

Index

- Accountability, 43-45
- ADC.** *See* Animal Damage Control Program
- Agricultural Marketing Service, 177
- Agricultural Quarantine Enforcement Act, 251
- Agricultural Research Service, 29-30, 115
 - research, 179-181
- Agricultural Stabilization and Conservation Service, 183-184
- Air cargo as pathway, 80,91,96
- Alabama
 - agency surveys, 210-212
 - decisionmaking standards, 216
 - fire** ants, 10,99, 100
 - regulatory approaches, 14
 - statutes and regulations, 222
- Alaska
 - agency surveys, 210-212
 - gaps in legal authority over importation and release, 214
 - interstate movement of MS, 202
 - monitoring programs, 220
 - numbers of **NIS**, 95
 - regulatory approaches, 14, 218
 - statutes and regulations, 222
- Alien Species Alert* Program, 254
- Alien Species Prevention and Enforcement Act, 48-49
- Altered environments, 74,257
 - biological diversity, 75
 - Florida, 259-260
- American Association of Zoological Parks and Aquariums, 150
- American Fisheries Society, 97, 125, 214
- AMS. *See* Agricultural Marketing Service
- Animal and Plant Health Inspection Service, 114-118, 139
 - “blitz” baggage inspections, 142-143
 - control and eradication, 176-177
 - Federal-State cooperative programs, 206
 - genetically engineered organisms, 272-274, 276-277
 - importation and exclusion, 173
 - inspections in Hawaii, 249
 - interstate movement of **NIS**, 174-175
 - monitoring programs, 175-176
 - overseas pests and diseases, 301
- Animal Damage Control Program, 176-177
- Animal Health Association, 227-229
- APHIS.** *See* Animal and Plant Health Inspection Service
- Aquaculture** Advisory Committee, 218
- AquaCulture industry, 18
 - Agricultural Research Service research, 180
 - Fish and Wildlife Service discussion paper, 203
 - Florida, 258
 - research, 180, 187
 - trends, 291
- Aquarium industry, 57,85
- Aquatic **NIS**, Federal policy, 168
- Aquatic Nuisance Species Task Force, 32,54,85, 113, 119, 185, 194, 198-199
 - research, 50
- Aquatic Plant Control Program, 196
- Arbor Day Foundation, 89
- Arizona
 - agency surveys, 210-212
 - Asian **clam**, 79
 - game* releases, 217
 - regulatory approaches, 14
 - road construction and species movement, 97
 - statutes and regulations, 222
- Arkansas
 - agency surveys, 210-212
 - regulatory approaches, 14
 - statutes and regulations, 222

- Army Corps of Engineers, 88, 195
 ARS. See Agricultural Research Service
 ASCS. See Agricultural Stabilization and Conservation Service
- Bait animals as pathway, 88
 Benefit/cost analysis, 37
 Benefits of introductions, 56-57,63
 - altered environments that are inhospitable to indigenous species, 75
 - biological diversity, 75-76
 - to ensure survival of the species, 76
 - indigenous species utilize NIS, 75
- Big Cypress National Preserve, 261
- Bilateral treaties, 297-298
- Biological controls
 - Animal and Plant Health Inspection Service, 176
 - Bureau of Land Management, 192
 - classical, 37-38, 153-154
 - environmental impact, 160
 - genetically engineered organisms, 154, 155,277
 - host plant resistance to pests, 155
 - importation, 141
 - microbial pesticides, 154
 - in national forests, 179
 - natural enemies, 153
 - as pathway, 56, 82, 90
 - sale and release, 46-48
 - State laws, 225
 - trends, 291
 - vertebrate contraceptives, 154-155
- Biological diversity, 34,74-76,294
 - Florida, 259
 - Hawaii, 239
- Biomedical experimentation, 57
- Biopesticides, 154, 197
 - environmental impact, 160
- Bioremediation, 57
- Biotechnology, 293-294
- Boll weevil eradication, 149
- Border inspection stations, 225
- Boundary Waters Treaty of 1909, 297
- Brown trout, 64
- Buildings, economic *costs* of NIS, 67
- Bulk commodities as pathway, 79
- Bureau of Indian Affairs, 193
- Bureau of Land Management, 30,44, 189-193
- Bureau of Reclamation, 180-181, 193
- California
 - African clawed frog, 84
 - agricultural pests, 96
 - Asian clam, 68, 79
 - border inspections, 149,225
 - clams, 81
 - Dutch elm disease, 98
 - ecological risk analysis, 112
 - eucalyptus, 75, 76
 - Federal emergency powers to override State control, 204
 - feral mammals, 75
 - first class** mail, 49, 143,144, 206,251
 - golden trout, 64
 - ice plant, 75
 - illegal releases of fish, 220
 - importation permits, 211
 - interstate cooperation, 208
 - Japanese beetle, 91
 - laws concerning biological controls, 225
 - mason bee, 82
 - Mediterranean **fruit** fly, 48,89
 - melaleuca** tree, 63
 - numbers of NIS, 95
 - ornamental plants, 83
 - Pacific oyster, 83,90
 - pests associated with Asian **foods**, 97
 - pests from military cargo, 97
 - pets, 93
 - rainwater **killifish**, 90
 - red **brome**grass, 76
 - regulatory approaches, 14
 - replacing NIS in parks, 227
 - rust **fungus**, 56
 - scale insects, 93
 - Scotch broom, 82
 - shoal grass from Texas, 89
 - snails, 90
 - species decline and extinction, 72
 - statutes and regulations, 222
 - sticklebacks, 90
 - surveys to detect new introductions, 145
 - sweet potato whitefly, 143
 - Texas big-scale **logperch**, 90
 - woody weeds, 301
- California Department of Food and Agriculture, 142-143
- Centers for Disease Control and Prevention, 46
- Chemical pesticides, 37-38, 152-153
 - environmental* impact, 159-160
 - Hawaii, 242
 - reregistration, 38, 160-162
- CITES. See Convention on International Trade in Endangered Species
- “Clean” and “dirty” lists, 8, 23-24, 108-110, 210-212
- Climate change, 302-306
- Coastal Zone Management Act, 194
- Colorado
 - agency surveys, 210-212

- regulatory approaches, 14
- statutes and regulations, 222
- Colorado River Fish and Wildlife Council, 208
- Columbia River Basin Project, 193
- Computerized databases, 146-147
- Congress and a more stringent national policy, 15-19
- Connecticut
 - gaps in legal authority over importation and release, 214
 - regulatory approaches, 14
 - statutes and regulations, 222
- Conservation Reserve Program, 183
- Containerized freight, 80,93
- Containment**
 - big-game animals, 150
 - biological controls, 151, 153-156
 - chemical pesticides, 152-153
 - fish, 150-152
 - physical controls, 151
- Control of **NIS**. See *also* Biological controls; Chemical pesticides; Physical controls
 - Agricultural** Research Service, 181
 - Animal and Plant Health Inspection Service, 176-177
 - Bureau of Land Management, 190-193
 - Department of Defense, 196
 - Fish and Wildlife Service, 186-188
 - Forest Service, 178-179
 - National Oceanic and Atmospheric Administration, 194
 - policymaking process, 9, 110-111
 - Soil Conservation Service, 182-183
- Convention on Biological Diversity, 296-297
- Convention on Great Lakes Fisheries, 297
- Convention on International Trade in Endangered Species, 185,298-299
- Convention on the Law of the Sea, 297
- Cooperative **Forestry** Assistance Act, 179
- Cooperative State Research Service, 38, 161, 184-188
- CRP. See Conservation Reserve Program
- CSRS. See Cooperative State Research **Service**
- Cuivre** River State Park, 74
- Damage to natural areas, 31-34
- Decisionmaking** approaches, 22
 - ‘clean’ and “dirty” lists, 23-24
 - economic analysis, 122-125
 - new syntheses of diverse approaches, 131-136
 - protocols, 47, 125-130
 - risk analysis, 111-119
 - standards, 24-25, 26, 214-217
 - values, 129-131
- Decline of indigenous species, 71. See *also* Species extinction
- Definitions**, 52-54
- Delaware
 - regulatory** approaches, 14
 - statutes and regulations, 222
- Department of Agriculture, 170-184. See *also specific agencies*
 - Conservation Reserve Program, 79
 - quarantines, 249
- Department of Commerce policies, 194-195
- Department of Defense, 195-199
- Department of Energy, 200
- Department of Health and Human Services, 199
- Department of the Interior, 184-195. See *also specific agencies*
 - Department of Justice, 200
 - Department of Transportation, 199-200
 - Department of the Treasury, 199
- Detection technologies
 - GIS technology, 146
 - remote sensing, 146
 - traps, 145
 - visual surveys, 145
- District of Columbia
 - English ivy, 75
 - Japanese honeysuckle, 75
 - pathways, 89
 - Rock Creek Park, 189
- Drug Enforcement Agency, 200
- Ecological restoration, 157-159
 - Hawaii, 239
- Ecological risk assessment, 279-285
- Economic costs of **NIS**, 5,6,92
 - to agriculture, 65-66
 - analysis, 122-125
 - to buildings, 67
 - to fisheries and **waterway** use, 67
 - Florida, 261-262
 - to **forestry**, 66-67
 - fruit flies in Hawaii, 244
 - to health, 69-70
 - to natural areas, 68-69
- Education. See Public education
- Emergencies, 36-38
- Endangered species, 262
 - Hawaii, 238
- Endangered Species Act, 49,72, 130, 204
- Enforcement of laws and regulations, 220-221,225,227
- Environmental costs of **NIS**, 70
 - to biological diversity, 74-76
 - decline of indigenous species, 71
 - in National Parks, 74
 - transformation of ecological communities and ecosystems, 73-74
- Environmental impact

- of control technologies, 159
- decisionmaking** standards, 215-216
- transgenic** fish, 278
- Environmental impact assessment, 120-122
- Environmental Protection Agency, 155, 196-199
 - genetically engineered organisms policies, 274
 - research, 198-199
- Eradication, 9-11, 170
 - Animal and Plant Health Inspection Service, 176-177
 - Department of Defense, 196
 - fire** ant and boll **weevil** programs, 10
 - Fish and Wildlife Service, 186-188
 - Florida, 262
 - National Oceanic and Atmospheric Administration, 194
 - policymaking process, 110-111
 - programs, 149
 - research, 181
 - Soil Conservation Service, 182-183
 - States' responsibility, 207
 - technologies, 147-148
- Evaluations
 - genetically engineered organisms, 269
 - probable environmental impact, 61-62
 - risk analysis, 111-119
- Everglades National Park, 74, 158, 159
 - water management, 260
- Exclusion, 170. See *also* Importation; Inspections
 - Animal and Plant Health Inspection Service, 173
 - Federal policies, 163-165
- Executive Order 11987, 21, 167
- Exotic Pest Plant Council, 205, 230, 264, 265
- Exotic Plant Pest Council, 39
- Extinction
 - Hawaii, 238
- Farm Bill of 1990, 30-31, 42, 183
- FAS. See Foreign Agricultural Service
- Federal Aid Program, 185-186, 188
- Federal Endangered Species List, 238
- Federal Insecticide, Fungicide, and **Rodenticide** Act, 38, 153, 196, 274
- Federal Land Policy and Management Act of 1976, 189, 193
- Federal laws, 11-13
- Federa! Negotiated **Rulemaking** Act, 135
- Federal Noxious Weed Act, 25-26, 26-30, 30-31, 117, 173, 175, 202, 203, 224
 - 1990 Amendment, 192, 205
- Federal Plant Pest Act, 173, 202, 203, 204, 278, 279, 282
- Federal Plant Quarantine Act, 203
- Federal Seed Act, 26-28, 79-80, 97, 224, 277
- Federal-State relationships, 201-203
 - cooperative programs, 204-207, 254
 - Federal preemption of State law, 203-204
 - genetically engineered organisms, 279
- FIFRA**. See Federal Insecticide, Fungicide, and **Rodenticide** Act
- Fire** ant eradication, 149
- Fish and Wildlife Service, 19, 72, 99, 109, 184-188
 - aquiculture discussion paper, 203-204
 - Federal-State cooperative programs, 206
 - freed, 45
 - release of genetically engineered organisms, 276
 - risk analysis, 119
- Fishing industry, 56-57
 - benefits of introductions, 64
 - economic costs of NIS, 67
 - evaluations of probable environmental impact, 61
 - interstate shipments, 90
 - removing harvesting pressure from indigenous species, 76
 - values in decisionmaking, 131
- Florida, 13-15, 254-257
 - African giant snail, 84, 258
 - African honey bee, 263
 - agency surveys, 210-212
 - American oyster catcher, 262
 - anoles**, 257
 - aquarium **fish**, 85, 109
 - Asian fig plant, 58
 - Asian tiger mosquito, 81, 262, 263
 - Asian water spinach, 82
 - Asiatic clam, 263
 - Australian pine, 75, 258, 262
 - bagoine** weevil, 264
 - beach mouse, 262
 - blue tilapia**, 263
 - border inspection of commodities, 149
 - Brazilian pepper tree, 67, 88, 258
 - brown darter, 262
 - brown trout, 64
 - cactus moth, 61
 - cane toad, 258
 - Cape Sable seaside sparrow, 262
 - catclaw** mimosa, 263
 - citrus blackfly, 260
 - citrus canker, 207, 260, 263
 - climate, 95, 257-258
 - Cogon grass, 263
 - decisionmaking** standards, 214-215
 - diamondback moth, 89
 - ecological restoration, 158, 159
 - economic costs of NIS, 261-262
 - effects of hurricanes, 88, 259
 - eradication, 262
 - Exotic Pest Plant Council, 205, 230, 264, 265
 - Exotic Plant Pest Council, 39
 - Federal-State cooperative programs, 207

- fire ants, 260
- funding, 265-266
- giant African snail, 263
- GIS technology use, 146
- grass carp**, 263
- health costs of **NIS**, 262
- honey bee parasites, 90
- human population growth, 258
- hydrilla**, 258
- key deer, 262
- laws concerning biological controls, 225
- leaf-mining** flies, 263
- Mediterranean fruit** fly, 260
- melaleuca** tree, 63, 73, 99, 258, 260, 261
- minimum containment standards for commercial
 - aquaculture**, 150
- mole crickets, 258
- monk parakeet, 258
- nine-banded armadillo, 263
- numbers of **NIS**, 95, 255
- Okaloosa** darter, 262
- panther, 76, 263
- pathways, 258
- peacock bass, 263
- peacock cichlid, 84-85
- peanut stripe virus, 84
- pets, 93
- potential future impacts of **NIS**, 263
- public education, 266
- regulatory** approaches, 14
- releases, 19, 214
- research, 181
- research centers, 187
- snail kite, 262
- snails, 67
- statutes and regulations, 217, 222
- urbanization, 260-261
- water hyacinth, 258
- water lettuce, 262
- water management, 260
- wild hogs, 263
- Florida Tropical Fish Farms Association, 258
- FLPMA. See Federal Land Policy and Management Act of 1976
- FNWA**. See Federal Noxious Weed Act
- Food and Agriculture Organization, 290, 296
- Food Security Act of 1985, 183
- Foreign Agricultural Service, 177
- Forest **Service**, 32
 - Federal-State cooperative programs, 206
 - land management, 178-179
 - research, 179
- Forestry, economic costs of **NIS**, 66-67
- Free trade agreements, 290-291
- Funding, 33, 4043
- Fur industry, 57
- FWS. See Fish and Wildlife Service
- Game animals, 19
 - big-game, 84, 94
 - containment, 150
 - enforcement of laws and regulations, 220
 - quarantine, 140-141
 - releases, 217
- Gaps in legal authority, 213-214
- Gaps in legislation and regulation, 45
- Gardening, 291
- GATT**. See General Agreement on Tariffs and Trade
- General Agreement on Tariffs and Trade, 288-290
- Genetically engineered organisms, 7-11, 113-114, 155
 - commercial distribution and sale, 277-278
 - commercialization issues, 282
 - compared with **NIS**, 268
 - confinement, 283-284
 - Coordinated Framework, 274-275
 - EPA regulations, 197
 - Federal policies concerning release, 269
 - fish and wildlife, 275-277
 - insects and invertebrates used in biological control, 277
 - international trade, 284-285
 - microbes, 280
 - plants, 276-277
 - potential effects, 269
 - pre-release** evaluations, 11-12
 - regulatory responsibilities, 272
 - releases, 272-279
 - research, 277
 - risks, 270
 - terms, 268
- Geographic distribution, 93-95
- Geographic information systems, 146
- Georgia
 - agency surveys, 210-212
 - diamondback moth, 89
 - feral hogs, 76
 - regulatory approaches, 14, 217
 - statutes and regulations, 217, 222
 - sterile grass carp, 188
- GEOs**. See Genetically engineered organisms
- Glacier National Park, 73, 79
- Grand **Teton** National Forest, 85
- Grazing, 189-190
 - in national forests, 178
- Great Lakes Fishery Commission, 67, 208, 297
- Great Smoky Mountains National Park, 74, 189
- Guam

- brown tree snake, 76, 177
 - military freight as pathway, 195
- Habitat destruction, 304
- Habitat* modification, 78-79
- Habitat reduction, 74
- Haleakala** National Park, 189, 190,240
 - rabbits, 246, 253
- Hawaii, 13-15
 - agency surveys, 210-212
 - agriculture, 241-245
 - banana poka, 88
 - barn owl, 56
 - brown tree snake, 247-248
 - chemical controls, 242
 - Christmas trees, 252
 - climate, 95, 235-236
 - crested wheatgrass, 75
 - decisionmaking standards, 214-215
 - ecology, 234-235
 - Endangered Species Act, 204
 - environmental education programs, 157
 - Federal-State cooperative programs, 205
 - feral goats, 148
 - fiie tree, 75
 - first class mail, 49
 - fruit flies, 239, 249
 - gourd-producing vine, 254
 - Guam rail, 76
 - gypsy moth, 252
 - Haleakala** National Park, 189, 190
 - human populations of diverse origins, 93
 - hunting industry, 246
 - hurricane effects, 88
 - importation laws, 110
 - insects introduced as biological controls, 61
 - inspections, 246-248
 - interagency cooperation, 255
 - interstate movement of **NIS**, 202
 - irradiation of imported commodities, 140
 - leuceana*, 89
 - mail as pathway, 48, 89, 143, 144, 175, 206
 - mealybug, 249
 - military freight as pathway, 195, 246
 - molasses grass, 73
 - monitoring programs, 220, 253
 - National Parks, 33
 - number of **NIS**, 235
 - ornamental plants, 82, 243-245
 - pet industry, 246
 - popular attitudes toward **NIS**,130
 - potted plants, 96
 - public education, 253-254
 - quarantines, 243,249-251
 - rabbits, 253
 - ranching, 243
 - rates of introductions, 236, 238
 - recovery* plans for threatened *or* endangered species, 187
 - regulatory approaches, 14, 219
 - roles of Federal and State agencies, 241
 - rosy snail, 71, 238
 - significant NIS**, 237
 - species decline and extinction, 71-72
 - state of indigenous species, 238-239
 - statutes **and** regulations, 217, 222, 252-253
 - strawberry guava, 236
 - sugar cane, 236
 - tourism, 245
 - transgenic** cottons, 278
 - Volcanoes National Park, 189
- Hawaii Tropical Recovery Act, 240
- Health costs of **NIS**, 46,69-70
 - Asian tiger mosquito, 81
 - Florida, 262
- High-speed trains, 294
- Honey bee industry, 56, 90
 - economic costs of **NIS**, 66
 - model State laws, 229
 - regulation, 175
 - research, 181
- Host **plant** resistance to pests, 155, 181
- Hunting industry, 57,82, 84,94
 - Hawaii, 246
 - state regulation, 220
- Hurricanes and **NIS** spread, 88, 259
- Hybridization, 71, 76
- Idaho
 - agency surveys, **210-212**
 - regulatory** approaches, 14
 - statutes and regulations, 222
 - weed and seed laws, 221, 224
- Illinois
 - agency surveys, 210-212
 - Elsmo lacebark** elm, 182
 - garlic mustard, 158
 - numbers of **NIS**, 95
 - nursery trade, 88
 - regulatory approaches, 14, 218
 - statutes and regulations, 222
 - use of indigenous plants, 227, 228
- Immune-contraception, 155
- Importation, 194. See *also* Interstate movement of **NIS**
 - Animal and Plant Health Inspection Service policies, 173
 - animals, 140-141
 - biological control agents, 141

- commodities, 139-140
- decisionmaking** standards, 215
- Department of Defense policies, 195
- Fish and Wildlife Service, 185
- number prohibited by states, 194
- permits, 211
- plant germ plasm, 141
- policymaking process, 108-110
- public education, 141-142,225,227
- Public Health Service, 199
- seeds, 80, 177, 221
- Soil Conservation Service, 182
- State laws, 208-221
- treaties, 294
- Indiana
 - agency surveys, 210-212
 - regulatory approaches, 14
 - statutes and regulations, 222
- Information gaps, 54-55
- Inspections, 28
 - Animal and Plant Health Inspection Service, 173
 - commodities, 139-140, 173
 - containerized freight, 80
 - detection technologies, 145-146
 - evaluation of prevention programs, 142
 - Hawaii, 246-248,249-250,252-253
 - Public Health Service, 199
 - sterile grass carp, 188
 - travelers and baggage, 138-139
 - U.S. Customs Service, 199
- Integrated Pest Management, 119-124, 156
- Intentional introductions, 6, 28, 61-62, 170. *See also*
 - Unintentional introductions
 - Federal funding, 185
 - Florida, 258
 - national forests, 178
 - National Park Service, 189
 - pathways, 82-83
- Interagency cooperation, 254
 - Florida, 264,265
- Interagency coordination
 - genetically engineered organisms, 274-275
- Intergovernmental Panel on Climate Change, 302
- International law, 287-306
- International Office on Epizootics, 296
- International Plant Protection Convention, 295-296
- International trade, 287-288
 - genetically engineered organisms, 284-285
- International treaties, 295
- International Union for Conservation of Nature and Natural Resources, 17, 125, 129, 296
- Interregional Research Project No. 4, 38, 161
- Interstate cooperation, 207-208
 - Interstate movement of MS, 21, 170,202
 - Animal and Plant Health Inspection Service, 174-175
 - Department of Defense, 195
 - Fish and Wildlife Service, 185-186
 - produce shipments, 89
 - Iowa
 - agency surveys, 210-212
 - gaps in legal authority over importation and release, 214
 - regulatory approaches, 14
 - statutes and regulations, 222
 - IPM.** *See* Integrated Pest Management
 - IPPC.** *See* International Plant Protection Convention
 - Irradiation of imported commodities, 140
 - IUCN.** *See* International Union for Conservation of Nature and Natural Resources
- Kansas
 - agency surveys, 210-212
 - regulatory approaches, 14
 - statutes and regulations, 222
- Kentucky
 - Asian clam, 68
 - regulatory approaches, 14
 - statutes and regulations, 222
- Lacey Act, 44, 109, 114, 119, 185,201-202, 203
 - implementation, 34
 - proposed changes, 22,23,49
- Land and Water Conservation Fund Act of 1965, 33,42
- Land management, 30-31,33
 - Department of Defense, 196
 - Federal policy, 165-170
 - Forest Service, 178-179
 - National Oceanic and Atmospheric Administration, 194
 - National Park **Service**, 188-189
- Landscaping industry, 258
- Local approaches, 229-231
- Louisiana**
 - agency surveys, 210-212
 - Argentine ant, 91
 - boll **weevils**, 10
 - gaps in legal authority over importation and release, 214
 - legal approaches, 14
 - regulatory approaches, 14,218
 - statutes and regulations, 222
- Loxahatchee** National Wildlife Refuge, 261
- Maguire** approach to **decisionmaking**, 133-135
- Mail as pathway, 48-49,82,89-90, 143, 175,251-252
 - Federal regulation, 202
 - Puerto Rico, 143
- Mail-order sale of plants or **seeds**, 202
- Maine

- agency surveys, 210-212
- numbers of NIS, 95
- regulatory approaches, 14, 219
- requirements for releases, 215
- statutes and regulations, 222
- Marine Fisheries Commissions, 208
- Marine Mammal Protection Act, 289
- Maryland**
 - agency surveys, 210-212
 - diamondback moth, 89
 - Pacific oyster, 207
 - regulatory approaches, 14
 - statutes and regulations, 222
- Massachusetts
 - agency surveys, 210-212
 - animals found in plant shipments, 89
 - California sea squirt, 91
 - numbers of NIS, 95
 - pet escapes, 84
 - regulatory approaches, 14
 - statutes and regulations, 222
- Massachusetts Division of Fisheries and **Wildlife**, 84
- Medical technology, 294
- Michigan
 - enforcement of laws and regulations, 220
 - gaps in **legal** authority over importation and release, 214
 - regulatory approaches, 14
 - research centers, 187
 - Sichuan** pheasant, 82
 - statutes and regulations, 222
- Microbes, 280
- Microbial pesticides, 197
 - environmental impact, 160
 - registered by EPA, 198
 - used for biological control, 154
- Military freight as pathway, 81,97, 195, 246
 - Hawaii, 253
- Minnesota
 - agency surveys, 210-212
 - educational material, 157
 - Environmental Research Laboratory, 198
 - European **zander**, 207
 - numbers of NIS, 95
 - regulatory approaches, 14, 219
 - sea lampreys, 186
 - statutes and regulations, 222
- Minnesota Interagency Exotic Species Task Force, 21,39
- Mississippi
 - agency surveys, 210-212
 - bighead carp, 83
 - boll weevils, 10
 - fish releases, 217
 - gaps in legal authority over importation and release, 214
 - legal authority to release, 213
 - regulatory approaches, 14
 - research facilities, 196
 - statutes and regulations, 222
 - under-regulation, 219
- Missouri
 - agency surveys, 210-212
 - Asian Amur maple, 84
 - Elsmo lacebark** elm, 182
 - European **buckthorn**, 74
 - model laws, 24-25
 - statutes and regulations, 222
- Model local ordinances, 230-231
- Model national law on NIS, 17
- Model State laws, 24-25
 - captive wild and exotic **animals**, 227-229
 - honey bee **certification** plan, 229
 - weeds in natural communities, 229
- Monitoring programs, 37-38,220
 - Animal and Plant Health Inspection Service, 175-176
 - Environmental Protection Agency, 197-198
 - Hawaii, 253
- Montana
 - agency surveys, 210-212
 - decisionmaking standards, 214-215,216
 - emergency moratorium on game farm activities, 217
 - funding strategies, 225
 - game farms, 220
 - leafy spurge, 99, 300
 - regulatory approaches, 14, 218, 219
 - statutes and regulations, 217, 222
- Movement of species into the United States. See Importation
- NAFTA**. See North American **Free** Trade Agreement
- National Aeronautic and Space Administration, 294
- National Animal Health Monitoring Program, 176
- National Aquiculture Act of 1980, 187
- National Arboretum, 180
- National Biological Control Institute, 176
- National Environmental Policy Act, 18, 120-122,289-290
- National **Estuarine** Research Reserve System, 194
- National Fish and Wildlife Foundation, 193
- National Fish Health Strategy, 187
- National Fisheries Research Centers, 187
- National Genetic Resources Center, 183
- National Genetic Resources Program, 180
- National Institutes of Health, 274
- National Oceanic and Atmospheric Administration, 19-20
 - genetically engineered organisms, 276
 - land management, 194
 - research, 194-195
- National Park Service, 31-34,74, 183, 188-189
 - fencing, 240

- GIS technology use, 146
- Hawaii, 251-252
- land management, 188-189
- natural zones, 190
- policies, 107
- research, 189
- National Plant Board, 204-205, 221
- National Plant **Germplasm** System, 179-180
- National Wildlife Refuge System, 187
- Natural enemies used in biological **control**, 153
- Nature Conservancy of Hawaii, 240
- Nebraska
 - agency surveys, 210-212
 - regulatory approaches, 14
 - statutes and regulations, 223
- NEPA. See National Environmental Policy Act
- Nevada
 - game animals, 94
 - regulatory approaches, 14
 - statutes and regulations, 223
- New Hampshire
 - agency surveys, 210-212
 - regulatory approaches, 14
 - statutes and regulations, 223
- New Jersey
 - agency surveys, 210-212
 - gaps in legal authority over importation and release, 214
 - regulatory approaches, 14, 218
 - statutes and **regulations**, 223
- New Jersey Division of Fish and Wildlife, 186
- New Mexico
 - game animals, 19
 - numbers of **NIS**, 95
 - regulatory approaches, 14
 - statutes and regulations, 223
- New York
 - agency surveys, 210-212
 - diamondback moth, 89
 - nursery industry as pathway, 93
 - regulatory approaches, 14
 - statutes and regulations, 223
- New York Sea Grant Marine Advisory Service, 146
- New Zealand, 19
 - benefit/cost analysis, 37
 - laws and programs, 20
- NIH**. See National Institutes of Health
- NOAA. See National Oceanic and Atmospheric Administration
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, 19,27,32,54, 176-177, 199,206,276
- North American Association for Environmental Education, 35
- North American Free Trade Agreement, 290-291
- North Carolina
 - agency surveys, 210-212
 - boll **weevils**, 10
 - commercial sales, 47
 - genetically engineered organisms, 278-279
 - gypsy moth, 67
 - laws concerning biological controls, 225
 - regulatory** approaches, 14
 - statutes and regulations, 223
 - witchweed**, 147-148
- North Carolina Genetically Engineered Organisms Act, 278-279
- North Dakota
 - agency surveys, 210-212
 - European zander, 83,99,207,297-298
 - gaps in legal authority over importation and release, 214
 - leafy spurge, 99
 - regulatory approaches, 14
 - statutes and regulations, 223
 - under-regulation, 219
- Northeastern Forest Experiment Station, 179
- Noxious Weed Technical Advisory Group, 39
- NPGS**. See National Plant **Germplasm** System
- NPS. See National Park **Service**
- Numbers of NIS**, 3,91-106,257
 - Florida, 255
 - Hawaii, 235
 - by state, 95
- Nursery industry, 18
- Ohio**
 - agency surveys, 210-212
 - gaps in legal authority over importation and release, 214
 - regulatory approaches, 14
 - statutes and regulations, 223
 - under-regulation, 219
- Oklahoma
 - agency surveys, 210-212
 - regulatory approaches, 14
 - statutes and regulations, 223
- Omnibus Crime Control Act of 1987,44
- Oregon
 - gaps in legal authority over importation and release, 214
 - numbers of **NIS**, 95
 - pine wood chips, 117
 - regulatory approaches, 14
 - species arriving in ballast water, 82
 - statutes and regulations, 223
 - weed and seed laws, 221, 224
- organic Act of 1944,33, 177
- OSTP. See White House Office of Science and Technology Policy
- Oyster industry, 56

- Pacific Marine Fisheries Commission, 208
- Packing material as pathway, 80
- Pathways of spread within the United States, 85, 88-91
- Pennsylvania
 - agency surveys, 210-212
 - funding for eradication programs, 194
 - gaps in legal authority over importation and release, 214
 - regulatory approaches, 14
 - statutes and regulations, 223
- Pennsylvania State Bureau of Consumer Protection, 48
- Pest-free zones, 139
- Pet industry, 18,57, 84,93
 - animal quarantines, 140-141
 - Hawaii, 246
 - values in **decisionmaking**, 131
- Pet Industry Joint Advisory Council, 24, 97
- Physical controls, 151
- Phytotoxins, 293
- Plant Boards, 208, 221
- Plant germ plasm, 141
 - importation, 141, 179-181
- Plant Pest Act, 44, 117
- Plant Quarantine Act, 44, 173,249, 278,279,282
- Pollution, 78
- Potential future impacts of **NIS**, Florida, 263
- Power industry, economic costs of **NIS**, 67,68
- Pre-release** evaluations, 11-12, 28-30
- Predictions, 298-301
 - next pests, 301-302, 303
- Preservation of ecosystems, 188
- Preservation of endangered and threatened species that cannot be saved in their natural habitat, 57
- Presque** State Park, 194
- Priority setting, 38-40
- Protected lands, 205
- Public education, 34-36, 156-157
 - Florida, 266
 - Hawaii, 253-254
 - importation, 141-142
- Public Health Service, 19,46
- Public opinion
 - eradication programs, 148
 - values in **decisionmaking**, 131
- Puerto Rico
 - mail as pathway, 49, 143, 144
 - species decline and extinction, 72
- Quarantines, 83
 - animal, 140-141
 - commodities, 139-140
 - coordination, 208
 - domestic, 148-150, 174-175,203,204-205, 207,221
 - Hawaii, 243, 249
 - international, 289
 - Washington, 226-227
- Ranching in Hawaii, 243
- Randall approach to **decisionmaking**, 132-133
- Rates of introductions, 6
 - Hawaii, 236, 238
- Rates of movement, 95-96
- Regulating product content and labeling, 170
- Releases, 83-95. *See also* Containment
 - biological control agents, 46-48
 - decisionmaking** standards, 215
 - Florida, 258
 - genetically engineered organisms, 281
 - interstate cooperation, 208
 - number prohibited by states, 213
 - Pacific oysters in Virginia, 207
 - polycymaking process, 108-110
 - pre-release** evaluations, 11-12
 - from research facilities, 91
 - State laws, 208-221
- Remote sensing, 146
- Reregistration of minor use pesticides, 38, 160-161
- Research, 50, 170
 - Agricultural Research Service, 179
 - Animal and Plant Health Inspection Service, 177
 - biological *control*, 180-181
 - Environmental Protection Agency, 198-199
 - Forest Service, 179
 - genetically engineered organisms, 277
 - interagency agreements, 205
 - methodology, 55-56
 - National Oceanic and Atmospheric Administration, 194-195
 - ship design, 200
- Research releases as pathway, 91
- Resistance to chemical pesticides, 160
- Restoration of habitats, 57
- Rhode Island
 - agency surveys, 210-212
 - gaps in legal authority over importation and release, 214
 - regulatory approaches, 14
 - statutes and regulations, 223
- Risk **analysis**, 7-8, 111-113
 - economic analysis, 122-125
 - environmental impact, 120-122
 - experimentation, 114
 - by Federal agencies, 114-119
 - process, 113-114
- Rock Creek National Park, 89, 189
- Safe Minimum Standard, 132
- SCS. *See* Soil Conservation Service

390 | Harmful Non-Indigenous Species in the United States

- Seed trade as pathway, 88
- Semiochemicals**, 155
- SEPAS. See State environmental policy acts
- Ship's ballast**, 81,88,91
 - dry, 100
 - U.S. Coast Guard regulations, 199-200
- Soil Conservation Act of 1935, 181
- Soil Conservation Service, 82,84,88, 181-183
 - importation, 182
- South Carolina, 147-148
 - boll **weevils**, 10
 - gaps in legal authority over importation and release, 214
 - giant tiger shrimp, 83
 - legal approaches, 14
 - Pacific white shrimp, 85
 - sawtooth oak, 89
 - statutes and regulations, 223
- South Carolina Department of Fish and Game, 89
- South Dakota
 - agency surveys, 210-212
 - leafy spurge, 99,300
 - regulatory approaches, 14
 - statutes and regulations, 223
- South Florida Exotic Pest Plant Council, 230
- Southeast Cooperative Wildlife Disease Study Center, 227
- Species extinction, 71-73
- Species identification and inspection, 143-144
 - molecular biology techniques, 144-145
- Species Survival Commission, 44, 47
- Standards, 24-25, 26,214-217
- State environmental policy acts, 120,216
- State **fish** and wildlife agencies survey, 210-211
- State laws and regulations, 13,201-229
 - Alaska: Ak. Stat. sec. 16,05.940(17), 218
 - genetically engineered organisms, 278
 - Georgia: **Ga.** Game and Fish Code 27-5-1,218
 - Georgia: **Ga.** Game and Fish Code 27-5-4(f), 218
 - Hawaii, 252
 - Hawaii: Ha. Rev. Stat. sec. 150A-14, 219
 - Illinois: 17 Ill. **Admin.** Code sec. 870.10(e), 218
 - insects and other invertebrates, 225
 - Louisiana: La. Wildlife and Fisheries Reg. sec. 107.1 **I.D.**, 218
 - Maine: 12 Me, Rev, Stat. Ann. 7613,219
 - Maine v. Taylor*, 202
 - Montana: Rev. Code Mont. 87-1-102,219
 - Montana: Mont. Admin. Register 2-1/30/'92, 218
 - Nevada: Nev. Rev. Stat. 504.165,218
 - New Jersey: **N.J.** Stat. **Annot.** 23:2A-5, 218
 - Tennessee**: Term. Code **Annot.** 70-4-417,218
 - Vermont: 10 **Vt.** Stat. Ann. sec 4502(b)(2)(L), 219
 - Vermont: 10 **Vt.** Stat. **Annot.** sec. 4709,218
 - weeds, 221-225
 - Wisconsin: Wise. Admin. Code **NR** 19.05,218
- Sterile male release for biological control, 154
- Subset sampling, 139
- Taxes, 43
- Technological changes, 293-294
- Tennessee**
 - agency surveys, 210-212
 - Great Smoky Mountains National Park, 189
 - regulatory approaches, 14, 218
 - statutes and regulations, 223
- Texas
 - African honey bee, 90, 176,229
 - Asian Tiger mosquito, 81
 - big-game animals, 84
 - bobcats, 84
 - boll **weevils**, 10
 - gaps in legal authority over importation and release, 214
 - illegal releases from game farms, 220
 - numbers of NIS, 95
 - peanut stripe virus**, 84
 - regulatory approaches, 14
 - salt cedar, 75
 - snails, 67, 72
 - statutes and regulations, 223
 - under-regulation, 219
 - unsuccessful introductions of fish, 83
- Thermal pollution, 78
- Timber imports, 118-119
- Time lags, 79
 - between establishment and **harmful** effects, 58
 - between **identification** of species' pathway and implementation of prevention program, 8, 144
- Toxic Substances Control Act, 196,274
- Transformation of ecological communities and ecosystems, 73
- Transgenic fish**, 278
- Transgenic** squash, 282
- Transgenic** technology, 155-156. See **also** Genetically engineered organisms
- Traps used for detection, 145
- Travelers and baggage
 - "blitz" inspections, 142-143
 - Hawaii, 245,252
 - international flights, 36
 - as pathway, 82
- Treatment technologies **for importing commodities**, 139,140
- TSCA. See Toxic Substances Control Act
- Types of organisms covered by **OTA's** contractors, 55
- Unintentional introductions, 6,62-63
 - national forests, 178
 - pathways, 79-83

- prevention technologies, 137-143
- Unknown effects, 58
- Urban landscaping, 57
- U.S. Coast Guard, 199-200
- U.S. Customs Service, 199
- USDA. See Department of Agriculture
- USFS. See Forest Service
- Utah
 - agency surveys, 210-212
 - brown trout, 64
 - enforcement of laws and regulations, 220
 - gypsy moth control, 153
 - model laws, 24-25
 - numbers of NIS, 95
 - regulatory approaches, 14
 - salt cedar, 75
 - statutes and regulations, 217, 223
 - weed and seed laws, 221, 224
- Utilities. See Power industry
- Values in **decisionmaking**, 129-131
- Vehicles as pathways, 80
- Vermont
 - agency surveys, 210-212
 - Eurasian **watermilfoil**, 157
 - gaps in legal authority over importation and release, 214
 - pear **thrip**, 67
 - regulatory approaches, 14, 218, 219
 - statutes and regulations, 223
- Vertebrate contraceptives, 154-155
- Virginia
 - African giant snails, 84
 - boll weevils, 10
 - numbers of NIS, 95
 - Pacific oyster, 207
 - peanut stripe virus**, 84
 - regulatory approaches, 14
 - statutes and regulations, 223
- Virus, Serum, and Toxin Act, 277
- Volcanoes National Park, 73, 148, 189
 - fencing, 240
- Warm Springs Regional Fisheries Center, 188
- Washington
 - animated oat, 88
 - apple ermine moth, 206
 - dyer's woad, 88
 - emergency moratorium on game farm activities, 217
 - Pacific oyster, 83
 - regulatory** approaches, 14
 - shad, 76
 - statutes and regulations, 223
 - weed and seed laws, 221, 224
 - weeds, 221
- Washington, D.C.. See District of Columbia
- Washington State Department of Fisheries, 76
- Water management, Florida, 260
- Waterways, economic costs of NIS, 67
- Weeds, 25-31
 - economic costs of NIS, 65-66
 - State laws, 221-225
- West Virginia
 - agency surveys, 210-212
 - gaps in legal authority over importation and release, 214
 - numbers of NIS, 95
 - regulatory approaches, 14
 - statutes and regulations, 223
 - under-regulation, 219
- Western Weed Coordinating Committee, 205
- White House Office of Science and Technology Policy, 270
- Wichita Mountains National Wildlife Refuge, 187
- Wild Free-Roaming Horses and Burros Act, 190,204
- Wildflowers as **ornamentals**, 89
- Wisconsin
 - agency surveys, 210-212
 - crayfish, 71
 - gaps in legal authority over importation and release, 214
 - honey bee parasites, 90
 - protocols, 47
 - regulatory approaches, 14, 218
 - research centers, 187
 - statutes and regulations, 223
- Wood chips**, 36-37
- Wooden crates as pathways, 80
- Wyoming
 - agency surveys, 210-212
 - big-game animals, 84
 - leafy spurge, 99,300
 - regulatory approaches, 14
 - statutes and regulations, 223
 - weed and seed laws, 221, 224
- Wyoming Game and Fish Commission, 217
- Yellowstone National Park, 205
- Yosemite National Park, 189
- Zebra mussel education programs, 158
- Zebra Mussel Information Clearinghouse, 146
- Zoo animal importation, 140-141