

**To:** Joshua Hanson[joshua.hanson@sol.doi.gov]  
**From:** Betenson, Matthew  
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[GSENM DOIMemo 11.06.1998.pdf](#)  
[GSENM publications as of April 2016 Final.xlsx](#)  
[GSENM List of Historic and Scientific Objects of Interest.xlsx](#)

Hi Josh,  
Attached are a couple of references for your review.

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**Matt Betenson**  
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THE SECRETARY OF THE INTERIOR  
WASHINGTON

NOV 6 1996

Memorandum

To: Director, Bureau of Land Management

From: Secretary *[Signature]*

Subject: Management of the Grand Staircase - Escalante National Monument

On September 18, 1996, the President created by Proclamation the Grand Staircase - Escalante National Monument in Utah. This is the first National Monument in history for which management responsibility has been given to the Bureau of Land Management (BLM), offering BLM a highly visible opportunity to demonstrate its stewardship. The purposes of this memorandum are: (a) to direct that you issue interim guidance for managing the Monument during the next three years; and (b) to direct you to prepare the management plan for the Monument for my adoption by the end of that period.

The President's Proclamation directs management of the Monument pursuant to applicable legal authorities, including the Federal Land Policy and Management Act (FLPMA) and the National Environmental Policy Act (NEPA). Further, I want to make certain that we work very closely with the State of Utah as our efforts proceed. While stewardship of the Grand Staircase - Escalante National Monument is the responsibility of this Department, I believe an effective working relationship with the State is crucial to our development of an effective management plan. The State possesses expertise in numerous management disciplines, and its capabilities will complement our own.

INTERIM MANAGEMENT DIRECTION

The public should have more explicit information concerning the management of specific activities during the three year interim period. Accordingly, I ask that you issue appropriate guidance to field managers as soon as possible. Field managers should be fully conversant with that guidance and initiate efforts to provide information to the public as necessary.

The President's Proclamation cited the Monument's unique geological, paleontological, archeological, biological and historical values. It also stated that valid existing rights (VER) must be recognized, withdrew Federal lands and interests in lands within the Monument from entry, location, selection, sale, leasing, or other disposition (except exchange) under the public land laws including, among others, the mineral leasing and mining laws, and stated that existing grazing uses shall continue to be governed by applicable laws and regulations other than the Proclamation. As a general principle,

actions that are not precluded by the Proclamation and which do not conflict with the established purposes of the Monument may continue.

#### DEVELOPING THE MONUMENT MANAGEMENT PLAN

The President's Proclamation directed me to prepare, within three years, a management plan for the Monument and any necessary regulations. You should take the lead in preparing the plan and proposing it for my adoption. In preparing the plan, you must make certain that it reflects the purposes for which the Monument was established.

In order to assure an effective planning effort, you should develop a detailed inventory of significant resources within the Monument's boundaries which have been identified thus far through available sources. The inventory should have a usable format and be easy to update as new information becomes available. Attached is a bibliography of monument resources that was completed in connection with the Proclamation. Although there is considerable understanding of the Monument's attributes, much more work is needed to identify, assess, interpret and protect them in an integrated manner.

In addition to the State, local and Tribal governments, the private sector, the public and other Federal agencies have interests and insights as to managing the Monument's resources and integrating the Monument with local community development. I expect you to be energetic and innovative in working with these entities. Many models for involving our neighbors have been developed and implemented. Useful lessons can be drawn from these models throughout the West by both government and non-government entities.

The management of the Grand Staircase - Escalante National Monument is one of the Department's most visible and important priorities. Your work will have a profound impact on the public's assessment of the Bureau and of Federal land management in general. I know that the challenges of managing the Monument and preparing its management plan are significant and encompass a very broad variety of scientific, historical, and economic considerations. The Bureau will have my full support and encouragement as your efforts proceed.

Attachment

## Bibliography of Sources Concerning Objects of Interest in the Grand Staircase - Escalante National Monument

### I. Geology resources

#### Mineral deposits

Carey, Dwight, et al. Kaiparowits Handbook: Coal Resources (Los Angeles: Institute of Geophysics and Planetary Physics, University of California, 1975).

Doelling, Hellmut. Carcass Canyon Coal Area, Kaiparowits Plateau, Garfield and Kane Counties, Utah (Salt Lake City: Utah Geological and Mineralogical Survey, 1968)

Heylman, Edgar. Paleozoic Stratigraphy and Oil Possibilities of Kaiparowits Region, Utah (Salt Lake City: Utah Geological and Mineralogical Survey, University of Utah, 1966, 1958).

Jepperson, Ronald, et al. The Kaiparowits Coal Project and the Environment: A Case Study (Ann Arbor: Ann Arbor Science Publishers; and Palo Alto: Electric Power Research Institute, 1981).

Kunkel, R. P., 1965. History of exploration for oil and natural gas in the Kaiparowits region, Utah, in Geology and resources of south-central Utah -- Resources for power: Utah Geological Society Guidbook to Geology of Utah 19, p. 93-111.

Sargent, K.A. Environmental Geologic Studies of the Kaiparowits Coal-Basin Area, Utah. U.S. Geological Survey Bulletin 1601, 1984.

Utah Coal for Southwest Gas Markets: A New Concept for Utah Coal and a New Industry for the Kaiparowits Plateau (Salt Lake City: Kaiser Engineers, 1977).

#### Geology

Baars, Donald. The Colorado Plateau: A Geologic History (Albuquerque: University of New Mexico Press, 1983).

Beus, Stanley and Morales, Michael, eds. Grand Canyon Geology. (New York, NY: Oxford University Press; reprint edition Flagstaff, AZ: Museum of Northern Arizona Press, 1990).

Blanchard, Paul. Ground-water Conditions in the Kaiparowits Plateau Area, Utah and Arizona, with Emphasis on the Navajo Sandstone (Salt Lake City: Utah Department of Natural Resources, 1986).

Carter, L. M. H., and Sargent, K. A., 1983 (1984), Scenic features related to geology in the Kaiparowits Plateau area, Utah: U.S. Geological Survey Miscellaneous Investigations Map I-1033-K, scale 1:125,000.

Craig, L.C., Holmes, C.N., Cadigan, R.A., Freeman, V.L., Mullens, T.E., and Weir, G.W., 1955, Stratigraphy of the Morrison and related formations, Colorado Plateau region, a preliminary report: U.S. Geological Survey Bulletin 1009-E, 168 p.

Davidson, E. S., 1967, Geology of the Circle Cliffs area, Garfield and Kane Counties, Utah: U.S. Geological Survey Bulletin 1229, 140p.

Doelling, H.H., 1975, Geology and mineral resources of Garfield County, Utah: Utah Geological and Mineralogical Survey Bulletin 107, 175 p.

Doelling, H.H., and Davis, F.D., 1989, The geology of Kane County, Utah—Geology, mineral resources, geologic hazards: Utah Geological and Mineral Survey Bulletin 124 and Map 121, 192 p., 10 pls., scale 1:100,000

Doelling, H. H., and Graham, R. L. 1972, Southwestern Utah coal fields -- Alton, Kaiparowitz Plateau and Kolob-Harmony: Utah Geological and Mineralogical Survey Monograph I, 333 p.

Dutton, C.E.: Report on the Geology of the High Plateaus, Government Printing Office, Washington, 1880.

Dutton, Clarence. Topographical and Geological Atlas of the District of the High Plateaus of Utah (New York: Julius Bien Lithographers, 1879).

Fuller, H.K., V.S. Williams, R.B. Colton. 1981. Map Showing Areas of Landsliding in the Kaiparowits Coal Basin Area, Utah. U.S. Geological Survey Miscellaneous Investigations Series Map I-1033-H, scale 1:125,000.

Gregory, H. E., and Moore, R. C., 1931, The Kaiparowits region, a geologic reconnaissance of parts of Utah and Arizona: U.S. Geological Survey Professional Paper 164, 161

Gregory, H.E., 1951: The geology and geography of the Paunsaugunt region. U.S. Geological Survey Professional Paper 220.

Gregory, H. E., 1948, Geology and geography of central Kane County, Utah: Geological Society of America Bulletin, v. 59, no. 3, p. 211-248.

Hintze, Lehi. Geologic History of Utah (Provo, UT: Brigham Young University Department of Geology, 1988).

Lewis, G.E., Irwin, J.H., and Wilson, R.F., 1961, Age of the Glen Canyon Group on the Colorado Plateau: Geological Society of America Bulletin, v. 72, no. 9, p. 1437-1440.

Lidke, K.J. and Sargent, K.A., 1983, Geologic cross sections of the Kaiparowits coal-basin area, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1033-J, scale 1:125,000.

Peterson, Fred. "Four New Members of the Upper Cretaceous Straight Cliffs Formation in the Southeastern Kaiparowits Region Kane County, Utah." 1969. Geological Survey Bulletin 1274-J

Plantz, Gerald G. Hydrologic Reconnaissance of the Kolob, Alton, and Kaiparowits Plateau Coal Fields, South-Central Utah. U.S. Geological Survey, Open-File Report 84-071. 1984

Sargent, K. A., and Hansen, D. E., 1976, General geology and mineral resources of the coal area of south-central Utah, with section on Landslide Hazards by Roger B. Colton, Coal Mine Subsidence by C. Richard Dunrud, and Landscape Geochemistry by J.J. Connor: U.S. Geological Survey Open-File Report 76-811, 122p.

Sargent, K.A., and Hansen, D.E., 1980. Landform map of the Kaiparowits coal-basin area, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1033-G, scale 1:125,000.

Shanley, Keith, "Predicting Facies Architecture Through Sequence Stratigraphy--An Example from the Kaiparowits Plateau, Utah." Geology, vol. 19, no. 7 (July 1, 1991) pp. 742-745.

Steed, R. H., 1954, Geology of Circle Cliffs anticline, in Geology of portions of the high plateaus and adjacent lands, central and south-central Utah: Intermountain Association of Petroleum Geologists Annual Conference, 5th, 1954, Guidebook, p. 99-102.

Stokes, William Lee. Geology of Utah. Utah Museum of Natural History.

Stratigraphy, Depositional Environments, and Sedimentary Tectonics of the Western Margin, Cretaceous Western Interior Seaway (Boulder, CO: Geological Society of America, 1991).

Williams, V.S., 1985, Surficial geologic map of the Kaiparowits coal-basin area, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1033-L, scale 1:125,000.

## II. Paleontology resources

Cifelli, Richard, "Cretaceous Mammals of Southern Utah." Journal of Vertebrate Paleontology, vol. 10, no. 3 (Sept. 20, 1990) pp. 295-360.

Cifelli, R.L., 1987 Therian Mammals from the Late Cretaceous of the Kaiparowits Region, Utah (abstract). Journal of Vertebrate Paleontology, Vol. 7, Supplement to No. 1, Abstracts of Papers, Forty-Seventh Annual Meeting, Society of Vertebrate Paleontology, p. 14A

Cifelli, R.L., and J.G. Eaton, 1987. Marsupial from the Earliest Late Cretaceous of Western United States. Nature 325, p. 520-522.

Cifelli, Richard & Eaton, Jeffrey, "Preliminary Report on Late Cretaceous Mammals of the Kaiparowits Plateau, Southern Utah." Contributions to Geology, vol. 26, no. 2 (Fall 1988) pp. 45-55.

Eaton, Jeffery G., Correspondence with Mike Noel, Kanab Resource Area, 1991.

Eaton, J.G. 1987. Mammalian Paleontology and Correlation of the Uppermost Cretaceous rocks of the Paunsaugunt Plateau, Utah. in M. Morales, ed. Aspects of Mesozoic Geology and Paleontology of the Colorado Plateau. Museum of Northern Arizona Bulletin 59, p. 163-180.

Eaton, J.G. 1993b. Therian Mammals from the Cenomanian (Upper Cretaceous) Dakota Formation, Southwestern Utah. Journal of Vertebrate Paleontology, 13(1). p. 105-124.

Eaton, J.G., 1987 Stratigraphy, Depositional Environments, and Age of Cretaceous Mammal-Bearing Rocks in Utah, and Systematics of the Multituberculata (Mammalia). Ph.D. dissertation, University of Colorado, Boulder, Colorado. 308 p.

Eaton, Jeffrey G., Biostratigraphic Framework for late Cretaceous nonmarine sequence, Kaiparowits Plateau, Southern Utah.

Elder, W.P. and J.L. Kirkland: 1993 Cretaceous Paleogeography of the Colorado Plateau and Adjacent Area. in M. Morales, ed. Aspects of Mesozoic Geology and Paleontology of the Colorado Plateau. Museum of Northern Arizona Bulletin 59. p. 129-152.

Miller, Wade E., Paleontological Literature Search of Alternative Plant Sites for the Utah Power and Light Company, 1975

### III. Prehistoric resources (Anthropology/Archaeology)

Barnes, F.A., Canyon Country Rock Art (Salt Lake City, UT: Wasatch Publishers, Inc., 1982).

Castleton, Kenneth. Petroglyphs and Pictographs of Utah, 2 vols. (Salt Lake City: Utah Museum of Natural History, 1979).

Cole, Sally J., Legacy on Stone: Rock Art of the Colorado Plateau and Four Corners Region (Boulder, CO: Johnson Books, 1990).

Fish, Paul, Preliminary Report for Archaeological and Ethnohistorical Phase I Consultation for the Kaiparowits Power Project: Proposed Plant Sites, Impact Study Area and Proposed Transmission Line Corridors, Museum of Northern Arizona, Department of Anthropology

Fowler, Don. 1961 Excavations, Kaiparowits Plateau, Utah (Salt Lake City: Department of Anthropology, University of Utah 1963) Anthropological Papers, University of Utah Department of Anthropology no. 66.



Glen Canyon Series no. 20.

Gunnerson, James H., "Archeological Survey of the Kaiparowits Plateau" in The Glen Canyon Archeological Survey, Salt Lake City, University of Utah Press, 1959

Hauck, Forrest. Cultural Resource Evaluation in South Central Utah, 1977-78 (Salt Lake City, UT: U.S. Bureau of Land Management Utah Office Cultural Resource Series no. 4, final report for contract 14-08-0001-16494, 1979).

Janetski, Joel, ed.; University of Utah, Department of Anthropology, Archeological Center. Prehistoric and Historic Settlement in the Escalante Desert (Salt Lake City: University of Utah Press, 1981).

Madsen, David. Prehistory of the Eastern Great Basin, 2 vols. (Washington, D.C.: Smithsonian Institution, 1979, 1986).

Marshall, Larry G., Paleontological Investigations Phase I - Kaiparowits Power Project; Report of Paleontological Resources on Plant Sites, Related Facilities, Associated Access Roads, Impact Area and Proposed Transmission Lines., Museum of Northern Arizona, Department of Geology, 1974.

Schaafsma, Polly. The Rock Art of Utah (Cambridge: Papers of the Peabody Museum of Archaeology and Ethnology, vol. 65, 1971).

University of Nevada, Las Vegas; Museum of Natural History; Nevada Archaeological Research Center. Final Report on the Preliminary Archaeological Reconnaissance of the Proposed Eldorado/Kaiparowits Transmission Line Right-of-Way; Corridor and Alternate Routes (Las Vegas: University of Nevada, Las Vegas, 1977).

#### IV. History resources

##### General

Coppel, Lynn. Kaiparowits: "It may be your playground but it's my home." (Fullerton, CA: California State University, 1979) Master's thesis, typescript of oral history project.

Gregory, Herbert. "Scientific Explorations In Southern Utah." American Journal of Science, vol 243, no. 10. (October, 1945).

Powell, Allan, ed. Utah History Encyclopedia. (Salt Lake City, UT: University of Utah Press, 1994).

Thompson, George. Some Dreams Die: Utah's Ghost Towns and Lost Treasures. (Salt Lake City, UT: Dream Garden Press, 1982).

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Van Cott, John. Utah Place Names. (Salt Lake City, UT: University of Utah Press, 1990).

Woodbury, Angus. A History of Southern Utah and Its National Parks (Salt Lake City: Utah State Historical Society, 1944, 1950).

**Mormon era--includes sources for Hole-in-the-Rock expedition**

Decker, Elizabeth. Biography (Salt Lake City: Daughters of the Utah Pioneers Museum manuscript collection).

Family Histories of Edwards, Robb and Worlton Families (St. George, UT: Dixie College, manuscript collection).

Gleave, Eva, ed. Journal-Stories of Elder Adelbert Twitchell, 1866-1950 (Salt Lake City: ?, 1979).

Lyman, Platte. Platte DeAlton Lyman Journal (Berkeley: University of California manuscript collection, 1879, 1894).

Miller, David. Hole-in-the-Rock: An Epic in the Colonization of the Great American West (Salt Lake City: Publisher's Press, 1966).

Reay, Lee. Through the Hole in the Rock to San Juan (Provo, UT: Meadow Lane Publications, 1980).

Smart, William. Old Utah Trails (Salt Lake City: Utah Geographic Series, 1988).

Smith, Albert, ed. Silas Sanford Smith: Pioneer, Statesman, Colonizer 1847-1910 (Provo, UT: Brigham Young University manuscript collection, 1963).

Woolsey, Nethella. The Escalante Story: A History of the Town of Escalante, and Description of the Surrounding Territory, Garfield County, Utah, 1875-1964 (Springville, UT: Art City Publishers, 1964).

## V. Biology resources

- Albee, BJ, LM Shultz, and S Goodrich. "Atlas of the vascular plants of Utah". Occasional Publications 7, Utah Museum of Natural History. (Salt Lake City, UT: University of Utah, 1988).
- Allen, TFH and TW Hoekstra. Problems of scaling in restoration ecology. (Cambridge, Great Britain: Cambridge University Press, 1981).
- Armbruster, P and R. Lande. "A population viability analysis for African elephants: how big should a reserve be?". Conservation Biology, vol. 7, (1993) pp. 602-610.
- Atwood, K, J Holland, R Bolander, B Franklin, DE House, L Armstrong, K Thorne and L England. Utah threatened, endangered and sensitive plant field guide. (USDA/USFS/BLM/NPS. 1991)
- Axelrod, DI. 1960. The evolution of lowering plants. in Tax, S., Evolution after Darwin, The evolution of life, Vol. 1. (Chicago, IL: University of Chicago, 1960. pp. 227-305)
- Ayyad, MA. "Soil-vegetation-atmosphere interactions". in Goodall, D. W. and Perry, R.A., eds, Aridland ecosystems, International Biome Programme Publications #17, (Cambridge, MA: Cambridge University Press, 1981).
- Barbour, MG. "Plant-plant interactions". in Goodall, D.W. and Perry, R.A., eds, Aridland ecosystems, International Biome Programme Publications #17, (Cambridge, MA: Cambridge University Press, 1981).
- Behnke, R. J. "Native trout of western North America." American Fisheries Society Monograph, vol. 6, (1992).
- Behnke, R. J., and M. Zar. 1976. "Biology and management of threatened and endangered western trouts." (Ft. Collins, CO: Technical Report RM-GTR-28, USDA Forest Service, 1976).
- Beier, P. "Determining minimum habitat areas and habitat corridors for cougars." Conservation Biology, vol. 7, (1993) pp. 94-108.
- Belnap, J. 1994. Potential role of cyanobacterial-lichen soil crusts. in SB Monsen and SG Kitchen, eds,

Proceedings: Ecology and Management of Annual Rangelands. (Ogden, UT: USDA INT-GTR-313, 1994). pp. 179-185.

Belnap, J. Soil surface disturbances: their role in accelerating desertification. Environmental Monitoring and Assessment. vol. 37, (1995) pp. 39-57.

Belnap, J. Soil surfaces disturbances in cold deserts: effects on nitrogenase activity in cyanobacterial-lichen crusts. Biology and Fertility of Soils, in press.

Belnap, J. and KT Harper. The influence of cryptobiotic soil crusts on elemental content of tissue in two desert seed plants. Arid Soil Research and Rehabilitation. vol. 9, (1995) pp. 107-115.

Belnap, J. KT Harper and SD Warren. "Surface disturbance of cryptobiotic soil crusts: nitrogenase activity, chlorophyll content, and chlorophyll degradation." Arid Soil Research and Rehabilitation. vol. 8, (1994) pp. 1-8.

Belovsky, GE. 1987. "Extinction models and mammalian persistence". in Soule, M.E., ed. Viable populations for conservation. (Cambridge, UK: Cambridge University Press, 1987). pp. 35-57.

Bergelson, J. JA Newman, and EM Floresroux. "Rates of weed spread in spatially heterogenous environments." Ecology. vol. 74, (1993) pp. 999-1011.

Billings, WD. " Ecological impacts of cheatgrass and resultant fire on ecosystems in the western Great Basin." in SB Monsen and SG Kitchen, eds. Proceedings: Ecology and Management of Annual Rangelands. (USDA INT-GTR-313, Ogden UT: 1994) pp. 2-30.

Brown, JH. "Mammals on mountaintops: nonequilibrium insular biogeography." American Naturalist. vol. 105, (1971) pp. 467-478.

Bowers, J.E., Webb, R.H., and Rondeau, R.J.. "Longevity, recruitment, and mortality of desert plants in Grand Canyon, Arizona, U.S.A." Journal of Vegetation Science. v. 6, (1995) p. 551-564.

Case, TJ and ML Cody. 1988. "Testing theories of island biogeography." American Scientist. vol. 75 (1988). pp. 402-411.

Chronic, H. Roadside geology of Utah, (Missoula, MT: Mountain Press Publishers, 1990).

Cronquist, A., AH Holmgren, NH Holmgren, JL Reveal. Intermountain Flora, vol 1. (New York, NY: Hafner Publishing, 1977).

Davidson DE, WD Newmark, JW Sites, DK Shiozawa, EA Rickart, KT Harper, and RB Keiter. "Selecting wilderness areas to conserve Utah's biological diversity". Great Basin Naturalist, vol. 56, (1996) pp. 95-118.

Davis, G. D. " Preservation of natural diversity: the role of ecosystem representation in wilderness." (Tampa, FL: Paper presented at the National Wilderness Colloquium, 1988)

Deacon, J.E. and Minckley, W.L. "Desert fishes." in Brown, G.W. ed, Desert biology, vol II. (New York, NY: Academic Press, 1974 ). pp. 385-488.

Diamond, JM. "'Normal' extinctions of isolated populations". in MH Nitecki, ed, Extinctions, (Chicago, IL: University of Chicago Press, 1981). pp. 191-246.

Dott, CE. Disturbance and plant communities in a dynamic landscape: canyons of southeastern Utah. (Madison, WI: Unpublished PhD dissertation, University of Wisconsin, 1996).

Dregne, HE. "Desertification of arid lands." in Dregne, H.E., ed. Advances in desert and arid land technologies and development, vol. 3. (Chur, Switzerland: Harwood Academic Publisher, 1993).

Evans, RD and JR Ehleringer. "A break in the nitrogen cycle in aridlands? Evidence from  $^{15}\text{N}$  of soils." Oecologia, vol. 94, (1993) pp. 314-317.

Fahrig, L., and G. Merriam. "Habitat connectivity and survival." Ecology, vol. 66, (1985) pp. 1762-1768.

Fleischner, T. "Ecological costs of livestock grazing in North America." Conservation Biology, vol. 8, (1994) pp. 629-644.

Forcella, F and SJ Harvey. 1983. "Eurasian weed infestation in western Montana in relation to vegetation and disturbance." Madrone, vol. 30, (1983) pp. 102-109.

Foreman, D., and H. Wolke. The big outside, (Tucson, AZ: Ned Ludd Books, 1989).

Fowler, J.F., Stanton, N.L., Hartmann, R.L., and May, C.L. in Van Riper, C. Proceedings of the Second Biennial Conference on Research in Colorado Plateau National Parks. (NPS/NRNAU/NRTP-95/11. USDI-NPS. 1995.)

Frankel, OH and ME Soule. Conservation and evolution, (Cambridge, UK: Cambridge University Press, 1981).

Gaud, William, ed. Supplemental Environmental Studies of the Kaiparowits Generating Station (Flagstaff, AZ: Northern Arizona University Biology Department, report issued July 1, 1974).

Graff . Fluvial processes in dryland rivers. (New York, NY: Springer-Verlag, 1988).

Gross, KL. "Mechanisms of colonization and species persistence in plant communities." in Jordan, W.R. and Gilpin, M.E., eds, Restoration ecology, (Cambridge, UK: Cambridge University Press, 1987).

Grumbine, RL. "What is ecosystem management?" Conservation Biology, vol. 8 (1994) pp. 27-38.

Harper K.T. and Marble, J.R. "A role for nonvascular plants in management of arid and semiarid rangelands." in PT Tueller, ed, Vegetation science applications for rangeland analysis and management. (Dordrecht: Kluwer Academic Publisher, 1988). pp. 135-169.

Harper, K.T., St. Clair, L., Thorne, K.H., and Hess, W.H. Natural History of the Colorado Plateau and the Great Basin. (Niwot, CO: University Press of Colorado, 1994).

Harris, LD. The fragmented forest: island biogeography theory and the preservation of biotic diversity. (Chicago, IL: University of Chicago Press, 1984).

Harris, L. D., and P. B. Gallagher. "New initiatives for wildlife conservation: the need for movement corridors." in G. MacKintosh, ed. Preserving communities and corridors, (Washington, D.C., Defenders of Wildlife, 1989) pp. 11-34.

Heaney, LR. 1984. "Mammalian species richness on islands on the Sunda Shelf, Southeast Asia."

Oecologia, vol. 61, (1984) pp. 11-17.

Henderson, M. T., G. Merriam, and J. Wegner. "Patchy environments and species survival: chipmunks in an agricultural setting." Biological Conservation, vol. 31, (1985) pp. 95-105.

Holden, PB, RA Stone, W White, G Somerville, D Duff, R Gervais, and S Gloss. 1974. "Threatened fishes of Utah". Proceedings of the Utah Academy of Science, Arts and Letters, vol. 51, (1974) pp. 46-65.

Hunter, R. 1990. "Recent increases in Bromus on the Nevada Test Site." in ED McArthur, EM Romney, SD Smith and PT Tueller, eds, Proceedings: Symposium on cheatgrass invasion, shrub die-off, and other aspects of shrub biology and Management, (Ogden, UT: USDA USFS Technical Report INT-GTR-276). pp. 22-25

Jeffries, Douglas. The Vegetation, Soil, and Cryptogamic Crusts of Blackbrush Communities in the Kaiparowits Basin (Phoenix: Arizona State University, 1989) Ph.D. dissertation, 1989.

IUCN. Categories, objectives and criteria for protected areas. (Morges, Switzerland: 1978).

Iverson, RM, BS Hinckley, RM Webb, B Haller. "Physical effects of vehicular disturbance on arid landscapes." Science, vol. 212, (1981) pp. 915-917.

Johansen, JR. "Cryptogamic crusts of semiarid and arid lands of North America." Journal of Phycology, vol. 29, (1993) pp. 140-147.

Johnson, W. C., and C. S. Adkisson. "Dispersal of beech nuts by blue jays in fragmented landscapes." American Midland Naturalist, vol. 113, (1985) pp. 319-324.

Kershner, J. L. "Bonneville cutthroat trout" in M. K. Young, ed. Conservation assessment for inland cutthroat trout, (Ft. Collins, CO: Technical Report RM-GTR-256, USDA Forest Service, 1995) pp. 28-35.

Kleiner, EF and KT Harper. "Environmental and community organization in grasslands of Canyonlands National Park." Ecology, vol. 53, (1972) pp. 299-309.

Knopf, FL. "Significance of riparian vegetation to breeding birds across an altitudinal cline." in Riparian ecosystems and their management: reconciling conflicting uses, (Ft. Collins, CO: USDA

USFS Technical Report RM-GTR-120.1985). pp. 105-111.

Kushlan, JA. "Design and management of continental wildlife reserves: lessons from the Everglades." Biological Conservation. vol 15, (1979) pp. 281-290.

Larsen, K.D. Effects of microbiotic crusts on the germination and establishment of three range grasses. Unpublished thesis, Boise State University, Boise, ID. 1996.

Levins, R. "Extinctions." in M. Gerstenhaber, ed. Some mathematical questions in biology. Lectures on mathematics in the life sciences. Vol. 2. (Providence, RI: American Mathematical Society) pp. 77-107.

Lomolino, MV and R Channell. "Splendid isolation: Patterns of the geographic range collapse in endangered mammals." Journal of Mammalogy. vol. 76, (1995) pp. 335-347.

Loope, LL, PG Sanchez, PW Tarr, WL Loope, and RL Anderson. "Biological invasions of arid land nature reserves." Biological Conservation. vol. 44, (1988) pp. 95-118.

Loope, WL. Relationship of vegetation to the environment in Canyonlands National Park, (Logan, UT: Unpublished PhD dissertation, Utah State University, 1977).

Ludwig, JA and WG Whitford. "Short-term water and energy flow in arid ecosystems." in Goodall, D.W. and RA Perry, eds. Aridland ecosystems, International Biome Programme Publications #17, (Cambridge, MA: Cambridge University Press, 1981).

Mack, RN and JN Thompson. "Evolution in steppe with few large, hooved mammals." American Naturalist vol. 119 (1978) 757-773.

MacKinnon, I, K MacKinnon, G Child and J Thorsell. Managing protected areas in the tropics. (Gland, Switzerland: IUCN, 1986).

MacMahon, JA. "Disturbed lands and ecological theory." in WR Jordan and ME Gilpin, eds, Restoration ecology. (Cambridge, UK: Cambridge University Press, 1987).

Mader, HJ. 1984. "Animal habitat isolation by roads and agricultural fields." Biological Conservation. vol. 29, pp. 81-96.



Mader, H. J., C. Schell, and P. Kornacker. "Linear barriers to movements in the landscape." Biological Conservation. vol. 54, (1990) pp. 209-222.

May, CL, JF Fowler, and NL Stanton. *in* Van Riper, C III, Proceedings of the Second Biennial Conference on Research in Colorado Plateau National Parks. (NPS/NRNAU/NRTP-95/11. USDI-NPS. 1995).

Meffe, GK and CR Carroll. . Principles of conservation biology. (Sunderland, MA: Sinauer, 1994).

Michener, CD. 1979. "Biogeography of the bees." Annals of the Missouri Botanical Garden. vol. 66, (1979) pp. 277-347.

Miller, RR. "Origin and affinities of the freshwater fish fauna of western North America." *in* CL Hubbs, ed., Zoogeography. (AAAS Publication 51, 1959) pp 187-222.

Miller, RR. 1961. "Man and the changing fish fauna of the American Southwest". Papers, Michigan Academy of Science, Arts and Letters. vol. 46, (1961) pp. 365-404.

Minckley, WL and JE Deacon. . "Southwestern fishes and the enigma of 'endangered species'." Science, vol. 159, (1968) pp. 1424-1432.

Minckley, WL and JE Deacon. Battles against extinction: native fish management in the American West. (Tucson, AZ: University of Arizona Press, 1990).

Minckley, WL, DA Henderson, and CE Bond. "Geography of western North American freshwater fishes: description and relationships to intracontinental tectonism." *in* CH Hocutt and EO Wiley, eds., The zoogeography of North American freshwater fishes. (New York, NY: John Wiley and Sons, 1986). pp. 519-613.

Moldenke, A. Soil microarthropods of Virginia and Chesler Parks, Canyonlands National Park, UT. Final report, National Park Service, Moab, UT. 1995.

Monsen, SB and SG Kitchen, eds. Proceedings: Ecology and Management of Annual Rangelands. (Ogden, UT: USDA INT-GTR-313, 1994). pp. 179-185.

Murdoch, Joseph, et al. Navajo-Kaiparowits Environmental Baseline Studies Summary Report 1971-1974

(Provo, UT: Center for Health and Environmental Studies; Botany and Range Science Department of Brigham Young University, 1974).

Nabhan, GP and C Wilson. Canyons of Color. (New York, NY: Harper Collins, 1996).

Neff, JL and BB Simpson. "Bees, pollination systems and plant diversity." Pages 143-167 in J. LaSalle and IE Gauld, eds, Hymenoptera and biodiversity. (Wallingford, UK: C.A.B. International, 1993).

Newmark, WD. "Legal and biotic boundaries of western North American national parks: a problem of congruence." Biological Conservation, vol. 33, (1985) pp. 197-208.

Newmark, WD. 1987. "A land-bridge island perspective on mammalian extinction in western North American parks." Nature, vol. 325, (1987) pp. 430-432.

Newmark, WD. 1995. "Extinction of mammal populations in western North American national parks." Conservation Biology, vol. 9, (1995) pp. 512-526.

Noss, RF. "The wildlands project: land conservation strategy." in The wildlands project, Wild Earth Special Issue. (Genezoic Society, 1992) pp 10-25.

Noss, R. F. "What can wilderness do for biodiversity?" in P. Reed, ed. Preparing to manage wilderness in the 21st century. ( Asheville, NC: GTR SE-66, USDA Forest Service, Southeastern Forest Experiment Station, 1990) pp. 49-69.

Noss, R. F. " Landscape connectivity: different functions at different scales." in W. E. Hudson, ed. Landscape linkages and biodiversity. (Washington, DC: Defenders of Wildlife, 1991) pp. 27-39.

Noss, R. F. "Wildlife corridors." in D. Smith and P. Hellmund, eds. Ecology of greenways. (Minneapolis, MN: University of Minnesota Press, 1993) pp. 43-68.

Noss, R. F., and A. Y. Cooperrider. Saving nature's legacy. (Washington, DC: Island Press, 1994).

Osley, DJ, MB Fenton, and GR Carmody. "The effects of roads on populations of small mammals." Journal of Applied Ecology, vol. 11, (1974) pp. 51-59.

Patterson, BD. "Mammalian extinction and biogeography in the southern Rocky Mountains." in MH Nitecki, ed. Extinctions. (Chicago, IL: University of Chicago Press, 1984) pp. 247-293

Pellant, M and C Hall. "Distribution of two exotic grasses on intermountain rangelands." in SB Monsen and SG Kitchen, eds. Proceedings: Ecology and Management of Annual Rangelands. (Ogden, UT: USDA INT-GTR-313, 1994): pp. 109-112.

Pickett, STA and JN Thompson. "Patch dynamics and the design of nature reserves." Biological Conservation. vol. 13, (1978) pp. 27-37.

Pickett, STA and PA White. The ecology of natural disturbance and patch dynamics. (Orlando, FL: Academic Press, 1985).

Pimm, SL. "Community structure and stability." in ME Soule, ed. Conservation Biology: the science of scarcity and diversity. (Sunderland, MA: Sinauer Press, 1986).

Primack, RB. Essentials of conservation biology. (Sunderland, MA: Sinauer, 1993).

Raines, James. Modeling Studies of Small Mammal Trapping, Phenology, and Plant Succession in the Kaiparowits Region, Kane County, Utah (Provo: Brigham Young University, 1985, 1976); Ph.D. Dissertation, 1976.

Raven, PR. The nature and value of biodiversity, in Global biodiversity strategy: guidelines for action to save, study and use earth's biotic wealth sustainably and equitably. (WRI, IUCN, UNEP, 1992). pp. 1-18.

Reice, SR. "Non-equilibrium determinants of biological community structure." American Scientist. vol. 82, (1994) pp. 424-435.

Roberts, L. "A dynamical systems perspective on vegetation theory." Vegetation. vol. 69, (1987) pp. 27-33.

Rogers, GF. Then and Now. (Salt Lake City, UT: University of Utah Press, 1982).

Rosenweig, ML. 1987. "Restoration ecology: a tool to study population interactions?" in WR Jordan and ME Gilpin, eds. Restoration ecology. (Cambridge, UK: Cambridge University Press, 1987).

Rost, GR and JA Bailey. "Distribution of mule deer and elk in relation to roads". Journal of Wildlife Management. vol. 43, (1979) pp. 634-641.

Salwasser, H, C Schonewald-Cox, and R Baker. "The role of interagency cooperation in managing viable populations." *in* ME Soule, Viable populations for conservation. Cambridge, UK: Cambridge University Press, 1987) pp. 159-173.

Saunders, DA, RJ Hobbs, and CR Margules. 1991. "Biological consequences of ecosystem fragmentation: a review." Conservation Biology. vol. 5, (1991) pp. 18-32.

Schonewald-Cox, CM. "Guidelines to management: a beginning attempt." *in* Schonewald-Cox, SM Chambers, B MacBryde, and L Thomas, eds., Genetics and conservation. (Menlo Park, CA: Benjamin Cummings, 1983) pp. 414-445.

Shaffer, ML. "Minimum population size for species conservation." BioScience. vol. 31, (1981) pp. 131-134.

Shreve, F. 1942. "The desert vegetation of North America." Botanical Reviews. vol. 8, (1942) pp. 195-246.

Shulz, L. M. 1993. "Patterns of endemism in the Utah flora." *in* R. Svirsky and K. Lightfoot, eds. Southwestern rare and endangered plants. (Santa Fe, NM: NM Department of Forestry and Resources Conservation Division, Miscellaneous Publication No. 2, 1993) pp. 249-263.

Simberloff, D., and J. Cox. "Consequences and costs of conservation corridors." Conservation Biology. vol 1) pp. 63-71.

Simberloff, D., J. A. Farr, J. Cox, and D. W. Mehlman. "Movement corridors: conservation bargains or poor investments?" Conservation Biology. vol. 6, (1992) pp. 493-504.

Soule, ME, ed. Viable populations for conservation. (Cambridge, UK: Cambridge University Press, 1987).

Soule, ME and BA Wilcox. Conservation biology: an evolutionary-ecological perspective. (Sunderland, MA: Sinauer, 1980).

Stebbins, GL. "Aridity as a stimulus to plant evolution." American Naturalist. vol. 86, (1952) pp. 33-44.

Stevens GC. "The elevational gradient in altitudinal range: an extension of Rapoport's latitudinal rule to altitude." American Naturalist. vol. 140, (1992) pp. 893-911.

Terborgh, J and B Winter. "Some cases of extinction." in ME Soule and BA Wilcox, ed., Conservation biology. (Sunderland, MA: Sinauer, 1980) pp. 119-134.

Tuhy, Joel and MacMahon, James. Vegetation and Relict Communities of Glen Canyon National Recreation Area (Logan, UT: Utah State University, final report for contract CX1200-6-B076, 1988).

Turner, MG, WH Romme, RH Gardner, RV O'Neill, TK Kratz. "A revised concept of landscape equilibrium: disturbance and stability on scaled landscapes." Landscape Ecology. vol. 8, (1993) pp. 213-227.

Utah Natural Heritage Program. Vascular Plant Database. (Salt Lake City, UT: Unpublished, Utah Division of Wildlife Resources).

Van Devender, AR and WG Spaulding. "Development of vegetation and climate in the Southwestern United States." Science. vol. 204, (1979) pp.701-710.

Van Dyke, FG, RH Brocke, HG Shaw, BE Ackerman, TP Hemker, and FG Lindzey. "Reactions of mountain lions to logging and human activity." Journal of Wildlife Management. vol. 50, (1986) pp. 95-102.

Van Pelt, Nicholas and Tuhy, Joel, "Relict Vegetation Sites: Urgent Inventory Need for Desert Parks." Park Science, vol. 11, no. 3 (Summer 1991) p. 20.

Van Riper, C III. Proceedings of the Second Biennial Conference on Research in Colorado Plateau National Parks. (NPS/NRNAU/NRTP-95/11. USDI-NPS.1995).

Wagner, FH. "Population dynamics." in Goodall, D.W. and RA Perry, eds, Aridland ecosystems. (Cambridge, MA: International Biome Programme Publications #17, Cambridge University Press, 1981).

Warren, M. L., and B. M. Burr. "Status of freshwater fishes of the United States: overview of an imperiled fauna." Fisheries. vol. 19, (1994) pp. 6-18.

Webb, RH and HG Wilshire. Environmental effects of off-road vehicles: impacts and management in arid regions. (New York, NY: Springer-Verlag, 1981).

Wegner, J. F., and G. Merriam. "Movements of birds and small mammals between a wood and adjoining farmland." Journal of Applied Ecology. vol. 16, (1979) pp. 349-357.

Welsh, SL. "Endangered and threatened plants of Utah, a reevaluation." Great Basin Naturalist. vol. 38, no. 1 (March 31, 1978) pp. 1-18.

Welsh, SL, ND Atwood, JL Reveal. "Endangered, threatened, extinct, endemic and rare or restricted Utah vascular plants." Great Basin Naturalist. vol. 35, (1975) pp. 326-327.

Welsh, Stanley. Flowers of the Canyon Country (Salt Lake City: University of Utah Press, 3d edition, 1986).

Welsh, SL, ND Atwood, LC Higgins, and S Goodrich. "A Utah Flora." Great Basin Naturalist Memoirs. vol. 9. (Provo, UT: Brigham Young University, 1987).

Welsh, Stanley. Environmental Baseline Studies of the Navajo-Kaiparowits Generating Stations (Provo, UT: Brigham Young University, 1973).

Welsh, Stanley. "Kaiparowits Flora." Great Basin Naturalist, vol. 38, no. 2 (1978) pp. 125-179.

Welsh, Stanley, et al. A Survey of Natural Landmark Areas of the North Portion of the Colorado Plateau--Biologic and Geologic Themes (Provo, UT: Brigham Young University, 1980).

Wiens, J. A. The ecology of bird communities. Vol 2, (New York, NY: Cambridge University Press, 1989).

Wilcove, DS, CH McLellan, and AP Dobson. "Habitat fragmentation in the temperate zone." pp. 237-256 in ME Soule, ed, Conservation biology: the science of scarcity and diversity. (Sunderland, MA: Sinauer, 1986).

Wilcox, BA and DD Murphy. "Conservation strategy: the effects of fragmentation on extinction." American Naturalist. vol. 125, (1985) pp. 879-887.

Williams, JD, JP Dobrowolski, NE West and DA Gillette. "Microphytic crust influence on wind erosion." Transactions of the American Society of Agricultural Engineers. vol. 38, (1995) pp. 131-137.

Willis, EO. "Populations and local extinctions of birds on Barro Colorado Island, Panama." Ecological Monographs. vol. 44, (1974) pp. 153-169.

Witmer, GW and DS Calesta. "Effect of forest roads on habitat use by Roosevelt elk." Northwest Science, vol. 59, (1985) pp.122-125.

Young, JA, RA Evans and BL Kay. "Cheatgrass." Rangelands, vol. 9, (1987) pp. 266-270.

Zanaboni, A. and Lorenzoni, G., "The Importance of Hedges and Relict Vegetation in Agroecosystems and Environment Reconstruction." Agriculture Ecosystems & Environment. vol. 27, nos. 1-4 (special issue) (November, 1989).

#### VI. General resources (These sources describe resources that cover several disciplines within the area.)

Abbey, Ed. "Escalante Canyon." in Meyer, Alfred, ed. Encountering the Environment (New York: Van Nostrand Reinhold, 1971).

Barnes, F.A. Utah Canyon Country. (Salt Lake City, UT: Utah Geographic Series, Inc. 1986).

Crampton, C. Gregory. Standing Up Country: The Canyonlands of Utah and Arizona (New York: A.A. Knopf, 1964; Layton, UT: Peregrine Smith, 1983).

Daughters of Utah Pioneers. Utah Rivers, Part 2 (Salt Lake City: The Daughters of Utah Pioneers, 1986)

Frankel, Zachary, A Citizen's Proposal to Protect the Wild Rivers of Utah, Southern Utah Wilderness Alliance, Salt Lake City, Utah. 1994

Kelsey, Michael. Hiking and Exploring the Paria River, Including the Story of John D. Lee and the Mountain Meadows Massacre (Provo, UT: Kelsey Publishers, 1991).

Lambrechtse, Rudi. Hiking the Escalante (Salt Lake City: Wasatch Publishers, 1985).

Millar, Rodney and Degiorgio, Joan. The Colorado Plateau: A Proposed Thematic World Heritage List Nomination. Unpublished, submitted to the Federal Interagency Panel for World Heritage, National Park Service by the State of Utah, June, 1986.

Phillips, John. "Nowhere Man", Car and Driver. Vol. 42, No. 1.( July 1996) pp. 109-121.

Powell, John Wesley. Report on the Lands of the Arid Region of the United States (Boston: The Harvard Common Press, 1879, 1983).

Powell, John Wesley. The Exploration of the Colorado River and Its Canyons (originally published by Flood & Vincent under the title Canyons of the Colorado, reprint, New York: Dover Publications, 1961)

Richarson, Elmo R., 1965, " Federal park policy in Utah: the Escalante National Monument controversy of 1935-1940." Utah State Historical Quarterly, vol. 33, no. 2, p. 109-133.

Utah Wilderness Coalition. Wilderness at the Edge (Salt Lake City: Utah Wilderness Coalition, 1990; distributed by Peregrine Smith Books).

U.S. Department of the Interior, Bureau of Land Management. BLM Intensive Wilderness Inventory: Final Decision. 1980

U.S. Department of the Interior, Bureau of Land Management. Escalante/Kanab Resource Management Plan; Grand Staircase Ecosystem Analysis. (Cedar City, UT: Cedar City District, 1994).

U.S. Department of the Interior, Bureau of Land Management. Draft Sensitive Resources: Escalante/Kanab RMP. (Cedar City, UT: Cedar City District, 1994).

U.S. Department of the Interior, Bureau of Land Management. Utah Statewide Wilderness Environmental Impact Statement, Final. 1990

U. S. Department of the Interior, Bureau of Land Management. Utah Statewide Wilderness Study Report. Vol IIA - Summay Analylsis of Study Area Recommendations. 1991.

U.S. Department of the Interior, Bureau of Land Management. Kanab/Escalante Grazing Management



Environmental Impact Statement, Draft. 1980.

U.S. Department of the Interior, Bureau of Land Management. Kaiparowits Project Environmental Impact Statement. 1976.

U.S. Department of the Interior, Bureau of Land Management. Kaiparowits Coal Development and Transportation Study, Final Report. 1980.

U.S. Department of the Interior, Bureau of Land Management and Office of Surface Mining Reclamation and Enforcement. Preliminary Draft Environmental Impact Statement: Proposed Development and Operation of the Warm Springs Project. 1995.

Wahlquist, Wayne, ed. Atlas of Utah. (Provo, UT: Brigham Young University Press; Weber State College. 1981).

Wels, S.L., Rigby, J.K., Hamblin, W.K., A Survey of Natural Landmark Areas of the North Portion of the Colorado Plateau: Biotic and Geologic Themes. Brigham Young University, Provo. 1980.

Grand Staircase - Escalante National Monument  
List of Historic and Scientific Objects of Interest

Objects of Geologic Interest

Description: Perennial streams enter entrenched canyons in white Navajo and deep-red Windgate Sandstone. Deer Creek, Steep Creek, and The Gulch have perennial flows of clear cold water. The Gulch leads up into the spectacular Circle Cliffs where remarkable specimens of petrified wood (60 ft. logs) exist in the Morrison and Chinle formations.

Location: Escalante - Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: White Canyon cuts through the Kaibab Limestone to the Coconino Sandstone, the oldest stratum in the Upper Escalante drainage.

Location: Escalante - Studhorse Peaks unit

Source: Davidson, E.S., Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p. 10

Description: Big Spencer Flat Road and the V Road is site of "thunderball" iron concretions known as Moqui marbles. These oddities weather out of the Navaho sandstone and are a popular recreation feature.

Location: North Escalante Canyons WSA

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p. 16, and Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Waterpocket Fold tops out at Deer Point (7,243 feet). Most of the Waterpocket Fold is in the Capitol Reef National Park where it is a major landmark.

Location: Escalante - Colt Mesa unit

Source: Utah Wilderness Coalition. Wilderness at the Edge. p. 189, and Davidson, E.S., Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p. 61

Description: The inner gorges of the upper Moody Canyons cut into the relatively harder Kaibab Limestone and Coconino Sandstone (oldest exposed layer in this region).

Location: Escalante - Colt Mesa unit

Source: Utah Wilderness Coalition. Wilderness at the Edge. p. 189

Description: Dry Valley Creek Canyon. A waterfall blocks the entrance to Dry Valley Creek Canyon and consequently, the canyon remains in its natural condition. A perennial stream cuts through alluvial benches. It is relict and probably possesses important scientific values.

Location: Mud Springs Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The East Kaibab Monocline or the Cockscomb is unique as a Colorado

Plateau structure. Its alignment with the Paunsaugant, Seevier, and Hurricane faults suggest that it too could be a fault at depth. It extends from the Colorado River north to Canaan Peak and is a major landmark.

Location: Kaiparowits Plateau - The Cockscomb WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Blues - a Cretaceous shale badlands, richly colored and contrasting with adjacent pink sandstone cliffs that forms a significant part of the vista for visitors to Bryce Canyon National Park. The Kaiparowits formation is well exposed here represents an accumulation of exceedingly rapid proportions and an immature sedimentary region which is not well displayed in any other formation in the Colorado Plateau.

Location: The Blues WSA (near Bryce Canyon)

Source: Welch, S.L., Rigby, J.K., Hamblin, W.K., A Survey of Natural Landmark Areas of the North Portion of the Colorado Plateau, 1980. p. 248

Description: Fiftymile Mountain is a complex of deep canyons, upwarps, monoclines, hogbacks and a spectacular 42-mile long Straight Cliffs wall, topping a thousand-foot-high cliffline of the Summerville, Morrison and Dakota formations. This complex marks the edge of the Kaiparowits Plateau.

Location: Kaiparowits Plateau - Fiftymile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Ancient coal fires of Right Hand Collet Canyon have left surface remains in the form of clinkers and deep red ash. These remains dominate the visual character of the drainage.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Arch. Span of 40 feet located in Calf Canyon, and is visible from the Alvey Wash road.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Burning Hills - naturally occurring underground coal fires have turned steep and rugged exposed hilltops a distinctive red.

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Devils Garden - oddly shaped arches (including Metate Arch) and rock formations in the hills at the foot of the cliffs marking the Kaiparowits Plateau.

Location: Carcass Canyon WSA (east of WSA)

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: This area possesses exceptional scenic values and contains a

portion of the Cockscomb, a prominent southern Utah geologic feature. the Cockscomb forms 2 parallel knife-edged ridges with a bisection V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge. These major features of south central Utah cover over 4,000 acres.

Location: Mud Spring WSA.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: An interesting fold in Henrieville Creek along the northwest boundary of the WSA is of geologic interest and a sightseeing attraction.

Location: Mud Spring WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Window Wind Arch above the middle trail has scenic value because of its location on the very edge of the Straight Cliffs. The Straight Cliffs escarpment is major landmark in south-central Utah and an important scenic feature within view from the Hole-in-the-Rock road. Woolsey Arch is located in Rock Creek Basin, an area of colorful Navaho sandstone and high cliffs.

Location: Fifty Mile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Unique because it consists of 2 prominent southern Utah physiographic systems. It includes the eastern most extension of the White Cliffs component of the famous ascending staircase, cliff and terrace physiography, the Vermillion, White, and Pink Cliffs; and east of the Paria river, the dividing point is the landscape representative of the Glen Canyon physiography of sculptured, dissected, and exposed Navaho sandstone. The area where these merge between Deer Range and Rock Springs Bench is a highly scenic complex and colorful landscape.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Vermillion Cliffs with its associated Wingate Sandstone cliffs, colorful Chinle badlands, and canyons with there multiple colors and the intensity of coloration contribute to high scenic quality. Included in this landscape are Hackberry Canyon, Paria River Valley, Hogeys Canyon, the Pilot Ridge-Starlight Canyon-Kirbys Point area and Eight Mile Pass.

Location: Paria-Hackberry WSA.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: An area of high scenic value include the breaks of the Rush Beds and the west wall of Cottonwood Canyon, upper tributaries to Hackberry Canyon, Death Valley Draw, and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Four ONA's designated to preserve "unique scenic values and natural wonders". North Escalante Canyon (5,800 acres), The Gulch (3,430), Escalante Canyons (480 acres), Phipps-Death Hollow (12 more outside WSA)

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 Location: North Escalante Canyons WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Location: North Escalante Canyons/The Gulch ISA  
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Description: This area is geologically complex and has some of the most outstanding canyon scenery in the country. Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: A unique feature of the Burning Hills is the red coloration in the landscape is the result of geological changes attributed to the naturally occurring coal fires. The coloration creates a highly scenic area.  
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Location: Burning Hills WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: The White Cliffs are high white or yellow cliffs of Navajo Sandstone. Vary in height from 600' at Deer Springs Point bench to 1,200' at Deer Springs Point and the Sheep Creek Bull Valley Gorge-Paria River confluence. The cliffs consistently reach a 1000' in height and the cliffline is interrupted by 8 canyons.  
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Location: Paria-Hackberry WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: This area contains twenty-four undeveloped springs. Ten are located in upper Paria, 6 in hackberry, 5 on the eastern border of Cottonwood Creek, and 3 on west boundary. There are also 6 developed springs. These are significant features in this arid environment.  
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Location: Paria-Hackberry WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: Phipps-Death Hollow ONA (12/23/70) contains 34,288 acres managed to preserve scenic values and natural wonders.  
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Location: Phipps-Death Hollow ISA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: Arches. Peek-a-boo Rock, Wahweap Window, Jacob Hamblin Arch, Starlight Arch, Cobra Arch, Sam Pollack Arch, Woolsey Arch, and several more unnamed arches and natural bridges.  
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Location: Kaiparowits Plateau and adjacent areas  
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Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.  
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Description: Sand-calcite crystals from the Morrison Formation. These crystals are the first reported occurrence from rocks of Jurassic age and only reported sand crystals in southern Utah.  
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 Location: Kaiparowits Plateau  
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Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah, p. 18  
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Description: Circle Cliffs in the northeast portion of WSA features intensively colored red, orange, and purple Chinle mounds and ledges at the base of Wingate Sandstone cliffs. Vertically jointed cliffs banded with red, yellow, and white colors and bench tops and upper cliff faces possess innumerable orange-red Kayenta Sandstone knobs. One of most spectacular and distinctive landscapes on the Colorado Plateau.  
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Location: Steep Creek WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: Area includes Escalante Natural Bridge (130' high, 100' span) and 4 other natural bridges and arches.  
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Location: Phipps-Death Hollow WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: The Gulch is a major geologic feature. Deeply entrenched very sheer red straight line Wingate Sandstone walls. High ridges and slickrock peaks. Ridges drop fairly abruptly to canyons below.  
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Location: Steep Creek WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: Lamanite Natural Bridge. Actually a large arch with good symmetry and form. Located in an impressive setting in a deep side canyon to The Gulch.  
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Location: Steep Creek WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: Petrified wood. Upper Gulch-Circle Cliffs contains large, unbroken logs of petrified wood (NEA 2,213 acres). Maximum log length 36'. The scenic values of these logs is enhanced by their colorful surroundings.  
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Location: Steep Creek WSA  
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Source: Utah Statewide Wilderness EIS, 1990 W FEIS 3B 19, and Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah, p.13.  
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Description: Outstanding scenic values include the upper portion of Paradise Canyon where sandstone in the Wahweap Formation outcrops as colorful walls and cliffs. Ponderosa pine growing in the sandstone enhance the scenic values. Two sandstone monoliths or fins above Alvey Wash are prominent geological features.  
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Location: Death Ridge WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: The area contains a unique canyon and bench system. The entire ISA contains outstanding scenery. Examples include the area east of Horse Canyon. Four canyons have isolated 10 benches of varying size. Many bench tops have  
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intricate pattern of innumerable orange-red Kayenta Sandstone knobs. Wolverine Canyon and Death Hollow have extremely narrow and convoluted sections. Another feature, Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.

Location: North Escalante Canyons/The Gulch ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Mollie's Nipple, an erosional remnant is a major landmark in the area.

Location: Kaiparowits Plateau.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Natural Arches. Sam Pollock Arch, located at the head of a tributary drainage of Hackberry Canyon, and Starlight Arch located west of No Man's Mesa.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Area of diverse geology represented by spectacular deep canyons. The Escalante River canyon is 1100 feet deep. The canyon walls are rough and broken and the canyon is narrow and it meanders. Pure white to golden sandstone has been eroded into expanses of slickrock. Death Hollow Canyon is 1,000' feet deep and meandering. The extensive upper basin through which Mamie Creek flows is a extremely dissected area of canyons, tanks, other formations. Red layers of Carmel Formation cap high mesas and ledges of the exposed Kayenta Formation.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Petrified wood deposits just west of the Old Paria Townsite and in Hackberry Canyon. Both are in the Chinle formation.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: All the topographic features of the Kaiparowits region have been developed in sedimentary rocks. The Kaiparowits Plateau is a slightly tilted sedimentary mass that extends as a narrow mesa from the High Plateaus to Glen Canyon 70 miles distant. Its culminating point, Canaan Peak is an outlier of the Table Cliff Plateau; the Paria Plateau is a huge block of sandstone, the Waterpocket monicline is a ridge of folded rock intricately dissected and flanked by hogbacks, and the broken "comb" in the vicinity of Paria is the edge of sandstone beds upturned in the East Kaibab fold. The Circle Cliffs are inward-facing walls of sandstone that rim an oval depression. These prominent features are but large-scale examples of the mesas, buttes, and ridges that characterize the landscape of southern Utah.

Location: Kaiparowits Plateau region

Source: Gregory, H.E. and Moore, R. C. The Kaiparowits Region; A Geographic and Geologic Reconnaissance of Part of Utah and Arizona. 1931.

Description: Paria River from Colorado River to its source, identified by NPS as

possessing values that may be of national significance, potential to be included in the National Wild and Scenic River System.

Location: Paria-hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Escalante River from Lake Powell to its source, a section of 14.9 miles, was designated as for study as a candidate Wild and Scenic River by the Secretary of the Interior on 10/11/70.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Lower Calf Creek Falls. Calf Creek Canyon is characterized by red alcoved walls, 2 waterfalls, and extensive expanses of white slickrock. Lower Calf Creek Falls drops 126' and Upper Calf Creek's drop is 86'. High educational values associated with interpretation of these areas.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The area contains 40 miles of perennial streams, a significant feature in this arid environment.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Objects of Paleontologic Interest, August, 1996

Description: Fossil assemblage photographs. Typical mollusks from Tropic Shale, south of Escalante include straight cone edaphopods, ammonites, gastropods, and pelecypods and Cretaceous sharks teeth from the Straight Cliffs Formation.

Location: Kaiparowits Plateau

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah, pp 14-15

Description: Gray Cliffs/Pink Cliffs - This sequence of rocks may contain one of the best and most continuous records of Late Cretaceous terrestrial life in the world. Formation has yielded early mammals, lizards, dinosaurs, crocodillians, turtles, mollusks.

Location: Kaiparowits - The Blues WSA

Source: BLM, Escalante/Kanab RMP - Grand Staircase Ecosystem Analysis, 1994

Description: Fossils deemed by the Museum of Northern Arizona in a 1976 study to be of major importance. They are found in the Cretaceous Wahweap Formation outcrops include abundant fragments of turtle shells and dinosaurs, as well as several crocodile teeth. There is an excellent chance that mammal fossils will be found

Location: Kaiparowits Plateau - Nipple Bench unit

Source: BLM, Kaiparowits power project environmental impact statement, 1976



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Description: The Straight Cliffs Formation is limited to the southern Utah area. It contains primitive mammals including one of the potentially oldest marsupial fossils identified.

Location: Kaiparowits Plateau

Source: BLM, Warm Springs Project Preliminary Draft EIS, 1996

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Description: Invertebrate and vertebrate specimens found Straight Cliffs, Tropic Shale, and Dakota Formations. 13 collection sites recorded (gastropods, cephalopods in upper Cretaceous Formations, vertebrate in Dakota and Tropic Shales). Likely to occur along entire length of the Straight Cliffs

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: The Kaiparowits is of interest in understanding the evolution of mammals and other terrestrial vertebrates. Very little is known of Cretaceous mammals prior to the latest part of that period. The mid-Cretaceous mammalian twilight zone is spanned by the fossiliferous, terrestrial rock units of the Kaiparowits region. They contain unique evidence bearing on the early diversification of important mammalian groups of the Late Cretaceous. The thickness, continuity, and broad temporal distribution of the Kaiparowits sequence provides the opportunity to document changes in terrestrial vertebrate assemblages over a wide span of Late Cretaceous time.

Location: Kaiparowits Plateau

Source: Eaton, Jeffrey G, and Cifelli, Richard L. Preliminary report on Late Cretaceous mammals of the Kaiparowits Plateau, southern Utah, 1988

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Description: Extremely significant fossils including marine and brackish water mollusks, turtles, crocodillians, lizards, dinosaurs, fishes, and mammals have been recovered from the Dakota formation, Tropic shale, Straight Cliffs Formation (Tibbet Canyon, Smoky Hollow, and John Henry members), and Wahweap formation in the area around the proposed Andalex mine and some localities lie directly along the proposed haul routes. This sequence of rocks (including the overlying Wahweap and Kaiparowits formations) contain perhaps the best and most continuous record of Late Cretaceous terrestrial life in the world

Location: Kaiparowits Plateau

Source: Eaton, Jeffrey G., Personal correspondence to Mr. Mike Noel, BLM, 1991

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## Objects of Prehistoric Interest

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Description: Sixty sites have been recorded and the potential for additional sites is exceptionally high. Sites discovered to date include lithic scatters, 13 rockshelters (some w/storage cists and rock art), 1 pithouse village site and 1 structure (probably of Anasazi origin). Some of the rock art and rock shelter and 1 campsite are potentially eligible for nomination to the NRHP.

Location: North Escalante Canyons/The Gulch ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Friendship Cove Pictograph site nominated to NRHP. This site consists of a set of large Fremont style pictographs painted on the face of a large sandstone cliff.

Location: Phipps-Death Hollow ISA, eastern part

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Forty-four sites of diverse types have been recorded in the area. 14 rock art (petroglyph and pictographs sites (2 from Fremont culture), 1 Pithouse village site, lithic scatters of Paiute and Anasazi, and 6 rockshelters have been discovered. Potential for more sites is good.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Situated at the intersection of three major prehistoric cultures the Plateau has long been a magnet for archeological study. It has been recognized that the Kaiparowits Plateau might contain important clues that would aid in answering questions in the archeology of the Southwest.

Location: Kaiparowits Plateau

Source: Utah Wilderness Coalition. Wilderness at the Edge, p. 147 and Lister, Florence C., Kaiparowits Plateau and Glen Canyon prehistory, an interpretation based on ceramics, 1964

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Description: Fiftymile Mountain Archeological District contains more than 400 sites including Anasazi habitations and granaries. Important scientific value. Some of the most significant cultural resources in the Four Corners area. Archaeological District (47,325 acre) has been nominated to NRHP. Majority of sites are masonry structures (of 1-10 rooms). Most are of Virgin Anasazi origin but include sites attributed to Fremont, Hopi, and Paiute. Navaho are also expected of occupying the area. 4,000 total sites may be located in WSA.

Location: Fiftymile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Sixty-five sites have been recorded. They include lithic and ceramic scatters, masonry structures (granaries and storage cists), one rock shelter. Masonry and some lithic/ceramic associated with Virgin Anasazi/Virgin-Kayenta Anasazi. Two are Pueblo II-III time period. Some sites are associated with Paiute-age or Archaic-age peoples. At least 8 sites in this area are eligible for nomination to the NRHP.

Location: Wahweap WSA

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 Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: High concentration of prehistoric sites. Although surveys are incomplete for the Warm Creek unit more than 600 sites have been found ranging from lithic scatters and campsites to rockshelters.

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 Location: Kaiparowits Plateau/Warm Creek unit

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 Source: BLM, Kaiparowits power project environmental impact statement, 1976

Description: Part of a larger area extensively used by the Kayenta Anasazi and later the Southern Paiute Indians. Site densities expected to be moderate to high.

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 Location: Kaiparowits Plateau/Squaw Canyon unit

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 Source: ERT, 1980, Kaiparowits coal development and transportation study, final report

Description: Prehistoric site densities are high on top of Nipple Bench. Sites represent Fremont, Virgin Anasazi and Kayenta Anasazi. The sites represent complex associations of features and artifacts and indicate permanent or extensive camps in rock shelters.

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 Location: Kaiparowits Plateau/Nipple Bench unit

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 Source: Fish, Paul, Preliminary Report Kaiparowits Power Project

Description: Six sites have been recorded. One is Pueblo II Anasazi occupation site, with others unidentified.

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 Location: Burning Hills WSA

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 Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: One hundred-five sites (primarily lithic scatters) have been recorded covering a broad period of occupation. Ten rockshelters w/storage cists or storage caches, 1 w/masonry room, 3 w/granaries associated with Anasazi or Fremont have been discovered. Additional sites include petroglyph and pictograph panels associated with shelter sites and 1 burial site.

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 Location: Carcass Canyon WSA

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 Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: One hundred thirty-four documented sites represent virtually all known prehistoric cultures in southern UT (Archaic, Fremont, Anasazi, Southern Paiute). 8,000 years of prehistory are represented. The sites primarily represent temporary habitation by hunter gatherers.

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 Location: Death Ridge WSA

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 Source: BLM Utah Statewide Wilderness EIS, 1990, and Hauck, F.R., Cultural Resource Evaluation of South-Central Utah, 1977-1978

Description: The area contains 41 recorded sites and based on surveys may contain exceptionally high densities of sites. Known sites include rockshelters, pit houses, lithic scatters, and masonry structures. Pictograph panels are in Deer Creek Canyon and petroglyphs are found in Snake Creek Canyon.

A study located and estimated 612 sites per 23,000 acres. 564 potentially eligible for nomination to the NRHP (southern border of WSA). Another inventory-- estimated 360 sites per 23,000 acres at the northern border of the WSA.

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Location: Paria-Hackberry WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: The Kayenta Pueblo culture inhabiting the Straight Cliff and portions of the Escalante River drainage between A.D. 1000 and 1200 were likely in contact with the Fremont culture. Although both inhabited the area at the same time and competed for limited agricultural lands there is no evidence of open conflict during this time. Some modifications of pottery making techniques between the two cultures indicates that there was trade and exchange between them. Little is known positively about the Kayenta culture, and additional research in this area could provide valuable insight on interactions between the two cultures.

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Location: Straight Cliffs WSA  
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Source: Lister, Kaiparowits Plateau and Glen Canyon Prehistory: An interpretation based on ceramics. 1964.

## Objects of Historic Interest

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Description: Dance Hall Rock/Hole-in-the-Rock Trail. While the Hole-in-the-Rock Trail was under construction in 1879, Mormon Pioneers camped at Fortymile Spring and held meetings and dances in the shelter of Dance Hall Rock. Designated historical site by DOI 1970.

Location: Two miles west of the Glen Canyon NRA on the Hole in the Rock Trail

Source: Utah Wilderness Coalition. Wilderness at the Edge. -- p. 182

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Description: Historic route constructed in 1879 to provide access from Escalante to areas on the opposite side of the San Juan River in Southeast Utah.

Location: Historic trail running from Escalante to Hole in the Rock in Glen Canyon NRA

Source: Lambrechtse, Rudi. Hiking the Escalante, 1985

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Description: Boulder Mail Trail. Used to carry mail between Escalante and Boulder beginning in 1902. Much of trail still visible where necessary to construct through slickrock. Nominated to NRHP. Popular backpacking route.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Boynton Road. Constructed 1909 as short cut between Escalante and Salt Gulch. Abandoned after 2 years because of flooding. Visible over approx 9 of its 10 miles.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Escalante-Boulder telephone line: First Boulder-Escalante telephone line constructed by Forest Service in 1911 providing first phone service to area. Still visible between Antone Flat and Sand Creek.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Washington Phipps grave. A historical grave site of an early pioneer shot in 1878 in a dispute with his partner John Boynton. Provided the namesake for the area.

Location: Phipps Death Hollow

Source: Lambrechtse, Rudi. Hiking the Escalante, 1985

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Description: Old Boulder Road. Main route between Escalante and Boulder until the CCC built Hell's Backbone Road and Highway 12 in 1930's to replace it.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: The Hattie Green mine, an early copper working located on the crest of The Cockscomb.

Location: The Cockscomb WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

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Description: Old Paria Townsite was established in 1874 on the bench above the eastern bank of the Paria River by Mormon settlers who attempted to farm the bottomlands. Site was abandoned in 1890.

Location: adjacent to Paria-Hackberry WSA

Source: Abby, Edward and Hyde, Philip. Slickrock p.46

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Description: Old Paria Townsite movie set. Built in the 1960's to film several movies. Now abandoned but still a popular recreation destination.

Location: adjacent to Paria-Hackberry WSA

Source: Abby, Edward and Hyde, Philip. Slickrock p.46

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## Objects of Biological Interest

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**Description:** Riparian zones are corridors for many of the region's species, including neotropical migrant birds. The corridors (including the Escalante, and Paria Rivers and Johnson Creek and their tributaries) bisect the region north to south, allowing for exchange of individuals among different animal populations. The importance of movement corridors to the long term viability of animal populations is of great scientific and management interest. This area would afford many opportunities to enhance this ecological issue.

**Location:** Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab including the Escalante, Paria rivers and Johnson Creek

**Source:** Edwards, Tom, 1996; Knopf, 1985; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

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**Description:** 25 miles of riparian corridor in unit. Connects mountains to desert lowlands. Has great concentration of hanging gardens and riparian vegetation, including relictual populations in canyon bottoms. Also supports many rock crevice communities. Connects other protected areas. High plant endemism, due to large extent of parent material exposure.

**Location:** Escalante River

**Source:** BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

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**Description:** Riparian corridor links high country to lowland desert scrub. Connects protected areas. Has high concentrations of isolated communities; hanging garden, rock crevice and canyon bottom communities. Also has an abundance of packrat middens.

**Location:** Paria River

**Source:** Van Devender and Spaulding, 1979; BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

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**Description:** Fifty miles of perennial streams including the Paria River (which is a wild and scenic river inventory segment). Riparian vegetation covers 500 acres.

**Location:** Paria-Hackberry WSA

**Source:** Utah BLM Statewide Final Wilderness EIS, 1990

Description: Three major floras meet in this area. Plants from the Mojave, Arizona deserts and northern Utah are all found here, with a few species from the Great Plains. The Colorado Plateau is surrounded by high mountains, isolating the flora and fauna. Unlike many ecosystems, the plant density, diversity and stature within the monument is determined more by substrate than climate. Consequently, isolation, plus the great diversity of substrates (providing a wide range of soil chemistry and physical characteristics) found within close proximity to each other has resulted in a high level of plant endemism in this area. Eleven species found in the monument are found nowhere else in the world. Of plants that occur only in Utah or on the Colorado Plateau, 125 species occur in the monument. The Canyonlands portion of the Colorado Plateau, much of which is contained in the monument, is considered the richest floristic region in the Intermountain West, and contains 50% of Utah's rare and endemic plants. 90% of these rare and endemic species are found on substrates typical of most of the monument. Of the Canyonlands area, the monument area is considered one of the most significant for endemic populations, with more than 10% of the flora being found no nowhere else.

Of additional significance is that many of the plants in the monument are diploid species. This means they represent the basic genetic stock from which polyploid species in the area evolved. This makes this area of great significance to plant evolutionary biologists and provides a unique opportunity to study the evolution and speciation of plant species, as well as the structure and dynamics of plant communities, independent of climate.

Location: Entire monument

Source: Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977; Utah Natural Heritage Program plant database

Description: The Colorado Plateau was uplifted and downcut without deformation. As a consequence, large areas of unmixed geologic parent materials are exposed, and plants must adapt to large array of highly distinct parent materials. These substrates are sharply demarcated, and often occur within a few meters of each other. This situation offers the unique opportunity to examine the role of soil physical and chemical characteristics in determining plant and animal community structure independent of climatic variables, an important ecological question. It also results in different plant community structure and dynamics than is generally observed in other ecosystems. This area contains shales, siltstones, mudstones, sandstones and limestone of differing depths, and deposited in a variety of environments (marine, freshwater and eolian). Each soil depth and depositional environment has very different chemical and physical characteristics. As a result, there is a great diversity of substrates in this area, each supporting a unique plant community.

Location: Entire monument

Source: Hintze, 1988; Nabhen and Wilson, 1996; Gross, 1987; Dott, 1996; Roberts, 1987

Description: The presence of steep elevational gradients gives the opportunity to sort out the role of temperature and precipitation in structuring plant and animal communities. Elevational gradients have traditionally been used by scientists as a way of examining factors controlling biotic community structure. Juxtaposition of diverse substrates and elevational gradients gives an unparalleled opportunity to determine the respective roles of soil chemistry, physical characteristics, elevation, rainfall and temperature in structuring biotic communities. In addition, it allows for high biodiversity in a small area.

Location: Entire monument



Source: Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977

Description: The Escalante Plateau is the home to approximately 300 species of amphibians, birds, mammals, and reptiles. This diverse set of wildlife species includes over 20 species of birds of prey including the bald eagle, peregrine falcon, and was the historical range of the condor. The region contains 2 of the 7 recognized centers of endemism for fishes of the western United States.

Location: Escalante Plateau

Source: Davidson et al. 1996; Tom Edwards, 1996, Behnke, R.J., and Zar, M., 1976

Description: Contains many different geologic substrates (therefore soils with different physical and chemical attributes) in a small area. The majority of endemic in Utah are found on these particular substrates; consequently, this area is expected to have a high concentration of endemics.

Location: Escalante -along boundary of Glen Canyon NRA and Capital Reef National Park

Source: Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988

Description: Large expanses of fine-textured soils (Morrison, Mancos/Tropic) shales support large number of endemic plant species, fossils.

Location: Henrieville to Escalante

Source: Hintze, 1988; Shulz, 1993; BLM Wilderness EIS

Description: An exposed monocline with many soils/substrates in close juxtaposition provides tremendous biodiversity of both general and endemic flora. High salt content of stream provides habitat for salt-tolerated riparian plants. Provides a elevational gradient from ponderosa pine to desert scrub. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.

Location: The Cockscomb

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996

Description: Contains a concentration of many different geologic substrates/soils with different physical and chemical attributes. This area has a high concentration of endemics. This boundary also abuts protected areas (Glen Canyon, Capitol Reef), thereby effectively increasing the value of all three areas for biological conservation. In addition, the Waterpocket Fold has isolated two outcrops of the same parent material. These two areas now support different floras. This presents an outstanding scientific opportunity to explore processes of speciation.

Location: Far eastern boundary

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond,

1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: This is an exposed monocline. Consequently, many substrates (Summerville, Morrison, Dakota, Tropic, Entrada, Navajo, Wingate and Carmel) are exposed directly next to each other, providing an opportunity for studies of ecological processes independent of climate. This monocline also has an elevational gradient, facilitating the study of effects of temperature and moisture on community dynamics. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.

Location: Straight Cliffs area

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978.

Description: Diversity of plant life ranging from low desert shrub to Ponderosa Pine (less than 1 mile apart) enhances the study and observation of ecology. 3 small stands of Ponderosa pine in Alvey Wash.

Location: Death Ridge WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Contained within the monument are 3-5 spatially separated areas where the same substrates are exposed in close proximity to each other. In addition, there are 5 elevational gradients along riparian corridors. This is critical for replicated scientific work to be conducted.

Location: Entire monument

Source: Hintze, 1988; USGS Topographical Maps

Description: Riparian corridor with elevational gradient, connecting desert low lands to the high country. Vermillion, White, Pink Cliffs (Triassic, Jurassic, Cretaceous material).

Location: Johnson's Creek

Source: Hintze, 1988; USGS Topographical Maps; Beier, 1993; Noss, 1992, 1993

Description: Fifty Mile Mountain. Presence of aspen on Pleasant Grove, Steer Canyon, and Pinto Mare Canyons.

Location: Fifty Mile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Protects lands at low elevation sites frequently rich in species diversity. The range of elevation in these areas from approximately 4500-8300 feet encompasses a wide variation in elevation and will capture the full diversity of plant and animal species in the region.

Location: Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab

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 Source: Hintze, 1988; Utah BLM Final Wilderness EIS, 1990  
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Description: The monument contains an abundance of hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket and rock crevice communities. These small, isolated populations often contain unusual, often relictual plants and animals. Hanging gardens and canyon bottom communities harbor riparian plants and their pollinators, as well as unique vertebrates (bats and small mammals) and soil fauna. Tinajas are important aquatic resources, and contain a diverse array of tadpole, fairy and clam shrimp, amphibians, algae, water beetles, other crustaceans, snails, mosquito and gnat larvae and aquatic/riparian plants. Highly saline areas are found around many seeps and streams, and consist of plants and animals adapted to highly saline conditions. Dunal pockets contain species adapted to shifting sands, while rock crevice communities consist mostly of slow-growing species that can thrive in extremely infertile sites. These communities offer a chance to examine gene flow dynamics, and to distinguish the respective role of pollen versus seeds. They offer an opportunity to study ground water flow dynamics in the absence of significant fluvial processes, and island biogeography of plants, pollinators and ground-dwelling biota. They also are highly simplified, discrete ecosystems, making them ideal for elucidating basic ecosystem processes.

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 Location: Entire monument  
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Source: Nabhen and Wilson, 1996; Harper et al., 1994; Welsh et al., 1993; May et al., 1995; Fowler et al., 1995; Graff, 1988  
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Description: These canyons provide a high concentration of isolated, unique plant and invertebrate communities: hanging garden, rock crevice, and canyon bottom communities. Many relictual plant species can be found in these communities. Pack rat middens are abundant, providing paleoclimate and paleo-vegetation information.

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 Location: Escalante Canyons  
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Source: Axelrod, 1960; BLM Wilderness EIS; Van Devender and Spauling, 1979; Fowler et al., 1995; Nabhen and Wilson, 1996  
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Description: Dunal pockets contribute Great Plains species to the flora. These are unique, isolated plant communities.

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 Location: Cockscomb to Kaiparowits  
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Source: Hintze, 1988  
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Description: Unique, isolated communities are located throughout the monument. These include hanging gardens, tinajas, canyon bottom, dunal pocket, salt pocket and rock crevice communities. They provide great opportunities for examining evolution, gene flow, island biogeography and other ecological principles.

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 Location: Entire monument  
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Source: Case and Cody, 1988; Diamond, 1981; Dott, 1996; Harris, 1984; Ludwig and Whitford, 1981; Fowler et al., 1995; Nabhen and Wilson, 1996; Roberts, 1987; Reice, 1994; Axelrod, 1960  
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Description: Biological conservation theory and literature suggests that large contiguous conservation areas increase both extent and probability of population survival, increases protection of migratory pathways, and is the most effective means of conserving aquatic and riparian communities.

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 Location: Entire monument  
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Source: Soule, 1987; Davidson et al., 1996; Miller, 1961; Minckley and Deacon, 1968; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: The connection with Glen Canyon provides a larger protected area. It also provides low desert vegetation as part of the vegetational gradients. Large areas are important for maintaining the evolutionary potential of plants and animals, allowing for the exchange of genetic material among the separate populations that constitute a population.

Location: Common boundaries and riparian connections with Glen Canyon NRA, Capitol Reef NP, Box Hollow Wilderness and Paria Wilderness

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: Cryptobiotic soil crusts are critical for soil stability, nutrient availability for vascular plants and normal soil surface temperatures. These crusts are extremely fragile and easily disrupted by soil surface disturbances such as trampling or off-road vehicles. Since the soils in the monument are highly susceptible to erosion, it is important that these biocrusts be protected so they stabilize these erodible soil surfaces. In addition, these ecosystems have few nitrogen-fixing plants. Since these crusts provide nitrogen to these soils, they are a critical part of these nitrogen-limited ecosystems.

Location: Entire monument

Source: Belnap, 1994, 1995; Belnap and Harper, 1995; Belnap et al., 1994; Jefferies, 1989; Harper and Marble, 1988; Johansen, 1993; Mack and Thompson, 1978; Fleischner, 1994

Description: Disturbance of most soil surfaces in the monument area will result in soil surface temperature changes, as bio-crusts are darker than the substrates underneath them. The expected lowering of temperature with disturbance would result in cooler soil temperatures, and thus later spring plant germination and lower nutrient uptake rates. This may adversely effect desert plant growth in early spring. Surface temperatures also influence foraging and burrowing patterns for many soil invertebrates, and many effect community dynamics of these species.

Location: Entire monument

Source: Ludwig and Whitford 1981; Belnap 1995

Description: Ecosystems in this area are some of the most stable documented to date, as both large and small scale disturbances are limited spatially and temporally. Very little of this area was glaciated in the Pleistocene. Most plant communities evolved without fire or grazing by large ungulate herds, as evidenced by characteristics of the soils and the flora. Catastrophic events are minimal, with the exception of wash bottoms. Microsite disturbances are minimal as well, as most soils support very low populations of invertebrates. 1880

photos repeated in 1990 show many sites virtually unchanged, with the same tree, shrub and grass individuals present, indicating very low species turnover rates in this region relative to other ecosystems. In addition, dead tree branches can still be found in virtually the same condition as they were 100 years ago, indicating plant tissue decomposition rates are extremely low in this region. This makes this area highly unique, as most ecosystems are believed to be structured disturbance. In this region, ecological processes can be studied independent of the effects of disturbance to give us greater insight into their functioning (i.e. factors controlling exotic plant invasions, species-species interactions, etc.)

Soil physical, chemical and biological features appear to be both easily damaged (low resistance) by surface disturbance and have very slow recovery rates (low resilience) when compared to other deserts or more mesic systems. This may be a result of evolution of this ecosystem evolving in the relative absence of disturbance (Belnap 1995, 1996). Therefore, this area is important in the study of how disturbance influences community dynamics, including species-species interactions, and for understanding how to restore these fragile systems. This also means that this area is highly susceptible to damage by different land uses, including recreation and grazing.

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Location: Entire monument  
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Source: Belnap, 1995, 1996; Belnap et al., 1994; Mack and Thompson, 1982; Fleischner, 1994; Kleiner and Harper 1972; Harper et al., 1994; Webb, 1994; Rogers, 1982; Pickett and White, 1985; Moldenke, 1995; Evans and Ehleringer, 1993; Turner et al. 1993; Iverson et al. 1981; Webb and Wilshire 1981; Larsen 1996; Bowers et al. 1994

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Description: Isolation of this area has resulted in minimal human impacts. Many of the ecosystems found in this area have received little, if any, human use and the type and extent of disturbance has that has occurred is known. In addition, there are large areas unbroken by roads. This is essential to the protection and conservation of plant and animal species.  
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Location: Entire monument  
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Source: Wilcox et al 1986; Wilcox and Murphy 1985; Mader et al., 1990; Osley, et al., 1974; Rost and Bailey, 1979; Witmer and Calesta, 1985

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Description: The monument lacks any areas that have been invaded to any large extent by exotic species. There are few such areas in the Intermountain West, and they can provide invaluable information in understanding the ecology and dynamics of exotic plant invasion. These areas aid scientists in understanding what makes systems resistant to such invasions, and thus help land managers predict what areas are susceptible to invasion and restore already-invaded regions.  
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Location: Entire monument  
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Source: Billings, 1994; Fleischner, 1994; Forcella and Harvey, 1983; Gross, 1987; Hunter, 1990; Loope et al., 1988; MacMahon, 1987; Pellant and Hall, 1994

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Description: Six threatened or endangered candidate species are located within or near this area.  
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Location: Wahweap WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990  
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Description: Contains Peregrine falcon (endangered) and 6 special status animal species and 5 special status plant species.  
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Location: Mud Spring WSA  
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Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Habitat for Swainson's hawk, golden eagle (Sensitive) and peregrine falcon (endangered).

Location: The Blues WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Peregrine falcon and bald eagle (endangered). 8 animal and 5 plant species of special status.

Location: Paria-Hackberry and Cockscomb WSA and Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Thirteen species of raptors are known or suspected of nesting in the WSA

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Relict plant community in the upper part of Dry Valley "probably possesses important scientific values"

Location: Mud Spring Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Unique relict plant community of pinion-juniper and sagebrush-grass park vegetation accessible only by a steep trail. One of the few remaining unaltered plant communities in Utah. No Man's Mesa RNA was designated as an ACEC in 1986. Such areas are invaluable to science. They provide restoration and management goals for administration of lands. Such areas are also critical to scientists who are trying to understand the natural functioning of ecosystems. Grasslands are especially valuable, as almost all have been heavily grazed for over a century.

Location: Paria-Hackberry WSA (No Man's Mesa and Little No Man's Mesa)

Source: Utah BLM Statewide Final Wilderness EIS, 1990 and Kleiner and Harper, 1972

Description: Four Mile Bench Old Tree Area. Unique area of extremely old (1,400 years) pinon and juniper trees. Unique scientific values on over 1,000 acres.

Location: Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: This region is at the northern end of areas that receive summer monsoonal rains, and is at the southern end of areas that depends on winter rains. This distinction is very important to the physiological functioning of plants in this moisture-limited areas, as even minor changes in temperature and/or rainfall may lead to major differences in water availability, and consequently, plant metabolic processes. Climate change is expected to alter both rainfall timing and amount, as well as temperature. This, in turn, would alter plant physiology, water use patterns and community composition in this

region, making the monument an excellent place for studying global climate change.

Location: Entire monument

Sources: Ayyad 1981; Graff 1988; Van Devender and Spaulding 1979; Wagner 1981

Description: Unlike most deserts that are primarily depositional environments, the CP is an erosional one (Welsh 1979; Nat Hist). This contributes to high endemism, as substrate material is not mixed. In addition, it makes this region highly susceptible to soil loss when surfaces are disturbed. This soil loss has a negative impact on plant and aquatic communities, as well as dam sediment loads.

Location: Entire monument

Source: Welsh, 1979; Harper et al., 1994

Description: The effects of scaling up and down are not known for many ecological processes. The multitude of variably sized, discrete watersheds found in this area offer a unique opportunity to test the effects of scaling for hydrological and biological processes. In addition, the close spacing of these watersheds offers a chance to separate the effects of area per se from other environmental factors on community structure.

Location: Entire monument

Source: Allen and Hoekstra 1987; Reice 1994; Pickett and White 1985; Rosenweig 1985

Description: Semi-arid and arid lands of the western United States are highly susceptible to desertification. The lack of natural disturbance in much of this area offers the opportunity to study the effects of different types and levels of land use and to better understand the steps leading to desertification.

Location: Entire monument

Source: Dregne, 1983

Description: This area contains few exotic plants. Having this resource gives the opportunity to better understand what factors inhibit or facilitate exotic plant invasions. Roads have been heavily implicated in facilitating exotic plant invasion, while intact Cryptobiotic soil crusts and less favorable soil chemistry may inhibit such an invasion. Invasion could fundamentally alter these communities, by altering species composition, community dynamics and fire cycles.

Location: Entire monument

Source: Monsen and Kitchen, 1994; Kelly 1996; Harper and Marble 1988; Davidson et al. 1996

Description: Quaternary resources are abundant in the monument. Pack rat middens enable reconstruction of paleoclimates and paleo-vegetation, while Pleistocene animal remains found in alcoves.

Location: Entire monument

Source: Harper et al., 1994

Description: Unlike more mesic ecosystems, there is little evidence that desert communities demonstrate traditional successional sequences. There is little or

no modification of soils or other site characteristics by previous-occurring plants. Understanding of this is important for restoration efforts. The monument offers an excellent opportunity to study this phenomenon independent of climate and disturbance factors.

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Location: Entire monument  
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Source: Barbour, 1981; MacMahon, 1987; Shreve, 1942; Dott, 1996  
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Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 7 plant and 9 animal species considered sensitive.  
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Location: Death Ridge and Fifty Mile Mountain WSAs  
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Source: Utah Statewide Wilderness Study Report, 1991  
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Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 8 plant and 7 animal species considered sensitive.  
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Location: Phipps Death Hollow ISA and Steep Creek WSA  
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Source: Utah Statewide Wilderness Study Report, 1991  
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Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 9 plant and 7 animal species considered sensitive.  
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Location: North Escalante Canyon, The Gulch and Carcass Canyon WSAs  
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Source: Utah Statewide Wilderness Study Report, 1991  
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[illegible]

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	A	B	C	D	E	F	G
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6	36	37	38	39	40	41	42
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26	176	177	178	179	180	181	182
27	183	184	185	186	187	188	189
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[illegible]

Order	Author	Title	Year	Genre	Language	Country	Notes
1	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	First novel in the series
2	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Second novel in the series
3	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Third novel in the series
4	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Fourth novel in the series
5	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Fifth novel in the series
6	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Sixth novel in the series
7	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Seventh novel in the series
8	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Eighth novel in the series
9	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Ninth novel in the series
10	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Tenth novel in the series
11	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Eleventh novel in the series
12	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twelfth novel in the series
13	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirteenth novel in the series
14	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Fourteenth novel in the series
15	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Fifteenth novel in the series
16	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Sixteenth novel in the series
17	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Seventeenth novel in the series
18	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Eighteenth novel in the series
19	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Nineteenth novel in the series
20	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twentieth novel in the series
21	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-first novel in the series
22	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-second novel in the series
23	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-third novel in the series
24	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-fourth novel in the series
25	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-fifth novel in the series
26	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-sixth novel in the series
27	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-seventh novel in the series
28	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-eighth novel in the series
29	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Twenty-ninth novel in the series
30	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirtieth novel in the series
31	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-first novel in the series
32	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-second novel in the series
33	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-third novel in the series
34	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-fourth novel in the series
35	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-fifth novel in the series
36	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-sixth novel in the series
37	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-seventh novel in the series
38	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-eighth novel in the series
39	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Thirty-ninth novel in the series
40	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Fortieth novel in the series
41	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-first novel in the series
42	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-second novel in the series
43	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-third novel in the series
44	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-fourth novel in the series
45	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-fifth novel in the series
46	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-sixth novel in the series
47	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-seventh novel in the series
48	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-eighth novel in the series
49	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Forty-ninth novel in the series
50	John Galsworthy	The Forsyte Saga	1906	Fiction	English	United Kingdom	Fiftieth novel in the series

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List of Historic and Scientific Objects of Interest  
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List of Historic and Scientific Objects of Interest  
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*List of Historic and Scientific Objects of Interest*  
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List of Historic and Scientific Objects of Interest  
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