DOLORES ARCHAEOLOGICAL PROGRAM TECHNICAL REPORTS

Report No.: DAP-003

The Sagehen Flats Archaeological Locality

by

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Prepared for
Cultural Resources Mitigation Program: Dolores Project
Bureau of Reclamation, Upper Colorado Region
Contract No. 8-07-40-S0562

Under the supervision of
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Final Submission
September 30, 1981

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ABSTRACT

The Sagehen Flats Locality is a spatial division of the Escalante Sector located in southwest Colorado about 6 km northwest of the town of Dolores. Containing primarily lowland areas west of the Dolores River, the locality has been the scene of human habitation for thousands of years. The first well-documented occupation dates to the Great Cut Phase of the Archaic Tradition or 2000 BC-AD 500. During this period the prehistoric inhabitants utilized seasonal sites situated along the perimeter of the Sagehen Flats Marsh and subsisted primarily on wild foods. During the subsequent Anasazi Tradition (AD 600-1200) the locality served as the home territory of several farming communities whose members lived first in dispersed farmsteads and then in aggregated villages. A prehistoric population maximum in the locality occurred about AD 875; a rapid decline then followed and the area was virtually abandoned by the Anasazi as a setting for permanent settlement by AD 975. The locality was re-occupied during the Shoshonean-Athabascan Tradition (AD 1500-1900) and served as a hunting and gathering province. Modern Euro-American settlement began in the area in the late 1800s.

INTRODUCTION

The Sagehen Flats Locality is one of 16 such divisions currently identified in the Escalante Sector of the Yellowjacket District. The locality incorporates the flat lowland area west of the former townsite of McPhee known as Sagehen Flats, a fringe area of low loess covered hills, and the Dolores River valley to the east*. The total area included within the locality is about 1050 ha (Figure 3.1). As originally conceived, the boundaries of the Sagehen Flats Locality were drawn to reflect two phenomena: first, a lowland resources area including the river bottoms and the marshy area known as Sagehen Flats and its fringes, and second, the extent of the local maximum subsistence-settlement unit during the McPhee Phase. This latter area would correspond to the extent of social and perhaps ceremonial influence exerted by McPhee Villae during its population maximum; the present boundaries of the locality may undergo modification as more is learned about local settlement patterns and cultural processes. This paper is a presentation of the natural setting and prehistory of the locality followed by a discussion of the prehistoric settlement system in terms of economy and society.

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*Note: the boundaries of the locality were modified after the completion of this report; these changes will be reflected in 1979 and later manuscripts dealing with this area.

Figure 3.1: The Sagehen Flats Locality. Note Dolores River Valley and Sagehen Flats Marsh.

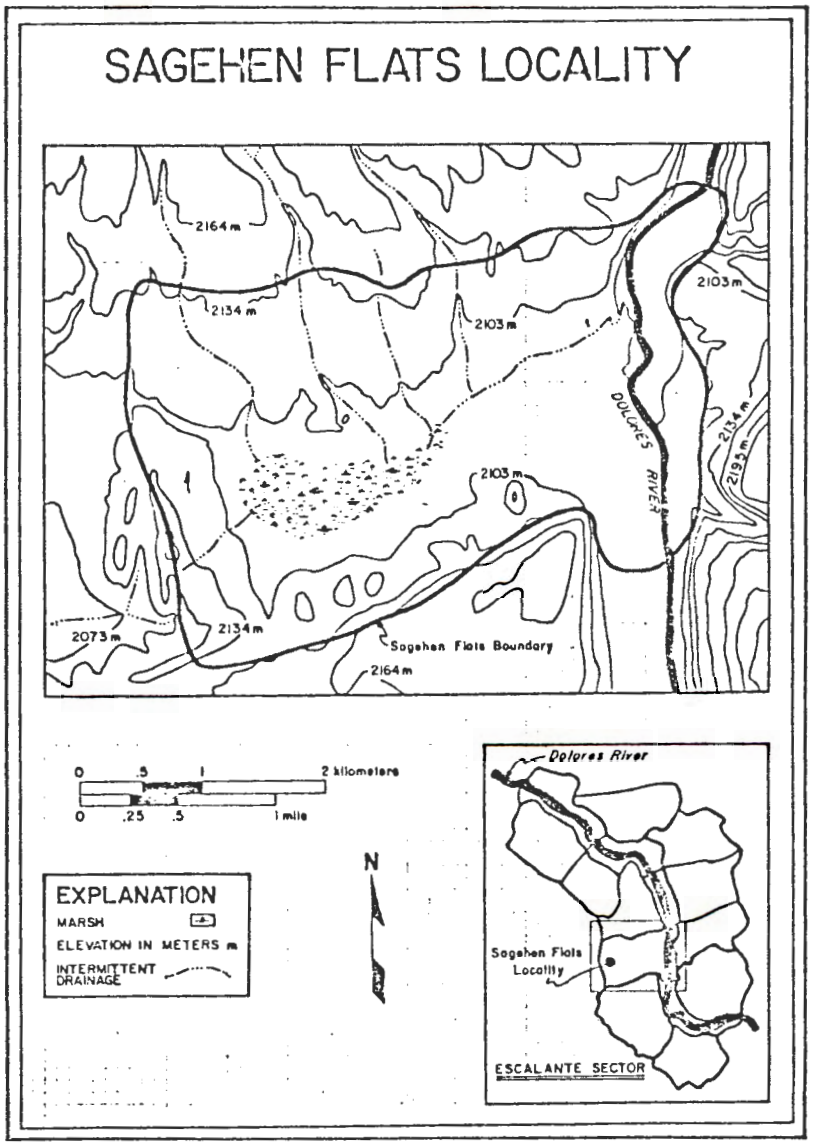
SAGEHEN FLATS LOCALITY
2164 m
2134 m
2103 m
2103 m
2103 m
2134 m
2193 m
DOLORES RIVER
2073 m
2134 m
Sagehen Flats Boundary
2164 m
0 .5 1 2 kilometers
0 .25 .5 1 mile
N
EXPLANATION
MARSH
ELEVATION IN METERS m
INTERMITTENT DRAINAGE
Dolores River
Sagehen Flats Locality
ESCALANTE SECTOR

Figure 3.1.

NATURAL SETTING

In a topographic sense, the Sagehen Flats Locality presents a marked contrast to the canyon and plateau terrain common in nearby areas. The locality is typified by low flat bottomlands and wetlands surrounded by rolling hills; low cliffs are found along the Dolores River Valley. The Sagehen Flats area itself is probably the result of prehistoric geological processes. Specifically, the flats area represents the southern extremity of the down-thrust northern block along the House Creek Fault (see Crandall [1]). Elevations in the locality range from 2075 m in the eastern portion along the Dolores River to 2135 m on the crests of the low hills surrounding the Sagehen "marsh." Vertical relief in the locality is most extreme along the cliffs bordering the Dolores Valley and along the House Creek Fault, but even in these areas it is moderate when compared to other localities in the Escalante Sector. The height of the cliff zone to the north of McPhee Village is approximately 40 m, from the bottom of the talus slope to the top of the canyon rimrock.

Surface soils in the locality were formed during the Tertiary and Quaternary Periods, while exposed bedrocks are of the Jurassic and Cretaceous Periods. A north-south geological cross-section of the locality is presented as Figure 3.2. The southern boundary of the study area is formed by the uplift of the House Creek Fault with the upthrown southern block lifted 100 m over the northern block (Crandall [1:26]). Exposed strata in the southern block include (from bottom to top) the Morrison-Summerville Formation (230 m thick, Jurassic Period); Burro Canyon Formation (20 m thick, Cretaceous Period), and the Dakota Formation

Figure 3.2: North-south geological cross-section of the Sagehen Flats Locality (after Crandall [1]).

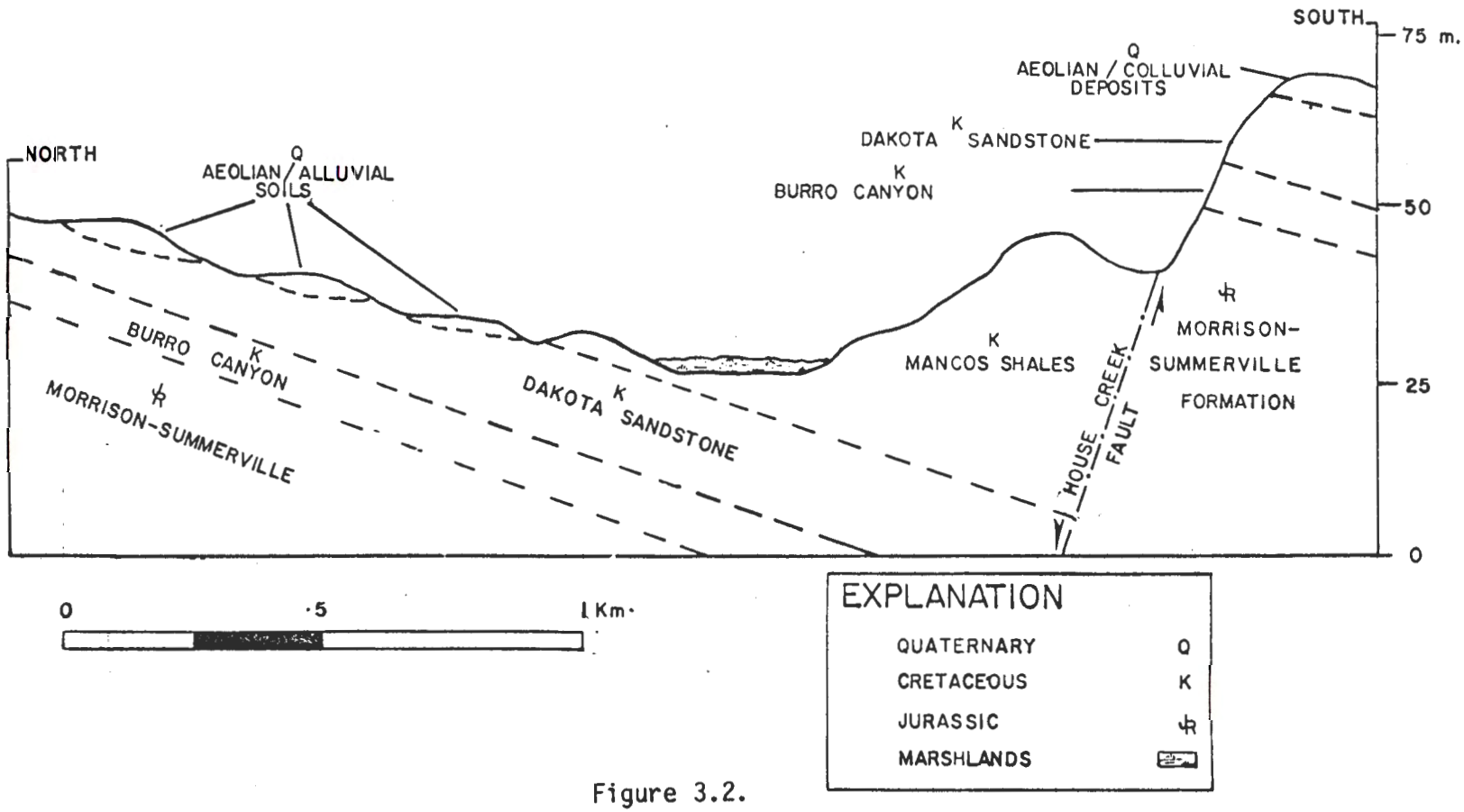
NORTH
SOUTH
75 m.
50
25
0
Q
AEOLIAN / ALLUVIAL SOILS
Q
AEOLIAN / COLLUVIAL DEPOSITS
K
DAKOTA SANDSTONE
K
BURRO CANYON
K
MANCOS SHALES
BURRO CANYON
K
MORRISON-SUMMERVILLE
DAKOTA SANDSTONE
K
HOUSE CREEK FAULT
MORRISON-SUMMERVILLE FORMATION
0
.5
1 Km.
EXPLANATION
QUATERNARY Q
CRETACEOUS K
JURASSIC
MARSHLANDS

Figure 3.2.

(30 m thick, Cretaceous Period). Three to six m of Quaternary/Recent age cobbles and gravels cover the Dakota Formation (Crandell [1:35]). The fault zone itself consists of crushed and brecciated debris of Mancos Shale and may exceed 200 ~~ft.~~ m in thickness. To the north of the fault the bedrock units comprising the bedrock stratigraphy consist of Dakota Sandstone, Mancos Shale and aeolian and alluvial/residual clay soils. Dakota Sandstone outcrops occur in cliffs along the river valley and in eroded areas north of the Sagehen Flats Marsh. The Mancos Shales are exposed on eroded hillocks north of the marsh and along the fault line. Aeolian and colluvial soils cover most of the rolling hillocks and ridges to the north of the marsh; the aeloian deposts seem to be quite similar to the Mesa Verde loess as described by Arrhenius and Bonatti [2] and may have derived from the same source. Residual clay soils are found in the western extremity of the locality, in the vicinity of the Great Cut. Quaternary alluvial soils are located in the Dolores River Valley in the eastern part of the locality, both on Pleistocene age terraces along the sides of the canyon and in the valley bottomlands.

The groundwater system in the Sagehen Flats Locality is unconfined flow (Arrhenius and Bonatti [2:26]). The recharge-discharge regime is localized and interconnected with Main Canal No. 2 of the Montezuma Valley Irrigation Company System, the Sagehen Flats Marsh and the Dolores River.

Lands suitable for cultivation are located on the margins of the Sagehen Flats Marsh, on the hills and ridges in the northern upland portion of the locality, and in the river valley. The total area available for cultivation is about 600 ha; 215 ha of this total (35.8 percent) are river terrace or bottomlands and 385 ha (64.2 percent) are areas with aeolian or alluvial soils west of the river valley. Presently there are

no data bearing on prehistoric preferences for either of these potential agricultural zones. Settlement pattern analysis indicates that both zones were being utilized as farming areas during the Sagehen (AD 650-850) and McPhee (AD 850-975) Phases of the Anasazi Tradition.

The locality is part of a larger climatic province classified as a cold, middle-lattitude, semi-arid type according to Koppen (Trewartha [3:225]). The area is characterized by a bimodal pattern of precipitation, most of which results from summer thunderstorms or winter snows. July, August, and October are the wettest months; May, June, and November the driest (based on U.S. Weather Bureau records from stations in Montezuma County for the years 1964-1975). Climatic data for four weather stations within a 50 km radius of the Sagehen Flats Locality are presented in Table 3.1. A significant conclusion to be drawn from the data is that local elevation has a major effect on climatic variables; for example, groups farming in the Yellowjacket and Dolores areas would benefit from greater precipitation because of relative elevations, but their crops would be subject to lower annual temperatures and a shorter growing season. Modern vegetation cover is illustrated in Figures 3.3 and 3.4.

Growing season is considered to be a particularly critical environmental variable affecting Anasazi farming practices in the project area. Hack [4:20] has described Hopi maize cultivation is his comprehensive ethnographic treatment of these people and their environment; on the average, a period of 130 days separates the main Hopi planting period in the spring and the harvest in September. Generally the planting occurs after the last spring freeze, while the harvest often occurs after the first freeze in the autumn. Most of the Hopi Reservation in northeastern Arizona has a frost-free period of 120-150 days (Hack

Figure 3.3: Modern vegetation types and topography in Sagehen Flats Locality. Sagehen Flats Marsh is in foreground.

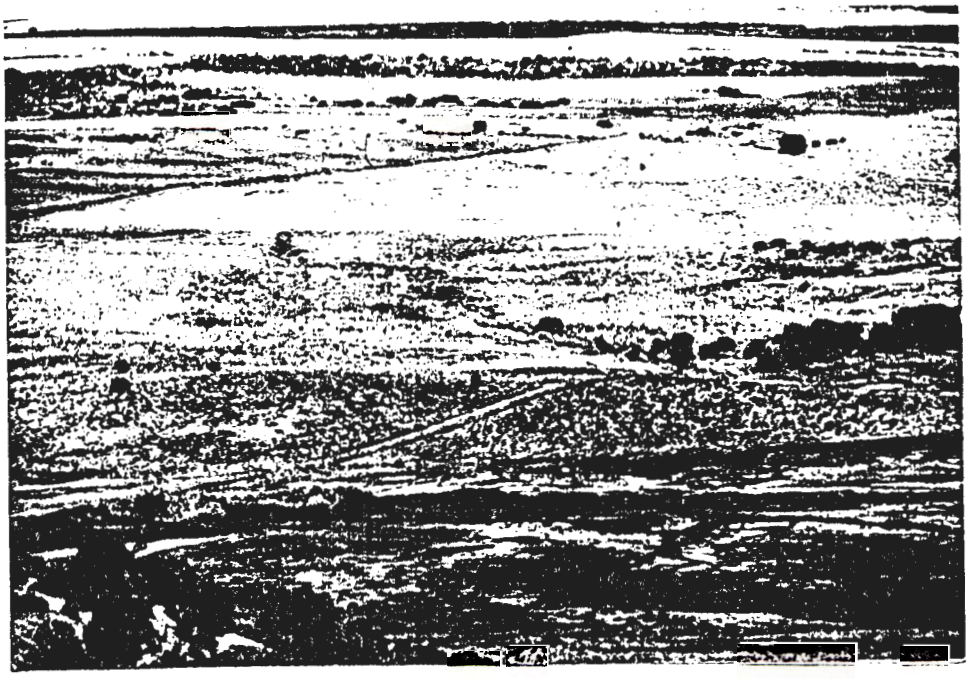

Figure 3.4: Modern land use and topography in Sagehen Flats Locality. McPhee Village is in right center.

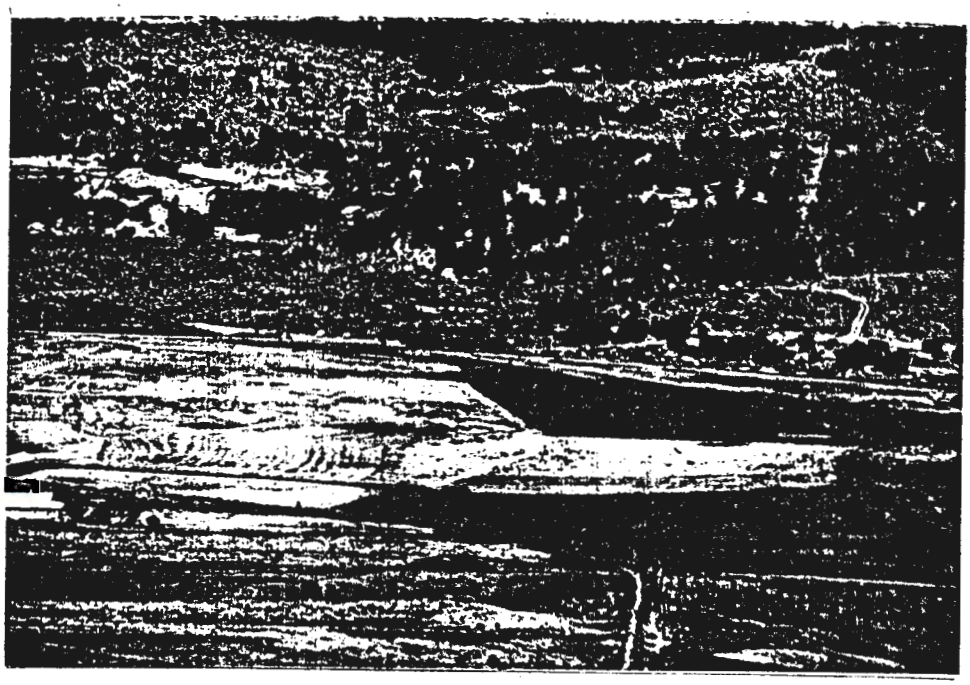

Table 3.1. Climatic Data from U.S. Weather Bureau Stations in the Vicinity of the Sagehen Flats Locality.

Station	Elv. (m)	Latitude	Annual Precip. (mm)	July Mean Temp. (°C)	Jan. Mean Temp. (°C)	Consecutive Frost-Free Days (mean)	Frost-Free Days, Standard Deviation
Dolores[1]	2118	37°28'N	460.5	19.7*	-3.1*	**	**
Yellowjacket[2]	2090	37°33'N	376.4	21.2	-4.2	124	17.92
Cortez[3]	1882	37°21'N	308.9	22.2	-2.8	128	12.42
Hovenweep[4]	1646	37°23'N	288.8	24.6	-3.7	147	17.42

Source: U.S. Department of Commerce Weather Bureau Climatological Substation Summaries, 1964-1975.

* - For period 1908-1928.

** - Not available.

[1]The Dolores Station is located 6.4 km southest of the locality.

[2]The Yellojacket Station is located 13.7 km west of the loaclity.

[3]The Cortez Station is located 17.8 km south of the localtiy.

[4]The Hovenweep Station is located 47.7 km southwest of the locality.

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[4:8]), which in most years would be ample time for the growing of a mature crop. Extrapolations from the regional weather data available indicate the Saghen Flats Locality probably averages about 120-125 frost-free days plus or minus about 20 days. Thus the usual frost-free period is 100-145 days, significantly shorter than that of the Hopi lands. It is assumed that the local Anasazi farmers were probably employing methods suited to the Sagehen environment such as the use of more hardy strains of maize or the planting of several strains as a buffer against micro-climatic fluctuations. Still, it appears that crop failures may have been frequent and that a small climatic shift toward cold temperatures may have rendered the locality unsuitable for agriculture.

The Sagehen Flats Locality is presently characterized by disturbed, transitional vegetation zones. Approximately 90 percent of the river valley itself is presently under cultivation or has been farmed in the near past. In addition, a major portion of this part of the locality was the site of a timber processing town, McPhee [5] in the 1930s and 1940s. Hence there are very few areas containing undisturbed vegetation in the river valley; some strips along the river channel in the northern portion of the locality may contain vegetation stands that come close to replicating prehistoric conditions.

The flats and upland areas west of the river also have a history of recent disturbance. Perhaps 50 percent of the locality north of Road X (or an elevation greater than 2120 m) is presently cultivated; the remainder is apparently undisturbed. Common vegetation zones in this area are pinyon-juniper woodland, oak scrubland and sagebrush scrubland. South of Road X (elevations less than 2120 m) the vegetation cover is typically

rabbitbrush (Chrysothamnus nauseosus), snakeweed (Gutierrezia sarothrae), and big sagebrush (Artemisia tridentata) scrubland in the eastern portion of the area and sage scrubland and pinyon-juniper woodland in the western portion. Many of the plant commuities contain a high percentage of weedy species which are indicative of the modern disturbance of the Sagehen Flats area. The flats have probably been used for cultivation or pasturage on a more or less regular basis since the early 1900s.

In the center of the flats is a marshy area with a fair expanse of open water. The finges of the marsh support a luxurious growth of wetlands vegetation including cattail (Typha latifolia), willow (Salix sp.) and bulrush (Scirpus acutus). The area would have provided a rich resource base for prehistoric groups practicing foraging if it were a marsh then but it is questionable whether the wetlands were a permanent phenomenon. Analysis of core samples collected from the marsh by Ken Petersen (personal communication), Washington State University, indicates that the marsh is transitory in nature, and that the area has experienced several prolonged periods of desiccation in the past. The present robust condition of the marsh may be the result of ground water flow from the Main Canal No. 2 of the Montezuma Valley Irrigation Company System. The modern marsh, therefore, may not reflect prehistoric conditions; during prehistoric periods, the wetland area may have been intermittent in nature and probably smaller in area, or non-existant.

A partial listing of exploitable plants probably available to the prehistoric inhabitants of the Sagehen Flats Locality is presented below. The plants are included in the vegetation community in which they are most commonly found (Table 3.2).

Table 3.2. Economic Plants Identifed in the Sagehen Flats Locality.

1. Riparian Community (in bottomlands along Dolores River, eastern portion of locality).

   Fremont cottonwood (Populus fremontii)
   Box elder (Acer negundo)
   Willow (Salix sp.)
   Chokecherry (Prunus virginiana)
   Hackberry (Celtis reticulata)
   Wild rose (Rosa woodsii)

2. Wetlands Community (along fringes of marsh, west central part of locality).

   Bulrush (Scirpus acutus)
   Cattail (Typha latifolia)
   Reed (Phragmites communis)

3. Big sagebrush Community (in disturbed area, Sagehen Flats, on higher exposed slopes).

   Big sagebrush (Artemisia tridentata)
   Rabbitbrush (Chrysothamnus nauseosus)
   Sunflower (Helianthus petiolaris), in disturbed habitats
   Indian rice grass (Oryzopsis hymenoides)

4. Pinyon-juniper Woodland/Oak Scrub (on shelter or north slopes, oak scrub at higher elevations. Many of the plants listed are found in cliff zones or on comparatively open talus slopes).

   Pinyon pine (Pinus edulis)
   Juniper(Juniperus osteosperma)
   Gambel oak (Quercus gambelii)
   Serviceberry (Amelanchier utahensis)
   Gooseberry (Ribes cynosbati)
   Currant (Ribes aureum)
   Broad-leafed yucca (Yucca baccata)
   Prickly pear (Opuntia sp.)
   Sego lily (Calochortus nuttallii)
   Wild onion (Allium sp.)
   Peppergrass (Lepidium campestre)
   Squaw bush (Rhus trilobata)

Besides economic plants, the various vegetation communities of the Sagehen Flats Locality also support many animals which would have been useful to prehistoric peoples. The riparian and marsh communities are good habitat for such mammal species as muskrat (Ondatra zibethicus), beaver (Castor canadensis), and raccon (Procyon lotor). Avifauna, including many duck and goose species, passerines, herons and cranes, are also common to these wetland environments. The prehistoric inhabitants may also have exploited animal resources living in the river or marsh pool, such as native fish (a fish vertebra was recovered from McPhee Pueblo) and crawfish (Cambarus affinis).

The sage scrub and pinyon-juniper-oak communities of the higher slopes and ridges support larger populations of small rodent species including deer mice (Peromyscus maniculatus), pinyon mice (Peromyscus truei), chipmunk (Eutamias minimus), spotted ground squirrel (Spermophilus spilosoma), bushy-tailed wood rat (Neotoma cinerea), and rock squirrel (Spermophilus variegatus). Cottontail rabbits (Sylvilagus audubonii) and porcupines (Erethizon dorsatum) are also common members of the upland communities. A jackrabbit (Lepus californicus) tibia awl was recovered from Site 5MT2198, indicating that these animals were also in the locality during prehistoric times. Wider ranging economically important species include mule deer (Odocoileus hemionus) which are common throughout the year in this area, and American elk (Cervus canadensis) which winter on the canyon slopes along the river. Predator species observed in the locality or in the surrounding areas include black bear (Ursus americanus), mountain lion (Felis concolor), coyote (Canis latrans), bobcat (Lynx rufus), badger (Taxidea taxus), and striped skunk (Mephitis mephitis).

The evidence for the presence of exploitable avifauna is more indirect. Certainly, the name "Sagehen Flats" is suggestive, but sagehens or grouse were not observed in the locality during 1978. Preliminary analyses of faunal remains from Little House and McPhee Pueblo have resulted in the identification of grouse and turkey (S. Emslie, personal communication). The grouse remains have not yet been identified as to species because of lack of comparative material and it is unclear whether the turkey remains represent domestic or wild forms. In the latter case, however, it appears that the remains may be those of wild individuals as domesticated forms were probably introduced into the Four Corners area after the main Anasazi occupation in the Escalante Sector (S. Emslie, personal communication).

The Sagehen Flats Locality has been characterized by highly disturbed conditions since the appearance of modern Euro-American settlers. Therefore, it is difficult to describe the prehistoric environment available to the Anasazi at the time they moved into the area. The Sagehen Flats area itself, in the center of the locality and Dolores River floodplain, appears to have been particularly affected by modern modifications. The previous description is meant only to serve as a rough estimate of prehistoric conditions. A more thorough reconstruction awaits the implementation of more thorough testing and sampling programs.

PREHISTORY

The first clear evidence for human presence in the Sagehen Flats Locality apparently dates to the Archaic Period (the Great Cut Phase in the chronological scheme developed for project researchers). However, there are a few indications that prehistoric peoples may have been acquainted with the area even earlier; one such indication of an earlier occupation is an isolated base fragment of a Plano-type projectile point recovered from the Northwestern portion of the locality (D. Dykeman, personal communication).

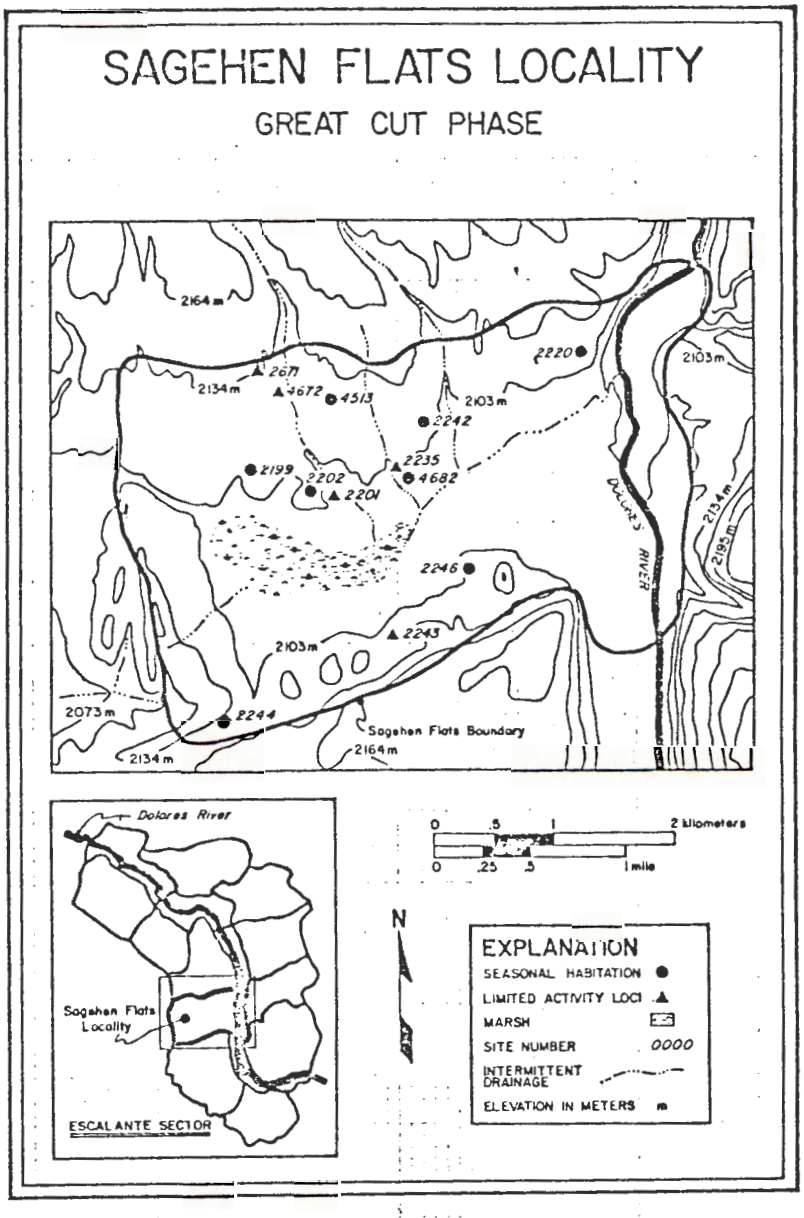
The nature and extent, if any, of the Plano occupation is presently conjectural; more evidence is available for the succeeding local manifestations of the Archaic and Anasazi Traditions. Separate discussions of the cultural periods within these traditions follow.

The Great Cut Phase

(2000 BC-AD 500)

Archaeological survery crews have recorded 13 sites in the locality that have been assigned a Great Cut Phase occupation (Figure 3.5). They are assumed to represent occupations by the theoretical North Marsh Band, the local late Archaic community. The sites have been placed in a functional category based on visible characteristics; six are classified as seasonal camps and four are limited activity loci. One of the seasonal camps, Sheep Skull Camp (Site 5MT2202), was investigated by intensive excavation techniques during the 1978 field season. Unfortunately, no features were discovered during excavation, probably due to destruction of the original surface of the site by erosion. (For a presentation of the

Figure 3.5: Great Cut Phase sites in the Sagehen Flats Locality.


SAGEHEN FLATS LOCALITY
GREAT CUT PHASE
2164 m
2134 m
2671
4672
4513
2103 m
2242
2220
2103 m
2199
2202
2201
2235
4682
DOLORES RIVER
2134 m
2195 m
2246
2243
2103 m
2073 m
2244
Sagehen Flats Boundary
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0 .5 1 2 kilometers
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N
EXPLANATION
SEASONAL HABITATION
LIMITED ACTIVITY LOCI
MARSH
SITE NUMBER 0000
INTERMITTENT DRAINAGE
ELEVATION IN METERS m

Figure 3.5.

archaeology of Site 5MT2202, see Schlanger [6]). An Archaic component is also present at Marsh View Hamlet (Site 5MT2235; Bussard [7]) but has not yet been investigated. Thus, very little is known regarding the Archaic occupation in the locality except site location. A pressing need before further investigation of the Geat Cut Phase is the establishment of a chronology, perhaps based upon projectile point typologies or radiocarbon dating of suitable remains.

The Sagehen Phase

(AD 650-850)

To date no sites have been recorded in the locality that might yield information on the transition between the Archaic and Anasazi Traditions. The earliest known Anasazi site in the locality is Sagehen Hamlet which dates to the last half of the seventh century AD and hence is well into the Anasazi period. The potential for evaluating the nature of the transition based on evidence from the Sagehen Flats Locality presently does not appear promising and awaits further research.

There is definite evidence for an Anasazi occupation in the locality by AD 650. This early manifestation has been designated the Sagehen Phase (AD 650-850); 44 Sagehen Phase sites have been recorded in the locality and assigned to two functional types: small hamlets and limited activity loci. Thirty-three hamlets and 11 limited activity loci with Sagehen Phase occupations have been recorded in the locality (Figure 3.6). Two Sagehen Phase sites, Sagehill Hamlet (Site 5MT2198) and Dos Casas Hamlet (Site 5MT2193) were excavated in 1978. Both are small habitations, apparently occupied by one household. Typically, these early hamlets appear to consist of a main domicile (pithouse), a storage and activity

Figure 3.6: Locations of Sagehen Phase sites in the Sagehen Flats Locality.

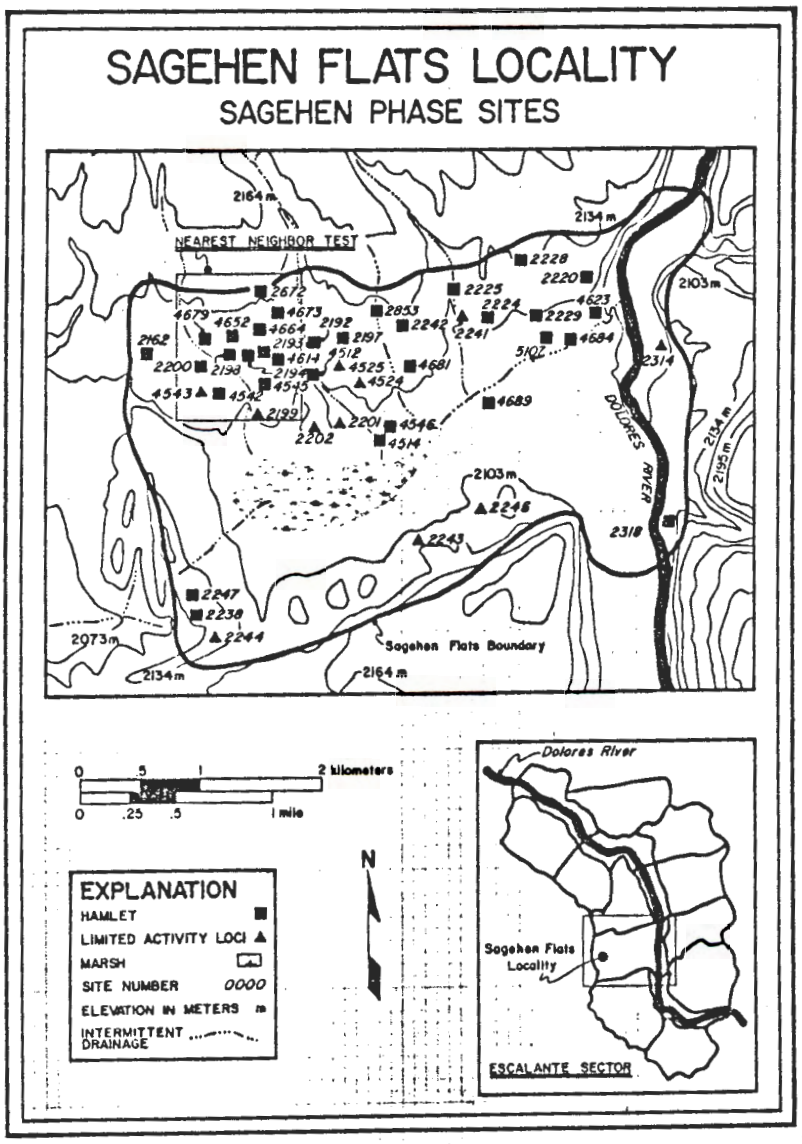
SAGEHEN FLATS LOCALITY
SAGEHEN PHASE SITES
NEAREST NEIGHBOR TEST
2164 m
2134 m
2103 m
2973 m
2195 m
DOLORES RIVER
Sagehen Flats Boundary
0 .5 1 2 kilometers
0 .25 .5 1 mile
N
EXPLANATION
HAMLET
LIMITED ACTIVITY LOCI
MARSH
SITE NUMBER 0000
ELEVATION IN METERS m
INTERMITTENT DRAINAGE
Dolores River
Sagehen Flats Locality
ESCALANTE SECTOR

Figure 3.6.

area to the north and ancillary use areas to the east of the house. Dendrochronology indicates that Site 5MT2198 was inhabited during the time span AD 690-720 and Site 5MT2193 during the span AD 760-790 (more detailed description of these sites have been prepared by Hewitt [8] and Emerson, Brisbin, and Schlanger [9]). Sagehill and Dos Casas Hamlets are believed to represent habitations used by the West Sagehen Neighborhood, a Sagehen Phase dispersed community. This community apparently consisted of small family groups living in isolated farmsteads and practicing a mixed horticulture and hunting and gathering subsistence strategy.

The McPhee Phase

(AD 850-975)

Near the end of this cultural period, these small-time farming groups began moving out of their single farmsteads and into large villages. By AD 875, most of the local population was concentrated at one large aggregated habitation, McPhee Village, located on the western side of the Dolores River Valley. The culmination of this change in settlement pattern is manifest in the McPhee Phase (late Pueblo I - early Pueblo II, AD 850-975). Nineteen sites in the Sagehen Flats Locality have been assigned a McPhee Phase occupation; the type breakdown is as follows: villages - one; hamlets - two; field houses (a type of seasonal habitation) - five; and limited activity loci - 11 (Figure 3.7). Two sites representing this phase, McPhee Pueblo (Site 5MT4475, a component of McPhee Village) and Little House (Site 5MT2191, a field house) were excavated during 1978; both sites were used by the McPhee community. Tree-ring dates from construction wood recovered from McPhee Pueblo indicate the two major elements at this large habitation occurred during the last two decades of

Figure 3.7: Locations of McPhee Phase sites in the Sagehen Flats Locality.

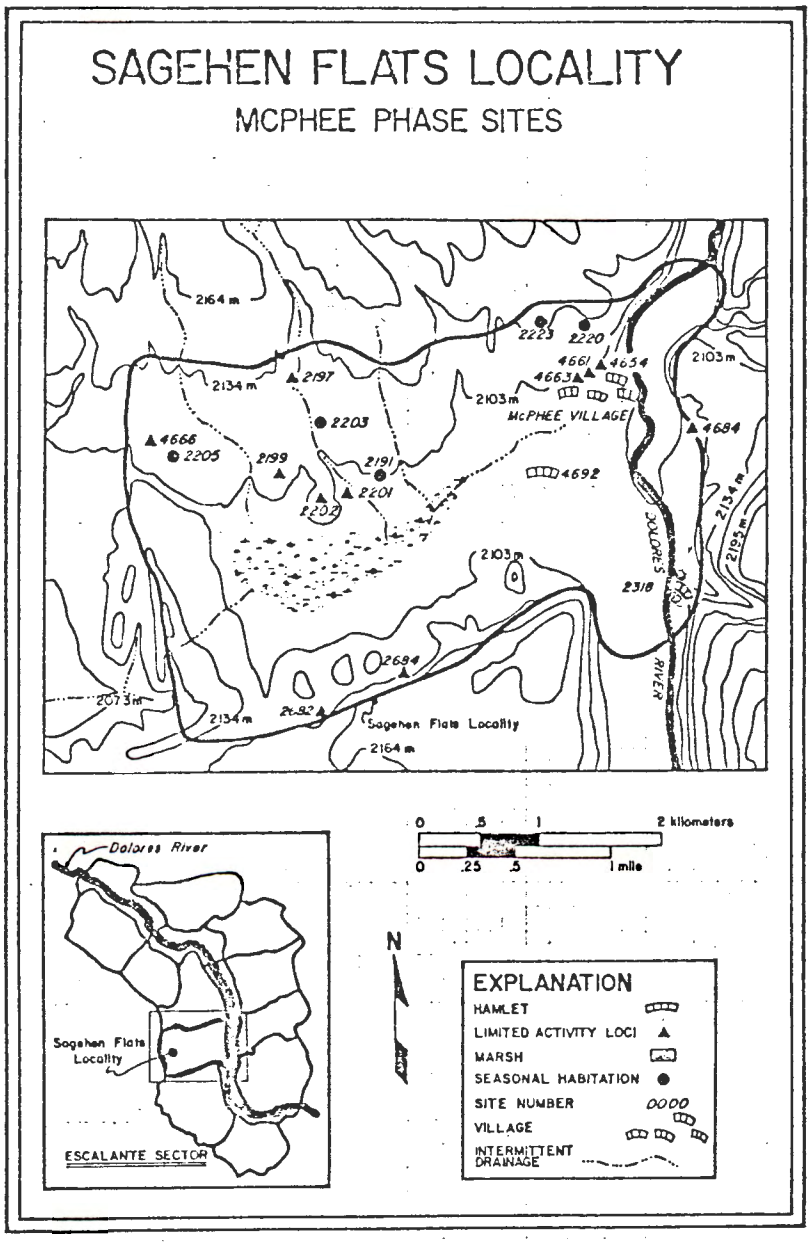
SAGEHEN FLATS LOCALITY
MCPHEE PHASE SITES
2164 m
2223
2220
4661
4654
4663
2103m
2134 m
2197
2103m
McPHEE VILLAGE
2203
4684
4666
2205
2199
2191
4692
2201
2202
2134 m
2195 m
DOLORES
RIVER
2103m
2318
2694
2073m
2134m
Pt.92
Sagehen Flats Locality
2164 m
Dolores River
Sagehen Flats Locality
ESCALANTE SECTOR
0 .5 1 2 kilometers
0 .25 .5 1 mile
N
EXPLANATION
HAMLET
LIMITED ACTIVITY LOCI
MARSH
SEASONAL HABITATION
SITE NUMBER 0000
VILLAGE
INTERMITTENT DRAINAGE

Figure 3.7.

the ninth century AD, and between AD 900-940. (For more detailed narratives of Site 5MT2191 and McPhee Pueblo, see Hewitt [10] and Brisbin [11]). Again, the population appears to have been relying on farming as a primary subsistence strategy backed up by hunting and gathering.

The Sundial Phase

(AD 1050-1200)

During the tenth century AD population levels in the locality were in rapid decline. Only a sparse population was present during the period succeeding the McPhee Phase, the Sundial Phase (late Pueblo II - early Pueblo III, AD 1050-1200). Seven sites assigned to the Sundial Phase have been recorded in the locality, the summary by type is: small hamlets - 2; towers(?) - 3; limited activity loci - 2 (Figure 3.8). Marsh View Hamlet (Site 5MT2235), a small habitation, was excavated during the 1978 season to recover data regarding this cultural period; this site was occupied by a household unit of the North Peripheral Neighborhood. Tree-ring dates from wood at the site indicate it was occupied in the time span AD 1100-1150. An inhouse report detailing operations at the site has been prepared by Bussard. Apparently by this period, the great majority of the Anasazi farming population had left the Escalante Sector, perhaps moving south and west to the Montezuma Valley and the canyon and mesa country north of McElmo Canyon. A few small farmsteads and towers in the Sagehen Flats area were occupied during this phase, but then the locality appears to have been totally deserted by AD 1200.

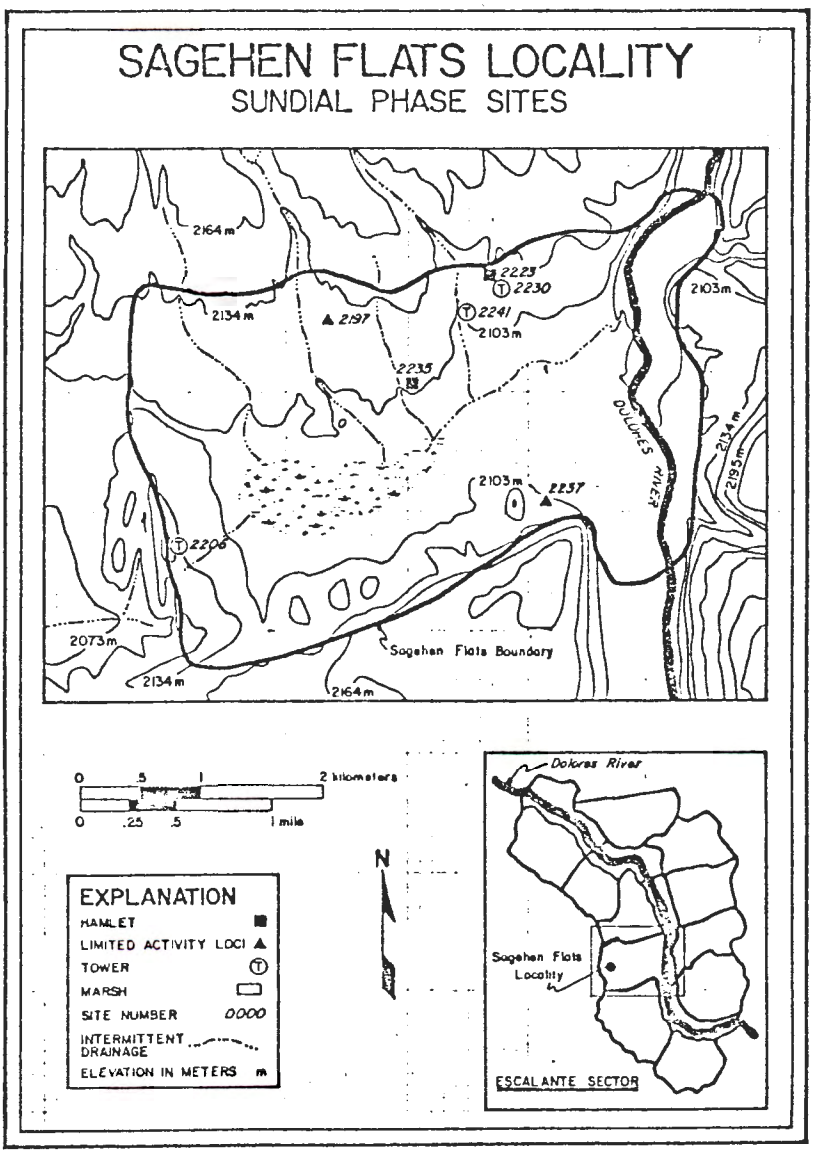
SAGEHEN FLATS LOCALITY
SUNDIAL PHASE SITES
2164 m
2134 m
2197
2223
2230
2241
2103 m
2235
2103 m
2237
2206
2073 m
2134 m
2164 m
Sagehen Flats Boundary
DOLORES RIVER
2103 m
2134 m
2195 m
0 .5 1 2 kilometers
0 .25 .5 1 mile
N
EXPLANATION
HAMLET
LIMITED ACTIVITY LOCI
TOWER
MARSH
SITE NUMBER 0000
INTERMITTENT DRAINAGE
ELEVATION IN METERS m
Dolores River
Sagehen Flats Locality
ESCALANTE SECTOR

Figure 3.8.

Figure 3.8: Locations of Sundial Phase sites in the Sagehen Flats Locality.

The Beaver Point Phase

(AD 1400-1900)

After the departure of the Anasazi, the Escalante Sector and the Sagehen Flats Locality apparently were without man's presence until the appearance of Shoshonean peoples. Their occupation (designated the Beaver Point Phase in the Escalante Sector, AD 1400-1900) in the Sagehen area is poorly documented, although a possible Beaver Point Phase camp has been recorded by survey crews on the mesa top north of McPhee Village. The first representatives of Western culture to visit the area were the members of the Dominquez-Escalante Expedition in 1776, who probably passed through the locality on their journey to the Colorado River. Modern Anglo-European settlement in the area began in the late 1870s [5].

RESOURCES, ADAPTATIONS, AND SETTLEMENT PATTERNS

The Sagehen Flats Locality presently exhibits a rich variety of natural resources which probably would also have been available to the prehistoric inhabitants. The locality contains a variety of plant communities and ecosystems, including marshlands, riparian communities, cliff zones, and woodlands. The variety and productivity of this area may have allowed prehistoric populations to support themselves primarily on local resources. The woodlands in the area north of Sagehen Flats would have provided ample firewood and construction material for houses. Lenses of cherts and other materials suitable for manufacture of flaked stone tools are found in the Burro Canyon and Morrison-Summerville Formations which outcrop along the House Creek Fault. Dakota Sandstone an excellent raw material for masonry blocks and ground stone tools, is also plentiful in the locality.

The most important resource for a subsistence strategy based on horticulture or agriculture, as practiced by the Anasazi, is arable land and soils. Approximately 600 ha of arable land are available for farming in the locality, 215 ha located in the river valley itself and 385 ha in the Sagehen Flats vicinity and in the peripheral upland area.

Kirkby [12] has presented figures on prehistoric maize yields in Meso-America based on data from the Tehuacan valley; her work is not directly applicable to the American Southwest because of the utilization of different races of maize and other cultural factors. The maize collection from the Dolores Archaeological Project's 1978 field season did not contain enough cobs to establish the physical characteristics of the

local population. Estimated yields based on extrapolations from other analyses of this sort from Southwest Colorado (Valdez [13]; Cutler and Meyer [14]) are .3+ metric tons annually per hectare for the Sagehen Phase and .4 metric tons per hectare for the McPhee Phase. Assuming one crop per year, the potential total annual harvest yield for the Sagehen Flats Locality was 210 metric tons of maize during the Sagehen Phase and 240 tons during the McPhee Phase. According to Flannery's [15:93] estimates for the Meso-American Formative, these yields would be sufficient to support between 210 and 240 households, a much higher figure than is currently estimated for any prehistoric occupation in the locality. Of course, such figures assume that environmental factors permitting a harvest were present. Among limiting factors affecting local agricultural productivity are soil fertility, effective moisture, and growing season. One or more of these factors may have affected Anasazi farming productivity and methods during their occupation of the locality.

From the general literature pertaining to prehistoric southwestern cultures, it is assumed that the local Archaic Anasazi populations were pursuing varying subsistence strategies, and that these are reflected by settlement patterns and material remains; culture is a systemic phenomenon and reacts with changes in the environmental system, which is often unstable. A discussion of settlement pattern-subsistence strategy relationships follows for such cultural periods defined in the Sagehen Locality as part of the Anasazi Tradition. In addition, the nature of Archaic adaptations are also presented, as they influenced later Anasazi patterns.

The Great Cut Phase

A small, probably seasonal, population of Archaic peoples was present in the locality, based on analysis of archaeological survey data. These early groups were probably performing a variety of economic and social activities in the local area. Their lifestyle is believed to have been a rather simple one (Kane [16]) and was oriented around the seasonal exploitation of truely wild, and/or encouraged wild, resources. These peoples probably lived is small social groups or bands which were very mobile within a defined territory, harvesting plants and animals when they were available in local areas. The North Marsh Band is the formal project appellation assigned to the Archaic group that occupied the Sagehen Flats and northern upland portions of the locality.

An examination of the characteristics of the Archaic sites in the Sagehen Flats Locality reveals the utilization of a simple settlement system. Only two site types are recognizable from the record - seasonal camps and limited activity loci. The criteria for this division are site size, quantity of material remains, and topographical aspect. Large sites with a fair quantity of artifacts and a good view over the surrounding terrain are interpreted as camps, and are assumed to be components of a seasonal round. Small sites with limited artifacts located in diverse topographic situations are assumed to be limited activity loci.

As components of a seasonal round where the population arrives in a certain area at a certain time to harvest available resources, seasonal camps would be located in close proximity to such resources. One of the more obvious areas that might be expected to yield exploitable plants and game is the bottomland in Sagehen Flats; this is currently a marsh with a variety of economic plant types and good cover for game. The

environmental characteristics of the flats may have been different during the prehistoric period; the bottomland is a natural drainage basin.

A scrutiny of Great Cut Phase camp locations (Figure 3.5) suggest that they are clustered in the perimeter around the flats. To lend rigor to this impression, a simple test was devised. First, the distances from known Great Cut Phase camps to the marsh were calculated and an average taken (Table 3.3); this value is 603 m.

Table 3.3. Distances and Directions from Great Cut Phase Camps to Sagehen Flats Marsh.

Site	Distance (m)	Direction (°)
5MT2199	360	170
5MT2202	260	180
5MT2242	300	190
5MT2220	1400	240
5MT2243	400	260
5MT2244	900	30

Average Distance from Marsh: 603 m; Standard Deviation: 455 m.

Next, 25 random locations with in the locality were designated, using a table of random units, and the average distance from these locations to the marsh calculated. The average for random locations was 905 m (Standard Deviation of 592 m). Thus, there is good evidence for clustering of Archaic camps around the marsh, which implies exploitation of wetland resources by the local peoples. It also should be noted that eight additional camps within two km of the marsh have been recorded outside of the locality boundaries.

The Sagehen Phase

By AD 650, social groups in the Sagehen Flats Locality had apparently

abandoned the traditional hunting and gathering lifestyles and were depending on horticulture for a major portion of their foodstuffs. Local Sagehen Phase subsistence patterns and material cultures are seen as being similar to the general pattern observed for Basketmaker III and Early Pueblo I cultures (Kane [16]). The typical simple settlement pattern, containing two site types, hamlets and limited activity loci, is present.

An examination of the map depicting West Sagehen Neighborhood habitations for this period (Figure 3.6) gives the impression of somewhat even spacing of hamlets over the loess-covered hillocks and colluvial flats north of the central marsh area. For these early farmers, arable land was probably the most critical criterion for site location. A review of site locations and inventory form descriptions for specific sites reveals that all Sagehen Phase hamlets in the locality are located in arable soil ares (arable soils areas in this case being defined as at least .25 ha of soils judged to be of adequate depth for cultivation and of aeloian or colluvial derivation).

The habitation sites, therefore, are clustered on the arable land areas for the locality (57.1 percent of the total area). To test the impression of uniform spacing of hamlets in the locality, spatial distributions were analyzed using the nearest neighbor statistic. As originally described by Clark and Evans [17], the nearest neighbor statistic is a measure of spacing; the statistic itself expresses departure from a random condition. A formula, $R=\bar{r}A/\bar{r}E$, is used to calculate deviation from randomness. In the formula, R is the ratio of the mean distance observed ($\bar{r}A$) to the mean distance expected ($\bar{r}E$). The factor $\bar{r}E$ is derived from the Poison distribution and is determined by

site density in the area to be tested. Mean expected distance is calculated using the formulas $\bar{r}E = 1/(2\sqrt{p})$, where p is the site density.

For the test, a 100 ha area with high habitation density was chosen; this study area is located in the western portion of the locality north of the Sagehen Flats Marsh and represents part of the area occupied by the West Sagehen Neighborhood (Figure 3.6). For this analysis it was assumed that all hamlets in the study area were effectively contemporaneous, or were members of the same momentary population (see section on population parameters). This assumption is probably erroneous in a real sense, but not in a social context. In other words, even though many of the hamlets may have been unoccupied at one time, they may have been treated as viable entities and their social territories respected by other local settlers. The area contains 13 sites that have been classified as Sagehen Phase hamlets; the average distance ($\bar{r}A$) to the nearest neighbor is .1767 km. The site density in the study area is 13 per sq km; therefore, $\bar{r}E = 1/(2\sqrt{13}) = .1387$. R (the nearest neighbor statistic) is then calculated to be .1767/.1387, or 1.273. To interpret this figure it is noted that an "R" of 1 indicates a randomly distributed population, results of between 0 and 1 indicates clustering and those between 1 and 2.149 indicate even spacing. The nearest neighbor statistic for the hamlets in the study area therefore indicates some movement toward even spacing. A possible interpretation of this phenomenon is competition among households for farmland. The Sagehen Phase settlement pattern might be similar to that described for the Late Formative cultures of the East Texcoco Region described by Earle:

> . . . village locations were strongly influenced by the dominance of the Lower Piedmont, especially above 2300 m. Sites are "clustered" in this zone relative to the area as a whole, yet within the zone, they become regularly spaced by competition [18:206].

In other words, Earle observed that on a large scale, sites were clustered in areas containing important resources (in the case of the Sagehen Flats Locality, arable lands), but within these areas the sites tended to be regularly spaced.

The McPhee Phase

Early in the ninth century AD, a significant shift in settlement patterns is demonstated within the Sagehen Flats Locality. The many small farmsteads distributed evenly over the arable flats and uplands were abandoned; the local population moved to larger hamlets and villages containing as many as 20 households. This trend toward centralization marks the beginning of a new cultural period, the McPhee Phase (AD 850-975). A comparison of the site descriptions for the McPhee and Sagehen Phases reveals that more site types (four vs. two) have been identified for the McPhee Phase occupation. This greater variety is believed to reflect a more complex ecomonic and social system during this period. Rather than practicing a simple horticultural/hunting and gathering economy with farming plots adjacent to the farmstead, the McPhee population had adopted a central habitation/field house system where large agricultural fields are located up to three or four km away from the main living area. Thus the field houses and most of the limited activity loci so far identified in the Sagehen Flat Locality (Figure 3.7) are believed to have been utilized by peoples living at McPhee Village (Site 5MT4475).

On a larger scale, it is a possibility that McPhee Village and the other McPhee Phase sites in the Sagehen Flats Locality form a component of a larger sector-wide settlement pattern. Such a conceptual model would include McPhee Village, House Creek Village and May Mesa Village (Figure 3.9) as central nodes in this larger system. These three large habitations form a triangular distribution with approximately equal distances between the apexes. By applying Thiessen polygon construction, tentative territories for each village can be estimated. The distribution of large hamlets around McPhee can be regarded as components in a polygonal network surrounding McPhee (Figure 3.10). Such patterns may be integral parts of central place systems (Losch [19]; Johnson [20]; Haggett [21]; Haggett, Cliff, and Frey [22]). Note that there are no western or southwestern components of the polygon system; as the central place model for the Escalante Sector is confined to the margins of the Dolores Valley, the settlements may not be "packed" in this direction (i.e., the area four to five km west and southwest of McPhee Village may represent a frontier area that had not reached the population level necessary for a central place pattern).

The Sundial Phase

As is generally the case for the Escalante Sector, population levels in the Sagehen Flats Locality declined drastically in the period AD 900-950. By AD 950, the locality was virtually abandoned, except perhaps for seasonal visits by hunting and gatherng parties.

Archaeological survery and excavation indicate a resumption of prehistoric activity and perhaps an attempt at resettlement in the period AD 1050-1200. This interval has been designated the Sundial Phase and is represented by seven sites within the boundaries of the locality (Figure

Figure 3.9: McPhee Phase villages in the Escalante Sector; Thiessen polygons are employed to approximate village territories.

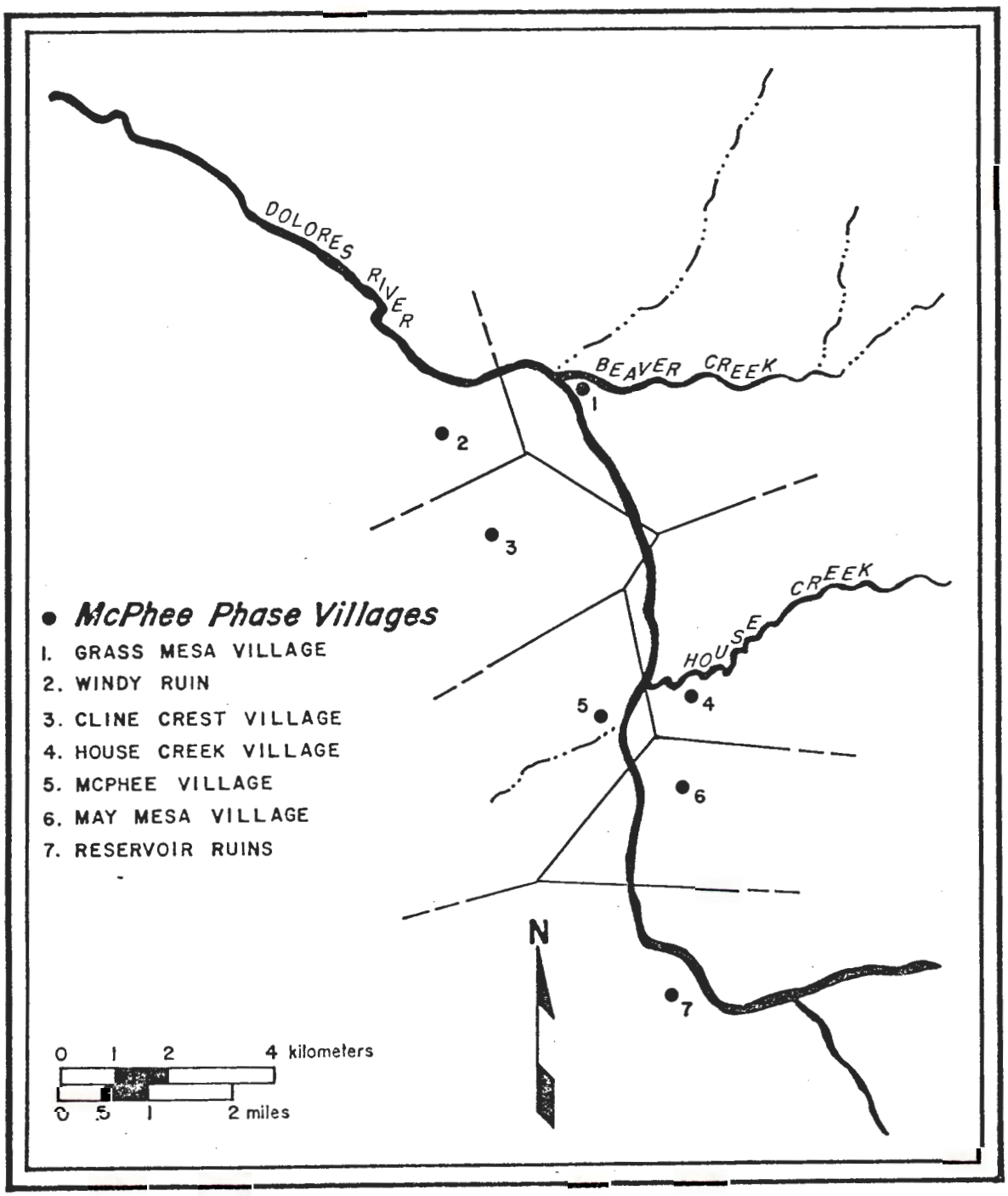
DOLORES RIVER
BEAVER CREEK
HOUSE CREEK
McPhee Phase Villages
1. GRASS MESA VILLAGE
2. WINDY RUIN
3. CLINE CREST VILLAGE
4. HOUSE CREEK VILLAGE
5. MCPHEE VILLAGE
6. MAY MESA VILLAGE
7. RESERVOIR RUINS
N
0 1 2 4 kilometers
0 .5 1 2 miles

Figure 3.9.

Figure 3.10: McPhee Phase Hamlets surrounding McPhee Village.

population). Households, for this purpose, are considered to be the social unit of consumption (i.e., those individuals that cook and eat together, see Ciolek-Torrello and Reid [23]; Dozier [24]) and is often equivalent to the social unit responsible for reproduction, shelter, and subsistence, although subsistence may be the responsibility of a larger group (Flannery [15]). Households are assumed to be recognizable in the archaeological record by material distributions and architecture; these archaeological assemblages are termed household clusters (Winter [25:25]). Household clusters in early Anasazi sites are assumed to be manifest by a pithouse and ancillary features (Birkedal [26]) and later, by pueblo room suites and adjacent outdoor space (Rohn [27:31]). Thus household clusters in the Sagehen Flats Locality can be identified by site excavations, and tentative estimates for survey data can be made through extrapolation from the more intensive investigations.

The number of individuals present in a household is a second problem area. Birkedal [26] has made a strong case that Basketmaker III households consist of nuclear families of five to seven individuals; his argument is based on artifact assemblages and floor areas of Mesa Verde pithouses. Murdock [28:23], on the other hand, believes the term household frequently applies to groups larger than a nuclear family. Because of the thoroughness of Birkedal's argument and the apparent similarity of cultures in the Sagehen Flats Locality to those of Mesa Verde, his figures have been adopted for this study. One piece of evidence from excavation in the study area relating to this problem is the discovery of a secondary burial consisting of four individuals (three adults and a child) at Marsh View Hamlet. The burial may represent all individuals living as a family

unit at the site about AD 1120. If so, this would seem to support Birkedal's hypotheses.

Finally, a last problem area to be considered in obtaining preliminary population estimates is the concept of "momentary population" (Tolstoy and Fish [29]; Marcus [30]). Assignments of locality sites to phases are based primarily on lithic and ceramic assemblages and architecture. Within the Yellowjacket District, such criteria can often be used to temporally place an Anasazi site within a 50-100 year period, but no finer definition is possible. Within the Sagehen Flats Locality, Archaic sites presently cannot be placed in a time span finer than a few thousand years, and, while the criteria are more exacting for the Anasazi Tradition, there are ambiguities here as well. A case in point is the relationship between Sagehill and Dos Casas Hamlet. Both were assigned to the Sagehen Phase (AD 650-850) on the basis of survey data, but no finer temporal distinctions could be made. In fact, excavations yielded tree-ring dates and other evidence indicating that approximately 100 years separate the occcupations at the two sites. Thus, even though sites may be assigned to the same cultural period on the basis of survey collections, an estimate of the momentary or truly contemporaneous population for the period may be more difficult to make.

There are major difficulties in obtaining population figures for any prehistoric occupation. In addition to the above-mentioned major problems, approximately ten percent of the locality has not been archaeologically surveyed; allowances for unsurveyed areas are incorporated into the estimates. Rough parameters can be estimated for the Sagehen Flats Locality on the basis of the available data. These are presented below according to phase, and are tabulated in Table 3.4.

The Great Cut Phase

Six sites assumed to be seasonal Archaic camps are present in the Sagehen Flats Locality; perhaps one or two others might be recorded during future survey operations. The problem with computing population estimates for this period is twofold: (1) material evidence for reconstructing household clusters is lacking and the social complement of such clusters is unknown; and (2) there is no present method for establishing momentary populations. The sites in question are lithic scatters averaging perhaps 1 ha in area. If the assumption is made that each camp was utilized seasonally by one to three households, then the maximum temporary population in the locality would be on the order of 100 individuals. This seems excessive considering the size of the locality and the available resources; a more realistic estimate based on a conservative approach (a momentary population of three households occupying two of the six camps) is 15-50 individuals. This, of necessity, is a very subjective analysis; it is hoped that the recovery of more data during future field operations will allow a more rigorous approach.

The Sagehen Phase

There is less difficulty in recognizing household clusters representing the Sagehen Phase. However, the problem of estimating momentary populations remains. Thirty-three small hamlets are identified in the locality during this period; the great majority (90 percent) are probably unit hamlets containing one household cluster, but perhaps three (10 percent) contain two or three household clusters. For the period as a whole, then, approximately 38 households were present in the area. However, this does not address momentary population levels. Based on

it appears that the average span of occupation at a Sagehen Phase hamlet was somewhat less than 50 years; therefore, only one-third to one-quarter of the hamlets were probably contemporaneous, an accurate estimate of the maximum momentary population is probably 55-70 individuals representing nine to 12 households. Assuming three additional hamlets will be identified when the remainder of the locality is archaeologically surveyed, the momentary population living in the locality during the Sagehen Phase probably averaged 60-75 individuals.

The McPhee Phase

Population estimates for this phase are probably more accurate than for the previous two examples. There is no difficulty in recognizing and estimating household clusters and as only two habitations have been recorded in the locality, momentary population is also not a problem (the large hamlet, Site 5MT2318, is assumed to be socially related and therefore comtemporaneous with McPhee Village). McPhee Village is estimated to contain 20-25 household clusters; however, probably a maximum of 15-20 clusters were occupied at one time (Plog [31]); Site 5MT2322 contains four or five household clusters or three or four coeval clusters. On this basis, the maximum momentary population for the McPhee Phase is 110-150 individuals representing 18-24 households. It is assumed that no additional McPhee habitations would be discovered by future survey operations in the locality.

The Sundial Phase

Only two hamlets representing the Sundial Phase have been identified in the locality. It is assumed they are contemporaneous and that no other habitations will be recorded during anticipated future surveys. The maximum momentary population is estimated at 12 individuals representing two households.

POPULATION DYNAMICS

Prehistoric population levels in the locality were low during the Archaic Tradition and began to rise with the beginning of the Sagehen Phase of the Anasazi Tradition (Figure 3.11); a population climax was reached during the McPhee Phase (perhaps AD 875-900). At this point in the program it is impossible to estimate the factors which may have contributed to this phenomenon. Possible relevant variables are continued immigration into the area and little migration to other areas, favorable climate, improved subsistence methods and cultigins resulting in larger harvests, and improved social mechanisms able to better cope with more and larger groups. A rapid decline and probably exodus from the locality as part of a sector-wide phenomenon took place soon after the beginning of the tenth century AD. By AD 1000, the locality was virtually deserted, but a small-scale and localized re-settlement effort is featured in the endsuing Sundial Phase. By AD 1200, this effort had failed and the locality received only seasonal visits until the advent of Euro-American settlement.

It is notable that at no time during the Anasazi Tradition did the population levels, apparently approach the potential annual maize harvest as calculated earlier (p. 15). Indeed, the maximum number of contemporaneous households in the locality (24 households during the McPhee Phase) is less than 15 percent of the carrying capacity of the locality using the figures for potential maize yields; this statistic is not expected to change significantly with the addition of future survey data. Such figures have bearing on the possible causes for the abandonment of the locality; it would necessitate a severe environmental

Figure 3.11: Prehistoric popuation dynamics in the Sagehen Flats Locality.

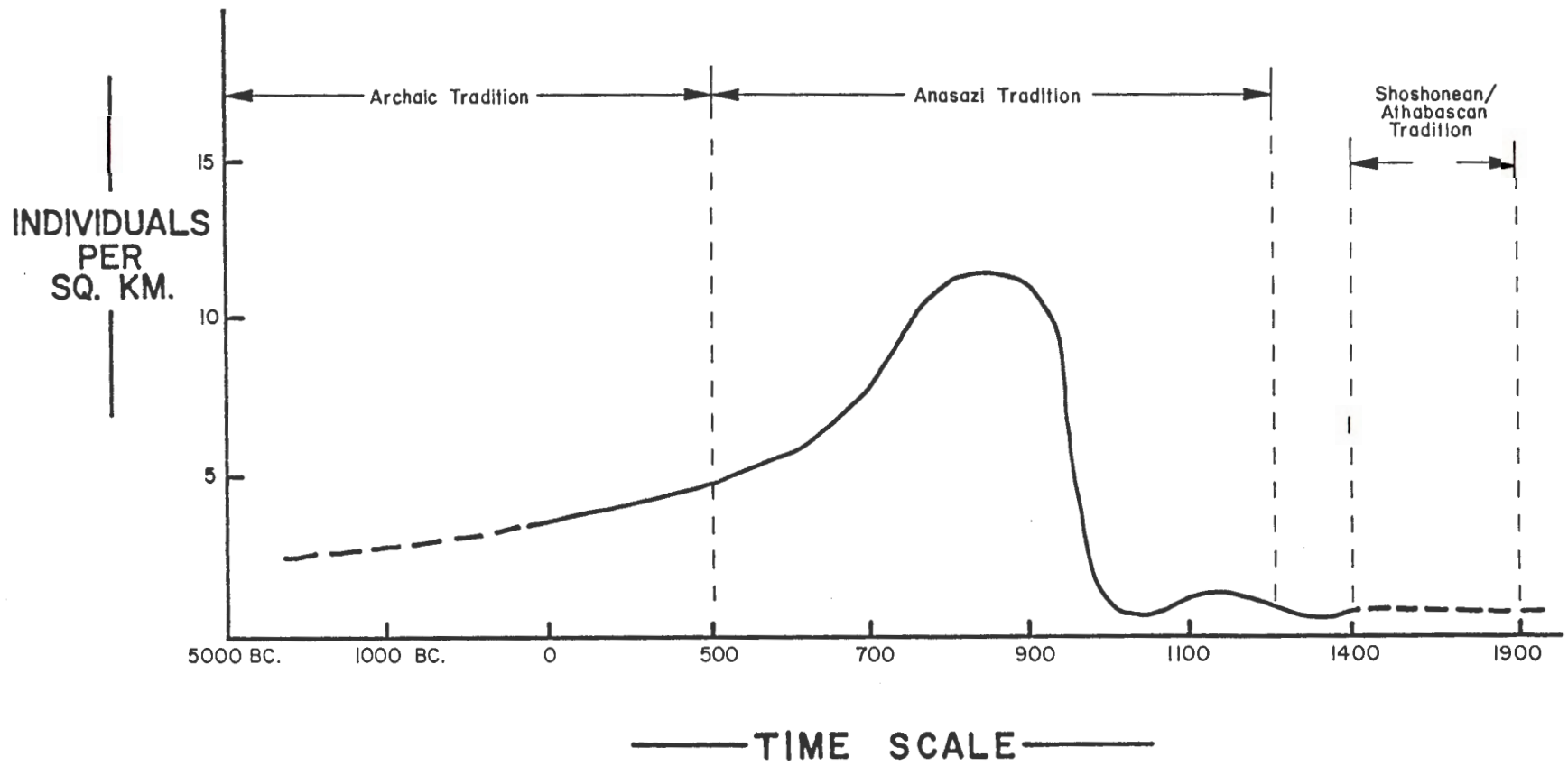
Archaic Tradition
Anasazi Tradition
Shoshonean/
Athabascan
Tradition
INDIVIDUALS
PER
SQ. KM.
15
10
5
5000 BC.
1000 BC.
0
500
700
900
1100
1400
1900
TIME SCALE

Figure 3.11.

change to reduce the potential maize yields to an extent whereby a carrying capacity overload would be a factor in the cultural collapse. A lowering of annual temperature resulting in a reduction in the length of the growing season has been mentioned in this respect. Social factors may have been a major force in the decline of the Anasazi culture in the locality and offer a promising avenue for future research in this light.

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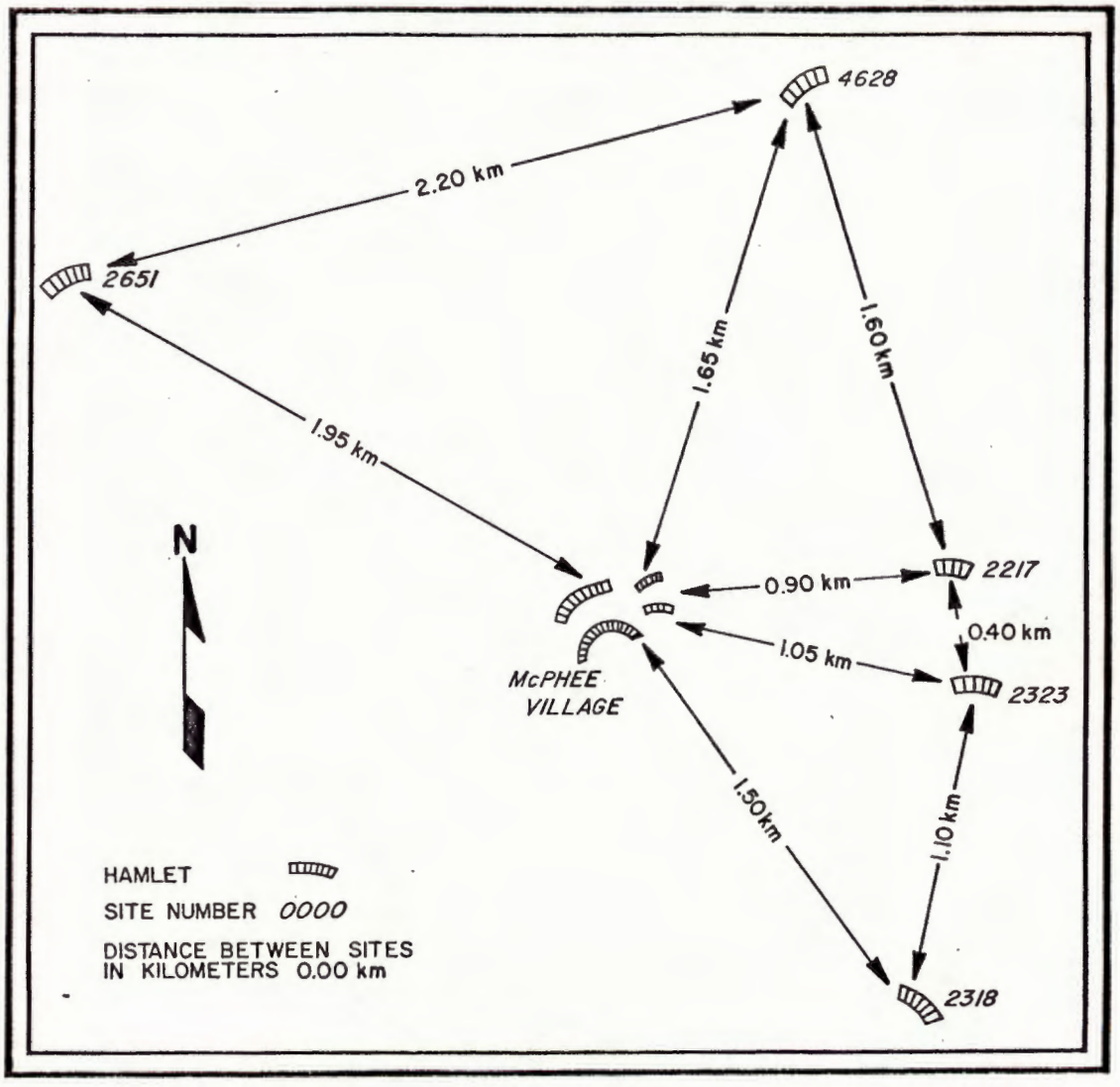
4628
2.20 km
2651
1.65 km
1.60 km
1.95 km
N
0.90 km
2217
0.40 km
1.05 km
McPHEE
VILLAGE
2323
1.50 km
1.10 km
HAMLET
SITE NUMBER 0000
DISTANCE BETWEEN SITES
IN KILOMETERS 0.00 km
2318

Figure 3.10.

3.8). Two small Sundial Phase habitations are located in areas characterized by easy access to arable land and potentially resource-rich ecological zones (Site 5MT2223 is situated on an upland hillock close to a cliff zone and the riparian areas in the Dolores Valley; Site 5MT2235 is situated on the top of a low ridge just north of the Sagehen Flats Marsh). It seems a reasonable conclusion that the small social groups at these hamlets (habitation units of the North Peripheral Neighborhood) were practicing horticulture on small plots within a short distance of the dwelling and were also exploiting nearby wild resources.

The so-called Sundial Phase "towers" (Site 5MT2206, Site 5MT2230, and Site 5MT2241), present a more difficult interpretive problem. These "towers" consist of mounds of block sandstone rubble, often in the form of a ring. The masonry rings are approximately six to eight m in diameter and the interiors of the "towers" measure about four to five m across; these edifices are always located on prominent points or ridge tops with a commanding view of the surrounding terrain. Their function must remain conjectural for the present, although their salient location is notable. Intuitively, the locations of these sites appear to form a regular pattern, and therefore, may be construed as a network. It is not a reasonable presumption that these structures were built and used primarily by the inhabitants of the coeval local hamlets, as such activities would be outside the scope of loosely organized dispersed groups. Rather, it is more logical that these sites were maintained and utilized by prehistoric communities based outside the locality and perhaps outside the sector as well. It may be that the use of these "towers" is related to the communities inhabiting Escalante Ruin and/or Reservoir Village, both located approximately four to five km southeast of the locality; both

apparently were important centers of prehistoric activity during the Sundial Phase. By AD 1200, the Anasazi were no longer maintaining settlements in the locality or practicing any intensive activities. The area may have been used during the thirteenth century as a hunting and gathering province and visited at infrequent intervals; evidence for these activities is slight. After the abandonment of the Four Corners area by the Anasazi, the localtity was utilized by Shoshonean and Athabascan peoples until the arrival of Euro-American settlers.

POPULATION PARAMETERS

The Sagehen Flats Locality was the setting for a long-term prehistoric occupation, perhaps extending from 6000 BC until the advent of modern Euro-American settlement. During this long period prehistoric populations utilized different subsistence stategies and the number of people living in the Sagehen Flats area was subject to wide fluctuation. The locality achieved a maximum level of exploitation and population during the Sagehen and McPhee Phases of the Anasazi Tradition.

To better quantify this statement and to obtain figures for inter-locality comparisons, population and density estimates for the locality according to cultural period have been calculated; these estimates are summarized in Table 3.4.

Table 3.4. Prehistoric Population Estimates for the Sagehen Flats Locality.

Period	Time Span	Total Population	Density (Indiv./sq km)
Paleoindian Tradition	6000 BC	A few transitory groups (?)	?
Archaic Tradition			
Great Cut Phase	1000 BC-AD 500	15-50 (seasonal)	1.7-5.6
Anasazi Tradtion			
Sagehen Phase	AD 650-850	60-75	6.7-8.3
McPhee Phase	AD 850-975	110-150	12.2-16.7
Sundial Phase	AD 1050-1200	5-10	0.6-1.1
Shoshonean-Athabascan Tradition			
Beaver Point Phase	AD 1400-1800	A few transitory groups (?)	?

These figures have been obtained by estimating the number of households present in the locality contemporaneously (the momentary

population). Households, for this purpose, are considered to be the social unit of consumption (i.e., those individuals that cook and eat together, see Ciolek-Torrello and Reid [23]; Dozier [24]) and is often equivalent to the social unit responsible for reproduction, shelter, and subsistence, although subsistence may be the responsibility of a larger group (Flannery [15]). Households are assumed to be recognizable in the archaeological record by material distributions and architecture; these archaeological assemblages are termed household clusters (Winter [25:25]). Household clusters in early Anasazi sites are assumed to be manifest by a pithouse and ancillary features (Birkedal [26]) and later, by pueblo room suites and adjacent outdoor space (Rohn [27:31]). Thus household clusters in the Sagehen Flats Locality can be identified by site excavations, and tentative estimates for survey data can be made through extrapolation from the more intensive investigations.

The number of individuals present in a household is a second problem area. Birkedal [26] has made a strong case that Basketmaker III households consist of nuclear families of five to seven individuals; his argument is based on artifact assemblages and floor areas of Mesa Verde pithouses. Murdock [28:23], on the other hand, believes the term household frequently applies to groups larger than a nuclear family. Because of the thoroughness of Birkedal's argument and the apparent similarity of cultures in the Sagehen Flats Locality to those of Mesa Verde, his figures have been adopted for this study. One piece of evidence from excavation in the study area relating to this problem is the discovery of a secondary burial consisting of four individuals (three adults and a child) at Marsh View Hamlet. The burial may represent all individuals living as a family

The Great Cut Phase

Six sites assumed to be seasonal Archaic camps are present in the Sagehen Flats Locality; perhaps one or two others might be recorded during future survey operations. The problem with computing population estimates for this period is twofold: (1) material evidence for reconstructing household clusters is lacking and the social complement of such clusters is unknown; and (2) there is no present method for establishing momentary populations. The sites in question are lithic scatters averaging perhaps 1 ha in area. If the assumption is made that each camp was utilized seasonally by one to three households, then the maximum temporary population in the locality would be on the order of 100 individuals. This seems excessive considering the size of the locality and the available resources; a more realistic estimate based on a conservative approach (a momentary population of three households occupying two of the six camps) is 15-50 individuals. This, of necessity, is a very subjective analysis; it is hoped that the recovery of more data during future field operations will allow a more rigorous approach.

The Sagehen Phase

There is less difficulty in recognizing household clusters representing the Sagehen Phase. However, the problem of estimating momentary populations remains. Thirty-three small hamlets are identified in the locality during this period; the great majority (90 percent) are probably unit hamlets containing one household cluster, but perhaps three (10 percent) contain two or three household clusters. For the period as a whole, then, approximately 38 households were present in the area. However, this does not address momentary population levels. Based on

it appears that the average span of occupation at a Sagehen Phase hamlet was somewhat less than 50 years; therefore, only one-third to one-quarter of the hamlets were probably contemporaneous, an accurate estimate of the maximum momentary population is probably 55-70 individuals representing nine to 12 households. Assuming three additional hamlets will be identified when the remainder of the locality is archaeologically surveyed, the momentary population living in the locality during the Sagehen Phase probably averaged 60-75 individuals.

The McPhee Phase

Population estimates for this phase are probably more accurate than for the previous two examples. There is no difficulty in recognizing and estimating household clusters and as only two habitations have been recorded in the locality, momentary population is also not a problem (the large hamlet, Site 5MT2318, is assumed to be socially related and therefore comtemporaneous with McPhee Village). McPhee Village is estimated to contain 20-25 household clusters; however, probably a maximum of 15-20 clusters were occupied at one time (Plog [31]); Site 5MT2322 contains four or five household clusters or three or four coeval clusters. On this basis, the maximum momentary population for the McPhee Phase is 110-150 individuals representing 18-24 households. It is assumed that no additional McPhee habitations would be discovered by future survey operations in the locality.

The Sundial Phase

Only two hamlets representing the Sundial Phase have been identified in the locality. It is assumed they are contemporaneous and that no other habitations will be recorded during anticipated future surveys. The maximum momentary population is estimated at 12 individuals representing two households.

POPULATION DYNAMICS

Prehistoric population levels in the locality were low during the Archaic Tradition and began to rise with the beginning of the Sagehen Phase of the Anasazi Tradition (Figure 3.11); a population climax was reached during the McPhee Phase (perhaps AD 875-900). At this point in the program it is impossible to estimate the factors which may have contributed to this phenomenon. Possible relevant variables are continued immigration into the area and little migration to other areas, favorable climate, improved subsistence methods and cultigins resulting in larger harvests, and improved social mechanisms able to better cope with more and larger groups. A rapid decline and probably exodus from the locality as part of a sector-wide phenomenon took place soon after the beginning of the tenth century AD. By AD 1000, the locality was virtually deserted, but a small-scale and localized re-settlement effort is featured in the endsuing Sundial Phase. By AD 1200, this effort had failed and the locality received only seasonal visits until the advent of Euro-American settlement.

It is notable that at no time during the Anasazi Tradition did the population levels, apparently approach the potential annual maize harvest as calculated earlier (p. 15). Indeed, the maximum number of contemporaneous households in the locality (24 households during the McPhee Phase) is less than 15 percent of the carrying capacity of the locality using the figures for potential maize yields; this statistic is not expected to change significantly with the addition of future survey data. Such figures have bearing on the possible causes for the abandonment of the locality; it would necessitate a severe environmental

Figure 3.11: Prehistoric popuation dynamics in the Sagehen Flats Locality.

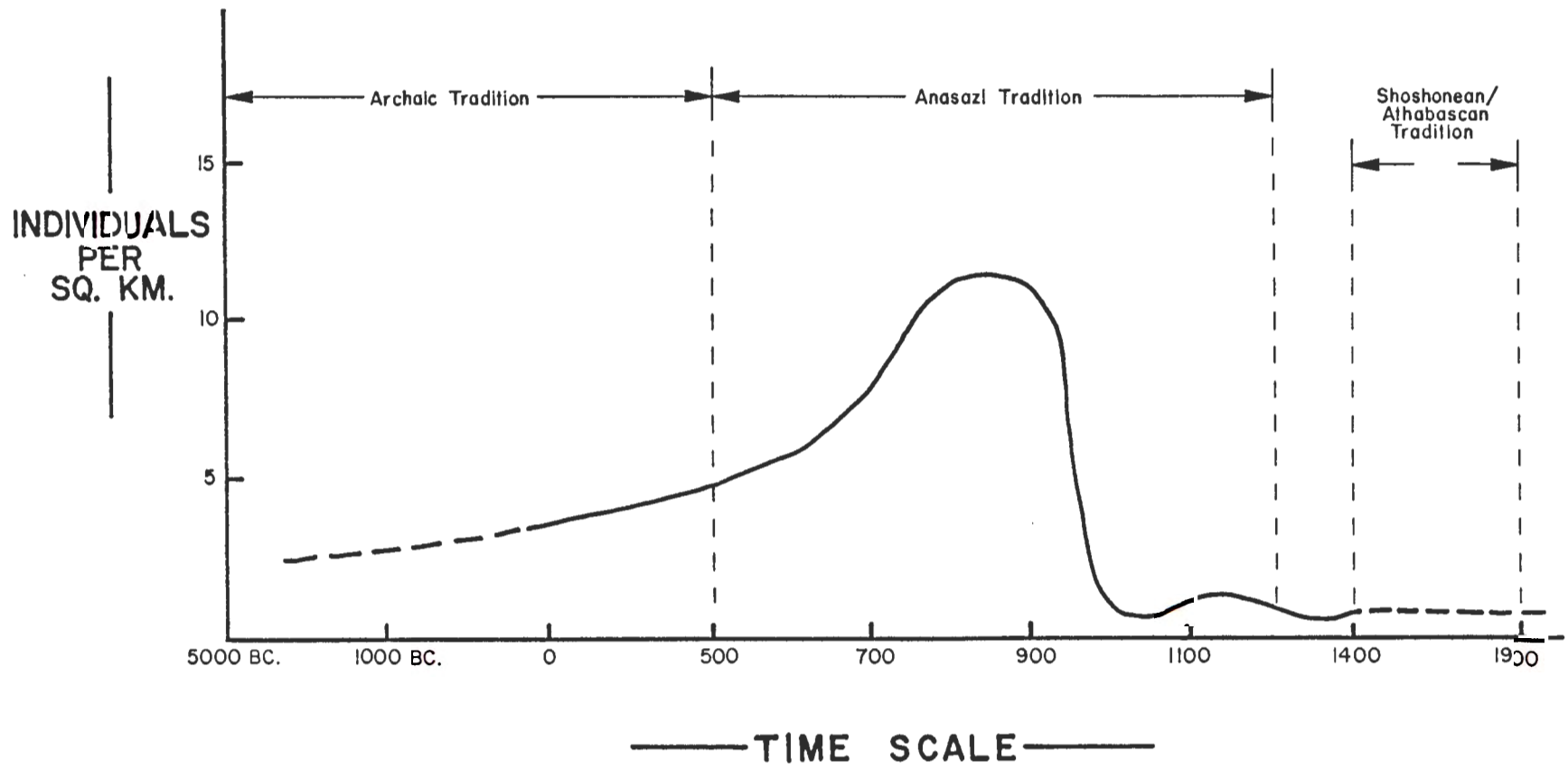
Archaic Tradition
Anasazi Tradition
Shoshonean/
Athabascan
Tradition
INDIVIDUALS
PER
SQ. KM.
15
10
5
5000 BC.
1000 BC.
0
500
700
900
1100
1400
1900
TIME SCALE

Figure 3.11.

change to reduce the potential maize yields to an extent whereby a carrying capacity overload would be a factor in the cultural collapse. A lowering of annual temperature resulting in a reduction in the length of the growing season has been mentioned in this respect. Social factors may have been a major force in the decline of the Anasazi culture in the locality and offer a promising avenue for future research in this light.

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