

Subject index

Page numbers in *italics* refer to illustrations; those in **bold** refer to tables. For countries please see Countries index.
For fish names please see Fish index

- aboriginal fisheries 421–425, 435
 - archaeological studies 421
 - Australia 405–407, 407
 - recreational fishing 408
 - Cambodia 427–430
 - Canada 422–424, 432–434
 - environmental degradation
 - impacts 424–425
 - governance and fishing rights 422–424
 - habitat management issues 424–425
 - New Zealand 410, 411, 425–427
 - Norway 430–432
 - United States 170, 423, 424, 432–434
 - see also* subsistence fishing
- accountability principle 518
- acidification 43, 564
 - Fennoscandia 103, 114
 - Western Europe 185–186
 - see also* pollution; water quality
- acute-to-chronic ratio (ACR) 702
- adaptation investigation 821–822
- adaptive genetic variation 812
- adaptive management (AM)
 - framework 457
 - see also* management
- aeration 589, 589, 733–734
 - aerating turbines 733
- Africa *see* tropical Africa
- agricultural land use
 - Fennoscandia 114
 - irrigation *see* irrigation schemes
- Alaska 85–86
 - fisheries 88–89
 - management activities 92–93
 - see also* northern North America
- Alaska Board of Fisheries (BOF) 92
- Alaska Department of Fish and Game (ADFG) 92
- Alden turbine 744
- algal blooms, estuaries 53, 70
- alien species 44, 475–476
- African countries 246, 356–357, 357
 - Lake Victoria 349–350, 356
- aquaculture escapees 800
 - genetic detection of
 - interbreeding 820–821
 - monitoring of 820
- Asian countries 379–380, 395
 - China 226, **226**, 228–229
 - Japan 233–236
 - Southeast Asia 371
- Australasian countries
 - Australia 407, 408
 - New Zealand 412
 - Papua New Guinea 414
- climate change effects 657–658
- ecosystem models 493–494
- European countries
 - Balkan countries 289
 - Belarus 219
 - Czech Republic 205
 - Fennoscandia 108, 108, 110
 - Greece 293–295
 - Hungary 198–199
 - Iberian Peninsula 272–273, 275–276
 - Italy 290
 - Poland 213
 - Russia 123, 127, 127, 128
 - Slovakia 191–192, 194
 - Western Europe 183, 187
- eutrophication relationships 787–788
- fisheries context 770
 - benefits and impacts of non-native species 771
 - impact examples 771–773
 - risk assessment 773–774, 774
- interspecific interactions 573–574
 - predation by non-natives 567, 574
- invertebrates 772
- Janus syndrome 774–775
- macrophytes 773–775
- management 567
- North America
 - Canada 156
 - Great Lakes 138, 139, 144–146, 493–494
 - United States 172–173, 173, 174, 175
 - see also* subtropical America (below)
- regulations 775, 798
- South American river basins 314–315, 330, 333, 337–338
- subtropical America 258, 261, 263, 264
- yield prediction model 486–487
- alkalinity 587
- Amazon River basin 319–322, 474
 - fisheries catch 319–322, **322**
 - species **320–321**
 - management strategies 322
 - sediment dynamics 15
 - small-scale commercial fisheries 439–440
 - see also* South American river basins
- ammonia 587
- amphidromous species 57
- anadromous species 57, 68–69
- androgens, synthetic 799
- angling *see* recreational and sport fishing
- annual quotas 566–567
- anthropogenic impacts
 - estuaries 64–66, 65, 70–71
 - greenhouse gas emissions 645
 - lakes 41–44, 42
 - rivers 22–26
 - future scenarios 25–26
 - hydrological changes on regulated rivers 22–24
 - sediment regime changes 24
 - see also* climate change; impoundments; pollution
- anti-fishing movement 460
- antimicrobial use in aquaculture 799
- Apure River, South America 319

- aquaculture 580–592, 794
 Asian countries 390–393, **393**
 China 221–222, 225–228, **225**, 227, 617, 735
 culture-based fisheries (CBF) 390–931, 395–397
 Japan 231, 232
 Southeast Asia 369–370, 370, **370**
 Turkey 308, **309**
 Australasian countries
 Australia 408
 New Zealand 412
 Papua New Guinea 415
 best practices 592
 capture fisheries for 444–445, 445, 472
 climate change relationship 800, 801
 conservation role 735
 culture species 581–583
 Cichlidae 582
 Cyprinidae 582
 Salmonidae 583
 Siluriformes 582–583
 domestication effects 573, 800
 efficacy indicators **592**
 environmental effects 794–801
 energy use 797
 escapees 800, 820–821
 feed provision 797
 land use 795
 parasites and microorganisms 799–800
 seed 797
 wastes 797–800
 water use 795–797, **796**
 European countries
 Balkan countries **288**, 289–290, 289
 Belarus 219, 220
 Czech Republic 203–204
 Fennoscandia 113–115
 Hungary 198
 Iberian Peninsula 275
 Italy **288**, 289–290, 289
 Poland 209–213, 212
 Russia 129
 Slovakia 194
 Western Europe 183, 617
 eutrophication relationships 787
 genetic management 573
 global overview 580–581
 growth of 581
 growth rate of fish 584–585, 585
 herbivorous *v.* carnivorous
 species 617–618
 social acceptance of non-carnivorous fishes 618–619
 management 472
 mitigation hatcheries 735–736
 North America
 Canada 94
 Great Lakes 146
 Mexico 261
 United States 92, 167, 170–171
 see also subtropical America (below)
 polyculture 584, **584**
 principles of 583–584
 production systems 590–591
 cages and raceways 590–591
 ponds 590
 recirculation 591
 unfed systems 591
 productivity increase 587–589
 feed provision 584, 588–589, **589**
 fertilization 583, 587–588
 subtropical America 258, 261, 261
 sustainability 591–592
 water quality management 586–587
 aeration 589, **589**
 alkalinity 587
 nitrogenous wastes 587, 589, 590, 591
 oxygen 586–587, 586, 589
 yield 585–586, 586
 AquAdvantage® salmon 595, 605
 aquarium fish trade *see* live fish trade
 Aral Sea 669–670
 Archimedes screw turbine 744–745, 745, 747
 Arrow Lakes Reservoir, British Columbia 724
 artificial reefs 565
 artisanal fisheries 473
 Asian countries 366, 380, 392, 775
 Balkan countries 286–287, **287**
 climate change effects 670, 671
 Italy 286–287, **287**
 South American river basins 313, 315, 321, 325, 326, 330, 333, 335–337, **337**
 subtropical America 258–259, 259
 see also commercial fisheries; subsistence fishing
 Ash Meadows National Wildlife Refuge, Nevada 257, 257
 Asian inland lacustrine waters 384–399
 aquaculture 390–392
 fish biodiversity and endemism 386–388
 inland fisheries 389–390
 climate change impacts 396–397
 fisheries enhancement 394–395
 management 392–394
 significance of 389, 389
 trends in production 389, 389
 yield predictive models 395–397, **396**, 397
 lacustrine fish fauna 388–389
 v. riverine fish species 390
 see also Southeast Asia
 Asian uplands 377–383, 379
 fisheries 380–382
 assessment 483–484
 recreational fisheries 457, 458
 see also environmental assessment (EA); stock assessment
 Atlantis model 491
 ATP-binding cassette (abc) transporters 700
 Axios River, Greece 294
 Ayeyarwady River, Myanmar 363–365, 371
 bacterial coldwater disease (BCWD), Japan 234
 baffle passes 738
 bag limits 566–567
 decision tree 568
 bait
 eutrophication effects 787
 fishing for 470
 South American river basins 327, 328
 balanced harvest 526–537
 empirical case studies 526–534
 Bangweulu swamps fishery, Zambia 527–531
 Lake Volta, Ghana 531–534
 size-based models 534–537
 Balkan countries 283, 284, 293
 alien species introductions 290
 aquaculture **288**, 289–290, 289
 biogeographical regions 293
 commercial and recreational
 fishing 288–289
 fish habitats 285
 human impact 290
 fishing techniques 288
 fish species 285–287, **287**
 threatened species **286**
 Bangweulu swamps fishery, Zambia 527–531
 biomass-size distribution 529–530, 530
 catch size composition related to fishing methods 530–531, 531, 532
 fishing gears **528**
 fishing mortality 529
 barotrauma 728
 behavioural screening and guidance systems 747
 benthic invertebrates, estuaries 62–63
 bioaccumulation 697, 702
 bioassays 33
 bioclimatic envelope 649
 biocontrol 604
 biodiversity
 loss of 726, 725
 surveys, environmental DNA approach 823–824
 biofiltration 589, 590, 591
 biofloc technology 591
 biological hotspots 19
 biologically inactive metal (BIM)/biologically active metal (BAM) model 704

- biological research 479
- biomanipulation 565–566, 787–789, 788
- biomass-size distribution 530, 535, 535
- biomonitoring 603–604
- biotic ligand model (BLM) 704, 705
- blackfishes 365, 366
- Borland lift design 741
- by-catch 525
- bypass systems 736, 741

- cadmium uptake 698
- carbon dioxide
 - atmospheric 43
 - dissolved 587
- carcass planting 734–737
- carrying capacity 583–584
 - feed effect 584
 - fertilization effect 583
 - water quality relationship 583
- catadromous species 57, 69–70
 - Fennoscandia 107
- catchability 524
- catch and release 567
- catch-at-age models 490, 490
- catch per unit effort (CPUE) 530
- cavitation 728
- Changjiang River, China 223
- Chao Phraya River 363, 365, 371
 - pollution 372
- Chikuma River system, Japan 237–238, 238
- chlorofluorocarbons (CFCs) 43
- Churchill River, Canada 155
- Clean Water Act (1972), United States 174, 799
- climate 644
 - future prediction 644–646, **646**, **647**
 - impact on freshwater fishes 643
 - acclimation effect 650
 - biogeographical distribution 650, 655–656
 - estimation of future changes 647–649
 - water temperature effects 650–651
 - importance to freshwater
 - fisheries 649–652
 - modelling 645–649, 663
 - bioclimatic envelope 649
 - mechanistic or process-based models 649
 - natural variation 644
- climate change 24, 43, 70, 641–677, **653**
 - aquaculture relationship 800, 801
 - community- and ecosystem-level responses 657–658
 - bottom-up processes 657
 - top-down regulation 657
 - extreme weather events 675
 - fisheries impacts 95, 397–398, 643–644, 670–674
 - Africa 357–358
 - Asia 371, 397–398
 - Belarus 220
 - management of 675–677
 - New Zealand 412–413
 - recreational fisheries 671
 - Russia 125–126
 - subtropical America 264
 - United States 175–176
 - Western Europe 186
 - freshwater ecosystems as indicators 642
 - freshwater habitat effects 658, **659–662**
 - lakes 666–669
 - salinity 669–670
 - temperature and thermal regime 664, 664
 - water availability 664–670
 - impact monitoring parameters **676**
 - impact on fishers 670–671, 675
 - individual fish responses 652–654
 - population-level responses 654
 - species-level responses 654–657
 - see also* climate
- Clunie Dam, Scotland 747
- cold tolerance modification 602–603
- Colorado River, United States/Mexico 262
 - impoundment effects 721
- Columbia River Basin, Canada/United States 425
 - impoundment effects 726–727, 730, 749
 - mitigation 733–735, 741–746
- co-management 479
- commercial fisheries 421, 438–446
 - Asian countries 366–369, 389–390
 - China 221–225
 - culture-based fisheries 389–390, 395–397
 - fisheries enhancement 394–395
 - Japan 231–233, 232, 233, 235
 - trends 367–369, 368, 369, 389, 389
 - Turkey 307–308, **307**, **308**
 - yield predictive model 395–397, **396**, 397
 - Australasian countries
 - Australia 408
 - New Zealand 410–411, *411*
 - Papua New Guinea 414
 - capture fisheries for aquaculture 444–445, 445, 472
 - diversity of 473
 - employment statistics 440
 - European countries
 - Balkan countries **287**, 288–289
 - Belarus 217, **218**
 - Czech Republic 201
 - Fennoscandia 111–112
 - Greece 296–301, 296–301
 - Hungary 196–198, **197**
 - Iberian Peninsula 273–274, **273**
 - Italy **287**, 288–289
 - Poland 209
 - Russia 123–125, *124*, **124**, *125*
 - Western Europe 184
 - fishing fleet 444, **444**
 - fishing gear 441–442, *441*, **441**, **443**
 - diversity of 474
 - mesh sizes 446
 - fishing operations 439–445, 440
 - conservation and 445–446
 - large-scale inland fisheries 439
 - North America
 - Canada 89–92, **91**, **92**, 94–95, **162**, 163
 - Great Lakes 140–143, *141*
 - United States 88, 168–170, **169**
 - production trends 439
 - seasonality 442–443
 - small-scale inland fisheries 439
 - South Africa 248–249
 - yield estimates **249**
 - South American river basins 312–313
 - Amazon basin 319–322, **322**
 - La Plata basin 326–333, **329**
 - Magdalena basin 313–316, *314*, *315*, 316
 - Orinoco basin 316–319, *317*, 319
 - São Francisco basin 322–323, **323**
 - see also* artisanal fisheries; threats to fisheries production
- Committee on World Food Security (CFS) 521
- Common Fisheries Policy (CFP), Europe 274
- community structure 549
 - climate change effects 657
 - size structure 535–537
- comparative surveys 33
- compensation 559–560
- Confédération Internationale de la Pêche Sportive (CIPS), South Africa 246
- connectivity *see* hydrological connectivity
- conservation
 - aquaculture for 738–739
 - Australia 409–410
 - fishing operations and 445–446
 - freshwater protected areas 446, 480, 620
 - establishment of 619–620
 - Himalayan region 380
 - management for 470
 - see also* management
 - Mexico 265
 - ‘no net loss’ principle 96–97
 - Russia 130–131
 - South American river basins 316, 338
 - units 812
 - Yukon Territory 93
 - see also* mitigation

- consumption surveys 479
- contraceptive pill toxicology 695, 706–707
- copper excretion 699
- cormorant impact on fish numbers
 - Hungary 199
 - Italy 289
 - Japan 232, 234–235
 - Poland 213
 - Slovakia 193
- cormorant use for fishing, Japan 232, 234
- critical period concept 832
- Cuatro Ciénegas Basin, Mexico 257
- Culham Inlet, Western Australia 51–53, 53
- culture-based fisheries (CBF) 390–391, 569–570
 - population dynamics 572
 - yield predictive model 395–397, **396**, 397
- culverts 727
 - fish passage improvement 740–741
 - see also* impoundments
- current velocity 19
 - see also* flow regime
- cytochrome *c oxidase 1* (CO1) gene 821
- cytochrome P450 enzymes 700, **701**, 708
- dams 22–24, 617, 719
 - Africa 357
 - Asian countries 370–371, 373, 380, 388, 617
 - China 223–224, 228
 - Japan 233, 237
 - Mekong River Delta 513, 515, 617
- categorization 720
- Egypt 244
- European countries
 - Belarus 219
 - Iberian Peninsula 275
 - Russia 120, 122, 128
 - Slovakia 192, 194
- Mexico 262
- New Zealand 412
- removal of 45, 424, 563, 747–748
 - negative effects 748
- South American river basins 323, 325, 330, 333, 338
 - see also* fish passes; hydropower development; impoundments; reservoirs; *specific dams*
- Danube River 18, 617
 - fisheries sustainability 617
 - Hungary 196, 199
 - Slovakia 191–194
- Dartmouth Dam, Australia 723
- data requirements 676–677
- deforestation
 - Fennoscandia 114
 - South American river basins 313, 314
- Denil fishways 738
- dequada phenomenon, South America 330
- deterrents 746–747
- detritus, estuaries 60–61
- diadromous species 57
 - immigration into Fennoscandia 106–107, 106
- diamond mines, Canada 96, 97
- Diavik Diamond Mine, Canada 97
- dichlorodiphenyltrichloroethane (DDT) 695
- diclofenac 695
- dietary metal exposure 705, 706
- dioxins 707–708
- disease
 - aquaculture and 799
 - climate change effects 654, 677
 - genetic modification for resistance 602
 - introduction to wild stocks 574
 - Japan 234
 - management, cultured fishes 574
- dissolved organic carbon (DOC) 688
- dissolved oxygen (DO) 586–587, 586, 651
 - aeration 589, 589, 733
 - impoundment effects 724, 734
 - water temperature relationship 651, 665
- divalent metal transporter 1 (DMT1) 698–699
- DNA barcoding and traceability 821, 823
- domestication effects 573, 800
- drivers, pressures, states, impacts and responses (DPSIR) framework 545, 545
- droughts 9, 19
 - Fennoscandia 102, 103
 - Poland 211
- drug toxicology *see* pharmaceutical toxicology
- Dunajec River 191
- Dworshak National Fish Hatchery, Canada 734
- Dworshak Reservoir, Canada 732
- dynamic pool stock assessment 489–491
- dynamic size spectrum model 535–536, 535
- ecological impact assessment (EcIA) 546
- ecology 3
- economic exclusion 506
- Ecopath with Ecosim (EwE) model 491–494, 492, 494
- ecosystem models 491–494
- ecosystems-based approach to fisheries management (EBFM) 60, 447, 526
 - South American river basins 338–341, **339**
 - United States 176
 - Western Europe 187–188
- ecosystem services 720
- EE2 toxicity 695, 706–707
- effective population size 814
- effort creep 490
- Elbe Estuary, Germany 51
- Elbe River, Czech Republic 202–205, 205
- electrofischer machines, Hungary 196
- El Niño–La Niña effects, South American river basins 315–316, 316
- empowerment 518
- enhancement
 - fisheries 394–395, 569–570
 - population dynamics 572–573
 - typology **571**
- growth rate 598–599, 599
- stock 570, **571**, 572–573
- environmental assessment (EA) 543–548
 - components of 547
 - drivers, pressures, states, impacts and responses (DPSIR) framework 545, 545
 - environmental quality–fish population relationships 549–552
 - community interactions 551
 - complex habitat and non-intuitive responses 550
 - cumulative effects 551–552
 - detectability issues 550
 - regional variation 550–551
 - sublethal effects 551
 - future developments 553
 - strategic environmental assessment (SEA) 546
- environmental DNA approach to ecological surveys 823–824
- environmental impacts 548–553, 549
 - assessment (EIA) 544–546
- environmental risk assessment 702–703
- environmental standards 552
- environmental tolerance 651
- escapees from aquaculture 800
 - genetic detection of interbreeding 820–821
 - monitoring of 820
- estuaries 7, 48–49
 - anthropogenic changes 64–66, 65, 70–71
 - climate change 70, 398
 - eutrophication 53, 70
 - overfishing 70
- biota 60, 61
- definition 49–50
- fish fauna
 - cyclical changes 51, 52
 - spatial variation 51
- food sources of fishes 60
 - benthic invertebrates 62–63
 - detritus 60–61
 - fishes 63
 - macrophytes and macroalgae 61–62
 - microphytobenthos 61
 - phytoplankton and zooplankton 62

- estuaries (*cont'd*)
 habitat use 54–57, 66–70
 benthic macroinvertebrates 57
 estuarine dependence 54–56, 59–60
 estuarine opportunists 54
 marine species 54–56
 life cycle categories 55, 56–57, 58, 66–70
 macrotidal v. microtidal
 estuaries 50–53, **50**
 nursery function 48
 productivity 48–49
 reproductive mode 63
 salinity 48, 51
 changes 53, 70
 turbidity 51
 turbulence 48
 estuarine fisheries
 Australia 408
 history of 63–64
 South Africa 251–252
 fishing methods 251
 management 252
 ethinyl oestradiol (EE2) toxicity 695,
 706–707
 euphotic depth 39
 eutrophication 41–42, 564, 625, 669,
 779–790
 as an environmental syndrome 780
 Asian countries, China 228
 definition 779
 estuaries 53, 70
 European countries
 Balkan countries 290
 Italy 285, 290
 Lake Constance 186, 477, 635,
 783–784, 783, 787
 Russia 129
 Sweden 105
 Western Europe 186–187
 fisheries as cause 785–787
 aquaculture 787
 bait and groundbait 787
 introductions and stocking 785–786
 species- and size-selective fishing 786
 geographical distribution of 779–790
 impoundment effects 724, 725
 Lake Victoria 349, 358, 783
 management 477, 787–788
 biomanipulation 787–788, 788
 negative consequences of 782–785
 direct consequences 783–785
 indirect abiotic consequences
 783–785
 indirect biotic consequences 784
 Philippines 393
 positive consequences of 780–782
 experimental studies 782
 increased phosphorus benefits 780
 observational studies 780–782, 781
 reduction consequences 788–790
 rivers 725
 see also fertilization
 evolutionary significant units (ESUs) 812
 exotic species *see* alien species
 explosives use in fishing 264
 export income 471
 extinction rate 718
 extreme weather events 675
 Farakka Barrage, Ganges River 371
 Federation of South African Flyfishers
 (FOSAF) 247
 feed provision 584, 588–589, **589**, 797
 wastes 787–800
 treatment 802
 Fennoscandia 101–116, *106*
 anthropogenic impact 103
 aquaculture 113
 drainage areas *102*
 fisheries 111–113
 fish fauna 106–111, **109**, *110*, **111**
 human-mediated introductions 108,
 108, 110
 immigration from the
 south-east 107–108
 immigration from the south-
 west 106–107, *106*
 species diversity 108–110
 fish habitats 101–102, *103*, *104*
 floods and droughts 102, *103*
 management activities 115–116
 habitat restoration 115–116
 supportive breeding 115
 surface ice 102, *103*
 threats to fisheries production 113–115
 acidification 114
 agricultural land use 114
 fish farming 114–115
 regulation of rivers and lakes
 113–114
 water quality 103, 105
 acidification 103, 114
 fertilization 476, 583, 587–588
 carcass planting 734–736
 chemical fertilizers 588, 736
 organic fertilizers 588
 see also eutrophication
 filtration 589, 590, 591
 Fish Barcode of Life database 821
 fish culture *see* aquaculture
 fish disease *see* disease
 fisheries *see* inland fisheries
 Fisheries and Aquaculture Organization of
 the United Nations (FAO)
 Code of Conduct for Responsible
 Fisheries 396–397, 399, 480, 514
 Committee on Fisheries (COFI) 513,
 519–520
 Database for Introduced Aquatic Species
 (DIAS) 371
 global inland fishing fleet estimation 445
 Japanese catch statistics 232
 Mexican catch statistics 259, 260
 South African catch statistics 248
 Technical Guidelines for Responsible
 Fisheries 462
 US commercial harvest data 169
 Voluntary Guidelines to the Right to
 Adequate Food 515
 fisheries enhancement 394–395, 570
 population dynamics 572–573
 typology **571**
 fisheries-induced evolution (FIE)
 537–538
 empirical evidence 629
 evidence for in inland waters 630–636,
 631–633
 patterns of phenotypic
 change 630–636
 search strategy 630
 gaps in understanding 629–630
 genetic analysis 822–823
 heritability of traits under selection 629
 rapid rate of phenotypic change 636–637,
 636, 637
 selective nature of fishing 628–629
 see also selective fishing
 fisheries management *see* management
 fish farming *see* aquaculture
 fish habitats
 fragmentation 174, 198
 functional habitat units 560
 habitat preferences 22
 habitat suitability 20, 22
 habitat use curves 20–22, 21
 see also freshwater habitats; habitat
 degradation; habitat management;
 specific habitats
 Fish Index of Slovakia (FIS) 195
 fishing *see* recreational and sport fishing;
 subsistence fishing
 fishing down 475, 628
 fishing fleet 445, **445**
 fishing gear 441–442, 441, **442**, **444**
 balance harvest 526
 diversity of 474
 mesh sizes 446
 Zambia 527–528, **528**
 fishing mortality 524
 Bangweulu fishery, Zambia 529
 fishing patterns 527
 see also optimal fishing pattern
 Fish Invasiveness Scoring Kit (FISK) 774
 fish ladders *see* fish passes

- fish passes 563–564, 563, 736–743, 754
 - as ecological traps 743
 - baffle passes 738–739
 - bypass systems 741, 742
 - fish ladders 736–737, 737
 - fish lifts 741
 - fish locks 741
 - Hungary 200
 - Japan 236, 236
 - nature-like 739–740, 739
 - rock ramps 740, 740
 - siphon fish pass 744
 - Southeast Asia 371
 - specialist technical passes 738–739, 739
 - step-pool fishways 736–737
 - Yukon Territory 96
 - see also* trap-and-haul systems
- fish zonation 11
- fixation index (F_{st}) 813
- Flaming Gorge Dam, United States 721–723
- floodplains
 - Africa 350
 - Asia, Southeast 365, 368
 - drainage and management impacts 371
 - connectivity loss 727
 - degradation of 175
 - Belarus 219
 - development of 17
 - ecological importance of 175
 - ecosystem models 493
 - fisheries management 489
 - fish population dynamics 19
 - impoundment effects 725–726
 - inundation 17–19
 - productivity 442, 488
 - empirical models for fisheries productivity 488–489
 - socio-economic aspects of fisheries 502
 - South American river basins 313, 323–325, **325**
 - Pantanal wetlands 326, 326, 330
- flood pulse 18, 488
 - climate change effects 665
 - impoundment effects 725
 - loss of 333, 489
- flood rivers 9
- floods 9, 19
 - Asia, Southeast 368
 - climate change effects 665
 - dequada phenomenon, South America 330
 - ecological importance of 18
 - extreme floods 17, 675
 - Fennoscandia 102
 - flood pulse concept (FPC) 18, 488
 - loss of 333, 489
 - impoundment effects 725–726
 - Poland 211
 - river channel impacts 17
 - see also* floodplains
- flow regime 13–15, 14, 175
 - climate change effects 664, **664**
 - flow-duration curves 15
 - flow-frequency curves 15
 - impoundment effects 721–723
 - flow rehabilitation 731–733, 733
 - see also* dams
 - management 564, 565
- flow regulation 22–24, 564
 - impact assessment 551, 552
 - see also* dams; irrigation schemes
- flow velocity 19
- fluvial hydrosystem 12–13
- fossil fuel consumption 677
- Fraser River, British Columbia 422–423
- Freshwater Diversity Identification for Europe database 821
- freshwater estuarine-opportunist guild 57
- freshwater fisheries *see* inland fisheries
- Freshwater Fish Marketing Corporation (FFMC), Northwest Territories 94
- freshwater habitats
 - Asia, Southeast 364–365
 - Australasian countries
 - Australia 405
 - New Zealand 410
 - Papua New Guinea 413
 - climate change effects 658, **659–662**
 - temperature and thermal regime 663, **663**
 - European countries
 - Belarus 216
 - Czech Republic 201
 - Fennoscandia 101–102
 - Hungary 196
 - Italy and Western Balkans 283–285
 - Poland 208–209
 - Russia 120
 - Slovakia 191–192
 - Western Europe 181–183
 - North America 85
 - subtropical America 257
 - Turkey 304–305
 - see also* fish habitats; habitat degradation; habitat management; *specific habitats*
- freshwater protected areas (FPAs) 446, 480, 620
 - establishment of 619–620
 - see also* conservation
- freshwater straggler guild 57
- fuzzy cognitive map (FCM) 494–495
- Ganges River 363–365, 371, 378–380
 - water abstractions 372
- gastrointestinal tract 696
 - toxicant uptake 696
- gear *see* fishing gear
- gene flow 812–816
 - assessment 813–816
 - isolation-by-distance (IBD) models 815
 - stream hierarchy model (SHM) 815, 815
 - extrinsic factors 817–818
 - intrinsic factors 817
 - see also* population genetics
- General Authority for Fish Resources Development (GAFRD), Egypt 245
- genetically modified (GH) fishes 543, 594–607, **597–598**
 - biocontrol 604
 - biomonitoring 603–604
 - concerns 594–595, 605–607
 - disease resistance 602
 - ecological considerations 605–607
 - confinement 605
 - risk assessment 605–607
 - surrogates 606–607
 - environmental tolerance
 - improvement 602–603
 - food utilization changes 601–602
 - growth rate enhancement 598–599, 599
 - pleiotropic effects of GH overexpression 599–601, 600
 - ornamental use 603
 - protein production 604–605
 - purposes for genetic modification 594
 - regulatory processes 605
 - technology 595–596
 - waste output reduction 602
- genetic diversity 812–816
 - adaptive genetic variation 812
 - assessment 813–816
 - loss of 800
 - see also* population genetics
- genetic isolation 727–728
 - isolation-by-distance (IBD) models 815
- genetic management 573
 - see also* molecular techniques
- genetic markers 813, **814**
- genetic stocks 812
 - assignment methods 816
 - clustering methods 816
- Gezhouba Dam, China 735
- gills 696
 - metal toxicity 703, 704
 - structure 696, 697
 - toxicant uptake 696, 698
- Gippsland Lakes, Australia 67, 67

- global circulation models (GCMs) 645
- Global Conference on Small-Scale Fisheries 514, 520
- global trade 504
- global warming 43, 641
 - predictions 646, **646**
 - see also* climate change
- GloFish® 595, 596, 601, 603
- governance 478
 - aboriginal fisheries 422–424
 - functions **478**
 - see also* management
- government 478–479
 - objectives 471
- Great Central Lake, British Columbia 782
- Great Lake, Cambodia 364–366, 368, 371, 384
- Great Lakes Fishery Commission 144, 145
- Great Lakes, North America *see* Laurentian Great Lakes
- Great Slave Lake fisheries, Canada 90
 - management 94
- greenhouse gases 43, 644–645
- Green River, United States 721–723
- greyfishes 365, 366
- gross yield 585
- groundbait, eutrophication effects 787
- groundwater extraction, subtropical America 262
- growth hormone (GH) 595
 - genetic modification 598
 - pleiotropic effects of overexpression 599–601, 600
- growth overfishing 525, 536, 628
- growth rate 584–585, 585
 - enhancement by genetic modification 598–599, 599
 - pleiotropic effects of GH overexpression 599–601, 600
 - stocking density relationship 585
- growth theory 525
- habitat degradation 718
 - China 228
 - European countries
 - Balkan countries 290
 - Fennoscandia 113–114
 - Hungary 198
 - Italy 290
 - Western Europe 187
 - Japan 233–234
 - Laurentian Great Lakes 146
 - South American river basins 314, 329–330, 333–334
 - subtropical America 262
 - United States 174
 - see also* eutrophication; impoundments; pollution
- habitat fragmentation 718
 - impoundment effects 727–729
 - reconnecting 736–744
 - see also* fish passes
 - see also* hydrological connectivity
- habitat management 558–566
 - common techniques 560, **561**
 - compensation 559–560
 - functional habitat units 560
 - lakes and reservoirs 564–566
 - biomanipulation 565–566, 787–788, 788
 - flow and silt deposition 565
 - physical habitat modification 564–565
- mitigation 559–560
- pollution management 477, 565, 696
- purpose 558–560
- rivers 561–564
 - flow management 564
 - physical habitat modification 561–563, 562
 - restoring connectivity 563–564, 563
- habitat preferences 22
- habitat restoration, Fennoscandia 115–116
- habitat suitability 22
 - indices (HSIs) 20, 551, 731
- habitat use curves 20–22, 21
- halogenated aromatic hydrocarbons 700
- Hardy-Weinberg equation 816
- harvest-induced selection *see* fisheries-induced evolution (FIE)
- hatcheries *see* aquaculture
- Hatch Mere, United Kingdom 786
- headwater streams 12
- hierarchical ranking 22
- Himalayan mountains 378–380
 - fisheries 380
- homogenization 175
- hooking mortality 567
- Hornborgsjön Lake, Sweden 104
- Hudson Bay, Canada 154
- human dignity 518
- human impacts *see* anthropogenic impacts; *specific impacts*
- human rights-based approach (HRBA) to development 514–515
 - application to fisheries policy 517–519, **519**
 - benefits of 516
 - enabling factors 516–517
 - human rights principles 517
 - international guidelines on small-scale fisheries 519–522
 - Lake Volta case study, Ghana 517
 - linking rights and resource governance agendas 516
 - right to food 515
 - UN Common Understanding of 514–515
- hydraulic-based habitat models 551
- hydrogeomorphological principles 12–13
- hydrological connectivity 18–19
 - Japan 236
 - restoration of 563–564, 563, 735–744
 - see also* fish passes; impoundments
- hydroponics 591
- hydropower development 677, 719–720
 - Asia
 - Mekong River Delta 515
 - Southeast 370
 - European countries
 - Belarus 219
 - Czech Republic 204
 - Finland 105
 - Iberian Peninsula 275
 - Norway 105
 - Russia 127–128
 - Slovakia 194
 - Patagonia 338
 - turbine-related mortality 727–728
 - Yukon, Canada 96
 - see also* dams; impoundments
- hypolimnion 39–40
- Iberian Peninsula 268, 269
 - aquaculture 275
 - commercial fisheries 273–274
 - economics 274
 - landings 273, 274
 - regulations 273–274
 - fish fauna 269–273, **270–271**
 - exotic species 272–273
 - native species 272
 - future directions 276–277
 - Minho River case study 277–279, 277, 278
 - recreational fishing 274–275
 - economics 274–275
 - threats to fisheries production 275–276
 - dam construction 275
 - exotic species 275–276
 - overfishing 276
 - water quality 276
 - water bodies 269, 269
- ice cover
 - climate change effects 666–667, 675
 - surface ice, Fennoscandia 102, 103
- illegal fishing 526
 - Ghana 532–533
 - Hungary 196
 - Iberian Peninsula 275
 - Italy and Western Balkans 290
 - Russia 126–127, 126
 - South Africa 251
 - Southeast Asia 366
 - subtropical America 264
 - Turkey 305
 - Zambia 527–528

- impoundments 717–755
 - biases in understanding 749–751
 - biological bias 750
 - functional response bias 750–751
 - spatial and temporal bias 749–750
 - technical bias 751–752
 - future research
 - recommendations 752–753
 - global perspective 754–755
 - impacts of 720–730, 730
 - direct and indirect mortality 728–730
 - disconnected energy and nutrient transfer 724–726
 - flow and sediment regimes 720–722
 - migratory movements 113, 371, 726–727
 - river discontinuity and habitat fragmentation 726–728
 - water characteristics 720–724
 - mitigation of impacts 731–748
 - dam removal 747–748
 - flow rehabilitation 731–733, 733
 - gas supersaturation and hypoxia 733–734
 - productivity loss 734–736
 - reconnecting fragmented habitats 736–744
 - sediment augmentation 733
 - turbines, pumps and screens 744–747
 - see also* culverts; dams; weirs
- income
 - from exports 471
 - from fishing 471, 503–504
- indigenous communities
 - marginalization 513
 - rights of 423–424, 516, 519
 - see also* human rights-based approach (HRBA) to development
 - see also* aboriginal fisheries; *specific peoples*
- inland fisheries 3, 166, 627, 643
 - as complex systems 501–502
 - benefits from 502–503
 - climate change impact 95, 397–398, 643–644, 670–674
 - management 675–677
 - diversity of 473–474
 - fisheries enhancement 394–395, 570
 - population dynamics 572–573
 - typology 571
 - fishing down 475, 628
 - global production 500, 627, 627
 - under-reporting 627
 - purposes of 470
 - sustainability 616–620, 671
 - v. marine fisheries* 3–4
 - see also* commercial fisheries; fisheries-induced evolution (FIE); recreational and sport fishing; *specific locations*
- inland fisheries reserves (IFRs) 619–620
 - see also* freshwater protected areas (FPAs)
- institutions 507
 - local 506
- instream flow incremental methodology (IFIM) 20, 551
- international agreements, Turkey 309
- International Association for Impact Assessment (IAIA) 546
- international collaboration 480–481, **481**
- Inuit fisheries management, Nunavut 94
- invasive species *see* alien species
- invertebrate introductions 772
- iron uptake 697–698
- Irrawaddy River *see* Ayeyarwady River
- irrigation schemes 23–24, 721
 - Africa 357
 - Asia 386
 - Japanese paddy fields 233, 236, 237
 - Southeast 372
 - pump-related mortality 729–730
- islands, formation in rivers 17
- isolation-by-distance (IBD)
 - model 815
- Itaipu Reservoir fisheries, South America 331–332, 332
- James Bay, Canada 154
- Janus syndrome 774–775
 - see also* alien species
- Kakisa Lake fishery, Northwest Territories 90
- Karuk tribe, United States 425
- Khmer fisheries, Tonle Sap, Cambodia 427–430
 - fishing rights and management issues 428–430
 - importance of 427
- kidney, toxicant metabolism and excretion 697, 699
- Kielder Dam, United Kingdom 735
- koi herpesvirus (KHV), Japan 234
- Kunlun mountains, China 378
- Laerdalselva River, Norway 104
- Lajeado Dam, Brazil 743
- Lake Annecy, France 184, 184
- Lake Balaton, Hungary 196, 198, 199
- Lake Chad, Africa 350, 358
- Lake Chapala, Mexico 259–260
- Lake Chilwa, Malawi 671
- Lake Chivero, Zimbabwe 358
- Lake Constance, Europe 186, 477, 635, 781–782, 781, 785
 - re-oligotrophication 788–790
- Lake Ellesmere, New Zealand 411, 412
- Lake Erie
 - commercial fishing 142
 - fishing down 628
 - policy model 494–495, 494
 - recreational fishing 139–140
 - see also* Laurentian Great Lakes
- Lake Gariep case study, South Africa 249–250, **250**, 253
- Lake Geneva, France/Switzerland 181, 184, 184, 788
- Lake Honghu, China 224–225
- Lake Hongze Hu, China 224
- Lake Huron
 - commercial fishing 142
 - invasive species 494
 - recreational fishing 139
 - see also* Laurentian Great Lakes
- Lake Kainji, Nigeria 356
- Lake Kariba, Africa 351, 355, 355, 356, 358
 - production models 487–488
 - surplus production 490
- Lake Kasumigaura, Japan 235–236, 235
- Lake Kivu, Africa 350, 356, 358
 - ecosystem model 493
 - production model 487–488
- Lake Kyoga, Uganda 356, 357
- Lake Lanao, Philippines 384, 387, 389, 390, 393
- Lake Liambezi, Namibia 358
- Lake Malawi, Africa 349, 358
 - ecosystem model 492–493, 492
 - overfishing 354
- Lake Malombe, Africa, overfishing impact 354, 354, 356
- Lake Mburo, Uganda 357
- Lake Michigan
 - commercial fishing 141–142
 - invasive species 494
 - recreational fishing 138–139
 - see also* Laurentian Great Lakes
- Lake Mikata, Japan 236–237, 236
- Lake Mweru, Zambia 356
- Lake Naivasha, Kenya 45, 356, 357
- Lake Nasser, Egypt 244–245, 244, 253
- Lake Nasser Development Authority (LNDA) 245
- Lake Ngami, Botswana 357–358
- Lake Ontario
 - commercial fishing 143, 163
 - recreational fishing 140
 - see also* Laurentian Great Lakes
- Lake Pamvotis, Greece 296
- lakes 7, 31–33
 - anthropogenic changes 41–44, 42
 - acidification 43, 114, 564
 - alien species introduction 44
 - engineering work 42–43

- lakes (*cont'd*)
- eutrophication 41–42, 564
 - pollution 43, 564
 - catchment 32
 - characteristics compared to
 - reservoirs **386**
 - climate change effects 666–669
 - ice cover 667–668
 - mixing and thermal structure 666–667
 - water levels 666
 - water quality 668–669
 - colonization 35
 - ecosystem development 35–36
 - euphotic depth 39
 - evolution within 36
 - global lake distribution 385, 386, **386**, 387
 - habitat management 564–566
 - biomanipulation 565–566
 - physical habitat 564–565
 - pollution management 565
 - hypolimnion 39–40
 - littoral zones 39–41, 40
 - modelling 34, 34
 - morphometry 35
 - oxbow lake formation 17
 - profundal zone 39–40
 - rehabilitation 44–45
 - seiches 39
 - stratification 666–667
 - study methodology 33–34
 - temporal changes 34–36
 - terminology 35
 - water chemistry 36–39, 37
 - nutrients 36–39, 668–669
 - organic chemistry 38–39
 - pH 37
- Windermere, United Kingdom
- eutrophication effects 784
 - fisheries-induced selection 630
 - see also* freshwater habitats; *specific lakes and locations*
- Lake Superior
- commercial fishing 141
 - ecosystem model 493, 494
 - recreational fishing 138
 - see also* Laurentian Great Lakes
- Lake Suwa, Japan 237
- Lake Tana, Africa 350
- Lake Tanganyika, Africa 349, 351, 358
- fishing fleet 444, **444**
 - management 446
 - production model evaluation 487–488
 - stock assessment 491
- Lake Tempe, Sulawesi 384
- Lake Victoria, Africa 349, 358, 359
- alien species introduction 349–350, 356, 493
 - ecosystem model 493
 - eutrophication 349, 358, 783
 - fisheries 442, **442**
 - socio-economic importance 350–351, **351**
 - management 446
 - overfishing 353–355, 359
 - production model evaluation 488
 - selective fishing effects 352–353, 352, 353, 634, 635
 - stock assessment model 490–491, 490
- Lake Volta, Ghana 356, 531–534
- fishing gears 533, 533
 - human rights and poverty 517
 - seasonality of gear use **443**
 - size distribution of catch 533–534, 534, 535
- Lake Volvi, Greece 296
- landing surveys 479
- landscape management approach 460
- land use aquaculture 795
- La Plata River basin, South America 325–334
- fisheries 326–333, 327
 - non-dammed lotic stretches 332–333
 - reservoir fisheries 330–332, 331
 - Upper Paraná River fisheries 330
 - yield 327–328, 328, **329**
 - yield problems 328–330
 - migratory movements 325
 - Pantanal wetlands 326, 326, 330
 - threats and impacts 333–334
 - damming 333
 - flood pulse loss 333
 - land use 333–334
 - migratory species depletion 334
 - overfishing 334
 - stocking and hatchery policies 333
- Laurentian Great Lakes, North America 134, 135, 154
- aquaculture 146
 - commercial fishing 140–143, 141
 - methods 143, 143
 - ecosystem models 493–494, 494
 - fish fauna 134–136
 - fishing down 628
 - future prospects 146–147
 - habitat and water quality degradation 146
 - invasive and non-native species 144–146, 748
 - management 143–144, 675
 - physical features **136**
 - recreational fishing 136–140, **136**, **137**
 - methods 140
 - see also specific lakes*
- leasable fisheries, Southeast Asia 372–373
- legal issues *see* management; regulations
- legislation *see* regulations
- length-based harvest limits 566–568, **567**
 - decision tree 568
- limnology 7
- Little Goose Dam, Washington, United States 726–727
- littoral zones 39–41, 40
- live bait capture 470
 - South American river basins 327, 328
- live fish trade 470
 - Amazon River basin 319
 - Papua New Guinea 414
 - Southeast Asia 371
 - subtropical America 259
- liver, toxicant metabolism and excretion 697, 699–700, 705
- Lough Neagh, Northern Ireland 655
- Lower St Lawrence, Canada 153–154
- Mackenzie River, Canada 156
 - delta, fisheries 90
- macrophytes
 - estuaries 61–62
 - non-native species invasions 771–773
- Magdalena River basin, South America 313–316
- fisheries catch 313–315, **313**, 314, 315, 316
- Magnuson–Stevens Fishery Conservation and Management Act (MSA), United States 812
- management 469–470, 557–575, 558
 - Africa 355–357
 - Egypt 245
 - aquaculture 472
 - Asian countries 372, 392–394
 - Cambodia 428–430
 - Japan 231, 233, 238–239
 - Mekong River 617
 - Turkey 309
 - Australasian countries
 - Australia 409–410
 - New Zealand 413
 - Papua New Guinea 415–416
 - capture fisheries 472
 - co-management 479
 - data requirements 676–677
 - decision tree 559
 - diversity of strategies 474–475, 474
 - allow fishing down 475
 - manage only for large valuable species 474
 - manage yields but conserve assemblages 474–475
 - proportionally fish the whole assemblage 475
 - ecosystems-based approach (EBFM) 60, 176, 187–188, 338–341, 446, 526

- elimination of unwanted species 476
 environment 476–477
 environmental form and function 477
 pollution 477, 565, 696
 water quantity and flow 477
 see also habitat management
 estuarine fisheries, South Africa 252
 European countries
 Belarus 220
 Czech Republic 206
 Fennoscandia 115–116
 Hungary 199–200
 Russia 129, **129**, 130
 Slovakia 129
 Western Europe 187–188
 eutrophication 477, 787–788
 biomanipulation 787–788, 788
 fertilization 476
 fish assemblages 475–476
 introductions 475–476
 stocking 476
 floodplain fisheries 489
 genetic management 573
 habitat *see* habitat management
 human rights-based approach
 (HRBA) 514–515
 application to fisheries policy
 517–519, **519**
 benefits of 516
 enabling factors 516–517
 international guidelines on small-scale
 fisheries 519–522
 linking rights and resource governance
 agendas 516
 international collaboration 480–481, **481**
 issues 507–509
 North America
 Canada 93–95, 163–164
 Great Lakes 143–144, 675
 United States 92–93, 176
 see also subtropical America (below)
 objectives 470–471, 557–558
 conflict reduction 471
 extractive objectives 470
 government objectives 471
 regional differences 471–472, **471**
 social objectives 471
 sustainability objectives 470, 617
 people-centred approach 509
 people management 566–569
 see also regulations
 primary fishery management 483
 recreational fisheries 457, 459
 landscape approach 460
 South American river basins 338–340, **339**
 Amazon basin 322
 São Francisco basin 323
 stocking practices 675
 strategy 557–558
 variation 471–472
 subtropical America 264–265
 voluntary measures 569
 waterbody engineering 476
 see also conservation; optimal fishing
 pattern; regulations; stocking
 management units (MUs) 812
 manual fish salvage 732
 Maori fisheries, New Zealand 410, 411,
 425–427
 fishing methods 425–426, 426
 ownership and fishing rights 426–427, 519
 marine estuarine-dependent guild 54
 marine estuarine-opportunist guild 54, 55,
 63, 66–67
 Marine Living Resource Act (1998), South
 Africa 252
 marine straggler guild 54, 55
 Maritimes and Atlantic Islands ecoregion,
 Canada 152–153
 market surveys 479
 match–mismatch hypothesis 832
 material well-being 503–504
 maximum economic yield (MEY) 484
 maximum sustainable yield (MSY) 167,
 484, 485
 mean depth 485
 Mekong River 363–367, 370–373, 381, 617
 capture fisheries for aquaculture 444, 445
 damming 513, 515, 617
 fisheries sustainability 617
 fishing gears 441, 441
 management issues 617
 stock identification 818–819, 819
 see also Tonle Sap, Cambodia
 Mekong River Commission (MRC) 367,
 372, 617
 mercury pollution 44, 264
 impoundment effects 722–723
 Lake Victoria 358
 South American river basins 315
 mesohabitats 19–20, **20**
 meta-analysis 33–34
 metals 703–706
 acute toxicity 703–705, 704
 predictive models 704
 chronic effects, acclimation and
 adaptation 705–706
 dietary exposure 705, 706
 excretion 699–700
 impoundment effects 722, 748
 sublethal effects on behaviour 705
 uptake 697–698, 697
 see also mercury pollution
 microcystin accumulation 783
 microphytobenthos, estuaries 61
 migratory movements 9–10
 estuarine habitats 56–57, 68–70
 importance of migratory species 443–444
 impoundment impact 113, 370, 726–727
 legislation to protect migratory
 species 718–719
 Southeast Asia 365
 see also bypass systems; fish passes
 Mi'kmaq people, Canada 519
 Minho River, Spain/Portugal 277–279,
 277, 278
 fishing features 277–278, 277
 fish species 278–279
 research findings 279
 mining developments
 Canada 96, 97
 discharge toxicity 703
 South American river basins 315, 329
 subtropical America 263–264
 Missouri ecoregion, Canada 156
 mitigation 559–560
 hatcheries 734–735
 impoundment impacts 730–749
 dam removal 747–748
 flow rehabilitation 730–733, 733
 gas supersaturation and hypoxia 733–734
 productivity loss 734–736
 reconnecting fragmented
 habitats 736–744
 sediment augmentation 733
 turbines, pumps and screens 744–747
 mixture toxicity 709
 molecular techniques 33
 adaptation investigation 821–822
 areas for improvement 824–825
 catch management in North
 America 819–820
 DNA barcoding and traceability 821, 823
 environmental DNA studies 823–824
 escapee and interbreeding
 detection 820–821
 fisheries-induced evolution
 investigation 822–823
 stock assessment in Asian fresh
 waters 818–819, 819
 Mondsee, Austria 187
 morphoedaphic index (MEI) 484–485
 Morris Pond, Mississippi 731
 Morské oko, Slovakia 192
 mortality
 fishing-related 524
 irrigation pump-related 729–730
 turbine-related 728–729
 multidrug resistance-associated protein
 (MRP) 700
 Murray River, Australia 24
 Namoi River, Australia 723, 729–730
 nanomaterial toxicology 708

- National Pollution Discharge Elimination System (NPDES), United States 799
- Native American fisheries 143, 144, 170
- net yield 585
- Niger River delta 628
- Nile River 241, 243, 253
- nitrate 587
- nitric acid 43
- nitrites 587
- nitrogen content 668–669
- estuaries 53
- impoundment effects 723–724
- lakes 37, 39, 668–669
- control of 45
- plankton limitation 36
- supersaturated nitrogen 723–724, 734
- see also* fertilization
- nitrogenous wastes 587, 589
- management 589, 590, 591
- genetic modification 602
- non-discrimination principle 518
- 'no net loss' principle 96–97
- non-native species introductions *see* alien species
- northern North America 85, 86
- fisheries 86–92
- fish fauna 86, **87–88**
- management activities 92–95
- threats to fisheries production 95–97
- adverse impacts from resource development 96–97
- natural events 95
- overharvesting in sport fisheries 95–96
- overharvesting of migratory stocks 95
- quality of fishery information 96
- Northwest Territories 85
- fisheries 90
- management activities 94
- see also* northern North America
- Nunavut 85
- fisheries 91–92, **91**
- quotas **92**
- management activities 94–95
- see also* northern North America
- nutrient levels
- control of 45, 477
- Fennoscandia 103, 105
- impoundment effects 724
- mitigation 734–736
- lakes 36–39
- climate change effects 668–669
- see also* eutrophication; fertilization; nitrogen content; phosphorus content
- oil pollution, Italy 290
- oligotrophication 788–790
- Onega Lake, Russia 125
- open fisheries, Southeast Asia 372
- optimal fishing pattern 524–538
- balanced harvest 526–537
- empirical case studies 526–534
- size-based models 534–537, 536
- selective fishing 351–353, 525, 538
- classical views on selectivity 525–526
- optimum sustainable yield (OSY) 167, 167
- Orange River, South Africa 241, 245–246
- Orinoco River basin, South America 316–319, 318
- fisheries catch 317, 319
- ornamental fish trade *see* live fish trade
- Oueme River fishery, West Africa 628
- overfishing 627
- Africa 353–355
- Lake Victoria 353–355, 359
- estuaries 70
- European countries
- Czech Republic 206
- Hungary 199
- Iberian Peninsula 274, 276
- Russia 126–127, 126
- Slovakia 193
- fishing down 475, 628
- growth overfishing 525, 536, 628
- North America 95–96, 163–164
- migratory stocks 95
- sport fisheries 95–96
- recruitment overfishing 628
- South American river basins 334
- subtropical America 262
- oxbow lakes
- culture-based fisheries 391, **391**
- formation 17
- oxygen, dissolved *see* dissolved oxygen (DO)
- ozone layer 43
- Pacific and Pacific Islands ecoregion, Canada 157
- Pacific Northwest (PNW) bioregion 432–434
- aboriginal fishing methods 432
- Pacific Salmon Commission 93
- Pacific Salmon Treaty 93
- paddy fields
- Japan 233, 236, 237
- Southeast Asia 366
- palaeolimnology 34
- Pamir mountains 378
- Pantanal wetlands, South America 326, 326, 330, 493
- Paraguay River 330
- see also* La Plata River basin, South America
- Paraná River 18, 330
- see also* La Plata River basin, South America
- parasites
- aquaculture and 799
- climate change effects 654, 677
- control in cultured fishes 574
- parental care 365
- parks 480
- participation principle 517
- Patagonian lakes basin, South America 336–338
- fisheries 336–338, **337**
- threats 337–338
- Patos Lagoon basin, South America 334–336
- fisheries 334–336, 335
- Peel–Harvey Estuary, Western Australia 51, 53, 56
- persistent organic pollutants (POPs) 702
- see also* pollution; toxicology
- Phalacrocorax* *see* cormorant impact on fish numbers; cormorant use for fishing
- pharmaceutical toxicology 706–707
- contraceptive pill 695, 706
- environmental risk assessment 702–703
- Philippines, Tagbanua people 519
- phosphorus content
- estuaries 53
- eutrophication benefits for fisheries 780, 781
- lakes 37, 39, 669
- Fennoscandia 103, 105
- plankton limitation 36
- see also* eutrophication; fertilization
- photosynthesis 586–587
- Physical Habitat Simulation (PHABSIM) model 731
- instream flow incremental methodology (IFIM) 551
- phytoplankton, estuaries 62
- Pitlochry Dam, Scotland 738
- placer mining, northern North America 96
- poaching *see* illegal fishing
- policies *see* management; regulations
- Polish Angling Association (PAA) 214
- pollution 43, 625
- Africa 358–359
- Egypt 243–244
- aquaculture wastes 797–800
- feed-derived 797–799
- non-feed-derived 799
- Asia
- China 228
- Southeast 372
- European countries
- Balkan countries 290
- Czech Republic 204–205
- Iberian Peninsula 276
- Italy 290
- Russia 128–129
- Western Europe 186

- impoundment effects 721–722
- management 477, 565, 709
- New Zealand 412
- South American river basins 315, 323–325, 329–330, 334
- subtropical America 262–264
- United States 174
- see also* acidification; eutrophication; toxicology
- polyculture 584, **584**
- polycyclic aromatic hydrocarbons (PAHs) 708
- population genetics 813–816
 - adaptation investigation 821–822
 - effective population size 814
 - Wright's island model 814–815
 - see also* gene flow; genetic diversity
- Po River, Italy 283–285, 290
- power relations 505–506
- precipitation 13
 - predicted changes 646, **647**
 - see also* climate
- primary fishery management 483
- process-based models 551
- production models 485–488, 486
 - choice of baseline lake 488
 - estimation error evaluation 487
 - examples 487–488
 - process error evaluation 487
 - yield prediction 395–397, **396**, 397
 - introduced fish 486–487
- productivity
 - aquaculture 587–589
 - feed provision 584, 588–589, **589**
 - fertilization 583, 587–588
 - estuaries 48–49
 - floodplains 442
 - global production of inland fisheries 500
 - mitigating for impoundment
 - impacts 734–736
 - see also* yield
- profundal zone 39–40
- propagation theory 524–525
- protected areas *see* freshwater protected areas (FPAs)
- protein production using genetic modification 604–605
- pulse fishing 94
- pump-related mortality 729–730
 - mitigation 745
 - see also* screens
- pyrethroids 707
- quotas 566–567
- Rapfish rapid appraisal framework 495
- recirculation systems 591
- recreational and sport fishing 421, 449–461, 451, 452, 470
- anti-fishing movement 460
- Asian uplands 380, 382
- Australia 408
- characteristics of 452–455
 - capture and release 454
 - diversity 453–454
- climate change impact 671
- competition/conflict with other users 460
- diversity of 473–474
- European countries
 - Balkan countries 289–290
 - Belarus 217–218
 - Czech Republic 202
 - Fennoscandia 112–113
 - Hungary 196
 - Iberian Peninsula 274–275
 - Italy 288–289
 - Poland 209, **210**, **211**, 212
 - Slovakia 193
 - Western Europe 184–185
- fishery types **450**
- management 457–459
 - assessment 457, 458
 - course of action 458–459
 - goals and objectives 457–458
 - information needs 460–461
 - landscape approach 460
 - monitoring and adjustment 459
- motivations for 453, 456
- New Zealand 411
- North America
 - Canada 89, 90, 92, 157–161, **158–159**, 160, 161
 - Great Lakes 136–140, **136**, **137**
 - United States 88, 167–168
- overharvesting 95–96
- participation 452–454
 - decline 459–460
- socio-economic benefits 454–455
 - cultural value 455
 - fisheries as coupled social–ecological systems 455–457, 455
- South Africa 246–247
- South American river basins 325–327, 330, 333, 337
- subtropical America 259
- Turkey 308, 309
- valuation of recreational fisheries 459
- see also* threats to fisheries production
- recruitment 830–841
 - definition 830
 - density-dependent factors 833–834
 - compensatory effects 834
 - intraspecific predation and competition 834
 - offspring production 833
- density-independent factors 831–833
- food availability 832–833
- interspecific predation and competition 833
- physical habitat 831–832
- temperature 832
- modelling strategies 840–841
- stock-recruit (S–R)
 - relationships 834–840
- accounting for environmental variation 840
- influences 838–840, 839, 840
- models 834–835, 835, **836–837**, 838
- recruitment overfishing 628
- regional climate models (RCMs) 645
- regression models 480
- regulations 566–569, **566**
- Africa
 - Egypt 245
 - Ghana 532–533
 - Zambia 527–528
- Asia, Southeast 372
- Australia 410
- bag limits 566–567
- Brazil 329, 336
- compliance 568–569
- enforcement 568–569
- European countries
 - Czech Republic 206
 - Iberian Peninsula 273–274
 - Italy and Western Balkans 290
 - Poland 211–212, 214
 - Slovakia 195
- genetic modification 605
- input controls 566
- length-based harvest limits 566–568, **567**
- migratory species protection 725–726
- New Zealand 412
- non-native species 775, 800
- output controls 566
- protected areas 446
- purpose of 566
- stocking practices 675
- Turkey 309
- types of 566–568
- United States 171–172
- voluntary measures 569
- see also* management
- reintroduction 571–572
- lakes 45
- relational well-being 504–506
- renewable energy 677
- re-oligotrophication 788–789
- research 479
 - catch statistics 479
 - direct survey approaches 479
 - future directions 752, 808–810
 - information needs 480
 - regression models 480

- reserves 480
- reservoir rivers 9
- reservoirs 386
 - Asia 386–390, 394–395
 - aquaculture 391–392, **393**
 - characteristics compared to lakes **386**
 - European countries
 - Belarus 216
 - Russia 120
 - Slovakia 192
 - Western Europe 181–182
 - fish yields worldwide 389, **390**
 - global reservoir distribution 385, 386, **386**
 - habitat management 564–566
 - biomanipulation 565–566
 - flow and silt deposition 565
 - physical habitat 564–565
 - pollution 565
 - longitudinal zonation 388, **388**
 - movement restriction 727
 - nutrient retention 724
 - pollutant accumulation 722
 - South American river basins 330–332, 331
 - see also* dams; impoundments
- restocking 570–571
 - population dynamics 573
- rice fields *see* paddy fields
- Rio Grande, United States/Mexico 262, 263
- risk assessment
 - environmental 702
 - genetically modified fishes 605–607
 - introduced species invasiveness 773–774, 774
- River Cann, south-east Australia 24
- River Dart, United Kingdom 14–15, 14
- River Garry, Scotland 721
- River Lee, London 25
- river networks 10
- rivers 7, 9
 - anthropogenic changes 22–24, 23
 - see also* habitat degradation; impoundments; pollution
 - channel bars 16–17
 - channel migration 17
 - channel types 16, **16**, 24
 - size effects 11–12
 - characteristics of **10**
 - ecohydraulics 19
 - ecosystems 12
 - eutrophication 725
 - fish habitats 19
 - habitat use curves 20–22, 21
 - mesohabitats 19–20
 - fish migratory movements 9–10
 - fish zonation 11
 - flood rivers 9
 - flow regime 13–15, 14, 175
 - climate change effects 664, 664
 - flow-duration curves 15
 - flow-frequency curves 15
 - impoundment effects 720–722
 - rehabilitation 731–733, 733
 - flow regulation 22–24
 - impact assessment 551, 552
 - future scenarios 25–26
 - geomorphological dynamics 17
 - habitat management 561–564
 - flow management 564
 - physical habitat modifications 561–563, 562
 - restoring connectivity 563–564, 563
 - hydrological connectivity 18–19
 - physical dynamics 13
 - primary landforms 16–17
 - regime shifts 15
 - reservoir rivers 9
 - river corridor habitat mosaic 17–18
 - run-off dynamics 13
 - secondary channels 17
 - sediment dynamics 15–16, 24
 - spawning ground characteristics 15–16
 - see also* freshwater habitats; *specific rivers and locations*
- river systems 10–12
 - drainage area 12
 - drainage density 12
 - fluvial hydrosystem concept 12–13
 - interior links 12
 - tributary junctions 12, 19
 - see also* rivers
- River Warta, Poland 724
- rule of law 518
- run-off dynamics 13
 - climate change effects 664, 665
 - coefficient of variation (CV) of annual run-off 13
- Sacramento River, California 11
- Saimaa Lake, Finland 103, 104
- salinity
 - climate change effects 669–670
 - estuaries 48, 51
- Sámi indigenous people, Norway 423, 430–433, 431
 - fishing methods 430
 - fishing rights 430–431, 519
- Santa Clara Dam, Brazil 742
- São Francisco River basin, South America 322–325, 324
 - commercial fisheries 322–323
 - catch composition **323**
 - floodplain importance 323–325, **325**
 - management activities 323
- Saskatchewan–Nelson River ecoregion, Canada 155–156
- screens 744–746
 - behavioural screening and guidance systems 747
 - damage caused by 745, 747
 - design 746
 - efficiency of 745–746
 - removal 749
- seasonality 442–444
- sediment dynamics 15–16
 - impoundment effects 24, 721
 - dam removal effects 747–749
 - mitigation 733
- seiches 39
- seismic exploration, northern North America 96
- selective fishing 351–353, 525, 538, 628–629
 - classical views on selectivity 525–526
 - eutrophication relationships 786
 - size-based harvest limits 566–567, **567**
 - see also* fisheries-induced evolution (FIE)
- semi-anadromous species 57
- semi-catadromous species 57
- serial discontinuity concept 724
- Severn Estuary, United Kingdom 52, 56
- shear stress-related mortality 728
- silt deposition, reservoirs 565
- single-species yield-per-recruit model 525
- siphon fish pass 744
- size-based harvest limits 566–568, **567**
 - decision tree 568
 - see also* selective fishing
- size-structured models 535–537
- Skalka Reservoir, Czech Republic 205
- Slovak Anglers' Union 193
- Snake River, United States
 - impoundment impacts 726–727, 730–732
 - passage enhancement methods 742, 743, 745–746
- socio-economic aspects 500–501
 - benefits from inland fisheries 502–503
 - cultural value of fishing 455, 501
 - equity and benefit distribution 471
 - export income 471
 - fisheries as social–ecological systems 455–457, 455
 - fishing for income 471
 - management objectives 471
 - recreational fisheries 454–455
 - tropical Africa 350–351, **350**, **351**
 - see also* well-being framework
- South African Bass Angling Association (SABAA) 247, **248**

- South African Freshwater Bank Angling Federation (SAFBAF) 247
- South American river basins 311–341, 312
- Amazon basin 319–322
- La Plata basin 325–334, 326–333
- Magdalena basin 313–316
- management approaches 338–341, **339**
- ecosystem issues 340
- fisheries issues 340–341
- political and institutional management issues 341
- social issues 341
- Orinoco basin 316–319, 318
- Patagonian Lakes basin 336–338
- Patos Lagoon basin 334–336
- São Francisco basin 322–325, 324
- Southeast Asia 363–373, 364
- aquaculture 369–370, 370, **370**
- fisheries 366–369
- capture methods 366, 366, 367
- catch disposal 367
- recent trends 367–369, 368, 369
- fish species diversity 365–366
- habitats 364–365
- management activities 372–373
- threats to fisheries production 370–372
- climate change 372
- dams 370–371
- floodplain drainage and management 371
- non-native species
- introductions 371–372
- pollution 371
- water abstractions 371
- see also* Asian inland lacustrine waters
- spawner–recruit relationship *see* stock–recruit (S–R) relations
- spawning ground characteristics 15–16
- speciation, lakes 36
- sport fishing *see* recreational and sport fishing
- starvation mortality 832
- statistics 479–480
- regression models 480
- stock assessment 458, 479, 489–491
- Asian fresh waters 818–819, 819
- catch management, North America 819–820
- escapee and interbreeding detection 820–821
- recreational fisheries 457
- Russia 130, 130
- stocking 476, 569–574
- additive effects 574
- Asia 366, 394–395
- Japan 231, 233, 237
- considerations 572–574
- diseases 574
- domestication 573
- ecosystem effects 573–574
- genetic management 573
- human dimensions 574
- population dynamics 572–573
- decision tree 570
- density related to growth rate 585
- European countries
- Belarus 219, 220, **220**
- Czech Republic 205–206
- Fennoscandia 116
- Hungary 197–199
- Italy and Western Balkans 287
- Poland 213, **213**, 786
- Russia 129, **129**
- Slovakia 194
- eutrophication relationships 785–786
- fishing for stocking material 470
- management 675
- purpose 569
- South Africa 246
- South American river basins 333
- types of 569–572
- reintroduction and translocation 571–572
- restocking or stock rebuilding 570–571, 573
- stock enhancement 570, **571**, 572–573
- supplementation 571, 573
- see also* culture-based fisheries (CBF)
- United States 92–93, **93**, 167, 170–171
- see also* aquaculture; management
- stock–recruit (S–R) relations 834–840, 835
- accounting for environmental variation 840
- influences 838–840, 839, 840
- models 834–835, 835, **836–837**, 838
- Stonach Dam, Pine River, Michigan 563
- storm run-off 13
- strategic environmental assessment (SEA) 546
- Strbské Pleso, Slovakia 192
- stream hierarchy model (SHM) 815, 815
- streams
- anthropogenic change 22, 23
- headwater streams 12
- restoration, Fennoscandia 115
- structured decision-making (SDM) 457
- subjective well-being 506
- subsistence fishing 473
- Canada 89, 90, **91**, 92
- Papua New Guinea 413, 414
- South Africa 247–248
- South American river basins 319–322, 325, 326, 439
- Southeast Asia 366
- United States 88–89, 170
- Native American 143, 144, 170
- see also* aboriginal fisheries; artisanal fisheries
- subtropical Africa 241
- subtropical America 256–265
- alien species introductions 258, 261, 263, 264
- aquaculture 258, 261, 261
- fisheries 258–261
- harvests and abundance trends 259–260, 260
- stock status 260–261
- threats to production 261–264
- fish fauna 257–258
- fish habitats 257
- management activities 264–265
- sport fishing 259
- water resource overexploitation 257, 262, 263
- sulphur oxides 43
- control of 45
- supplementary feed 584, 588–589, **589**, 797
- supplementation 571
- population dynamics 573
- supportive breeding 115
- surface ice, Fennoscandia 102, 103
- surplus production models 489–490
- surveys 479
- sustainability 616–620, 671
- aquaculture 591–592
- herbivorous v. carnivorous species 617–618
- social acceptance of non-carnivorous fishes 618–619
- management for 470
- tropical Africa 355–357
- sustainable development 514
- see also* human rights-based approach (HRBA) to development
- Swan–Canning Estuary, Western Australia 51, 56
- Syamozero Lake, Russia 127, 127, 128
- synoptic policy models 494–495, 495
- Tagbanua people, Philippines 519
- Tagliamento River, Italy 11, 12, 17
- habitat variation 18
- Tana River, Norway 430–432, 431
- targeted fishing *see* selective fishing
- Tathlina Lake fishery, Northwest Territories 90
- temperature *see* climate; global warming; water temperature
- Tewett Tarn, United Kingdom 32
- Thames River, United Kingdom 188
- estuary 49
- anthropogenic changes 64–66
- history of fishing 64
- pollution reduction 186

- threats to fisheries production 198–199
- Asia
 - China 228–229
 - Japan 233–235
 - Southeast 370–372
 - Australasian countries
 - Australia 408–409
 - New Zealand 412–413
 - Papua New Guinea 415
 - European countries
 - Belarus 219–220
 - Czech Republic 204–206
 - Fennoscandia 113–115
 - Iberian Peninsula 275–276
 - Russia 125–129
 - Slovakia 194
 - North America 95–97
 - South American river basins 313
 - Magdalena basin 314–316
 - subtropical America 261–264
 - Three Gorges Dam, China 42, 228, 721–725
 - Three Rivers region, Yukon Territory, Canada 96
 - Tibet–Qinghai plateau 378
 - Tonle Sap, Cambodia 365, 365, 366, 368, 371, 429
 - fisheries importance 384, 442
 - migratory species 443
 - fishing gears **441**
 - indigenous Khmer fisheries 427–430
 - total dissolved solids 485
 - toxicology 695–710
 - bioaccumulation 697, 702
 - environmental risk assessment 702–703
 - metals 697–700, 698, 703–706
 - acute toxicity 703–705, 704
 - mixture toxicity 709
 - nanomaterials 708
 - organic pollutants 699, 700–701, 707–708
 - persistence 702
 - pharmaceuticals 706–707
 - toxicant uptake, metabolism and excretion 696–697
 - metals 697–700, 688
 - organic pollutants 699, 700–701
 - toxicity testing 701–702
 - see also* pollution
 - toxic plant use in fishing 264, 264
 - traditional fisheries *see* aboriginal fisheries
 - transparency practices 518
 - trap-and-haul systems 742, 742
 - trawling
 - estuaries 64
 - Lake Victoria 352
 - tributyltin (TBT) 695
 - Trichonis Lake, Greece 294
 - tropical Africa 349–359
 - challenges 357–359
 - catchment problems 358–359
 - climate change 357–358
 - water competition 357
 - fisheries socio-economic
 - importance 350–351, **350, 351**
 - fishing ecological impact 351–353, 352
 - overfishing 353–355
 - human population growth 351
 - management for sustainable yield 355–357
 - controlling effort 355–356
 - new stock utilization 356
 - non-native species introduction 356–357, 357
 - trout farming *see* aquaculture
 - turbidity, estuaries 51
 - turbines
 - aerating 733–734
 - design to improve safety 744–745, 745
 - turbine-related mortality 728–729
 - see also* screens
 - turbulence, estuaries 48
 - Turner Falls Dam, United States 737
 - ultraviolet (UV) radiation 43–44
 - exposure 654
 - unfed systems 591
 - United Nations Declaration on the Rights of Indigenous Peoples 423, 516
 - United States *see* Laurentian Great Lakes; northern North America
 - Upper Mackenzie ecoregion, Canada 156
 - Upper St Lawrence ecoregion, Canada 154
 - urbanization effects
 - subtropical America 262
 - United States 176
 - Uruguay River *see* La Plata River basin, South America
 - Váh River, Slovakia 191, 192
 - valuation of recreational fisheries 459
 - Velhas River, Brazil 323–325
 - Vistula River, Poland 213
 - Vltava River, Czech Republic 204
 - Volga River, Russia
 - canal and dam construction 120, 121, 122, 128
 - commercial fish catches 125
 - pollution 128
 - threats to fisheries production 125
 - Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (Tenure Guidelines) 521–522
 - Wanapum Dam, Washington, United States 738, 744
 - waste products of aquaculture 797–800
 - feed-derived 797–799
 - non-feed-derived 799
 - treatment 799
 - waterbody engineering 476, 717–720
 - see also* culverts; dams; weirs
 - waterfowl threat to fisheries production, Japan 234–235
 - Water Framework Directive (WFD), EU 195, 202, 206, 211
 - Water Plan of the Slovak Republic (WPSR) 195
 - water productivity 795
 - water quality
 - aquaculture 586–587
 - aeration 589, 589
 - alkalinity 587
 - nitrogenous wastes 587, 589, 590, 591
 - oxygen 586–587, 586, 589
 - carrying capacity relationship 583
 - clarity effects on predator-prey interactions 783
 - Fennoscandia 103, 105
 - Iberian Peninsula 276
 - Laurentian Great Lakes 146
 - management 477, 586
 - subtropical America 262
 - United States 174
 - see also* acidification; eutrophication; pollution
 - water resources
 - aquaculture water use 795–797, **796**
 - reduction 796–797
 - Australia 408
 - climate change impacts 664–670
 - competition for 3
 - Africa 357
 - management 477
 - overexploitation, subtropical America 257, 262, 263
 - management needs 265
 - see also* water quality
 - water temperature
 - climate change effect 663
 - predicted changes **663**
 - dissolved oxygen relationship 651, 665
 - effects on fishes 650–651
 - acclimation effect 650
 - impoundment effects 723
 - recruitment relationship 832
 - weighted usable area (WUA) 551
 - weirs
 - aeration role 733–734
 - fish passage improvement 740, 740
 - impact on migratory fishes 113, 187
 - see also* impoundments
 - well-being framework 503–506, 509
 - definition of well-being 503
 - material well-being 503–504

- relational well-being 504–506
- subjective well-being 506
- Western Balkans *see* Balkan countries
- Western Europe 181, 182
 - aquaculture 183, 617
 - ecosystem-based management 187–188
 - environmental threats 185–188
 - acidification 185–186
 - chemical pollution 186
 - climate change 186
 - dense human population 185
 - eutrophication 186–187
 - physical habitat modification 187
 - species introductions 187
 - fisheries 183–185
 - catch statistics 185, 185
 - characteristics of 184–185, 184
 - exploited taxa 183, 184
 - fish fauna 183
 - fish habitats 181–183
 - estuaries 182–183
 - lakes 181–182
 - reservoirs 181–182
 - rivers 182
 - streams 182
- whitefishes 365, 366
- Wilson Inlet, Western Australia 51, 56, 68
- Windermere, United Kingdom
 - eutrophication effects 784
 - fisheries-induced selection 630
- Xayaburi Dam, Mekong River Delta 370, 373, 513, 515
- Yangtze River, China 222–224, 228, 725
 - Three Gorges Dam 42, 228, 721–725
- year-class strength 830
- Yellow River, China 721
 - impoundment effects 721
- yield
 - aquaculture 585–586, 586
 - gross yield 585
 - maximum economic yield (MEY) 484
 - maximum sustainable yield (MSY) 484
 - net yield 585
 - optimum sustainable yield (OSY) 484
 - see also* productivity; *specific locations*
 - yield prediction
 - culture-based fisheries 395–397, 396, 397
 - introduced species 486–487
- Yukon Fish and Wildlife Management Board 93
- Yukon River 89, 93–94, 96
- Yukon Territory 85
 - fisheries 89–90
 - management activities 93–94
 - see also* northern North America
- zooplankton, estuaries 62