
5.1 REFERENCES

- Adams, D. K., and A. C. Comrie. 1997. The North American Monsoon. *Bulletin of the American Meteorological Society* 78: 2197-2214.
- Agee, J.K. 1998. Landscape Fire Regimes and their Implications for Wildlife. In: *Fire and Wildlife in the Pacific Northwest: Research, Policy, and Management*. Symposium of the Northwest Section of The Wildlife Society, April 6-8, 1998. Spokane, Washington.
- Aldon, E. F. and T.J. Loring. 1977. Ecology, Uses, and Management of Pinyon-Juniper Woodlands. Proceedings of the workshop in Albuquerque, New Mexico, March 24-25, 1977. USFS General Technical Report RM-39. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Allen, C. D. 2002. Lots of Lightning and Plenty of People: An Ecological History of Fire in the Upland Southwest. Chapter 5. In: *Fire, Native Peoples, and the Natural Landscape*. Vale, T.R. (editor). Island Press. Washington, D.C.
- Allen, C. D., M. Savage, D. A. Falk, K. F. Suckling, T. W. Swetnam, T. Schulke, P. B. Stacey, P. Morgan, M. Hoffman, and J. T. Klingel. 2002. Ecological Restoration of Southwestern Ponderosa Pine Ecosystems: A Broad Perspective. *Ecological Applications* 12:1418-1433.
- Alpine Vegetation in the Sangre de Cristo Mountains, Wheeler Peak and Latir Peak Areas. Author Unknown.
- American Sportfishing Association. 2006. State and National Economic Impacts of Fishing, Hunting, and Wildlife-Related Recreation on U.S. Forest Service-Managed Lands. Prepared for U.S. Forest Service. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Andreasen, J.K and J.R. Barnes. 1975. Reproductive Life History of *Catostomus ardens* and *C. discobolus* in the Weber River, Utah. *Copeia* 1975(4):645-648.
- Andrews, T. 1983. Subalpine Meadow and Alpine Vegetation of the Upper Pecos River. Unpublished Report. Thesis. Prepared for the U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Bailey, R.G. 1995. Description of the Ecoregions of the United States. 2nd edition, revised and expanded (1st ed. 1980). Miscellaneous Publication No. 1391 (revised). U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Baisan, C. H. and T. W. Swetnam. 1990. Fire History on a Desert Mountain Range. *Canadian Journal of Forest Research* 20:1559-1569.
- Baker, W. L. 1989. Landscape Ecology and Nature Reserve Design in the Boundary Waters Canoe Area, Minnesota. *Ecology* 70:23-35.
- Baker, W. L. 1992a. Effects of Settlement and Fire Suppression on Landscape Structure. *Ecology* 73:1879-1887.
- Baker, W. L. 1992b. The Landscape Ecology of Large Disturbances in the Design and Management of Nature Reserves. *Landscape Ecology* 7:181-194.
- Baker, W. L. 2006. Fire and Restoration of Sagebrush Ecosystems. *Wildlife Society Bulletin* 34(1): 177-185.
- Baker, W. L. and D.J. Shinneman. 2004. Fire and Restoration of Pinon-Juniper Woodlands in the Western U.S.: A Review. *Forest Ecology and Management* 189:1-21.
- Baker, W. L. and T. T. Veblen. 1990. Spruce Beetles and Fires in the Nineteenth-Century Subalpine Forests of Western Colorado, U.S.A. *Arctic and Alpine Research* 22:65-80.

- Baker, W. L. 1983. Alpine Vegetation of Wheeler Peak, New Mexico, USA: Gradient Analysis, Classification, and Biogeography. *Arctic and Alpine Research*. Volume 15, Number 2: 223-240.
- Balda, R.P. 1986. Avian Impacts on Pinyon-Juniper Woodlands. In: *Proceedings-Pinyon-Juniper Conference in Reno, Nevada, January 13-16, 1986*. USFS General Technical Report INT-215. U.S. Department of Agriculture, U.S. Forest Service. Intermountain Research Station. Ogden, Utah.
- Baron, J.S., D.M. Theobald, and D.B. Fagre. 2000. Management of Land Use Conflicts in the U.S. Rocky Mountains. *Mountain Research and Development* 20(1): 24-27.
- Beetle, A.A. and K.L. Johnson. 1982. Sagebrush in Wyoming. *Bulletin 779*. Agricultural Experiment Station, University of Wyoming. Laramie, Wyoming.
- Behnke, R.J. 1979. Monograph of the Native Trouts of the Genus *Salmo* of Western North America. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Region. Denver, Colorado.
- Behnke, R.J. 1992. Native Trout of Western North America. *American Fisheries Society Monograph* 6.
- Behnke, R.J. and D.E. Benson. 1980. Endangered and Threatened Fishes of the Upper Colorado River Basin. *Bulletin 503A*. Cooperative Extension Service. Colorado State University. Fort Collins, Colorado.
- Behnke, R.J. and M. Zarn. 1976. Biology and Management of Threatened and Endangered Western Trouts. USFS General Technical Report RM-28. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Beidleman, C.A. (facilitator). 2000. Colorado Partners in Flight Land Bird Conservation Plan. Colorado Partners-In-Flight. Estes Park, Colorado.
- Belnap, J., J.H. Kaltenecker, R. Rosentreter, J. Williams, S. Leonard, and D. Eldridge. 2001. Biological Soil Crusts: Ecology and Management. BLM Technical Reference Report BLM/ID/ST-01/001+1730. U.S. Department of the Interior, Bureau of Land Management. Denver, Colorado.
- Belsky, A.J. and D.M. Blumenthal. 1997. Effects of Livestock Grazing on Stand Dynamics and Soils in Upland Forests of the Interior West. *Conservation Biology* 11:315.
- Bestgen, K.R. and L.W. Crist. 2000. Response of the Green River Fish Community to Construction and Re-Regulation of Flaming Gorge Dam, 1962-1996. Colorado River Recovery Implementation Program Project Number 40. Fort Collins, Colorado.
- Beus, S.S (editor). 1977. Centennial Field Guide — Volume 2, Rocky Mountain Section of the Geological Society. Geological Society of America. Boulder, Colorado.
- Beyers, D.W., C. Sodergren, J.M. Bundy, and K.R. Bestgen. 2001. Habitat Use and Movement of Bluehead Sucker, Flannelmouth Sucker, and Roundtail Chub in the Colorado River. Department of Fishery and Wildlife Biology. Colorado State University. Fort Collins, Colorado.
- Bezzerrides, N. and K. Bestgen. 2002. Status Review of Roundtail Chub *Gila robusta*, Flannelmouth Sucker *Catostomus latipinnis*, and Bluehead Sucker *Castostomus discobolus* in the Colorado River Basin. Colorado State University Larval Fish Laboratory. Fort Collins, Colorado.
- Binns, N.A. 1977. Present Status of Indigenous Populations of Cutthroat Trout (*Salmo clarki*) in Southwest Wyoming. *Fisheries Technical Bulletin* 2. Wyoming Game and Fish Department. Cheyenne, Wyoming.
- Blair, R., T.A. Casey, W.H. Romme, and R.N. Ellis. 1996. The Western San Juan Mountains, their Geology, Ecology, and Human History. University Press of Colorado. Fort Lewis College Foundation. Durango, Colorado.
- Blaisdell, J. P. and R. C. Holmgren. 1984. Managing Intermountain Rangelands: Salt-Desert Shrub Ranges. USFS General Technical Report INT-163. U.S. Department of Agriculture, U.S. Forest Service. Intermountain Forest and Range Experiment Station. Ogden, Utah.
- Bockheim, J.G., S.W. Lee, and J.E. Leide. 1983. Distribution and Cycling of Elements in a *Pinus Resinosa* Plantation Ecosystem in Wisconsin. *Canadian Journal of Forest Research* 13: 609-619.
- Bozek, M.A. and F.J. Rahel. 1991. Assessing Habitat Requirements of Young Colorado River Cutthroat Trout by Use of Macrohabitat and Microhabitat Analyses. *Transactions of the American Fisheries Society* 120:571-581.

- Brady, W., D.R. Patton, and J. Paxton. 1985. The Development of Southwestern Riparian Gallery Forests. In: Johnson, R.R., C.D. Ziebell, D.R. Patton, P.F. Ffolliott, R.H. Hamre (technical coordinators). Riparian Ecosystems and their Management: Reconciling Conflicting Uses. GTR-RM-120. First North American Riparian Conference. Tucson, Arizona.
- Brinson, M., B. Swift, R. Plantico, and J. Barclay. 1981. Riparian Ecosystems: Their Ecology and Status. FWS/OBS-81/17. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Washington, D.C.
- Brooks, J.E., M.J. Buntjer, and J.R. Smith. 2000. Nonnative Species Interactions: Management Implications to Aid in Recovery of the Colorado Pikeminnow (*Ptychocheilus lucius*) and Razorback Sucker (*Xyrauchen texanus*) in the San Juan River, CO-NM-UT. Final Report. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Albuquerque, New Mexico.
- Brown, D.E. 1982. Biotic Communities of the American Southwest-U.S. and Mexico. Desert Plants. Volume 4. University of Arizona. Tucson, Arizona.
- Brown, D.E. and C.H. Lowe. 1974a. A Digitized Computer-Compatible Classification for Natural and Potential Vegetation in the Southwest with Particular Reference to Arizona. Journal of the Arizona Academy of Science 9: 3-11.
- Brown, D.E., C.H. Lowe, and C.P. Pase. 1977. A Digitized Systematic Classification for Ecosystems with an Illustrated Summary of the Natural Vegetation of North America. In: Symposium on Classification, Inventory, and Analysis of Fish and Wildlife Habitat. January 24-27, 1977. Phoenix, Arizona.
- Brown, H.E. 1958. Gambel Oak in West-Central Colorado. Ecology 39:317-327.
- Brown, P. M., and R. Wu. 2005. Climate and Disturbance Forcing of Episodic Tree Recruitment in a Southwestern Ponderosa Pine Landscape. Ecology 86:3030-3038.
- Brown, P. M., and W. D. Shepperd. 2003. Preliminary Fire History in Ponderosa Pine Forests of the Uncompahgre Plateau. Final Report. Rocky Mountain Tree-Ring Research. Fort Collins, Colorado. Available on the Internet: www.rmtrr.org.
- Brown, P. M., M. R. Kaufmann, and W. D. Shepperd. 1999. Long-term Landscape Patterns of Past Fire Events in a Montane Ponderosa Pine Forest of Central Colorado. Landscape Ecology 14:513-532.
- Brown, P.M. and R. Wu. 2005. Climate and Disturbance Forcing of Episodic Tree Recruitment in a Southwestern Ponderosa Pine Landscape. Ecology, 86(11):3030-3038.
- Brown, R.W. and R.S. Johnston. 1979. Revegetation of Disturbed Alpine Rangelands. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Buechner, H. K. 1960. The Bighorn Sheep in the United States: Its Past, Present and Future. Wildlife Monographs 4:174.
- Bunnell, F.L. 1995. Forest-Dwelling Vertebrate Faunas and Natural Fire Regimes in British Columbia: Patterns and Implications for Conservation. Conservation Biology 9:636-644.
- Bureau of Land Management (BLM). 1985. San Juan/San Miguel Resource Management Plan. U.S. Department of the Interior, Bureau of Land Management. San Juan Field Office. Durango, Colorado.
- BLM. 1986. BLM Manual 8410-1 -- Visual Resource Inventory. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 1988a. BLM Manual 1613 -- Areas of Critical Environmental Concern. Rel. 1-1541. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 1988b. BLM Handbook H-1790-1 -- National Environmental Policy Act Handbook. Rel. 1-1547. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 1991. Colorado Oil and Gas Leasing and Development Final Environmental Impact Statement and Amendment to the San Juan/San Miguel Resource Management Plan. U.S. Department of the Interior, Bureau of Land Management. Montrose District. Durango, Colorado.
- BLM. 1991a. Record of Decision: Oil and Gas Plan Amendment to the San Juan/San Miguel Resource Management Plan. U.S. Department of the Interior, Bureau of Land Management. Montrose Field Office. Montrose, Colorado.
- BLM. 1991b. Riparian-Wetland Initiative for the 1990s. BLM/WO/GI-91/001+4340. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 1991c. Final EIS: Vegetation Treatment on BLM Lands in Thirteen Western States. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C. Available on the Internet: www.blm.gov/weeds/VegEIS/.

- BLM. 1996. Rangeland Standards and Guidelines for Livestock Grazing. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C. Available on the Internet: www.co.blm.gov/standguide.htm.
- BLM. 1997. Colorado Public Land Health Standards and Guidelines for Livestock Grazing Management. U.S. Department of the Interior, Bureau of Land Management. Denver, Colorado.
- BLM. 1998a. State Protocol Agreement between the Colorado State Director of the BLM and the Colorado State Historic Preservation Officer (SHPO), regarding the manner in which the BLM will meet its responsibilities under the National Historic Preservation Act (NHPA) and the National Programmatic Agreement (NPA), among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (NCSHPO).
- BLM. 1998b. Programmatic Agreement between the BLM, the State of Colorado, the national forests in the State of Colorado, the USDA Forest Service, the SHPO, and the Advisory Council on Historic Preservation, regarding the management of wildland fire for resource benefits. Agreement No. 1102-002-98-038.
- BLM. 1998c. BLM Handbook H-9214-1 -- Prescribed Fire. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 1999. BLM North San Juan Basin White Paper. Coalbed Methane Development in the Northern San Juan Basin of Colorado: A Brief History and Environmental Observations. Working document compiled by San Juan Public Lands Center. U.S. Department of the Interior, Bureau of Land Management. Durango, Colorado. Available on the Internet: http://oil-gas.state.co.us/Library/sanjuanbasin/blm_sjb.htm. Accessed on June 4, 2007.
- BLM. 1999a. Programmatic Agreement between the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (NCSHPO), regarding the manner in which the BLM will meet its responsibilities under the National Historic Preservation Act (NHPA).
- BLM. 2000. Information Bulletin No. CO-2000-014. BLM State Director's Sensitive Species List. U.S. Department of the Interior, Bureau of Land Management. Denver, Colorado.
- BLM. 2000a. Instruction Memorandum No. CO-2001-001. Recreation Guidelines to Meet Public Land Health Standards. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2001a. BLM Manual 6840 -- Special Status Species Management. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2001b. BLM Manual 4180 -- Rangeland Health Standards. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2001c. BLM Handbook H-1601-1 -- Land Use Planning Handbook. Rel. 1-1693. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2001d. National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2001e. Interim Management Guidance for Oil and Gas Leasing and Development. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2001f. Oil and Gas Development on the Southern Ute Indian Reservation Draft Environmental Impact Statement. U.S. Department of the Interior, Bureau of Land Management. San Juan Public Lands Center. Durango, Colorado.
- BLM. 2002a. Prescribed Fire Policy Direction and Clarification, Attachment 1. Office of Fire and Aviation. June. BLM. 1998c. Instructional Memorandum 2002-027. Office of Fire and Aviation. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2002b. Water Resources Inventory. U.S. Department of the Interior, Bureau of Land Management. On file. San Juan Resource Area. Dolores, Colorado.
- BLM. 2003a. Instruction Memorandum No. 2003-152. Application for Permit to Drill (APD) – Process Improvement #1 – Comprehensive Strategies. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2003b. Instructional Memorandum 2003-38. Interim Guidance for Completion of Fire Management Plan Revisions Using the Interagency Template. Office of Fire and Aviation. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.

- BLM. 2003c. San Juan Fire Management Plan. U.S. Department of the Interior, Bureau of Land Management. San Juan Public Lands Center. Durango, Colorado.
- BLM. 2003d. Water Resources Inventory. U.S. Department of the Interior, Bureau of Land Management. On file. San Juan Resource Area. Dolores, Colorado.
- BLM. 2005. BLM Handbook H-1601-1 -- Land Use Planning Handbook. Department of the Interior, Bureau of Land Management. Washington, D.C.
- BLM. 2006. 2006 Oil and Gas Surface Operating Standards and Guidelines. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.
- Burned Area Emergency Rehabilitation Plan for the Bircher Fire. August 2000. U.S. Department of the Interior. Cortez, Colorado.
- Buse, L. J. and A. H. Perera (compilers). 2002. Emulating Natural Forest Landscape Disturbances: Concepts and Applications. Popular Summaries. Forest Research Information Paper Number 149:100. Ontario Forest Research Institute. Ontario, Canada.
- Buskirk, S.W., L.F. Ruggiero, K.B. Aubry, D.E. Pearson, J.R. Squires, and K.S. McKelvey. 2000. Comparative Ecology of Lynx in North America. In: L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, S.W., G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires (editors). Ecology and Conservation of Lynx in the United States. University Press of Colorado. Boulder, Colorado.
- Byrne, G. and J. Copeland. 1997. An Aerial Survey for Wolverine in Colorado. Unpublished Report. Colorado Division of Wildlife. Denver, Colorado.
- Callicott, J.B. 1992. Can a Theory of Moral Sentiments Support a Genuinely Normative Environmental Ethic? Inquiry 35:183-198.
- Carlson, C.A., C.G. Prewitt, D.E. Snyder, E.J. Wick, E.L. Ames, and W.D. Fronk. 1979. Fishes and Macroinvertebrates of the White and Yampa Rivers, Colorado. Final Report. U.S. Department of the Interior, Bureau of Land Management. Colorado State University. Fort Collins, Colorado.
- Carothers, S.W. 1977. Importance, Preservation, and Management of Riparian Habitats: An overview. In: Johnson, R. R., Jones, D.A. (technical coordinators). Importance, Preservation, and Management of Riparian Habitats: A symposium, July 9, 1977. Tucson, Arizona. USFS General Technical Report RM-43. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Carroll, C. J., M. L. Gillam, J. C. Ruf, T. D. Loseke, and R. M. Kirkham. 1999. Geologic Map of the Durango West Quadrangle, La Plata County, Colorado. Colorado Geological Survey. Denver, Colorado.
- Carter, J.G., V.A. Lamarra, and R.J. Ryel. 1986. Drift of Larval Fishes in the Upper Colorado River. Journal of Freshwater Ecology 3:567-577.
- Carter, M.F. and S.W. Gillihan. 2000. Influence of Stand Shape, Size, and Structural Stage on Forest Bird Communities in Colorado. In: R.L. Knight, F.W. Smith, S.W. Buskirk, W.H. Romme, and W.L. Baker (editors). Forest Fragmentation in the Southern Rocky Mountains. University Press of Colorado. Boulder, Colorado.
- Castetter, E.F. 1956. The Vegetation of New Mexico. New Mexico Quarterly 26:257-288.
- Chart, T.E. and E.P. Bergersen. 1992. Impact of Mainstream Impoundment on the Distribution and Movements of the Resident Flannelmouth Sucker (*Catostomidae: Catostomus latipinnis*) Population in the White River, Colorado. Southwestern Naturalist 37(1):9-15.
- Christensen, N.L., A.M. Bartuska, J.H. Brown, S. Carpenter, C. D'Antonio, R. Francis, J.R. Franklin, J.A. MacMahon, R.F. Noss, D.J. Parsons, C.H. Peterson, M.G. Turner, and R.G. Woodmansee. 1996. The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. Ecological Applications 6:665-691.
- Clary, W.P. 1975. Range Management and its Ecological Basis in the Ponderosa Pine Type of Arizona: The Status of Our Knowledge. USFS Research Paper RM-158. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Clary, W.P. and B.F. Webster. 1989. Managing Grazing of Riparian Areas in the Intermountain Region. USFS General Technical Report INT-263. U.S. Department of Agriculture, U.S. Forest Service. Intermountain Research Station. Ogden, Utah.
- Clary, W.P. and D.E. Medin. 1990. Differences in Vegetation Biomass and Structure Due to Cattle Grazing in a Northern Nevada Riparian Ecosystem. USFS Research Paper INT-427. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.

- Collins S.K., W.J. Grimm, and A. Wise. 2006. Class I Cultural Resources Overview of Bureau of Land Management Lands in the San Juan Field Office, Southwestern Colorado. Prepared by Sandstone Archaeology, LLC. Mancos, Colorado.
- Colorado Department of Natural Resources (CDNR). 2004. Statewide Water Supply Initiative Report Overview. Colorado Department of Natural Resources. Denver, Colorado.
- CDNR. 2005. Statewide Water Supply Initiative Report. CDNR. Colorado Water Conservation Board. Denver, Colorado.
- Colorado Department of Public Health and Environment (CDPHE). 2003. Total Maximum Daily Load (TMDL) for Mercury in McPhee and Narraguinnep Reservoirs, Colorado Phase 1. CDPHE. 2002. Status of Water Quality in Colorado. CDPHE. Water Quality Control Division. Denver, Colorado.
- CDPHE. 2005. Colorado Air Pollution Control Division. 2005. Scenic and Important Views in Colorado. Colorado Air Pollution Control Division. Available on the Internet: <http://apcd.state.co.us/permits/SCENICVW2005.pdf>.
- CDPHE. 2006a. 2006 303(d) "For Sure" List. CDPHE. Water Quality Control Division. Denver, Colorado. Available on the Internet: <http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf>.
- CDPHE. 2006b. Mercury Concentrations in Fish from Vallecito Reservoir. Water Quality Control Division. Denver, Colorado.
- Colorado Division of Wildlife (CDOW). 2002. Threatened and Endangered Species. Colorado Division of Wildlife. Denver, Colorado. Available on Internet: <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList/ListOfThreatenedAndEndangeredSpecies.htm>. Accessed in January 2002.
- CDOW. 2004. The Economic Impacts of Hunting, Fishing, and Wildlife Watching in Colorado. Colorado Division of Wildlife. Denver, Colorado. Report prepared by BBC Research & Consulting. Denver, Colorado.
- CDOW. 2006. San Juan National Forest Roadless Areas from a Wildlife Perspective. Field recommendations for Southwest Region Area 15 for San Juan IRAs. Unpublished Report. Colorado Division of Wildlife. Denver, Colorado.
- Colorado Natural Heritage Program (CNHP). 2002. Status and Ranking. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado. Available on Internet: <http://www.cnhp.colostate.edu/list.html>. Accessed in January 2002.
- CNHP. 2003. Survey of Critical Wetlands and Riparian Areas in La Plata County. Prepared for the Colorado Department of Natural Resources. Denver, Colorado. Available on the Internet: http://www.cnhp.colostate.edu/documents/2004/La_Plata_County_Wetlandsf.pdf. Accessed on June 4, 2007.
- CNHP. 2005. Survey of Rare Plants. San Juan Public Lands in Dolores and Montezuma Counties, Colorado. Prepared for the San Juan National Forest. U.S. Department of Agriculture, U.S. Forest Service. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado. Available on the Internet: http://www.cnhp.colostate.edu/documents/2005/Rare_plant_survey_Dolores_and_Montezuma.pdf. Accessed on June, 4, 2007.
- CNHP. 2006. Element Occurrence Records for San Juan National Forest: GIS Files and Database Reports. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado.
- Colorado River Cutthroat Trout Task Force. 2001. Conservation Agreement and Strategy for Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) in the States of Colorado, Utah, and Wyoming. Colorado Division of Wildlife,. Fort Collins, Colorado.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe. Arlington, Virginia.
- Cooper, C. F. 1960. Changes in Vegetation, Structure, and Growth of Southwestern Pine Forests Since White Settlement. Ecological Monographs 30:129-164.
- Cooper, D.J. 1996. Water and Soil Chemistry, Floristics, and Phytosociology of the Extreme Rich High Creek Fen in South Park, Colorado. Canadian Journal of Botany 74: 1801 – 1811.
- Cooper, D.J. and R. Andrus. 1994. Patterns of Vegetation and Water Chemistry in Peatlands of the West-Central Wind River Range, Wyoming. Canadian Journal of Botany 72: 1586 – 1597.
- Copeland, 1998. Integrated Report of Aerosol and Scene Monitoring, Weminuche Wilderness. Interagency Monitoring of Protected Visual Environments, 21 pp.

- Cordell, H. Ken et al. 1999. *Outdoor Recreation in American Life*. Urbana-Champaign, Illinois, Sagamore Publishing, 449 pages.
- Costello, D.F. and H.E. Schwan. 1946. *Conditions and Trends on Ponderosa Pine Ranges in Colorado*. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Covington, W. W. and M. M. Moore. 1994. *Southwestern Ponderosa Forest Structure: Changes Since Euro-American Settlement*. *Journal of Forestry* 92:39-47.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. U.S. Department of the Interior, US Fish and Wildlife Service. Washington, D.C.
- Craig, Jerry 2002. *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors* Colorado Division of Wildlife publication.
- Crane, M.F. 1982. *Fire Ecology of Rocky Mountain Region Forest Habitat Types*. Final Report. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Region. Lakewood, Colorado.
- Currie, P.O. 1975. *Grazing Management of Ponderosa Pine-Bunchgrass Ranges of the Central Rocky Mountains: The Status of Our Knowledge*. USFS Research Paper RM-159. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Dadkhah, M. and G.F. Gifford. 1980. *Influence of Vegetation, Rock Cover and Trampling on Infiltration Rates and Sediment Production*. *Water Resources Bulletin* 16:979-986.
- Dahms, W.C. and B.W. Geils. 1997. *An Assessment of Forest Ecosystem Health in the Southwest*. USFS General Technical Report RM-GTR-295. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Daubenmire, R. 1966. *Vegetation: Identification of Typal Communities: Stratification of Samples and Attention to Population Structure Reveal the Existence of Discontinuities*. *Science* 151(3708):291-298.
- Daubenmire, R.F. 1968. *Plant Communities: A Textbook of Plant Synecology*. Harper and Row. New York, New York.
- Deacon, J.R. and S.V. Mize. 1997. *Effects of Water Quality and Habitat on Composition of Fish Communities in the Upper Colorado River Basin*. Technical Report. Prepared by the Upper Colorado River Basin NAWQA. US Geological Survey. Denver, Colorado.
- Debyle, N.V., and R.P. Winokur. 1985. *Aspen: Ecology and Management in the Western United States*. USFS General Technical Report RM-119. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Debyle, N.V., 1995. *Wildlife*. In: DeByle N.V., Winokur R.P. (Eds.), *Aspen: Ecology and Management in the Western United States*. USDA Forest Service RM-119, pp. 29–33.
- DeStaso J. and F.J. Rahel. 1994. *Influence of Water Temperature on Interactions between Juvenile Colorado River Cutthroat Trout and Brook Trout in a Laboratory Stream*. *Transactions of the American Fisheries Society* 123:289-297.
- DeVelice, R.L., J.A. Ludwig, W.H. Moir, and F. Ronco, Jr. 1986. *A Classification of Forest Habitat Types of New Mexico and Southern Colorado*. USFS General Technical Report RM-131. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Dick-Peddie, W.A. 1993. *New Mexico Vegetation: Past, Present, and Future*. University of New Mexico Press. Albuquerque, New Mexico.
- Dieterich, J. H. and T. W. Swetnam. 1984. *Dendrochronology of a Fire-Scarred Ponderosa Pine*. *Forest Science* 30:238-247.
- Dixon, H. 1935. *Ecological Studies on the High Plateaus of Utah*. *Botany Gazette* 97:272-320.
- Dobson, A.K., Ralls, M. Foster, M.E. Soule, D. Simberloff, D. Doak, J.A. Eates, L.S. Mills, D. Mattson, R. Dirzo, H. Arita, S. Ryan, E.A. Norse, R.F. Noss, and D. Johns. 1999. *Corridors: Reconnecting Fragmented Landscapes*. In: M.E. Soule and J. Terborgh (editors). *Continental Conservation: Science Foundations of Regional Reserve Networks*. Island Press. Washington, D.C.
- Duke, P. 1998. *Management Summary of an Overview of the Archaeological Resources in the San Juan-Rio Grande National Forest: Mancos-Dolores, Columbine and Pagosa Districts*. Center for Southwest Studies. Fort Lewis College., Durango, Colorado.
- Durango Herald. 2007. *Feds reject putting cutthroat on endangered species list*. June 15, 2007. Durango, Colorado

- ECOMAP. 1993. National Hierarchical Framework of Ecological Units. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Ecosphere Environmental Services. 2003. Presence/Absence Surveys for Southwestern Willow Flycatcher on Southern Ute Indian Tribal Lands in the San Juan Recovery Unit, Colorado. Colorado Division of Wildlife. Denver, Colorado. Prepared by Ecosphere Environmental Services. Durango, Colorado.
- Ecosphere Environmental Services. 2005a. Presence/Absence Surveys for Southwestern Willow Flycatcher at Durango Mountain Resort: La Plata and San Juan Counties, Colorado. Durango Mountain Resort. Durango, Colorado. Prepared by Ecosphere Environmental Services. Durango, Colorado.
- Ecosphere Environmental Services. 2005b. 2005 Southwestern Willow Flycatcher (*Empidonax trailii extimus*). Surveys on the San Juan River Below Navaho Dam. U.S. Department of the Interior, Bureau of Reclamation. Prepared by Ecosphere Environmental Services. Durango, Colorado.
- Ecosphere Environmental Services. 2005c. Results of Southwestern Willow Flycatcher (*Empidonax trailii extimus*) Surveys in the La Plata River Mitigation Area, 2005. Formal letter to the U.S. Department of the Interior, Bureau of Reclamation. Prepared by Ecosphere Environmental Services. Durango, Colorado.
- Ecosphere Environmental Services. 2005d. Results of 2005 Southwestern Willow Flycatcher (*Empidonax trailii extimus*). Surveys at the Nenahnezad Wetland Restoration Area. U.S. Department of the Interior, Bureau of Reclamation. Prepared by Ecosphere Environmental Services. Durango, Colorado.
- Ehle, D. S. and W. L. Baker. 2003. Disturbance and Stand Dynamics in Ponderosa Pine Forests in Rocky Mountain National Park, USA. *Ecological Monographs* 73:543-566.
- Eldridge, D.J. and R.S.B. Greene. 1994. Microbiotic Soil Crusts: A Review of their Roles in Soil and Ecological Processes in the Rangelands of Australia. *Australian Journal of Soil Research* 32:389-415.
- Ellingson, A.R. 2003. Uncompahgre Fritillary Butterfly Monitoring and Inventory: 2002 field report and recommendations. Unpublished Report. Prepared for the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the U.S. Bureau of Land Management. Fort Collins, Colorado.
- Elmore W. and R.L. Beschta. 1987. Riparian Areas: Perceptions in Management. *Rangelands* Volume 9, Number 6.
- Engle, D.M., C.D. Bonham, and L.E. Bartel. 1983. Ecological Characteristics and Control of Gambel Oak. *Journal of Range Management* 36(3).
- Erdman, J. A. 1970. Piñon Juniper Succession after Natural Fires on Residual Soils of Mesa Verde, Colorado. *Brigham Young University Biological Series* Vol. XI (2).
- Evans, R.A. 1988. Management of Pinyon-Juniper Woodlands. USFS General Technical Report INT-249. U.S. Department of the Interior, U.S. Forest Service. Intermountain Research Station. Ogden, Utah.
- Everett, R.L. 1987. Proceedings-Pinyon-Juniper Conference in Reno, Nevada, January 13-16, 1986. USFS General Technical Report INT-215. U.S. Department of Agriculture, U.S. Forest Service. Intermountain Research Station. Ogden, Utah.
- Eyre, F.H. 1980. *Forest Cover Types of the U.S. and Canada*. Society of American Foresters. Bethesda, Maryland.
- Fausch, K.D. 1989. Do Gradients and Temperature Affect Distributions of, and Interactions between, Brook Charr (*Salvelinus fontinalis*) and other Resident Salmonids in Streams? *Physiology and Ecology Japan, Special Volume 1*:303-322.
- Federal Land Managers Air Quality Related Value Workgroup Guideline (FLAG). 2000. Phase I Report of the Federal Lands Manager's Air Quality Related Values Workgroup. U.S. Department of the Interior, National Park Service. Washington, D.C. Available on Internet: <http://www2.nature.nps.gov/air/permits/flag/flaginfo/>.
- Ferland, C. 2005. Northern Goshawk (*Accipiter gentilis atricapillus*) Breeding Status in the San Juan and Rio Grande National Forests, Southwestern Colorado. Unpublished Report. Prepared for the San Juan and Rio Grande National Forests. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Finch D.M. and J.A.Tainter. 1995. Ecology, Diversity, and Sustainability of the Middle Rio Grande Basin. USFS General Technical Report RM-GTR-268. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.

- Finch D.M., G.L. Wolters, and W. Yong. 1995. Plants, Arthropods, and Birds of the Rio Grande (Chapter 7). In: Finch D.M. and J.A.Tainter. 1995. Ecology, Diversity, and Sustainability of the Middle Rio Grande Basin. USFS General Technical Report RM-GTR-268. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Finch, Deborah M.; Ruggiero, Leonard F. 1993. Wildlife habitats and biological diversity in the Rocky Mountains and Northern Great Plains. *Natural Areas Journal*. 13:191-203.
- Fitzgerald, J.P., C.A. Meaney and D.M. Armstrong. 1994. *Mammals of Colorado*. Denver Museum of Natural History and University of Colorado Press. Niwot, Colorado.
- Fleischner, T.L. 1994. Ecological Costs of Livestock Grazing in Western North America. *Conservation Biology*. 8(3): 629-644.
- Fletcher, R. and W. Robbie. 2004. Historic and Current Conditions of SW Grasslands. In: USFS RMRS-GTR-135-volume 1. U.S. Department of Agriculture, U.S. Forest Service. Washington. D.C.
- Floyd, L.M. (editor). 2004. *Ancient Piñon-Juniper Woodlands: A Natural History of the Mesa Verde Country*. University Press of Colorado. Niwot, Colorado.
- Floyd, L.M., W.H. Romme, and D.D. Hanna. 2000. Fire History and Vegetation Pattern in Mesa Verde National Park, Colorado, USA. *Ecological Applications* 10(6) 2000.
- Floyd, L.M., W.H. Romme, and D.D. Hanna. 2004. Historical and Recent Fire Regimes in Pinon-Juniper Woodlands on Mesa Verde Colorado, USA. *Forest Ecology and Management* 198: 269-289.
- Floyd, M.E. 1982. Interaction of Pinon Pine and *Quercus Gambelii* in Succession near Dolores, Colorado. *Southwestern Naturalist*. 27:143-147.
- Floyd, M.E. 1986. Inter- and intra-specific Variations in Pinon Pine Reproduction. *Botanical Gazette* 147:180-188.
- Floyd, M.E. 2003. *Ancient Pinon-Juniper Woodlands: A Natural History of Mesa Verde Country*. University Press of Colorado. Niwot, Colorado.
- Floyd-Hanna, L.M., A. Spencer, and W.H. Romme. 1996. Biotic Communities of the Semiarid Foothills and Valleys. In: Blair, R., T.A. Casey, W.H. Romme, and R.N. Ellis. 1996. *The Western San Juan Mountains: Their Geology, Ecology, and Human History*. University Press of Colorado. Niwot, Colorado. Fort Lewis College Foundation. Durango, Colorado.
- Forest Service. 2007. *Invasive Species Action Plan 2007-2009*. Durango, CO. USDA Forest Service San Juan National Forest. 16 pp.
- Four Corners Air Quality Task Force. 2006. *Oil and Gas Matrix*. State of New Mexico. State of Colorado. Available on the Internet: <http://www.nmenv.state.nm.us/aqb/4C/index.html>.
- Fox, D.G. et al. 1989. A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas. USDA General Technical Report RM-168. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Frischknecht, N.C. 1975. Native Faunal Relationships within Pinyon-Juniper Ecosystems. In: Gifford, G.F., and F. E. Busby (editors). *The Pinyon-Juniper Ecosystem: A Symposium*. Utah State University. Utah Agricultural Experiment Station. Logan, Utah.
- Fule, P. Z., J. E. Crouse, T. A. Heinlein, M. W. Moore, W. W. Covington, and G. Verkamp. 2003. Mixed-Severity Fire Regime in a High-elevation Forest of Grand Canyon, USA. *Landscape Ecology* 18:465-486.
- Fule, P. Z., W. W. Covington, and M. M. Moore. 1997. Determining Reference Conditions for Ecosystem Management of Southwestern Ponderosa Pine Forests. *Ecological Applications* 7:895-908.
- Fule, P. Z., W. W. Covington, M. M. Moore, T. A. Heinlein, and A. E. M. Waltz. 2002. Natural Variability in Forests of Grand Canyon, USA. *Journal of Biogeography* 29:31-47.
- Garrison, G.A., A.J. Bjugstad, D.A. Duncan, M.E. Lewis, and D.R. Smith. 1977. *Vegetation and Environmental Features of Forest and Range Ecosystems*. USFS Agricultural Handbook 475. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Gault Group 2006: *Oil & Gas Potential & Reasonable Foreseeable Development (RFD) Scenarios in the San Juan National Forest & BLM Public Lands, Colorado*, 117 pp. December 2006. Gault Group Inc., Cortez, CO.

- Geist, V. 1971. *Mountain Sheep: A Study in Behavior and Evolution*. University of Chicago Press. Chicago, Illinois and London, England.
- Glinski, R.L. 1977. Regeneration and Distribution of Sycamore and Cottonwood Trees along Sonoita Creek, Santa Cruz County, Arizona. In: Johnson, R. R., and D.A. Jones (technical coordinators). *Importance, Preservation and Management of Riparian Habitats: A symposium*. GTR-RM-43. Tucson, Arizona.
- Goddard Institute for Space Studies. 2007. Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots. New York, New York. Available on the Internet: <http://data.giss.nasa.gov/gistemp/graphs/Fig.B.lrg.gif>.
- Golley, F.B. 1960. Energy Dynamics of a Food Chain of an Old-Field Community. *Ecological Monographs* 30:187-206.
- Goodwin, G.A. 1975. Seasonal Food Habits of Mule Deer in Southeastern Wyoming. USFS Research Note RM-287. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Gray et. al. 2005. Historical Deposition and Fluxes of Mercury in Narraguinnep Reservoir, Southwestern Colorado, USA. *Applied Geochemistry* 20: 207-220.
- Gregory, S.V., F.J. Swanson, W.A McKee, and K.W. Cummins. 1991. An Ecosystem Perspective of Riparian Zones. *Bioscience* 41(8): 540-551.
- Grissino-Mayer, H. D. 1995. *Tree-Ring Reconstructions of Climate and Fire History at El Malpais National Monument, New Mexico*. Dissertation. University of Arizona. Tucson, Arizona.
- Grissino-Mayer, H. D., W. H. Romme, M. L. Floyd, and D. D. Hanna. 2004. Climatic and Human Influences on Fire Regimes of the Southern San Juan Mountains, Colorado, USA. *Ecology* 85:1708-1724.
- Grossman, D.H., D. Faber-Langendoen, A.S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. Patterson, M. Pyne, M. Reid, and L. Sneddon. 1998. *Terrestrial Vegetation of the United States*. Volume 1. The National Vegetation Classification System. The Nature Conservancy. Arlington, Virginia.
- Gunnison Sage-Grouse Rangewide Steering Committee. 2005. *Gunnison Sage-Grouse Rangewide Conservation Plan*. Colorado Division of Wildlife. Denver, Colorado.
- Hammerson, G.A. 1999. *Amphibians and Reptiles in Colorado*. 2nd Edition. Colorado Division of Wildlife. Denver, Colorado. University Press of Colorado. Niwot, Colorado.
- Hann, W., D. Havlina, A. Shlisky, et al. 2003. Interagency and The Nature Conservancy Fire Regime Condition Class Website (frcc.gov). U.S. Department of Agriculture, U.S. Forest Service; U.S. Department of the Interior; The Nature Conservancy, and Systems for Environmental Management.
- Harper, K.T. and J.R. Marble. 1988. A Role for Nonvascular Plants in Management of Arid and Semiarid Rangelands. In: Tueller, P.T. (editor). *Vegetation Science Applications for Rangeland Analysis and Management*. Kluwer Academic Publishers. Dordrecht, Netherlands.
- Harrington, H.D. 1964. *Manual of the Plants of Colorado*. Sage Books. Southampton, Massachusetts.
- Harrington, M. G. 1985. The Effects of Spring, Summer, and Fall Burning on Gambel Oak in a Southwestern Ponderosa Pine Stand. *Forest Science* 31:156-163.
- Harrington, M. G. 1987. Phytotoxic Potential of Gambel Oak on Ponderosa Pine Seed Germination and Initial Growth. USFS Research Paper RM-277. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Harris, L.D. and P.B. Gallagher. 1989. New Initiatives for Wildlife Conservation: The Need for Movement Corridors. In: Mackintosh, G. (editor). *Preserving Communities and Corridors*. Defenders of Wildlife. Washington, D.C.
- Hartman, E.L. and M.L. Rottman. 1985. The Alpine Vascular Flora of Three Cirque Basins in the San Juan Mountains, Colorado. *Madrono* 32(4): 253-272.
- Hayward, G.D. and J. Verner. 1994. Flammulated, boreal, and great gray owls in the United States: a technical conservation assessment. USDA Forest Service General Technical Report RM-253. Fort Collins, Colorado.. 214 pp.
- Heinselman 1981
- Heitschmidt, R.K. and J.W. Stuth. 1993. *Grazing Management - An Ecological Perspective*. Timber Press. Portland, Oregon.

- Herger, L.G. 1993. Assessment of the Basin-Wide Habitat Inventory Technique to Colorado River Cutthroat Trout. Master's Thesis. University of Wyoming. Laramie, Wyoming.
- Hess, K. and C.H. Wasser. 1982. Grassland, Shrubland, and Forestland Habitat Types of the White River-Arapaho National Forest. Final Report. Cooperative Agreement No. 53-82FT-1-19. U.S. Department of Agriculture, U.S. Forest Service, Washington, D.C.
- Hess, K. and R. Alexander. 1986. Forest Vegetation of the Arapaho and Roosevelt National Forests in Central Colorado: A Habitat Type Classification. USFS Research Paper RM-266. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Hessburg, P.F., B.G. Smith, and R.B. Salter. 1999. Detecting Change in Forest Spatial Patterns from Reference Conditions. *Ecological Applications* 9:1232-1252.
- Holden, P.B. 1973. Distribution, Abundance, and Life History of the Fishes of the Upper Colorado River Basin. Ph.D. Dissertation. Utah State University. Logan, Utah.
- Holden, P.B. (editor). 1999. Flow Recommendations for the San Juan River. San Juan River Basin Recovery Implementation Program, U.S. Department of the Interior, U.S. Fish and Wildlife Service. Albuquerque, New Mexico.
- Holden, P.B. and C.B. Stalnaker. 1975. Distribution and Abundance of Mainstream Fishes of the Middle and Upper Colorado River Basins, 1967-1973. *Transactions of the American Fisheries Society* 104:217-231.
- Hoover, R. L. and D. Wills. 1984. Managing Forested Lands for Wildlife. Colorado Division of Wildlife, Denver, Colorado.
- Hubbs, C.L. and L.C. Hubbs. 1947. Natural Hybrids between Two Species of Catostomid Fishes. *Papers of the Michigan Academy of Science, Arts, and Letters* 31:147-167.
- Hubbs, C.L. and R.R. Miller. 1953. Hybridization in Nature between the Fish Genera *Catostomus* and *Xyrauchen*. *Papers of the Michigan Academy of Science, Arts, and Letters* 38:207-233.
- Humphrey, R.R. 1958. The Desert Grassland: A History of Vegetational Change and an Analysis of Cause. *Botanical Review* 24: 193-252.
- Intergovernmental Panel on Climate Change (IPCC). 2001. Third Assessment Report: Climate Change 2001. Cambridge University Press. Cambridge, England and New York, New York. Available on the Internet: <http://www.ipcc.ch/ipccreports/tar/vol4/english/index.htm>.
- IPCC. 2007. Climate Change 2007: The Physical Basis (Summary for Policymakers). Cambridge University Press. Cambridge, England and New York, New York. Available on the Internet: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>.
- Jameson, D.A. 1966. Juniper Control by Individual Tree Burning. USFS Research Note RM-71. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Jespersen, D.M. 1981. A Study of the Effects of Water Diversion on the Colorado River Cutthroat Trout (*Salmo clarki pleuriticus*) in the Drainage of the North Fork of the Little Snake River in Wyoming. Master's Thesis. University of Wyoming. Laramie, Wyoming.
- Jessup, D.A. 1980. Pneumonia, Bighorn, and Domestic Sheep. September 1. Newsletter Number 4. American Association of Wildlife Veterinarians. Gainesville, Florida.
- Jiggins, J. and N. Roling. 2002. Adaptive Management: Potential and Limitations for Ecological Governance of Forests in a Context of Normative Pluriformity. In: Ogletohorpe, J.A.E. (editor). 2002. Adaptive Management: From Theory to Practice. IUCN. Gland, Switzerland and Cambridge, England.
- Johnson, E. A. 1992. Fire and Vegetation Dynamics in the North American Boreal Forest. Cambridge University Press. Cambridge, England.
- Johnston, B.C. 1993. Alpine Ecosystems and their Management in the Southern and Central Rocky Mountains. Preliminary Draft. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Johnston, B.C. 1987. Plant Associations of Region Two. Edition 4. USFS Technical Report R2-ECOL-87-2. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Johnston, B.C. and L. Hendzel. 1985. Examples of Aspen Treatment, Succession and Management in Western Colorado. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Region. Lakewood, Colorado.

- Johnston, B.C. and L. Huckaby. 2001. Ecological Types of the Upper Gunnison Basin. USFS Technical Report R2-RR-2001-01. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Jones, G. 1990. Workplan for a Uniform Statewide Riparian Classification. Wyoming Natural Diversity Database. Laramie, Wyoming.
- Jones, J. R. 1974. Silviculture of Southwestern Mixed Conifers and Aspen: The Status of our Knowledge. USFS Research Paper RM-122. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Joseph, T.W., J.A. Sinning, R.J. Behnke, and P.B. Holden. 1977. An Evaluation of the Status, Life History, and Habitat Requirements of Endangered and Threatened Fishes of the Upper Colorado River System. FWS/OBS-77-62. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Fort Collins, Colorado.
- Joslin, G. and H. Youmans. 1999. Effects of Recreation on Rocky Mountain Wildlife: A Review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society. Missoula, Montana.
- Kauffman, J.B. and W. C. Krueger. 1984. Livestock Impacts on Riparian Ecosystem and Streamside Management Implications – A Review. *Journal of Range Management* 37(5): 430-438.
- Kauffman, J.B., W. C. Krueger, and M. Vavra. 1982. Impacts of a Late Season Grazing Scheme on Nongame Wildlife in Wallowa Mountain Riparian Ecosystems. In: *Wildlife-Livestock Relationships Symposium: Proceedings 10*. University of Idaho Forest, Wildlife, and Range Experiment Station. Moscow, Idaho.
- Kauffman, J.B., W. C. Krueger, and M. Vavra. 1983. Impact of Cattle on Streambanks in Northeastern Oregon. *Journal of Range Management* 36: 683-685.
- Kauffman, J.B. 1998. The Relationships Between Fire and Human Land Use: Influences on Wildlife Habitats and Implications for Ecological Restoration. In: *Fire and Wildlife in the Pacific Northwest: Research, Policy, and Management*. Symposium of the Northwest Section of The Wildlife Society, April 6-8, 1998. Spokane, Washington.
- Kaufmann, M. R. et al. 1994. An Ecological Basis for Ecosystem Management. USFS General Technical Report RM-246. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Fort Collins, Colorado.
- Kaufmann, M.R., W.H. Moir, and W.W. Covington. 1992. Old Growth Forest: What Do We Know About their Ecology and Management in the SW and Rocky Mountain Region? In: USFS General Technical Report RM-213. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Fort Collins, Colorado.
- Keith, J.O. 1965. The Abert squirrel and its dependence on ponderosa pine. *Ecology* 46:150–163.
- Keystone Center. 1991. Keystone Policy. Biological Diversity on Federal Lands. Report of a Keystone Policy Dialogue. Keystone Center. Keystone, Colorado.
- Kilgore 1981
- Kingery, H.E. (editor). 1998. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership and Colorado Division of Wildlife. Denver, Colorado. 636 p.
- Kittel, G., E. VanWie, M. Damm, R. Rondeau, S. Kettler, A. McMullen, and J. Sanderson. 1999c. A Classification of Riparian Wetland Plant Associations of Colorado: A User Guide to the Classification Project. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado.
- Knight, R. L., F. W. Smith, S. W. Buskirk, W. H. Romme, and W. L. Baker. 2000. Forest Fragmentation in the Southern Rocky Mountains. University Press of Colorado. Boulder, Colorado.
- Knight, R.L. and D.N. Cole. 1995. Wildlife Responses to Recreationists. In: Knight and Gutzwiller (editors). *Wildlife and Recreationists: Coexistence through Management and Research*. Island Press. Washington, D.C.
- Knopf, F.L., R.R. Johnson, T. Rich, F.B. Samson, and R. Szaro. 1988. Conservation of Riparian Ecosystems in the United States. *Wilson Bulletin*. 100 (2): 272-284.
- Komarek, S. 1994. Flora of the San Juans. A Field Guide to the Mountain Plants of Southwestern Colorado. Kivaki Press. Durango, Colorado.
- Komarkova, V. 1986. Habitat Types on Selected Parts of the Gunnison and Uncompahgre National Forests. Final Report. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.

- Korb, J. 2004. In Terrestrial Current Landscape Condition Assessment for the San Juan National Forest. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Fort Collins, Colorado.
- Kram, M., K. Decker, M. Dimmitt, D. Gann, P. Lyon, B. Neely, C. Pague, R. Rondeau, K. Sochi, and C. Supples. 2005. San Juan Planning for Biodiversity Model Project: Phase 1. Report to the U.S. Department of the Interior, Bureau of Land Management. Prepared by The Nature Conservancy of Colorado, with extensive support from the Colorado Natural Heritage Program and guidance from the Bureau of Land Management. The Nature Conservancy of Colorado. Boulder, Colorado.
- Kram, M.E. et al. 2006. San Juan Planning for Biodiversity Model Project. Phase 1. Report to the U.S. Department of the Interior, Bureau of Land Management. Developed by The Nature Conservancy of Colorado and the Colorado Natural Heritage Program, with funding from the BLM (San Juan Public Lands Center and Washington Office). The Nature Conservancy of Colorado. Boulder, Colorado. Available on the Internet: <http://conserveonline.org/workspaces/CO%20-%20San%20Juan%20Project/SanJuanPhase1Report>. Accessed on June 4, 2007.
- Kuchler, A.W. 1964. Potential Natural Vegetation of the Conterminous U.S. American Geographic Society Special Publication 36. American Geographical Society. New York, New York.
- Kues, B. S. and S. G. Lucas. 1987. Upper Cretaceous-Paleocene Sequence. Centennial Field Guide, Rocky Mountain Section. Geological Society of America. Boulder, Colorado.
- Ladyman, J.A.R. and E. Muldavin. 1996. Terrestrial Cryptograms of Pinyon-Juniper Woodlands in the Southwest U.S.: A Review. USFS General Technical Report RM-GTR-280. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Landres, P.B., P. Morgan, and F.J. Swanson. 1999. Overview of the Natural Variability Concepts in Managing Ecological Systems. Ecological Applications 9:1179-1188.
- Langenheim, J. 1962. Vegetation and Environmental Patterns in the Crested Butte Area, Gunnison County, Colorado. Ecological Monographs 32: 249-285.
- Layser, E.F. and G.H. Schubert. 1979. Preliminary Classification for the Coniferous Forest and Woodland Series of Arizona and New Mexico. USFS Research Paper RM-208. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Lentsch, L.D., C.A. Toline, T.A. Crowl, and Y. Converse. 1998. Endangered Fish Interim Management Objectives for the Upper Colorado River Basin Recovery and Implementation Program. Utah Division of Wildlife Resources. Salt Lake City, Utah.
- Lertzman, K.P. and C.J. Krebs. 1991. Gap Phase Structure of a Subalpine Old Growth Forest. Canadian Journal of Forest Research 21:1730-1741.
- Lipe, W. D., M.D. Varien, and R.H. Wilshusen. 1999. Colorado Prehistory: A Context for the Southern Colorado River Basin. Prehistory of Colorado: A Publication Series. Colorado Council of Professional Archaeologists. Denver, Colorado.
- Lull, H.W. 1959. Soil Compaction on Forest and Range Lands. USFS Miscellaneous Publication No. 769. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Lyon P., D. Culver, M. March, and L. Hall. 2003. San Juan County Biological Assessment. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado. Available on the Internet: http://www.cnhp.colostate.edu/documents/2003/San_Juan_County_Biological_Assessment.pdf. Accessed on June 4, 2007.
- Lyon, L.J., J.K. Brown, M.H. Huff, and J.K. Smith. 2000a. In: Smith, J.K. (editor). Wildland Fire in Ecosystems: Effects of Fire on Fauna. USFS General Technical Report RMRS-GTR-42. Volume 1. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Research Station. Ogden, Utah.
- Lyon, P., and J. Hanson. 2003. Survey of Rare Plants San Juan Public Lands in Dolores and Montezuma Counties, Colorado. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado.
- Lyon, P., J. Huggins, J. Lucht, D. Culver, M. March, and J. Hanson. 2004. Assessment of Critical Biological Resources, La Plata County, Colorado. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado. Available on the Internet: http://www.cnhp.colostate.edu/documents/2004/LaPlata_County_Biological_Assessment.pdf. Accessed on June 4, 2007.
- Lyon, P. and J. Stovell. 2000. A Natural Heritage Assessment: San Miguel and Western Montrose Counties, Colorado. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado.

- Madany, M. H. and N. E. West. 1983. Livestock Grazing: Fire Regime Interactions within Montane Forests of Zion National Park, Utah. *Ecology* 64:661-667.
- Maddux, H.R. and W.G. Kepner. 1988. Spawning of Bluehead Sucker in Kanab Creek, Arizona (*Pisces: Catostomidae*). *The Southwestern Naturalist* 33(3): 364-365.
- Madgwick, H.A.I., B.W. Jackson, and P.J. Knight. 1977. Above-Ground Dry Matter, Energy, and Nutrient Content of Trees in an Age Series of *Pinus Radiata* Plantations. *New Zealand Journal of Forestry Science* 7:445-468.
- Malm et al. 2000. Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States: Report III. Interagency Monitoring of Protected Visual Environments Measurement Program. Cooperative Institute for Research in the Atmosphere. Colorado State University. Fort Collins, Colorado.
- March, M., D. Culver, P. Lyon, J. Hanson, and S. Eastin. 2003. Survey of Critical Wetlands and Riparian Areas in Dolores County. Colorado Natural Heritage Program. Colorado State University. Fort Collins, Colorado. Available on the Internet: http://www.cnhp.colostate.edu/documents/2005/Survey_of_Critical_Wetlands_in_Dolores_County.pdf. Accessed on June 4, 2007.
- Marcus, M.D., M.K. Young, L.E. Noel, and B.A. Mullan. 1990. Salmonid Habitat Relationships in the Western United States: A Review and Indexed Bibliography. USFS General Technical Report, RM-188. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Marshall, R.M. and S.H. Stoleson. 2000. Threats in Status, Ecology, and Conservation of the Southwestern Willow Flycatcher (D.M. Finch and S.H. Stoleson, eds.). U.S. Forest Service General Technical Report RMRS-GTR-60. 131 pp.
- Martin, K.D., T.J. Schommer and V.L. Coggins. 1996. Literature Review Regarding the Compatibility between Bighorns and Domestic Sheep. *Northern Wild Sheep and Goat Council Proceedings* 10:72-77.
- Martin, S.C. 1975. Ecology and Management of Southwest Semidesert Grassland Ranges: The Status of our Knowledge. USFS Research Paper RM-156. U.S. Department of Agriculture, U.S. Forest Service. Washington. D.C.
- Martin, W. and C. Hutchins. 1980. A Flora of New Mexico. *Contr. U.S. Natl. Herb.* 19:1-794.
- Mast, J. N. and J. J. Wolf. 2004. Ecotonal Changes and Altered Tree Spatial Patterns in Lower Mixed-Conifer Forests, Grand Canyon National Park, Arizona, U.S.A. *Landscape Ecology* 19:167-180.
- McAda, C.W. 1977. Aspects of the Life History of Three Catostomids Native to the Upper Colorado River Basin. Thesis. Utah State University. Logan, Utah.
- McAda, C.W., C.R. Berry, Jr., and C.E. Phillips. 1980. Distribution of Fishes in the San Rafael River System of the Upper Colorado River Basin. *The Southwestern Naturalist* 25:41-50.
- McAda, C.W. and R.S. Wydoski. 1980. The Razorback Sucker, *Xyrauchen texanus*, in the Upper Colorado River Basin. U.S. Fish and Wildlife Service Technical Paper 99:1-15. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Washington, D.C.
- McGarigal, K. and W. Romme. 2005. Historic Range of Variability in Landscape Structure and Wildlife Habitat. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- McGarigal, K., W.H. Romme, M. Crist, and E. Roworth. 2001. Cumulative Effects of Roads and Logging on Landscape Structure in the San Juan Mountains, Colorado, USA. *Landscape Ecology* 16: 321-349.
- McNab W. H. and P.E. Avers. 1994. Ecological Subregions of the U.S.: Section Descriptions. Ecosystem Management Report WO-SWA-5. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- McNab, W.H., D.T. Cleland, J.A. Freeouf, J.E. Keys, Jr., G.J. Nowacki, G.J., and C.A. Carpenter. 2005. Description of Ecological Subregions: Sections of the Conterminous United States. [CD-ROM]. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- McPherson, G.R. 1995. The Role of Fire in Desert Grasslands. In: Mclaran, M.P., and T.R. Van Devender (editors) *The Desert Grassland*. University of Arizona Press. Tucson, Arizona.
- Meehan, W.R., F.J. Swanson, and J.R. Sedell. 1977. Influences of Riparian Vegetation on Aquatic Ecosystems with Particular Reference to Salmonid Fishes and their Food Supply. In: *Proceedings. Symposium on the Importance, Preservation, and Management of the Riparian Habitat, July 9, 1977*. Tucson, Arizona.

- Mehl, M.S. 1992. Old Growth Descriptions for the Major Cover Types in the Rocky Mountain Region. In: USFS General Technical Report RM-213. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Miller, J.R., L.A. Joyce, R.L. Knight, and R.M. King. 1996. Forest Roads and Landscape Structure in the Southern Rocky Mountains. *Landscape Ecology* 11(2): 115-127.
- Miller, W.J. and D.E. Rees. 2000. Ichthyofaunal Surveys of Tributaries of the San Juan River, New Mexico. Miller Ecological Consultants, Inc. Fort Collins, Colorado.
- Miller, W.J., J. Hogle, and D.E. Rees. 1995. Final Report. Animas-LaPlata Project Native Fish Studies. Miller Ecological Consultants, Inc. Fort Collins, Colorado.
- Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department. Phoenix, Arizona.
- Moir, W. H., B. Geils, M. A. Benoit, and D. Scurlock. 1997. Ecology of Southwestern Ponderosa Pine Forests. In: Block, W.M. and D.M. Finch. 1997. Songbird Ecology in Southwestern Ponderosa Pine Forests: A Literature Review. USFS General Technical Report RM-GTR-92. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Moir, W.H. 1967. The Subalpine Tall Grass, *Festuca Thurberi*, Community of Sierra Blanca, New Mexico. *The Southwestern Naturalist* 12(3): 321-328.
- Moir, W.H. 1983. A Series Vegetation Classification for Region 3. Proceedings of the workshop on southwestern habitat types. April 6-8, 1983. Albuquerque, New Mexico. U.S. Department of Agriculture, U.S. Forest Service.
- Moir, W.H. and J.H. Dieterich. 1988. Old-Growth Ponderosa Pine from Succession in Pine-Bunchgrass Forests in Arizona and New Mexico. *Natural Areas Journal*, Volume 8 (1), 1988.
- Moir, W.H. and J.O. Carleton. 1986. Classification of Pinyon-Juniper Sites on National Forests in the Southwest. In: Proceedings-Pinyon-Juniper Conference in Reno, Nevada, January 13-16, 1986. USFS General Technical Report INT-215. U.S. Department of Agriculture, U.S. Forest Service. Intermountain Research Station. Ogden, Utah.
- Muldavin, E., P. Durkin, M. Bradley, M. Stuever, and P. Mehlhop. 2000. Handbook of Wetland Vegetation Communities of New Mexico. Volume 1: Classification and Community Descriptions. University of New Mexico. Albuquerque, New Mexico.
- Mule Deer Working Group. 2003. Mule Deer: Changing Landscapes, Changing Perspectives. Mule Deer Working Group. Western Association of Fish and Wildlife Agencies. Cheyenne, Wyoming.
- Mullen, L.D. 1992. Biological Diversity Assessment: A Technical Report Used in Amending the Rocky Mountain Regional Guide. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Musselman, R.C. and W.L. Slaussen. 2004. Water Chemistry of High Elevation Colorado Wilderness Lakes. *Biogeochemistry* 71:387-414.
- Mutel, C.F. and J.C. Emerick. 1984. From Grassland to Glacier: The Natural History of Colorado. Johnson Books. Boulder, Colorado.
- Naiman, R.J., C.A. Johnson, and J.C. Kelley. 1988. Alteration of North American Streams by Beaver. *BioScience* 38(11): 753-762.
- National Academy of Sciences. 2006. Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies. National Academy of Sciences. Washington, D.C. Available on the Internet: <http://dels.nas.edu/basc/Climate-HIGH.pdf>.
- National Atmospheric Deposition Program. 2005. NADP/NTN National Trends Network, Site Molas Pass (CO96). National Atmospheric Deposition Program. University of Illinois at Urbana-Champaign. Champaign, Illinois. Available on the Internet: <http://nadp.sws.uiuc.edu/sites/siteinfo.asp?id=CO96&net=NTN>.
- National Park Service. 2005. Air Quality Conditions and Trends in Parks – Annual Report 2004. Air Resources Division. U.S. Department of the Interior, National Park Service. Washington, D.C.
- Natural Resources Conservation Service (NRCS). 2001. National Soil Survey Handbook. Natural Resources Conservation Service. U.S. Department of Agriculture. Washington, D.C.
- The Nature Conservancy. 1982. Natural Heritage Program Operations Manual. The Nature Conservancy. Arlington, Virginia.

- NRCS. 2003. Keys to Soil Taxonomy. 9th Edition. Natural Resources Conservation Service. U.S. Department of Agriculture. Washington, D.C.
- Neely, B., P. Comer, C. Moritz, M. Lammert, R. Rondeau, C. Pague, G. Bell, H. Copeland, J. Humke, S. Spackman, T. Schulz, D. Theobald, and L. Valutis. 2001. Southern Rocky Mountains: An Ecoregional Assessment and Conservation Blueprint. Prepared by The Nature Conservancy, with support from the U.S. Forest Service, Rocky Mountain Region; the Colorado Division of Wildlife; and the Bureau of Land Management. The Nature Conservancy of Colorado. Boulder, Colorado.
- Neubert, J.T., compiler, 1992, Mineral Appraisal of San Juan National Forest, Colorado: U.S. Bureau of Mines Report MLA 1-92, 311 pp.
- New Mexico Environment Department. 2004. Air Quality Bureau, 8-Hour Ozone Measurements in San Juan County. Santa Fe, New Mexico. Available on the Internet: <http://www.nmenv.state.nm.us/aqb/projects/Ozone.html>.
- Norton, B.G. 1999. Forest Reserves. In: Maintaining Biodiversity in Forest Ecosystems. Cambridge University Press. Cambridge, England.
- Noss, R.F. 1987. From Plant Communities to Landscapes to Conservation Inventories: A Look at The Nature Conservancy, USA. *Biological Conservation* 41:11-37.
- Noss, R.F. and A.Y. Cooperrider. 1994. Saving Nature's Legacy - Protecting and Restoring Biodiversity. Island Press. Washington, D.C.
- Noss, R.F. and R.L. Peters. 1995. Endangered Ecosystems: A Status Report on America's Vanishing Habitat and Wildlife. Defenders of Wildlife. Washington, D.C.
- Noss, R.F. and L.D. Harris. 1989. Habitat Connectivity and the Conservation of Biological Diversity: Florida as a Case History. In: Proceedings of the 1989 Society of American Foresters. Spokane, Washington.
- Natural Resource Conservation Service (NRCS). 1998. Keys to Soil Taxonomy, Eighth Edition. Natural Resources Conservation Service. Washington, D.C.
- O'Neill, F.M. 1989. A Preliminary Survey of the Horse Range Mesa Fossil Area for the San Juan Resource Area. Unpublished Report. U.S. Department of the Interior, Bureau of Land Management. San Juan Public Lands Center. Durango, Colorado.
- Odum, E.P. 1971. Fundamentals of Ecology. 3rd edition. W.B. Saunders. Philadelphia, Pennsylvania.
- Olson, R. and W.A. Hubert. 1994. Beaver: Water Resources and Riparian Habitat Manager. University of Wyoming. Laramie, Wyoming.
- O'Rourke, Paul M. 1980. Frontier in Transition. Number 10. Chapter IX. Denver, CO: USDI Bureau of Land Management, Colorado State Office. 14 pp.
- Orr, H.K. 1975. Recovery from Soil Compaction on Bluegrass Range in the Black Hills. *Transactions of the ASAE*: 1076-1081.
- Otis, E.O. 1994. Distribution, Abundance, and Composition of Fishes in Bright Angel and Kanab Creeks, Grand Canyon National Park, Arizona. Thesis. University of Arizona. Tucson, Arizona.
- Patton, D. R. 1975. Abert squirrel cover requirements in southwestern ponderosa pine. Research Paper RM-145, United States Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.
- Paulsen, H.A. Jr. 1960. Plant Cover and Forage Use of Alpine Sheep Ranges in the Central Rocky Mountains. *Iowa State Journal of Science* 34:731-748.
- Paulsen, H.A. Jr. 1975. Range Management in the Central and Southern Rocky Mountains: A summary of the Status of our Knowledge by Range Ecosystems. USFS Research Paper RM-154. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Pearson, G. A. 1950. Management of Ponderosa Pine in the Southwest. Developed by research and experimental practice. USFS Monograph Number 6. U. S. Government Printing Office. Washington, D.C.
- Pearson, M., D. Foreman, B. Miller, J. Smith, T. Hogan, and M. Soule. 2003. Section 9: A Conservation Vision for the Southern Rockies. In: DeMarco, M (Executive Director). Southern Rockies Wildlands Vision: A Science-Based Approach to Re-wilding the Southern Rockies. The Colorado Mountain Club Press. Golden, Colorado.
- Peterson, E. B. and Peterson, N. M. 1992. Ecology, Management, and Use of Aspen and Balsam Poplar in the Prairie Provinces, Canada. Special Report 1. Forestry Canada. Northwest Region. Northern Forestry Centre. Edmonton, Alberta, Canada.

- Platania, S.P. and D.A. Young. 1989. A Survey of the Ichthyofauna of the San Juan and Animas Rivers from Archuleta and Cedar Hill (respectively) to their Confluence at Farmington, New Mexico. Department of Biology. University of New Mexico, Albuquerque, New Mexico.
- Platania, S.P. 1990. Biological Summary of the 1987-1989 New Mexico-Utah Ichthyofaunal Study of the San Juan River. U.S. Department of the Interior, U.S. Bureau of Reclamation. Salt Lake City, Utah.
- Platts, W.S. and R.F. Raleigh. 1984. Impacts of Grazing on Wetlands and Riparian Habitat. In: Developing Strategies for Rangeland Management. National Research Council/National Academy of Sciences. Westview Press. Boulder, Colorado.
- Propst, D.L. and A.L. Hobbes. 1999. Seasonal Abundance, Distribution, and Population Size-Structure of Fishes in San Juan River Secondary Channels: 1991-1997. New Mexico Department of Game and Fish. Santa Fe, New Mexico.
- Ptacek, J.A., D.E. Rees, and W.J. Miller. 2005. Bluehead Sucker (*Catostomus discobolus*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/blueheadsucker.pdf>.
- Quinlan, R.E. 1980. A Study of the Biology of the Colorado River Cutthroat Trout (*Salmo clarki pleuriticus*) Population in the North Fork of the Little Snake River Drainage in Wyoming. Thesis. University of Wyoming. Laramie, Wyoming.
- Redders, J.S. 2003. A Classification of Riparian Area and Wetland Vegetation of the San Juan National Forest. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- Redders, J.S. 2001. Vegetation of the San Juan National Forest, Working White Paper (updated 6/1/06). U.S. Department of Agriculture, U.S. Forest Service, San Juan National Forest. Durango, Colorado.
- Redders, J.S. 2006. Affected Environment Reports and field notes for NEPA documents on the San Juan Public Lands. U.S. Department of Agriculture, U.S. Forest Service and U.S. Department of the Interior, Bureau of Land Management. San Juan Public Lands Center. Durango, Colorado.
- Reed, A.D. and M.D. Metcalf. 1999. Colorado Prehistory: A Context for the Northern Colorado River Basin. Prehistory of Colorado: A Publication Series. Colorado Council of Professional Archaeologists. Denver, Colorado.
- Reed, R.A., J. Johnson-Barnard, and W.L. Baker. 1996a. Fragmentation of a Forested Rocky Mountain Landscape, 1950-1993. *Biological Conservation* 75:267-277.
- Rees, D.E., J.A. Ptacek, and W.J. Miller. 2005. Roundtail Chub (*Gila robusta robusta*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/roundtailchub.pdf>.
- Rees, D.E., J.A. Ptacek, R.J. Carr, and W.J. Miller. 2005. Flannelmouth Sucker (*Catostomus latipinnis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/flannelmouthsucker.pdf>.
- Reid, L.M. 1981. Sediment Production from Gravel-Surfaced Forest Roads, Clearwater Basin, Washington. Final Report No. FRI-8108. Washington State Department of Natural Resources. Olympia, Washington.
- Report to Congress: Corridors and Rights-of-Way on Federal Lands; November 7, 2005. U.S. Department of the Interior. U.S. Department of Agriculture. U.S. Department of Energy. Council on Environmental Quality. Washington, D.C.
- Rico Master Plan. 2003, p. 2 – 4.
- Riebsame, W.E., J. Robb, Gosnell, H., D. Theobald, P. Breeding, C. Hanson, and K. Rokoske. 1997. Atlas of the New West: Portrait of a Changing Region. Center of the American West. W.W. Norton and Company. New York, New York.
- Risser, P. 1990. The Ecological Importance of Land-Water Ecotones. In: Naimann, R.J. and H. Decamps (editors). The Ecology and Management of Aquatic-Terrestrial Ecotones. UNESCO. Paris, France.
- Robinson, A.T., R.W. Clarkson, and R.E. Forrest. 1998. Dispersal of Larval Fishes in a Regulated River Tributary. *Transactions of the American Fisheries Society* 127:772-786.
- Robinson, R.R. and R.B. Alderfer. 1952. Runoff from Permanent Pastures in Pennsylvania. *Journal of Agronomy* 44:459-462.
- Romme, W. H. 1982. Fire and Landscape Diversity in Sub-Alpine Forests of Yellowstone National Park. *Ecological Monographs* 52(2):199-221.
- Romme, W. H. and D. G. Despain. 1989. Historical Perspective on the Yellowstone Fires of 1988. *BioScience* 39:695-699.

- Romme, W.H. and D.H. Knight. 1981. Fire Frequency and Subalpine Forest Succession along a Topographic Gradient in Wyoming. *Ecology* 62:319-326.
- Romme, W.H., D.W. Jamieson, J.S. Redders, G. Bigsby, J. P. Lindsey, D. Kendall, R. Cowen, T. Kreykes, A.W. Spencer, and J.C. Ortega. 1992. Old-Growth Forests of the San Juan National Forest in Southwestern Colorado. USFS General Technical Report RM-213. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Romme, W.H., M.L. Floyd, and D.D. Hanna. 2006. Final Report. Landscape Condition Analysis for the South Central Highlands Section, Southwestern Colorado and Northwestern New Mexico. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Romme, W. H., M. L. Floyd, D. D. Hanna, and J. S. Redders. 2000. Using Natural Disturbance Regimes as a Basis for Mitigating Impacts of Anthropogenic Fragmentation. Chapter 18. In: Knight, R. L., F. W. Smith, S. W. Buskirk, W. H. Romme, and W. L. Baker (editors). 2000. Forest Fragmentation in the Southern Rocky Mountains. University Press of Colorado. Niwot, Colorado.
- Romme, W.H., M.L. Floyd, D.D. Hanna, H.D. Grissino-Mayer, D. Green, and J.S. Redders. 1998. Ponderosa Pine Forests of Southwestern Colorado: Ecology and History. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Romme, W.H., M.L. Floyd, D.D. Hanna, H.D. Grissino-Mayer, D. Green, E.J. Bartlett, J.S. Redders, K. McGarigal, J. P. Lindsey, and M. Crist. 2003. Landscape Condition Analysis for the South Central Highlands Section, Southwestern Colorado and Northern New Mexico. Draft Final Report for the San Juan National Forest, March 31, 2003. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- Roovers, L.M. and A.J. Rebertus. 1993. Stand Dynamics and Conservation of an Old-Growth Engelmann Spruce/Subalpine Fir Forest in Colorado. *Natural Areas Journal* 13:256-267.
- Rosenburg, D.K., B.R. Noon, and E. C. Meslow. 1997. Biological Corridors: Form, Function, and Efficiency. *BioScience* 47(10): 677-687.
- Ruediger, B. 2005. Management Considerations for Designing Carnivore Highway Crossings. U.S. Department of Agriculture, U.S. Forest Service. Prepared by Wildlife Consulting Resources. Missoula, Montana.
- Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. 2000. The Scientific Basis for Lynx Conservation: Qualified Insights. In: Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires (editors). *Ecology and Conservation of Lynx in the United States*. University Press of Colorado. Boulder, Colorado.
- Ruppert, J.B., R.T. Muth, and T.P. Nesler. 1993. Predation on Fish Larvae by Adult Red Shiner, Yampa and Green Rivers, Colorado. *The Southwestern Naturalist* 38:397-399.
- Ryan, M.G., L.A. Joyce, T. Andrews, and K. Jones. 1994. Research Natural Areas in Colorado, Nebraska, South Dakota, and Parts of Wyoming. USFS General Technical Report RM-251. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Sampson, A.W. and B.S. Jespersen. 1963. California Range Brushlands and Browse Plants. Publication 4010. University of California. Division of Agriculture and Natural Resources. Berkeley, California.
- San Juan Citizens Alliance. 2005. Citizens Plan for the Wild San Juans. 2005. Updated Report. San Juan Citizens Alliance. Durango, Colorado.
- San Juan Interviews. 2004. <http://ocs.fortlewis.edu/forestPlan/reports.asp>
- San Juan Public Lands Center (SJPLC). 1990. In: Arrington, K, D.Lujan, and J.Clarke (editors). Alpine Triangle Cultural Resources Management Plan and Environmental Analysis. U.S. Department of Interior, Bureau of Land Management. U.S. Department of Agriculture, U.S. Forest Service. San Juan Public Lands Center. Durango, Colorado.
- Sando, R.W. 1978. Natural Fire Regimes and Fire Management: Foundations for Direction. *Western Wildlands* 4(4): 34-44.
- Savage, M. 1991. Structural Dynamics of a Southwestern Pine Forest under Chronic Human Influence. *Annals of the Association of American Geographers* 81:271-289.
- Savage, M. and T. W. Swetnam. 1990. Early 19th-Century Fire Decline following Sheep Pasturing in a Navajo Ponderosa Pine Forest. *Ecology* 71:2374-2378.

- Schmid, J. M. and S. A. Mata. 1996. Natural Variability of Specific Forest Insect Populations and their Associated Effects in Colorado. USFS General Technical Report RM-GTR-275. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Schmidt, K.M., P.James, C.C. Hardy, W.J. Hann, and D.L. Bunnell. 2002. Development of Coarse-Scale Spatial Data for Wildland Fire and Fuel Management. USFS General Technical Report RMRS-GTR-87. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Research Station. Fort Collins, Colorado.
- Schommer, T. and M. Woolever. 2001. A Process for Finding Solutions to the Incompatibility between Domestic and Bighorn Sheep. USFS Internal Document. U.S. Department of the Interior, U.S. Forest Service. Washington, D.C.
- Schwan, H.E. and D.F. Costello. 1951. The Rocky Mountain Alpine Type: Range Conditions, Trends, and Land Use. A Preliminary Report. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Scott, J.M., F. Davis, B. Csuti, R. Noss, B. Butterfield, C. Groves, J. Anderson, S. Caicco, F. D'Erchia, T.C. Edwards, J. Ulliman, and R.G. Wright. 1993. Gap Analysis: A Geographical Approach to Protection of Biological Diversity. Wildlife Monographs 123:1-41.
- Scott, R.W. 1995. The Alpine Flora of the Rocky Mountains. Volume 1 - The Middle Rockies. The University of Utah Press. Salt Lake City, Utah.
- Sedgwick, J.A. 2001. Geographic variation in the song of Willow Flycatchers: differentiation between *Empidonax traillii adastus* and *E.t. extimus*. Auk 118:366-379.
- Seymore, R. and M. Hunter. 1999. Principles of Ecological Forestry. In: Maintaining Biodiversity in Forest Ecosystems. Cambridge University Press. Cambridge, England.
- Shinneman, D. J. and W. L. Baker. 1997. Nonequilibrium Dynamics between Catastrophic Disturbances and Old-Growth Forests in Ponderosa Pine Landscapes of the Black Hills. Conservation Biology 11:1-13.
- Shinneman, D. and B. Miller. 2003. Section 2: Natural Landscapes of the Southern Rockies Ecoregion. In: DeMarco, M (Executive Director). Southern Rockies Wildlands Vision: A Science-Based Approach to Re-Wilding the Southern Rockies. The Colorado Mountain Club Press. Golden, Colorado.
- Shinneman, D. and H. Gosnell. 2003. Section 3: The Human Landscape. In: DeMarco, M. (Executive Director). Southern Rockies Wildlands Vision: A Science-Based Approach to Re-wilding the Southern Rockies. The Colorado Mountain Club Press, Golden, Colorado.
- Shinneman, D.R., R. McClellan, and R. Smith. 2000. The State of the Southern Rockies Ecoregion: Southern Rockies Ecosystem Project. Nederland, Colorado.
- Sigler, W.F. and R.R. Miller. 1963. Fishes of Utah, Utah Department of Game and Fish, Salt Lake City, Utah.
- Sigler, W.F. and J.W. Sigler. 1996. Fishes of Utah: A Natural History. University of Utah Press. Salt Lake City, Utah.
- Simon, J.R. 1935. A Survey of the Waters of the Wyoming National Forest. U.S. Department of Commerce, Bureau of Fisheries. Washington, D.C.
- Simon, W., B. Horn, and D. Wegner. 2000. Appendix 6A. Fisheries Report, Current and Historical Review of Animas Watershed Fisheries. Prepared for Animas River Stakeholders Group. In: Use Attainability Analysis for the Animas River Watershed. 2001. U.S. Department of the Interior, Bureau of Reclamation. Durango, Colorado.
- Sims, Phillip L. 1988. Grasslands. In: Barbour, M.G. and W.D. Billings (editors). North American Terrestrial Vegetation. Cambridge University Press. Cambridge, England.
- Sisler, J., D. Huffamn, and D. Latimer. 1993. Spatial and Temporal Patterns and the Chemical Composition of the Haze in the United States: An Analysis of Data from the IMPROVE Network, 1988-1991. Cooperative Institute for Research in the Atmosphere. Colorado State University. Fort Collins, Colorado. Available on the Internet: <http://vista.cira.colostate.edu/Improve/Publications/Reports/1993/1993.htm>.
- Smith, D.W. 1967. Effects of Cattle Grazing on a Ponderosa Pine-Bunchgrass Range in Colorado. USFS Technical Bulletin 1371. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Smith, G.R. 1966. Distribution and Evolution of the North American Catostomid Fishes of Subgenus *Pantosteus*, Genus, *Catostomus*. Miscellaneous Publications of the Museum of Zoology, No. 129. University of Michigan. Ann Arbor, Michigan.

- Snyder, D.E. and R.T. Martin. 1990. Descriptions and Identification of Razorback , Flannelmouth, White, Utah, Bluehead, and Mountain Sucker Larvae and Early Juveniles. Colorado Division of Wildlife. Fort Collins, Colorado.
- Society for Ecological Restoration, (SER 2002).
- Soule, M.E. 1985. What is Conservation Biology? *BioScience* 35:727-734.
- Southern Rockies Ecosystem Project. 2004. The State of the Southern Rockies Ecoregion. A Report by the Southern Rockies Ecosystem Project. Colorado Mountain Club Press. Golden, Colorado.
- Southern Rockies Wildlands Network Vision. A Science-Based Approach to Rewilding the Southern Rockies. 2003. Colorado Mountain Club Press. Golden, Colorado.
- Spence, J.R., W.H. Romme, W.H., L. Floyd-Hanna, and P.G. Rowlands. 1995. A Preliminary Vegetation Classification for the Colorado Plateau. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Spies, T. 1997. Forest Stand Structure, Composition and Function. In: Kohm, K.A. and J. F. Franklin (editors). *The Science of Ecosystem Management: Creating a Forestry for the 21st Century*. Island Press. Washington, D.C.
- Springfield, H.W. 1976. Characteristics and Management of Southwestern Pinyon-Juniper Ranges: The Status of Our Knowledge. USFS Research Paper RM-160. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO.
- Stadtman, K.L. and W.E. Miller. 1989. A Report on the collection of a paleontological specimen by Brigham Young University personnel at the Horse Range Mesa Paleontological Site. San Miguel County. Brigham Young University. Unpublished Report. U.S. Department of Interior, Bureau of Land Management. Durango, Colorado.
- Stuever, M. and J. Hayden. 1997. Plant Associations of Arizona and New Mexico. Volume 1: Forests and Volume 2: Woodlands. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Sublette, J.E., M.D. Hatch, and M. Sublette. 1990. *The Fishes of New Mexico*. University of New Mexico Press. Albuquerque, New Mexico.
- Swank, W.T. and D.A. Crossley Jr. 1988. Forest Hydrology and Ecology at Coweeta. *Ecological Studies* (66):313-324.
- Swetnam T.W. and J.L. Betancourt. 1998. Mesoscale Disturbance and Ecological Response to Decadal Climatic Variability in the American Southwest. *Journal of Climate* 11:3128-3147.
- Swetnam, T. W. and A. M. Lynch. 1994. Multicentury, Regional-Scale Patterns of Western Spruce Budworm Outbreaks. *Ecological Monographs* 63:399-424.
- Swetnam, T. W. and C. H. Baisan. 1996. Historical Fire Regime Patterns in the Southwestern United States Since AD 1700. In: Allen, D.C. (editor). 1996. *Fire Effects in Southwestern Forests: Proceedings of the Second La Mesa Fire Symposium*. USFS General Technical Report RM-GRT-286. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Thilenius, J.F. 1975. *Alpine Range Management In the Western United States – Principles, Practices, and Problems: The Status of Our Knowledge*. USFS Research Paper RM-157. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Tibbitts, T.J., M.K. Sogge, and S.J. Sferra. 1994. A survey protocol for the southwestern willow flycatcher (*Empidonax traillii extimus*). U.S. Department of the Interior, National Park Service. Technical Report NPS/NAUCPRS/NRTR-94/04. Colorado Plateau Research Station, Northern Arizona University, Flagstaff, AZ. 24 pp.
- Touchan, R., C. D. Allen, and T. W. Swetnam. 1996. Fire History and Climatic Patterns in Ponderosa Pine and Mixed-Conifer Forests of the Jemez Mountains, Northern New Mexico. In: Allen, C.D. and L. Eskew (technical coordinators). USFS General Technical Report. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Touchan, R.C., Swetnam, T.W., and Grissino-Mayer, H.D. 1993. Effects of Livestock Grazing on Pre-Settlement Fire Regimes in New Mexico. In: *Proceedings of the Symposium on Fire in Wilderness and Park Management: Past Lessons and Future Opportunities*. Missoula, Montana.
- Trombulak, S.C. and C.A. Frissell. 2000. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. *Conservation Biology* 14(1): 18-30.
- Tuhy, J.S., P. Comer, D. Dorfman, M. Lammert, J. Humke, B. Cholvin, G. Bell, B. Neely, S. Silbert, L. Whitham, and B. Baker. 2002. A Conservation Assessment of the Colorado Plateau Ecoregion. The Nature Conservancy. Moab Project Office. Moab, Utah.

- Turner, G.T. and Paulsen, H.A. 1976. Management of Mountain Grasslands in the Central Rockies: The Status of Our Knowledge. USFS Research Paper RM-161. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- Turner, M. G., W. H. Romme, R. H. Gardner, and W. W. Hargrove. 1997. Effects of Fire Size and Pattern on Early Succession in Yellowstone National Park. *Ecological Monographs* 67:411-433.
- Tyus, H.M. and C.A Karp. 1990. Spawning and Movements of Razorback Sucker, *Xyrauchen texanus*, in the Green River Basin of Colorado and Utah. *Southwestern Naturalist* 35:427-433.
- U.S. Census 2000. Web site created January 25, 2002, U.S. Census Bureau, Systems Support Division. <http://www.census.gov/main/www/cen2000.html>
- U.S. Corps of Engineers. 1987. Wetlands Delineation Manual 1987. ADA-176-734. Technical Report Y-87-1. U.S. Corps of Engineers. Washington, D.C.
- U.S. Department of Agriculture and U.S. Department of Interior (USDA and USDI). 2006. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071. Bureau of Land Management, Denver, Colorado. 34 pp.
- U.S. Department of Agriculture, U.S. Forest Service. San Juan Public Lands Center. Durango, Colorado. SJPLC. 2007. Northern San Juan Basin Coal Bed Methane Project. Final Environmental Impact Statement. U.S. Department of Interior, Bureau of Land Management.
- U.S. Department of Energy (USDOE). 2007. West-Wide Energy Corridor PEIS. Designation of Energy Corridors on Federal Land in the 11 Western States. DOE/EIS-0386. In Progress. Available on the Internet: <http://corridoreis.anl.gov/>. Accessed on June 4, 2007.
- U.S. Environmental Protection Agency (USEPA). 2005. Control of Mercury from Coal Fired Electric Utility Boilers: An Update. Air Pollution and Control Division, National Risk Management Research Laboratory. U.S. Environmental Protection Agency. Washington, D.C.
- U.S. Fish and Wildlife Service (USFWS). 1994a. Uncompahgre Fritillary Butterfly Recovery Plan. U.S. Department of the Interior. Denver, Colorado.
- USDA Forest Service. 1996. Rangeland Analysis & Management Training Guide. Rocky Mountain Region, Denver, Colorado.
- USDA Forest Service, FS 710, The Built Environment Image Guide, Dec. 2001.
- USFS 2006: Winters, D.S., D.M. Staley, J. Fryxell, and J. Krezelok. 2006. Aquatic, Riparian, and Wetland Ecosystem Assessment for the San Juan National Forest. Introduction and Ecological Driver Analysis; Anthropogenic Influences Report; and Cumulative Influences: Synthesis and Discussion. Denver, CO; US Department of Agriculture, Forest Service, Rocky Mountain Region.
- USFWS. 1994b. Endangered and Threatened Wildlife and Plants: Determination of Critical Habitat for Four Colorado River Endangered Fishes: Razorback Sucker, Colorado Squawfish, Humpback Chub, and Bonytail Chub. Final Rule. Federal Register. March 21, 1994.
- USFWS. 1995. San Juan Basin Recovery Implementation Program. U.S. Fish and Wildlife Service. Albuquerque, New Mexico.
- USFWS. 2002a. Endangered and Threatened Wildlife and Plants: Review of Plant and Animal Taxa that are Candidate Proposed for Listing as Endangered or Threatened. Annual notice of findings on recycled petitions. Annual description of progress on listing actions. Federal Register 67(114): 40657-40679.
- USFWS. 2002b. San Juan River Basin Recovery Implementation Program. Program Highlights. Available on the Internet: <http://www.fws.gov/southwest/sjrip/PH.cfm>. Accessed on July 3, 2003.
- USFWS. 2002c. Birds of Conservation Concern 2002. Division of Migratory Bird Management. Arlington, Virginia.
- USFWS. 2003a. Birding in the United States: A Demographic and Economic Analysis. Addendum to the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Report 2000-1.
- USFWS. 2003a. San Juan River Basin Recovery Implementation Program. Program Highlights 2002-2003 [Web Page]. Available on the Internet: <http://www.fws.gov/southwest/sjrip/pdf/20022003highlights.pdf>. Accessed on July 3, 2003.

- USFWS. 2004. Proposed Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*): Proposed Rule. Federal Register Volume 69, No. 196, 60706.
- USFWS. 2006. Final Listing Determination for the Unison Sage-Grouse as Threatened or Endangered. Federal Register Vol. 71, No. 74, 19954-19982.
- USFWS. 2006. U.S. Fish and Wildlife Service Unit Species List of Federally Threatened, Endangered, and Candidate Species for the San Juan National Forest and the BLM San Juan Field Office. U.S. Department of Agriculture, U.S. Forest Service. U.S. Department of the Interior, Bureau of Land Management. San Juan Public Lands Center. Durango, Colorado.
- United State Forest Service (USFS). 1987. Terrestrial Ecosystem Survey of the Carson National Forest. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- USFS. 1988. Range Plant Handbook. Dover Edition. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- USFS. 1991. Weminuche Wilderness Monitoring Plan for Air Quality Related Values, San Juan National Forest. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Region. Lakewood, Colorado.
- USFS. 1992a. Ecology and Management of Oak and Associated Woodlands: Perspectives in the Southwestern U.S. and Northern Mexico. USFS General Technical Report RM-218. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- USFS. 1992b. Land and Resource Management Plan for the San Juan National Forest. U.S. Department of the Interior, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 1993. Research Natural Area Guide for the Rocky Mountain Region. Review Draft. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Region. Lakewood, Colorado.
- USFS. 1996a. Soil Resource and Ecological Inventory of the Rio Grande National Forest-West Part, Colorado. U.S. Department of Agriculture, U.S. Forest Service. Durango, Colorado.
- USFS. 1996b. Forest Service Classification for Paleontological Resources: Probable Fossil Yield Classification - (PFYQ) Developed by the Paleontology Center of Excellence and the R-2 Paleo Initiative. Available on the Internet: <http://fsweb.wo.fs.fed.us/mgm/fspaleoclassification.htm>. Accessed on January 1, 2007.
- USFS. 2000. U.S. Forest Service Manual (FSM) 7700. Travel Management. U.S. Department of Agriculture, U.S. Forest Service. Washington, D.C.
- USFS. 2001. Special Areas: Roadless Area Conservation. Final Rule. Federal Register Volume 66, No. 9, 3244-3273.
- USFS. 2002a. Mountain Grassland Habitat Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2002b. Piñon-Juniper Habitat Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2002c. Riparian and Wetland Habitat Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2003a. Aspen Habitat Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2003b. Mixed-Conifer Habitat Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2004a. Mountain Shrubland Habitat Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2004b. Ponderosa Pine Habitat Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2004c. Developing a Lynx Habitat Conservation Model: Assumptions, Criteria, and Components. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2005a. R2 Regional Forester's Sensitive Species List. Rocky Mountain Region. FSM Supplement No. 2600-2005-1. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Region. Lakewood, Colorado.
- USFS. 2005b. Special Areas: State Petitions for Inventoried Roadless Area Management. Roadless Area Conservation National Advisory Committee. Final Rule and Notice. Federal Register Volume 70, No. 92, 25653-25662.

- USFS. 2005c. I-Web Database. INFRA Roads Module, Conditions Surveys. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2006a. American Elk Species Assessment: San Juan National Forest. Unpublished internal document. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2006b. San Juan National Forest Forest-Scale Roads Analysis. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2006c. I-Web Database. INFRA Roads Module. Deferred Maintenance. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2007a. Integrated Resource Inventory – Common Land Unit (IRI-CLU). Database. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- USFS. 2007b. Integrated Resource Inventory – Common Vegetation Unit (IRI-CVU). Database. U.S. Department of Agriculture, U.S. Forest Service. San Juan National Forest. Durango, Colorado.
- Urness, P.J. Undated. Wildlife Habitat Manipulation in Sagebrush Ecosystems. Department of Range Science. Utah State University. Logan, Utah.
- Vanicek, C.D. 1967. Ecological Studies of Native Green River Fishes Below Flaming Gorge Dam, 1964-1966. Thesis. Utah State University. Logan, Utah.
- Vanicek, C.D. and R.H. Kramer. 1969. Life History of the Colorado Squawfish, *Ptychocheilus lucius*, and Colorado Chub, *Gila robusta*, in the Green River in Dinosaur National Monument, 1964-1966. Translations of the American Fisheries Society 98:193-208.
- Vanicek, C.D., R.H. Kramer, and D.R. Franklin. 1970. Distribution of Green River Fishes in Utah and Colorado following Closure of Flaming Gorge Dam. Southwestern Naturalist 14:297-315.
- Van Loenen R.E. and Gibbons, A.B., editors, 1994, Mineral Resource Potential and Geology of the San Juan National Forest, Colorado: U.S.D.A. Forest Service Administrative Report June 1994, 159 pp.
- Veblen, T. T. 2000. Disturbance Patterns in Southern Rocky Mountain Forests. In: Knight, R. L., F. W. Smith, S. W. Buskirk, W. H. Romme, and W. L. Baker (editors). Forest Fragmentation in the Southern Rocky Mountains. University Press of Colorado. Boulder, Colorado.
- Veblen, T. T., K. S. Hadley, and M. S. Reid. 1991. Disturbance and Stand Development of a Colorado Subalpine Forest. Journal of Biogeography 18:707-716.
- Veblen, T. T., K. S. Hadley, E. M. Nel, T. Kitzberger, M. Reid, and R. Villalba. 1994. Disturbance Regime and Disturbance Interactions in a Rocky Mountain Subalpine Forest. Journal of Ecology 82:125-135.
- Veblen, T. T., K. S. Hadley, M. S. Reid, and A. J. Rebertus. 1989. Blowdown and Stand Development in a Colorado Subalpine Forest. Canadian Journal of Forest Research 19:1218-1225.
- Vegetation Database. San Juan Public Lands Region 2 vegetation database.
- Wadleigh, L. and M. J. Jenkins. 1996. Fire Frequency and the Vegetative Mosaic of a Spruce-Fir Forest in Northern Utah. Great Basin Naturalist 56:28-37.
- Weaver, H. 1951. Observed Effects of Prescribed Burning on Perennial Grasses in the Ponderosa Pine Forests. Journal of Forestry 49:267-271.
- Webber, B. and Madgwick, H.A.I. 1983. Biomass and Nutrient Content of a 29-year-old *Pinus Radiata* Stand. New Zealand Journal of Forestry Science 13, 222-228.
- Weber, W.A. and R.C. Wittmann. 2001. Colorado Flora Western Slope. 3rd Edition. University Press of Colorado. Boulder, Colorado.
- Weiss, S.J. 1993. Spawning, Movement, and Population Structure of Flannelmouth Sucker in the Paria River. Thesis. University of Arizona. Tucson, Arizona.
- Weitzel, D.L. 2002. Conservation and Status Assessments for the Bluehead Sucker (*Catostomus discobolus*), Flannelmouth Sucker (*Catostomus latipinnis*), Roundtail Chub (*Gila robusta*), and Leatherside Chub (*Gila copei*): Rare Fishes West of the Continental Divide, Wyoming. Wyoming Fish and Game Department. Cheyenne, Wyoming.

- Welch, T.G. and J.O. Klemmenson. 1975. Influence of the Biotic Factor and Parent Material on Distribution of Nitrogen and Carbon in Ponderosa Pine Ecosystems. In: Bernier, B. and C.H. Wingget (editors). Forest Soils and Land Management. Proceedings of the Fourth North American Forestry Soils Conference. Laval Quebec, Canada.
- West, N.E. 1990. Structure and Function of Microphytic Soil Crusts in Wildland Ecosystems of Arid to Semi-Arid Regions. *Advances in Ecological Research* 20:179-223.
- West, N.E. and J.A. Young. 2000. Intermountain Valleys and Lower Mountain Slopes. In: Barbour, M.G. and W.D. Billings (editors). *North American Terrestrial Vegetation*. 2nd Edition. Cambridge University Press. Cambridge, England.
- Wheeler, C.A. 1997. Current Distributions and Distributional Changes of Fish in Wyoming West of the Continental Divide. Thesis. University of Wyoming. Laramie, Wyoming.
- White, A. S. 1984. Presettlement Regeneration Patterns in a Southwestern Ponderosa Pine Stand. *Ecology* 66:589-594.
- Whiteman, S.L. 2000. 1999 Fish Studies on Animas and La Plata Rivers. Southern Ute Indian Tribe. Ignacio, Colorado.
- Whitman, S.L. 2000. 1999 Fish Studies on Animas and La Plata Rivers. Southern Ute Indian Tribe. Ignacio, Colorado.
- Wiggins, D. 2004. American Three-Toed Woodpecker (*Picoides dorsalis*): A Technical Conservation Assessment. U.S. Department of Agriculture, U.S. Forest Service. Rocky Mountain Region. Lakewood, Colorado.
- Winthers, E., D. Fallon, J. Haglund, T. DeMeo, G. Nowacki, D. Tart, M. Ferwerda, G. Robertson, A. Gallegos, A. Rorick, D. Cleland, and W. Robbie. 2005. Terrestrial Ecological Unit Inventory Technical Guide. U.S. Department of Agriculture, U.S. Forest Service. Washington D.C.
- Winward, A.H. 1991. A Renewed Commitment to Management of Sagebrush Grasslands. Special Report 880. Agricultural Experiment Station, Oregon State University. Corvallis, Oregon.
- Winward, A.H. 2004. Sagebrush of Colorado: Taxonomy, Distribution, Ecology, and Management. Colorado Division of Wildlife. Denver, Colorado.
- Wohl, E.E. 2001. Virtual Rivers: Lessons from the Mountain Rivers of the Colorado Front Range. Yale University Press. New Haven, Connecticut and London, England.
- Western Regional Air Partnership (WRAP). 2002. 2002 WRAP Point and Area Source Inventory, Area Sources By County. Available on the Internet: www.wrapair.org.
- Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and Southern Canada. John Wiley and Sons. New York, New York.
- Wu, R. 1999. Fire History and Forest Structure in the Mixed Conifer Forests of Southwest Colorado. Thesis. Department of Forest Sciences. Colorado State University. Fort Collins, Colorado.
- Wuerthner, G. 1992. Some Ecological Costs of Livestock.
- Young, M.K. 1989. Effect of Substrate Composition on the Survival to Emergence of Colorado River Cutthroat Trout and Brown Trout. Dissertation. University of Wyoming. Laramie, Wyoming.
- Young, M.K. (technical editor). 1995. Conservation Assessments for Inland Cutthroat Trout. USFS General Technical Report RM-256. U.S. Department of Agriculture, U.S. Forest Service. Fort Collins, Colorado.
- Young, M.K., W.A. Hubert, and T.A. Wesche. 1991. Selection of Measures of Substrate Composition to Estimate Survival to Emergence of Salmonids and to Detect Changes in Stream Substrates. *North American Journal of Fisheries Management* 11:339-346.
- Zwinger A.H. and E.W. Beatrice. 1972. Land Above the Trees: A Guide to American Alpine Tundra. Harper and Row. New York, New York.

5.2 GLOSSARY

This glossary defines terms used by the U.S. Forest Service and by the Bureau of Land Management to explain natural resource concepts and management activities specific to this Draft Land Management Plan/Draft Environmental Impact Statement.

abandoned mine: An abandoned hardrock mine on or affecting public lands administered by BLM, at which exploration, development, mining, reclamation, maintenance, and inspection of facilities and equipment, and other operations ceased as of January 1, 1981 (the effective date of BLM's Surface Management regulations codified at 43 CFR 3809) with no evidence demonstrating that the miner intends to resume mining.

Abandoned Mine Lands (AML) Program: A BLM program that focuses on reclaiming hardrock abandoned mine lands on or affecting public lands administered by the BLM.

actual use: The amount of animal unit months consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks.

adaptive management: The process of implementing management decisions incrementally, so that changes can be made if the desired results are not being achieved. Adaptive management acknowledges that our understanding of complex ecological systems is limited and we may make mistakes, but the seriousness of these mistakes can be reduced by placing forest management into a consciously experimental framework, by carefully observing the ecosystem's response to our well-intentioned efforts, and by modifying our actions appropriately as we learn more about the ecosystem.

affected environment: A physical, biological, social, and economic environment within which human activity is proposed. The natural, physical and human-related environment that is sensitive to changes from the alternatives.

air pollutant: Any substance in air that could, if in high enough concentration, harm humans, animals, vegetation, or material. Air pollutants may include almost any natural or artificial matter capable of being airborne, in the form of solid particles, liquid droplets, gases, or a combination of these.

air pollution: The contamination of the atmosphere by any toxic or radioactive gases and particulate matter as a result of human activity.

air quality: Refers to standards for various classes of land as designated by the Clean Air Act (PL 88-206: Jan. 1978.).

allotment: A designated area of land available for livestock grazing upon which a specified number and kind of livestock may graze for a certain period. Allotments generally consist of federally managed, State owned, and/or private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotments are administered to standard when the responsible manager determines and documents that the permittee is in compliance and that applicable resource management standards are being met. Where the permittee is not in compliance, all necessary corrective actions are initiated and documented.

Allotment Management Plan (AMP): A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in a grazing allotment. An AMP is prepared in consultation with the permittee(s), lessee(s), and other affected interests. Livestock grazing is considered in relation to other uses of the range and to renewable resources, such as watershed, vegetation, and wildlife. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system. A long-term operation plan that is the implementing document for the decision made through the NEPA process and promotes progress toward Desired Conditions.

alternatives: A choice of two or more things. For NEPA purposes, alternatives to the Proposed Action must be examined in the planning process. The discussion of alternatives must define the issues and provide a clear basis for choice by the decision maker and the public (40 CFR 1502.14).

amenity: Resource use, object, feature, quality, or experience that is pleasing to the mind or senses; typically refers to values for which monetary values are not or cannot be established, such as scenic or wilderness values.

amenity migration: The movement of people for pleasure rather than economic reasons.

analysis area: The geographic area defining the scope of analysis for the project. Sometimes for a particular resource, the analysis area may have to be larger when effects have potential to extend beyond the boundaries of the proposal. May also be referred to as the “planning area.”

Analysis of the Management Situation (AMS): Assessment of the current management direction. It includes a consolidation of existing data needed in order to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

Animal Unit Month (AUM): The amount of forage necessary for the sustenance of one cow, an “animal unit” or its equivalent for a period of 1 month. (43 CFR 4100). The animal unit in turn is defined as one mature 1,000-pound cow and her suckling calf.

annual mortality: The average annual volume of sound wood (free from decay) in growing-stock trees that died from natural causes during the period between inventories.

Annual Operating Instructions (AOI): Annual instructions, developed with each livestock permittee, describing livestock management, livestock pasture rotations, season of use, utilization and/or residual levels, etc. These instructions implement project level NEPA decisions (AMP) or in the absence of project NEPA, the Forest plan.

aquatic ecosystems: Water dependent environments that serve as habitat for interrelated and interacting communities and populations of plants and animals. Includes the stream channel, lake or estuary bed, water, biotic communities, and the habitat features that occur therein.

Areas of Critical Environmental Concern (ACEC): Areas within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) in order to protect and prevent irreparable damage to important historic, cultural, and/or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards (from BLM H-6310-1, Wilderness Inventory and Study Procedures).

atmospheric deposition: Air pollution produced when acid chemicals are incorporated into rain, snow, fog or mist and fall to the earth. Sometimes referred to as “acid rain,” it comes from sulfur oxides and nitrogen oxides, products of burning coal and other fuels and from certain industrial processes. If the acid chemicals in the air are blown into areas where the weather is wet, the acids can fall to Earth in the rain, snow, fog or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dusts or smokes.

avoidance area: Areas with sensitive resource values where rights-of-way and Section 302 permits, leases, and easements would be strongly discouraged. Authorizations made in avoidance areas would have to be compatible with the purpose for which the area was designated and not otherwise be feasible on lands outside the avoidance area.

backcountry byways: Vehicle routes that traverse scenic corridors utilizing secondary or backcountry road systems. National backcountry byways are designated by the type of road and vehicle needed to travel the byway.

base property: Land and improvements owned and used by the permittee for a farm or ranch operation and specifically designated by him to qualify for a term grazing permit.

Beneficial outcomes (Also referenced as “Recreation Benefits”): These include improved conditions, maintenance of desired conditions, prevention of worse conditions, and the realization of desired experiences.

beneficial uses: Attributes that are considered useful products of the resource.

best available science: Peer-reviewed and other quality-controlled literature, studies, or reports related to planning or project issues.

best management practices (BMPs): Methods, measures or practices to prevent or reduce water pollution including, but not limited to, structural and non-structural controls, operation and maintenance procedures, other requirements, scheduling and distribution of activities. Usually, BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, economic, and technical feasibility.

big game: Those species of large mammals normally managed as a sport hunting resource. Generally includes; elk, moose, white-tailed deer, mule deer, mountain goat, bighorn sheep, black bear & mountain lion.

Biological Assessment (BA): An evaluation conducted for Federal projects requiring an environmental statement in accordance with legal requirements under Section 7 of the Endangered Species Act [16 USC 1536(c)]. The purpose of the assessment is to determine whether the Proposed Action is likely to affect any endangered or threatened species.

biological diversity: The full variety of life in an area including the ecosystems, plant and animal communities, species and genes, and the processes through which individual organisms interact with one another and with their environment (USDA Forest Service 1991). More simply it is defined as the variety of life and its processes (Keystone Report 1991).

Biological Evaluation (BE): A documented Forest Service review of Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species (FSM 2670.5). Objectives of the Biological Evaluation are to ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or animal species (including threatened, endangered, proposed, or sensitive plant and animal species) or contribute to trends toward Federal listing of any species, and to comply with the requirements of the Endangered Species Act that actions of Federal agencies not jeopardize or adversely modify critical habitat of federally listed species (FSM - R2 Supplement 2672.41).

biological soil crusts: A complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria (Belnap et al. 2001) that function as living mulch by retaining soil moisture and discouraging annual weed growth. They reduce wind and water erosion, fix atmospheric nitrogen, and contribute to soil organic matter (Eldridge and Greene 1994). Also known as cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts.

BLM special-status species: Species designated as federally endangered, threatened, proposed, or candidate under the ESA, those designated by the Colorado Division of Wildlife as state endangered or threatened, and BLM Sensitive Species which are species under status review by the USFWS, species with numbers declining so rapidly that Federal listing may become necessary, species with typically small and widely dispersed populations, or species inhabiting ecological refugia or other specialized or unique habitats.

candidate species: Species for which the USFWS has sufficient information on their status and threats to support proposing the species for listing as endangered or threatened under the Endangered Species Act, but for which issuance of a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register (from M6840, Special Status Species Manual) (from M6840, Special Status Species Manual).

canopy: The branches and leaves that form the crowns of trees, shrubs, or herbs. Canopy usually refers to the uppermost layer of vegetation, but can be used to describe lower layers in a multi-storied forest.

canopy cover: The percentage of the ground surface covered by the vertical downward projection of the outermost perimeter of the plant foliage in a given area.

capability: The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as protection from insects, and disease.

carrying capacity: The average number of livestock and/or wildlife that may be sustained on a management unit compatible with management objectives for the unit. In addition to the site characteristics, it is a function of management goals and management intensity. The maximum population or level of activity that can be supported without degradation of the habitat or the population.

casual use: Activities that involve practices that do not ordinarily cause any appreciable disturbance or damage to the public lands, resources or improvements and, therefore, do not require a right-of-way grant or temporary use permit (43 CFR 2800). Also means any short-term non-commercial activity which does not cause appreciable damage or disturbance to the public lands, their resources or improvements, and which is not prohibited by closure of the lands to such activities (43 CFR 2920). Casual use generally includes the collecting of geochemical, rock, soil, or mineral specimens using hand tools, hand panning, and non-motorized sluicing. It also generally includes use of metal detectors, gold spears, and other battery-operated devices for sensing the presence of minerals, and hand battery-operated dry washers. Casual use does not include use of mechanized earth-moving equipment, truck-mounted drilling equipment, suction dredges, motorized vehicles in areas designated as closed to off-road vehicles, chemicals, or explosives. It also does not include occupancy or operations where the cumulative effects of the activities result in more than negligible disturbance.

cave: Any naturally occurring void, cavity, recess, or system of interconnected passages beneath the surface of the earth or within a cliff or ledge and large enough to permit a person to enter, whether the entrance is excavated or naturally-formed. Such term shall include any natural pit, sinkhole, or other opening that is an extension of a cave entrance or that is an integral part of the cave (36 CFR 290).

cavity: The hollow excavated in a tree that is used by birds or mammals for roosting and/or reproduction.

Class I Area: The Clean Air Act defines Class I areas as National Parks over 6,000 acres, and national wilderness areas over 5,000 acres that were in existence before August of 1977. (The Weminuche Wilderness and Mesa Verde National Park are Class I Areas.)

Class II Area: In general, all areas not designated as a Class I Area are considered a Class I Area for air quality protection.

Clean Air Act (CAA) of 1963 and Amendments: Federal legislation governing air pollution control.

Clean Water Act, as amended in 1977: Legislation enacted by the U.S. Congress in 1977 to maintain and restore the chemical, physical, and biological integrity of the waters of the United States. This act was formerly known as the Federal Water Pollution Control Act (33 USC 1344).

climate: The composite or generally prevailing weather conditions of a region throughout the year, averaged over a series of years.

closed: Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 sets forth the specific meaning of “closed” as it relates to off highway vehicle use, and 43 CFR 8364 defines “closed” as it relates to closure and restriction orders (from H-1601-1, BLM Land Use Planning Handbook).

closed road: A road or segment which is restricted from certain types of use during certain seasons of the year. The prohibited use and the time period of closure must be specified.

Code of Federal Regulations (CFR): The official, legal tabulation or regulations directing Federal government activities.

commercial forest products: Sawlogs, small roundwood, biomass, and other forest products removed in the process of harvesting or cutting trees from USFS lands.

community: A group of one or more populations of plants and animals in a common spatial arrangement; an ecological term used in a broad sense to include groups of various sizes and degrees of integration.

Community recreation-tourism market: A community, or communities, dependent upon public lands recreation and/or related tourism use, growth, and/or development. Major investments in facilities and visitor assistance are authorized within SRMAs where the strategy is to target demonstrated community recreation-tourism market demand. Here, recreation management actions are geared toward meeting primary recreation-tourism market demand for specific activity, experience, and benefit opportunities. These opportunities are produced through maintenance of prescribed natural resource and/or community setting character and by structuring and implementing management, marketing, monitoring, and administrative actions accordingly.

Condition Class (Fire Regimes): Fire Regime Condition Classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects or disease, or other management activities.

conditions of approval: Conditions or provisions (requirements) under which an Application for a Permit to Drill (APD) or a Sundry Notice is approved.

conifer: Any of a group of needle- and cone-bearing evergreen trees.

connectivity: A condition in which the special arrangement of vegetation types allows organisms to move freely across the landscape.

conservation strategy: A management plan to conserve or sustain particular ecosystem elements such as rare species or habitats.

consumptive water use: Use that permanently removes water from a watershed or a confined aquifer from which it is withdrawn by activities that result in substantial evaporation and evapo-transpiration.

Council on Environmental Quality (CEQ): An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews Federal programs to analyze and interpret environmental trends and information.

cover: Vegetation used by wildlife for protection from predators, breeding and rearing of young (hiding cover), or to ameliorate conditions of weather (thermal cover).

criteria: Data and information that are used to examine or establish the relative degrees of desirability among alternatives or the degree to which a course of action meets an intended objective.

critical habitat: An area occupied by a threatened or endangered species “on which are found those physical and biological features: 1) essential to the conservation of the species, and 2) which may require special management considerations or protection.”

crucial winter range: That part of the overall range where 90 percent of the individuals are located during the average five winters out of ten from the first heavy snowfall to spring green-up, or during a site-specific period of winter as defined for each Colorado Division of Wildlife Data analysis unit.

cryptogamic soil or crust: A thin crust made up of mosses, lichens, algae, and bacteria, known collectively as cryptogams. Cryptogams function as soil builders, forming a spongy layer that helps protect soil from erosion, absorbs moisture, and provides nitrogen and other nutrients for plant growth. Also referred to as cryptobiotic or microbiotic soils or crusts.

cultural resource: Any prehistoric site, as well as historic site, which is more than 50 years old. The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) having scientific, prehistoric, or social values.

cumulative impacts: Combined impacts of the past, present and reasonably foreseeable future actions. For example, the impacts of a proposed timber sale and the development of a mine together result in cumulative impacts.

deciding officer: The Forest Service or Bureau of Land Management employee who has the authority to select and/or carry out a specific planning action.

deferred rotation: Rotation grazing with regard to deferring pastures beyond the growing season, if they were used early the prior year, or that have been identified as needing deferment for resource reasons.

demographic: Related to the vital statistics of human populations (size, density, growth, distribution, etc.) and the effect of these on social and economic conditions.

denning habitat: The environment lynx use when giving birth and rearing kittens until they are mobile. The most common component is large amounts of coarse woody debris to provide escape and thermal cover for kittens. Denning habitat must be within daily travel distance of winter snowshoe hare habitat – the typical maximum daily distance for females is about three to six miles. Denning habitat includes mature and old growth forests with plenty of coarse woody debris. It can also include young regenerating forests with piles of coarse woody debris, or areas where down trees are jack-strawed.

designated roads and trails: Specific roads and trails identified by the land management agency where motorized vehicle use is authorized. Road and trail designations include the types of vehicles authorized to operate on a specific route, and may also include a time of year (season) when motorized use is allowed.

desired future condition: A portrayal of the land or a resource condition that is expected to result if goals and objectives are fully achieved. (36 CRF part 219).

Destination Recreation – Tourism Market: National or regional recreation-tourism visitors and other constituents who value public lands as recreation-tourism destinations. Major investments in facilities and visitor assistance are authorized within SRMAs where the strategy is to target demonstrated destination recreation-tourism market demand. Here, recreation management actions are geared toward meeting primary recreation-tourism market demand for specific activity, experience, and benefit opportunities. These opportunities are produced through maintenance of prescribed natural resource and/or community setting character and by structuring and implementing management, marketing, monitoring, and administrative actions accordingly.

developed recreation: Outdoor recreation requiring significant capital investment in facilities to handle a concentration of visitors on a relatively small area. Examples are ski areas, resorts, and campgrounds.

direct impacts (direct effects): Impacts that are caused by the action and occur at the same time and place.

dispersed recreation: Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are more for access and protection of the environment than for the comfort or convenience of the people.

disposal: Transfer of public land out of Federal ownership to another party through sale, exchange, Recreation and Public Purposes Act, Desert Land Entry or other land law statutes.

disturbance: A discrete event, either natural or human-induced, that causes a change in the existing condition of an ecosystem.

diversity: An expression of community structure. The relative distribution and abundance of different plant and animal communities and species within an area. The relative distribution and abundance of different plant and animal communities and species within an area. It is “high” if there are many equally abundant species. It is “low” if there are only a few equally abundant species.

dynamic equilibrium: Stream systems normally function within natural ranges of flow, sediment movement, temperature, and other variables, in what is termed “dynamic equilibrium.”

easement: A right afforded a person or agency to make limited use of another’s real property for access or other purposes.

ecological integrity: The capability of an ecosystem to maintain its composition, structure, and function over time, thus maintaining the productivity of the land and a diversity of plants and animals.

ecosystem: Areas with living organisms interacting with each other and with their physical environment. They are dynamic entities shaped by natural processes and disturbances including succession, fire, floods, and wind. Ecosystems occur at various scales, with smaller ones found within larger ones.

ecosystem diversity: The variety of ecosystem types including their composition, structure, and processes.

ecotone: An ecological community of mixed vegetation formed by the overlapping of adjoining communities.

edge: The place where plant communities meet or where successional stages or vegetative conditions within plant communities come together (Thomas 1979).

effects: “Effect” and “impact” are synonymous as used in this document. Environmental consequences (the scientific and analytical basis for comparison of alternatives). Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

elk security areas: Habitat that allows elk to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other human activities (Lyon and Christensen 1992).

eligibility: Qualification of a river for inclusion into the National Wild and Scenic Rivers System through the determination (professional judgment) that it is free-flowing and, with its adjacent land area, possesses at least one river-related value considered to be outstandingly remarkable (from M-8351, BLM WSR Policy and Program).

emission: A release into the outdoor atmosphere of air contaminants.

endangered species: Any species of animal or plant in danger of extinction throughout all or a significant portion of its range and so designated by the Secretary of Interior in accordance with the 1973 Endangered Species Act.

Endangered Species Act (ESA): A law that sets a policy for conserving animal and plant species that are in danger of extinction.

environment: The physical conditions that exist within the area that will be affected by a proposed project, including land, water, minerals, flora, fauna, and objects of historical or aesthetic significance. The area involved is the area in which significant effects would occur either directly or indirectly as a result of the project. The “environment” includes both natural and human-made conditions.

environmental analysis: An analysis of alternative actions and their predictable environmental effects, including physical, biological, economic, and social consequences and their interactions; short- and long-term effects; direct, indirect, and cumulative effects.

Environmental Impact Statement (EIS): A detailed written statement as required by section 12(2)(C) of the National Environmental Policy Act (40 CFR 1508.11). An analytical document prepared under the National Environmental Policy Act (NEPA) that portrays potential impacts to the human environment of a Proposed Action and its possible alternatives. An EIS is developed for use by decision makers to weigh the environmental consequences of a potential decision.

ephemeral streams: Streams that flow only as a direct response to rainfall or snowmelt events. They have no baseflow.

erosion: Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is much more rapid than normal, natural, or geologic erosion, primarily as a result of the influence of activities of people, animals, or natural catastrophes.

even-aged management: Actions resulting in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age.

even-aged regeneration harvest: A timber cutting procedure that creates a new age class of trees by using methods including clearcutting, seed tree, shelterwood, and coppice.

exclusion area: Areas with sensitive resource values where rights-of-way and 302 permits, leases, and easements would not be authorized.

explicit recreation management objective: Specifically targeted recreation activity, experience, and/or benefit opportunities (i.e., recreation opportunity outputs) and their attainment (i.e., recreation outcomes).

Extensive Recreation Management Area (ERMA): a public lands unit identified in land use plans containing all acreage not identified as a SRMA. Recreation management actions within an ERMA are limited to only those of a custodial nature.

feasible: Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

Federal Land Policy and Management Act of 1976 (FLPMA): Public Law 94-579, October 21, 1976, often referred to as the BLM's "Organic Act," which provides the majority of the BLM's legislated authority, direction policy and basic management guidance (from BLM National Management Strategy for OHV Use on Public Lands).

Federal Register: A daily publication which reports Presidential and Federal Agency documents.

federally listed species: Species that are listed by the Department of the Interior, U.S. Fish and Wildlife Service, or the National Oceanic and Atmospheric Administration, National Marine Fisheries Service as threatened or endangered.

fens: Groundwater-fed wetlands that support high biodiversity and unique plant communities. Soil in a fen is saturated with water. Saturation creates low-oxygen conditions that slow down decomposition and promotes the accumulation of organic peat over time.

final regeneration harvest: Timber harvest designed to regenerate a forest stand or release a regenerated stand. This includes clearcut, removal cut of a shelterwood or seed tree system, and selection cut.

Fire Regime Condition Class 1: Lands whose fire regimes are within the historical range of variation (HRV) and whose vegetation attributes (species composition, structure, and function) are intact.

fire suppression: All work activities connected with fire extinguishing operations, beginning with discovery of a fire and continuing until the fire is completely out.

fish habitat: The place where a population of fish species lives and its surroundings; includes the provision of life requirements such as food and cover.

fishery: The total population of fish in a stream or body of water and the physical, chemical, and biological factors affecting that population.

floodplain: The lowland and relatively flat areas adjoining inland and coastal waters, including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

flora: The plant life characteristic of a region, period, or special environment.

fluid minerals: Oil, gas, coal bed natural gas, and geothermal resources.

forage: Plant material that is available for animal consumption.

forage reserve: A determination for an allotment, or a portion of an allotment, on which there is no current term permit obligation for some or all of the estimated livestock grazing capacity and where it has been determined to use the available forage for management flexibility when there is a loss of forage availability on other allotments because of factors such as drought, hail, or fire.

forb: An herbaceous plant without a woody stem other than those in the grass (*Poaceae*), sedge (*Cyperaceae*), or rush (*Juncaceae*) families.

forest land: Land that has at least 25 percent canopy cover of trees.

forest cover type: A descriptive classification of forest land based on the present vegetative species composition and/or locality (i.e., lodgepole pine, mixed conifer). Most stands are given a classification (stratum label), based on aerial photo interpretation, that includes the forest cover type, size class, density class, and stand development phase.

Forest Plan: A Forest Service document required by regulations for each national forest that provides general standards and guidelines for activities and that identifies area of management emphasis.

forest regulation: The control of stocking, harvests, growth, and yields on lands designated as suited for timber production to meet management objectives including sustained yield of timber products.

forest road or trail: A road or trail wholly or partly within or adjacent to and serving the National Forest System and which is necessary for the protection, administration and utilization of the National Forest System and the use and development of its resources.

forest transportation atlas: A display of the system of roads, trails, and airfields of an administrative unit.

forest transportation system: The system of roads, trails, and airfields on National Forest System lands.

form: The mass or shape of an object, which appears unified, often defined by edge, outline, and/or surrounding space.

fragmentation: Process by which habitats are increasingly subdivided into smaller units, resulting in their increased insularity as well as losses of total habitat area.

functional at-risk: 1) Condition in which vegetation and soil are susceptible to losing their ability to sustain naturally functioning biotic communities. Human activities, past or present, may increase the risks; 2) Uplands or riparian-wetland areas that are properly functioning, but a soil, water, or vegetation attribute makes them susceptible to degradation and lessens their ability to sustain natural biotic communities. Uplands are particularly at risk if their soils are susceptible to degradation. Human activities, past or present, may increase the risks.

grade: A slope states as so many feet per mile or as ft/ft (%).

grassland: Areas dominated by grasses and forbs. These areas include foothill and mountain grasslands and grasslands vegetation types.

grazing preference: The total number of AUMs on public land apportioned and attached to base property owned or controlled by a lessee.

ground cover: The percentage of biotic and abiotic material (other than bare soil) covering the ground surface including litter, mosses, lichens, vegetation basal area, and rock fragments. Ground cover plus bare soil equals 100%.

growing stock: A timber inventory classification of live commercial trees meeting specified standards of quality or vigor. Cull trees are excluded. Only includes trees 5.0 inches d.b.h. and larger.

habitat: An environment, which meets a specific set of physical, biological, temporal or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle. The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

habitat connectivity: Habitat arrangements that allow organisms to move freely across the landscape.

habitat structural stages: Any of several developmental stages of tree stands described in terms of tree size and the extent of canopy closure they create (Wills 1987).

habitat type: An aggregation of all land areas potentially capable of producing similar plant communities at climax.

hardwoods: A conventional term for the wood of broadleaf trees. In the decision area these trees are generally confined to areas near water.

herb: A flowering plant whose above ground stem is not woody; graminoids and forbs.

Herd Management Area (HMA): Public land under the jurisdiction of the BLM that has been designated for special management emphasizing the maintenance of an established wild horse or burro herd.

hazardous substances: CERCLA term identifying those substances designated pursuant to section 1321(b)(2)(A) of Title 33, or 42 USC 9602, or listed in 40 CFR 302 or 355.

hazardous substance release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant).

hazardous waste: Refers to a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial threat to human health and the environment.

hiding cover: Vegetation, primarily trees, capable of hiding 90 percent of a standing adult animal from the view of a human at a distance of 200 feet or less.

Historic Range of Variation (HRV): The range of ecological conditions, including vegetation structure and natural disturbance regimes that occurred during the reference period; the period of indigenous settlement from about 1500 to the late 1800s.

hydrophytic plant: A plant that grows in water or in very moist ground, usually found in riparian areas and wetlands.

impacts: “Effect” and “impact” are synonymous as used in this report. See definition for effects.

Impaired water body: Streams and lakes that are not meeting their designated uses due to excess pollutants.

indirect effects: Secondary effects which occur in locations other than the initial action or significantly later in time.

Integrated Pest Management (IPM): A process for evaluating and selecting techniques to reduce pest populations in an ecologically, economically, and socially acceptable manner. May include the use of pesticides, cultural or silvicultural treatments, biological control agents, host resistance, genetic control, mechanical destruction or trapping, and behavioral chemicals including attractants and repellants.

integrated prescription: A multiple-use management practice used to select and schedule applications on a specific area to attain Desired Conditions and objectives. This prescription identifies and quantifies outputs, effects, benefits, and costs of all resources to the extent practical.

Interdisciplinary (ID) Team: A group of resource professionals with different expertise that collaborate to develop and evaluate resource management decisions.

intermittent stream: A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow. During the dry season and throughout minor drought periods, these streams will not exhibit flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors (pollution, thermal modifications, etc.), biology is scarce and adapted to the wet and dry conditions of the fluctuating water level.

invasive species: A non-native species whose introduction to an area causes economic or environmental harm or harm to human health.

irretrievable impact: Commitment of a resource would be considered “irretrievable” when the project would directly eliminate the resource, its productivity, and/or its utility for the life of the project.

irreversible impact: The commitment of a resource would be “irreversible” if the project started a “process” (chemical, biological, and/or physical) that could not be stopped. As a result, the resource or its productivity, and/or its utility would be consumed, committed, or lost forever.

issue indicators: A “yardstick” for measuring or comparing any changes associated with each issue or concern by alternative.

jurisdictional wetland: A wetland area delineated and identified by specific technical criteria, field indicators, or other information for purposes of public agency jurisdiction. The public agencies that administer jurisdictional wetlands are the Fish and Wildlife Service, the U.S. Army Corps of Engineers, the Environmental Protection Agency, and the Soil Conservation Service.

K factor: A soil erodibility factor used in the universal soil loss equation that is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff. Estimation of the factor takes several soil parameters into account, including: soil texture, percent of sand greater than 0.10 mm, soil organic matter content, soil structure, soil permeability, clay mineralogy, and coarse fragments. K factor values range from .02 to .64, the greater values indicating the highest susceptibilities to erosion.

key habitat: Specific areas within the geographic area occupied by a species in which are found those physical and biological features 1) essential to the conservation of the species, and 2) which may require special management considerations or protection.

key viewpoint: The point(s) commonly in use or potentially in use where the view of a management activity is the most disclosing; the location that provides the means of studying the visual impact of alternatives to the landscape.

land classification: When, under criteria of 43 CFR 2400, a tract of land has potential for either retention for multiple use management or for some form of disposal, or for more than one form of disposal, the relative scarcity of the values involved and the availability of alternative means and sites for realization of those values will be considered. Long-term public benefits will be weighed against more immediate or local benefits. The tract will then be classified in a manner, which will best promote the public interest.

land tenure adjustments: Ownership or jurisdictional changes are referred to as “Land Tenure Adjustments.” To improve the manageability of the public lands and improve their usefulness to the public, the BLM has numerous authorities for “repositioning” lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges, but also through land sales, jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

land use allocation: The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

land use plan: A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land-use-plan level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed.

lands generally suited for timber harvest: Lands where timber production is compatible with the attainment of Desired Conditions and objectives established by the LMP, and other lands where salvage sales or other timber harvest is necessary for multi-purpose objectives other than timber production.

landscape: The aspect of the land that is characteristic of a particular region or area.

Landscape character is the combination of physical, biological and cultural attributes that gives an area its visual and cultural identity. Each attribute contributes to the uniqueness of the landscape and gives a particular place meaning and value and helps to define a “sense of place.” Landscape character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity and scenic sustainability.

Landscape visibility addresses the relative importance and sensitivity of what is seen and perceived in the landscape. It is a function of many important and interconnected considerations such as number and context of viewers, duration of views, degree of discernable detail (which depends in part on the position of the viewer, i.e. the landscape may be superior, level with or inferior) and seasonal variation. Landscape visibility inventory and analysis consists of three elements, including travel ways and use areas, concern levels and distance zones.

late season: Fall or late summer grazing.

lease: Section 302 of the Federal Land Policy and Management Act of 1976 (FLPMA) provides the BLM’s authority to issue leases for the use, occupancy, and development of the public lands. Leases are issued for purposes such as a commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, harvesting of native or introduced species, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and non-irrigation facilities. The regulations establishing procedures for the processing of these leases and permits are found in 43 Code of Federal Regulations (CFR) 2920.

lek: A specific location where male grouse congregate and strut to attract and breed with female grouse. Most male grouse return to the same lek every year.

lifeways: The manner and means by which a group of people lives; their way of life. Components include language(s), subsistence strategies, religion, economic structure, physical mannerisms, and shared attitudes.

Limited (BLM): Designated areas and trails where the use of off-road vehicles is subject to restrictions, such as limiting the number or types of vehicles allowed, dates and times of use (seasonal restrictions), limiting use to existing roads and trails, or limiting use to designated roads and trails. Under the designated roads and trails designation, use would be allowed only on roads and trails that are signed for use. Combinations of restrictions are possible, such as limiting use to certain types of vehicles during certain times of the year.

linkage area: An area that provides connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where basins, valleys or agricultural lands separate blocks of lynx habitat, or where lynx habitat naturally narrows between blocks. (LCAS updated definition approved by the Steering Committee 10/23/01).

litter: The dead vegetation on the ground surface usually consisting of leaves, needles, twigs, and bark.

live cull: Live trees that are 5.0 inches d.b.h. and larger, that are 66% rotten or unable to produce a saw log.

livestock: Species of domestic animals including cattle, sheep, horses, burros, and goats.

locatable minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Long-term Sustained-yield Timber Capacity: The highest wood yield that may be sustained under specified management intensities consistent with multiple-use objectives after stands have reached Desired Conditions.

lower montane: A terrestrial community that generally is found in drier and warmer environments than the montane terrestrial community. The lower montane community supports a unique clustering of wildlife species.

Lynx Analysis Units (LAUs): An area of at least the size used by an individual lynx, from about 25 to 50 mi² (LCAS). An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant.

lynx habitat: Primarily coniferous forests that provide a prey base of snowshoe hare.

maintenance level: Maintenance levels define the level of service provided by, and maintenance required for, a specific road. There are five maintenance levels that are described as follows:

Level 1 - Assigned to intermittent service roads during the time they are closed to vehicular traffic. Closures must be for 1 or more years. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities.

Level 2 - Assigned to roads open for use by high clearance vehicles. Road in this maintenance level are low speed, single lane and native surface.

Level 3 - Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material.

Level 4 - Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated.

Level 5 - Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated.

management area: An area of land used in planning that consists of similar analysis area, has one prescription assigned, and may not be contiguous.

management direction: A statement of multiple use and other goals and objectives, along with the associated management prescriptions and standards and guidelines to direct resource management.

management indicator species (MIS): A species of wildlife, fish, or plant whose health and vigor are believed to accurately reflect the health and vigor of other species having similar habitat and protection needs to those of the selected indicator species.

mean annual increment and culmination of mean annual increment: The total increment of increase of volume of a stand (standing crop plus thinning) up to a given age divided by that age. Culmination of mean annual increment is the age in the growth cycle of an even-aged stand at which the average annual rate of increase of volume is at a maximum. In land management plans, mean annual increment is expressed in cubic measure and is based on the expected growth of stands, according to intensities and utilization guidelines in the plan document or set of documents.

metapopulation: A set of partially isolated populations belonging to the same species. The populations are able to exchange individuals and re-colonize sites in which the species has recently become extinct.

mineral: Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained for man's use, usually from the ground. Under Federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

mineral entry: The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

mineral estate: The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

mineral materials: Materials such as sand and gravel and common varieties of stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws, but that can be acquired under the Materials Act of 1947, as amended.

mineral: Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained for man's use, usually from the ground. Under Federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

mitigation measure: Actions taken to reduce or eliminate effects (impacts) from management actions, including: 1) avoiding the impact altogether by not taking certain action or parts of an action; 2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; 3) rectifying the impacts by repairing, rehabilitating or restoring the affected environment; 4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and 5) compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

modification: A visual quality objective meaning activities by humans may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

monitoring and evaluation: The evaluation, on a sample basis, of management practices to determine how well objectives are being met, as well as the effects of those management practices on the land and environment.

montane: Inhabiting the cool, moist ecological zone located near the timberline and usually dominated by evergreen trees.

motor vehicle: Any vehicle which is self-propelled, other than a vehicle operated on rails and any wheelchair or mobility device, included on that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area.

motor vehicle use map: A map reflecting designated roads, trails, and areas on an administrative unit or a Ranger District of the National Forest System.

motorized wheeled vehicle: Includes all types of motorized wheeled vehicles capable of or designed for, travel on or immediately over land or other natural terrain (motorcycles, four-wheel drive vehicles, all-terrain vehicles, sport utility vehicles, pickup trucks, etc.) and includes those vehicles that have the driving wheels moving inside endless tracks, or capable of conversion to such method of travel.

multiple use: The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

National Environmental Policy Act of 1969 (NEPA): An act which encourages productive and enjoyable harmony between man and his environment; promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of people; enriches the understanding of the ecological systems and natural resources important to the Nation; and establishes a Council on Environmental Quality; 40 CFR 1500-1508 are the regulations for implementing the act.

NEPA process: All measures necessary to comply with the requirements of Section 2 and Title 1 of NEPA. An interdisciplinary process, mandated by the National Environmental Policy Act, which concentrates decision-making around issues, concerns, alternatives and the effects of alternatives on the environment.

National Forest Management Act (NFMA): A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest plans and the preparation of regulations to guide that development.

National Forest System: All national forest lands reserved or withdrawn from the public domain of the United States, all national forest lands acquired through purchase, exchange, donation, or other means, the national grasslands and land utilization projects administered under Title 111.

National Forest System road: A forest road other than a road that has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority.

National Forest System trail: A forest trail other than a trail which has been authorized by a legally documented ROW held by a State, county, or other local public road authority.

National Wild and Scenic Rivers System: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: 1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past; 2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads; and 3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

native fish: Fish species that are indigenous to a region's waters, as opposed to introduced or exotic fish.

native species: Species that normally live and thrive in a particular ecosystem.

naturalness: Refers to an area that "generally appears to have been affected primarily by the forces of nature, with, the imprint of man's work substantially unnoticeable" (Set 2[c] of the Wilderness Act of 1964).

NatureServe: A non-profit conservation organization that provides the scientific information and tools needed to help guide effective conservation action. It represents an international network of biological inventories – known as natural heritage programs or conservation data centers – operating in all 50 U.S. states, Canada, Latin America, and the Caribbean.

net annual growth: The average net annual increase in the volume of trees during the period between inventories. Components include the increment in net volume of trees at the beginning of the specific year surviving to its end, plus the net volume of trees reaching the minimum size class during the year, minus the volume of trees that died during the year, and minus the net volume of trees that became cull trees during the year.

No-Action Alternative: The No-Action Alternative is required by regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1502.14). The No-Action Alternative provides a baseline for estimating the effects of other alternatives. Where a project activity is being evaluated, the No-Action Alternative is defined as one where no action or activity would take place.

non-functional: Riparian areas that lack the soil, water, or vegetation attributes to function properly and that are highly susceptible to degradation.

non-functioning condition: 1) Condition in which vegetation and ground cover are not maintaining soil conditions that can sustain natural biotic communities; 2) Riparian-wetland areas are considered to be in non-functioning condition when they do not provide adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, or other normal characteristics of riparian areas. The absence of a floodplain may be an indicator of nonfunctioning condition.

non-game species: Those species of animals that are not managed as a sport hunting resource.

non-point source pollution: Pollution whose source is not specific in location; the sources of the pollutant discharge are dispersed, not well defined or constant. Examples include sediments from logging activities and runoff from agricultural chemicals.

not suitable for timber production: Forest land for which timber production is not a management objective (36 CFR 219.12 and FSM 1921.12). These are lands where: a.) statute, Executive order, or regulation prohibits timber production on the land; or the Secretary of Agriculture or the Chief of the Forest Service have withdrawn the land from timber production; b.) the land is not forest land; c.) timber production would not be compatible with the achievement of Desired Conditions and objectives established by the LMP for those lands; or d.) timber is generally not suitable for harvest.

noxious weeds: Plants designated as noxious by the Secretary of Agriculture or by the responsible state official. They are usually an invasive species. They generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, non-native, new, or not common to the United States. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed is one that causes disease or has other adverse effects on people or their environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

off-highway vehicle (OHV): Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain. Travel on or immediately over land, water, or other natural terrain, excluding: 1) any non-amphibious registered motorboat; 2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; 3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; 4) vehicles in official use; and 5) any combat or combat support vehicle when used for national defense.

off-road: Any motorized travel that is not on the designated road and trail system.

old growth: Forest lands that meet the old-growth descriptions for the Rocky Mountain Region as outlined in Mehl, 1992. Old-growth forests represent the late stages of forest development and are primarily distinguished by old trees, large trees, snags, and large wood on the forest floor.

Open (BLM): Designated areas and trails where off-road vehicles may be operated, subject to operating regulations and vehicle standards set forth by land management agencies; or an area where all types of vehicle use is permitted at all times, subject to the standards set forth by land management agencies.

Outstanding Waters: An Outstanding Waters designation offers the highest level of water-quality protection available under the Clean Water Act and under Colorado regulations. This designation is designed to prevent any degradation from existing conditions.

outstandingly remarkable values (ORVs): Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act: “scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values...” Other similar values, which may be considered, include ecological, biological or botanical, paleontological, hydrological, scientific or research values (from M-8351, BLM WSR Policy and Program).

ozone: A faint blue gas produced in the atmosphere from chemical reactions of such sources as burning coal, gasoline and other fuels, and chemicals found in products including solvents, paints, hairsprays, etc.

perennial stream: Perennial streams carry flowing water continuously throughout the year, regardless of weather conditions. It exhibits well-defined geomorphological characteristics and in the absence of pollution, thermal modifications, or other man-made disturbances has the ability to support aquatic life. During hydrological drought conditions, the flow may be impaired.

permit long: Grazing for the duration of the permitted time with care taken not to overuse the resource.

permitted livestock: Livestock presently being grazed under a permit or those that were grazed under a permit during the preceding season, including their offspring retained for herd replacement.

permitted use: The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease, and is expressed in Animal Unit Months (AUMs) (43 CFR Section 4100.0-5) (from H-4180-1, BLM Rangeland Health Standards Manual).

plan amendment: The system that provides a step-by-step process for considering multiple resource values, resolving conflicts, and making resource management decisions.

planning criteria: The factors used to guide development of the resource management plan, or revision, to ensure that it is tailored to the issue previously identified and to ensure that unnecessary data collection and analysis are avoided. Planning criteria are developed to guide the collection and use of inventory data and information, analysis of the management situation, design and formulation of alternatives, estimation of the effects of alternatives, evaluation of alternatives, and selection of the preferred alternative.

planning horizon: The overall time period that spans all activities covered in the LMP and all future conditions and effects of proposed actions that would influence the planning decisions. This is typically considered 50 years.

population: Organisms of the same species that occur in a particular place at a given time. In statistics, the aggregate of all units forming the subject of study; otherwise, a community of individuals that share a common gene pool.

potential natural vegetation (PNV): The stable vegetation community which could occupy a site under current climatic conditions without further influence by humans. Often used interchangeably with “Potential Natural Community”.

preferred alternative: The agency’s preferred alternative, one or more, that is identified in the impact statement (40 CFR 1502.14).

prescribed burning: The intentional application of fire to wildland fuels in either their natural or modified state under such conditions as to allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e., silviculture, wildlife management, reduction of fuel hazard, etc.).

prescribed fire: A fire purposely ignited to meet specific objectives (See prescribed burn).

prevention of significant deterioration (PSD): An air pollution-permitting program intended to ensure that air quality does not diminish in attainment areas.

primary succession: The establishment and subsequent changes in a community from newly formed habitats without plants (e.g. sand dunes, lava flows, or newly exposed rock). Involves much modification of the environment by early colonists = pioneer species (such as lichens and mosses, beach grasses) which in terrestrial environments stabilize and enrich or even generate soil.

primitive and unconfined recreation: Non-motorized, non-mechanized (except as provided by law), and undeveloped types of recreational activities. Bicycles are considered mechanical transport.

productivity: The capacity of USFS lands and their ecological systems to provide the various renewable resources in certain amounts in perpetuity (36 CFR 219.16).

programmatic EIS: An environmental impact statement that establishes a broad management direction for an area by establishing a goal, objective, standard, management prescription and monitoring and evaluation requirement for different types of activities that are permitted. It also can establish what activities are not permitted within the specific area(s). This document does not mandate or authorize the permitted activities to proceed.

project: The whole of an action, which has the potential for resulting in a physical change in the environment.

project area: The geographic area defining the scope of this document and the alternatives proposed by it.

project file: An assemblage of documents that contains all the information developed or used during an environmental analysis. This information may be summarized in an Environmental Assessment or an Environmental Impact Statement. The project file becomes part of the administrative record for judicial review in case of legal action.

proper functioning condition (PFC): 1) An element of the Fundamental of Rangeland Health for watersheds, and therefore a required element of State or regional standard and guidelines under 43 CFR Section 4180.2(b); 2) Condition in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities; 3) Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize stream banks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is influenced by geomorphic features, soil, water, and vegetation; 4) Uplands function properly when the existing vegetation and ground cover maintain soil conditions capable of sustaining natural biotic communities. The functioning condition of uplands is influenced by geomorphic features, soil, water, and vegetation.

proposed action: A description of the project as proposed by the project proponent in the Special Use Permit application.

public lands or BLM lands: Any land or interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management.

public scoping: Giving the public the opportunity for free, unhampered, speaking or writing concerning the intentions, activity, or influence of a project on the community and environment.

range analysis: Systematic acquisition and evaluation of rangeland resource data needed for allotment management planning and overall land management.

range improvement: An authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; and restore, protect and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes, but is not limited to, structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means (43 CFR 4100).

rangelands: Lands that produce or are capable of producing forage for grazing and browsing animals. It includes grasslands, forblands, shrublands, and forested lands.

rangeland condition: The present state of a rangeland relative to the potential of that rangeland, usually associated with the composition, abundance, and distribution of plant species relative to the potential natural community for that rangeland.

Ranger District: An administrative subdivision of the national forest system, supervised by a district ranger who reports to the forest supervisor.

reasonable foreseeable development (RFD) scenario: The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

reclamation: Returning disturbed land to a form and productivity that will be ecologically balanced and in conformity with a predetermined land management plan.

Record of Decision (ROD): A concise public document disclosing the decision made following preparation of an EIS and the rationale used to reach that decision.

Recreation and Public Purposes (R&PP) Act of 1926: Recreation and Public Purposes Act provided for the lease and sale of public lands determined valuable for public purposes. The objective of the R&PP Act is to meet the needs of State and local government agencies and non-profit organizations by leasing or conveying public land required for recreation and public purpose uses. Examples of uses made of R&PP lands are parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost-benefits for land acquisition and provides for recreation facilities or historical monuments at no cost.

recreation experiences: Psychological outcomes realized either by recreation-tourism participants as a direct result of their onsite leisure engagements and recreation-tourism activity participation or by non-participating community residents as a result of their interaction with visitors and guests within their community and/or interaction with public land (BLM/USFS) and other public and private recreation-tourism providers and their actions.

recreation management zones (RMZ): Sub-units within a SRMA managed for distinctly different recreation products. Recreation products are comprised of recreation opportunities, the natural resource and community settings within which they occur, and the administrative and service environment created by all affecting recreation-tourism providers, within which recreation participation occurs.

recreation niche: The place or position within the strategically targeted recreation-tourism market for each SRMA that is most suitable (i.e., capable of producing certain specific kinds of recreation opportunities) and appropriate (i.e., most responsive to identified visitor or resident customers), given available supply and current demand, for the production of specific recreation opportunities and the sustainable maintenance of accompanying natural resource and/or community setting character.

recreation opportunities: Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.

Recreation Opportunity Spectrum (ROS): The ROS offers a framework to establish the desired setting conditions of access, remoteness, naturalness, built environment, social encounters, visitor impacts, and management for all areas of the SJPL. These conditions are shown on the Established ROS Settings Map.

Projects and activities shall be consistent with the established ROS settings. Because this map shows broad desired setting conditions for the entire SJPL, site specific analysis is generally necessary to further refine desired setting conditions that may apply to site specific projects.

Pristine areas provide outstanding opportunity for solitude, natural quiet, and isolation; sights and sounds of development do not intrude on the experience. Lands are managed to protect and perpetuate their pristine conditions. Encounters with others are rare. All travel is cross-country. There is no lasting evidence of camping activity, social trails, or other human impacts. Indirect methods of accomplishing management objectives predominate.

Primitive areas are an essentially unmodified natural environment. These areas offer a moderate degree of solitude and natural quiet, and are managed to allow natural ecological change to occur uninterrupted. Human influence on vegetation is minimal. There may be evidence of campsites. Campsites are dispersed; usually one will not hear or see visitors at adjacent campsites. Maintained trails exist and user-established trails are evident. Evidence of management is minor.

Semi-primitive areas are managed to protect the natural environment and provide access to primitive or pristine areas. Encounters with other users may be frequent in some concentrated use areas. Constructed and maintained trails support access to popular destinations. Use is often heavily concentrated day-use, however, over-night camping occurs. Management emphasizes sustaining and protecting natural conditions. Management actions to mitigate visitor use impacts may be noticeable. Human use and activities within the area may be evident.

SPNM – Semi-Primitive Non-Motorized non-wilderness backcountry areas are characterized by a quiet, predominantly natural-appearing environment. Resource modification and utilization practices are not evident. Recreation opportunities are primarily those which provide opportunities for self-reliance and challenge. Concentrations of users are low. Common recreation activities include hiking, mountain biking, hunting, fishing, backpacking, and camping.

SPM – Semi-Primitive Motorized landscapes are similar in naturalness to SPNM landscapes with motorized travel. Travel is over designated trails or high-clearance, four-wheel drive roads. Roads are designed primarily for low speeds and with native surfacing. Road and trail density provide for a sense of remoteness and solitude. Common recreation activities include motorized trail riding, four-wheel driving, visiting cultural sites, hunting, fishing, and dispersed camping.

RN – Roaded Natural lands are generally high use travel corridors with a high level of visitor services and associated development. Concentrations of users can be moderate to high. The areas often take on a mosaic of development and resource evidence from highly modified areas to pockets of unmodified lands. Conventional motorized use is provided for in construction standards such as road widths and surface hardening. Road development levels are native surfaced high-clearance to levels that will accommodate passenger vehicles. OHV travel is common on forest roads and trails. Road and trail densities are moderate to high and interaction with the other users is to be expected. Developed campgrounds, picnic areas, trailhead, and interpretive sites may be present within this setting. Constructed recreation facilities provide for resource protection, visitor information and comfort. Hunting, fishing, biking, hiking, and viewing scenery are common activities.

R – Rural areas are substantially modified although they may have natural appearing elements. Facilities are almost always designed for a large number of people and roads are generally paved. Rural areas are characterized by substantially modified natural environment. The landscape is often dominated by human-caused geometric patterns; there is also a dominant sense of open, green-space. Development of facilities is for user comfort such as pavement on roads and trails, and convenience amenities within campgrounds. Common facilities within this setting would be visitor centers, developed campgrounds that provide electricity and showers, areas with multiple facility developments such as lodges, campgrounds, and recreation residences. Driving for pleasure, viewing scenery and cultural features, camping, and picnicking are common activities.

recreation setting character conditions: The distinguishing recreational qualities of any landscape, objectively defined along a continuum ranging from primitive to urban landscapes, expressed in terms of the nature of the component parts of its physical, social and administrative attributes. These recreational qualities can be both classified and mapped. This classification and mapping process should be based on variation that either exists (i.e., setting descriptions) or is desired (i.e., setting prescriptions) among component parts of the various physical, social, and administrative attributes of any landscape. The recreation opportunity spectrum is one of the existing tools for doing this.

recreation settings: The collective, distinguishing attributes of landscapes that influence, and sometimes actually determine, what kinds of recreation opportunities are produced.

recreation-tourism market: Recreation-tourism visitors, affected community residents, affecting local governments and private sector businesses, or other constituents and the communities or other places where these customers originate (local, regional, national, or identify primary recreation-tourism markets for each SRMA).

recreation visitor days (RVDs): One 12-hour period of recreation. It can be one person for 12 hours, 2 people for 6 hours, 12 people for 1 hour, etc.

reference period: The period of indigenous settlement from about 1500 to the late 1800s. It is a time when broad-scale climatic conditions were similar to those of today, but Euro-American settlers had not yet introduced the sweeping ecological changes (including timber harvest, livestock grazing, fire suppression, water diversions, dams, and roads) that have greatly altered many Rocky Mountain landscapes.

recreational river: Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

remnant plant species: A remnant or fragment of the vegetation of an area that remains from a former period when the vegetation was more widely distributed.

resilient: The capability to withstand or recover from disturbance or change.

Resource Management Plan (RMP): A BLM planning document, prepared in accordance with Section 202 of the Federal Land Policy and Management Act that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved. It presents systematic guidelines for making resource management decisions for a planning area. An RMP is based on an analysis of an area's resources, existing management, and capability for alternative uses. RMPs are issue oriented and developed by an interdisciplinary team with public participation.

restoration: The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. It is an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity, and sustainability.

rest rotation: Grazing rotation that rests pastures that have been grazed early the prior year or that have been identified as needing rest for resource reasons.

restricted road: A National Forest road or segment which is restricted from a certain type of use or all uses during certain seasons of the year or yearlong. The use being restricted and the time period must be specified. The closure is legal when the Forest Supervisor has issued an Order and posted that Order in accordance with 36 CFR 261.

revegetation: The reestablishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora, or artificially through the direct action of reforestation or reseeding.

Right-of-Way (ROW): The public lands authorized to be used or occupied for specific purposes pursuant to a right-of-way grant, which are in the public interest and which require rights-of-way over, upon, under, or through such lands.

riparian: A type of ecological community that occurs adjacent to streams and rivers. It is characterized by certain types of vegetation, soils, hydrology and fauna and requires free or unbound water or conditions more moist than that normally found in the area.

riparian area: A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

road: A motor vehicle route over 50 inches wide, unless identified and managed as a trail that has been improved and maintained by mechanical means to ensure relatively regular and continuous use. (A way maintained strictly by the passage of vehicles does not constitute a road.)

roadless: Refers to the absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use.

roadless area: A national forest area which: 1) is larger than 5,000 acres, or if smaller than 5,000 acres, contiguous to a designated wilderness or primitive area; 2) contains no roads; and 3) has been inventoried for possible inclusion in the wilderness preservation system.

Roadless Area Review and Evaluation (RARE II): Roadless areas inventoried in the second roadless area review and evaluation (36 CFR 219.17).

rock art: Petroglyphs (carvings) or pictographs (painting) used by native persons to depict their history and culture.

rotation: The number of years (including the regeneration period) required to establish and grow timber crops to a specified condition or maturity under even-aged management. Selected integrated prescriptions in the land management plan provide the basis for the rotation age. This is used to calculate the contribution to long-term sustained-yield capacity for the LMP area from lands suitable for timber production.

rotation age: The period of years between when a forest stand (i.e., primarily even-aged) is established (i.e., regeneration) and when it receives its final harvest. This time period is an administrative decision based on economics, site condition, growth rates, and other factors.

routes: A combination of roads, trails, or ways that are used by motorized vehicles (including jeeps, all terrain vehicles, motorized dirt bikes, etc.), mechanized uses (mountain bikes, wheelbarrows, game carts), pedestrians (hikers), and/or equestrians (horseback riders).

satisfactory rangeland conditions: Rangelands are considered to have satisfactory rangeland conditions if current conditions are meeting or moving toward the Desired Conditions identified in an Allotment Management Plan (AMP) or in a Land Health Determination (LHD). Desired conditions in an AMP or LHD and are developed using the BLM Colorado Public Land Health Standards (USDOI BLM 1997) and the Rangeland Analysis and Management Training Guide (USDA FS Rocky Mountain Region 1996).

scenic byways: Highway routes, which have roadsides or corridors of special aesthetic, cultural, or historic value. An essential part of the highway is its scenic corridor. The corridor may contain outstanding scenic vistas, unusual geologic features, or other natural elements.

Scenic attractiveness is a measure of the landscape's scenic importance based on common human perceptions of the intrinsic scenic beauty of landforms, rock forms, water forms, vegetation patterns, and cultural features. There are three levels of inherent scenic attractiveness that classify the scenic quality of natural landscapes. (Reference SMS)

Class A - Distinctive: areas where features of landform, vegetative patterns, water forms and rock formation are of unusual or outstanding scenic quality.

Class B - Common: areas where features contain variety in form, line, color and texture or combinations thereof but which tend to be common throughout the landscape province and are not outstanding scenic quality.

Class C - Undistinguished: areas whose features have little change in form, line, color, or texture. Includes all areas not found under Classes A and B.

Scenic sustainability is a measure of the degree to which the ecosystem is likely able to restore, maintain, or continue to exhibit the positive dominant attributes of the landscape character. It is a continuum that ranges from high to low. High scenic sustainability is a prediction that all positive dominant attributes of the landscape character are perpetuated (during the planning period), moderate is a prediction that there is some loss of attributes, and low is the loss of most or all attributes.

Scenic integrity is a measure of the lack of noticeable human-caused disturbance in the area that detracts from the dominant, valued attributes of landscape character. The baseline from which to measure scenic integrity is dependent upon a complete and accurate description of the important and dominant positive landscape character attributes that are viewed at the time of measurement. It can be used to describe scenery in the past, as it presently exists, and as predicted in the future. Scenic integrity is a continuum that ranges from very high to low. Landscapes with a high degree of scenic integrity have virtually no discordant elements and contain only positive human alterations. They are intact, unimpaired and appear to be in good visual condition. On the opposite end of the continuum, landscapes with low scenic integrity usually have negative human alterations and are in poor visual condition. They often contain discordant and contrasting features such as geometric shapes resulting from vegetative treatment, structures that do not blend with their surroundings, or roads that create large cut and fill slopes across steep hillsides.

Scenic Integrity Levels:

Very High – refers to landscapes where the valued landscape character “is” intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.

High – refers to landscapes where the valued landscape character “appears” intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.

Moderate – refers to landscapes where the valued landscape character “appears slightly altered.” Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Low – refers to landscape where the valued landscape character “appears moderately altered.” Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.

Very Low – refers to landscapes where the valued landscape character “appears heavily altered.” Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles within or outside the landscape being viewed. However deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the compositions.

scenic river: A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

scoping: The procedures by which the Forest Service and the BLM determine the extent of analysis necessary for a proposed action, i.e., the range of actions, alternatives, and impacts to be addressed, identification of significant issues related to a proposed action, and establishing the depth of environmental analysis, data, and task assignments needed.

scrubland: Areas dominated by woody shrubs. These areas include sagebrush, salt desert shrub, and mountain shrub vegetation types.

season of use: The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

seasonal closure: A temporary closure of an area or road for a part of the year.

Section 404 Permit: A permit issued by the U.S. Army Corps of Engineers, as dictated in Section 404 of the Clean Water Act, that specifies that anyone wishing to place dredged or fill materials into the waters of the United States and adjacent jurisdictional wetlands shall apply to the U.S. Army Corps of Engineers for approval.

secondary succession: Results from changes in an area that previously had a vegetation community where disturbance (i.e., surface disturbance, insect pest or disease) reset the stage of the community to an earlier point in the succession process but did not reset it to the primary succession stage.

sediment: Material suspended in liquid or air. Any material carried in suspension by water, which will ultimately settle to the bottom. Sediment has two main sources: from the channel area itself and from disturbed sites.

self-sustaining population: A population of organisms that has appropriate characteristics, including the abundance and distribution of individuals of the population, to provide for its long-term persistence.

semi-arid: Moderately dry; region or climate where moisture is normally greater than under arid conditions but still definitely limits the production of vegetation.

sensitive species: A plant or animal listed by a State of Federal agency as being of environmental concern that includes, but is not limited to, threatened and endangered species.

sensitivity level: A particular degree or measure of viewer interest in the scenic qualities of the landscape.

seral: The stage of succession of a plant community that is transitional. If left alone, the seral stage will give way to another plant community that represents a further stage of succession.

severe winter range: Areas within the winter range where 90% of the individuals are located when annual snow pack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten.

shrub: A plant with persistent woody stems and relatively low growth form; usually produces several basal shoots as opposed to a single bole; differs from a tree by its low stature and non-arborescent form.

significant: As used in NEPA, requires consideration of both context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as society as a whole and the affected region, interests, and locality. Intensity refers to the severity of impacts (40 CFR 1508.27).

significant effect: A substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, water, minerals, flora, fauna, and objects of historic or aesthetic significance.

silvicultural system: A planned series of treatments for tending, harvesting, and re-establishing a stand. The system name is based on the number of age classes (coppice, even-aged, two-aged, uneven-aged) or the regeneration method (clearcutting, seed tree, shelterwood, selection, coppice) used.

snag: A standing dead tree.

soil productivity: The inherent capacity of a soil to support the growth of specified plants or plant communities.

Special Recreation Management Area (SRMA): A public lands unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities (i.e., activity, experience, and benefit opportunities). The BLM recognizes three distinct types of SRMAs: community-based; intensive; and undeveloped big open (H-1601-1, BLM Land Use Planning Handbook).

special-status species: Refers to federally listed threatened or endangered species, Federal candidate species, species recognized as requiring special protection by State agencies, and species managed as sensitive species by the USFS and/or by the BLM.

special use permit: A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest System lands for some special purpose.

species: Any member of the currently accepted and scientifically defined plant or animal kingdoms of organisms” (USDA Forest Service 2005). A unit of classification of plants and animals consisting of the largest and most inclusive array of sexually reproducing and cross-fertilizing individuals which share a common gene pool.

species of concern: Species for which the Responsible Official determines that management actions may be necessary to prevent listing under the Endangered Species Act.

species of interest: Species for which the Responsible Official determines that management actions may be necessary or desirable to achieve ecological or other multiple-use objectives.

split season: Removing livestock from the allotment and returning them later in the year within the permitted time.

stand: A vegetation community sufficiently uniform in composition, age, spatial arrangement, or condition to be distinguishable from an adjacent vegetation community.

standard: A particular action, level of performance, or threshold specified by the Forest Plan for resource protection or accomplishment of management objectives. Unlike “guidelines” which are optional, standards specified in the Forest Plan are mandatory.

State Implementation Plan (SIP): A detailed description of the programs a State will use to carry out its responsibilities under the Clean Air Act. State implementation plans are collections of the regulations used by a state to reduce air pollution.

stocking: The degree to which trees occupy the land, measured by basal area or the number of trees per given area.

structure: The horizontal and vertical distribution of components in a vegetation community including the height, diameter, crown layers, and stems of the plants, and the amount and arrangement of snags and down woody material.

Structure Recreation Management Area (SRMA): In this plan the term has the same meaning as Bureau of Land Management planning term Special Recreation Management Area. This plan already uses the term special area to denote small areas that possess one or more special features or characteristics that make them and their management unique for other areas. This includes RNAs, ACECs, Archeological areas.

subalpine: A terrestrial community that generally is found in harsher environments than the montane terrestrial community. Subalpine communities are generally colder than montane and support a unique clustering of wildlife species.

succession: The progressive replacement of plant communities on a site which leads to the potential natural community.

suitability: The appropriateness of a particular area of land for applying certain resource management practices, as determined by an analysis of the existing resource condition of that land. A unit of land may be suitable for a variety of management practices.

suitable habitat: Habitat that currently has the attributes needed for a given species.

sustainability: Obtaining yields and services from ecosystems without irreversibly affecting their resilience, natural resistance to change, or ability to meet the needs of future generations.

summer range: A range, usually at higher elevation, used by deer and elk during the summer; a summer range is usually much more extensive than a winter range.

sustained yield: sustained yield of wood fiber that properly harvested and mitigated, would sustain the underlying ecosystem processes.

take: To harass, harm, pursue, hunt, shoot, kill, trap, capture, or collect a species listed under the Endangered Species Act, or to attempt to engage in any such conduct.

temporary road or trail: A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas.

terrestrial ecosystem: Ecosystems that occur in relatively dry, upland landscape positions.

thermal cover: Vegetation used by animals to modify the adverse effects of weather. A forest stand that is at least 40 feet in height with tree canopy cover of at least 70 percent provides thermal cover. These stand conditions are achieved in closed sapling-pole stands and by all older stands unless the canopy cover is reduced below 70 percent. deciduous stands may serve as thermal cover in summer, but not in winter.

threatened species: Any species likely to become endangered within the foreseeable future throughout all or a significant portion of its range and that has been designated in the Federal Register by the Secretary of Interior as such (FSM 2670.5).

tiering: The use of a previously written environmental document with a broad scope to cover discussion of issues common to both.

timber harvest: The removal of trees for wood fiber use and other multiple-use purposes.

timber production: The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use (36 CFR 219.16).

timber sale program quantity (TSPQ): The estimated output of timber from the LMP area. The estimate is displayed as an average annual cubic foot output for a decade. It includes projected outputs from lands generally suitable for timber harvest. The projected timber outputs reflect past and projected budget levels and organizational capacity to achieve the Desired Conditions and objectives in the plan (36 CFR 219.12 and FSM 1921.12).

total maximum daily load (TMDL): An estimate of the total quantity of pollutants (from all sources: point, non-point, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

traditional cultural property: A property that derives significance from traditional values associated with it by a social and/or cultural group such as an Indian tribe or local community. A traditional cultural property may qualify for the National Register if it meets the criteria and criteria exceptions at 36 CFR 60.4. See National Register Bulletin 38.

trail: A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail.

tribe: Term used to designate a Federally recognized group of American Indians and their governing body. Tribes may be comprised of more than one band.

unauthorized road or trail: A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas.

understory: Vegetation (trees or shrubs) growing under the canopy formed by taller trees.

undertaking: A term with legal definition and application i.e., “actions carried out by or on behalf of the agency; those carried out with Federal financial assistance; those requiring a Federal permit, license, or approval; and those subject to State or local regulation administered pursuant to a delegation or approval by a federal agency.” (See National Historic Preservation Act, Section 106 and Section 301(7), Appendix 5; 36 CFR Part 800).

Undeveloped Recreation - Tourism Market: National, regional, and/or local recreation tourism visitors, communities, or other constituents who value public lands for the distinctive kinds of dispersed recreation produced by the vast size and largely open, undeveloped character of their recreation settings. Major investments and facilities are excluded within SRMAs where the strategy is to target demonstrated undeveloped recreation-tourism market demand. Here, recreation management actions are geared toward meeting primary recreation-tourism market demand to sustain distinctive recreation setting characteristics; however, major investments in visitor services are authorized both to sustain those distinctive setting characteristics and to maintain visitor freedom to choose where to go and what to do - all in response to demonstrated demand for undeveloped recreation.

upland: The portion of the landscape above the valley floor or stream.

uneven-aged management: Actions resulting in the creation of stands in which trees of different ages grow together. Cutting is usually regulated by specifying the number or proportion of trees of particular size to retain within each cut area, thereby maintaining a planned distribution of size classes.

ungulate: A hoofed mammal such as a deer, elk, horse, sheep, or cow.

valid existing rights: Any lease established (and valid) prior to a new authorization, change in land designation, or in regulation.

viable populations: A wildlife population of sufficient size to maintain its existence over time in spite of normal fluctuations in population levels.

visibility (air quality): A measurement of the ability to see and identify objects at different distances.

visitor day: Twelve visitor hours, which may be aggregated by one or more persons in single or multiple visits.

visitor use: Visitor use of a resource for inspiration, stimulation, solitude, relaxation, education, pleasure, or satisfaction.

Visual Quality Objective (VQO): A system of indicating the potential expectations of the visual resource by considering the frequency an area is viewed and the type of landscape. **Maximum Modification:** A Visual Quality Objective meaning man's activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background. **Modification:** A Visual Quality Objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground. **Partial Retention:** A Visual Quality Objective which, in general, means man's activities may be evident but must remain subordinate to the characteristic landscape. **Preservation:** A Visual Quality Objective that provides for ecological change only. **Retention:** A Visual Quality Objective which, in general, means man's activities are not evident to the casual forest visitor.

visual resource: The visible physical features of a landscape (topography, water, vegetation, animals, structures, and other features) that constitute the scenery of an area.

Visual Resource Inventory Classes – For BLM lands, scenic conditions and anticipated effects are measured using the Visual Resource Inventory Class (VRI).

Visual resource inventory classes are assigned through the inventory process. These are generally assigned based on a combination of scenic quality, sensitivity level, and distance zones. Inventory classes are informational in nature and provide the basis for considering visual values in the RMP process. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

Visual Resource Management (VRM): The system by which BLM classifies and manages scenic values and visual quality of public lands. The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. After inventory and evaluation, lands are given relative visual ratings (see definition for Visual Resource Management Classes), which determine the amount of modification allowed for the basic elements of the landscape.

Visual Resource Management (VRM) Classes: Visual resource management classes define the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. Each class has an objective, which prescribes the amount of change allowed in the characteristic landscape.

VRM Class I Objective: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.

VRM Class II Objective: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.

VRM Class III Objective: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.

VRM Class IV Objective: To provide for management activities that requires major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

volatile organic compounds (VOCs): Volatile organic chemicals that produce vapors readily; at room temperature and normal atmospheric pressure. Volatile organic chemicals include gasoline, industrial chemicals such as benzene, solvents such as toluene and xylene, and tetrachloroethylene (perchloroethylene, the principal dry cleaning solvent).

water quality: The biological, physical, and chemical properties of water that make it suitable for specific uses.

watershed: The entire land area that contributes water to a particular drainage system or stream.

wetlands: those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, etc.

Wild and Scenic Study River: Rivers identified in Section 5 of the Wild and Scenic Rivers Act for study as potential additions to the National Wild and Scenic Rivers System.

wild river: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Wild, Scenic, and/or Recreational (WSR): The term used in this Manual Section for what is traditionally shortened to “Wild and Scenic” rivers. Designated river segments are classified, i.e., wild, scenic, and/or recreational, but cannot overlap (from M-8351, BLM WSR Policy and Program).

wilderness: A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that:

- 1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable;
- 2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- 3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and
- 4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

The definition contained in Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

wilderness characteristics: Wilderness characteristics include size, the appearance of naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include ecological, geological, or other features of scientific, educational, scenic, or historical value. However Section 2(c) of the Wilderness Act of 1964 has been updated by IM-2003-195, dated June 20, 2003. Indicators of an area’s naturalness include the extent of landscape modifications; the presence of native vegetation communities; and the connectivity of habitats. Outstanding opportunities for solitude or primitive and unconfined types of recreation may be experienced when the sights, sounds, and evidence of other people are rare or infrequent, in locations where visitors can be isolated, alone or secluded from others, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered.

Wilderness Study Area (WSA): A designation made through the land use planning process of a roadless area found to have wilderness characteristics as described in Section 2(c) of the Wilderness Act of 1964.

wildfire: Unplanned human or naturally caused fires in wildlands.

wildland fire: Any fire, regardless of ignition source, that is burning outside of a prescribed fire and any fire burning on public lands or threatening public land resources, where no fire prescription standards have been prepared.

Wildland-urban Interface (WUI): The area adjacent to an at-risk community that is identified in the community wildfire protection plan, or if there is no community wildfire protection plan in place, the area 1/2 mile from the boundary.

winter range: A range, usually at lower elevation, used by migratory deer and elk during the winter months; usually better defined and smaller than summer ranges.