

## Index

- Acadian orogeny  
   *see* geological history
- Acartia hudsonica*  
   *see* zooplankton, copepods
- Acartia tonsa*  
   *see* zooplankton, copepods
- Acipenser brevirostrum*  
   *see* shortnose sturgeon
- Acipenser oxyrinchus*  
   *see* Atlantic sturgeon
- Adirondacks, 317
- aerosols, 82–83
- alkylphenol ethoxylate  
   metabolites, 394
- alewife, 178–179, 205, 429
- alien species, 9  
   and bait release, 306  
   and ballast water, 306  
   and black carp, 307  
   and pet trade, 306  
   and shipping, 297  
   Asian shore crab, 304  
   Atlantic rangia, 303–304  
   black bass, 302  
   comparisons with other basins, 298–299  
   definition, 296  
   ecological and economic impacts, 304–305  
   eradication, 305, 306  
   future invaders, 305  
   intentional vs. unintentional introductions, 307  
   invasion in 19th century, 298  
   list of alien and native species, 297  
   management, 305–307  
   number of species in Hudson, 296  
   risk of impacts, 305  
   saline part of Hudson, 297  
   solid ship ballast versus agricultural sources, 297
- time course of freshwater  
   invasions, 296–297  
   vectors, 298–299, 306–307  
   water chestnut, 302  
   zebra mussel invasion  
     *see* zebra mussels
- Alosa aestivalis*  
   *see* blueback herring
- Alosa mediocris*  
   *see* hickory shad
- Alosa pseudoharengus*  
   *see* alewife
- Alosa sapidissima*  
   *see* American shad
- American eel, 176, 211, 431, 432, 443
- American shad, 176–178, 429  
   fisheries trends, 195–196
- Ampelisca abdita*, 246, 249, 257, 258, 261
- Ampelisca toxicity test*, 448–449, 450
- anadromous fish  
   definition, 171
- Anadromous Fish Conservation Act, 192
- Anchoa mitchilli*  
   *see* bay anchovy
- angling  
   *see* fisheries
- angling and toxicity  
   *see* human health
- Anguilla rostrata*  
   *see* American eel
- APEO  
   *see* alkylphenol ethoxylate metabolites
- Arthur Kill, 388, 443
- Arthur Kill circulation, 36–37
- Asian shore crab  
   *see* alien species
- Atlantic rangia  
   *see* alien species
- Atlantic salmon, 191
- Atlantic sturgeon, 173–175, 330, 429  
   fisheries trends, 194–195
- Atlantic tomcod, 180, 429, 431, 432, 433, 434, 452, 454  
   mixtures of contaminants, 454–455  
   tumors, 180
- atmospheric deposition  
   dry deposition, 401  
   gaseous absorptive deposition, 401–402  
   measuring sites, 400–401  
   physical factors, 402–404  
   processes, 398  
   wet and dry deposition, 399–400  
   wet deposition, 88–92, 401
- bacteria  
   and chlorophyll *a*, 102  
   and zebra mussels, 102  
   carbon sources, 102–105  
   cell densities, 99–100  
   DOC and POC sources, 102–103  
   growth rate, 100–102  
   heterotrophic microorganisms, 99  
   relation to terrestrial carbon sources, 104–105  
   secondary production, 101  
   spatial variation in production, 103–104
- bacteria and zooplankton  
   *see* zooplankton
- ballast water  
   *see* alien species
- bass tournaments, 197
- bay anchovy, 429
- Benthic Mapping Program, 51
- benthos, 8  
   and bioturbation, 274  
   and substratum type, 242  
   definition, 266  
   functional groups in Lower Bay Complex, 245, 253, 256

- benthos (*cont.*)  
 Lower Bay Complex species list, 247  
 role in ecosystem, 266  
*see* Lower Bay Complex  
*see* tidal-freshwater benthos  
 sieve size effect, 246  
 size classes, 267  
 tidal-freshwater Hudson  
*see* tidal-freshwater benthos  
 water column interactions, 274
- berillium-7, 386
- Berry's Creek, 443
- biological oxygen demand, 121, 338, 340, 341–342, 344
- biomarkers of cancer in fish, 451–452
- black carp  
*see* alien species
- black sea bass, 431
- blue crab, 164, 167, 268, 429, 444, 446
- blueback herring, 179
- bluefish, 429
- BOD  
*see* biological oxygen demand
- borers, reinvasion of New York Harbor, 344
- Bosmina*, 218, 221, 222–223
- box crab, 165
- Bray-Curtis index, 245, 261
- Brown bullhead  
 lesions, 450
- cadmium, 391, 444  
 bioaccumulation, 443
- Calappa flammea*  
*see* box crab
- Callinectes sapidus*  
*see* blue crab
- cancer  
 and PCB exposure, 451–452
- carbon  
 DOC and POC, 102  
 export, 273
- Carcinus maenas*, 304
- cardinalflower, 285
- CARP,  
*see* Contaminant Assessment and Reduction Project 210
- Carson, Rachel, 325, 417
- catadromous fish  
 definition, 171
- Catostomus commersoni*  
*see* white sucker
- cattail, 285, 444
- Centropages*  
*see* zooplankton, copepods
- Centropristis striata*  
*see* black sea bass
- cesium-137, 281, 383–386, 388
- channel axis deposit  
*see* Sedimentary features
- Chesapeake Bay Program, 327
- Chione stutchburys*, 261
- chlordan, 417, 418
- chlorination byproducts, 93–94
- Chlorophyceae, 109
- chromium, 391
- Chrysophyceae, 109
- Ciba-Geigy plant and metals, 391
- circulation, 5–6
- cladocera  
 decline due to zebra mussels, 222
- Clean Water Act, 123, 134, 320, 321, 324, 337, 339
- Clermont*, 317
- Clinton, DeWitt, 315
- closed gentian, 285
- Colvin, Verplanck, 13, 317
- combined sewer outfalls, 129, 345
- Commencement Bay,  
 Washington, 361
- common reed, 285  
 spread in marshes, 286, 287
- Consolidated Edison, 324
- Contaminant Assessment and Reduction Project, 326, 327–328
- contaminants, 6  
 chronologies of input, 75–76, 387–392  
 FDA guidelines, 199  
 in blood of anglers, 421  
 long-term trends, 76–77  
 toxicity of organic contaminants  
 to invertebrates, 445–449  
 toxicity of organic contaminants  
 to vertebrates, 449–458
- copper, 389–390
- Corophium tuberculatum*, 249
- Coxsackie Creek, 210
- crab larvae, 160
- Crangon septemspinosa*  
*see* shrimp, bay
- Cryptophyceae, 109
- CSOs  
*see* combined sewer outfalls
- cunner, 431
- Cyanobacteria, 109
- CYP1A1 gene expression  
 in Tomcod, 452–454
- Cyprinus carpio*  
*see* carp
- DDT, 417, 418, 441
- DDT and chlordan in sediments, 388
- deforestation, 315, 317
- Delaware and Hudson Canal, 315
- Delaware River, 361
- diadromous fish  
 and climate change, 184  
 conservation of habitats, 182–183  
 definition, 171  
 ecological interactions, 183–184
- diatoms, 109
- dieldrin, 417, 418
- dioxin, 417, 441  
 in sediments, 387–388
- discovery of the Hudson, 1
- dissolved oxygen  
 Arthur Kill, 343  
 East River, 343  
 Hudson River temporal trends, 341–342, 344  
 New York Harbor, 341–342
- Dorosoma cepedianum*  
*see* gizzard shad
- Dreissena polymorpha*  
*see* zebra mussels
- drinking water chemistry, 79–86
- dry particle deposition  
*see* atmospheric deposition
- duckweeds, 285
- Dyspanopeus sayi*, 160, 161, 163
- East River circulation, 35–36
- endocrine disruptors, 394
- fish, 457
- environmental actions:  
 1960s–1990s, 320–323
- environmental history, 315–319
- environmental issues – Hudson River, 316
- environmental legislation, 321
- environmental management  
*see* management
- equilibrium surface concept  
*see* Sedimentation
- Erie Canal, 315–317
- Esox lucius*  
*see* northern pike
- estuarine circulation, 28–29, 30–31  
 salt front, 29  
 stratification, 29–30, 31
- Etheostoma olmstedi*  
*see* Tessellated darter
- Eurytemora affinis*  
*see* zooplankton, copepods
- eutrophication, 121, 142  
 and nutrient excess, 121  
 models, 142
- exotic species  
*see* alien species
- fallout, radioactive, 383
- fecal coliform bacteria, 344–345  
 and rain events, 345

- Federal Dam, Troy, 5  
 fiddler crabs, 165, 445  
 fisheries, 8–9  
   and contaminants, 199–201  
   and petroleum, 191  
   angling, 190–191, 196–198  
   future trends, 201  
   history, 189–190  
   regulatory agencies, 192  
   water withdrawal, 198–199  
 fjord, 1  
 fjord morphology  
   *see* watershed  
 Foundry Cove, 6, 391, 441, 443, 444  
 Fulton, Robert, 315–317  
*Fundulus diaphanus*  
   *see* killifish  
*Fundulus heteroclitus*  
   *see* killifish  
 gaseous absorptive deposition  
   *see* atmospheric deposition  
*Gemma gemma*, 261  
 gene expression  
   *see* CYP1A1 gene expression  
 General Electric, 398  
 General Electric Fort Edward Plant, 356  
*Gentiana andrewsii*  
   *see* closed gentian  
 geological history, 14–20  
   Acadian orogeny, 16  
   Catskill delta, 16–17  
   Grenville orogeny, 15  
   Paleozoic, 15–18  
   Pleistocene glaciation, 18–20  
     post-glacial environment, 20  
     post-glacial geologic processes, 20–21  
     recession of ice sheet, 19–20  
   Proterozoic, 15  
   Taconic orogeny, 16  
 geological setting, 1–5  
 gizzard shad, 210  
 Glacial Lake Albany, 20  
 glaciation  
   *see* geological history  
*Gobiosoma bosc*  
   *see* naked goby  
 golden shiner, 209  
 grass shrimp, 429, 445, 446  
 gribbles, 344  
 gross primary production, 108  
 habitat types, 6–7, 51–63  
 Hackensack River, 388, 389, 441  
 Harbor Estuary Program, 326–327  
 HCH, 417  
*Hemigrapsus sanguineus*  
   *see* Asian shore crab  
 Henry Hudson, 315  
 heterotrophic microorganisms  
   *see* bacteria  
 hexachlorocyclohexane  
   *see* HCH  
 hickory shad, 178  
*Homarus americanus*, 446  
 Housatonic River, 361  
 Hudson estuary  
   features of saline portion, 145  
 Hudson Highlands State Park, 321  
 Hudson River Estuary Program, 326  
 Hudson River Foundation, 316, 324, 325  
   and research, 330  
 Hudson River Level B Study, 323, 324  
 Hudson River Valley Commission, 321  
 human health  
   advisories, 422  
   and watershed management, 422–423  
   anglers health study, 420–422  
   children, 423  
   fish consumption, 414  
   pollutants of concern, 413  
*Ictalurus nebulosus*  
   *see* Brown bullhead  
*Ilyanassa obsoleta*, 257, 258  
 Indian Point Nuclear Power Plant, 324  
 Interstate Sanitation Commission, 319  
 invasive plant eradication, 238  
 invasive species  
   *see* alien species  
 Iona, 287  
 ionic chemistry  
   inputs, 80–83  
 Jamaica Bay, 389, 392  
 Kalamazoo River, 361  
 Kill van Kull, 392  
 Kill van Kull circulation, 36–37  
 killifish, 444, 455–456  
 lady crab, 164, 165  
 largemouth bass, 208  
 larval migration, 158–159  
   and behavior, 159–163  
   and estuarine circulation, 160  
   estuarine plume, 160–164  
   Hudson River and New York Bight, 158  
   management implications, 166–168  
   ontogenetic changes, 163  
   plasticity, 165  
   recruitment to shore, 165–166  
 larval mortality, 157–158  
 lead, 391  
 lead-210, 281  
 lead-210 dating, 386  
 leeches  
   in tidal-freshwater benthos, 268  
*Lemna minor*  
   *see* duckweeds  
*Lepomis*  
   *see* sunfish  
 lesions and cancer in Hudson River Fish, 450–455  
*Limnodrilus hoffmeisteri*, 444  
*Limnoria*  
   *see* gribbles  
*Lobelia cardinalis*  
   *see* cardinalflower  
 Lower Bay, 238, 242  
 Lower Bay Complex  
   description, 242–243  
   hydrography, 242  
 Lower Bay Complex benthos  
   annual changes, 257  
   anthropogenic disturbance, 243  
   benthic decline in 1973–1974, 258, 262  
   benthic habitat change, 259–260, 262  
   benthic recovery, 263  
   community structure, 246–255, 261  
   decadal changes, 257–259  
   diversity, 246  
   functional groups, 249, 254–255  
   geographic regimes, 249–254  
   list of benthic studies, 244  
   problems with analysis, 261  
   sample resemblance, 245  
   sampling methods, 244–245  
   seasonal changes, 255–257  
*Lythrum salicaria*  
   *see* purple loosestrife  
 Magnuson Act, 192  
 management  
   agencies, 322  
   and scientific information gathering, 328–329  
   and scientific research, 330–331  
   definition, 313  
   history, 314  
   major concerns, 314–315  
 Mantel test, 246, 256, 259  
 marginal flat deposit  
   *see* sedimentary features

- marsh crab, 167  
 marsh vegetation  
   see tidal wetlands  
 MDS  
   see multidimension scaling  
 mercury, 391–392, 441  
   accumulation in fish, 443,  
     445–449  
   chemistry, 419  
   environmental distribution, 419  
   exceeding water quality  
     standards, 443  
   human exposure, 419  
   toxicity, 419–420  
 metallothioneins, 445  
 metal-rich granules, 445  
 metals, 392–393  
   atmospheric input, 389  
   bioaccumulation, 443, 444  
   in New York Harbor, 443  
   in sediments, 388–392, 443  
   sources, 443  
   toxicity, 444  
   trophic transfer, 445  
   water quality standards, 443  
 Metropolitan Sewerage  
   Commission, 318, 337  
 microbial loop, 99  
*Microgadus tomcod*  
   see Atlantic tomcod  
*Micropterus dolomieu*  
   see smallmouth bass  
*Micropterus* spp.  
   see alien species, black bass  
*Mimulus alatus*  
   see winged monkeyflower  
 mink, 355, 457  
*Morone americana*  
   see white perch  
*Morone saxatilis*  
   see striped bass  
*Moxostoma macrolepidotum*  
   see shorthead redhorse  
*Mulinia lateralis*, 258  
 multibeam bathymetry, 53–55  
 multibeam scanning sonar, 6  
 multidimensional scaling,  
   non-metric, 245  
 mummichog  
   see killifish  
 Mussel Watch, 447  
*Mustela vison*  
   see mink  
*Mya arenaria*, 257, 258, 261, 446  
*Mylopharyngodon piceus*  
   see black carp  
*Mytilus edulis*, 249  
 naked goby, 431, 432  
 National Environmental Policy  
   Act, 320  
 National Estuary Program, 326  
 NDPZP, 112  
*Nephtys incisa*, 257  
 net primary production, 108  
 New Jersey Atmospheric  
   Deposition Study, 400  
 New Jersey Department of  
   Environmental Protection,  
   321  
 New York Bay Pollution Act, 318,  
   319  
 New York Bight, 158, 164  
 New York Bight circulation, 37  
 New York City Department of  
   Environmental Protection,  
   321  
 New York Harbor,  
   circulation, 34–35  
   dumping, 317  
   landfill, 318  
   navigation, 317, 318  
   sewerage system, 317, 318,  
     319–320  
 New York State Department of  
   Environmental  
   Conservation, 321, 349,  
   446–447  
 Newark Bay, 441, 443  
 nitrogen, 290  
 nitrogen loading rate, 127  
 non-point sources  
   see nutrient loading  
 North River waste treatment  
   plant, 343  
 northern pike, 210  
*Notemigonus cryoleucas*  
   see golden shiner  
*Notropis hudsonius*  
   see Spottail shiner  
 nutrient excess  
   see eutrophication  
 nutrient loading, 129–130  
   and GPP before human  
     impacts, 131–133  
   and New York City, 128  
   and nitrogen, 131  
   and phosphorus, 130–131  
   and wastewater, 128–129  
   and watershed, 123  
   into estuary, 127–131  
   Mohawk and upper Hudson,  
     129  
   non-point sources, 129  
*Oithona*  
   see zooplankton, copepods  
 ordination methods, 245–246  
 organic carbon balance, 115–116  
*Osmerus mordax*  
   see rainbow smelt  
 otter, 355  
*Ovalipes ocellatus*  
   see lady crab  
 oxygen, dissolved  
   historical trends, 133–135  
   pollution standards, 133  
 oysters, 190  
 PAHs, 362  
   and neoplasms, 450  
   atmospheric input, 407–410  
   comparison of localities, 409  
   deposition fluxes, 409  
   in sediments, 388  
   in stream invertebrates,  
     446–447  
*Palaemonetes*, 268  
*Palaemonetes pugio*  
   see grass shrimp  
 partially mixed estuary, 5  
 Passaic River, 441, 443  
   dioxin, 387  
 Passaic River Superfund site, 388  
 Passaic Valley Sewerage  
   Commission, 319  
 PCBs, 325  
   and sediment interactions, 355  
   and striped bass, 199  
   atmospheric input, 404–407  
   bioaccumulation models,  
     373–374  
   carcinogenesis, 417  
   chemistry, 414–415  
   chronologies of input, 75–76  
   concentrations in fishes, 354  
   congeners, 370  
   discharge history to Hudson,  
     349–351  
   dredging problems, 362–364  
   effects on fish and wildlife,  
     353–355  
   environmental distribution, 415  
   extreme events and transport,  
     360–361  
   General Electric manufacturing  
     plants, 368  
   harm to people, 352–353  
   highly chlorinated congeners,  
     359  
   Hudson compared with other  
     rivers, 361–362  
   Hudson River superfund site,  
     349  
   human exposure, 416  
   human nervous system, 416  
   in mink, 457–458  
   in tree swallows, 458  
   levels in fish, 353  
   levels in invertebrates, 446–447  
   loads to Hudson, 368, 370–371  
   maternal and prenatal  
     exposure, 416–417

- model notation, 380–381  
 releases from General Electric, 356  
 remediation through dredging, 361–364  
 remediation, benefits, 361–362  
 residues in New York Harbor fishes, 415  
 Risk-based PCB advisory in Great Lakes, 353  
 role of fish migration on bioaccumulation, 378–379  
 sediment chronologies, 387  
 sediment release, 358  
 sorption to phytoplankton, 379  
 striped bass, 449–450  
 Thompson Island Pool, 357–358  
 transport and fate model test, 374–376  
 transport models, 358–360, 371–373  
 white perch, 449  
*Perca flavescens*  
 see yellow perch  
 pesticides, 414  
 pesticides, organochlorine chemistry, 417  
 environmental distribution, 417–418  
 human exposure, 418  
 toxicity, 418–419  
*Petromyzon marinus*  
 see sea lamprey  
 phosphates in detergents, 131  
 phosphorus, 290  
*Phragmites australis*  
 see common reed  
 phytoplankton  
 biomass, 109–111  
 composition, 109  
 interannual differences  
 net production, 112–114  
 relation to water discharge  
 seasonal changes  
 spatial variation in biomass, 110–111  
 Piermont marsh, 282, 287  
 piers  
 compared to open water, 431  
 current disrepair, 429  
 effects on fish feeding, 434–435  
 effects on fish growth, 432–434  
 effects on shoreline, 429  
 habitat quality assessment, 430–431, 436–437  
 history, 428–429  
 management, 436–437  
 prey availability, 435  
 relation to fish sensory systems, 432  
 responses of fishes, 431–435  
 Piles Creek, New Jersey, 445  
 pipefish, northern, 432  
 Pleistocene glaciation  
 see geological history  
 pollution  
 and beach openings, 346  
 non-point sources, 414  
 point versus non-point, 341  
 polychlorinated biphenyls  
 see PCBs  
 polycyclic aromatic hydrocarbons  
 see PAHs  
*Polydora ligni*, 257, 258, 261  
*Pomatomus saltatrix*  
 see bluefish  
 Port Authority of New York and New Jersey, 318  
 potadromous fishes  
 definition, 206  
 power plants  
 and fish mortality, 184, 324  
 Storm King pump storage proposal, 324–325  
 primary productivity, 7–8, 140–141  
<sup>14</sup>C technique, 108  
 and vertical mixing, 108  
 and water residence time, 123  
 and zebra mussels  
 contributing organisms, 107  
 dissolved oxygen technique, 108  
 fresh water part of the Hudson, 107–117  
 from New York City  
 gross primary production, 108  
 Hudson compared with other rivers, 114–115  
 in saline Hudson, 123–127  
 light limitation, 7  
 limiting nutrients, 109  
 macrophytes, 109  
 management implications, 117  
 models, 141, 142–145  
 net primary production, 108  
 nutrients, 7–8  
 rate, 111–114  
 respiration, 113–114  
 primary treatment  
 see sewage  
*Pseudocalanus*  
 see zooplankton, copepods  
*Pseudopleuronectes americanus*  
 see winter flounder  
 pumped-storage hydroelectric, 94  
 Pure Waters Bond Act, 321  
 purple loosestrife, 285  
 Pyrrhophyceae, 109  
 Quassaic Creek, 209  
 rainbow smelt, 179–180, 206  
*Rangia cuneata*  
 see Atlantic rangia  
 Raritan Bay, 388  
 Raritan Bay circulation, 36–37  
 Red Hook waste treatment plant, 343  
 R-EMAP Study, 447–448, 449  
 resistance to contaminants, 444–446  
 cadmium, 444  
 evolution, 445  
 fish, 455–456  
 in killifish, 455  
 in tomcod, 455  
 invertebrates, 447–448, 449  
 mercury, 445–446  
 selection experiments, 445  
 uptake mechanisms, 445  
 worms, 444–445  
*Rhithropanopeus harrisi*, 160, 161, 163  
*Ritaxis punctostriatus*, 258  
 River and Harbor Act, 318  
 rock and mineral resources, 21–22  
 Rockefeller Foundation Hudson River study, 321  
 Rondout Creek, 210  
 salinity structure, 5  
 salt front  
 see estuarine circulation  
 sand waves, 45  
 Sandy Hook Bay, 238, 242  
 SAV  
 see submerged aquatic vegetation  
 Scenic Hudson Preservation Conference vs. FPC Case, 324  
 Science Management Paradigm, 329  
 sea lamprey, 173  
 sea level rise and glaciation, secondary treatment  
 see sewage  
 sediment chronologies  
 beryllium-7 technique, 66  
 cesium-137 technique, 67  
 intercalibration, 393–394  
 lead-210 technique, 66–67  
 radioactive methods, 65–67  
 thorium-234 technique, 66  
 sediment contaminant chronologies, 383–386  
 sediment deposition  
 spatial heterogeneity, 386–387

- sedimentary features  
 anthropogenic deposits, 62–63  
 channel axis deposit, 60–61  
 channel bank deposit, 61–62  
 marginal flat deposit, 62  
 oyster beds, 62
- sedimentation, 6  
 accumulation estimates from  
 radionuclides, 67–68  
 and salinity, 39–40  
 and spring freshet, 69  
 and tides, 39  
 deposition, 44–45  
 equilibrium surface concept, 68  
 geological sources, 39–40  
 input, 40–41  
 marine sources, 41  
 spatial and temporal variation  
 in accumulation, 69–75  
 suspended sediment, 6, 41–44,  
 45  
 unsolved problems, 47–49  
 seismic bottom profiles, 56–57
- Sesarma reticulatum*  
 see marsh crab
- sewage  
 and nutrients, 346  
 and primary treatment, 340  
 and secondary treatment, 339,  
 340, 341  
 East River, 343  
 inputs, 336–337  
 nitrogen loads, 340  
 phosphorus loads, 340–341  
 raw sewage release, 343  
 treatment history, 337–338  
 untreated, 346  
 wastewater loads – 20th  
 century, 338–340
- sewage treatment, 123, 130
- sewerage system  
 see New York Harbor
- sharks, 191
- shellfish beds  
 and pollution, 345
- ship worms, 344
- shorthead redhorse, 210
- shortnose sturgeon, 175–176, 429
- shrimp, sevenspine bay, 429
- sidescan sonar, 55–56
- Silent Spring*  
 see Carson, Rachel
- smallmouth bass, 207–208
- South Cove, 444
- Spio filicornis*, 257
- Spirodela polyrrhiza*  
 see duckweeds
- sports fisheries  
 see fisheries, angling
- spottail shiner, 209
- spotted hake, 431, 432
- St. Lawrence River, 361
- Stizosedion vitreum*  
 see walleye
- Stockport flats, 283, 287
- stream chemistry, 83–88
- Streblospio benedicti*, 246, 257, 258
- striped bass, 181–182, 323, 324,  
 429  
 and PCBs, 448–449, 450  
 decline from PCBs?, 450  
 fisheries trends, 192–194  
 PCB bioaccumulation model,  
 373, 376–379  
 zooplankton as food, 225–226
- sub-bottom profiles  
 see seismic bottom profiles
- submerged aquatic vegetation  
 and nutrients, 234–235  
 and water quality, 230  
 as habitat, 235–238  
 before and after zebra mussels,  
 235–236  
 critical role, 230  
 distribution in Hudson, 231  
 effect on suspended sediments,  
 233–234  
 fish species, 237  
 fish use, 235–236, 238  
 food webs and metabolism,  
 233  
 habitat value, 230  
 invertebrate use, 235–236  
 management implications, 238  
 microbial processes in water,  
 234  
 oxygen concentration, 231  
 plant species, 231  
 primary production, 231–233  
 use of nutrients from overlying  
 water, 235
- sunfish, 443
- Superfund sites, 414
- suspended sediment  
 see sedimentation
- Syngnathus fuscus*  
 see pipefish, northern
- System-Wide Eutrophication  
 Model, 145–152
- Tachycineta bicolor*  
 see Tree swallow
- Taconic orogeny  
 see geological history
- tautog, 432, 433, 434
- Tautoga onitis*  
 see tautog
- Tautogolabrus adspersus*  
 see cunner
- Tear of the Clouds, 1, 24
- Tear of the Clouds, Lake  
 discovery, 9–10, 13
- Temora*  
 see zooplankton, copepods
- Teredo*  
 see ship worms
- tessellated darter, 211
- Thompson Island Dam, 356–357
- thorium-234, 386
- tidal swamps  
 see tidal wetlands
- tidal wetlands in low salinity  
 algae, 286  
 animal species list, 288  
 biomass, 286  
 diversity, 285–286  
 dredge spoils and railroad  
 construction, 282–283  
 erosion and resuspension, 282  
 fauna, 288  
 geographic extent, 269, 279  
 history of marshes, 282–283  
 important future study areas,  
 291  
 microbial assemblages, 289  
 nutrient cycling, 289–290  
 organic matter and nutrients,  
 288–289  
 plant litter, decay and microbial  
 growth, 289  
 plant species list, 284  
 porewaters and nutrients, 290  
 research needs, 292  
 role of tidal exchange, 280–281  
 sediment buildup, 281, 297, 298  
 sedimentation rates in tidal  
 marshes, 281  
 sedimentation rates in tidal  
 wetlands, 281  
 swamps, 285  
 tidal particle flux and  
 sedimentation, 281–282  
 vegetation, 283–285  
 vegetation spatial-temporal  
 patterns, 286–287
- tidal-freshwater benthos  
 and plankton, 274–275  
 and salinity, 270  
 and substratum type, 270  
 annelids, 268  
 biomass, 271  
 chironomid midges, 268  
 crustaceans, 268  
 factors in spatial variation,  
 269–271  
 history of studies, 266–267  
 in diet of fishes, 269, 274, 275,  
 279  
 in food web, 273–274  
 insects other than chironomids,  
 268  
 mollusks, 268  
 oligochaetes, 269

- poor knowledge of temporal variation, 271  
 resemblance to regional assemblages, 269  
 suspension feeding effects, 272, 273  
 taxonomic composition, 271  
 unknown factors in abundance, 270–271  
 zebra mussel invasion  
*see* zebra mussels
- tidal-induced mixing, 34  
 tides, 5  
 tidal currents, origin in Hudson, 29  
 tides and sedimentation  
*see* sedimentation  
 Tivoli Bays, 282, 283, 286  
 nutrient budget, 290–291  
 tomcod  
 lesions and toxicity, 450–455  
*see* Atlantic tomcod  
 total suspended solids, 338, 340, 341–342  
 toxicity  
 assessment, 436, 441–443  
 genetics and evolution, 442  
 Hudson/Raritan sediments, 447–448  
 management implications, 458–459  
 tomcod  
*see* tomcod, lesions  
*Trapa*  
*see* water chestnut  
*Trapa natans*  
*see* water chestnut  
 tree swallow, 458  
 tributaries  
 access by fishes from Hudson, 212  
 anadromous fishes, 205–206  
 catadromous fishes, 206  
 dams, 213  
 description, 205  
 nutrient input, 290  
 potadromous fishes, 206, 207  
 resident fishes, 211–212  
 species list, 207  
 water quality, 213  
 TSS  
*see* total suspended solids  
 TTHMs, 94  
 tumors in fish  
*see* lesions  
 turbidity maxima, 42–44, 45–47  
*Typha augustifolia*  
*see* cattails  
 typhoid epidemics, 337  
 U.S. Environmental Protection Agency, 321, 349  
*Uca pugnax*  
*see* fiddler crabs  
 UPGMA, 245  
*Urophycis regia*  
*see* spotted hake  
*Valisneria*  
*see* water celery  
*Vallisneria americana*  
*see* water celery  
 walleye, 210  
 wastewater effluent flow, 340  
 wastewater treatment plants  
 maintenance, 346  
 water celery, 107, 184, 230, 231, 234, 235–236, 238, 242  
 biomass of beds, 231  
 competition with water chestnut, 231  
 light limitation, 231  
*see* *Valisneria*  
 water chestnut, 107, 209, 231, 236, 238, 242  
 effect on oxygen, 302  
 water quality, 135–136  
 water quality trends  
*see* dissolved oxygen  
 water residence time, 123  
 water supply  
 DOC, 94  
 New York City, 92–93  
 watershed, 1, 13–14  
 fjord morphology, 28  
 major sections, 24–29  
 population size, 123  
 watershed-water area ratios, 400  
 weathering, 91–92  
 Westway, 323, 324  
 wet deposition  
*see* atmospheric deposition  
 white perch, 208  
 PCBs, 449  
 white sucker, 206–207  
 Whitman, Christine Todd, 351  
 winged monkeyflower, 285  
 winter flounder, 429, 432, 433, 434  
 yellow perch, 208–209  
 zebra mussels, 268  
 and bacteria, 102  
 and phytoplankton biomass, 111  
 and zooplankton, 222–223  
 effect on bottom habitat, 272  
 effect on dissolved oxygen, 271, 273  
 effect on plankton, 271  
 effect on trophic group of benthos, 271, 272  
 effect on zoobenthos, 271–272  
 effects on Hudson, 301  
 feces and pseudofeces as nutrients, 235–236  
 invasion of Hudson, 271, 299–301  
 zinc, 390  
 zooplankton, 8, 219  
 ciliates, 218  
 community composition, 218–219  
 copepods, 218  
 decline due to zebra mussels, 222–223  
 definition, 217  
 feeding on bacteria, 224  
 food web connections to fish, 224–226  
 mysids, 219  
 phytoplankton and zooplankton food sources, 223–224  
 population regulation, 224–225  
 predation on qualitative aspects of food limitation, 224–225  
 rotifers, 218, 222  
 saline part of Hudson, 219  
 seasonal changes, 220–221  
 size classes, 219  
 spatial variation, 221  
 spatial-temporal scales, 221–222  
 swimming larvae, 220  
 tidal variation, 220