

APPENDIX H

PALEONTOLOGICAL AND CULTURAL INFORMATION

Appendix H

Detailed Cultural Resources Discussion

Prehistoric Resources

The cultural-chronological sequence represented in the project area includes the Paleoindian, Archaic, Fremont, Protohistoric, and Euro-American periods (Larralde and Chandler 1982; Liestman 1985; LaPoint 1987). The earliest inhabitants of the region are representative of the Paleoindian period (ca. 12,000-8,000 BP). This period is characterized by the adaptation to the terminal Pleistocene environments and by the exploitation of big game fauna (Berry and Berry 1976; McDonald 1992). The presence of Paleoindian hunters in the Uinta Basin region is implied by the discovery of Clovis and Folsom fluted points (ca. 12,000-10,000 BP), as well as the more recent Plano Complex lanceolate points (ca. 10,000-7,000 BP). However, no such artifacts have been recovered in stratigraphic or chronometrically controlled contexts in northeastern Utah (Montgomery and Ball 2000).

The Archaic period (ca. 8,000-1500 BP) is characterized by people depending on a foraging subsistence strategy, seasonally exploiting a wide spectrum of plant and animal species in different ecozones. Significant excavated sites in the Uinta Basin that contain Archaic cultural material include Hells Midden (Lister 1951), Thorne Cave (Day 1964), Deluge Shelter, and Swelter Shelter (Leach 1970). This period generally saw an increase in local populations and a “settling in” of these populations to a smaller local territory (McDonald 1992). In the Uinta Basin, evidence of widespread Early Archaic exploitation is relatively sparse compared to the Middle and Late Archaic periods. Early Archaic (ca. 8,000-5,000 BP) sites in the Basin include sand dune sites and rockshelters clustered mainly in the lower White River drainage as well as along the Green River in Browns Park and Flaming Gorge (Spangler et al. 1995:373). Projectile points recovered from Uinta Basin contexts include Pinto Series, Humboldt, Elko Series, Northern Side-notched, Hawken Side-notched, Sudden Side-notched and Rocker Base Side-notched points (Montgomery and Ball 2000). During the Middle Archaic period (ca. 5,000-700 BP) population densities increased, and many human settlements flourished near the Great Salt Lake and northern Colorado Plateau (Fagan 1991). Several stratified Middle Archaic sites have been excavated and dozens of sites have been documented in the Uinta Basin (Crosland and Billat 1998). Middle Archaic sites in the area reflect cultural influences from the Plains, although a Great Basin and/or northern Colorado Plateau influence is represented in the continuation of the Elko Series projectile points. The Late Archaic period (ca. 700 BP to AD 550) in the Uinta Basin is distinguished by the continuation of Elko Series atlatl points with the addition of semi-subterranean residential structures at base camps (Montgomery and Ball 2000).

The Formative period (AD 500-1300) is recognized in the area by the Uinta Fremont as first termed by Marwitt (1970). This period is characterized by reliance upon domesticated corn and squash, increased sedentism, substantial habitation structures, pottery, and the bow and arrow. Based on evidence from Caldwell Village, Boundary Village, Deluge Shelter, Mantles Cave, and others, the temporal range of the Uinta Fremont appears to be from AD 650 to 950 (Fagan 1991; Montgomery and Ball 2000). The Fremont built semi-subterranean pit houses, surface jacal and masonry habitation units, and coursed adobe granaries. The remains of the structures often appear as low lying mounds in valleys, and on alluvial fans and ridge tops. Fremont traits considered unique or predominate to the Uinta Basin include calcite-tempered pottery, two-handled wide-mouth vessels, Utah type metates, the use of gilsonite for pottery repair, and settlement on tops of buttes and large-shouldered bifaces (Shields 1970).

The expansion of Numic-speaking people out of southern Nevada beginning about AD 1000 eventually disrupted the Fremont subsistence pattern, possibly leading to the loss of cultural identity (McDonald 1992; Fagan 1991). Fremont sites are absent or indistinguishable from after approximately AD 1200, suggesting that this culture either left the region after the migration of Numic-speaking people into the area or reverted to a hunting/gathering lifestyle in the face of severe climatic conditions and incursions of Numic people (Fagan 1991; McDonald 1992). Creasman and Scott (1987) and Leistman (1985) have argued that some Fremont traits (corn, storage structures, and ceramics) lingered in the area longer, perhaps as late as protohistoric times, although by AD 1200 or 1300 the artifactual hallmarks of this period are considered to be the Desert side-notched point and Shoshone pottery, which were manufactured by other cultural groups (Tucker 1986:46).

The archaeological remains of Numic-speaking Utes consist primarily of lithic scatters with low quantities of brown ware ceramics, rock art, and occasional wickiups (Montgomery and Ball 2000). The Ute relied on a hunter-gatherer lifestyle, similar to that of the Desert Archaic culture, employing seasonal movements and gathering resources produced in various ecological zones. According to macrobotanical and faunal data from dated components deer, elk, pronghorn, bison, and small game were hunted (Reed 1994:191). The Ute also exploited a variety of wild plants, including goosefoot, grass seeds, piñon nuts, juniper berries, squawbush berries and leaves, hackberry seeds and possibly saltbush seeds, knotweed, chokecherry, and chickweed.

Historical Resources

The first white men to set eyes on the Uinta Basin and Uinta Mountains were members of the small Spanish expedition from Santa Fe headed by Fray Silvestre Velez de Escalante and Fray Francisco Atanasio Dominguez. The expedition crossed into Utah and the Uinta Basin several miles northeast of present day Jensen (Lewis 1999). With the exception of the 1776 Dominguez and Escalante expedition, few explorers ventured into Ute territory until the 1820s when a growing number of trappers passed through or established temporary trading posts. Between the 1820s and the 1840s, such men as William H. Ashley, Etienne Provost, Antoine Robidoux, and Kit Carson visited the basin and mountains. These intrepid travelers passed through the area via several routes. One northerly route from Santa Fe, today known as the Old Spanish Trail, was used from 1829 to 1848 to access that portion of eastern Utah near the present day town of Green River, where the trail turned west en route to Los Angeles (Crampton 1979). Others came from the north following a number of trails, later to become such well-known routes as the Oregon, Overland, and Cherokee trails (McDonald 1992).

At least two semi-permanent trading posts were established in the Uinta Basin: Fort Robidoux, sometimes referred to as Fort Uintah or Winty (1830s-1844) and Fort Kit Carson (1833-34) (Fuller 2001). Several important U.S. government expeditions visited the area, including Captain John C. Fremont's expedition in the 1840s, and Major John Wesley Powell who floated down the Green River from Green River, Wyoming in 1869 and again in 1871 (Fuller 2001). Fort Robidoux was established in 1832 at the confluence of the Uinta and Duchesne Rivers and survived until late 1844 when Ute Indians routed the inhabitants just after John C. Fremont's visit. However, the Utah Historical Records Survey (UHRS 1940:10-11) maintains that the Fort was established earlier, possibly by 1830, at the mouth of the White River.

The Uinta Basin was of little interest to most settlers during the initial phase of settlement of the Great Basin. In 1861, Brigham Young sent a formal Mormon exploration party to the Uinta Basin, but they soon returned to the Wasatch front range stating that the basin was too desolate, disappointing, and undesirable for settlement (UHRS 1940:17-18). Soon after, most

of the Uinta Basin was set aside by Presidential proclamation for an Indian reservation. It was not until the late 1860s, however, that most of the Utes residing in Utah Valley and areas south were relocated to the new Indian reservation (see Section 3.14.1.2, Ethnography, for Ute history). By the early 1870s, Mormon ranchers began filtering into Ashley Valley, which first served as excellent summer feeding grounds for herds of cattle. The building of water flumes and canals through the late 1800s was crucial to farming success in this arid region, first tapping Ashley Creek along which the majority of the white population lived in the early years (McDonald 1992). By 1880, there was a permanent population sufficiently large enough for Uintah County to be established by the territorial legislature (Fuller 2001). By the 1890s, Gilsonite and other asphaltum minerals were discovered in Uintah County, as well as on the eastern edges of the Indian reservations. The population grew slowly until August of 1905 when much of the Uintah Indian Reservation was declared open for white settlement (McDonald 1992). Thousands of potential homesteaders rushed to Vernal, Price, and Provo, Utah, to register for the land drawing. Only a small fraction of registrants actually took up homesteads and many of those eventually gave up on their efforts to secure cheap farmland (Lewis 1999).

Commercial oil production was started in 1948, but was not fully exploited until the 1970s with the increased price of crude oil. This in turn spurred private and public ventures to develop an inexpensive process for separating oil from oil shale and tar sands. The oil development in the basin during the 1970s resulted in vigorous economic activity, an increase in the local population, increased school enrollment, and a shortage of housing (Fuller 2001). However, in 1980 international oil prices began to fall and the economic health of the Uinta Basin quickly fell. Attempts to development water resources for the Wasatch Front has been another economic stimulus, but this has been only temporary.

The Uinta Basin has been susceptible to frequent economic boom-bust cycles. Currently, there is little evidence of past economic booms. The small population base of whites and Indians is supported by a fragile economy based on farming, ranching, and the removal of oil and gas. It is increasingly influenced by worldwide energy prices.

Ethnographic Overview

Many Native American people have inhabited or migrated through the project area from 12,000 BP to the present. The first people were those that archaeologists refer to as Paleoindian, Archaic, and Fremont. At the time of Euro-American contact, the Native Americans inhabiting the general area were the Uinta-ats, a band of the Utah Utes. Occasionally the Northern and Northwestern Shoshones visited the Uinta Basin on hunting or plant gathering excursions. The Basin was extremely valuable to the Ute Indians as a source of food and clothing material.

Ute Indians (who call themselves Nucu, "The People") can be divided into eastern and western groups. The eastern Utes inhabited the high plateaus and Rocky Mountain parks of Colorado and northern New Mexico, and consisted of the Yamparka and Parianuc (White River Utes), the Taviwac (Uncompahgre Utes), and the Wiminuc, Kapota, and Muwac (Southern and Ute Mountain Utes) (Lewis 1999). The western or Utah Utes inhabited the central and eastern two-thirds of the state. Utah Ute bands included the Cumumba or Weber Utes, the Tumpuwac, Uinta-ats, Pahvant, San Pitch, and Sheberetch (Lewis 1999). The bands recognized, traded, and intermarried with each other, but did not form large tribal organizations. Principally hunters and gatherers, the semi-nomadic Utah Utes gathered seeds and berries in

season, dug roots, fished, hunted small game, and occasionally killed mountain buffalo (Fuller 1978).

Utes in Colorado acquired horses from the Spanish by 1640 (Smith 1974); however, the Utah Ute, being farther away from the Spanish frontier, acquired horses sometime later, possibly by 1680 (Bolton 1972; Steward 1938:223). With acquisition of the horse, the Ute quickly adopted the horse and buffalo culture of the Plains Indians. They became noted raiders and traded horses between the Spanish Southwest and the northern plains. Utes actively participated in Spanish attacks against Navajo and Apache raiders, and conducted their own slave trade with the Spanish against the Southern Paiute and Navajo (Lewis 1999).

Beginning in 1847, Utes experienced the full impact of Euro-American contact with the arrival of Mormon settlers. The Mormons rapidly extended their settlements south into the Utah Valley, a major trade crossroads and subsistence area for the Ute People. As conflicts increased between the Mormons and Utes, the federal government was pressured by the Mormons to put the Indians on a reservation (Smith 1974). In 1861, Abraham Lincoln issued an executive order creating the Uintah Valley Reservation, comprising 2,039,400 acres in the Uinta Basin (Fuller 1978). By 1870, most members of the Tumpanuwac, San Pitch, Pahvant, Sheberetch, Cumumba, and Uinta-at bands of Utah Utes (collectively called the Uintah Band) resided on the Uintah Reservation. In 1881, the Yamparka and Parianuc bands (known as the White River Utes) were forced by the federal government to join the Uintah Band on the Uintah Reservation (Lewis 1999). In 1882, the Taviwac (Uncompahgre Utes) were moved to their own reservation, the 1,912,320 acre Uncompahgre (Ouray) Reservation, immediately south of the Uintah Reservation. The Uintah and Uncompahgre Reservations were combined into the present Uintah and Ouray Reservation in 1886. Today these three bands (White River Utes, Uintah Utes, Uncompahgre Utes) are collectively called the Northern Ute Tribe.

In 1905, the federal government allotted the reservations and opened the remainder for white entry. Each Ute received an 80- to 160-acre plot for farming and access to a communal grazing district (O'Neill 1971). By 1909, the Uintah-Ouray Reservation shrank from nearly four million acres in 1882 to a jointly owned 250,000-acre grazing reserve and 1,283 individual allotments totaling 103,265 acres (O'Neill 1971). Sales of individual allotments further reduced Ute holdings.

Following the Indian Reorganization Act of 1934, the Northern Ute Tribe began repurchasing alienated reservation lands (O'Neill 1971). In 1948, the federal government returned some 726,000 acres to the Tribe in what is now called the Hill Creek Extension (Lewis 1999). In the 1970s and early 1980s, Northern Utes benefited from increased oil and gas development on reservation lands in the form of jobs and severance taxes. The Northern Utes also have been key players in the Central Utah Project, receiving money and stored water in return for the diversion of their watershed runoff into central Utah. In a 1986 decision, the U.S. Supreme Court upheld an Appeals Court ruling granting the Northern Ute Tribe "legal jurisdiction" over three million acres of alienated reservation lands. In the 1990s, the Northern Ute Tribe had grown to 3,000 members and became an increasingly powerful force in local and state politics. Currently, the Tribe has been actively maintaining their language and cultural traditions while striving to improve their economic situation through education, tribal enterprises, and planned development. The Uintah-Ouray Reservation, which is located north of and adjacent to the project area, now encompasses approximately 4.5 million acres. It is the largest in Utah, containing valuable timber, oil and gas, water, and other natural resources.

Table H-1
Vertebrate Fossils

RANK	MAP SYMBOL	FORMATION	AGE
1.	Tu	Uinta Formation	Eocene
2.	Jm	Morrison Formation	Jurassic
3.	Tqu	Green River/Manti Fm.	Eocene
4.	Tdr	Duchesne River Fm.	Eocene
5.	Tknh	North Horn Formation	Cret./Paleo.
6.	Pcu	Cutler Horn Formation	Permian
7.	T c	Chinle Fm. or Gp.	Triassic
8.	T m	Moenkopi Fm. or Gp.	Triassic
9.	Tm	Manti Formation	Eocene
10.	Tw	Wasatch Fm. or Gp.	Eocene
11.	Dwc	Water Canyon Fm.	Devonian
12.	JT k	Kayenta Formation	Trias./Jurassic
13.	Qb	Bonneville Formation	Pleistocene
14.	Dj	Jefferson Limestone	Devonian
15.	Qp	Provo Formation	Pleistocene
16.	Tbr	Bridger Formation	Eocene
17.	Kcm	Cedar Mountain Shale	Cretaceous
18.	Kka	Kaiparowits Formation	Cretaceous
19.	Qa	Alpine Formation	Pleistocene
20.	Tfo	Fowkes Formation	Eocene
21.	Tnt	Norwood Tuff	Oligocene
22.	Tsl	Salt Lake Fm. or Gp.	Oligocene
23.	Kms	Mancos Shale	Cretaceous
24.	Tbp	Browns Park Formation	Plio./Miocene
25.	Tc	Colton Formation	Paleo./Eocene
26.	Kl	Lakota Conglomerate	Cretaceous
27.	Kbl	Blackhawk Formation	Cretaceous
28.	Kmf	Mowery Shale	Cretaceous
29.	JT n	Navajo/Nugger Ss.	Trias./Jurassic
30.	Tvbh	Brian Head Formation	Eocene
31.	Dbi	Bluebell Formation	Devonian
32.	Kc	Castlegate Sandstone	Cretaceous
33.	Tch	Crazy Hollow Fm.	Eocene
34.	Kd	Dakota Sandstone	Cretaceous
35.	Pdc	De Chelly Sandstone	Permian
36.	Ppc	Park City Formation	Permian
37.	Qd	Draper Formation	Pleistocene
38.	Tf	Flagstaff Limestone	Paleocene
39.	Kk	Kelvin Formation	Cretaceous
40.	Kmv	Mesa Verde Group	Paleocene
41.	Tn	Nacimiento Formation	Paleocene
42.	Jcu	Curtis Formation	Jurassic
43.	Je	Entrada Formation	Jurassic
44.	Kn	Nelson Formation	Cretaceous
45.	PPr	Rico Formation	Penn./Permian
46.	Tsa	Sage Creek Fm.	Tertiary
47.	Kse	Seco Sandstone	Cretaceous
48.	Kwa	Wahweap Sandstone	Cretaceous
49.	Kst	Straight Cliffs Fm.	Cretaceous
50.	Mgb	Great Blue Limestone	Mississippian

Table H-1 (Continued)

Fossil Plants

RANK	MAP SYMBOL	FORMATION	AGE
1.	Kcm/Kbc	Cedar Mt./Burro Can. Fm	Cretaceous
2.	PMmc	Manning Canyon Shale	Penn./Miss.
3.	Kbn	Blackhawk Formation	Cretaceous
4.	Kd	Dakota Sandstone	Cretaceous
5.	Tqu	Green River Formation	Eocene
6.	Jm	Morrison Formation	Jurassic
7.	Tdr	Dipping Vat Formation	Eocene
8.	Tfu	Fort Union Formation	Paleocene
9.	T c	Chinle Shale	Triassic
10.	T s	Shinarump/Mossback Fm.	Triassic
11.	Pcu	Cutler Fm. or Gp.	Permian
12.	Tsl	Salt Lake Fm. or Gp.	Plio./Mio./Pleis
13.	Kf	Frontier Formation	Cretaceous
14.	Kw	Wanship Formation	Cretaceous
15.	Qlb	Lake Bonneville Group	Pleistocene

Trace Fossils

RANK	MAP SYMBOL	FORMATION	AGE
1.	Tqu	Green River Formation	Eocene
2.	Kbb	Black Hawk Fm. or Gp.	Cretaceous
3.	JT n	Navajo/Nugget Ss.	Tri./Jurassic
4.	Tu	Uinta Formation	Eocene
5.	JT k	Kayenta Formation	Tri./Jurassic
6.	PPo	Oquirrh Formation	Penn./Perm.
7.	Cbr/Ct	Brigham/Tintic Quartz	Cambrian
8.	T m	Moenkops Formation	Triassic
9.	Kfe	Ferron Sandstone	Cretaceous
10.	Co	Ophir Shale	Cambrian
11.	Op	Pogonip Group	Ordovician
12.	Jm	Lower Morrison Fm.	Jurassic
13.	Pcu	Cutler Fm. or Gp.	Permian
14.	T wi	Wingate Sandstone	Triassic
15.	Pdc	De Chelly Sandstone	Permian

Table H-1 (Continued)
Invertebrate Fossils

RANK	SYMBOL	MAP FORMATION	AGE
1.	Kfe/Kf	Ferron/Frontier Ss.	Cretaceous
2.	T t	Thaynes Limestone	Triassic
3.	Cw	wheeler Shale	Cambrian
4.	Op	Pogonip Fm. or Gp.	Ordovician
5.	Jm	Morrison Formation	Jurassic
6.	Ph	Hermosa Group	Pennsylvanian
7.	PMmc	Manning Canyon Sh.	Penn./Miss.
8.	Dd	Pilot Formation	Devonian
9.	Tknh	North Horn Fm.	Cret./Tert.
10.	T c	Chinle Shale	Triassic
11.	Dwc	Water Canyon Fm.	Devonian
12.	Mm/Ml	Madison/Lodgepole Fm.	Mississippian
13.	Ppc	Park City/Phos. Fm	Permian
14.	Tf	Flagstaff Fm.	Paleo./Eocene
15.	Tu	Uinta Formation	Eocene
16.	Kcm	Cedar Mt./Burro Can. Fm.	Cretaceous
17.	Jc/Jtc	Carmel/Twin Creek Fm.	Jurassic
18.	Prv	Round Valley Ls.	Pennsylvanian
19.	Cm1	Marjum Formation	Cambrian
20.	Kd	Dakota Sandstone	Cretaceous
21.	Tau	Green River Formation	Eocene
22.	Dai.	Gullimette/Jeff. Dol.	Devonian
23.	Mgb	Great Blue Ls.	Mississippian
24.	Tsl	Great Lake Fm. or Gp.	Plio./Mio./Pleist
25.	PPo	Oquirrh Formation	Penn./Permian
26.	Te	Evanston Formation	Paleocene
27.	Kbr	Bear River Formation	Cretaceous
28.	Ktr	Tropic Shale	Cretaceous
29.	Pka	Kiabab Limestone	Permian
30.	Mq	Gardison Formation	Mississippian
31.	Qkb	Lake Bonneville Gp.	Pleistocene
32.	kms/Kr	Mancos/Tununk Shale	Cretaceous
33.	Cl	Langston Formation	Cambrian
34.	Pht	Honaker Trail Fm.	Pennsylvanian
35.	Co	Ophir Shale	Cambrian

Table H-2

TERTIARY UINTA FORMATION
FAUNAL LIST

(Taken from Kay, 1957; Black and Dawson, 1966; Madsen and Miller, 1979; Savage and Russell, 1983; and Hamblin, 1987; 1992)

Kingdom Animalia:

Phylum Chordata:

Class Teleostomi (Fish)

Order Amiformes

Amia plicates ?

Order Lepisosteiformes

Lepisoteus sp. ?

Class Aves (Birds)

Order Anseriformes

Eonessa anaticula

Class Reptilia

Order Chelonia

Family Baenidae

Baena inflata

B. arenosa

B. playlastra

B. gigantea

B. emilia

Family Carettochelyidae

Anosteira ornata

Pseudoanosteira pulchra

Family Testudinidae

Echmatemys callopyge

E. douglassi

E. hollandi

E. uintensis

E. depressa

E. obscura

E. pusilla

Testudo uintensis

T. carsoni

T. utahensis

T. robustus

Trionyx egregia

T. crassa

T. scutumantiquum

Order Squamata

Glyptosaurus sp.

(?)Helodermoides sp.

Order Crocodylia

Procimanoidea utahensis

undetermined sp. of

Alligator

Class Mammalia

Order Lagomorpha

Mytonolagus petersoni

Order Insectivora

Talpavus dupus

Nyctitherium sp.

(?)Micropternodus sp.

Order Deltatheridia

Limnocyon douglassi

L. potens = Telmatocyon

Oxyaenodon dysclerus

Apatelurus kayi

(?)Micropternodus

= *Kentrogomphios*

Order Primata

Ourayia uintensis

Mytonius hopsoni

Stehlinella uintensis

= *Stehlinius*

Order Taeniodonta

Stylinodon mirus

Order Dinocerata

Uintatherium sp.
= *Dinoceras*, *Loxolophodon*

Order Rodentia

Family Ischyromyoidea

Ischyrotomus petersoni
I. compressidens
I. eugenei
Leptotomus leptodus
L. sciuroides
Reithroparamys gidleyi
Janimus rhinophilus
Mytonomys robustus
M. mytonensis
Thisbemys uintensis
T. medius
Sciuravus latidens
S. popi

Family Clindrodontidae

Pareumys milleri
P. grangeri
P. ? troxelli

Family Protoptychidae

Protoptychus hatcheri

Order Artiodactyla

Family Dichobunidae

Pentacemylus leotensis
P. progressus
Mytonomeryx scotti
Hylomeryx quadricuspis
H. annectens
Auxotodon pattersoni
Bunomeryx elegans
B. montanus
Mesomeryx grangeri

Family Entelodontidae

Achaenodon insolens
A. uintense

Family Camelidae

Poebrodon kayi

Family Oromerycidae

Oromeryx plicatus
Protylopus petersoni
P. ? annectens

Order Perrissodactyla

Family Equidae

Epihippus gracilis
E. parvus
E. uintensis
= *Duschesnehippus*

Table H-2 (Continued) Order Condylarthra

Hyopsodus uintensis

Order Carnivora

Miacis gracilis
M. longipes = *Mimocyon*
Uintacyon robustus
Prodaphaenus scotti
Procynodictis sp.
Simidectes medius
= *Pleurocyon*
Mesonyx sp.
Harpagolestes breviceps
H. uintensis

Family Agrichoeridae

Protoreodon pumilus
P. parvus
P. minor
P. petersoni
= *Eomeryx*, *Hyomeryx*,
= *Agriotherium*,
= *Chorootherium*,
= *Protagrichoerus*,
= *Mesagrichoerus*
Diplobunops matthewi
D. vanhouteni

Family Leptomerycidae

Leptotragulus proavus
L. medius
L. clarki
= *Parammeryx*
Leporeodon marshi
= *Camelomeryx*,
= *Merycodesmus*

Family Chalicotheriidae

Eomoropus annectens

Family Brontotheriidae

Mesatirhinus earlei

= *Orohippus?*
 = *Anchitherium?*
Family Isectolophidae
Isectolophus annectens
I. cuspidens

Family Helaletidae
Dilophodon leotanus

Family Aymynodontidae
Aymynodon advenum
A. intermedius
 = *Diceratherium?*

Family Hyracodontidae
Triplopus rhincerinus
T. obliquidens
 = *Prothyracodon*
Epitriplopus uintensis
Forstercooperia grandis

Table H-2 (Continued)

M. riparius
M. parvus
 = *Metarhinus*,
 = *Heterotitanops*
Dolichorhinus longiceps
D. intermedius
D. heterodon
Rhadinorhinus abbotti
R. diploconus
Sthenodectes incisivus
S. priscus
Manteoceras uintensis
Protitanotherium emarginatum
P. superbum
 = *Diplacodon*
Diplacodon progressum
D. elatum
Eotitanotherium osborni
Telmatherium cornutum

Table H-3

TERTIARY GREEN RIVER FORMATION
Taken from Grande, 1984; MacGinitie, 1969

Occurrences: F - Fossil Lake, G - Lake Gosiute, U - Lake Uinta

Phylum Chordata

Class Pisces

- F	<i>Heliobatis</i> (stingray)	<i>Notogoneus</i> (gonorynchid) - F
	<i>Crossophilis</i> (paddle fish) - F	<i>Amyzon</i> (sucker) - G
	<i>Lepisosteus</i> (gar) - F, G, U	<i>Astephus</i> (catfish) - F, G, U
	<i>Amia</i> (bowfin) - F, G	<i>Hypsidoris</i> (catfish) - G
	<i>Knightia</i> (herring) - F, G, U	<i>Erismatopterus</i> (trout perch) - F
	<i>Gosiutichthys</i> (herring) - G	<i>Amphiplaga</i> (trout perch) - F
- F, G, U	<i>Diplomystus</i> (herring)	<i>Asineops</i> (uncertain) - F, G, U
	<i>Echiodon</i> (Mooneye) - F	<i>Mioplosus</i> (perch-like) - F
(osteoglossid) - F, G	<i>Phareodus</i>	<i>Priscacara</i> (percoid) - F, G, U
		new percoid - F, G?

Class Amphibia

Eopelobates - frog -
F, G, U
salamanders

Class Reptilia

Order Chelonia - F, G,
U
Trionyx
Echmatemys
Baenid turtle
Chelydridid turtle

Order Squamata
Boavus idelmani - boa
- F

Table H-3 (Continued)

Varanidae? lizard - F,
G, U
trackways - U

Order Crocodylia
Leidyosuchus - G
Alligator - F, G
numerous partial
skeletons, bone,
teeth, and scute
fragments as well as
coprolites.

Numerous tracks of birds, mammals, and reptiles.

Green River Formation cont.

Class Aves:

Order Pelicaniformes
Limnofregata
azygosternon
Order Gallinuloididae
Gallinuloides
wyomingensis
Order Anseriformes
Prebyornis pervetus

Order Coraciiformes
Primobucco mcgrewi
P. olsoni
Neanis schucherti
N. kistneri

Class Mammalia

Order Marsupialia
Peratherium knighti -
G
P. innominatum - G, U

Order Insectivora
Talpavus nitidus - G
Nyctitherium sp. - U
N. serotinum - U

Order Carnivora
Vulpavus profectus - G
V. australis - U
Viverravus
eucristadens - U
V. minutus - U
Miacus gracilllis - U
Sinopa minor - U

Order Condylarthra
Hyopsodus minisculus -
G, U
H. vicarius - U

Order Tillodonta
Tellotherium? - U

Order Rodentia
Thisbemys sp. - G
Paramys sp. - U
P. cf P. delicatus - U
Sciuravus sp. - U
S. eucristadens - U
Pseudotomus cf. *P.*
robustus - U
Microparamys minutus -
U
Sciuravid sp. - U
Pauromys sp. - U

Table H-3 (Continued)

Order Chiroptera	Order Perissodactyla
<i>Icaronycteris index</i> -	<i>Hyracotherium</i> - G
F, U	<i>Orohippus</i> - U
	<i>Hyrachyus</i> - U
Order Primates	<i>Lambdotherium</i> - G
<i>Notharctus</i> sp. - G	<i>Metartithinus?</i> - U
<i>N. matthewi</i> - U	
<i>Uintasorex parvulus</i> -	Order Artiodactyla
G, U	<i>Antiacodon pygmaeus</i> -
<i>Microsyops elegans</i> - G	U
<i>Washakius insignis</i> - G	
<i>Tetonius</i> sp. - U	
<i>Onomys pucillus</i> - U	
<i>O. lloydi</i> - U	
<i>Utahia kayi</i> - U	
<i>Uintalacus nettingi</i> -	
U	
<i>Cynodontomys</i> - G	

**Table H-4
Paleontological Inventories Previously Conducted in the Study Area**

Report Name	Author(s)	Date of Report	Survey Results	Sensitivity/ Recommendations
Paleontological Report for the Balcron Oil Monument Butte Waterflood Injection Facility, Sections 5 and 6, T9S, R17E, SLB&M, Duchesne County, Utah	Alden H. Hamblin	November 20, 1992	3 turtle fragment localities.	Important turtle localities, potential for significant fossil material. Monitoring during construction; surface collection of known fossil material.
Paleontology of the Monument Butte Environmental Assessment Study Area	Alden H. Hamblin	December 31, 1992	Overview of study area.	Recommend surveys prior to any surface disturbance.
Balcron Oil, Monument Butte Water Injection, Lateral Pipeline, Sections 5, 6, and 7, T9S, R17E, SLB&M, Duchesne County, Utah	Alden H. Hamblin	October 10, 1993	Several turtle fragment localities, plant impression localities, and one mammal fragment locality.	Important fossil localities. Recommend area reexamined for fossils; spot check open trenches; screen spoil piles
PG&E, Wells Draw Unit, Sections 33 and 34, T8S, R16E and Sections 4, 5, T9S, R16E, SLB&M, Duchesne County, Utah, Paleontology Report	Alden H. Hamblin	February 11, 1994	3 previously recorded fossil localities, 24 new fossil localities. Localities contain vertebrates, invertebrates, plants, and vertebrate tracks.	1 Critical fossil invertebrate 1 Critical fossil vertebrate 1 Critical fossil plant 1 Significant fossil vertebrate 1 Significant fossil plant 12 Important fossil invertebrates 12 Important fossil plants 12 Important fossil vertebrates 1 Insignificant fossil vertebrate (Multiple fossil types at several localities.) The critical fossil plant, vertebrate, and invertebrate were found at site 42DC177TVP – recommended avoidance.

Table H-4 (Continued)

Report Name	Author(s)	Date of Report	Survey Results	Sensitivity/ Recommendations
Paleontology of the <u>Expanded</u> Monument Butte, Environmental Assessment Study Area, Duchesne and Uintah Counties, Utah	Alden H. Hamblin	April 30, 1994	12 fossil localities.	10 Important fossil vertebrate localities 1 Important fossil plant locality 1 Significant fossil plant locality Recommend surveys prior to any surface disturbance.
Balcron Oil, Monument Butte, Lateral Water Injection Lines, Section 6, T9S, R17E and Sections 10, 11, 12, 14, and 15, T9S, R16E, SLB&M, Duchesne County, Utah, Paleontology Report	Alden H. Hamblin	July 3, 1994	26 previously recorded fossil localities; 2 new fossil localities recorded. All turtle fragments.	Site 42DC191V – several turtle shells eroding out. Recommend trench and spoil pile be examined by paleontologist.
Dalen Resources, Paleontology Report for Area West of Castle Peak, Parts of Sections 4, 5, 8, and 9 T9S, R17E, SLB&M, Duchesne County, Utah	Alden H. Hamblin	May 24, 1995	29 previously recorded fossil localities within 1 mile of the study area. 24 fossil localities within the study area, 3 are previously recorded. 7 of the 24 are mammal fossil localities, the remaining localities are plant impressions and turtle fragments.	Parts of the study area are in the Uinta Formation or “Condition 1” area for fossils; the rest of the study is in older Pediment deposits or “Condition 3” areas for fossils. Recommend surveys in Condition 1 areas prior to any surface disturbance.
Equitable Resources Energy Company, Beluga Secondary Recovery Unit, Waterflood Facilities and Oil Gathering System, Sections 6, 7, 8, 18, 17, and 16 T9S, R17E SLB&M, Duchesne County, Utah	Alden H. Hamblin	May 15, 1996	35 previously recorded fossil localities; 6 new fossil localities recorded. All contain turtle fragments.	No high significance localities. Paleontological clearance recommended.

Table H-4 (Continued)

Report Name	Author(s)	Date of Report	Survey Results	Sensitivity/ Recommendations
Reliable Exploration Company, Seismic Line Sections 22, 23, 25, 26, 36, T8S, R17E, Section 31, T8S, R18E, Sections 5, 6 T9S, R18E, Duchesne and Uintah County, Utah	Alden H. Hamblin	September 1996	12 fossil localities (10 new and 2 previously recorded); 2 contain mammal material, the rest have turtle and plant material.	Site 42UN972V – turtle/mammal fragments – recommend minimize vehicular traffic. Site 42UN973P – plant impressions – recommend no vehicular traffic.
Inland Resources Monument Butte – Myton Bench Waterflood Environmental Assessment, Duchesne and Uintah Counties, Utah	ENSR	November 1996	22 fossil localities; 14 fossil vertebrates; 5 fossil plants; 2 both fossil vertebrate and plant; 1 fossil invertebrate	3 significant 7 important 12 unimportant Recommend avoidance of significant fossil localities
Paleontological Field Survey Report, Inland Production Company, Blackjack Unit, Sections 3, 4, 5, 9, and 10, Township 9 South, Range 17 East, Duchesne County, Utah	Sue Ann Bilbey, Ph.D.	March 19, 1998	6 fossil localities (turtle, mammal, crocodile)	4 of the localities contain significant amounts of fossil vertebrate and plant material. Recommend fossils be mapped and collected; monitor sites during construction activities.
Paleontological Survey of Proposed Production Development Areas, Southeastern Duchesne County, Utah, (Sections 5, 6, 11, and 12, Township 9 South, Range 16 East), Report of Survey	Wade E. Miller	March 27, 2000	Fossil plant localities.	Unimportant plant material. Recommendation is to contact paleontologist if fossils are uncovered during construction activities.
Paleontological Resource Inventory Report, W ½ Sec. 26, T 8 S, R 17 E, Pariette Draw SW Quadrangle, Uintah and Duchesne Counties, Utah, Declaration of Significant Paleontological Findings	Rod Scheetz, Ph.D.	May 26, 2001	2 fossil plant localities.	Significant plant fossil localities. Both well-protected; no special mitigation.

Table H-4 (Continued)

Report Name	Author(s)	Date of Report	Survey Results	Sensitivity/ Recommendations
Paleontological Inventory Survey, Section 32, T 8 S, R 18 E, Pariette Draw SW Quadrangle, Uintah County, Utah, Declaration of Significant Paleontological Findings	Rod Scheetz, Ph.D.	November 22, 2001	160 localities of turtles eroding in place; 34 previously recorded.	34 paleontologically sensitive localities were identified containing significant mammal, crocodile, turtle, and plant fossils. These sensitive areas should be avoided.

**Table H-5
Cultural Resource Inventories Previously Conducted in the Study Area**

Name of Report	Author(s)	Date of Report	Type of Sites	NRHP-Eligibility
Desert Spring Natural Gas Environmental Assessment, Uintah and Duchesne Counties, Utah	K. McDonald (Mariah Associates, Inc.)	January 1992	Class I inventory only – 3 previously recorded sites of unknown origin; these sites were not revisited	3 unevaluated ¹
A Cultural Resources Block Survey in the Pleasant Valley Unit Near Castle Peak, Duchesne County, Utah	H. M. Weymouth (Sagebrush Archaeological Consultants, L.L.C.)	May 20, 1995	2 prehistoric sites 1 multicomponent site	3 not eligible
Inland Resources Monument Butte/Myton Bench Waterflood Environmental Assessment, Duchesne and Uintah Counties, Utah	ENSR International	November 1996	Class I inventory only - 24 previously recorded prehistoric sites, 6 historic sites, 1 multicomponent site, and 2 unknown origin	Unknown
Cultural Resource Evaluation of the Ashley Unit, South Wells Draw Unit & South Pleasant Valley Unit Lease Areas in the Wells Draw & Pleasant Valley Localities in Duchesne County, Utah.	F. R. Hauck and G. Hadden (Archaeological-Environmental Research Corporation)	December 29, 1997	No sites identified	---
A Cultural Resource Survey of the Black Jack Unit, Duchesne County, Utah	S. Cowie, D. Diamond, and H. Weymouth (Sagebrush Consultants L.L.C.)	February 23, 1998	2 prehistoric sites 2 historic sites 2 multicomponent sites	4 eligible 2 not eligible
A Cultural Resource Survey of the South Wells Draw Unit, Duchesne County, Utah	A. Polk and D. Diamond (Sagebrush Consultants, L.L.C.)	April 23, 1998	4 historic sites	4 not eligible
A Cultural Resource Inventory in the Second Portion of the Black Jack Unit Block Area, Duchesne County, Utah	A. S. Polk and D. J. Diamond (Sagebrush Archaeological Consultants, L.L.C.)	June 26, 1998	1 historic site 2 prehistoric sites 1 multicomponent site	2 eligible 2 not eligible
Cultural Resource Evaluation of Various Large Tracts in the Wells Draw to Pariette Bench Locality in Duchesne and Uintah Counties, Utah	F. R. Hauck (Archaeological-Environmental Research Corporation)	July 28, 1998	28 prehistoric sites	12 eligible 16 not eligible

Table H-5 (Continued)

Name of Report	Author(s)	Date of Report	Type of Sites	NRHP-Eligibility
Cultural Resource Inventory of Six 40-Acre Well Pad Location: Wells Draw 5-5, 12-5, 13-30, Castle Draw 11-1, 12-1, 13-1, Duchesne and Uintah Counties, Utah	R. Crosland and S. Billat (JBR Environmental Consultants Inc.)	November 17, 1998	7 historic sites 1 unknown	6 not eligible 2 eligible
Cultural Resource Inventory of Inland Production's Wells Draw 760 Acre Parcel in Pleasant Valley, Duchesne County, Utah	K. R. Montgomery and S. Ball (Montgomery Archaeological Consultants)	December 12, 2000	4 historic sites 9 prehistoric sites 1 multicomponent site	5 eligible 9 not eligible
Pariette Overlook – A Paleo-Indian Quarry Site in the Pariette Draw Locality of Uintah County, Utah	F. R. Hauck and D. G. Weder (Archaeological-Environmental Research Corporation)	July 1989	Data recovery of a large prehistoric quarry site	1 eligible
Number of recorded sites			68 prehistoric sites 24 historic sites 6 multicomponent sites 3 unknown origin	
Duplicate sites or sites outside of project area			1 multicomponent site was recorded twice	
Total number of sites in the project area			101 sites	25 eligible 42 not eligible 33 unknown
Total				

¹ The three sites identified during the Class I inventory were not included in the total number of sites, because their locations were not verified by a Class III inventory.