

Index

- Adverse bedding conditions, 153, 158
Aesthetics, 1–2
Airspeed, 67
Algonquin bluffs, 131
Alquist-Priolo Earthquake Fault Zoning Act, 161
Anaheim Hills planned community, 254, 322
Appalachian Mountains, 196
Approximate original contour (AOC), 196–198
Asaayi Lake northwest drainage project, 254, 274
Athabasca River, 286
- Backfill. *See* Fills
Bearing capacity, loss of, 155
Beauty. *See* Aesthetics
Benching. *See* Terracing
Bio-stabilization, 23, 35, 57, 78
Blasting, 163
Boundary shear stress. *See* Tractive stress
Building pads. *See* Pads
Buried boulders, 153
Buttressing, 60, 159–160, 169
 by earthen or rock fills, 159–160, 338
 by rooted tree stems, 60
 temporary or interim, 169
 See also Retaining structures
- Canyon fills. *See* Disposal fills
Case studies. *See* Landform grading projects
Channel erosion, 20–21, 48–50, 266
Channel linings, 187–189, 271, 278, 307
 design considerations, 187, 271, 278
 influence on velocity, 188, 271
 See also Slope drains, Geofabrics
Chartres Cathedral, 1
Check dams. *See* Grade control structures
Chuska Mountains, 274
City of Anaheim, 254, 323
City of Los Angeles, 255
City of Orange, 323
City of San Clemente, 255, 335
- Cohesion, 31–33, 72
 effect on factor of safety, 33
 pseudo from roots, 33, 72
 See also Shear strength
Commonwealth of Virginia, 198
Compaction control, 78, 171, 233
Compaction equipment, 150–151
Compaction requirements, 81–85, 171
 balancing plant growth vs. engineering needs, 85
 for different engineering applications, 81, 171
 See also Soil compaction
Contour benching. *See* Terracing
Coppicing, 86
Cost-benefit analyses, 1
Cost of grading. *See* Grading economics;
 Landform grading costs
Coulomb-failure criterion, 31, 99
Critical gradient. *See* Groundwater erosion
Cut slopes, 163, 165–171, 342
 construction, 166
 design options, 177
 landform graded example, 342
 slope inclination designations, 165
 remediation, 166–171
 See also Slopes, Gradient
- Dams. *See* Grade control structures
Darcy-Weisbach equation, 50
Daylight fills, 223
Daylight line, 166
Death Valley, 218
Design, 1–2, 8–10, 186–192, 228, 238
 elements of superior design, 2
 landform designs, 8–10, 186–192, 228, 238
 stable landforms, 140–142
 See also Landform grading projects
Desilting-detention basins, 173, 175
Development, 5–10, 181–182, 185, 249–252
 hillsides, 6–8, 181, 254–255, 322, 332
 historical, 5–6, 181–182, 185
 planned communities, 322, 332

- Development (*Continued*)
 process, 249–252
 civil engineer's perspective, 250
 interdisciplinary team approaches, 251
 land-planner's perspective, 249
 owners and developers' perspective, 251
 regulatory agencies perspective, 250
See also Public response
- Dewatering. *See* Water control
- Diffusive processes, 2, 124
- Digital terrain models, 31, 134–143
 applications, 31, 134
 characteristics, 31, 134–135
 examples, 136–140
See also Modeling
- Dike interceptor. *See* Water control
- Disposal fills, 194, 200, 223, 303–319
 alternative designs, 200, 303–319
 conventional “dam” designs, 194, 223, 308
 environmental impacts, 234, 302
See also Fills
- Diversions. *See* Drainage measures
- Double-move operation, 157
- Dozer tracking, 171
- Drainage, devices, 233–238, 307–309
 down drains, 235–236, 340
 interceptor drains, 236
 limitations of, 237
 terrace drains, 234, 307, 309
 toe drains, 237
- Drainage measures, 155–159, 179–184, 186–189
 improved, 184
 landformed, 186–189, 340
 subsurface, 155–156
 surface drainage, 157–159
 traditional, 179, 182
See also Water control
- Drainage patterns, 113–114, 202–203, 213, 277–280
 desert wash configuration, 277–280
 natural, 213, 287, 294
 networks, 113
 postmining, 202, 292
 reconfiguration of, 277–280, 292, 302, 305, 312
- Dump, 201, 291
- Earth reinforcement, 60, 69–73, 172
 by imbedded grids and meshes, 172
 by roots and fibers, 60, 69–73
 force-equilibrium models, 69
 in-situ direct shear tests, 70–71
See also Mechanically stabilized earth (MSE)
- East Germany, 202
- Endangered Species Act, 147, 167
- Erodibility, soil, 16–17
 controlling factors, 17
 erodibility index, 17
See also Soil erosion; Soil loss predictions
- Erosion, laboratory and field tests, 107–110
 effects of slope shape, 108–110
 effects of slope gradient, 110
- Erosion, types, 15, 18–21
 water erosion, 15, 18–21
 wind erosion, 15, 18
See also Soil erosion
- Erosion thresholds, 48–52
 channel initiation, 48–50
 critical shear stress, 50
 threshold boundaries, 51–52
- Erosion control, 22–26, 173–174, 279
 during grading, 173
 groundcovers, 23–24
 erosion control blankets (ECBs), 23, 173, 186
 hydromulches, 174, 279
 selection, 24
 plantings, 23
 principles, 25
See also Grade control structures; Plant materials; Revegetation
- Equilibrium profiles, 2–4, 110–111
 slopes, 3–4, 110–111
 streams, 2–3
- Evolution, geomorphic, 113, 119, 124–132
 of natural slopes, 127–132
 of spoil mounds, 126–127
 of streams, 113
 prediction approaches, 124–125
- Factor of safety, 31–35, 71. *See also* Slope stability analyses
- Failure surface, 30
- False cuts, 232
- Faults, 161
- Fiber reinforcement. *See* Root reinforcement
- Fills, 163, 171–172, 233
 compaction of, 163, 171, 233
 construction, 171
 deep fills, 171, 196
 design options, 172
 remediation, 171

- valley or canyon, 233
- See also* Disposal fills
- Filters, 156
- Flexible channel linings. *See* Channel linings
- Flow velocity, 271, 312
- Fluvial processes, 2, 113, 124
- Form, 1–3
 - and function, 2
 - in nature, 1
- Friction angle, soil, 31. *See also* Shear strength

- Geocellular containment systems (GCS), 307
- Geofabrics, 23, 156, 186, 307
- Geogrid reinforced fills. *See* Earth reinforcement
- Geologic processes, 120
- Geomorphic alteration, 275. *See also* Landform grading
- Geomorphic evolution, 119
- Geomorphology, 121
- Geotechnical engineering, 228
- Global positioning systems (GPS), 148, 231
- Golden Gate Bridge, 1
- Grade control structures, 269–270, 276–280
 - check dams, 276–277
 - limitations, 277
 - purpose, 276
 - low-height boulder drops, 269–270
 - rock ramps, 277–282
- Gradient, 2, 40, 45, 51, 277
 - influence on erosion, 51
 - slopes, 2, 40, 45, 277, 318
 - streams, 2, 51, 277
 - See also* Slope stability, topographic influence
- Grading, 5–6, 146–173, 179–185
 - contour. *See* grading, improved method
 - cost estimating, 176
 - economics, 173, 245, 339
 - elements of hillside grading, 153
 - equipment, 148–151
 - historical development, 5–6, 181–182, 185
 - improved method, 184–185
 - influence of subsurface conditions, 151–153
 - major stakeholders, 147, 335
 - preparatory operations, 153–155
 - purpose, 146
 - selective, 166
 - special conditions and precautions, 155–163
 - traditional method, 179–183, 330
 - See also* Site preparation; Landform grading
- Grasses and forbs. *See* Erosion control, plantings
- Gravity retaining walls. *See* Retaining structures
- Grid rolling, 152, 171
- Ground covers. *See* Erosion control, groundcovers
- Groundwater, 21, 27, 33, 155
 - grading hazard, 155
 - influence on erosion, 21
 - influence on mass stability, 27, 33
 - removal, 155–156
 - See also* Soil moisture; Water control
- Groundwater erosion, 21, 48
 - pipng and spring sapping, 21
 - relation to saturation overland flow, 48
 - See also* Saturation overland flow; Seepage; Soil erosion
- Gully control, 19, 267, 276–281
 - landforming techniques, 277–281
 - treatment considerations, 19, 267, 276
 - See also* Grade control structures
- Gully formation, 19, 48, 275–277
 - causes, 19, 48, 275–276
 - description, 19
 - examples, 277, 289

- Hard rock conditions, 162
- Heaving. *See* Volume changes
- Herbaceous plants. *See* Erosion control plantings
- Highways. *See* Roads
- Hillside grading. *See* Grading
- Hillslopes. *See* Slopes
- Hollywood Hills project, 299
- Hydrocompaction, 153
- Hydrologic patterns. *See* Drainage networks
- Hydro-mechanical influence of vegetation, 61–62
- Hydromulching, 174, 279, 312

- Interception, 58
- Interceptor drain, 158–159, 236
- Irrigation, 241–243
 - high-pressure spray method, 241
 - low-pressure spray method, 241, 243

- Kinetic energy of raindrops, 17

- Lake Hollywood, 299–300
- Landscapes, 119, 211–214
 evolution of, 119
 natural elements, 211–214
 drainage patterns, 213
 slope forms, 212
 vegetation patterns, 213–216, 287, 294–295
 role of rock element, 224
 types, 1, 110–111
 desert, 110–111, 277
 glaciated, 1, 114, 286
See also Landforms
- Landscaping, 180–192, 238–241
 improved, 185
 landformed, 189–192, 238–241
 traditional, 180–183, 238
See also Plant materials; Revegetation
- Landforms, 3, 106, 211–223
 artificial or anthropogenic, 3, 211–212
 basic slope forms, 3–4, 106, 123, 214–220
 compound and composite shapes, 3, 220
 convex ridges and concave-foot slopes, 4, 106, 123, 220
 elbow shapes across the slope face, 218
 pyramid- and cone-shaped slope face, 218
 ridges and swales curvilinear across slope face, 218
 ridges and swales diagonally across slope, 215
 ridges and swales perpendicular to crest, 214
 wishbone configurations, 218
 human impact on, 3
 natural, 2, 211
 post mining, 202
 slope form descriptors, 222–223
See also Landform grading projects; Profile shapes; Slopes
- Landform grading
 adoption by agencies, 254–262
 aerial views of, 11, 314, 318, 320, 322, 327–329
 challenges to adoption, 11
 definition, 8, 179
 design alternatives, 193–202, 277, 303–318, 325–330
 mass grading and hillside development, 303–318, 325–330
 tailings disposal and storage, 193–202, 290
 future applications, 262–263
 project approval benefits, 253–254
See also Grading; Landforms; Landform grading projects
- Landform grading applications. *See* Landform grading projects
- Landform grading costs, 245–248, 339
 construction grading costs, 247
 design engineering costs, 245–247
 landscape architect costs, 247
 land-planning costs, 245
 surveying costs, 245
See also Grading economics
- Landform grading plans, 153–155, 225–245
 grading phase, 153–155, 231–232
 ground preparation, 153–155, 232
 retraining of grading personnel, 231–232
 slope construction, 232
 implementation strategies, 226–229, 232–233
 allaying engineering concerns, 227–228
 fill construction and compaction control, 171, 232–233
 geotechnical engineering requirements, 228
 introduction of concept to grading designers, 228–229
 land planning and initial site design, 226
 meetings with regulatory agencies, 226–227
 obstacles to implementation, 225
 placement of rocks and boulders, 241, 244
 planning and surveying requirements, 229–231
 project plans, 269–272, 277–281, 304, 325–327, 336–328
See also Grading; Landform grading projects
- Landform grading projects
 hillside developments, 254–256, 322, 332
 hillside mass grading, 255
 mining reclamation, 256–262, 286
 performance evaluation, 272, 282, 297, 319, 327, 339
 runoff and erosion control, 265
 site conditions, 266, 275, 286, 323
 watershed restoration, 255, 273
- Landform revegetation. *See* Revegetation
- Landforming. *See* Landforms, Landform grading
- Landuse, 5–7, 327
 examples, 327
 historical, 5–6
 impact of, 6–7
- Landslides. *See* Mass movement
- La Plata Mine, 245

- Limiting-equilibrium, 29–30, 99. *See also* Modeling
- Los Angeles Department of Water Power (LADWP), 300–303, 319
- Mannings equation, 271
- Mass grading. *See* Grading; Landform grading
- Mass movement, 14, 26–35, 158–160
 - causes of, 27, 158, 266
 - classification, 26
 - control of, 35, 158–160
 - definition, 14
 - failure surface, 30
 - indicators of, 28
 - laboratory and field tests, 107
 - See also* Slopes; Slope stability analyses
- Megastructures, 1
- Mining reclamation. *See* Surface mining reclamation
- Modeling
 - approaches and assumptions, 94
 - conceptual models, 95–98
 - digital terrain models, 105–106, 134–143
 - physical-mathematical models, 98–107
 - slope evolution models, 127–132
 - three-dimensional clay models, 229–230
- Mountain top removal, 196
- Mount McKinley National Park, 218
- Mulches, 23–24, 173–174
 - cover factor for, 24
 - dry, 24, 173
 - hydraulic, 174
 - role of, 23, 78
 - See also* Erosion control; Hydromulching
- National Cooperative Highway Research Program (NCHRP), 21
- Natural forms, 1–2
- Natural Resources Conservation Service (NRCS), 76, 271, 276–278
- Nature, 1
- Navaho Nation, 275–276
- Nichols Arboretum, 266
- Nipissing bluffs, 131–132
- Oil sands, 286
- Overexcavation, 166
- Overland flow. *See* Runoff
- Pads, 5, 180–190
 - improved grading, 184
 - landform grading, 9, 188–190, 328–329
 - traditional grading, 10, 180–181
- Perimeter-pad cut stabilization, 170
- Piping. *See* Seepage; Groundwater erosion
- Plant establishment, 73–88, 240–241
 - effect of compaction, 83–84
 - enhancement of, 73–88
 - on landformed surfaces, 240–241, 274, 284, 311, 317, 338–339
 - See also* Planting techniques; Irrigation; Revegetation
- Plant materials, 59, 73–74, 271
 - riparian, 271
 - selection criteria, 59, 73–74
 - See also* Revegetation, Erosion control planting, Woody plants
- Plasticity theory, 100–102. *See also* Modeling
- Plateaus, 198–201, 291. *See also* Pads
- Pools, stepped, 269–273
- Profile-shapes, 95, 105–108, 126–127, 179–186
 - basic hillslope units, 4
 - effect of climate on, 132
 - effect on sediment loss, 105, 108
 - equilibrium profiles, 99, 106
 - grading designs, 179, 184, 186
 - natural slopes, 4, 110–111, 132
 - ridgelines, 193
 - slope elements and shapes, 95, 122
 - slopes vs. streams, 2
 - spoil mounds, 126–127
 - See also* Landforms; Slopes
- Post-mining reclamation. *See* Surface mining reclamation
- Propagation. *See* Planting techniques
- Public response, 249–251
 - community and homeowners, 301, 319–320, 324
 - jurisdictional issues, 332
 - regulatory agencies' perspective, 250, 333
 - See also* Development process; Landform grading, adoption
- Quality standards. *See* Standards and codes
- Rainfall erosion, 16–21
 - controlling factors, 16
 - types, 18–21
 - See also* Soil erosion; Soil loss predictions
- Reinforced earth. *See* Earth reinforcement
- Regulatory response. *See* Public response
- Repair and restoration, 192–209
 - after mass grading and filling, 198–203, 299

- Repair and restoration (*Continued*)
 complete or partial in-situ landform restoration, 193–196
 creation of new physiographic landforms, 194
 direct slope replication, 192–193
 elements of critical concern, 203–209
 goals, 192, 267, 275, 290, 302
 reconfiguration of surface drainage, 277–280, 292, 302, 305, 312
 slope-form restoration via landform grading, 196–197
See also Surface mining reclamation; Landform grading projects
- Retaining structures, 159–160, 168–169
 function and purpose, 159
 types, 160, 168–170
 buttress fills, 169
 drained rock, 160
 stabilization fill, 168
 temporary, 169–170
See also Buttressing
- Revegetation, 189–191, 238–241
 attributes of, 240–241
 distribution patterns, 191, 238, 338
 influence of grading, 189
 performance evaluation, 272, 284, 319
 project design plans, 271, 279, 317, 338
See also Vegetation; Plant establishment; Irrigation
- Ripping, 78–79, 162. *See also* Hard rock conditions
- Rock ramps. *See* Grade control structures
- Rolled erosion control products. *See* Erosion control
- Roads, 6, 263, 275
 erosion and stability problems, 6, 275
 future application of landform grading, 263
See also Fills, Cut slopes
- Rocks and boulders, 224, 241–244, 257
 occurrence in natural landscape, 224, 241
 placement of, 244
 windrowing, 163
- Root area ratio, 63
- Root morphology, 63–67
 factors affecting, 65
 methods for studying, 66–67
 of ponderosa pine, 65
 structure and distribution, 63–67
- Root reinforcement, 69–73
 force-equilibrium models, 69
 influence on slope stability, 71–73
 in sandy, cohesionless soils, 70–71
 in situ direct-shear tests, 70
See also Root strength
- Root strength, 67–69
 factors affecting, 67
 tensile, 68–69
- Rosebud Mine, Western Energy Company, 258
- Runoff, 16, 48–50, 105, 188, 271
 cause of erosion, 16, 48
 depth of, 50, 105
 handling of, 271
 influence of grading, 188
See also Erosion thresholds
- Sand, 31, 34, 70–71
 internal friction angle of, 31, 34
 reinforcement by roots, 70–71
- Sand dunes, stabilization of, 290
- San Juan Mine, 245
- Saturation overland flow (SOF), 39, 48
- School Girl's Glen, 265
- Scrapers, 149
- Sediment. *See* Soil erosion
- Seepage, 21, 29, 33, 72, 153
 effect on slope stability, 29, 33, 72
 effect on surficial erosion, 21
 unanticipated, 153
See also Groundwater erosion; Water control
- SHALSTAB, 36–37, 42, 46
- Shapes. *See* Profile shape
- Shear key, 160
- Shear strength, 32–35
 Coulomb criterion, 32
 factors affecting, 33
 role in slope stability, 33–35
 shear strength parameters, 32
See also Cohesion; Friction angle
- Sheepsfoot roller, 150–151, 171
- Sheet erosion. *See* Soil erosion
- Shrink-swell. *See* Volume changes
- SIBERIA, 106, 136–142
 applications, 106, 138–142
 calibration, 136
 erosion model parameters, 138–139
 transport modes, 136
See also Modeling
- Site preparation, 76–78, 153–159
 clearing and grubbing, 153
 drainage, 155–159
 surface, 157–159
 subsurface, 155–156
 preapplication of water, 153
 removal of deleterious materials, 154
 soil blending and artificial gradation, 78

- stabilization of unstable slopes and landslides, 158
 - surface amendments and treatments, 78
 - surface modification, 76–77, 162
 - See also* Grading practices; Slope stabilization; Water control
- Slip lines, 100–102. *See also* Plasticity theory
- Slope architecture. *See* Slopes, basic forms
- Slope grading. *See* Grading practices
- Slope irrigation. *See* Irrigation
- Slopes, 121–126, 165, 214–223
 - alternative inclination designations, 165
 - basic forms, 214–222
 - classification, 121
 - evolution predictions, 124–126
 - profiles and elements, 122–123
 - stable slope ratios, 165
 - slope form descriptors, 222–223
 - See also* Slope stability, Cut slopes, Fills
- Slope drains, 158–159, 233–234
- Slope failures. *See* Mass movement
- Slope processes, 123–124
- Slope stability, 28–52
 - channel-incision threshold, 51
 - slope-stability threshold, 45
 - stability fields and threshold boundaries, 51
- Slope stability, analyses, 22–35, 71–72, 126
 - approaches, 28–29
 - infinite slope method, 32–35, 71–72
 - limiting equilibrium, 29
 - long-term stability, 126–132
 - shear strength parameters, 31
 - See also* Slope stability; Channel-erosion thresholds
- Slope stability, topographic influence, 93–94
 - conceptual models, 95–98
 - mass stability, 96–97
 - surficial erosion, 97–98
 - physical-mathematical models, 98–107
 - mass stability, 99–102
 - surficial erosion, 102–107
 - See also* Slopes; Slope stability analyses
- Slope stabilization, 166–171
 - in-place, 171
 - techniques, 167–170
 - cuts, 167–170
 - fills, 171
- Slope wash. *See* Sheet erosion
- Soil analyses, 17, 79, 83
 - degree of compaction, 79
 - erodibility, 17
 - growth limiting bulk density (GLBD), 83
 - See also* Sand; Site conditions
- Soil compaction, 78–85
 - definition, 79
 - effect on engineering properties, 81
 - effect on plant growth, 82–85
 - effect of water content, 80
 - moisture-density relationship, 79–80
 - purpose, 78
 - See also* Compaction; Compaction control
- Soil Conservation Service. *See* Natural Resource Conservation Service
- Soil erosion, 13, 15–21
 - agents and types, 15, 18–21
 - causes of, 13, 275
 - controlling factors, 16
 - definitions, 13
 - influence of vegetation on, 58
 - mechanics of, 16
 - sediment delivery, 266, 276
 - See also* Erosion; Rainfall erosion
- Soil loss predictions, 21–25, 102–107
 - controlling factors, 21–22
 - equation for, 21
 - models, 102–107
 - See also* Soil erosion; Universal soil loss equation
- Soil loss reduction measures, 22–24, 58–59
 - by controlling runoff, 195–199
 - by groundcovers, 22–24
 - by vegetation, 23, 58–59
 - See also* Sediment basins
- Soil moisture, 58, 60–62, 189–192
 - influence on plant establishment, 189–192
 - modification by vegetation, 58, 60–62
 - See also* Hydro-mechanical influence of vegetation
- Spoil disposal. *See* Tailings disposal
- Staking, 229, 295, 343–345
- Standards and codes, 252–254
 - landform grading adoption by agencies, 254
 - prescriptive vs. performance, 253
 - promulgation, 252
 - See also* Public response
- Stormwater Pollution Prevention Plans (SWPPP), 173
- Streams, 2, 20
 - longitudinal profiles, 2
 - planform shapes, 2, 20, 287, 294
 - networks. (*see* drainage patterns)
- Stream channel erosion, 20, 48–51
 - erosion threshold, 48–51
 - processes, 20–21
 - tractive stress on channel lining, 50
 - See also* Erosion
- Structural soil, 78

- Subsidence. *See* Volume changes
- Surcharge, 33–34, 60
 from weight of vegetation, 60
 influence on slope stability, 33–34
- Surface mining reclamation, 193–209, 256, 286
 design alternatives, 193–202, 291–295
 elements of critical concern, 203–209
 hydrology, 202–203
 landform grading projects, 256, 286
 mimicking original topography and hydrology, 202
 mining impact, 196, 201
 See also Repair and restoration
- Surficial erosion. *See* Erosion; Soil Erosion
- Surveying, 229, 246, 308, 343–345
- Syncrude Canada, 286
- Tailings disposal, 287–290. *See also* Surface mining reclamation
- Talega master-planned community, 255, 332
- Tennessee Valley watershed, 38–39, 48–49, 52
- Terracing, 22, 140–141
 effectiveness, 140–141
 to control runoff, 158
 to reduce erosion, 22, 140–141
 See also Grading, Erosion control
- TOPOG, 37
- Topographic maps, 229–231, 268, 292–293, 304
- Tractive stress, 48–50
 critical shear stress, 50
 effect of overland flow, 48–49
- Transplants. *See* Planting techniques
- Trees. *See* Woody plants
- Unaweep Canyon, 110–111
- Uncompahgre Plateau, 110
- Unified soil classification, 17
- Universal soil loss equation, 21–25, 103
 applications of, 22
 effect of slope shape, 102–103
 historical development, 21
 limitations of, 24
 See also Soil loss predictions
- University of Michigan, 266
- U.S. Army Corps of Engineers, 147, 302
- U.S. Bureau of Reclamation, 275
- U.S. Environmental Protection Agency, 16
- U.S. Fish and Wildlife Service, 147
- Vegetation
 influence on mass stability, 60–62
 beneficial influences, 60
 detrimental effects, 62
 influence on soil moisture, 60
 influence on surficial erosion, 58
 maximizing benefits of, 73–88
 management strategies, 85–88
 optimizing compaction, 78–85
 placement strategies, 74–75
 selection strategies, 73–74
 surface modifications, 76–78
 natural distribution patterns, 213–216, 287, 294–295
 See also Plant materials, Revegetation, Woody plants
- Vertical expansion, 201
- Visual impact, 1–2, 181
- Volume changes, 161
- Wash configuration, 277–280
- Water control, 155–156, 233–238
 groundwater, 155–156
 surface water, 157–159, 233–238, 269–271
 See also Drainage measures; Grade control structures
- Watershed repair, 255, 274
- Wind erosion, 15, 18. *See also* Soil erosion
- Windrowing, 163
- Wind throwing, 62
- Woody plants, 63–69, 189–192, 238–241
 depth and distribution of roots, 63–67
 root morphology and strength, 67–69
 use in revegetation, 189–192, 238–241
 See also Vegetation, Revegetation
- Zero-order watershed, 114–115