heterophylla* 22, 318
- tundra 346
 - biome 451
- two-phase mosaic 183–184

- uncertainty 30, 464
- 'unit hydrograph' 95
- unit impulse function 95
- unit ramp function 95
- unit step function 95
- United States Atomic Energy Commission (USAEC) 330
- unstable equilibrium point 77
- USA 356
 - Alaska 25, 40, 42
 - Arizona 130
 - Austin 154
 - Cascade Range 317, 393
 - Columbia 248
 - Florida 89
 - Michigan 304
 - Minnesota 22
 - Montana 65
 - New England 393
 - New Hampshire 23, 196
 - Oregon 317
 - Rocky Mountains 393
 - Silver Springs 87
 - Virginia 373
 - Willamette National Forest 317
 - Wisconsin 319, 374, 384
- validation 232
- variance in sizes within populations 214
- vegetation
 - change 22, 346
 - classifications 156
 - cover 12, 446
 - dynamics 43, 385
 - functional type response 176, 249
 - maps 157
 - pattern in space and time 55, 63
 - reconstructions 372
 - response to climate 143, 151, 172, 467
 - response to pollutants 368
 - shifts in cover 446
 - structure 440, 445
 - successional change 63
 - vital attributes 176
- VEMAP model 435–6
- Verhulst–Pearl equation 72–3
- verification 232
- vertical canopy geometry 226, 228
- Virginia, USA 373
- vital attributes 176, 299
 - approach 298, 391
 - classifications 175
- Vitis vinifera* 179
- volcanic eruptions 14
- Volterra, V. 74, 110
- warming 298, 420, 450
- water 322, 425
 - use efficiency 174
- vapour 28
- yield 399

- water flux 422
 - equations 173
- watershed 50, 321
 - model 399
- Watt, A. S. 31, 179, 191
- wave regeneration 185–6, 254
- Webster, N. 455
- Whitmore, T. C. 179, 191
- wilderness 10
 - concept 32
- wildfire 17, 55, 65–6, 208, 364
- wildlife 126
 - biology 73
- Willamette National Forest, USA 317
- wilting 152
- winners or losers 464
- wintering grounds 406
- Wisconsin 319, 384
 - forests 374
- woodlots 383
- World Conservation Monitoring Centre 447
- world vegetation 150
- yellow-back duiker 109
- yield tables 217, 242
- ZELIG model 228, 271, 315, 373, 384, 411, 414
- Zimbabwe 136
- Zonotrichia albicollis* 390
- zoocenose 47
- zooplankton 210