

## References Cited

## REFERENCES CITED

- Adams, S. 2005. Landowner. Personal communication with George Blankenship, Blankenship Consulting LLC. September 13, 2005.
- Alldredge, A.W., and R.D. Deblinger 1988. *Great Divide Basin Pronghorn Study*. Conducted for Minerals Company by Colorado State University. 137pp.
- Allen, J.D. and A.S. Flecker 1993. "Biodiversity Conservation in Running Waters." *BioScience* 43:32-43.
- Anderson, H.W. 1975. "Relative Contribution of Sediment from Source Areas and Transport Processes." in *Proceedings, Sediment-Yield Workshop*. November 28-30. Oxford MS. Berkeley, California: U. S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station. pp. 66-73.
- Angermeyer, P.L., A.P. Wheeler, and A.E. Rosenberger 2004. "A Conceptual Framework for Assessing Impacts of Roads on Aquatic Biota." *Fisheries* 29(12):19-29.
- AEPC 2004. *Production AREIS Annual Projections*. Excel Spreadsheet. Anadarko E & P Company, LP. October 20, 2004.
- Archer, D. L., L. R. Kaeding, B. D. Burdick, and C. W. McAda 1985. *A Study of the Endangered Fishes of the Upper Colorado River*, Final report. Cooperative agreement 14-16-0006 - 82-959. Grand Junction, Colorado: U.S. Department of the Interior, Fish and Wildlife Service.
- Archibald, J. D. 1993. "The Importance of Phylogenetic Analysis for the Assessment of Species Turnover: A Case History of Paleocene Mammals in North America." *Paleobiology* 19:1-27.
- ARS 2002. *Green River Basin Visibility Study. Monitored Air Quality Data*. Fort Collins, Colorado: Air Resource Specialists.
- Ayers, R. S. and D. W. Westcott 1985. *Water Quality for Agriculture: FAO Irrigation and Drainage paper 29 Rev. 1*. Food and Agriculture Organization of the United Nations. 174 pp.
- Baxter, G. T., and M. D. Stone 1992. *Amphibians and Reptiles of Wyoming*, Bulletin No. 16, Second Edition. Cheyenne, Wyoming: Wyoming Game and Fish Department. 137pp.
- Baxter, G. T., and M. D. Stone 1995. *Fishes of Wyoming*. Wyoming Game and Fish Department. 290pp.
- Beatty, R. J. 2005. *Catostomid Spawning Migrations and Late-Summer Fish Assemblages in Lower Muddy Creek, an Intermittent Watershed in Southern Carbon County, Wyoming*. Laramie, Wyoming: M.S. Thesis, Department of Zoology and Physiology, University of Wyoming.
- Beaumont, E. A. 1979. "Depositional Environments of Fort Union Sediments (Tertiary, Northwest Colorado) and Their Relation to Coal." *American Association of Petroleum Geology Bulletin* 63:194-217.

## REFERENCES CITED

---

- Beauvais, G. P., D. Kein ath, and J. Ratner 2001. *Habitat Mapping and Field Surveys for Lynx (Lynx Canadensis) on Lands Administered by the USDI-Bureau of Land Management in Wyoming*. Laramie, W yoming: W yoming Natural Diversity Database . 11 pp. p lus appendices.
- Beck, T.D.I. and C.E. Braun 1978. "Weights of Colorado Sage Grouse." *Condor* 80(2):241-243. Summer 1978.
- Behnke, R. J. 1992. "Native tro ut of western North America." *American Fisheries Society Monograph* 6. Bethesda, Maryland. 275 pp.
- Belnap, J., J.H. Kaltenecker, R. Ro sentreter, J. Williams, S. Leonard, and D. Eldri dge 2001. *Biological Soil Crusts: Ecology and Management*. Denver, Colorado: U.S. Department of Interior, Bureau of Land Mangement. Technical Reference 1730-2. 110pp.
- Bettinger, R. L. and M. A. Bau mhoff 1982. "The Numic spread: Great Basin Cultures in Competition." *American Antiquity* 47(3).
- Bezzerides, N. and K. Bestgen 2002. *Status Review of Roundtail Chub (Gila robusta), Flannelmouth Sucker (Catostomus latipinnis), and Bluehead Sucker (Catostomus discobolus) in the Colorado River Basin 2002*. Fort Collins, Colorado: Colorado State University Larval Fish Laboratory.
- Biggins, D., B. Miller, B. Oakleaf, A. Farmer, R. Crete, and A. Doo d 1989. *A System for Evaluating Black-Footed Ferret Habitat: Report Prepared for the Interstate Coordinating Committee*. U.S. Depart ment of the Interior, Fish and Wildlife Service; Wyoming Game and Fish Department; and Montana Department of Fish, Wildlife and Parks.
- Binns, N. A. 1977. "Present Status of Indigenous Populations of Cutthroat Trout, *Salmo clarki*, in Southwestern Wyoming." *Fisheries Technical Bulletin No. 2*. Cheyenne, Wyo ming: Wyoming Game and Fish Department. 58 pp.
- Blackstone, D. L. 1963. "Unpubli shed mapping, 1:250,00 scale" in *The Paleozoic History of Wyoming*, Donald W. Boyd, ed. Memoir No. 5., The Geological Sur vey of W yoming, 1993. pp. 164-187.
- Blankenship PhD., T. 2002. Superintendent, Carbon County School District # 1. Personal communication with Ge orge Blankenship, Bla nkenship Consulting L LC. Januar y 18, 2002.
- Blevins, A., K. Jensen, and M. Le ighty 2003. "Social Assessment f or the Medicine Bow National Forest Plan 15-Year Revi sion." Prepared for the *Final Environmental Impact Statement for the Revised Land and Resource Management Plan. Medicine Bow National Forest*. University of Wyoming, Department of Sociology. December 2003.
- Blevins, A. Ph.D. 2004. Professor of Sociology, University of Wyoming, Laramie, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. December 23, 2004.
- Blodgett, M. 2003. Director, Rawlins Workforce Center, Wyoming Department of Workforce Services, Employment and Trainin g Divisi on. Personal communication with George Blankenship, Blankenship Consulting LLC. October 21, 2003.

## REFERENCES CITED

---

- Blodgett, M. 2004. Director, Rawlins Workforce Center, Wyoming Department of Workforce Services, Employment and Training Division. Personal communication with George Blankenship, Blankenship Consulting LLC. September 20, 2004.
- Bower, M.R. 2005. *Distributions and Habitat Associations of Bluehead Suckers, Flannelmouth Suckers, and Roundtail Chubs in the Upper Muddy Creek Watershed of Southern Carbon County, Wyoming*. Laramie, Wyoming: M.S. Department of Zoology and Physiology, University of Wyoming.
- Bradley, W. H. 1964. *Geology of Green River Formation and Associated Eocene Rocks in Southwestern Wyoming and Adjacent Parts of Colorado and Utah*. U.S. Geological Survey Professional Paper 496-A, A1-A86.
- Braun, C. E. 1998. "Sage Grouse Declines in Western North America: What are the Problems?" *Proceedings of the Western Association of State Fish and Wildlife Agencies* 78:139-156.
- Braun, C. E., T. Britt, and R. O. Wallestad 1977. "Guidelines for Maintenance of Sage Grouse Habitats." *Wildlife Society Bulletin* 5:99-106.
- Breithaupt, B. H. 1982. "Paleontology and Paleogeology of the Lance Formation (Maastrichtian), East Flank Rock Springs Uplift, Sweetwater County, Wyoming." *Contributions to Geology* 21:123-151.
- Breithaupt, B. H. 1985. "Non-Mammalian Vertebrate Faunas from the Late Cretaceous of Wyoming" in *Cretaceous of Wyoming, Wyoming Geological Association 36th Annual Field Conference Guidebook*, G.E. Nelson ed. pp. 159-175.
- Busnel, M. C. and D. Molin 1978. "Preliminary Results of the Effects of Noise on Gestating Female Mice and their Pups" pp. 209-248 J. L. Fletcher and R. G. Busnel eds. *Effects of Noise on Wildlife*. New York: Academic Press.
- Call, M. W. 1974. *Habitat Requirements and Management Recommendations for Sage Grouse*. Denver, Colorado: U.S. Department of the Interior, Bureau of Land Management Technical Note. 37pp.
- Call, M. W. and C. Maser 1985. *Wildlife in Managed Rangelands – the Great Basin of Southeastern Oregon: Sage Grouse*. USDA, Forest Service General Technical Report PNW-187.
- Carbon County Board of Commissioners and Carbon County Planning Commission 1998. *Carbon County Land Use Plan*. Prepared by Pedersen Planning Consultants. Saratoga, Wyoming. Approved June.
- Carnes, S. 2002. Clerk, Town of Wamsutter. Personal communication with George Blankenship, Blankenship Consulting LLC. January 17, 2002.
- Carnes, S. 2003. Clerk, Town of Wamsutter. Personal communication with George Blankenship, Blankenship Consulting LLC. August 6, 2003.
- Carnes, S. 2005. Clerk, Town of Wamsutter. Personal communication with George Blankenship, Blankenship Consulting LLC. November 30, 2005.

## REFERENCES CITED

---

- Carrico, G. 2005. Outfitter and rancher, Rawlins, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC.
- 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.
- Case, G. R. 1987. "New Selachian Fauna from the Late Campanian of Wyoming (Teapot Sandstone Member, Mesaverde Formation, Big Horn Basin)." *Palaeontographica. Abteilung A: Palaeozoologie-Stratigraphie* 197(1-3):1-37.
- Case, J. C., T. V. Edg ar, and R. H. DeBruin 2002. *Subsidence Potential Related to Water Withdrawal in the Powder River Basin*. Online at:  
<<<http://www.wsgsweb.uwyo.edu/oilandgas/Subsidence.asp>>>
- Case, J. C., and L.L. Larsen 1991. *Landslide Map of the Rawlins 1E x 2E Quadrangle*, Open File Report 91-20, Scale 1:250,000. The Geological Survey of Wyoming
- Case, J. C., L. L. Larsen, C.S. Boyd, and J.C. Cannia 1994. *Compilers. Earthquake Epicenters and Suspected Active Faults with Surficial Expression in Wyoming*. Scale 1:1,000,000. The Geological Survey of Wyoming.
- CIRA 2003. *Interagency Monitoring of Protected Visual Environments (IMPROVE)*. Summary Data Provided by Scott Copeland, Cooperative Institute for Research in the Atmosphere (CIRA). Colorado State University. October 2003.
- City of Rawlins 1998. *Rawlins Housing Assessment, Revised 1998*. Rawlins, Wyoming. December 10, 1998.
- Clark, T. W., and M. R. Stromberg 1987. *Mammals in Wyoming*. University of Kansas Museum of Natural History, Public Education Series No. 10. 313pp.
- Clemens, W. A. 1966. "Fossil Mammals of the Type Lance Formation, Wyoming. Part II. Marsupialia." *University of California Publications in Geological Science* 62, 122pp.
- Clemens, W. A., and J.A. Lillegraven 1986. "New Late Cretaceous, North American Advanced Therian Mammals That Fit Neither the Marsupial nor Eutherian Molds" in *Vertebrates, Phylogeny, and Philosophy, Contributions to Geology*, K.M. Flanagan and J.A. Lillegraven eds. University of Wyoming, Special Paper 3. pp. 55-85.
- Clemens, W. A., J.A. Lillegraven, E. H. Lindsay, and G.G. Simpson 1979. "Where, When, and What; A Survey of Known Mesozoic Mammal Distribution" in *Mesozoic Mammals; The First Two-Thirds of Mammalian History*, J.A. Lillegraven, Z. Kielan-Jawarowska, and W.A. Clemens eds. Berkeley, California: University of California Press. pp. 7-58.
- Coates, D. A., and E.L. Heffern 1999. "Origin and Geomorphology of Clinker in the Powder River Basin, Wyoming and Montana." *Wyoming Geological Association 50th Annual Field Conference Guidebook*. pp. 211-229.
- Collentine, M., R. Libra, K. R. Feathers, and L. Hamden 1981. *Occurrence and characteristics of groundwater in the Great Divide and Washakie Basins, Wyoming, vols. VI-A, B*. Laramie, Wyoming: Water Resources Research Institute, University of Wyoming. 163 pp. plus maps.

## REFERENCES CITED

---

- Colson, J. 2000. Sheriff, Carbon County, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. June 22, 2000.
- Colson, J. 2002. Sheriff, Carbon County, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. January 25, 2002.
- Compton, B. 2005. Personal communication with Bobby Compton. University of Wyoming.
- Crawford, J.A., R.A. Olson, N.E. West, J.C. Mosley, M.A. Schroeder, T. D. Whitson, R.F. Miller, M.A. Gregg, and C.S. Boyd 2004. "Synthesis Paper - Ecology and Management of Sage-Grouse and Sage-Grouse Habitat." *Journal of Range Management* 57(1): 2-19.
- CRBSCF 2005. *Water Quality Standards for Salinity – Colorado River System, 2005 Review*. Colorado River Basin Salinity Control Forum. July 2005.
- Creasman, S. D. and K. W. Thompson 1988. "Settlement and Subsistence of the Late Prehistoric, Uinta Phase, in the Green River Basin, Wyoming." Paper presented at the 46<sup>th</sup> Annual Plains Anthropological conference. Wichita, Kansas.
- Creasman, S. D. and K. W. Thompson 1997. "Settlement and Subsistence of the Archaic Period in the Green River Basin, Wyoming" in *Changing Perspectives on the Archaic of the Northwestern Plains*, M.L. Larson and J. E. Francis, eds. Vermillion, South Dakota: University of South Dakota Press.
- CREG 2004. *Wyoming State Government Revenue Forecast. Fiscal Year 2005 \_ Fiscal Year 2010*. Wyoming Consensus Revenue Estimating Group. Online at: <<<http://eadiv.state.wy.us/CREG/CREG.asp>>> Accessed October 2004.
- Cronoble, J. M. 1969. "South Baggs C West Side Canal Gas Field, Carbon County, Wyoming, and Moffat County, Colorado," pp. 129-137 in *Guidebook to Tertiary Rocks of Wyoming. Wyoming Geological Association 21<sup>st</sup> Annual Field Conference Guidebook*, J.A.Barlow Jr. ed.
- DeBruin, R. H. 1993. "Overview of the Oil and Gas Geology of Wyoming," pp. 837-873 in *A Geology of Wyoming. at Wyoming Geological Survey Memoir 5*, A.W. Snodgrass, J.R. Steidtmann, and S. M. Roberts eds.
- DeBruin, R. H. 1996. *Oil and Gas Map of Wyoming*. Wyoming Geological Survey Map, MS-48.
- DeBruin, R. H., and C. S. Boyd 1991. *Oil and Gas Map of Wyoming*. Wyoming Geological Survey Map, 35, Scale 1:1,000,000.
- DeGraaf, R. M., V. E. Scott, R. H. Hamre, L. Ernst, and S. H. Anderson 1991. "Forest and Rangeland Birds of the United States." U.S. Department of Agriculture Forest Service. *Agriculture Handbook 688*. 625 pp.
- Dolan, L.S. and T.A. Wesche 1987. "Summary of Muddy Creek Surface Water and Sediment Transport Data 1984-1986." Report to the Wyoming Water Research Center. 56 pp. *WWRC 87-28*.

## REFERENCES CITED

---

- Dorf, E. 1942. *Upper Cretaceous Floras of the Rocky Mountain Region: II Flora of the Lance Formation at its Type Locality, Niobrara County, Wyoming*. Carnegie Institute Washington, Publication 580. pp. 79-159.
- Driver, N. E., J. M. Norris, and G. Kuhn 1984. *Hydrology of Area 53, Northern Great Plains and Rocky Mountain Coal Provinces, Wyoming, Colorado, Idaho, and Utah*. WRI Open-File Report 83-765. Cheyenne, Wyoming: U.S. Geological Survey. 87 pp.
- Easterly, T., A. Wood, and T. Lit chfield 1991. *Responses of Pronghorn and Mule Deer to Petroleum Development on Crucial Winter Range in the Rattlesnake Hills*. Unpublished Completion Report. 67 pp.
- Edge, W.D., and C.L. Marcum 1991. "Topography Ameliorates th e Effects of Roads and Human Dist urbance on Elk. pp. 1 32-137 in A.G. Christensen, L.J. Lyon, and T.N. Lonner, comps. *Proceedings of Elk Vulnerability – a Symposium*. Bozeman, Montana: Montana State University. 330pp.
- Edson, G. M. 1979. *Preliminary Geologic Map and Coal Sections of the Seaverson Reservoir Quadrangle, Carbon County, Wyoming*. U.S. Geological S urvey Open-File Repository, pp. 79-1577.
- EIA 2001. *Annual Energy Outlook 2001 with Projections to 2020*. Energy Information Agency. Online at: <<[www.eia.doe.gov/oiaf/aeo/](http://www.eia.doe.gov/oiaf/aeo/)>> December 2001.
- Englehart, J. 2000. Highland Enterprises. Personal communication with George Bl ankenship, Blankenship Consulting LLC. December 5, 2000.
- Englehart, J. 2002. Highland Enterprises. Personal communication with George Blankenship, Blankenship Consulting LLC. January 18, 2002.
- EPA 1997. *National Air Toxics Information Clearinghouse (NATICH) Database*. Research Triangle Park, North C arolina: Environmental Protection Agency, Office of Air Quality Planning and Standards.
- EPA 2002. Primary Di stinguishing Characteristics of Level III Ecoregions of the Continental United States, Draft. United States Environmental Prot ection Agency. Washington, D.C. 2002. Online at: <<<http://epa.gov/wed/ecoregions/us/useco.doc>>>
- Erwin, R. M. 1983. "Feeding Habitats of Nesting Wa dding Birds: Spatial Use and Social Influences." *Auk* 100: 960-970.
- Estes, R. 1964. "Fossil Vertebrat es from the Late Cretaceous Lance Formation, Eastern Wyoming." *California University Publications in Geological Sciences* 49, 180 pp.
- Evans, B. 2002. Foreman, Carbon County Road and Bri dge Department, Rawlins, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. January 23, 2002.

## REFERENCES CITED

---

- Fanning, E.J. 1986. "Wyoming's Approach to Nonpoint Pollution Control" in *Proceedings of Wyoming Water 1986 and Streamside Zone Conference – Wyoming's Water Doesn't Wait While We Debate*, April 28-30, 1986, Casper, Wyoming. Sponsored by the Wyoming Water Research Center and UW Agriculture Extension Service, University of Wyoming. pp. 63-69. *WWRC 86-05n*.
- Faure, G. 1986. *Isotope Geology*. 2nd ed. John Wiley & Sons. 589pp.
- FLAG 2000. *Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report*. U.S. Forest Service-Air Quality Program, National Park Service-Air Resources Division, U.S. Fish and Wildlife Service-Air Quality Branch. December 2000.
- Fertig, W. 2000. *Status Review of the Ute Ladies'-tresses in Wyoming*. Report prepared for the Wyoming Cooperative Fish and Wildlife Research Unit, US Fish and Wildlife Service, and Wyoming Game and Fish Department by the Wyoming Natural Diversity Database. Laramie, Wyoming.
- Fertig, W. 2001. *2000 Survey for Blowout Pentstemon (Penstemon haydenii) in Wyoming*. A report prepared for the Bureau of Land Management Wyoming State Office. Laramie, Wyoming: Wyoming Natural Diversity Database. University of Wyoming.
- Fertig, W. and W.A. Reiners 2002. "Predicting Presence/Absence of Plant Species for Rangeland Mapping: a Case Study from Wyoming." In: *Predicting Species Occurrences: Issues of Scale and Accuracy*, Scott, J.M., P.J. Heglund, M. Morrison, M. Raphael, J. Haufler, B. Wall, editors. Covello, California: Island Press. 483-489.
- Fletcher, P. K., D. E. Fletcher, and L. Whitley 1999. *Cherokee Trail Diaries*. Caldwell, Idaho: Caxton Printers, Ltd.
- Fowden, M. 2005. Personal communication with Mark Fowden of the Wyoming Game and Fish Department.
- Fox, D., A.M. Bartuska, J.G. Byrne, E. Cowling, R. Fisher, G. E. Likens, S. E. Lindberg, R.A. Linthurst, J. Messer, and D.S. Nichols 1989. *A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas*. General Technical Report RM-168. Fort Collins, Colorado: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. 36 pp.
- Freethy, G. W. 1987. "Upper Colorado River Basin Regional Aquifer Systems Analysis-Mesozoic rock in Colorado, Utah, Wyoming, Arizona, and New Mexico." pp. 57-70, in *Regional Aquifer Systems of the United States: Aquifers of the Western Mountain Area*, J.S. McLean and A. I. Johnson, eds. American Water Resources Association Monograph Series No. 14. 23<sup>rd</sup> Annual AWRA Conference and Symposium, Nov. 1-6, 1987. Salt Lake City, Utah. 229pp.
- Freeze, R. A., and J.A. Cherry 1979. *Groundwater*. New Jersey: Prentice-Hall, Inc. 604pp.
- Gardner, A. D., D. Allen and M. Allen 1993. *The Washakie Stage Station and Surrounding Environment 1849-1860*. Prepared for the Rawlins District, Bureau of Land Management. Rock Springs, Wyoming: Archaeological Services of Western Wyoming College.

## REFERENCES CITED

---

- Gardner, D., D. Allen and Johnson, D. 1999. *1999 Historical Assessment of the Cherokee Trail and Bryan to Browns Park Road in Sweetwater County*. Report submitted to the Bureau of Land Management, Rock Springs Field Office. Rock Springs, Wyoming.
- Gibson, R.J., R.L. Hae drich, and C.M. Wern erheim 2005. "Loss of Fish Habitat as a Consequence of Inappropriately Constructed Stream Crossings." *Fisheries* 30(1):10-17.
- Giesen, K. M. and J. W. Connelly 1993. "Guidelines for Management of Columbian Sharp-tailed Grouse Habitats." *Wildlife Society Bulletin* 21:325-333.
- Gill, J. R., E.A. Merewether, and W. A. Cobban 1970. *Stratigraphy and Nomenclature of Some Upper Cretaceous and Lower Tertiary Rocks in South-Central Wyoming*. U.S. Geological Survey Professional Paper 667. 53pp.
- Goertler, C. M. 1992. *Sediment Dynamics Within Channel and Riparian Zone Types Along a Cold-Desert Wyoming Stream*. Laramie, Wyoming: M.S. Thesis, University of Wyoming.
- Goodrich, S., D. Nelson, and N. Gale 1999. "Some Features of Wyoming Big Sagebrush Communities on Gravel Pediments of the Green River in Daggett County, Utah." pp. 159-167 in *Shrubland Ecotones*, D.E. McArthur, W. K. Otter, and D. L. Wambolt compilers. USDA Forest Service Proc. RMRS-P-11.
- Goodrick, S. 2000. *Class III Cultural Resource Inventory for the Petroleum Development Corporation Dry Cow Creek Pod*. Prepared for Holsan Environmental Planning. Rock Springs, Wyoming: Western Archaeological Services.
- Grabow, J. 2004. Carbon County Planning Director. Personal communication with George Blankenship, Blankenship Consulting LLC. August 25, 2004.
- Graf, W.L. 1978. "Fluvial Adjustments to the Spread of Tamarisk in the Colorado Plateau Region." *Geological Society of American Bulletin* 89:1491-1501.
- Gregory, R. W., and R. H. DeBruin 1991. *Oil and Gas Fields Map of the Greater Green River Basin and Overthrust Belt, Southwestern Wyoming*. Wyoming Geological Survey Map 36.
- Grieve, P. 2000. Western United Realty, Baggs, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. December 6, 2000.
- Grieve, P. 2002. Western United Realty, Baggs, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. January 17, 2002.
- Grieve, P. 2003. Western United Realty, Baggs, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. August 6, 2003.
- Gusey, W. F. 1986. *Terrestrial Wildlife and the Petroleum Industry: Interactions and Relationships. Draft Report*. Houston, Texas: Shell Oil Company.
- Hall, D. H. 1987. *Archaeological Investigations Within the Little Snake River Basin, Colorado and Wyoming*. Fort Collins, Colorado: Master's Thesis on file, submitted to the Department of Anthropology, Colorado State University.

## REFERENCES CITED

---

- Hand M. 2004. Project Manager, High Savery Dam and Reservoir Project, Wyoming Water Development Commission. Personal communication. August 12, 2004, and August 16, 2004.
- Hansen, B.R., S.R. Grattan, and A. Fulton 1999. Agricultural Salinity and Drainage. University of California Irrigation Program. University of California, Davis. Revised 1999.
- Hansen, N. 2004. Rancher, Little Snake River Valley. Personal communication with George Blankenship, Blankenship Consulting LLC. December 7, 2004.
- Harrell, L. 1989. *The Buffalo Hump Site: Late Prehistoric Dwellings in the Great Basin, Wyoming*. Cultural Resource Management Report No. 37. Rock Springs, Wyoming: Archaeological Services of Western Wyoming College.
- Harris, R. E. 1996. *Industrial Minerals and Construction Materials Map of Wyoming*. Wyoming Geological Survey Map, MS-47.
- Harris, R. E., W. D. Hasel, and J. E. Meyer 1985. *Metallic and Industrial Minerals Map of Wyoming*. Map Series 14, Scale 1:500,000. The Geological Survey of Wyoming,
- Harris, R. E., and J. K. King 1993. "Geologic Classification and Origin of Radioactive Mineralization in Wyoming." pp. 899-916 in *A Geology of Wyoming. at Wyoming Geological Survey Memoir 5*, A.W. Snoke, J.R. Steidtmann, and S. M. Roberts eds.
- Hawkins, M. 2000. Drifter's Inn Motel, Baggs, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC, Denver, CO. June 26, 2000.
- Hayden-Wing, L. D., D. B. Costain, J. L. Hull, M. R. Jackson, and T. B. Segerstrom 1986. "Movement Patterns and Habitat Affinities of a Sage Grouse Population in Northeastern Wyoming." Pages 207-226 in *Proceedings for Issues and Technology in the Management of Impacts on Western Wildlands*, R.D. Commer, T. G. Bauman, P. Davis, J. W. Monarch, J. Todd, S. Van Gytenbeek, D. Wills, and J. Woodling eds. Glenwood Springs, Colorado. February 4-6, 1985.
- Heath, R. C. 1984. *Groundwater Regions of the United States*. U.S. Geological Survey Water-Supply Paper 2242. Washington, D.C.: U.S. Government Printing Office. 78 pp.
- Hem, J. D. 1970. *Study and Interpretation of the Chemical Characteristics of Natural Water*. U.S. Geological Survey Water-Supply Paper 1473. Washington, D.C.: U.S. Government Printing Office. 363 pp.
- Herold, R. 2000. Baggs Medical Clinic. Personal communication with George Blankenship, Blankenship Consulting LLC. June 22, 2000.
- Herold, R. 2005. Town Clerk, Town of Baggs. Personal communication with George Blankenship, Blankenship Consulting LLC. September 13, 2005.
- Herold, R. 2006. Town Clerk, Town of Baggs. Personal communication with George Blankenship, Blankenship Consulting LLC. January 18, 2006.
- Hettinger, R. D., and R. Brown 1979. *Geophysical and Lithologic Logs of 1977 Coal Drilling in the Fort Union Formation, Carbon and Sweetwater Counties, Wyoming*. U.S. Geological Survey Open-File Repository 79-326: 81pp.

## REFERENCES CITED

---

- Hettinger, R. D., J. G. Honey, and D. J. Nichols 1991. *Chart Showing Correlations of Upper Cretaceous Fox Hills Sandstone and Lance Formation, and Lower Tertiary Fort Union, Wasatch, and Green River Formations, from the Eastern Flank of the Washakie Basin to the Southeastern Part of the Great Divide Basin, Wyoming.* Investigation Map I-2 151. U.S. Geological Survey Miscellaneous Investigation Series Map.
- Hettinger, R. D., and M. A. Kirschbaum 1991. *Chart Showing Correlations of Some Upper Cretaceous and Lower Tertiary Rocks, from the East Flank of the Washakie Basin to the East Flank of the Rock Springs Uplift, Wyoming.* Investigation Map, I-2152. U.S. Geological Survey Miscellaneous Investigation Series Map.
- Hewitt, H. 2001. Carbon County Planning Commission, Coldwell Banker Hewitt and Associates. Personal communication with George Blankenship, Blankenship Consulting LLC. August 23, 2001.
- Hiatt, K. 2000. Rawlins - Carbon County Chamber of Commerce. Personal communication with George Blankenship, Blankenship Consulting LLC. June 22, 2000.
- Hiatt, G. S., and D. Baker 1981. *Effects of Oil/Gas Drilling on Elk and Mule Deer Winter Distributions on Crooks Mountain, Wyoming. Final Report.* Cheyenne, Wyoming: Wyoming Game and Fish Department. 24pp.
- Hicks, L. 2003. "History and the Customs and Culture of the Little Snake River Valley." Prepared for the *Environmental Impact Statement for the Revised Land and Resource Management Plan. Medicine Bow National Forest.* Resource Coordinator, Little Snake River Conservation District. December 2003.
- Hicks, L. 2004. Resource Coordinator, Little Snake River Conservation District. Personal communication with George Blankenship, Blankenship Consulting LLC. September 21, 2004.
- Hicks, L. 2005. Resource Coordinator, Little Snake River Conservation District. Personal communication with George Blankenship, Blankenship Consulting LLC. September 08, 2005.
- Hicks, L. and A. Warren 1992. *Muddy Creek Seeking Common Ground Project.* Baggs, Wyoming: Little Snake River Conservation District.
- Hicks, L. and A. Warren 1997. "Muddy Creek Seeking Common Ground Project." In *Proceedings of Wyoming Water 1997 – What's New in the Toolbox?* April 21-23, 1997, Casper, Wyoming. Sponsored by the Wyoming Water Resource Center, University of Wyoming, pp. 12-14. *WWRC 97-05d.*
- Hicks, L., A. Warren and C. Hicks 1996. "Upper Muddy Creek Coordinated Resource Management." Symposium proceedings: *Sharing Common Ground on Western Rangelands.* Sparks, Nevada.
- Hightree, N.M 2002. Emergency Medical Technician, Memorial Hospital of Carbon County. Personal communication with George Blankenship, Blankenship Consulting LLC. January 25, 2002.

## REFERENCES CITED

---

- Hingtgen, T. M., and W. R. Clark 1984. "Small Mammal Recolonization of Reclaimed Coal Surface-mined land in Wyoming." *Journal of Wildlife Management* 48:1255-1261.
- Hoefler, T., III, S. D. Creasman, D. Murcay, and J. Bozovich 1992. "The South Baxter Brush Shelter Site: an Early Shoshonean Occupation in Southwestern Wyoming." *The Wyoming Archaeologist* 36(3-4).
- Hoffman, R. W. (Technical editor) 2001. *Northwest Colorado Columbian Sharp-tailed Grouse Conservation Plan*. Fort Collins, Colorado: Northwest Colorado Columbian Sharp-tailed Grouse Work Group.
- Holloran, M. J. 2005 *Greater Sage-Grouse (Centrocercus Urophasianus) Population Response to Natural Gas Field Development in Western Wyoming*. Dissertation. Larimer, Wyoming: University Of Wyoming.
- Honey, J. G. 1988. "A Mammalian Fauna from the Base of the Eocene Cathedral Bluffs Tongue of the Wasatch Formation, Cottonwood Creek Area, Southeast Washakie Basin, Wyoming" in *Geology and Paleocology of the Cottonwood Creek Delta in the Eocene Tipton Tongue of the Green River Formation and A Mammalian Fauna from the Eocene Cathedral Bluffs Tongue of the Wasatch Formation, Southeast Washakie Basin, Wyoming*, H.W. Roehler, J. H. Hanley, and J. G. Honey. US Geological Survey Professional Paper 1669. pp. 1-14.
- Honey, J. G. 1990. *Stratigraphic Sections Showing Coal Correlations within the Lower Coal Zone of the Paleocene Fort Union Formation, Riner Quadrangle, Carbon and Sweetwater Counties, Wyoming*. U.S. Geological Survey Coal Investigation Map, C-125.
- Honey, J. G. 2003. Personal communication with Thomas M. Bown on paleontology localities within the Atlantic Rim and adjacent areas.
- Honey, J. G., and R. D. Hettinger 1989. *Stratigraphic Sections Showing Coal Correlations within the Lower Coal Zone of the Paleocene Fort Union Formation, Fillmore Ranch and Seaverson Reservoir Quadrangles, Carbon County, Wyoming*. U.S. Geological Survey Coal Investigation Map, C-127.
- Honey, J. G., and L. N. Roberts 1989. *Stratigraphic Sections Showing Coal Correlations within the Lower Part of the Fort Union Formation in the Baggs Area, Carbon County, Wyoming*. U.S. Geological Survey Coal Investigation Map, C-135.
- HSI 1981. *Water Resources Investigation of the Atlantic Rim Project Area*, prepared for Rocky Mountain Energy. Reno/Denver: Hydro-Search, Inc.
- HWA 2000a. *Black-Footed Ferret Surveys, Atlantic Rim's Dry Cow Creek Pod, Carbon County, Wyoming*. Hayden-Wing Associates.
- HWA 2000b. *Black-Footed Ferret Surveys Atlantic Rim Sun Dog POD, Carbon County, Wyoming*. Hayden-Wing Associates.
- HWA 2001a. *Black-Footed Ferret Surveys Atlantic Rim Sun Dog POD, Carbon County, Wyoming September 9-14, 2001*. Report prepared for PE DCO and the Bureau of Land Management, Rawlins Field Office by Hayden-Wing Associates, Larimer, Wyoming. September 2001.

## REFERENCES CITED

---

- HWA 2001b. *Black-Footed Ferret Survey Results on the Atlantic Rim Blue Sky POD August, 16-18, 2001*. Report prepared for PEDCO and the Bureau of Land Management, Rawlins Field Office by Hayden-Wing Associates, Laramie, Wyoming. August 2001.
- HWA 2002a. *Black-Footed Ferret Survey Results on the Atlantic Rim Blue Sky POD September 18-20, 2002*. Report prepared for PEDCO and the Bureau of Land Management, Rawlins Field Office by Hayden-Wing Associates, Laramie, Wyoming. September 2002.
- HWA 2002b. *Black-Footed Ferret Survey Results on the Cow Creek Seismic Project Atlantic Rim Coalbed Methane EIS Project Area July 22-24, 2002*. Report prepared for Double Eagle and the Bureau of Land Management, Rawlins Field Office by Hayden-Wing Associates, Laramie, Wyoming. July 2002.
- HWA 2004. *Vegetation and Habitat Analysis of Critical Wintering Areas for Greater Sage-Grouse. Final Report*. Laramie, Wyoming: Hayden-Wing Associates. 45 pp.
- Irby, L.R., R.J. Mackie, H.I. Pac, and W.F. Kasworm 1988. "Management of Mule Deer in Relation to Oil and Gas Development in Montana's Overt Thrust Belt." pp. 113-121 in *Proceedings III: Issues and Technology in the Management of Impacted Wildlife*, J. Emerick et al., editors. Boulder, Colorado: Thorne Ecological Institute.
- Johnsgard, P. A. 1986. *Birds of the Rocky Mountains*. Boulder, Colorado: Colorado University Press. 504 pp.
- Jones, R.W. 1991. *Coal Map of Wyoming*. Wyoming Geological Survey Map, MS-34.
- Kaiser, W. R., A.R. Scott, D.S. Hamilton, R. Tyler, R.G. McMurry, N. Zhou, and C. M. Tremain 1994. *Geologic and Hydrologic Controls on Coalbed Methane: Sand Wash Basin, Colorado and Wyoming*. Colorado Geological Survey Resource Series 30/Bur. Econ. Geol. Repository. Investigation, No. 220.
- Kilgore, R. 2002. Community Development Director, City of Rawlins. Personal communication with George Blankenship, Blankenship Consulting LLC. January 9, 2002.
- Kilgore, R. 2004. City of Rawlins Planning Director. Personal communication with George Blankenship, Blankenship Consulting LLC. September 25, 2004
- Kilgore, R. 2005. Community Development Director, City of Rawlins. Personal communication with George Blankenship, Blankenship Consulting LLC. September 13, 2005.
- Kot, M. 2004. Sweetwater County Planning Director. Personal communication with George Blankenship, Blankenship Consulting LLC. September 20, 2004.
- Larson, L.R. and E.A. Zimmerman 1981. *Water Resources of Upper Separation Creek Basin, South-Central Wyoming*. U.S. Geological Survey Water Resources Investigations 80-85.
- Latham, M. A. 1999. *Class III Cultural Resource Inventory and Evaluation of Eleven Prehistoric Sites: Little Snake Supplemental Irrigation Water Supply Project, High Savery Dam and Reservoir Alternative, Carbon County, Wyoming*. Burns and McDonnell.
- Lillegraven, J.A. 2002. Personal communication to Gustav F. Winterfeld.

## REFERENCES CITED

---

- Lillegraven, J. A., and M.C. McKenna 1986. "Fossil Mammals from the "Mesaverde" Formation (Late Cretaceous, Judithian) of the Bighorn and Wind River Basins, Wyoming, with Definitions of Late Cretaceous North American Land-Mammal "Agnes"." *American Museum Novitates* 2840, 68 pp.
- Lowham, H. W., L.L. DeLong, K.R. Collier, and E.A. Zimmerman 1982. *Hydrology of Salt Wells Creek—a Plains Stream in Southwestern Wyoming*. U. S. Geological Survey Water-Resources Investigations 81-62.
- Lowham, H. W., L.L. DeLong, K.D. Peter, D.J. Wangsness, W.J. Head, and B.H. Ringen 1976. *A Plan for Study of Water and its Relation to Economic Development in the Green River and Great Divide Basins in Wyoming*. U.S. Geological Survey Open File Report 76-349.
- Love, J.D. 1970. *Cenozoic Geology of the Granite Mountains Area, Central Wyoming*. U.S. Geological Survey Professional Paper 495-C, 154 pp.
- Love, J. D. and A.C. Christiansen 1985. *Compilers. Geologic Map of Wyoming*. Scale 1:500,000. U.S. Geologic Survey Map.
- Love, J.D., A.C. Christiansen, and A.J. Ver Ploeg 1993. *Compilers. Stratigraphic Chart Showing Phanerozoic Nomenclature for the State of Wyoming*. The Geological Survey of Wyoming. Map Series 41.
- Lyman, R. N. and J.E. Volkmer 2001. *Pyrophoricity (Spontaneous Combustion) of Powder River Basin Coals - Considerations for Coalbed Methane Development*. Online at: <<<http://www.wsgsweb.uwyo.edu/Coal/CR01-1.pdf>>>
- MacDonald, M.G., and A.W. Harbaugh 1988. *A Modular Three-Dimensional Finite Difference Ground-Water Flow Model*. U.S. Geological Survey Techniques of Water Resources Investigations Report 88-4046. 201pp.
- Maddux, H. R., and W. G. Kepner 1988. "Spawning of bluehead sucker in Kanab Creek, Arizona (Pisces: Catostomidae)." *Southwest Naturalist* 33:364-365.
- Malm, W. C. 2000. *Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States, Report III*. Cooperative Institute for Research in the Atmosphere, Colorado State University, ISSN 0737-5352-47.
- Manning, R. E. 1986. *Studies in Outdoor Recreation: a Review and Synthesis of the Social Science Literature in Outdoor Recreation*. Corvallis, Oregon: Oregon State University Press.
- Martin, J. W. and B. A. Carlson 1998. "Sage Sparrow (*Amphispiza belli*)" in *The Birds of North America, No. 326*, A. Poole and F. Gill eds. Philadelphia, Pennsylvania: The Birds of North America, Inc.
- Martner, B. E. 1986. *Wyoming Climate Atlas*. Lincoln, Nebraska: University of Nebraska Press.
- Massey, R. 1989. *1989 Wyoming Comprehensive Historic Preservation Plan*. Report prepared for Archive Museums, and Historic Depart, Wyoming State Historic Preservation Office. Cheyenne, Wyoming.

## REFERENCES CITED

---

- Masursky, H. 1962. *Uranium-Bearing Coal in the Eastern Part of the Red Desert Area, Great Divide Basin, Sweetwater County, Wyoming*. U.S. Geological Survey Bulletin, 1099-B.152 pp.
- Matherne, A.M. 2006. *Effects of Roads and Well Pads on Upland Erosion in the Largo Canyon Watershed, New Mexico, 2001-2002*. U.S. Geological Survey Scientific Investigations Report 2006-5039. 24 pp.
- McGrew, P.O. 1951. "Tertiary Stratigraphy and Paleontology of South Central Wyoming." *Wyoming Geological Association, Sixth Annual Field Conference Guidebook*. pp. 54-57.
- McGrew, P.O. 1976. *Class Notes on Cenozoic Stratigraphy*. Department of Geology, University of Wyoming.
- Merewether, E. A. 1971. *Geologic Map of the Wild Horse Mountain Quadrangle, Carbon County, Wyoming*. Geologic Quadrangle Map, GQ-887. U.S. Geological Survey.
- Metcalf, M. D. 1987. "Contributions to the prehistoric chronology of the Wyoming Basin" in *Perspectives on Archaeological Resources Management in the Great Plains*, A.J. Osborn and R. C. Hassler, eds. pp. 233-261. Omaha, Nebraska: I & O Publishing Company.
- Metcalf, M. D. and K. Black 1991. *Archaeological Excavations at the Yarmony Pit House Site, Eagle County, Colorado*. Denver, Colorado: Colorado Cultural Resource Series No. 31.
- Metcalf, M. D. and P. Treat 1979. "Continuity in Late Prehistoric Period Pronghorn Procurement in Southwestern Wyoming". Paper presented at the 44<sup>th</sup> Annual Meeting of the Society for American Archaeology. Vancouver, B.C.
- Middleton, M. 1992. *Salt Content of Sediments Deposited Along Degraded and Improving Riparian Areas; Muddy Creek Wyoming*. Thesis, University of Wyoming.
- Miller, M. 1997 *Hollow Victory: The White River Expedition of 1879 and the Battle of Milk Creek*. Niwot, Colorado: University Press of Colorado.
- Miller, J.F., R.H. Frederick, and R.J. Tracey 1973. "Precipitation-Frequency Atlas of the Western United States." *National Oceanic and Atmospheric Administration Atlas 2*, vol. 2. Washington: U.S. Government Printing Office.
- Minckley, W. L. and J. E. Deacon 1991. *Battle Against Extinction: Native Fish Management in the American West*. University of Arizona Press.
- Montagne, J. de la 1991. "Cenozoic History of the Saratoga Valley Area, Wyoming and Colorado." *University of Wyoming Contributions to Geology* 29:13-70.
- Montgomery, R. 2004. Rancher, Little Snake River Valley. Personal communication with George Blankenship, Blankenship Consulting LLC. December 29, 2004.
- Morris, W. J. 1954. "An Eocene Fauna from the Cathedral Bluffs Tongue of the Washakie Basin, Wyoming." *Journal of Paleontology* 28:195-203.

## REFERENCES CITED

---

- Murcay, D. 1993. "An Assessment of the Newly Discovered Upper Powder Spring Sites: a Hunting Complex in Southwest Wyoming." *Wyoming Archaeologist* 37(1-2). Spring 1993.
- Murray, S. 2001. *The Use of Domestic Space in an Archaic Housepit: Archaeological Investigations at the High Point Site* (48CR1790). Prepared for Williams Field Services. Submitted to the Wyoming Bureau of Land Management, Rawlins Field Office. Cultural Resource Management Report no. 72. Rock Springs, Wyoming: Western Archaeological Services.
- NARCS 2000. *Muddy Creek CRM. Bureau of Land Management, Rawlins, Wyoming*. National Applied Resource Sciences Center.
- NatureServe 2003. *NatureServe Explorer: an Online Encyclopedia of Life* [web application]. Version 1.8. NatureServe. Arlington, Virginia. Online at: <<<http://www.natureserve.org/explorer>>>
- Naugle, Dr. D.E., B.L. Walker, and K. Doherty 2006. *Sage-grouse Population Response to Coal-bed Natural Gas Development in the Powder River Basin: Interim Progress Report on Region-wide Lek-count Analyses*. Wildlife Biology Program, College of Forestry and Conservation, University of Montana. May 26, 2006.
- NEIC 2003. *Internet Search of Available Earthquake Database*. National Earthquake Information Center. Online at: <<<http://neic.usgs.gov/>>>
- NEP 2001. *Report of the National Energy Policy Group, Reliable, Affordable, and Environmentally Sound Energy for America's Future*. National Energy Policy. May 2001. Online at: <<<http://www.whitehouse.gov/energy/National-Energy-Policy.pdf>>>
- NPC 2003. *Balancing Natural Gas Policy: Fueling the Demands of a Growing Economy*. National Petroleum Council. September 2003.
- NPS 2001. *Guidance on Nitrogen and Sulfur Deposition Analysis Thresholds. National Park Service and U.S. Fish and Wildlife Service*. National Park Service Air Resources Division. Online at: <<<http://www.aqd.nps.gov/ard/flagfree/2001>>> Accessed July 2003.
- NPS 2004. *Guidance on Nitrogen and Sulfur Deposition Analysis Thresholds. National Park Service and U.S. Fish and Wildlife Service*. National Park Service Air Resources Division. Online at: <<<http://www.aqd.nps.gov/ard/flagfree/2001>>> Accessed July 2004. 6 pp.
- Oedekoven, O.O. 1985. *Columbian Sharp-Tailed Grouse Population Distribution and Habitat Use in South Central Wyoming*. Laramie, Wyoming: M.S. Thesis, University of Wyoming. 58 pp.
- Oil and Gas Fields Symposium Committee 1957. *Wyoming Oil and Gas Fields Symposium*. Wyoming Geological Association. 579 pp.
- Oil and Gas Fields Symposium Committee 1979. *Oil and Gas Fields Greater Green River Basin, Volumes I and II*. Wyoming Geological Association. 428 pp.

## REFERENCES CITED

---

- Oil and Gas Fields Symposium Committee, 1992. *Oil and Gas Fields Greater Green River Basin, Wyoming*. Wyoming Geological Association. 372 pp.
- Omernik, J.M. 1987. Ecoregions of the Conterminous United States, Map (scale 1:7,500,000). *Annals of the Association of American Geographers* 77(1):118-125. 1987.
- O'Toole, P. 2004. Rancher, Little Snake River Valley. Personal communication with George Blankenship, Blankenship Consulting LLC. December 7, 2004.
- PCA 1956. *PCA Soils Primer*. Portland Cement Association.
- Perry, C., and R. Overly 1976. "Impact of Roads on Big Game Distribution in Portions of the Blue Mountains of Washington." pp. 62-68 in S.R. Heib, editor. *Proceedings of the Elk-Logging Roads Symposium*. Moscow, Idaho: University of Idaho.
- Peterson, R.A. 1993. *The Erodibility of the Muddy Creek Channel*. Laramie, Wyoming: M.S. Thesis, University of Wyoming.
- PFResources 2000. *Carbon/Sweetwater Counties of Wyoming: Workforce Report*. Dallas, Texas. October 2000.
- Pipiringos, G. N. 1961. *Uranium-Bearing Coal in the Central Part of the Great Divide Basin*. U.S. Geological Survey Bulletin 1099-A. 104 pp.
- Poland, J. F. 1984. "Mechanics of Land Subsidence Due to Fluid Withdrawal" in *Guidebook to Studies of Land Subsidence Due to Ground-Water Withdrawal: Studies and Reports in Hydrology 40*, J.F. Poland ed. Prepared for the International Hydrological Programme, Working Group 8.4, United Nations Educational, Scientific, and Cultural Organization (UNESCO). Paris, France. pp. 37-54.
- Porter, M. A. 1999. *Spatial Relationships Between Sympatric Mule Deer and Elk in South-Central Wyoming*. Laramie, Wyoming: M.S. Thesis, University of Wyoming. 60 pp.
- Powell, J. 2003. *Distribution, Habitat Use Patterns, and Elk Response to Human Disturbance in the Jack Morrow Hills, Wyoming*. MS Thesis. Laramie, Wyoming: University of Wyoming.
- Quist, M.C., M.R. Bower, and W.A. Hubert In press. "Summer Food Habitat and Trophic Overlap of Round Tail Chub and Creek Chub in Muddy Creek, Wyoming" *Southwestern Naturalist*.
- Rawlins Daily Times 2000. *Rag Shoshone Coal Mine Closes Thursday*. August 30, 2000.
- Rawlins Daily Times 2001. *Wamsutter Ponders Impacts*. February 7, 2001.
- Rawlins Daily Times 2006. *State in a "New" Era with Energy and For 20 years, its About Energy, Governor Says*. April 22, 2006.
- Reeve, A. F. 1984. *Environmental Influences on Male Pronghorn Home Range and Pronghorn Behavior*. Laramie, Wyoming: PhD. Dissertation, University of Wyoming. 172 pp.

## REFERENCES CITED

---

- Remington, T. E., and C. E. Braun 1991. "How Surface Coal Mining Affects Sage Grouse, North Park, Colorado." *Proceedings, Issues and Technology in the Management of Impacted Western Wildlife*. Thorne Ecological Institute 5:128–132.
- Rigby, J. K., Jr. 1980. "Swain Quarry of the Fort Union Formation, Middle Paleocene (Torrejonian) Carbon, County, Wyoming: Geological Setting and Mammalian Fauna." *Evolutionary Monographs* 3, 179 pp.
- Ritzma, H. R. 1949. *Geology Along the Southwest Flank of the Sierra Madre, Carbon County, Wyoming*. M.A. Thesis, University of Wyoming unpublished.
- Roehler, H. W. 1972. "A Review of Eocene Stratigraphy in the Washakie Basin, Wyoming." *Wyoming Geological Association Guidebook Field Conference on Tertiary Biostratigraphy of Southern and Western Wyoming*. pp. 3-19.
- Roehler, H. W. 1973. *Stratigraphy of the Washakie Formation in the Washakie Basin, Wyoming*. U.S. Geological Survey Bulletin 1369, 40 pp.
- Roehler, H. W. 1977. *Geologic map of the Rock Springs Uplift and Adjacent Areas, Sweetwater County, Wyoming*. U.S. Geological Survey Open File Report 77-242, Scale 1:250,000.
- Roehler, H. W. 1985. *Geologic Map of the Kinney Rim 30 x 60 Minute Quadrangle, Wyoming and Colorado*. U.S. Geological Survey Miscellaneous Investigation Series Map I-16 15, Scale 1:100,000.
- Roehler, H. W. 1991a. "Revised Stratigraphic Nomenclature for the Wasatch and Green River Formations" in *Geology of the Eocene Wasatch, Green River, and Bridger (Washakie) Formations, Green River Basin, Wyoming, Utah, and Colorado*. U.S. Geological Survey Professional Paper 1506-B, 38 pp.
- Roehler, H. W. 1991b. "Godiva Rim Member- A New Stratigraphic Unit of the Green River Formation in Southwest Wyoming and Northwest Colorado" in *Geology of the Eocene Wasatch, Green River, and Bridger (Washakie) Formations, Green River Basin, Wyoming, Utah, and Colorado*. U.S. Geological Survey Professional Paper 1506-B, 38 pp.
- Roehler, H. W. 1992a. *Introduction to Greater Green River Basin Geology, Physiography, and History of Investigations*. U.S. Geological Survey Professional Paper 1506-A, 14 pp.
- Roehler, H. W. 1992b. *Description and Correlation of Eocene Rocks in Stratigraphic Reference Sections for the Green River and Washakie Basins, Southwest Wyoming*. U.S. Geological Survey Professional Paper 1506-D, 83 pp.
- Roehler, H. W. 1992c. *Correlation, Composition, Aerial Distribution and Thickness of Eocene Stratigraphic Units, Greater Green River Basin, Wyoming, Utah, and Colorado*. U.S. Geological Survey Professional Paper 1506-E, 49 pp.
- Roehler, H. W. 1993. *Eocene Climates, Depositional Environments, and Geography, Greater Green River Basin, Wyoming, Utah, and Colorado*. U.S. Geological Survey Professional Paper 1506-F, 14 pp.

## REFERENCES CITED

---

- Roehler, H. W., J.H. Hanley, J.G. Honey 1988. *Geology and Paleoecology of the Cottonwood Creek Delta in the Eocene Tipton Tongue of the Green River Formation and A Mammalian Fauna from the Eocene Cathedral Bluffs Tongue of the Wasatch Formation , Southeast Washakie Basin, Wyoming*. U.S. Geological Survey Bulletin 1669 52 pp.
- Rosenberg, R. 1994. IMACS site form addendum for site 48CR3648.
- Rotenberry, J. T., M. A. Patten, and K. L. Preston 1999. "Brewer's Sparrow (*Spizella breweri*)" in *The birds of North America, No. 390*, A. Poole and F. Gill, ed s. Philadelphia, Pennsylvania: The Birds of North America, Inc.
- Rumbaugh, J.O., and D.B. Rumbaugh 2002. *Groundwater Vistas Version 3.33, Software and User's Manual*. Environmental Simulations Inc.
- Sanders, R. B. 1974. *Geologic Map and Coal Resources of the Riner Quadrangle, Carbon and Sweetwater Counties, Wyoming*. U.S. Geological Survey Coal Investigation Map, C-68.
- Sanders, R. B. 1975. *Geologic Map and Coal Resources of the Creston Junction Quadrangle, Carbon and Sweetwater Counties, Wyoming*. U.S. Geological Survey Coal Investigation Map, C-73.
- Sawyer, H., R. Nielson, L. McDonald, and D. Strickland 2004. *2004 Annual Report. Sublette Mule Deer Study (Phase II): Long-term Monitoring Plan to Assess Potential Impacts of Energy Development on Mule Deer in the Pinedale Anticline Project Area*. Cheyenne, Wyoming: WesternEcosystems Technology, Inc.
- Scheffe, R.D. 1988. *VOC/NO<sub>x</sub> Point Source Screening Tables*. Research Triangle Park, North Carolina: Office of Air Quality Planning and Standards. August 1988.
- Schlosser, I.J. 1995. "Critical landscape attributes that influence fish population dynamics in headwater streams." *Hydrobiologia* 303:71-81.
- Schroeder, T. 2005. Program Principal, Wyoming Department of Environmental Quality, Industrial Siting Division. Personal communication with David Simons, U.S. Department Of Interior, Bureau of Land Management, Rawlins Field Office. November 4, 2005.
- Scott, A. R., R. Tyler, D. S. Hamilton, and N. Zhou 1994. "Coal and In-Place Gas Resources of the Greater Green River Basin." *American Association of Petroleum Geologists Annual Convention Program with Abstracts* 4:253-254.
- Seaber, P. R., F.P. Karpinos, and G.L. Knapp 1987. *Hydrologic Unit Maps*. U. S. Geological Survey, Water-Supply Paper 2294.
- Shimkin, D. B. 1986 Eastern Shoshone, in W.L. D'Azevedo (Editor): *Handbook of North American Indians Vol. 11: Great Basin*, pp. 308-35. Smithsonian Institution. Washington, D.C.
- Shields, F. D., S. S. Knight, and C. M. Cooper 1994. "Effects of Channel Incision on Base Flow Stream Habitats and Fishes." *Environmental Management* 18:43-57.

## REFERENCES CITED

---

- Skinner, Q.D., M.A. Smith, T.A. Wesche, and S. Lowry 1989. "A Survey of Values Associated with Riparian Conditions of a Stream Tributary to the Green/Colorado River." in *Practical Approaches to Riparian Resource Management; an Educational Workshop, Billings, Montana*, R.E. Gresswell, B.A. Barton and J.L. Kershner eds. pp. 175. WWRC 89-48.
- Skinner, Q.D., M. A. Smith, T.A. Wesche, J. S. Todd and J.D. Rodgers 1991. "Research Findings from Riparian Zone Management on Muddy Creek." in *Proceedings of the Third Intermountain Meadow Symposium*, Steamboat Springs, Colorado. pp. 1-8. WWRC 91-24.
- Smith, A. M. 1974. *Ethnography of the Northern Utes*. Albuquerque, New Mexico: Museum of New Mexico Papers in Anthropology No. 17.
- Smith, J. H. 1961. "A Summary of Stratigraphy and Paleontology, Upper Colorado and Montanan Groups, South-Central Wyoming, Northeastern Utah, and Northwestern Colorado." pp. 101-112 in *Symposium on Late Cretaceous rocks, Wyoming and Adjacent Areas; Wyoming Geological Association 16<sup>th</sup> Annual Field Conference Guidebook*.
- Smith, J. B., M.F. Ayler, C.C. Knox, and B. C. Pollard 1972. *Strippable Coal Reserves of Wyoming*. U.S. Bureau of Mines Inf. Circular, IC-8538: 51 pp.
- Sullivan, R. 1980. *A Stratigraphic Evaluation of the Eocene Rocks of Southwestern Wyoming*. Geological Survey of Wyoming Report of Investigations 20, 50 pp.
- Tart, D. L. and A. H. Winward 1996. Revised 2001. "Key to sagebrushes (*Artemisia*) of Wyoming" in *Big sagebrush plant associations of the Pinedale Ranger District, Final Review Draft*. Bridger-East Ecological Unit Inventory, Bridger-Teton National Forest.
- Taylor, D. 2004. Professor/Extension Specialist, Department of Agricultural and Applied Economics. Personal communication with George Blankenship, Blankenship Consulting LLC. August 4, 2004.
- Texas Resource Consultants 1981. *Soil Inventory of the Overland Area Wyoming*. Prepared for the Bureau of Land Management in Cooperation with the Soil Conservation Service.
- Thomas, J.W., and D.E. Towell eds. 1982. *Elk of North America: Ecology and Management*. Stackpole. 698 pp.
- Thompson, J. 2001. "Muddy Creek Coordinated Resource Management Project, Carbon County Wyoming." *Workshop on Collaborative Resource Management in the Interior West*. Red Lodge, Montana.
- Thompson, K. W. 1989. *Salvage Excavations at the Nova Site, a Late Prehistoric Housepit in South Central Wyoming*. Cultural Resource Management Report No. 49. Rock Springs, Wyoming: Archaeological Services of Western Wyoming College.
- Thompson, K. W. and J. V. Pastor 1995. *People of the Sage: 10,000 Years of Occupation in Southwest Wyoming*. Cultural Resource Management Report No. 67. Rock Springs, Wyoming: Archaeological Services of Western Wyoming College.

## REFERENCES CITED

---

- Trewartha, G. 1968. *An Introduction to Climate*. New York, New York: McGraw-Hill Book Company. 408 pp.
- Trombulak, S.C. and C.A. Frissell 2000. "Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities." *Conservation Biology* 14:18-30.
- UDNR 2004. *Range-wide Conservation Agreement for Roundtail Chub, Gila robusta, Bluehead Sucker, Catostomus discobolus, and Flannelmouth Sucker, Catostomus latipinnis*. Salt Lake City, Utah: Utah Department of Natural Resources.
- U.S. Census Bureau 2000a. *Census 2000, Summary File 1*. Online at: <<[http://eadiv.state.wy.us/demog\\_data/pop2000/pop00.htm](http://eadiv.state.wy.us/demog_data/pop2000/pop00.htm)>> Accessed March 2003.
- U.S. Census Bureau 2000b. *Census 2000, Summary File 3*. Online at: <<[http://eadiv.state.wy.us/demog\\_data/pop2000/pop00.htm](http://eadiv.state.wy.us/demog_data/pop2000/pop00.htm)>> Accessed March 2003.
- U.S. Census Bureau 2002. *Table DP-4. Profile of Selected Housing Characteristics: 2000, Rawlins City, Wyoming*. Online at: <<<http://eadiv.state.wy.us/demogdata/pop2000/ProfilePDFsWY/63900.pdf>>> June 4, 2002. Accessed August 2003.
- U.S. Census Bureau 2004. *Households and Household Change: 1990 – 2000*. Online at: <<[http://eadiv.state.wy.us/demog\\_data/pop2000/Census\\_Tables/Households90\\_00.xls](http://eadiv.state.wy.us/demog_data/pop2000/Census_Tables/Households90_00.xls)>> Accessed March 2004.
- USDA 1954. *Agriculture Handbook 60*. U.S. Department of Agriculture.
- USDA-FS 1989. *A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas. General Technical Report RM-168*. Fort Collins, Colorado: U.S. Department of Agriculture Forest Service, Rocky Mountain Forest and Range Experiment Station. 36 pp.
- USDA-FS 2000. *Screening Methodology for Calculating ANC Change to High Elevation Lakes, User's Guide*. U.S. Department of Agriculture Forest Service, Rocky Mountain Region. January 2000.
- USDA-SCS 1971. *Guide for Interpreting Engineering Uses of Soils*. 87 pp. Washington, D.C.: U.S. Government Printing Office.
- USDI-BLM 1980. *BLM Handbook H-8410-1 – Visual Resource Inventory*. U.S. Department of Interior, Bureau of Land Management. 1980.
- USDI-BLM 1983. *Riley Ridge EIS Air Resources Technical Report*. Kemmerer, Wyoming: U.S. Department of Interior, Bureau of Land Management, Kemmerer Field Office, in Cooperation with Environmental Research and Technology Inc.
- USDI-BLM 1987. *Muddy Creek Watershed Plan, Divide Resource Area, Rawlins, Wyoming*. U.S. Department of Interior, Bureau of Land Management.

## REFERENCES CITED

---

- USDI-BLM 1988. *Proposed Resource Management Plan/Final Environmental Impact Statement for the Great Divide Resource Area (Formerly Medicine Bow and Divide Resource Areas) Rawlins District, Wyoming.* Rawlins, Wyoming: U.S. Department of the Interior, Bureau of Land Management, Great Divide Resource Area, Rawlins District Office. 249pp.
- USDI-BLM 1990. *Great Divide Resource Area Record of Decision and Approved Resource Management Plan.* Rawlins, Wyoming: U.S. Department of the Interior, Bureau of Land Management, Rawlins District Office, Great Divide Resource Area. 74pp.
- USDI-BLM 1994. *Creston/Blue Gap Natural Gas Project Environmental Impact Statement, Carbon and Sweetwater Counties, Wyoming, Rawlins Field Office, Rawlins, Wyoming.* U.S. Department of the Interior, Bureau of Land Management. 74pp.
- USDI-BLM 1995. *Greater Wamsutter Area II Natural Gas Development Project Environmental Impact Statement, Rawlins Field Office, WY.* U.S. Department of the Interior, Bureau of Land Management.
- USDI-BLM 1997. *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Land Administered by the Bureau of Land Management in the State of Wyoming.* Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming, pg. 13. August 12, 1997.
- USDI-BLM 1999. *Management (VRM) Manual H-8431, Visual Resource Contrast Rating.* Online at: <<http://www.blm.gov/nstc/VRM/8410.html>> November 8, 2004.
- USDI-BLM 2000a. *Continental Divide/Wamsutter II Natural Gas Development Environmental Impact Statement and Record of Decision, Sweetwater and Carbon Counties, Wyoming, Rawlins and Rock Springs Field Offices.* U.S. Department of the Interior, Bureau of Land Management. May 2000.
- USDI-BLM 2000b. *South Baggs Area Natural Gas Development Project Environmental Impact Statement, Carbon County, Wyoming, Rawlins Field Office.* U.S. Department of the Interior, Bureau of Land Management. August 2000.
- USDI-BLM 2001a. *Issuance of BLM (Wyoming) Sensitive Species Policy and List.* Instruction Memorandum no. WY-2001-040, from Alan R. Pierson, State Director, Cheyenne, Wyoming. April 9, 2001.
- USDI-BLM 2001b. *Environmental Assessment for the Atlantic Rim Coalbed Methane Project, Sun Dog Pod, Carbon County, Wyoming, Rawlins Field Office.* U.S. Department of the Interior, Bureau of Land Management. September 2001.
- USDI-BLM 2002a. *BLM Wyoming sensitive species policy and list, September 20, 2002.* Bureau of Land Management, Cheyenne, Wyoming. U.S. Department of the Interior, Bureau of Land Management. 14pp.
- USDI-BLM 2002b. *Environmental Assessment for the Atlantic Rim Coalbed Methane Project, Blue Sky Pod, Carbon County, Wyoming, Rawlins Field Office.* U.S. Department of the Interior, Bureau of Land Management. January, 2002.

## REFERENCES CITED

---

- USDI-BLM 2002c. *Environmental Assessment for the Atlantic Rim Coalbed Methane Project, Cow Creek Pod, Carbon County, Wyoming, Rawlins, WY*. U.S. Department of the Interior, Bureau of Land Management. February 2002.
- USDI-BLM 2002d. *Technical Support Document, Air Quality Impact Assessment for the Montana Final Statewide Oil and Gas EIS and Proposed Amendment of the Powder River and Billings Resource Management Plans and the Wyoming Final EIS and Planning Amendment for the Powder River Basin Oil and Gas Development Project*. Prepared for U.S. Department of Interior, Bureau of Land Management, Montana and Wyoming State Offices, by Environmental Assessment Division, Argonne National Laboratory, Argonne, Illinois.
- USDI-BLM 2002e. *Upper Colorado River Basin Standards and Guidelines Assessment*. Rawlins, Wyoming: U.S. Department of Interior, Bureau of Land Management, Rawlins Field Office.
- USDI-BLM 2002f. *Vermillion Basin Natural Gas Exploration and Development Project Environmental Assessment, Sweetwater County, Wyoming, Rock Springs Field Office*. U.S. Department of the Interior, Bureau of Land Management. August 2000. Online at: <<<http://www.wy.blm.gov/nepa/rsfodocs/vermbasin/index.htm>>>
- USDI-BLM 2003a. *FEIS and ROD for Powder River Basin Oil and Gas Project (BLM/WY/PL-03/004+1310)*. U.S. Department of the Interior, Bureau of Land Management. January 2003. 20pp.
- USDI-BLM 2003b. *Rawlins Field Office, Rawlins Resource Management Plan Management Situation Analysis (MSA)*. Online at: <<[http://www.rawlinsrmp.com/documents\\_MSA.html](http://www.rawlinsrmp.com/documents_MSA.html)>> Accessed October 2003.
- USDI-BLM 2003c. *Wild Horse Herd Management Areas*. Rawlins Field Office, Rawlins, Wyoming, U.S. Department of the Interior, Bureau of Land Management. Online at: <<<http://www.blm.gov/rfo/wh.htm>>>
- USDI-BLM 2003d. *Environmental assessment for the Atlantic Rim coalbed methane project, Brown Cow POD, Carbon County, Wyoming, Rawlins Field Office*. U.S. Department of the Interior, Bureau of Land Management. December 2003.
- USDI-BLM 2003e. *Environmental Assessment for the Atlantic Rim Interim Drilling Project, Doty Mountain POD, Carbon County, Wyoming, Rawlins Field Office*. U.S. Department of the Interior, Bureau of Land Management. October 2003.
- USDI-BLM 2003f. *Environmental Assessment for the Atlantic Rim Interim Drilling Project, Red Rim POD, Carbon County, Wyoming, Rawlins Field Office*. U.S. Department of the Interior, Bureau of Land Management. November 2003.
- USDI-BLM 2003g. *Desolation Flats Natural Gas Development Project Environmental Impact Statement, Sweetwater and Carbon Counties, Wyoming, Rawlins and Rock Springs Field Offices*. U.S. Department of the Interior, Bureau of Land Management.
- USDI-BLM 2004a. *Desolation Flats Natural Gas Field Development Project Environmental Impact Statement, Carbon County, Wyoming, Rawlins and Rock Springs Field Office*. U.S. Department of the Interior, Bureau of Land Management. May 2004.

## REFERENCES CITED

---

- USDI-BLM 2004b. *Environmental Assessment for the Atlantic Rim Interim Drilling Project, Jolly Roger POD, Carbon County, Wyoming, Rawlins Field Office*. U.S. Department of the Interior, Bureau of Land Management. September, 2004.
- USDI-BLM 2004c. *RMP DEIS 2004*. U.S. Department of the Interior, Bureau of Land Management, Rawlins Field Office .
- USDI-BLM 2004d. *Environmental Assessment for the Hay Reservoir Unit Natural Gas Infill Development Project, Carbon County, Wyoming, Rawlins Field Office*. U.S. Department of the Interior, Bureau of Land Management. October 2004. Online at: <<http://www.wy.blm.gov/nepa/rfodocs/hayreservoir2/index.htm>>
- USDI-BLM 2006. *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development*. U.S. Department of the Interior and the United States Department of Agriculture. 2006.. BLM/WO/ST-06/021+3071. Bureau of Land Management. Denver, Colorado. 84 pp
- USDI-FWS 1985. *Recovery Plan for the Pahrnagat Roundtail Chub, Gila robusta jordani*. Portland, Oregon: U.S. Department of the Interior, Fish and Wildlife Service. U.S. Fish and Wildlife Service. 71pp.
- USDI-FWS 1989. *Black-Footed Ferret Survey Guidelines for Compliance with the Endangered Species Act*. Denver, Colorado and Albuquerque, New Mexico: U.S. Department of the Interior, Fish and Wildlife Service. 15pp.
- USDI-FWS 1993. *Colorado River Endangered Fishes Critical Habitat. Draft Biological Support Document*. Salt Lake City, Utah: U.S. Department of the Interior, Fish and Wildlife Service.
- USDI-FWS 1995. "Intra-Service Section 7 Consultation for Elimination of Fees for Water Depletions of 100 Acre-Feet or Less from the Upper Colorado River Basin." Memorandum to the Assistant Regional Director, Ecological Services, Region 6, from Regional Director 6. March 9, 1995.
- USDI-FWS 1999. "Endangered and Threatened Wildlife and Plants: Proposed Threatened Status Mountain Plover." United States Fish and Wildlife Service. *Federal Register* 64: 7587-7601.
- USDI-FWS 2002. *Endangered, Threatened, Proposed, Petitioned and Candidate Species of Wyoming*. Cheyenne, Wyoming: U.S. Department of the Interior, Fish and Wildlife Service, Wyoming Field Office.
- USDI-FWS 2003. *Upper Colorado River Endangered Fish Recovery Program and San Juan River Basin Recovery Implementation Program, Program Highlights 2002-2003*. U.S. Fish and Wildlife Service. Online at: <<<http://mountainprairie.fws.gov/ColoradoRiver/publicpages/Highlights02-03.pdf>>> Accessed February 11, 2004.
- USDI-FWS 2004. *Threatened, Endangered, and Proposed Species of Carbon, County, Wyoming*. Cheyenne, Wyoming: U.S. Department of the Interior, Fish and Wildlife Service.

## REFERENCES CITED

---

- USDL-BLS 2000. *Incidence Rates of Nonfatal Occupational Injuries and Illnesses by Selected Industries and Case Types*. Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics.
- USDOT 1998. *Hazardous Liquid and Natural Gas Pipeline Safety Data and Property Damage*. National Transportation Statistics. Washington, D.C.: U.S. Department of Transportation.
- USGS 1976. *Hydrologic Unit Map, 1974, State of Wyoming*. Reston, Virginia: U.S. Geological Survey.
- USGS 1980. *Water Resources Data for Wyoming, Water Year 1978: v. 2* USGS Water-Data Report WY-78-2. U.S. Geological Survey.
- USGS 2004. *Patuxent Wildlife Research Center*. United States Geological Survey. Online at : <<<http://www.mbr-pwrc.usgs.gov/bbs/cbcra/h3780ra.html>>>
- USGS 2005. *Streamflow and Surface Water Quality Summaries of USGS Stations Available on the Internet*. U.S. Geological Survey. Online at: <<<http://waterdata.usgs.gov/usa/nwis/>>>
- Upper Colorado River Endangered Fish Recovery Program 1999. *Website of the Upper Colorado River Endangered Fish Recovery Program*. Online at: <<<http://www.r6.fws.gov/coloradoriver>>>
- UW 1997. *Southwest Wyoming Resource Evaluation: Part 1, Historical Context, Final Report*. Prepared for the US Bureau of Land Management, Wyoming State Office. University of Wyoming, College of Agriculture, Cooperative Extension Service, Agricultural Economics Department. May 1997.
- Valdez, R. A. and G. H. Clemmer 1982. "Life History and Prospects for Recovery of the Humpback and Bonytail Chub." pages 109-119 in *Fishes of the Upper Colorado River System: Present and Future*, W.H.Miller, H.M. Tyus, and C.A. Carlson, eds. Bethesda, MD: Western Division, American Fisheries Society.
- Valdez, R. A., R. J. Ryel, S. W. Carothers, and D. A. House 2000. *Recovery Goals for the Humpback Chub (Gila cypha) of the Colorado River Basin: A supplement to the Humpback Chub Recovery Plan*. Washington, D.C.: U.S. Department of the Interior, U.S. Fish and Wildlife Service.
- Van Voast, W. A.. 2003. "Geochemical Signature of Formation Waters Associated with Coalbed Methane." *AAPG Bulletin* 87(4):667-676.
- Vosika, B. N. 2000. USDI-BLM NEPA Coordinator, Rawlins Field Office. Personal communication with George Blankenship, Blankenship Consulting LLC. May 5, 2000.
- Waldner, V. 2000. Personal communication with George Blankenship, Blankenship Consulting LLC. December 5, 2000.
- Waldner, V. 2002. Personal communication with George Blankenship, Blankenship Consulting LLC. January 18, 2002.

## REFERENCES CITED

---

- Waldner, V. 2004. Mobile home park owner, Wamsutter, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. November 5, 2004.
- Waldner, V. 2005. Mobile home park owner, Wamsutter, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. September 13, 2005.
- Ward, A.L. 1976. "Elk Behavior in Relation to Timber Harvest Operations and Traffic on the Medicine Bow Range in South-Central Wyoming." in Hieb, S. R., ed. *Proceedings of the elk-logging-roads symposium*. Moscow, Idaho: Forestry, Wildlife and Range Experiment Station, University of Idaho: 32-43.
- Ward, A.L., J.J. Cupal, A.L. Lee, C.A. Oakley, and R.W. Weeks 1973. "Elk Behavior in Relation to Cattle Grazing, Forest Recreation, and Traffic." *Transactions of the North American Wildlife and Natural Resources Conference* 38:327-337.
- Warren, A. 2000. USDI-BLM Range Management Specialist, Rawlins Field Office. Personal communication with George Blankenship, Blankenship Consulting LLC. June 14, 2000.
- Warren, A. 2006. *Browse Monitoring/Trend Report: Lower Muddy Creek Watershed*. USDI-BLM Rawlins Field Office, Wyoming. June 19, 2006.
- Waters, T.F. 1995. *Sediment in Streams: Sources, Biological Effects and Control*. Monograph 7. Bethesda, Maryland: American Fisheries Society.
- WDAI 2001. *Division of Economic Analysis. Population for Counties and Incorporated Places: 1990 and 2000*. Wyoming Department of Administration and Information.
- WDAI 2002b. *Wyoming Incorporated Place Population Estimates: April 1, 2000 to July 1, 2002*. Wyoming Department of Administration and Information. Online at: <<<http://eadiv.state.wy.us/pop/SUB-02EST.htm>>> Accessed October 2003.
- WDAI 2003a. *Employment by Industry for the United States, Wyoming and Wyoming Counties*. Wyoming Department of Administration and Information.
- WDAI 2003b. *Regional Economic Profiles*. Wyoming Department of Administration and Information. Online at: <<<http://eadiv.state.wy.us/i&e/econ-profile.htm>>>
- WDAI 2003c. *Total Tax Collections by County*. Wyoming Department of Administration and Information. Online at: <<<http://eadiv.state.wy.us/s&UTax/s&u.asp>>>
- WDAI 2003 d. *Consensus Revenue Estimating Group, Wyoming State Revenue Forecasts. Fiscal Year 2003 - Fiscal Year 2008. Table 6. Mineral Severance Taxes to all Accounts; Fiscal Year Distributions by Mineral*. Wyoming Department of Administration and Information. January 2003.
- WDAI 2004 a. *Historical Decennial Census Population for Wyoming Counties, Cities, and Towns*. Online at: <<[http://eadiv.state.wy.us/demog\\_data/cnty\\_city\\_hist.htm](http://eadiv.state.wy.us/demog_data/cnty_city_hist.htm)>> Accessed October 2004.
- WDAI 2004b. *Annual population for Cities, Counties and Towns 1990 to 2000 and Wyoming Incorporated Place Population Estimates: April 1, 2000 to July 1, 2003*. Online at: <<[http://eadiv.state.wy.us/pop/c&sc90\\_00.htm](http://eadiv.state.wy.us/pop/c&sc90_00.htm)>> and <<<http://eadiv.state.wy.us/pop/SUB-03EST.htm>>> Accessed October 2004.

## REFERENCES CITED

---

- WDAI 2004c. *Population for Wyoming, Counties, Cities, and Towns: 2000 to 2020*. Online at: <<<http://eadiv.state.wy.us/pop/wyc&sc20.htm>>> Accessed October 2004.
- WDE 2004. *Local Area Labor Force Information. 1990-2003 Wyoming Benchmark Labor Force Estimates--Annual Averages*. Wyoming Department of Employment. Online at: <<<http://doe.state.wy.us/lmi/laus/9002aa.htm>>>
- WDEQ 2005. *Water Quality Rules and Regulations, Chapter 1, Wyoming Surface Water Quality Standards, June 21, 2001*. Wyoming Department of Environmental Quality. Online at: <<http://deq.state.wy.us/wqd/surfacestandards/>>>
- WDEQ 2006. *Wyoming's 2006 305(b) State Water Quality Assessment Report and 2006 303(d) List of Waters Requiring TMDLs*. Cheyenne, Wyoming: Wyoming Department of Environmental Quality.
- WDOR 2003. *Excise Tax Division. Sales, use and lodging tax rates effective 10/1/2003*. Wyoming Department of Revenue. Online at: <<[HTTP://revenue.state.wy.us/contentroot/MapsPubs/salestax/MASTER\\_Rates\\_10-1-03.pdf](http://revenue.state.wy.us/contentroot/MapsPubs/salestax/MASTER_Rates_10-1-03.pdf)>>
- Weigel, J. F. 1987. "Sources of Hydrologic Data on Mesozoic Formations in the Upper Colorado River Basin and Comparison of Data Analysis Methods." pp. 71-80 in *Regional aquifer systems of the United States: aquifers of the western mountain area*, J.S. McLean and A. I. Johnson, eds. American Water Resource Association Mono. Ser. No. 14. 23<sup>rd</sup> Annual AWRA Conference and Symposium, November 1-6, 1987, Salt Lake City, Utah. 229pp.
- Weishampel, D. B. 1992. "Dinosaurian Distribution" in Weishampel, D. B., P. Dodson, and H. Osmolska, editors. *The Dinosauria*. Berkeley, California: University of California Press. pp. 63-139.
- Weiss, S. J., E. O. Otis, and O. E. Maughan 1998. "Spawning Ecology of Flannelmouth Sucker, *Catostomus latipinnis* (Catostomidae), in Two Small Tributaries of the Lower Colorado River." *Environmental Biology of Fishes* 52:419-433.
- Weitz, J. L., and J. D. Love 1952. *Geologic Map of Carbon County, Wyoming*. U.S. Geological Survey and Wyoming Geological Survey Map. Scale 1:160,000.
- Welder, G. E. and L. J. McGreevy 1966. *Groundwater Reconnaissance of the Great Divide and Washakie Basins and Some Adjacent Areas, Southwestern Wyoming*. U.S. Geological Survey, Hydrologic Investigations Atlas, HA-219.
- Wells, R. W., T. K. Doney, E. G. Knox, and R.W. Pols 1981. *Soil Inventory of the Overland Area, Wyoming* (2 vol.). Columbia, Maryland: Prepared for the Bureau of Land Management in Cooperation with the Soil Conservation Service. Soil and Land Use Tech. Inc.
- WGFD 1996. *Herd Unit Land Statistics*. Cheyenne, Wyoming: Wyoming Game and Fish Department, Biological Services Section.
- WGFD 1998. *Muddy Creek Basin Management Plan*. Cheyenne, Wyoming: Wyoming Game and Fish Department.

## REFERENCES CITED

---

- WGFD 1999. *Atlas of Birds, Mammals, Reptiles and Amphibians in Wyoming*. Lander, Wyoming: Wyoming Game and Fish Department, Biological Services Section. 190pp.
- WGFD 2002. *2002 Harvest Information – 770, 2002 Deer*. Wyoming Game and Fish Department. Online at: <<<http://gf.state.wy.us/downloads/pdf/HarvestRpt/02BDeer.pdf>>> Accessed August 2005.
- WGFD 2003a. *Wildlife Observation System (WOS) Database Printout. T12-21N: R88-92W*. Cheyenne, Wyoming: Wyoming Game and Fish Department. November 17, 2003.
- WGFD 2003b. *Annual Big Game Yerd Unit Reports 2002*. Cheyenne, Wyoming: Wyoming Game and Fish Department, Green River Region. 349pp.
- WGFD 2004a. *Streams and Lakes Inventory Database*. Wyoming Game and Fish Department. Online at: <<<http://deq.state.wy.us/wqd/surfacestandards>>> August 20, 2004.
- WGFD 2004b. *Warmwater Stream Assessment Manual*. Cheyenne, Wyoming: Wyoming Game and Fish Department.
- WGFD 2004c. *Minimum Programmatic Standards Recommended by the Wyoming Game and Fish Department to Sustain Wildlife Habitats Affected by Oil and Gas Development*. Cheyenne, Wyoming: Wyoming Game and Fish Department.
- WGFD 2004d. *Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands*. Wyoming Game and Fish Department. Cheyenne, Wyoming. This was the Oil and Gas Mitigation Working Group 2004. Blomquist.
- WGS 2003. *100 Years of Earthquakes (1871-1970)*. Wyoming Geological Survey. Online at: <<[www.wsgsweb.uwyo.edu/coop.asp](http://www.wsgsweb.uwyo.edu/coop.asp)>> <<[www.wrds.uwyo.edu/wrds/wsgs/hazards/quakes/quake.html](http://www.wrds.uwyo.edu/wrds/wsgs/hazards/quakes/quake.html)>>
- Williams, V. 2001. Maintenance Department, Town of Wamsutter. Personal communication with George Blankenship, Blankenship Consulting LLC, April 16, 2001.
- Willis, J. 2000. Country Inn Motel, Baggs, Wyoming. Personal communication with George Blankenship, Blankenship Consulting LLC. June 7, 2000.
- Winterfeld, G. F. 1979. *Geology and Mammalian Paleontology of the Fort Union Formation, Eastern Rock Springs Uplift, Sweetwater County, Wyoming*. Laramie, Wyoming: University of Wyoming, Master's Thesis. 188 pp.
- Winterfeld, G. F. 1982. "Mammalian Paleontology of the Fort Union Formation (Paleocene), Eastern Rock Springs Uplift, Sweetwater County, Wyoming." *Contributions to Geology. The University of Wyoming* 21:73-111.
- Winward, A. H. 1993. Unpublished field trip notes by WGFD Region 4 Habitat personnel. Star Valley, Wyoming. September 2, 1993.
- Wischmeier, W. H., and D. D. Smith 1978. *Predicting Rainfall Rrosion Losses*. U.S. Department of Agriculture, Agricultural Research Service, Agriculture Handbook 537.

## REFERENCES CITED

---

- WOGCC 1995 - 2000. 1995 - 1998. *Annual Statistical Summaries 1995 through 2000*. Wyoming Oil and Gas Conservation Commission Casper, WY.
- Wollmer, S. 1994. *Effects of Multiple Use on Rainsplash Erosion and Runoff in Semiarid Rangeland*. Thesis for Masters of Arts in Geography, San Francisco State University, California.
- Woolley T. 2003. Wyoming Game and Fish Department, Savery, Wyoming. Personal communication. October 13, 2003.
- Woolley, T. P., F. G. Lindzey, and R. Rothwell 1995. *Swift Fox Surveys in Wyoming: Annual Report*.
- WRCC 2003. *Meteorological data Collected at Baggs, Wyoming 1979-2000*. Western Regional Climate Center. Online at: <<<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?wybagg>>> Accessed in 2003.
- WRCC 2005. Historical Climate Information for Wyoming. Western Regional Climate Center. Online at: <<<http://www.wrcc.dri.edu/>>>
- WRDS 2002. *Surface Water Quality Analyses at Selected Sampling Stations*. Wyoming Water Resources Data System. Online at: <<<http://www.wrds.uwyo.edu>>>
- WRDS 2004. *Streamflow Measurements at Selected Gauging Stations*. Wyoming Water Resources Data System. Online at: <<<http://www.wrds.uwyo.edu>>>
- WSLUC 1979. *Wyoming State Land Use Plan*. Wyoming State Land Use Commission. 1979. 180 pp
- WTA 2002. *Wyoming Property Taxation 2002*. Cheyenne, Wyoming: Wyoming Taxpayers Association. December 2002.
- WTA 2003. *Wyoming Property Taxation 2003*. Cheyenne, Wyoming: Wyoming Taxpayers Association. December 2003.
- WWC 2006. *Technical Report for the Atlantic Rim Natural Gas Project, Groundwater Modeling of Impacts Associated with Coal Bed Natural Gas Development*. Prepared in support of the Atlantic Rim Natural Gas Project EIS, USDI-BLM, Rawlins Field Office. WWC Engineering.
- WYDOT 2000. *Highway Safety Program Vehicle Crash Data*. Wyoming Department of Transportation. August 22, 2000.
- WYDOT 2001. *Transportation planning program. Vehicle miles 2001*. Wyoming Department of Transportation.
- WYDOT 2002. *Highway safety program vehicle crash data*. Wyoming Department of Transportation. January 10, 2002.
- WYNDD 2003. *Data Compilation for T. Olson, for the Atlantic Rim Project Area, completed August 21, 2003*. Unpublished report. Laramie, Wyoming: Wyoming Natural Diversity Database, University of Wyoming.

## REFERENCES CITED

---

Wyoming Business Council, Sweetwater County, Wamsutter Town, BAP America Production Company and local industries and Businesses 2002. *Town of Wamsutter Economic and Community Development Study*. Summer 2002.

Wyoming Weed and Pest Council 2006. Declared List of Weeds and Pests: Wyoming Weed and Pest Control Act of 1973 W.S. 11-5-102(a)(vii) and W.S. 11-5-102(a)(viii). November 2, 2006. Online at: <<http://wyoweed.org/>>>

## **Glossary**

## GLOSSARY

**µg/L:** Micrograms per liter, a unit of measure.

**abandon:** To cease producing oil or gas from a well when it becomes unprofitable. An exploration well may be abandoned after it has been proven nonproductive. Usually, some of the casing is removed and salvaged, and one or more cement plugs placed in the borehole to prevent migration of fluids between formations.

**acre foot:** A volume of water that covers an area of one acre to a depth of one foot (43,560 cubic feet or 325,851 gallons).

**ad valorem:** Levied according to assessed value.

**affected environment:** The biological, physical, and socioeconomic environment that will or may be changed by actions proposed and the relationship of people to that environment.

**allotment:** An area of land where one or more permittees graze their livestock. Generally consists of public land but may include parcels of private or State lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of several pastures or be only one pasture.

**alluvium:** General term for debris deposited by streams on river beds, floodplains, and alluvial fans, especially deposits brought down during a flood. Applies to stream deposits of recent time. Does not include below water sediments of seas and lakes.

**alternative:** A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis or expressed in goals and objectives. One of several policies, plans, or projects proposed for decision making.

**ambient:** The environment as it exists at the point of measurement and against which changes or impacts are measured.

**ambient air quality:** The state of the atmosphere at ground-level as defined by the range of measured and/or predicted ambient concentrations of all significant pollutants for a 11 averaging periods of interest.

**ambient concentration:** The mass of a pollutant in a given volume of air. It is typically measured as micrograms of pollutant per cubic meter of air.

**ambient standards:** The absolute maximum level of a pollutant allowed to protect either public health (primary) or welfare (secondary).

**animal unit month (AUM):** The amount of forage necessary for the sustenance of one cow/calf pair for 1 month.

**anticline:** An arched, inverted-trough configuration of folded and stratified rock layers.

**Application for Permit to Drill (APD):** The Department of Interior application permit form to authorize oil and gas drilling activities on federal land.

## GLOSSARY

---

**aquifer:** A water-bearing bed or layer of permeable rock, sand, or gravel capable of yielding water, or the part of a water-driven reservoir that contains the aquifer.

**Area of Critical Environmental Concern:** An area that needs special management attention to preserve historic, cultural, or scenic values; to protect fish and wildlife resources or other natural systems or processes; or to protect life and provide safety from natural hazards.

**artesian:** Groundwater with sufficient pressure to flow without pumping.

**assemblage:** A group of rocks grouped together by age or similar origin.

**background concentration:** The existing levels of air pollutant concentration in a given region. In general, it includes natural and existing emission sources, but not future emission sources.

**badland:** Steep or very steep, commonly non-stony barren land dissected by many intermittent drainage channels. Badland is most common in semi-arid and arid regions where streams are entrenched in soft geologic material. Runoff potential is very high, and geologic erosion is active in such areas.

**basin:** A closed geologic structure in which the beds dip toward the center; the youngest rocks are at the center of a basin and are partly or completely ringed by progressively older rocks.

**Best Available Control Technology (BACT):** The best available air pollution control technology for a given emission source, considering environmental benefits, economic and energy costs, as defined by the applicable air quality regulatory authority.

**big game:** Those species of large mammals normally managed as a sport hunting resource.

**borehole:** A circular hole made by boring; especially a deep hole of small diameter, such as an oil well or a water well.

**Bureau of Land Management (BLM):** The Department of Interior agency responsible for managing most Federal Government subsurface minerals. It has surface management responsibility for Federal lands designated under the Federal Land Policy and Management Act of 1976.

**canopy:** The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

**carrying capacity:** The ability of an area of land to sustain a species [generally livestock] over time without permanently degrading the land resources.

**casing:** Steel pipe placed in an oil or gas well to prevent the hole from collapsing.

**completion:** The activities and methods to prepare a well for production. Includes installation of equipment for production from an oil or gas well.

**Condition of Approval (COA):** Conditions or provisions (requirements) under which an Application for a Permit to Drill or a Sundry Notice is approved.

**coniferous:** Referring to a cone-bearing, usually evergreen, tree.

## GLOSSARY

---

**contrast:** The effect of a striking difference in the form, line, color, or texture of the landscape features within the area being viewed.

**Controlled Surface Use (CSU):** Use or occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights. CSU is used for operating guidance, not as a substitute for the NSO or Timing stipulations.

**corridor:** A strip of land, usually a few to many times the width of a right-of-way through which one or more facilities (e.g. pipelines, roads, powerlines) may be located.

**Council on Environmental Quality (CEQ):** An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

**criteria pollutants:** Air pollutants for which the EPA has established State and National Ambient Air Quality Standards. These include particulate matter (PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and volatile organic compounds (VOC).

**crucial range:** Any particular seasonal range or habitat component that has been documented as the determining factor in a population's ability to maintain itself at a certain level over the long-term.

**cubic feet per second (cfs):** The rate of discharge representing a volume of 1 cubic foot of water passing a given point during 1 second.

**cubic foot:** The volume of gas contained in one cubic foot of space at a standard pressure base of 14.7 psi and a standard temperature base of 60 degrees Fahrenheit.

**cultural resources:** The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) and the conceptual content or context (as a setting for legendary, historic, or prehistoric events, such as a sacred area of native peoples, etc.) of an area of prehistoric or historic occupation.

**cumulative impact:** The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taken place over a period of time (40 CFR 1508.7).

**deciduous:** Trees or shrubs that lose their leaves each year during a cold or dry season.

**decibel:** A unit of measurement of noise intensity. The measurements are based on the energy of the sound waves and units are logarithmic. Changes of 5 decibels or more are normally discernible to the human ear.

**development well:** A well drilled in proven territory (usually within 1 mile of an existing well).

**directional drilling:** The intentional deviation of a wellbore from vertical to reach subsurface areas off to one side from the drilling site.

## GLOSSARY

---

**discharge:** The volume of water flowing past a point per unit time, commonly expressed as cubic feet per second (cfs), gallons per minute (gpm), or million gallons per day (mgd).

**dispersion:** The spreading out of pollutants. Generally, used to show how much an air pollutant will spread from a particular point.

**displacement:** As applied to wildlife, forced shifts in the patterns of wildlife use, either in location or timing of use.

**disposal well:** A well into which produced water from other wells is injected into an underground formation for disposal.

**dissolved solids:** The total amount of dissolved material, organic and inorganic, contained in water or wastes.

**disturbance:** An event that changes the local environment by removing organisms or opening up an area, facilitating colonization by new, often different, organisms.

**disturbed area:** Area where natural vegetation and soils have been removed or disrupted.

**diversity:** The distribution and abundance of different plant and animal communities and species within the area covered by a Land and Resource Management Plan.

**drainage:** Natural channel through which water flows some time of the year. Natural and artificial means for effecting discharge of water as by a system of surface and subsurface passages.

**drill bit:** The cutting device used to drill a well. It is typically made of hardened steel, and may have industrial grade diamond components.

**drilling mud:** The circulating fluid used to bring cuttings out of the well bore, cool the drill bit, and provide hole stability and pressure control. Drilling mud includes a number of additives to maintain the mud at desired viscosities and weights. Some additives that may be used are caustic, toxic, or acidic.

**drill pad:** Relatively flat work area that contains equipment and facilities used for well drilling and well completion.

**drill pipe:** The heavy seamless tubing used to rotate the drill bit and circulate the drilling fluid. The standard drill pipe section is 30 feet long (a joint).

**drill rig:** The mast, draw works, and attendant surface equipment of a drilling workover unit.

**dry hole:** Any well incapable of producing oil or gas in commercial quantities. A dry hole may produce water, gas or even oil, but not enough to justify production.

**earthquake:** Sudden movement of the earth's crust resulting from faulting, volcanism, or other mechanisms.

**ecosystem:** An interacting system of organisms considered together with their environment for example, marsh, watershed, and stream ecosystems.

## GLOSSARY

---

**effects:** These include: a) Direct effects, which are caused by the action and occur at the same time and place; b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. In direct effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.

Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (40 CFR 1508.8).

**emergent vegetation:** Erect, rooted, herbaceous plants that project out of the water, or "emerge."

**emission factor:** An empirically derived mathematical relationship between pollutant emission rate and some characteristic of the source such as volume, area, mass, or process output.

**endangered species (animal):** Any animal species in danger of extinction throughout all or a significant portion of its range. This definition excludes species of insects that the Secretary of the Interior determines to be pests and whose protection under the Endangered Species Act of 1973 would present an overwhelming and overriding risk to man.

**endangered species (plant):** Species of plants in danger of extinction throughout all or a significant portion of their ranges. Existence may be endangered because of the destruction, drastic change, or severe curtailment of habitat, or because of over exploitation, disease, predation, or even unknown reasons. Plant taxa from very limited areas (e.g., the type localities only), or from restricted fragile habitats usually are considered endangered.

**endemic:** Confined naturally to a particular geographic area. Often used in opposition to the word epidemic.

**environment:** The aggregate of physical, biological, economic, and social factors affecting organisms in an area.

**environmental assessment (EA):** An investigation of a proposed action and alternatives to that action and their direct, indirect, and cumulative environmental impacts; the process which provides the necessary information for reaching an informed decision and the information needed for determining whether a proposed action may have significant environmental effects and determining the type of environmental documents required.

**environmental impact statement (EIS):** 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.

**ephemeral drainage:** A drainage area or a stream that has no base flow. Water flows for a short time each year but only in direct response to rainfall or snowmelt events.

## GLOSSARY

---

**ephemeral stream:** A stream that flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice and which has a channel bottom that is always above the local water table.

**emission:** Air pollution discharge into the atmosphere, usually specified by mass per unit time.

**erosion:** The removal, detachment, and entrainment of earth materials by weathering, dissolution, abrasion, and corrosion, later to be transported by moving water, wind, gravity, or glaciers.

**exploration:** The search for economic deposits of minerals, ore, and other materials through practices of geology, geochemistry, geophysics, drilling, and/or mapping.

**exploration well:** A well drilled in an area where there is no oil or gas production.

**fault:** A fracture in bed rock along which there has been vertical and/or horizontal movement caused by differential forces in the earth's crust.

**federal lands:** All lands and interests in lands owned by the U.S. that are subject to the mineral leasing laws, including mineral resources or mineral estates reserved to the U.S. in the conveyance of a surface or non-mineral estate.

**fisheries:** Streams and lakes used for fishing.

**floodplain:** That portion of a river valley, adjacent to the channel, which is built of recently deposited sediments and is covered with water when the river overflows its banks at flood stages.

**fluvial:** Comprehensive term for river processes.

**footprint:** The actual surface area physically disturbed by oil and gas operations and ancillary facilities.

**forage:** Vegetation of all forms available for animal consumption.

**forb:** A broad-leafed flowering herb other than grass.

**formation (Geologic):** A rocky body distinguishable from other rock bodies and useful for mapping or description. Formations may be combined into groups or subdivided into members.

**fugitive dust:** Airborne particles emitted from any source other than through a controllable stack or vent.

**functional value:** A term that refers to the various functions performed by wetlands and the values people place on those functions. Functions are the chemical, physical, and biological processes or attributes of a wetland without regard to their importance to society. They include groundwater recharge and discharge, sediment trapping, nutrient/pollutant retention and removal, shoreline anchoring and dissipation of erosive forces, food chain support, wildlife and fish habitat, and heritage value (including active and passive recreation, uniqueness, etc.).

**game species:** Animals commonly hunted for food or sport.

## GLOSSARY

---

**gpd/ft:** Gallons per day per foot.

**gpm:** Gallons per minute.

**grade:** A slope stated in terms of feet per mile or as feet per feet (percent); the content of precious metal per volume of rock (ounces per ton).

**groundwater:** Water contained in the pore spaces of consolidated and unconsolidated surface material.

**habitat:** A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

**habitat function:** The arrangement of habitat features, and the capability of those features to sustain species, populations, and diversity of wildlife over time.

**habitat type:** The aggregate of all areas that support or can support the same primary vegetation at climax.

**hazardous waste:** (A) Any substance designated pursuant to section 311(b)(2)(A) of the Federal Water Pollution Control Act. (B) Any element, compound, mixture, solution, or substance designated pursuant to section 102 of this Act. (C) Any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress). (D) Any toxic pollutant listed under section 307(a) of the Federal Water Pollution Control Act. (E) Any hazardous air pollutant listed under section 112 of the Clean Air Act. (F) Any imminently hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to section 703 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

**herbaceous:** The plant strata which contain soft, not woody, stemmed plants that die to the ground in winter.

**hydric soils:** A soil that is saturated, flooded, or ponded with water long enough during the growing season (i.e., soil temperature of 41 °F at 20 inches depth) to develop anaerobic soil conditions (i.e., reduced oxygen levels). These soils develop characteristics that are indicative of the wet and anaerobic conditions. Such characteristics may include an undecomposed organic surface layer (histic epipedon), surface horizons with low chromas (i.e., very dark brown to black), organic staining and streaking, grey-colored layers of horizons, iron concretions, and/or light grey- or rust-colored mottles or specks of highly contrasting color. These characteristics must generally occur within 50 percent of the root zone.

**hydrology:** A science that deals with the properties, distribution, and circulation of surface and subsurface water.

## GLOSSARY

---

**hydrophytic plants:** Those species which either require or tolerate wet or saturated soils and are therefore indicative of these conditions. Vegetation is a good indicator of the physical conditions on a given site. Such conditions include soil moisture.

**hydrostatic testing:** Testing of the integrity of a newly placed, but uncovered pipeline for leaks. The pipeline is filled with water and pressurized to operating pressures, and the pipeline is visually inspected.

**impact:** The results of an action on the environment; the impact may be primary (direct) or secondary (indirect); the term impact is synonymous with effect according to 40 CFR 1508.8.

**infiltration:** The movement of water or some other liquid into the soil or rock through pores or other openings.

**infrastructure:** The basic framework or underlying foundation of a community including road networks, electric and gas distribution, water and sanitation services, and facilities.

**injection well:** A well used to inject fluids into an underground formation to increase reservoir pressure.

**interdisciplinary team (IDT):** A group selected to work within the NEPA process in scoping, analysis, and document preparation. The purpose of the team is to integrate its collective knowledge of the physical, biological, economic, and social sciences and the environmental design arts into the environmental analysis process. Interaction among team members often provides insight that otherwise would not be apparent.

**intermittent stream:** A stream or reach of a stream that drains a watershed of at least one square mile; or a stream or reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and groundwater discharge.

**jurisdictional wetlands:** "Those wetlands which are within the extent of COE regulatory overview" (33 CFR 328.1 and (2). For an area to be identified as a jurisdictional wetland, the area must exhibit positive indicators of wetland hydrology, hydrophytic vegetation, and hydric soils. Those areas that do not meet the three parameters are uplands or non-jurisdictional wetlands. The Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) describes technical criteria for determining hydrophytic vegetation, hydric soils, and wetland hydrology, and therefore the occurrence of jurisdictional wetlands.

**kg/ha-yr:** Kilograms per hectare per year, a unit of measure.

**km:** Kilometers, a unit of measure.

**landform:** Any physical, recognizable form or feature of the Earth's surface, having a characteristic shape and produced by natural causes. Includes major features such as plains, plateaus, and mountains, and minor features, such as hills, valleys, slopes, canyons, arroyos, and alluvial fans.

**landscape character:** The arrangement of a particular landscape as formed by the variety and intensity of the landscape features as defined as the four basic elements (form, line, color, and texture). These factors give the area a quality that distinguishes it from its immediate surroundings.

## GLOSSARY

---

**landslide:** A perceptible downhill sliding or falling of a mass of soil and rock lubricated by moisture or snow.

**land use:** Land uses determined for a given area that establish the types of activities allowed (e.g., mining, agriculture, timber production, residential, industrial).

**lead agency:** The agency or agencies preparing or having taken primary responsibility for preparing the environmental impact statement (40 CFR 1508.16).

**lease:** (1) A legal document that conveys to an operator the right to drill for oil and gas. (2) The tract of land on which a lease has been obtained, where producing wells and production equipment are located.

**leasable minerals:** Federal minerals subject to lease under the Mineral Leasing Act of 1920, as amended, and supplemented. Includes minerals, such as oil, gas, coal, geothermal, tar sands, oil shale, potassium, phosphate, sodium, asphaltic materials.

**lek:** An assembly area for communal courtship display, usually in reference to greater sage-grouse or other grouse.

**lithic scatter:** A surface scatter of cultural artifacts and debris that consists entirely of lithic (i.e., stone) tools and chipped stone debris. This is a common prehistoric site type that is contrasted to a cultural material scatter, which contains other or additional artifact types such as pottery or bone artifacts, to a camp which contains habitation features, such as hearths, storage features or occupation features, or to other site types that contain different artifacts or features.

**loam:** A mixture of sand, silt, and clay containing between 7 and 27 percent clay, 28 to 50 percent silt and less than 50 percent sand.

**management area:** An area composed of aggregate pieces of land (generally several to many analysis areas) to which a given management objective and prescriptions are applied.

**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.

**meq/L:** Milliequivalents per liter, a unit of measure.

**mesic area:** A habitat having a moderate amount of moisture available for the support of plant life.

**methane (CH<sub>4</sub>):** The simplest hydrocarbon; natural gas is nearly pure methane.

**micromhos:** A measure of electrical conductance.

**mineral rights:** Reserved mineral rights are the retention of ownership of all or part of the mineral rights by a person or party conveying land to the United States. Conditions for exercising these rights have been defined in the Secretary's "Rules and Regulations to Govern Exercising of Mineral Rights Reserved in Conveyances to the United States" attached to and made a part of deeds reserving mineral rights.

## GLOSSARY

---

**mitigate:** To lessen the severity.

**mitigation:** Avoiding the impact altogether by not taking a certain action or parts of an action; minimizing impacts by limiting the degree of magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and/or compensating for the impact by replacing or providing substitute resources or environments.

**mL:** Micro liter, a unit of measure.

**modeling:** A mathematical or physical representation of an observable situation. In air pollution control, models afford the ability to predict pollutant distribution or dispersion from identified sources for specified weather conditions.

**monitor:** To systematically and repeatedly watch, observe, or measure environmental conditions in order to track changes.

**National Ambient Air Quality Standards (NAAQS):** The allowable concentrations of air pollutants in the air specified by the Federal government. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public welfare from any unknown or expected adverse effects of air pollutants).

**National Environmental Policy Act (NEPA):** The federal law established in 1969, which went into effect on January 1, 1970, that (1) established a national policy for the environment, (2) requires federal agencies to become aware of the environmental ramifications of their proposed actions, (3) requires full disclosure to the public of proposed federal actions and a mechanism for public input into the federal decision-making process, and (4) requires federal agencies to prepare an environmental impact statement for every major action that would significantly affect the quality of the human environment.

**National Register of Historic Places:** A list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture.

**native species:** Plants that originated in the area in which they are found, i.e., they naturally occur in that area.

**natural gas:** Those hydrocarbons, other than oil and other than natural gas liquids separated from natural gas, that occur naturally in the gaseous phase in the reservoir and are produced and recovered at the wellhead in gaseous form. Natural gas includes coal bed methane gas.

**No Action Alternative:** The management direction, activities, outputs, and effects that are likely to exist in the future if the current plan would continue unchanged.

**Notice of Staking:** Prior to filing a complete Application for Permit to Drill (APD) an Operator may wish to file a Notice of Staking (NOS). Under this procedure, the site is surveyed and staked, and the onsite inspection is used to provide information to the Operator prior to the Operator committing time and money in preparing an APD which might not reflect agency concerns.

## GLOSSARY

---

**noxious weeds:** Officially designated undesirable or invading weedy species generally introduced into an area due to human activity.

**OUT:** A designation for non-use areas, which are areas that contain habitats of limited or no importance to big game species.

**ozone:** A molecule containing three oxygen atoms ( $O_3$ ) produced by passage of an electrical spark through air or oxygen ( $O_2$ ).

**paleontology:** The science that deals with the history and evolution of life on earth.

**parent materials:** Unconsolidated material formed from bedrock which undergoes further changes to form soil.

**particulate matter:** A particle of soil or liquid matter (e.g., soot, dust, aerosols, fumes and mist).

**pCi/L:** Picocuries per liter, a unit of measure.

**perennial stream:** A stream or reach of a stream that flows throughout the year.

**permeability:** Extent that a substance is open to passage or penetration, especially by fluids.

**permittee (grazing):** A person who has livestock grazing privileges on an allotment or allotments within the resource area.

**pH:** The negative  $\log_{10}$  of the hydrogen ion activity in solution; a measure of acidity or basicity of a solution.

**playa:** The shallow central basin of a desert plain, in which water gathers after a rain and is evaporated.

**preferred alternative:** The alternative identified in the EIS as the action favored by the agency.

**prevailing wind:** The most frequent compass direction from which the wind blows.

**prevention of significant deterioration of air quality (PSD):** A classification established to preserve, protect, and enhance the air quality in National Wilderness Preservation System areas in existence prior to August 1977 and other areas of National significance, while ensuring economic growth can occur in a manner consistent with the preservation of existing clean air resources. Specific emission limitations and other measures, by class, are detailed in the Clean Air Act (42 U.S.C. 1875 et 15q.).

**produced water:** Formation water pumped during the development of a gas well.

**PSD increments:** The maximum allowable increase in pollutant concentrations permitted over baseline conditions as specified in the EPA Prevention of Significant Deterioration (PSD) regulations (40 CFR Part 52.21). The regulations apply only to areas currently attaining NAAQS/WAAQS. Most National Parks and Wilderness are as are Class I Areas, where almost no future pollution increase is permitted. Most other areas are Class II Areas, where moderate increases in pollution levels are allowed.

## GLOSSARY

---

**public land:** Lands or interests in lands owned by the United States and administered by the Secretary of Interior through the Bureau of Land Management, without regard to how the United States acquired ownership.

**range:** Land producing native forage for animal consumption and lands that are revegetated naturally or artificially to provide forage cover that is managed like native vegetation, which are amenable to certain range management principles or practices.

**raptor:** Living on prey; a group of carnivorous birds consisting of hawks, eagles, falcons, kites, vultures, and owls.

**reclamation:** rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves regrading, replacement of topsoil, revegetation and other work necessary to restore it for use.

**record of decision (ROD):** A decision document for an Environmental Impact Statement or Supplemental EIS that publicly and officially discloses the responsible official's decision regarding the actions proposed in the EIS and their implementation.

**reserve pit:** (1) Usually an excavated pit that may be lined with plastic, which holds drill cuttings and waste mud. (2) Term for the pit which holds the drilling mud.

**reserves:** Identified resources of mineral-bearing rock from which the mineral can be extracted profitably with existing technology and under present economic conditions.

**revegetation:** The re-establishment and development of self-sustaining plant cover. On disturbed sites, human assistance will speed natural processes by seed bed preparation, reseeding and mulching.

**right-of-way (ROW):** The legal right for use, occupancy, or access across land or water areas for a specified purpose or purposes.

**riparian:** Land areas which are directly influenced by water. They usually have visible vegetative or physical characteristics showing this water influence. Streamsides, lake borders, or marshes are typical of riparian areas.

**runoff:** That part of precipitation that appears in surface streams. Precipitation that is not retained on the site where it falls and is not absorbed by the soil.

**salinity:** A measure of the amount of mineral substances dissolved in water.

**scatter (archeological):** Random evidence of prior disturbance that is distributed about an area rather than concentrated in a single location.

**scoping:** An early and open process for determining the scope of issues to be addressed in an EIS and for identifying the significant issues related to a proposed action. Scoping may involve public meetings, field interviews with representatives of agencies and interest groups, discussions with resource specialists and managers, and written comments in response to news releases, direct mailings, and articles about the proposed action and scoping meetings.

## GLOSSARY

---

**sediment:** Soil or mineral transported by moving water, wind, gravity, or glaciers, and deposited in streams or other bodies of water, or on land.

**sediment load:** The amount of sediment (sand, silt, and fine particles) carried by a stream or river.

**sedimentary:** Rock formed from fragments of pre-existing rocks (e.g. sandstone) or by precipitation from solution (e.g. limestone).

**seismic:** Pertaining to an earthquake or earth vibration, including those that are artificially induced.

**seismic operations:** Use of explosive or mechanical thumpers to generate shock waves that can be read by special equipment to indicate subsurface conditions.

**sensitive species:** Those species of plants or animals that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as an endangered or threatened species under the Endangered Species Act. This also includes species that are on an official state list or are recognized by the Land Manager as needing special management to prevent their being placed on federal or state lists.

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

**shallow coal seam:** Those coal seams that are too shallow to drill to directionally given the area geology and spacing limitations.

**shut in:** To close the valves on a well so it ceases production.

**significant impact:** A meaningful standard to which an action may impact the environment. The impact may be beneficial, adverse, direct, indirect, or cumulative, and may have short-term or long-term effects.

**silt:** Any earthy material composed of fine particles, smaller than sand but larger than clay, suspended in or deposited by water.

**soil:** Loose, unconsolidated surface material comprising topsoil and subsoil.

**spawning:** The deposition of eggs and sperm by fish.

**species:** (1) The classification level of biological nomenclature which categorized each group of related organisms potentially capable of interbreeding; (2) the accepted level of classification to differentiate one specific type of organism from another.

**species of concern:** Species of concern include federally listed threatened or endangered species, species proposed for listing, BLM sensitive species, and species considered rare or important by the Wyoming Natural Diversity Database (WYNDD).

**spp.:** An abbreviation for the plural of species.

**spud:** Begin drilling a well.

## GLOSSARY

---

**sq.mi.:** Square mile.

**stipulation:** A legal requirement, specifically a requirement that is part of the terms of a mineral lease. Some stipulations are standard on all federal leases. Other stipulations may be applied to the lease at the discretion of the surface management agency to protect valuable surface resources.

**strata:** An identifiable layer of bed rock or sediment; does not imply a particular thickness of rock.

**s.u.:** Standard units, a unit of measure.

**substrate:** Material consisting of silts, sands, gravels, boulder and woody debris found on the bottom of a stream channel.

**surface lands:** Lands consisting of the outside part of the solid earth or ocean as contrasted with subsurface or below surface land use(s) such as drilling and mining.

**threatened and endangered species:** Any species, plant or animal, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

**topography:** The features of the earth, including relief, vegetation, and waters.

**topsoil:** The uppermost layers of naturally occurring soils suitable for use as a plant growth medium.

**total dissolved solids (TDS):** Total amount of dissolved material, organic or inorganic, contained in a sample of water.

**turbidity:** A fisheries measurement of the total suspended solids in water expressed as nephelometric turbidity units (NTU).

**usable water:** Defined by Onshore Oil and Gas Order No. 2 as groundwater with a TDS of 10,000 ppm or less encountered at any depth.

**vegetation:** All of the plants growing in and characterizing a specific area or region; the combination of different plant communities found there.

**vegetation type:** A plant community with visually distinguishable characteristics, named for the apparent dominant species.

**viewshed:** Landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.

**visibility:** A measurement of the maximum distance to which large objects may be viewed. Fixed reference objects such as mountains, hills, towers, or buildings are normally used to estimate visibility.

**visual range:** The distance at which a black object (in practice, a distant mountain) becomes indistinguishable to an observer.

## GLOSSARY

---

**visual resource:** The composite of basic terrain, geologic features, water features, vegetation patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for viewers.

**Visual Resource Management (VRM):** A system of visual management used by the BLM. The program has a dual purpose, to manage the quality of the visual environment and to reduce the visual impact of development activities while maintaining effectiveness in all Bureau resource programs. VRM also identifies scenic areas that warrant protection through special management attention. The system uses five classes for categorizing visual resources.

**Class 1** - Natural ecological changes and very limited management activity are allowed. Any contrasts created within the characteristic landscape must not attract attention. This classification is applied to wilderness areas, wild and scenic rivers, and other similar situations.

**Class 2** - Changes in any of the basic elements (form line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.

**Class 3** - Contrasts to the basic elements caused by a management activity are evident, but should remain subordinate to the existing landscape.

**Class 4** - Any contrast attracts attention and is a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color and texture of the characteristic landscape.

**Class 5** - The classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to one of the four other classifications. The classification also applies to areas where unacceptable cultural modification has lowered scenic quality; it is often used as an interim classification until objectives of another class can be reached.

**water bar:** A ridge made across a hill to divert water to one side.

**water quality:** Refers to a set of chemical, physical, or biological characteristics that describe the condition of a river, stream, or lake. The quality of water determines which beneficial uses it can support. Different instream conditions or levels of water quality are needed to support different beneficial uses.

**Waters of the United States:** A jurisdictional term from Section 404 of the Clean Water Act referring to water bodies such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce.

**watershed:** A topographically delineated area that is drained by a stream system, that is, the total land area above some point on a stream or river that drains past that point.

**wellbore:** The diameter of the hole to be drilled.

**well head:** The equipment used to maintain surface control of a well. It is composed of the casing head, tubing head and a series of valves and fittings.

## GLOSSARY

---

**well pad:** Relatively flat work area that contains equipment and facilities used for oil/gas production.

**wetlands:** Areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

**Wilderness Study Area (WSA):** An area determined to have wilderness characteristics. WSAs are submitted to the President and Congress for wilderness designation. These areas are an interim designation, valid until either designated as wilderness or released to multiple-use management.

**wind rose:** Any one of a class of diagrams designed to illustrate the distribution of wind direction experienced at a given location over a given period of time. Wind roses may also give information concerning distribution of wind speed, stability, or other meteorological parameters.

**winter range:** The place where migratory (and sometimes non-migratory) animals congregate during the winter season.

**workover:** Well maintenance activities that require onsite mobilization of a drill rig to repair the well bore equipment (casing, tubing, rods, or pumps) or the wellhead. In some cases, a workover may involve development activities to improve production from the target formation.