

## Index

- Acionyx lubatus* see cheetah  
 acorn woodpecker 331, 516  
*Acrocephalis (Bebornis) sechellensis* see Seychelles warbler  
 adder *Vipera berus* 36, 286, 300, 306, 401  
 additive genetic variance 109, 110–11, 533  
 additivity 533  
*Aepyceros melampus* see impala  
 African wild dog *Lycaon pictus* 65  
*Agrostis tenuis* see bent grass  
*Ailuropoda melanoleuca* see giant panda  
*Aix sponsa* see wood duck  
 Aleutian goose *Branta canadensis leucopareia* 464  
 Algonquin wolf 369  
 allele frequency 48, 73–4, 139–41  
   computer simulation 193–4, 195–6  
   divergence over time, population fragmentation 319–20  
   equilibrium 171–2  
   favourable allele 142  
   genetic drift 179–87  
   inbreeding 260  
   and migration 169–73  
   and mutation 158–60  
   recessive allele 62  
 alleles  
   deleterious 60–1  
   directional selection 215  
   effective number 201  
   effectively neutral 214–16, 327  
   lethal 261–2, 275–6, 293–4  
   mismatch analysis 481  
 allelic diversity (A) 48, 62, 80–3, 533  
 Allen's rule, clines 170  
 alligator, American *Alligator mississippiensis* 65  
 allopatric speciation 372, 533  
 allopolyploidy 237–9, 373–4, 533  
   allotetraploid 89  
 allozygous 257, 533  
 allozymes 61–2, 533  
   diversity 219  
   electrophoresis 49–50, 52  
   heterozygosity 246  
   indicators of hybridization 411  
  
*Alouatta seniculus* see red howler monkeys  
 Alpine ibex *Capra ibex* 464  
 Amazon basin, extinction rates, birds 5  
*Amazona vittata* see Puerto Rican parrot  
 American bison see bison  
*Ammodramus maritimus nigrescens* see dusky seaside sparrow  
 amphibians  
   allozyme diversity 62  
   genetic distances, means/ranges 69  
   percentage endangered 3  
 amphidiploid 533  
 amplified fragment length polymorphism (AFLP) 55–6, 64–6  
 Amur leopard *Panthera pardus orientalis* 425  
*Anas laysanensis* see Laysan duck (teal)  
 angiosperms, polyploidy 29  
*Anser caerulescens* see snow goose  
*Anser fabalis* see bean goose  
*Anthoxanthum odoratum* see bunch grass  
*Aotus trivirgatus* see owl monkey  
 Apalachicola rosemary *Conradina glabra* 345  
 Arabian oryx *Oryx leucoryx* 67, 184, 354, 385, 425, 431, 464  
   case study 466  
*Arabidopsis thaliana* see thale cress  
*Argyroxiphium sandwicense* var. *sandwicense* see Mauna Kea silversword  
 artificial insemination 442  
 Aruba Island rattlesnake *Crotalus unicolor* 345  
 asexual species 414–16  
 associative overdominance 219–20, 533  
 assortative mating 85, 533  
*Astragalus* see sentry milk-vetch  
*Astrocaryum mexicanum* 513, 514  
 Attwater's prairie chicken *Tympanuchus cupido attwateri* 345, 352  
 Australian bush rat *Rattus fuscipes* 217  
  
 autopolyploidy 373–4, 533  
 autotetraploid 88  
 autozygosity 257, 533  
 average heterozygosity 48, 533  
  
 B allele, blood groups 167–8  
 backcross 273, 533  
 Baiji dolphin 345  
 Baird's beaked whale *Berardius bairdii* 472–3  
*Balaenoptera endeni* see Bryde's whale  
*Balaenoptera musculus* see blue whale  
*Balaenoptera physalus* see fin whale  
 balancing selection 199, 204, 534  
 bald eagle *Haliaeetus leucocephalus* 352, 464  
 Bali starling *Leucopsar rothschildi* 345, 496  
 bandicoot, Eastern barred *Perameles gunnii* 61  
*Banksia brownii* see Brown's banksia  
*Banksia cuneata* see matchstick banksia  
 barnacle goose *Branta leucopsis* 117  
 barred owl *Strix varia* 15  
 bat, ghost *Macroderma gigas* 487  
 bay checkerspot butterfly *Euphydryas editha bayensis* 30, 130, 506, 509  
 bean goose *Anser fabalis* 464  
*Bebornis (Acrocephalis) sechellensis* see Seychelles warbler  
 bee-eater 117  
 bent grass *Agrostis tenuis*, tolerance to heavy metals 129, 148, 170–1, 212  
*Berardius bairdii* see Baird's beaked whale  
 Bergmann's rule, clines 170  
*Bidens*, Hawaiian 345, 494  
 bighorn sheep *Ovis canadensis* 332, 513  
   small vs. large populations 33  
 binomial distribution 534  
 binomial sampling 180  
 biodiversity  
   conservation 2–3  
   defined 2  
 bioresources 2  
 biparental inbreeding 494–6, 534

- birds  
 allozyme diversity 62  
 avian malaria 498  
 extinction rates 4  
 Amazon basin 5  
 genetic distances, means/ranges 69  
 heritabilities of fitness, body size,  
 bill size 117  
 inbreeding depression 282  
 percentage endangered 3  
 sex determination 497  
 birthweight, humans, stabilizing  
 selection 149–50  
 bison  
 American *Bison bison* 176  
 European *Bos bonasus* 176, 184, 425  
*Biston betularia* see peppered moth  
 black lion tamarin *Leontopithecus*  
*chrysopygus* 430  
 black sea bass 490  
 black stilt *Himantopus novaezelandiae*  
 345  
 black-footed ferret *Mustela nigripes* 99,  
 184, 352, 425, 431, 463  
 case study 466–7, 517  
 black-footed rock wallaby *Petrogale*  
*lateralis* 13, 34–6, 285, 315, 316,  
 401–3, 408  
 island and mainland populations  
 34, 408  
 loss of genetic diversity 285, 315,  
 316  
 reintroductions 13, 401–3  
 blackcap *Sylvia atricapilla* 129  
 blood groups, B allele 167–8  
 blue whale *Balaenoptera musculus*  
 472–3  
*Bombus terrestris* see bumble bee  
*Bos bonasus* see bison  
*Bos gaurus* see gaur  
 bottlenecks 19, 183–7, 304, 482–5,  
 533  
*Branta leucopsis* see barnacle goose  
*Branta canadensis leucopareia* see  
 Aleutian goose  
*Branta canadensis* see Canada goose  
*Branta sandvicensis* see nene (Hawaiian  
 goose)  
*Brassica* sp. 62  
 Brazil, Atlantic forest fragmentation  
 309  
 bridled nailtail wallaby *Onychogalea*  
*fraenata* 65  
 brown bear *Ursus arctos* 332  
 Pyrenean race 480, 498  
 Brown's banksia *Banksia brownii* 272,  
 415  
 brush-tailed bettong *Bettongia*  
*penicillata* 354  
 Bryde's whale *Balaenoptera endeni*  
 472–3  
 buffalo, African *Syncerus caffer* 65, 127,  
 486  
 bullfrog (American) *Rana catesbeiana*  
 354  
 bumble bee *Bombus terrestris* 39  
 bunch grass *Anthoxanthum odoratum*  
 465  
 tolerance to heavy metals 129, 148,  
 170–1, 212  
 butterflies, Finland, extinctions 31,  
 313  
 California condor *Gymnogyps*  
*californianus* 61, 83, 134–6, 143,  
 184, 260–1, 352, 431, 444–5, 496  
 case study 467  
 chondrodystrophy 83, 134–6, 260–1,  
 444–5  
 genetic disease, management 444–5  
 California spotted owl *Strix occidentalis*  
*occidentalis* 14–15  
 Canada goose *Branta canadensis* 117  
 canine distemper virus (Morbillivirus)  
 499, 515, 517  
*Canis lupus* see gray wolf  
*Canis rufus* see red wolf  
*Canis simiensi* see Ethiopian wolf  
*Capra ibex* see ibex  
 capricorn silveryeye *Zosterops lateralis*  
*chlorocephala* 509  
 captive population breeding  
 programmes 419–47  
 extent 420–1  
 founding 423–4  
 genetic adaptation in captivity  
 452–9  
 genetic changes in captivity 452  
 genetic deterioration 455  
 genetic goals 352–7  
 genetic management 427–39  
 growth 426–7  
 inbreeding depression 108, 428  
 avoiding 431–5  
 management of groups 439–41  
 maximizing  $N_e/N$  430–1  
 maximum avoidance of inbreeding  
 (MAI) 431–41  
 minimizing kinship 433–9  
 plant propagation 420–1  
 preservation following extinction  
 in wild 420  
 reintroductions 448–70  
 shortage of space 337  
 stages 422–3  
 zoos 421–2  
*Caretta caretta* see loggerhead turtle  
 Caribbean flamingo 354  
 carrier frequency 83–4  
*Castanea dentata* see chestnut,  
 American  
 Catalina mahogany *Cercocarpus*  
*traskiae* 345, 411–12  
 catastrophes 504, 515, 534  
*Cerastium fischerianum* var. *molle* 66  
*Cercocarpus traskiae* see Catalina  
 mahogany  
*Cercocebus atys* see sooty mangabey  
 chafer beetles *Prodonia modesta* and *P.*  
*bicolorata* 367  
*Chamaecrista fasciculata* 387  
 Chatham Island black robin *Petroica*  
*traversi* 184, 302, 400  
 cheetah *Acionyx lubatus* 61, 159, 300,  
 431, 485, 517  
 chestnut, American *Castanea dentata*  
 38, 148, 402  
 chi-square test 77–8  
 chimpanzee *Pan troglodytes* 64, 80  
 eastern *Pan t. schweinfurthii* 472  
 chloroplast DNA (cpDNA) 237, 534  
*Choeropsis* see pygmy hippopotamus  
 chondrodystrophy, condors 83, 134–6,  
 260–1, 444–5  
 chromosomal diversity 59–60  
 Cichlidae 372, 375  
 cinereous vulture 431  
 CITES (Convention on International  
 Trade in Endangered Species)  
 503  
 clade 534  
*Clarkia pulchella* see evening primrose  
*Clethrionomys glareolus* see bank vole  
 clines 167, 169–73  
 cloning 442–3  
 clover  
 rose *Trifolium hirtum* 460  
 white *Trifolium repens* 129  
 co-dominance, defined 48, 534  
 coalescence 475–80, 534  
 effective population size 485  
 coalescence times 478  
 coancestry 433, 534  
 see also kinship  
 cobra, blacknecked 354

- collared flycatcher 117  
 collared lizard *Crotaphytus collaris* 381, 462  
 colonial pocket gopher *Geomys colonus* 12, 217–18, 378  
*Columba mayeri* see Mauritius pink pigeon  
 computer simulation 28–30, 193–4, 195–6, 253, 507–9  
   allele frequency 193–4, 195–6, 253  
   PVAs 507–9  
 condor see Californian condor  
*Connochaetes* see wildebeest  
*Conolophus subcristatus* see Galapagos iguana  
*Conradina glabra* see Apalachicola rosemary  
 conservation biology 9  
 Conservation Breeding Specialist Group (CBSG), IUCN 534  
 conservation genetics  
   definition/scope xiii, 1, 9–10  
   management of endangered species 16–18  
   structure and content 10  
 Convention on International Trade in Endangered Species (CITES) 503  
 convergent evolution 535  
 Cook's kok'io *Kokia cookei* 176, 420  
 copepod, *Tigriopus californicus* 387  
*Copsychus sechellarum* see Seychelles magpie robin  
 cord grass see *Spartina*  
 correlation, defined 102  
 corridors 404  
 Corriagan grevillea *Grevillea scapigera* 345  
*Corvus corax* see raven  
*Corvus kubaryi* see Mariana crow  
 cotton (cultivated) *Gossypium*  
   *barbadense* and *G. hirsutum* 411  
 cotton-top tamarin *Saguinus oedipus* 112, 119  
*Coturnix coturnix japonica* see Japanese quail  
 coyote 65  
 crane  
   hooded 431  
   red-crowned 244, 431  
   whooping 67, 184, 345  
 cricket *Gryllus firmus* 425  
 critically endangered species 535  
 crossing over 93  
*Crotalus* see rattlesnake  
*Crotaphytus collaris* see collared lizard  
 crow see Mariana crow; raven  
 Cryan's buckmoth 391  
 cryopreservation 442  
 Cuvier's gazelle *Gazella cuvieri* 287  
*Cynomys* spp. see prairie dogs  
*Daphnia* see water flea  
 Darwin's cactus finch *Geospiza scandens* 117, 243, 244, 484  
 Darwin's fox *Dusicyon fulvipes* 345  
 Darwin's medium ground finch *Geospiza fortis* 115, 117, 129, 244  
 DDT control 400  
 deer mouse *Peromyscus maniculatus* 39, 288, 289  
 deleterious alleles 60–1  
 deleterious mutation 162, 198  
 demographic history, and population size 480–5  
 demographic stochasticity 28, 504, 513, 535  
*Dendrocopus medius* see middle spotted woodpecker  
 desert topminnow *Poeciliopsis monacha* 25, 284–5, 401  
 deterministic factors, endangered species 503  
*Diceros bicornis* see rhinoceros, black  
 die-back fungus *Phytophthora cinnamomi* 97–8  
 dik-dik *Madoqua* sp. 367, 386  
 directional selection 114, 145, 146–8, 191, 215, 535  
 disease  
   inherited diseases 443–4  
   species boundaries 127  
 disease resistance 129–30  
   and genetic diversity 39  
   and MHC 209  
 dispersal  
   evolutionary changes 129–30  
   and gene flow 330  
 dispersal distances 331  
 disruptive selection 145–6  
 DNA  
   non-intrusive sampling for genetic analysis 12, 475–6  
   sequence variation 62–4  
   sequencing 57–9  
   phylogenetic trees 382–4  
   see also microsatellites;  
   mitochondrial DNA  
 DNA fingerprints (minisatellites) 54–6, 64–5, 535, 540  
 dodo *Raphus cucullatus* 23  
 dog, hybridization see Ethiopian wolf (simian jackal)  
 dog see African wild dog;  
 dominance, degrees of 140–1  
 dominance variance 109, 111, 122, 535  
 Dorcas gazelle *Gazella dorcas* 270–1, 301  
*Drosophila melanogaster* see fruit fly  
*Dusicyon fulvipes* see Darwin's fox  
 dusky seaside sparrow *Ammodramus maritimus nigrescens* 367, 490, 504  
 Eastern barred bandicoot *Perameles gunnii* 61, 244, 345  
 ecological exchangeability 389–91  
 ecosystem services 535  
   value 1–2  
 ecotypes 129, 535  
 effective number of alleles ( $n_e$ ) 201, 535  
 effective population size ( $N_e$ ) 189–90, 228, 239–51, 535  
   estimating 250  
   fluctuating populations 247–8  
   inbreeding 250  
   unequal sex ratio 241–3  
   variance 250  
   variation in family sizes 243–6  
 effectively neutral alleles 214–16, 535  
 eider duck *Somateria mollissima* 73  
*Elaphurus davidianus* see Père David's deer  
 Eld's deer 513  
 electrophoresis 51–3  
 elephant  
   African *Loxodonta africana* 391  
   Asian *Elephas maximus* 30, 243, 413–14  
 emperor goose 499  
 endangered species 2–8  
   defined 6–7, 8, 535  
   deterministic factors 503  
   extent of endangerment 3–4  
   genetic diversity 65–6, 158–9  
   IUCN categories 7  
   microsatellite genetic diversity 65–6  
   regeneration of genetic diversity 158–9  
   stochastic factors 504  
 Endangered Species Acts, legal protection 7, 371, 421, 526  
 endemic species 34, 536  
*Enhydris lutra* see sea otter

- environmental stochasticity 504, 536  
 environmental variation 99  
   partitioning 105–6  
 epistasis 536  
 epistatic variance 536  
*Equus*, horse, evolution 148  
*Equus grevyii* see Grevy's zebra  
*Equus przewalskii* see Przewalski's horse  
 ethics, justification for preservation of  
   genetic diversity 1–2  
 Ethiopian wolf (simian jackal) *Canis  
 simiensis* 12, 65, 81, 169, 345, 411  
 eucalypts, glaucousness 212–13  
*Eucalyptus coccifera* see Tasmanian snow  
   gum  
*Eucalyptus gigantea* see gigantic  
   eucalypt  
*Eucalyptus gunnii* see gunni eucalypt  
*Eucalyptus marginata* see jarrah tree  
*Eucalyptus urnigera* see urn gum  
*Euperipatoides leuckartii* see velvet worm  
*Euphydryas editha bayensis* see bay  
   checkerspot butterfly  
 euro *Macropus robustus erubescens* 34,  
 285  
 evening primrose *Clarkia pulchella* 31  
 evolution  
   adaptive 128  
   convergent 129  
   large populations 126–53, 154–74  
   small populations 175–96  
 evolutionarily effective population  
   size 485  
 evolutionarily significant units (ESU)  
   388–9, 536  
 evolutionary potential 341–3, 536  
   and heritability 111–18  
   impact of population size 347–8  
*ex situ* conservation 441, 536  
 exons 62, 536  
 expected heterozygosity ( $H_e$ ) 78, 201,  
 536  
 extinction rates  
   plants 5  
   projections 5–6  
 extinction vortex 32, 505, 536  
 extinctions 23–44  
   causes  
     circumstantial evidence 32  
     human-associated factors 7–8  
     inbreeding depression 28, 32–3  
     loss of genetic diversity 36–9  
     stochastic factors 8  
     deterministic factors 503  
   island/mainland/ocean (1660 to  
     present) 4  
   population viability analysis 506–28  
   recorded (1660 to present) 4  
   sixth extinction 2  
   stochastic factors 504  
 F, Wright's inbreeding coefficient 536  
 F statistics  
    $F_{IS}$  324–7, 537  
    $F_{IT}$  324–7, 537  
    $F_{ST}$  324–7, 537  
*Falco araea* see Seychelles kestrel  
*Falco peregrinus* see peregrine falcon  
*Falco punctatus* see Mauritius kestrel  
 false poison sumach *Rhus michauxii*  
 414  
 family sizes 243–7  
   impact on effective population size  
     243–6  
*Felis concolor coryi* see Florida panther  
*Festuca ovina*, tolerance to heavy  
   metals 129, 148, 170–1, 212  
 fin whale *Balaenoptera physalus* 472–3  
 Finland, Glanville fritillary butterfly  
 31, 313  
 fishes  
   allozyme diversity 62  
   genetic distances, means/ranges 69  
   inbreeding depression 282  
   parasite load 38  
   percentage endangered 3  
 fitness see reproductive fitness  
 fixation 142, 217  
   selective sweeps 479  
 fixation index  $F_{ST}$  331, 536  
 Florida panther *Felis concolor coryi* 11,  
 345, 367–8, 397–9, 460  
   case study 518  
 flour beetle *Tribolium castaneum*,  
*T. confusum* 32, 303, 179  
   extinction due to inbreeding 32,  
   303  
   genetic drift 179  
 fluctuating asymmetry 300  
 flycatchers 117  
 forensic biology 13, 470–501, 536  
 founder effect 537  
 founder relationships 496–7  
 founders 183  
   captive populations 423–4  
   small numbers 424–6  
 founding events 192  
   effect on genetic diversity 423–6  
 fox  
   Darwin's *Dusicyon fulvipes* 345  
   San Joaquin kit *Vulpes macrotis  
     mutica* 481  
   silver *Vulpes vulpes* 147–8  
 Frankel, Sir Otto 9  
 Franklin tree *Franklinia alatamaha* 176,  
 420  
 frequency-dependent selection 199,  
 207–11, 537  
 fruit fly *Drosophila melanogaster* 63, 67  
   bottlenecks 185, 304  
   Buri's increase in variance in allele  
     frequencies over time 321  
   clines 170  
   directional selection 191  
   family size 246  
   genetic drift 324  
   heritabilities, mean 118  
   inversion polymorphism 211–12  
   mutational accumulation 350  
   speed 148  
 full-sib mating 261, 537  
 Furbish's lousewort *Pedicularis  
 furbishiae* 61, 519  
 G6PD (glucose-6-phosphate  
 dehydrogenase), deficiency 197,  
 207  
 Galapagos, see also Darwin's finches  
 Galapagos iguana *Conolophus  
 subcristatus* 464  
 Galapagos Island cotton *Gossypium  
 darwinii* 411  
 Galapagos tortoise *Geochelone  
 elaphantopus* 464  
*Gambusia holbrooki* see mosquito-fish  
 gaur *Bos gaurus* 443  
*Gazella cuvieri* see Cuvier's gazelle  
*Gazella dorcas* see Dorcas gazelle  
*Gazella spekei* see Speke's gazelle  
 gene diversity, expected  
   heterozygosity ( $H_e$ ) 78, 201, 536  
 gene dropping 537  
 gene flow 329–31  
   population structure 485–91  
 gene trees, and coalescence 475–80,  
 537  
 genetic characterization methods 476  
 genetic distance 48, 379–81, 537  
 genetic diversity 45–71  
   changes over time 228  
   characterization, quantitative  
     variation 96–125

- conservation 198  
 defined 47–50, 537  
 and disease resistance 39  
 endangered species 65–6, 158–9  
 extent 60–7  
 justification for preservation  
 1–2  
 in large populations 199–200  
 loss 225–6  
 maintenance 197–224  
 measurement 50–60  
 origin and regeneration 155–6  
 partitioning 105–6  
 reproductive fitness 220–1  
 single locus 348–9  
 time for regeneration 158–9  
 variation in space/time 67–71  
 genetic drift 178–87, 218, 324  
 defined 537  
 and selection 114, 145, 146–8  
 genetic issues in reserve design  
 410–11  
 genetic load 155, 162–7, 537  
 genetic management 419–47  
 endangered species 16–18  
 reintroductions 448–70  
 genetic markers 375–9  
 reproductive systems 492  
 genetic problems, diagnosis 401  
 genetic stochasticity 505  
 genetics  
 and minimization of extinctions  
 11–15  
 and population viability analysis  
 (PVA) 511–12  
 genome 48  
 genome resource banks 441–3, 537  
 genome uniqueness 438, 537  
 genotype frequency 76–8, 259–61  
 genotype × environment interaction  
 106, 537  
 genotypes 48  
*Gentiana pneumonanthe* 30  
*Geochelone elaphantopus* see Galapagos  
 tortoise  
*Geomys colonus* see pocket gopher  
*Geomys pinetus* see pocket gopher  
 ghost bat *Macroderma gigas* 487  
 giant panda *Ailuropoda melanoleuca*  
 345, 404  
 gigantic eucalypt *Eucalyptus gigantea*  
 213  
 giraffe *Giraffa camelopardis*, inbreeding  
 depression 25–7  
 Glanville fritillary butterfly, Finland  
 31, 313  
 glaucous gull *Larus hypoboreus* 499  
 global warming 127  
*Globicephalis melas* see long-finned pilot  
 whale  
 Gloger's rule, clines 170  
**Glossary 533–45**  
 glucose-6-phosphate dehydrogenase  
 deficiency 197, 207  
 golden hamster *Mesocricetus auratus*  
 356  
 golden lion tamarin *Leontopithecus*  
*rosalia* 30, 163, 178, 244,  
 249–50, 283, 345, 351, 354  
 captive breeding 423–5, 450–2, 461  
 computer simulation, PVA 508  
 genetic management 450–2  
 reintroductions 463  
 inbreeding depression 454  
 minimum habitat area 525–6  
 gopher see pocket gopher  
 gorilla *Gorilla gorilla* 427  
*Gossypium barbadense* and *G. hirsutum*  
 see cotton (cultivated)  
*Gossypium darwinii* see Galapagos  
 Island cotton  
 grasses see species names  
 grassland daisy *Rutidosis*  
*leptorrhynchoides* 88, 229–30,  
 373  
 gray wolf *Canis lupus* 65, 163, 332, 369  
 great tit *Parus major* 117  
 greater prairie chicken 25, 36, 231–2,  
 285, 300, 306, 401, 482, 505–6,  
 516  
*Grevillea scapigera* see Corrigan  
 grevillea  
 Grevy's zebra 244, 431  
 grey seal *Halichoerus grypus* 65  
*Grus americana* see whooping crane  
*Gryllus firmus* see cricket  
 Guadalupe Island lupine *Lupinus*  
*guadalupensis* 465  
 Guam rail *Rallus owstoni* 176, 184, 468  
 gunni eucalypt *Eucalyptus gunnii* 213  
*Gymnogyps californianus* see California  
 condor  
 gymnosperms, polyploidy 29  
 habitat area, minimum 525  
 habitat fragmentation 310  
 haemophilia 166  
*Haliaeetus leucocephalus* see bald eagle  
*Halichoerus grypus* see grey seal  
*Halocharpus bidwilli* 236  
*Haloragodendron lucasii* 414, 493  
 haplo-diploids 415–16  
 haploid loci 142  
 haplotype networks 486, 538  
 haplotypes 91, 537  
 Hardy–Weinberg equilibrium 75–89,  
 538  
 and carriers 83–4  
 deviations 84–6, 493  
 extensions 86–8  
 and inbreeding 84  
 recessive allele frequency 62, 82–3  
 sex-linked loci 88–90  
 harmonic mean 538  
 Harris's hawk *Parabuteo unicinctus* 464  
 harvesting, impacts 412–14  
 Hawaiian *Bidens* 345, 494  
 Hawaiian crow 302  
 Hawaiian duck 411  
 Hawaiian goose see nene  
 Hawaiian monk seal 511  
 heath hen *Tympanuchus cupido cupido*  
 33  
 heavy metals, tolerance to 129, 148,  
 170–1, 212  
*Helianthus* see sunflower  
 heliconius butterfly *Heliconius erato* 87  
 hemizygoty 538  
 heritability  
 defined 102, 112, 118, 538  
 estimating 118–20  
 and evolutionary potential 111–18  
 magnitudes 116–18  
 precision 120  
 realized 542  
 hermaphrodite 75, 538  
*Heterocephalus glaber* see mole-rat  
 heterosis 300, 305  
 heterozygosity (*H*) 48  
 allozyme 246  
 average 48  
 bottlenecks 185–7  
 equilibrium 202  
 expected 78, 201  
 rates of loss 237–9  
 loss of 186, 232–5, 321–4  
 observed 74, 234  
 and population size 202  
 heterozygote advantage 204–7, 538,  
 541  
*Himantopus novaezelandiae* see black  
 stilt

- hitchhiking 538  
 HIV-1 and HIV-2 499  
 homozygosity 48, 538  
 honeycreeper, Hawaiian *Vestiaria* 45, 130, 375  
 honeysuckle, roundleaf *Lambertia orbifolia* 493–4  
 Hong Kong lady's tresses orchid  
*Spiranthes hongkongensis* 373–4  
 horse, evolution 148  
 horseshoe crab 381  
 housefly *Musca domestica*, inbreeding depression 285  
*Howellia aquatilis* 61  
 human population  
 growth 8  
 total 8  
 humpback whale *Megaptera novaeangliae* 345, 472–3  
 hybridization, detecting 12, 168, 369, 411, 476  
*Hymenoxys acaulis* var. *glabra* see lakeside daisy  
 ibex *Capra ibex* 385–6  
 idealized population 188, 538  
 identity by descent 257, 538  
 illegal hunting/collecting 472–5  
 impala *Aepyceros melampus* 486  
*in situ* conservation 538  
 inbreeding 254–79, 538  
 and extinction 286  
 genetic consequences 258–62  
 and migration 328–31  
 parentage 494–6  
 and selection 297  
 small populations 263–8  
 see also self-fertilization  
 inbreeding coefficient  $F$  25, 256–8, 538  
 average  $F$  26  
 indirect estimation 267–8  
 inbreeding depression 24–7, 187, 226, 248–9, 280–308  
 captive populations 108  
 characteristics 287–95  
 computer projections 29–30  
 defined 538  
 detection and measurement 299–302  
 examples 282  
 minimization of extinction risk 11  
 purging 295–9  
 rate, and extinction risk 28  
 recovering 305–6  
 and reproductive fitness 18  
 in species that regularly inbreed 290, 431–41  
 susceptibility 120–1  
 variability 288–90  
 indigo bunting 117  
 industrial melanism 37, 126, 129, 137–9, 144–5, 171  
 inherited diseases 443–4  
 insecticide resistance 130  
 interaction variance 109, 111, 538  
 International Species Information System (ISIS) 422  
 introgression 16, 168, 411, 538  
 introns 62, 539  
 inversion polymorphism 211–12, 539  
*Ipomopsis aggregata* see scarlet gilia  
 island extinctions, recorded (1660 to present) 4  
 island populations 19, 33–6, 313–17  
 bottleneck to genetic diversity 19  
 extinction proneness 33–6  
 Isle Royale gray wolf *Canis lupus* 183, 267–8, 347–8, 509  
 isolating factors, origin of species 372–3  
 isozymes 539  
 IUCN (World Conservation Union)  
 aims 2, 420  
 CAMPs 422  
 captive breeding policy 422  
 CBSG 534  
 classification of endangerment 7  
 PVAs 508  
 Species Survival Commission 422  
 Japanese quail *Coturnix coturnix japonica*, inbreeding depression 27–8, 288  
 jarrah tree *Eucalyptus marginata* 97–8, 103  
 disease resistance 97–8  
 kangaroo see euro; red kangaroo  
 Kemp's ridley sea turtle *Lepidochelys kempii* 366  
 kestrels 65, 177  
 king penguin 117, 431, 431  
 King's lomatia *Lomatia tasmanica* 61, 414  
 kinship ( $k_{ij}$ )  
 captive populations 433–9  
 defined 539  
 mean 435  
 minimizing 457  
 Kirtland's warbler 345  
 koala *Phascolarctos cinereus* 65, 408–10, 482–3, 491  
*Kokia cookei* see Cook's kok'io  
 komodo dragon *Varanus komodoensis* 65, 345  
 lakeside daisy *Hymenoxys acaulis* var. *glabra* 38, 352, 407  
*Lambertia orbifolia* see honeysuckle, round-leaf  
*Lanius lucovicianus mearnsi* see San Clemente Island loggerhead shrike  
*Larus hypoboreus* see glaucous gull  
 Laysan duck (teal) *Anas laysanensis* 491  
 Laysan finch *Telespiza cantans* 65, 74, 79, 86  
*Leontopithecus chrysopygus* see black lion tamarin  
*Leontopithecus rosalia* see golden lion tamarin  
*Lepidochelys kempii* see Kemp's ridley sea turtle  
*Lepus americanus* see snowshoe hare  
 lesser snow goose see snow goose  
 lethal alleles 261–2, 275–6  
 inbreeding depression 293–4  
 lethal equivalents ( $B$ ) 301–4, 539  
 lethal mutations 158, 162, 192  
*Leucopsar rothschildi* see Bali starling  
 light-footed clapper rail *Rallus longirostris levipes* 66  
*Limonium duforii* 414  
 lineage sorting 383, 539  
 linkage (dis)equilibrium 90–3, 219  
 coefficient of 534, 539  
 lion  
 African *Panthera leo* 49, 499  
 Asiatic *Panthera leo persica* 50, 244–5, 345  
 lizards see collared lizard; sleepy lizard  
 loci 48, 539  
 mutations 157  
 loggerhead shrike *Lanius lucovicianus* 65  
 see also San Clemente Island loggerhead shrike  
 loggerhead turtle *Caretta caretta* 13, 470, 488–9, 495, 517  
*Lomatia tasmanica* see King's lomatia  
 long-finned pilot whale *Globicephalis melas* 488

- long-footed potoroo *Potorous longipes* 65, 375–6
- Lord Howe Island woodhen  
*Tricholimnas (Gallirallus) sylvestris* 176, 345, 352, 400, 425  
 case study 468–9, 518–19
- Loxodonta africana* see elephant
- Lupinus guadalupensis* see Guadalupe Island lupine
- Lycaon pictus* see African wild dog
- lynx *Lynx canadensis* 247, 504
- Lysimachia minorcicensis* 66, 460
- Macroderma gigas* see ghost bat
- Macropus robustus erubescens* see euro
- Madoqua* sp. see dik-dik
- mahogany see Catalina mahogany; royal mahogany
- maize *Zea mays*  
 inbreeding depression 282, 295  
 quantitative trait loci (QTL) 100, 123  
 two-way selection 149
- major histocompatibility complex (MHC) 38, 90, 92, 207–10, 539  
 drift 218  
 selection coefficient  $s$  145
- Malacothamnus fasciculatus* var. *nesioticus* see Santa Cruz Island bush mallow
- malaria 196, 204–7  
 avian 498
- malheur wirelettuce *Stephanomeria malheurensis* 176, 415
- mallee 414
- Malurus splendens* see splendid fairy wren
- mammals  
 allozyme diversity 62  
 extinction rates 4  
 genetic distances, means/ranges 69  
 inbreeding depression 282  
 percentage endangered 3
- management of captive populations 439–41
- management units, defining 12, 388–92
- management of wild populations 394–418
- Mariana crow *Corvus kubaryi* 65
- mass extinctions 504  
 sixth extinction 2
- matchstick banksia *Banksia cuneata* 509, 519–20
- mathematical models, role 132–3
- Mauna Kea silversword *Argyroxiphium sandwicense* var. *sandwicense* 176, 345, 407  
 case study 469
- Mauritius kestrel *Falco punctatus* 65, 67, 79, 176–7, 184, 302
- Mauritius pink pigeon *Columba (Nesoenas) mayeri* 184, 244, 302, 345, 425
- maximum avoidance of inbreeding (MAI) 431–41
- mean, defined 101
- mean kinship ( $mk$ ) 435, 539
- Megaptera novaeangliae* see humpback whale
- melanism, industrial pollution 37, 126, 129, 137–9, 144–5, 171
- Meleagris gallopavo* see turkey
- merino sheep *Ovis aries* 112
- Mesocricetus auratus* see golden hamster
- meta-analysis 539  
 mammals, example 18
- metapopulations 313, 332–3, 539
- Mexican wolf *Canis lupus mexicanus* 65, 108, 289, 367, 497
- microsatellites 53–7, 63–6, 539  
 genetic characterization methods 476  
 paternity determination 494–6
- middle spotted woodpecker  
*Dendrocopus medius* 33
- migration 167–73  
 detecting immigrants 488–9  
 and inbreeding 328–31
- migration corridors 404
- migration–selection equilibrium frequency 171–2
- minimum viable population size (MVP) 337–9, 506–7, 524–6, 539
- minisatellite (VNTR) 54–6, 64–5, 535, 540
- Mirounga angustirostris* see northern elephant seal
- Mirounga leonina* see southern elephant seal
- mitochondrial DNA (mtDNA) 540  
 analysis 59–60, 378–9, 476  
 scats 13, 480–1  
 evolutionarily significant units (ESU) 388–9
- mole-rat, naked *Heterocephalus glaber*, inbreeding depression 272–3
- molecular genetics, forensic biology 13, 470–501, 536
- Mongolian wild horse see Przewalski's horse
- monomorphic 48, 540
- monophyletic classifications 371, 540
- Monte Carlo simulations 193–4
- Morbillivirus see canine distemper virus
- mosquito-fish *Gambusia holbrooki*, extinction due to inbreeding 32, 303
- muntjac deer *Muntiacus* spp. 59, 370, 376
- Musca domestica* see housefly
- Mustela nigripes* see black-footed ferret
- mutation 156–67  
 balancing selection 199  
 beneficial 199  
 deleterious 198  
 human 162  
 lethal 158, 162, 192  
 neutral 156, 199, 200–3  
 reverse 160  
 small populations 191–2
- mutation load 162–7, 540  
 defined 155
- mutation rate  
 examples 157  
 from mutation–selection balance 165–6  
 and stable equilibrium 160
- mutation–selection balance 162–7, 275–7, 540  
 and fitness 166  
 polyploids 164–5
- mutational meltdown 349, 540
- myxoma virus, rabbit 129–30
- Nasella pulchra* 460
- natural selection 540  
 see also selection
- Nei's genetic distance 379–81, 540
- Nei's genetic similarity 540
- nene (Hawaiian goose) *Branta sandwicensis* 67, 184, 400, 482, 484
- neutral mutation 156, 199, 200–3, 540
- Nicotiana* see tobacco
- Ninox novaeseelandiae undulata* see Norfolk Island boobook owl
- non-synonymous substitution 540
- Norfolk Island boobook owl *Ninox novaeseelandiae undulata* 273–4, 367, 382–3, 490, 498
- normal distribution 96, 100, 540

- northern elephant seal *Mirounga angustirostris* 61, 176, 183–4, 241–2, 248, 339, 484–5  
 inbreeding 266–7  
 northern right whale *Eubalaena gracialis* 345  
 northern spotted owl *see* spotted owl  
 nucleotide substitutions 201  
 nyala *Tragelaphus angasi* 354
- observed heterozygosity 74, 540  
*Ochotona princeps see* pika  
 okapi *Okapia johnstoni* 302–3, 431  
 old-field mouse *Peromyscus polionotus* 288, 289  
*Onychogalea fraenata see* bridled nailtail wallaby  
 orangutan *Pongo pygmaeus* 367, 371, 377–8  
*Oryctolagus cuniculus see* rabbit  
*Oryx dammah see* scimitar-horned oryx  
*Oryx leucoryx see* Arabian oryx  
 outbreeding depression 10, 385–8, 541  
 overdominance 199, 204–7, 296, 541  
 associative 219–20  
*Ovis aries see* merino sheep  
*Ovis canadensis see* bighorn sheep  
 owl monkey *Aotus trivirgatus* 367, 386  
 owl *see* barred owl; spotted owl
- Pacific ridley turtle *Lepidochelys olivacea* 366  
 Pacific yew *Taxus brevifolia* 249, 326, 494  
 Palo Verdes blue butterfly 345  
*Pan troglodytes see* chimpanzee  
 panda *see* giant panda; red panda  
 panmictic 541  
*Panthera leo persica see* lion, Asiatic  
*Panthera leo see* lion, African  
*Panthera pardus orientalis see* Amur leopard  
*Panthera tigris see* tiger  
*Parabuteo unicinctus see* Harris's hawk  
 parasite load, fishes 38  
 parentage, paternity determination 494–6  
 partial dominance 541  
*Partula taeniata* and *P. tenuis* 101, 103, 113, 354, 420  
 heritabilities 119  
*Parus*, titmice 117  
*Pedicularis furbishiae see* Furbish's lousewort  
 pedigrees 269–71, 541
- penguin 117  
 peppered moth *Biston betularia*, industrial melanism 37, 126, 129, 137–9, 144–5, 171  
*Perameles gunnii see* Eastern barred bandicoot  
 percentage of loci polymorphic (*P*) 541  
 Père David's deer *Elaphurus davidianus* 184, 420  
 peregrine falcon *Falco peregrinus* 65, 352, 464  
*Peripatus see* velvet worm  
 peripheral characters 108, 541  
*Peromyscus leucops see* white-footed mouse  
*Peromyscus maniculatus see* deer mouse  
*Peromyscus polionotes see* old-field mouse  
 pesticide resistance 130  
*Petrogale see* wallaby  
*Petroica traversi see* Chatham Island black robin  
*Phascolarctos cinereus see* koala  
 phenotypic intermediates 149–50  
 phenotypic variance 105  
*Photinia* 499  
 phylogenetic trees 382–4  
 phylogeography 541  
*Phytophthora cinnamomi see* die-back fungus  
*Picoides borealis see* red-cockaded woodpecker  
 pied flycatcher *Ficedula hypoleuca* 117  
 pika *Ochotona princeps* 488  
 pink pigeon *Columba (Nesoenas) mayeri* 184, 244  
*Pinus torreyana see* Torrey pine  
 plagues 127  
 plant collections 421  
*ex situ* conservation 441  
 plant propagation, breeding programmes 420–1  
 plants, allozyme diversity 62  
*Platanus platanooides see* sycamore  
 pleiotropy 541  
 poaching 413–14  
 pocket gopher  
 colonial *Geomys colonus* 12, 217–18, 378  
 southeastern *Geomys pinetus* 12, 217–18, 378  
*Poeciliops occidentalis see* topminnow fish  
*Poeciliopsis monacha see* desert topminnow
- Poisson distribution 189, 243, 541  
 polar bear *Thalarctos* 65  
 polyandry 541  
 polygamy 541  
 polygyny 541  
 polymerase chain reaction (PCR) 58–9, 541–2  
 polymorphism  
 allozyme electrophoresis 49–50  
 defined 542  
 inversion 211–12  
 loci 48  
 transient 199  
 polyphyletic classifications 371, 542  
 polyploidy 60, 88–90, 373–4  
 genetic management 416  
 and inbreeding depression 29, 276–7, 294–5  
 mutation–selection balance 164–5  
 rates of loss of heterozygosity 237–9
- Pongo pygmaeus see* orangutan  
 population fragmentation 85–6, 226, 309–335, 404–10  
 degree 318–19  
 distribution of alleles 317–18  
 divergence in allele frequencies over time 319–20  
 $F_{ST}$  324–7, 537  
 genetic adaptation in captivity 457–9  
 genetic management 404–10  
 population size 176–96  
 bottlenecks 183–7, 304, 482–5  
 census (*N*) 240  
 demographic history 480–5  
 effective ( $N_e$ ) 189–90, 228, 239–51, 535  
 estimating 250–1, 339–41  
 fate <500 344–8  
 evolutionarily effective 485  
 genetic viability 336–59  
*see also* population viability analysis (PVA)  
 harmonic mean 247  
 idealized 188  
 increasing in wild populations 399–401  
 large, and evolution 126–53, 154–74  
 loss of genetic diversity 227–53  
 maximizing  $N_e/N$  430–1  
 measuring 187–90  
 reduction effects 225–6  
 single large or several small (SLOSS) 311, 314, 410

- small, and evolution 175–96  
 threatened populations 343–4  
 population structure, gene flow  
 485–91  
 population viability analysis (PVA) 18,  
 502–28  
 defined 542  
 exercises 527–8  
 extinctions 506–28  
 and genetics 511–12  
 limitations 523–4  
 minimum viable population size  
 (MVP) 337–9, 506–7, 524–6  
 predictions 520–3  
*Potentilla glandulosa* see sticky  
 cinquefoil  
 potaroo *Potorous tridactylus* 375–6  
*Potorous longipes* see long-footed  
 potaroo  
 prairie chicken see Attwater's; greater  
 prairie dogs *Cynomys* spp. 517  
 primer, defined 542  
 probe 542  
**Problems**  
 allele frequency 94, 153  
 bottlenecks 500  
 cloning 447  
 dominance 153  
 endangered species 527  
 evolutionary potential 358  
 genetic adaptation 470  
 genetic diversity 70–1, 222  
 genetic management 417  
 Hardy–Weinberg equilibrium 94  
 heritability 124  
 heterozygosity (*H*) 124, 252  
 heterozygote advantage 222  
 inbreeding 279, 308, 417  
 IUCN categories 21–2  
 kinship 446  
 lethal equivalents 308  
 linkage (dis)equilibrium 95  
 Mendelian inheritance 21  
 mutation 173–4  
 population fragmentation 334  
 population size 252  
 probability and statistics 21, 124,  
 195  
 reintroductions 470  
 revision 531–2  
 selection 151–3  
 selection differential 125  
 self-incompatibility 223  
 taxonomy 393  
**Solutions** 546–66  
*Prodontia modesta* and *P. bicolorata* see  
 chafer beetles  
 proteins  
 neutral mutation rate 202  
 variation 61–2  
 see also allozymes  
 Przewalski's horse *Equus przewalskii* 61,  
 163, 183, 244, 425, 496  
 case study 467  
 inbreeding 255–6  
 pseudogene 542  
*Pseudoryx nghetinhensi* see saola (Vu  
 Quang bovid)  
 Puerto Rican parrot *Amazona vittata*  
 30, 184, 345, 425, 515–16  
 Puerto Rican plain pigeon 66  
 puma see Florida panther  
 purging 275, 295–9, 542  
 puritan tiger beetle 392  
 pygmy hippopotamus *Choeropsis* 256  
 Pyrenean brown bear *Ursus arctos* 480,  
 498  
 quail *Coturnix coturnix japonica*,  
 inbreeding depression 27–8,  
 288  
 quantitative genetic variation 96–125,  
 542  
 correlation with molecular  
 variation 121–2  
 detecting 103–5  
 organization 122  
 partitioning 105–6, 108–11  
 vs. qualitative genetic variation 99  
 quantitative trait locus (QTL) 100, 123,  
 542  
 range of dominance 123  
 rabbit *Oryctolagus cuniculus* 129–30,  
 463  
*Rallus longirostris levipes* see light-footed  
 clapper rail  
*Rallus owstoni* see Guam rail  
*Rana catesbeiana* see bullfrog  
 (American)  
 random genetic drift 542  
 random mating, defined 542  
 randomly amplified polymorphic  
 DNA (RAPD) 55, 64–5, 542  
 RAPD 469  
*Raphus cucullatus* see dodo  
 rattlesnake *Crotalus viridis* 100  
 Aruba Island *Crotalus unicolor* 345  
*Rattus fuscipes* see Australian bush rat  
 raven *Corvus corax* 65  
 realized heritability 542  
 recessive allele frequency,  
 Hardy–Weinberg equilibrium  
 62, 82–3  
 recessive lethal selection 134–6  
 recombination 93  
 red grouse *Lagopus lagopus* 117  
 red kangaroo *Macropus rufus* 504  
 red panda *Ailurus fulgens* 431  
 Red Queen hypothesis 127  
 red wolf *Canis rufus* 289, 369  
 red-cockaded woodpecker *Picoides*  
*borealis* 311–12, 345, 352, 379,  
 395, 509  
 red-crowned crane 244, 431  
 red-ruffed lemur 61, 163, 184, 425  
 red-tailed hawk 302, 356  
 regression, defined 102  
 reintroductions 13, 543  
 genetic management 448–70  
 individuals, choice 460–3  
 sites  
 choice 459–60  
 identification by DNA 12–13  
 success 463–5  
 reproductive fitness 97, 213, 536, 543  
 heritabilities 116–18  
 and inbreeding depression 18, 281  
 relation to genetic diversity 220–1  
 retention 339–41  
 reproductive isolation, genetic  
 distance 379–81  
 reproductive systems, genetic markers  
 492  
 reproductive technology 441–3  
 reptiles  
 allozyme diversity 62  
 genetic distances, means/ranges 69  
 percentage endangered 3  
 reserves, design 410–11  
 resistance, evolution of 130  
 restriction enzyme 543  
 restriction fragment length  
 polymorphism (RFLP) 56, 485,  
 543  
*Rhagoletis pomonella* see hawthorn fly  
 rhinoceros  
 black *Diceros bicornis* 65, 391, 405,  
 512  
 Javan *Rhinoceros sondaicus* 6, 345, 352  
 one-horned (Indian) *Rhinoceros*  
*unicornis* 184, 186, 327, 336,  
 337–8, 400, 425  
*Rhus michauxii* see false poison sumach  
 Rodriguez fruit bat 431

- rose pink *Sabatia angularis* 288  
 royal mahogany 65  
*Rutidosia leptorrhynchoidea* see grassland daisy  
*Sabatia angularis* see rose pink  
*Saguinus oedipus* see cotton-top tamarin  
 salmon  
   Atlantic 65  
   chinook 240, 373, 519  
   coho 12  
   sockeye 373  
 San Clemente Island loggerhead  
   shrike *Lanius lucovicianus mearnsi* 65  
 San Joaquin kit fox *Vulpes macrotis mutica* 481  
 Santa Cruz Island bush mallow  
   *Malacothamnus fasciculatus* var. *nesioticus* 414–15, 493  
 saola (Vu Quang bovid) *Pseudoryx nghetinhensi* 377  
 scarlet gilia *Ipomopsis aggregata* 288, 401  
 scats, mtDNA analysis 13, 480–1  
*Schiedea haleakalensis* 345  
 scimitar-horned oryx *Oryx dammah* 176, 244, 431  
 sea otter *Enhydra lutra*, target population size 352  
 selection 133–50  
   adaptation 136–9  
     long-term 148  
   balancing 199, 204  
   directional selection 114, 145, 146–8  
   disruptive selection 145–6  
   frequency-dependent 207–11  
   natural selection 128  
   on mutations 160–7  
   quantitative characters 145–6  
   recessive lethal 134–6  
   small populations 190–1  
   stabilizing selection 145–6, 149–50  
   selection coefficient (*s*) 137, 139, 143–5, 543  
   major histocompatibility complex (MHC) 145  
   selection differential (*S*) 114, 543  
   selection response, prediction 115–16  
   selective sweep 543  
   selectively neutral alleles 214–16, 327, 543  
 self-fertilization 84–5, 248–9, 281, 415, 543  
 self-incompatibility 543  
   alleles 37–8, 210–11, 217, 229–30  
 sensitivity analysis 516–17, 543  
 sentry milk-vetch *Astragalus* 67  
 sex determination 497  
 sex ratio 241–3  
 sex-linked loci 543  
   Hardy–Weinberg equation 88–90  
 sexing, molecular 497–8  
 Seychelles kestrel *Falco araea* 65, 177  
 Seychelles magpie robin *Copsychus sechellarum* 302, 345  
 Seychelles warbler *Acrocephalus sechellensis* 99, 283, 345, 400  
 sheep  
   bighorn 33, 332, 513  
   merino 112  
   Soay 38, 288, 521–3  
 sibling species 381, 543  
 sickle cell anaemia 204–7  
 silent substitution 62, 156, 543  
 silver fox *Vulpes vulpes* 147–8  
 simian jackal see Ethiopian wolf  
 single large or several small (SLOSS) 310, 311, 314, 410, 544  
 single locus genetic diversity 348–9  
 single nucleotide polymorphism (SNP) 56, 544  
 single strand conformational polymorphism (SSCP) 56  
 sixth extinction 2  
 sleepy lizard *Tiliqua rugosa* 65  
 small scabious *Scabiosa columbaria* 405  
 snow goose, lesser *Anser caerulescens* 117, 119, 120, 489–90, 495  
 snow leopard *Panthera pardus orientalis* 425  
 snowshoe hare *Lepus americanus* 247  
 Soay sheep 38, 288, 521–3  
 Socorro dove *Zenaidura macroura* 176  
 Socorro Island red-tailed hawk 302, 356  
*Somateria mollissima* see eider duck  
 song sparrow 117  
 sooty mangabey *Cercocebus atys* 499  
 Soulé, Michael 9  
 source–sink 333, 544  
 southeastern pocket gopher *Geomys pinetus* 12, 217–18, 378  
 Southern blot 544  
 southern elephant seal *Mirounga leonina* 241–2  
 sparrow see dusky seaside sparrow; song sparrow  
*Spartina*, polyploidy 89  
 speciation 544  
   allopatric 372  
   instantaneous 373–4  
   sympatric 372  
 species  
   defined 370–1, 544  
   delineating using genetic markers 375–9  
   lifespan 5  
   management units, defining 12  
   origin  
     allopatric/sympatric 372  
     instant speciation 373–4  
     isolating factors 372–3  
     slow speciation 374–5  
   sibling 381  
 species survival plans (SSPs) 421  
 spectacled eider duck *Somateria fischeri* 499  
 Speke's gazelle *Gazella spekei* 425  
*Sphenodon guntheri*, *S. punctatus* see tuatara  
*Spiranthes hongkongensis* 373–4  
*Spiranthes sinensis* 373–4  
*Spiranthes spiralis* 373–4  
 spix macaw 431  
 splendid fairy wren *Malurus splendens* 283, 496  
 spotted owl *Strix occidentalis*  
   Californian *Strix o. occidentalis* 14–15  
   northern *Strix o. caurina* 14–15, 61, 509  
 SSCP see single strand conformational polymorphism  
 SSPs see species survival plans 421  
 stabilizing selection 145, 149–50, 544  
 stable equilibrium 160, 544  
 standard deviation, defined 102  
 starling  
   Bali *Leucopsar rothschildi* 345, 496  
   European *Sturnus vulgaris* 100, 117  
*Stephanomeria malheurensis* see malheur wirelettuce  
 stickleback, three-spined 373  
 sticky cinquefoil *Potentilla glandulosa* 107  
 stochastic evolution 177  
 stochastic factors  
   endangered species 504  
   interactions 505–6

- stochasticity  
 defined 544  
 demographic 28, 504, 513  
*Strix occidentalis* see spotted owl  
*Strix varia* see barred owl  
*Sturnus vulgaris* see starling  
*Styrax texana* see Texas snowbell  
 subspecies, defined 371  
 sunflower  
   Californian *Helianthus exilis* 366  
   Texan *Helianthus paradoxus* 367  
 supportive breeding 465–6, 544  
 sycamore *Platanus platanoides* 374  
*Sylvia atricapilla* see blackcap  
 sympatric species 372, 544  
*Syncerus caffer* see buffalo  
 synonymous substitution 544
- Taita thrush *Turdus helleri* 498  
**Take-home messages** 529–30  
 tandem repeats 54–6, 64–5, 535, 544  
 Tasmanian snow gum *Eucalyptus coccifera* 213  
 taxon 544  
 taxonomic status 365–94  
   flowchart of questions 17  
   management units 399  
   and minimization of extinction risk 11–12  
   susceptibility to inbreeding depression 29  
*Taxus brevifolia* see Pacific yew  
*Telespiza cantans* see Laysan finch  
 Texan sunflower *Helianthus paradoxus* 367  
 Texas snowbell *Styrax texana* 346  
*Thalarctos* see polar bear  
 thalassaemia 197, 207  
 thale cress *Arabidopsis thaliana* 100  
*Thomomys* see pocket gophers  
 threatened populations  
   defined 544  
   recovering 516–17  
   size 343–4  
 threatened species, defined 6, 544  
 tiger beetle 392, 490  
 tiger *Panthera tigris*  
   Bengal 386  
   Siberian 184, 354, 386, 425  
   Sumatran 244
- Tigriopus californicus* 387  
*Tiliqua rugosa* see sleepy lizard  
 titmice *Parus* 117  
 tobacco *Nicotiana* 103, 104–5  
 topminnow fish *Poeciliops occidentalis* 300  
 Torrey pine *Pinus torreyana* 61  
 toxoplasmosis *Toxoplasma gondii* 127  
 trans-species polymorphism 545  
 transient polymorphisms 199, 544  
 translocations 404–7, 545  
 transposons 156, 545  
 tree swallow 117  
*Tribolium* see flour beetle  
*Tricholimnas sylvestris* see Lord Howe Island woodhen  
*Trifolium* see clover  
 tuatara *Sphenodon punctatus* and *S. guntheri* 367  
*Turdus helleri* see Taita thrush  
 turkey, wild *Meleagris gallopavo* 288  
*Tympanuchus* see Attwater's prairie chicken; heath hen
- urn gum *Eucalyptus urnigera* 213  
*Ursus arctos* see brown bear
- Varanus komodoensis* see komodo dragon  
 variable number tandem repeats (VNTR, minisatellite) 54–6, 64–5, 535, 540  
 variance  
   defined 101, 545  
   dominance variance 109, 111, 122  
   effective sizes 250  
   partitioning 109–11  
 velvet worm  
   *Euperipatoides leuckartii* 72, 86  
   *Peripatus* 72, 86, 366, 385  
*Vestiaria* see honeycreeper, Hawaiian  
 vicariance 545  
 vinegar fly see fruit fly *Drosophila melanogaster*  
*Vipera berus* see adder  
 Vu Quang bovid (saola) *Pseudoryx nghetinhensis* 377  
 vulnerable, defined 545  
*Vulpes macrotis mutica* see fox, San Joaquin kit  
 vulture, cinereous 431
- Wahlund effect 322, 545  
 wallaby  
   allied 65  
   *Petrogale brachyotis* 365, 375  
   *Petrogale godmani* 365  
   *Petrogale lateralis* see black-footed rock wallaby  
 warbler see Kirtland's; Seychelles warbler  
 water flea *Daphnia* 129–30  
 whale meat, forensic biology 472–4  
 white-footed mouse *Peromyscus leucopus* 354  
 white-naped crane *Grus vipio* 354  
 white-winged wood duck *Aix sponsa* 431, 464  
 whooping crane *Grus americana* 67, 184, 345  
 wild populations, management 394–418  
 wildebeest *Connochaetes* 127  
 wolf see Algonquin wolf; Ethiopian wolf; gray wolf; Isle Royale wolf; red wolf  
 Wollemi pine *Wollemia nobilis* 1, 11, 66, 102, 346, 403  
 wombat  
   northern hairy-nosed *Lasiiorhinus krefftii* 65, 176, 227, 236, 237, 250–1, 345, 400, 475  
   reintroduction sites 12–13  
   southern hairy-nosed *Lasiiorhinus latifrons* 65, 227  
 wood duck *Aix sponsa* 431, 464  
 woodpecker  
   acorn 331, 516  
   middle spotted 33  
   red-cockaded 311–12, 345, 352, 379, 395, 509  
 World Conservation Union see IUCN
- Y-specific probes 488  
 yellow-bellied marmot 271
- Zea mays* see maize  
 zebra, Grevy's *Equus grevyi* 244, 431  
*Zenaida graysonii* see Socorro dove  
*Zieria prostrata* 491  
 zoos 421–2  
*Zosterops lateralis chlorocephala* see Capricorn silvereeye