ST 801 SN 0080

DOLORES ARCHAEOLOGICAL PROGRAM TECHNICAL REPORTS

Report Number: DAP-080

Introduction to Field Investigations in the Grass Mesa Locality, 1978-1980

ANASAZI HERITAGE CENTER
LIBRARY

by

William D. Lipe

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

Under the supervision of
David A. Breternitz, Senior Principal Investigator

Final Submission

24 January 1984

TABLE OF CONTENTS

Page Number

LIST OF FIGURES ii

LIST OF TABLES. iii

ABSTRACT. iv

INTRODUCTION. 1

GRASS MESA LOCALITY ENVIRONMENT 7

THE SITE SAMPLE AND LEVELS OF INVESTIGATION 14

REFERENCES CITED. 41

LIST OF FIGURES

Page Number

Figure 1. The Grass Mesa Locality 3

LIST OF TABLES

Page Number

Table 1. Sites in the Grass Mesa Locality, based on DAP survey records as of 1983. 16

Table 2. Levels of investigation at sites in the Grass Mesa Locality, by functional site type and type of project impact. 20

Table 3. Comparison of site type and temporal assignments from Track 4 and Track 1 through 3 investigations. 30

Table 4. Distribution of levels of investigation among site types and time periods, primary impact areas, Grass Mesa Locality. 32

Table 5. Distribution of levels of investigation among site types and time periods, secondary impact areas, Grass Mesa Locality. 33

ABSTRACT

Archaeological investigations in the Grass Mesa Locality from 1978 through 1980 were conducted by Washington State University personnel under the auspices of the Dolores Archaeological Program. Investigations were carried out on four levels, or "tracks," that reflect the relative intensity of effort expended in the investigations. Track 4 work consisted of inventory survey; Track 3 work consisted of more thorough examination of the site surface, including systematic collection of surface artifacts; Track 2 work involved nonintensive subsurface examination; and Track 1 work consisted of intensive excavation. The distribution of effort was designed to provide a representative sample of the functional and temporal variability of prehistoric sites in the locality. An evaluation of the adequacy of the various levels of investigation suggests that Track 4 survey was successful in accurately estimating site population in the locality. Similarly, Track 1 through 3 efforts, in general, appear to have been adequate in terms of sampling the cultural variability of Grass Mesa Locality sites. However, it probably would have been desirable to perform more Track 2 work at sites classed as limited activity loci on the basis of survey results; at sites with small ceramic collections that could be assigned only to very general time periods; and at sites that had been considerably disturbed or at which modern ground surface was obscured by vegetation or postoccupational deposits.

INTRODUCTION

This report serves to introduce several studies that describe the investigation of sites in the Grass Mesa Locality in the years 1978 through 1980. Testing and intensive excavations were conducted by WSU (Washington State University) as part of the mitigation efforts of the DAP (Dolores Archaeological Program). This introductory report contains a brief description of the environment of the Grass Mesa Locality and a discussion of the extent to which the testing and excavation programs have adequately sampled the functional and temporal variety of sites in the locality.

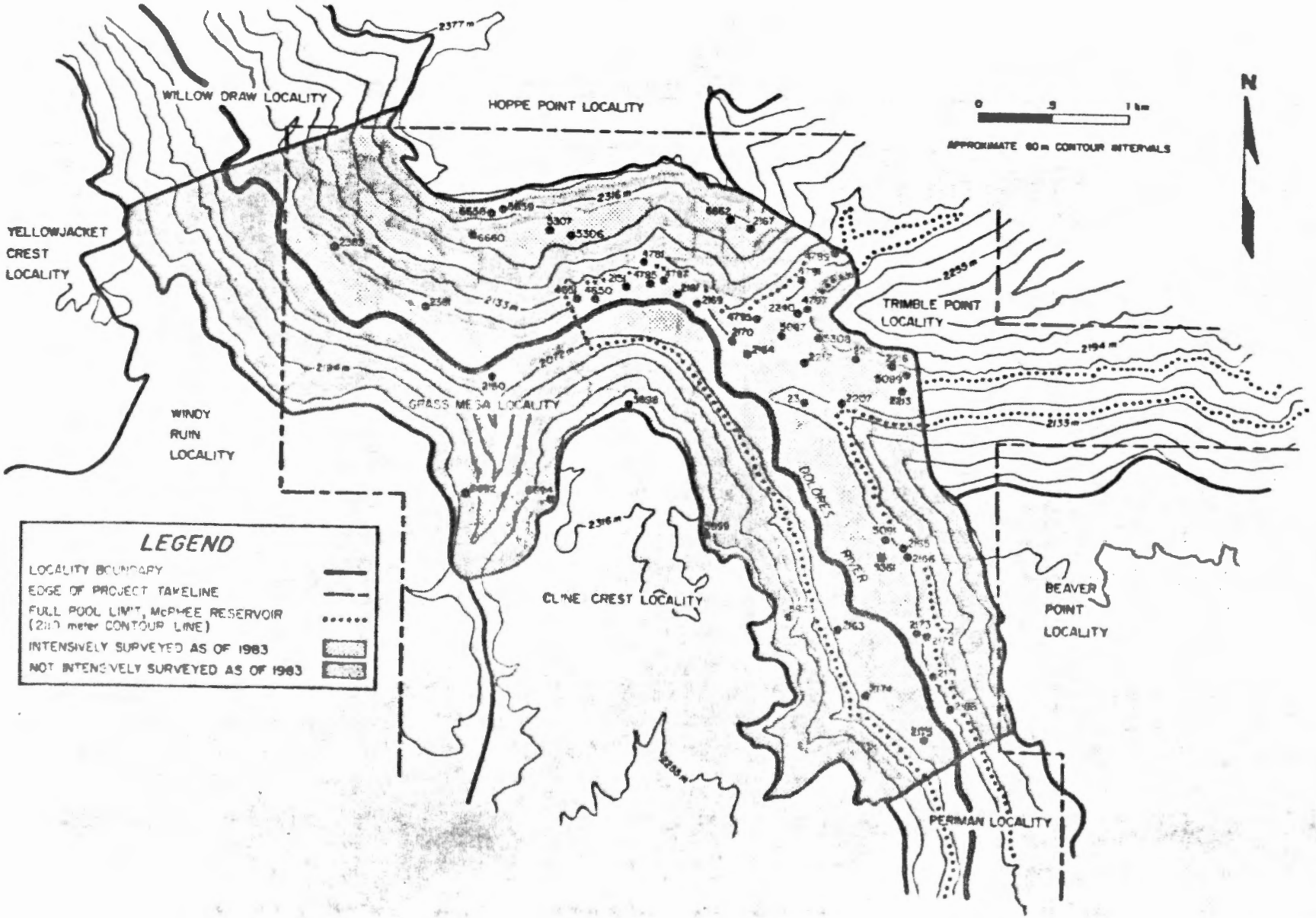
From 1978 through 1980, intensive excavations in Grass Mesa Locality focused on intensive work at three sites--LeMoc Shelter (5MT2151), Prince Hamlet (5MT2161), and Grass Mesa Village (5MT23). The first two sites are reported in full in the 1980 DAP report series (Hogan 1983; Sebastian 1983); because excavations at Grass Mesa Village continued past 1980, this site will be reported in detail at a later date. However, an introduction to Grass Mesa Village and a summary of inferences drawn from surface evidence is presented in Kohler (1983a), and excavations in Areas 3 and 4 of the site are reported in C. Breternitz (1982) and Ahlstrom and Dohm (1981), respectively. In addition, a report of less intensive studies at 18 other Grass Mesa Locality sites will be submitted (Gross 1983). Kohler's discussion of settlement patterning in the Grass Mesa Locality (Kohler 1983b) has been included in the 1980 series of survey reports, because it is based on survey data.

The Grass Mesa Locality was defined by Kane (1981a) in 1978 as part of his development and application of a hierarchical set of categories

describing social and spatial relationships among archaeological units. This set of categories is termed the DAP spatial systematics. In this scheme, a locality is a geographically well bounded area large enough to have served as the residential base of, or as a resource exploitation zone for, several closely related and presumably interacting Anasazi communities. Although locality boundaries were drawn primarily on the basis of geography, Kane used archaeological information available at the time to center several of his proposed localities on known clusters of Anasazi sites. According to DAP spatial systematics, groups of localities form sectors, which are larger geographic areas thought to have been occupied by culturally similar, but not necessarily socially integrated, groups. The Grass Mesa Locality forms part of the Escalante Sector, a group of localities whose occupants had access to the Dolores River valley in the stretch that extends approximately 32.2 km (20 mi) downstream from the present town of Dolores, Colorado.

The Grass Mesa Locality (fig. 1) conforms well to Kane's definition. Near its center lies a cluster of Anasazi settlements dominated by the Grass Mesa Village site, one of the largest prehistoric settlements known for the valley portion of the Escalante Sector. The Grass Mesa Locality is also well bounded geographically, at least on three sides. Its southeast boundary coincides with a slight constriction in the Dolores River canyon; upstream, in the Periman Locality, the canyon is shallower, more open, and has a broader flood plain, whereas downstream, in the Grass Mesa Locality, the canyon is much deeper and has a narrower floor. The rims of this deep canyon mark the "eastern" and "western" limits of the locality. However, at its northwestern, or downstream, end the Grass Mesa

Figure 1. The Grass Mesa Locality



Locality is separated arbitrarily from the Willow Draw Locality, which is also confined to the narrow, deep canyon of the Dolores River.

Whether the boundaries of the DAP localities correspond to any prehistoric cultural or social boundaries remains an open research question that is only now beginning to be addressed. Archaeological and environmental evidence gathered to date, however, suggest that the Grass Mesa Locality had a degree of cultural, social, and adaptive distinctiveness throughout most or all of the Anasazi occupation of the Escalante Sector. In any case, the localities have also functioned well as administrative subdivisions of the larger DAP study area; this is another reason for which they were established. For example, WSU has assumed responsibility for all excavations in the Grass Mesa Locality.

Prehistoric archaeological remains are being investigated by the DAP in the Grass Mesa Locality and other localities in order to mitigate the adverse effects on cultural resources in the Dolores Project area (D. Breternitz 1981; King 1981). This U.S. Bureau of Reclamation project includes a number of construction features such as the McPhee Dam and Reservoir and associated borrow areas (refer to King [1981] for a complete list of project features). Features of this sort have a direct, or primary, impact on cultural resources. The Bureau of Reclamation has also acquired a buffer zone around the proposed reservoir and damsite; this is bounded by the project "takeline" (fig. 1). Within the takeline are a number of areas where cultural resources will not suffer direct impacts from construction but will be subjected to secondary impacts. DAP surveys have covered the area within the takeline, but excavations have been

largely confined to sites that will receive direct impacts from construction or the filling of the reservoir.

In the Grass Mesa Locality, the project features having primary impacts on cultural resources are the McPhee Dam itself, McPhee Reservoir, borrow area B on the valley floor upstream from the dam, and public roads that will be widened in the course of dam construction. These features will not destroy all the cultural remains in the locality, but they will affect the configuration or total pattern of the remains, and hence will affect their ability to yield significant information about past cultures. For example, if the valley sites were destroyed without study, total reconstruction of the settlement system of the Dolores area would be severely hindered. Because of the systemic nature of culture, one aspect of mitigative data recovery is to extend findings from sites that have been studied to the larger area that encompasses the cultural system of which these sites were a manifestation. Consequently, in the Grass Mesa Locality, findings from sites excavated because they will be subjected to direct impacts must be generalized to the locality as a whole. Furthermore, because not every affected site can be excavated in its entirety, the results from excavated portions of sites must serve as samples representing the information that could potentially have been extracted from sites that will be lost. Also, since the Grass Mesa Locality represents only part of the area that is affected by the Dolores Project, findings from this locality must be used with evidence from other localities to characterize the past cultural system of the entire set of affected localities (Knudson et al. 1981). Finally, these findings must be generalized to the whole Escalante Sector, because the potential for

understanding cultural systems at this level is also affected by the loss of sites in the Dolores Project area.

In this report, and in the series of studies it introduces, the focus is on the locality. However, it is necessary for both the archaeologists who produce these reports and for those who read them to keep in mind the larger context to which the locality work contributes.

GRASS MESA LOCALITY ENVIRONMENT

Kohler (1983b) describes the Grass Mesa Locality environment in some detail, and Schlanger and Harden (1983) provide brief descriptions of the environments of adjacent upland localities. Authors of more general works on Dolores area environments also present information about the Grass Mesa Locality (e.g., Leonhardy and Clay 1982; Holliday and Piety 1981; Benz and Clay 1981; Shuster 1981, 1983; Petersen 1982, 1983; Darsie 1983). Consequently, the following characterization of the locality will be a brief summary.

The Grass Mesa Locality, which covers approximately 12.8 km^2, is the farthest downstream or most northern of the five localities (Dolores, Sagehen, House Creek, Periman, and Grass Mesa) that are the object of intensive investigation by the DAP. Of these localities, Grass Mesa is the one most dominated by a canyon environment. The northern rim near the damsite is approximately 350 m above the valley floor, and the opposite rim is only about 60 m lower. The width of the valley floor narrows to approximately 130 m just downstream from the damsite; its maximum breadth is about 450 m, near the upstream end of the locality (Kohler 1983b:5). Approximately 78 percent of the area in the Grass Mesa Locality consists of canyon wall, which has a general slope of about 40°. The flood plain occupies nearly 20 percent of the area, with the remaining 2 percent being terraces or other geological features (Kohler 1983b:12).

A reconstruction of the project area's vegetation prior to the effects of modern logging and agriculture (Petersen 1983) shows that the dominant vegetation in the Grass Mesa Locality was pinyon-juniper woodland, which covered approximately 55 percent of the area, principally

on the south- and west-facing valley walls. The west- and north-facing slopes primarily supported a thick cover of mountain brush, including scrub oak, mountain mahogany, and snowberry. According to the DAP potential vegetation map,[1] the riparian zone, which covers approximately 13 percent of the area (Kohler 1983b:15), contains some open areas, due to the scouring of floods and the formation of meadows and marshes in especially wet locations such as abandoned channels. For the most part, however, the potential riparian zone is dominated by cottonwood, boxelder, and willows. There is also a small patch of ponderosa-pine-oak woodland on the northwest-facing lower valley wall opposite the mouths of Beaver and Dry Creeks, and a stand of Douglas-fir on the north-facing wall of Beaver Creek canyon. As in other valley localities, stands of sagebrush are rare, comprising less than 2 percent of the vegetation of the Grass Mesa Locality, by area. This is in contrast to the upland localities, especially Sagehen Flats. The principal stand of sagebrush in the Grass Mesa Locality is on the Grass Mesa Village site, an erosional terrace at the juncture of Beaver Creek and the Dolores River. The site is covered with deep Granath loam (Kohler 1983b:15) and probably would have supported sagebrush as a climax vegetation even in the absence of the disturbance and organic matter introduced by the intensive prehistoric occupation.

Because of the abundance of forest resources, the inhabitants of the Grass Mesa Locality, relative to the occupants of more open areas such as the Sagehen Flats Locality, should have been well supplied with wood for construction and for fuel. However, the entire Escalante Sector probably

---

[1]Potential vegetation (Bye 1982) refers to the vegetation that would result if human influence were removed; the DAP potential vegetation map appears in Benz (1981a).

was better supplied with wood than were most other areas occupied by the Anasazi. Nevertheless, Kohler et al. (1981) present data and estimates indicating that during the time of maximum population of Grass Mesa Village, the inhabitants might have experienced some shortage of wood for fuel, and perhaps for construction. They cite archaeological evidence that suggests that some changes in wood use occurred through time at the Grass Mesa site, perhaps in response to depletion of nearby wood supplies.

Faunal resources available in the project area are summarized by Benz (1981b). The major food animals available in the Grass Mesa Locality, both year-round and seasonally, probably would have been the same as those in adjacent parts of the Dolores River valley: mule deer, American elk, bighorn, and waterfowl seasonally (Neusius and Phagan 1983); rabbits and other small mammals year-round. It seems likely, however, that jackrabbits would have been less plentiful in the Grass Mesa Locality than in upland areas having more open sagebrush flats.

There also may have been some differences between Grass Mesa Locality and some of the other localities in the frequencies with which certain of the larger game animals occurred, or in the distances at which they could be procured. It should be noted that when Grass Mesa Locality was occupied by the Anasazi, it was on the "edge of the settled world." Adjacent to it on the north and east were extensive uplands that evidently never supported year-round Anasazi settlements (Schlanger and Harden 1983), but that were fall through spring range for large game (Neusius and Phagan 1983). Furthermore, under current conditions, elk favor Beaver Creek canyon and areas of the Dolores River valley near the mouth of Beaver Creek as winter range; deer, on the other hand, are more likely to

winter in the Sagehen Flats Locality and in the lower Periman Locality.[2] Beaver Creek canyon would have provided a corridor leading up the high mountains east of the Escalante Sector; this corridor could have been used by Anasazi hunting parties as well as by game. Under these conditions, the opportunities for securing large game in or near the Grass Mesa Locality may have been greater than in localities to the south and southwest that were surrounded by other settled lands. Likewise, Grass Mesa settlements were somewhat more favorably situated for staging long-distance hunting forays than were those in areas to the south and west.

It is clear that the Grass Mesa Locality Anasazi, like other inhabitants of the Escalante sector, relied on agriculture as an essential part of their subsistence economy. What were the potentials for and constraints on agriculture in this locality?

The Dolores River flood plain, although well watered, may not have been very suitable for prehistoric maize farming, because it is severely affected by the nighttime pooling of cold air (Petersen 1982; Shuster 1981, 1983; Darsie 1983). The abundance of competing vegetation, including rhizomatous perennials (Shuster 1981, 1983), probably would have posed a problem for Anasazi farmers. Nonetheless, the results of the DAP experimental garden study (Shuster 1981, 1983; Bye and Shuster 1981; Shuster and Bye 1981) demonstrated that it was possible to grow cultigens analogous to prehistoric types on the flood plain, though production was less and problems were greater than in the experimental plot located in the uplands. Kohler (1983b) notes that approximately 30 ha of Cheyenne sandy loam, an agriculturally desirable soil type, overlie flood plain

---

[2]Sarah W. Neusius, DAP, personal communication.

gravels in the southern part of the Grass Mesa Locality. This might have been used during climatic regimes having warm, long summers, even though the greater abundance of competing vegetation and of insect and other animal pests might have made cultivation there more labor intensive than elsewhere.

The most generally favorable locations for farming in the Grass Mesa Locality may have been terraces, fans, and the gentler slopes formed on deep colluvium at the bases of valley walls. The single best plot of soil in the locality was probably that found on the Grass Mesa Village site, which is approximately 400 by 100 m, and which has a southern exposure. By the early A.D. 800's, however, settlement on this site was probably too dense to permit farming. The colluvial deposits at the base of the valley wall might have been usable for small linear plots, though not for "fields" in the modern agricultural sense. Many of the colluvial deposits are very rocky, but some are predominantly of fine-grained sediments. The latter, as well as the small patches of soil associated with terraces or fans, are often elevated enough above the valley floor to escape nighttime cold-air pooling. On the "right-hand" (facing downstream) side of the valley, many of these landforms have southern or southwestern exposures, which maximizes the warmth of their soils. Clearing such areas of their heavy growths of pinyon and juniper, with dense brushy understory, would have been onerous, but might not have required as much labor as clearing and maintaining fields on the flood plain, and the risk of frost damage would have been less.

Above the base of the slope, nearly all the valley wall is either too steep or has soil that is too thin and rocky to support effective farming. There are some exceptions, where localized benches have gentler slopes and

somewhat deeper sediments, but these are rare. Use of the adjacent uplands by valley residents is also possible, but seems unlikely. The best adjacent upland soils appear to have been in the Cline Crest and Windy Ruin Localities to the west; access to these, however, would have required crossing the Dolores River and climbing the steep canyon wall, because most Grass Mesa settlements are on the "right-hand" side of the valley. Furthermore, the population in the Cline Crest Locality (and probably in the adjacent Windy Ruin Locality) is estimated to have been high at approximately the same time that it was high in the Grass Mesa Locality (Schlanger and Harden 1983; Schlanger 1982). The Hoppe and Trimble Point uplands north and east of the Grass Mesa Locality appear to be too high in elevation to have been effectively cultivated, but the southern part of the Beaver Point Locality, to the southeast of the Grass Mesa Locality, was probably suitable. Beaver Point is at approximately the same elevation as Cline Crest, but apparently had a lower settlement density (Schlanger and Harden 1983). The fact that ponderosa-pine-oak woodland extends into the eastern edge of the Beaver Point area suggests that its proximity to the mountains may result in an effectively cooler climate than occurs on Cline Crest at similar elevations.

In general, the area of cultivable soils, even under favorable climatic conditions, was probably proportionately less in the Grass Mesa Locality than in the Sagehen Flats, Periman, or Dolores Localities. Although the Cline Crest and Windy Ruin uplands to the west have generally thin and rocky soils, their favorable southwestern exposures and freedom from cold air drainage probably also gave them a relatively higher proportion of cultivable land under most climatic conditions. Schlanger and Harden (1983) estimate that 11 percent of the Cline Crest Locality

today has soils suitable for cultivation; this certainly appears to be a greater proportion than is present in the Grass Mesa Locality, especially if it is assumed that the flood plain was largely unusable because of cold air drainage. Of course, the total amount of arable land in a locality would not have been critical to prehistoric farmers if their numbers were small relative to land area. On the other hand, given the topographic heterogeneity of the Dolores area and the generally mediocre-to-poor quality of even the better soils (as compared, for example, to the Midwestern corn belt), garden plot choice would have been important. Within any particular soil type, variation in actual arability undoubtedly would have been high. Consequently, if the ratio of potentially arable land to population was high, the individual farmer would have had greater freedom to maximize selection for soil depth, soil warmth, and gentle slopes; he might also have had greater freedom to select several plots having differing characteristics so as to "hedge his bets" against drought, early frost, or other hazards.

Darsie's (1983) model of agricultural potential in the central part of the Escalante Sector shows the Grass Mesa area generally to have a lower percentage of cultivable area than do the localities to the south, under the favorable climatic conditions that existed from A.D. 600 to 800. In the A.D. 880-950 period, when conditions were generally poorer for agriculture throughout his study area, his model shows that cultivable land in the Grass Mesa and Periman Localities essentially disappeared; in fact, the patches of suitable land probably got smaller, and many became unsuitable. Upland localities, such as Sagehen Flats and Cline Crest, retained substantially more agricultural potential, although they also experienced a reduction in land suitable for farming.

THE SITE SAMPLE AND LEVELS OF INVESTIGATION

Although inventory survey is in itself an important source of information, particularly on prehistoric settlement patterns and demography (e.g., Kohler 1983b; Schlanger 1982), many aspects of the DAP research design (Knudson et al. 1981) require more intensive investigation. Four levels, or "tracks," are used to catagorize the relative degree of intensiveness of investigation (Knudson et al. 1981). Track 4, the least intensive level, includes inventory survey, although it admits variation in the amount of effort involved. For example, magnetometer mapping in the absence of any subsurface testing is considered a Track 4 investigation. Track 3 refers to a more intensive level of surficial examination, generally involving more precise mapping of site area and features than would be characteristic of a Track 4 investigation. Track 3 work also usually involves systematic collection of surface artifacts, using methods that result in assemblages suitable for quantitative comparison (e.g., collection of all specimens from the site, or collection from a systematic, random, or stratified random sample of grid units). Track 2 refers to a less-than-intensive subsurface examination of a site and implies completion of Track 4 and 3 levels of work. This type of investigation may include blading of the site surface, with mapping of features and excavation of selected examples; excavation of judgmentally selected test pits or trenches; and excavation of probabilistically selected samples of test pits. Track 1 is the most intensive and thorough level of subsurface investigation. It may range from complete excavation of small sites to thorough study of a sample of

recurrent cultural units (e.g., household clusters, Pueblo roomblocks) at large sites.

In the Grass Mesa Locality, 50 prehistoric sites (table 1) have been discovered by survey, as of 1983 (the last surveys in this area were actually undertaken in 1981). Of these, 36 are in areas directly affected by Dolores Project features (in this case, McPhee Dam, McPhee Reservoir, borrow area B, and Lone Dome Road). The remaining 14 sites were discovered during surveys to locate sites between the primary construction features and the takeline. One of these sites, 5MT5898, was actually located in an area that will be affected by ground disturbance associated with improvement of wildlife habitat. Because the site itself will not be affected by this activity, however, it was classed with the other 13 sites that are in secondary impact portions of the project area.

Of the 50 sites known in the Grass Mesa Locality, 21, or 42 percent, have been subjected to some type of data recovery beyond the Track 4 level. All but one of these are in primary impact zones; the remaining site is in a secondary impact area and was subjected only to Track 3 work. Thus, approximateerived from survey assessments. The most intensive work--Tr 1 and 2--has been conducted at 5 of the 10 habitation sites known for the locality (9 of them in direct impact zones); at 3 of 11 seasonal loci (9 of the 11 being in direct impact areas); and at only 1 of the 29 limited activity and "other" sites (18 of which are located in primary impact areas).

Table 1. Sites in the Grass Mesa Locality, based on DAP survey records as of 1983

Site No.	Site name	Project feature	Site description	Ceramic date estimate* (A.D.)	Site type†	Investigations through 1980§
5MT23	Grass Mesa Village	McPhee Reservoir	Habitation - wall rubble		Habitation	Track 1, 1979, 1980; 63 crew-weeks
5MT2151	LeMoc Shelter	McPhee Reservoir	Rockshelter - structures		Habitation	Track 1, 1978, 1979; 15 crew-weeks
5MT2160		McPhee Reservoir	Artifact scatter - sherds and lithics		Limited activity	Track 3, 1979; 0.2 crew-weeks
5MT2161	Prince Hamlet	McPhee Reservoir	Habitation - wall rubble	825-910	Habitation	Track 1, 1979, 1980; 10 crew-weeks
5MT2163		Borrow area B	Artifact scatter - lithics		Limited activity	Track 4
5MT2164		McPhee Reservoir	Artifact scatter - sherds and lithics	825-910	Limited activity	Track 4
5MT2165		McPhee Reservoir	Artifact scatter - sherds and lithics	725-825	Seasonal	Track 3, 1980; 0.1 crew-weeks
5MT2166		McPhee Reservoir	Artifact scatter - sherds and lithics	600-725	Habitation	Track 3, 1980; 0.1 crew-weeks
5MT2167		Takeline	Artifact scatter - sherds and lithics; features	825-950; 910-1150	Limited activity	Track 4
5MT2169		McPhee Reservoir	Artifact scatter - sherds and lithics	725-925	Limited activity	Track 3, 1979; 0.5 crew-weeks
5MT2170		McPhee Reservoir	Artifact scatter - sherds and lithics	725-825	Habitation	Track 3, 1980; 0.1 crew-weeks
5MT2171		Borrow area B	Artifact scatter - lithics (1 sherd)	600-800	Limited activity	Track 4
5MT2172		McPhee Reservoir	Artifact scatter - lithics		Limited activity	Track 4
5MT2173		Borrow area B	Artifact scatter - lithics		Limited activity	Track 3, 1980; 0.1 crew-weeks
5MT2174	Dos Cuartos House	Borrow area B	Artifact scatter - sherds and lithics	825-910	Seasonal	Track 2, 1980; 0.3 crew-weeks
5MT2175		Borrow area B	Artifact scatter - lithics		Limited activity	Track 3, 1980; 0.1 crew-weeks

Table 1. Sites in the Grass Mesa Locality, based on DAP survey records as of 1983--Continued

Site No.	Site name	Project feature	Site description	Ceramic date estimate* (A.D.)	Site type†	Investigations through 1980
5MT2188		McPhee Reservoir	Rockshelter - sherds and lithics; no structures	910-1300	Seasonal	Track 4
5MT2207		McPhee Reservoir	Hand-and-toe holds		Not assigned	Track 4
5MT2211		McPhee Reservoir	Rockshelter - structures	800-910	Seasonal	Track 3, 1980; 0.1 crew-weeks
5MT2212		McPhee Reservoir	Artifact scatter - sherds and lithics	600-825; 910-1300	Limited activity	Track 3, 1980; 0.1 crew-weeks
5MT2213		McPhee Reservoir	Artifact scatter - sherds and lithics	725-825; 910-1300	Limited activity	Track 3, 1980; 0.1 crew-weeks
5MT2216		McPhee Reservoir	Rockshelter - structures	600-950 910-1300	Habitation	Track 3, 1980; 0.1 crew-weeks
5MT2240		McPhee Reservoir	Hand-and-toe holds		Not assigned	Track 4
5MT2381		Takeline	Rockshelter - sherds and lithics; no structures	600-900	Limited activity**	Track 3, 1980; 0.1 crew-weeks
5MT2383		Lone Dome Road	Rockshelter - sherds and lithics; no structures		Limited activity**	Track 4
5MT4650	Hanging Rock Hamlet	McPhee Dam	Habitation - wall rubble	825-910	Habitation	Track 2, 1979, 1980; 5 crew-weeks
5MT4651	Calmate Shelter	McPhee Dam	Rockshelter - structures	600-825	Habitation	Track 2, 1979; 0.3 crew-weeks
5MT4781		McPhee Reservoir	Artifact scatter - lithics		Limited activity	Track 4
5MT4785		McPhee Reservoir	Rockshelter - lithics; no structures		Limited activity	Track 4
5MT4787		McPhee Reservoir	Artifact scatter - sherds and lithics	725-825	Habitation	Track 4
5MT4789	Quasimodo Cave	McPhee Reservoir	Rockshelter - structures; lithics		Seasonal	Track 2, 1980; 0.6 crew-weeks

Table 1. Sites in the Grass Mesa Locality, based on DAP survey records as of 1983--Continued

Site No.	Site name	Project feature	Site description	Ceramic date estimate* (A.D.)	Site type†	Investigations through 1980
5MT4791		McPhee Reservoir	Artifact scatter - lithics		Limited activity	Track 4
5MT4795		McPhee Reservoir	Artifact scatter - lithics		Limited activity	Track 4
5MT4797	Cougar Springs Cave	McPhee Reservoir	Rockshelter - structures; lithics		Seasonal	Track 2, 1980; 1.2 crew-weeks
5MT5087		McPhee Reservoir	Artifact scatter - sherds and lithics	775-860	Seasonal	Track 4
5MT5089		McPhee Reservoir	Rockshelter - lithics; no structures		Seasonal	Track 4
5MT5091		McPhee Reservoir	Artifact scatter - sherds and lithics	750-825	Seasonal	Track 4
5MT5306		Takeline	Artifact scatter - lithics		Limited activity	Track 4
5MT5307		Takeline	Habitation - wall rubble	600-950	Seasonal**	Track 4
5MT5308		Takeline	Artifact scatter - sherds and lithics	600-900	Limited activity	Track 4
5MT5361	DTA Site	Borrow area B	Buried cultural horizon - sherds and lithics**	(Archaic) 600-900	Limited activity	Track 2, 1980; 0.5 crew-weeks
5MT5898		Wildlife land	Nonhabitation - rubble (cairn)		Limited activity**	Track 4
5MT5899		Takeline	Artifact scatter - lithics		Limited activity	Track 4
5MT5923		Takeline	Habitation - wall rubble	725-825	Habitation	Track 4
5MT6658		Takeline	Artifact scatter - lithics		Limited activity	Track 4
5MT6659		Takeline	Artifact scatter - lithics		Limited activity	Track 4

Table 1. Sites in the Grass Mesa Locality, based on DAP survey records as of 1983--Continued

Site No.	Site name	Project feature	Site description	Ceramic date estimate* (A.D.)	Site type†	Investigations through 1980
5MT6660		Takeline	Artifact scatter - sherds and lithics	600-950	Limited activity	Track 4
5MT6662		Takeline	Artifact scatter - lithics		Limited activity	Track 4
5MT6692		Takeline	Artifact scatter - sherds and lithics	600-950	Limited activity	Track 4
5MT6694		Takeline	Rockshelter - structures		Seasonal?/limited activity?	Track 4

* Date estimates based on ceramics from survey collections only; they do not take into account collections made during later Track 1 through 3 investigations.
† Assigned by Survey Group personnel in 1982 on a judgmental but systematic basis, after reevaluating all survey records. Does not take into account any information obtained in Track 1 through 3 investigations.
§ All work equated to standard 10-person crew-weeks.
** Category not assigned by Survey Group; assignment made by W. D. Lipe.

Table 2. Levels of investigation at sites in the Grass Mesa Locality, by functional site type and type of project impact

Project impact	Primary				Secondary			
Site type*	Habitation	Seasonal	Limited activity	Other	Habitation	Seasonal	Limited activity	Total
Level of investigation								
Track 1	3	0	0	0	0	0	0	3
Track 2	2	3	1	0	0	0	0	6
Track 3	3	2	6	0	0	0	1	12
Track 4	1	4	9	2	1	2	10	29
Total	9	9	16	2	1	2	11	50

* The site type assessments used in this table are those made only on the basis of information obtained by survey (Track 4) investigations. In a few cases, more intensive investigations resulted in a change in site type assignment (see table 3).

The remainder of this section of the report will be devoted to discussing the basis for assigning specific levels of data recovery work to specific sites within general temporal and functional classes of sites, and also to assessing this distribution of work effort against the overall DAP goal of adequate mitigative data recovery. Before proceeding to address these questions for the Grass Mesa Locality proper, however, some basic DAP concepts regarding adequacy of mitigation will be reviewed. This discussion is based on the DAP mitigation design (Knudson et al. 1981); the reader is referred to this document for a full discussion of the approach.

On a project such as the DAP, only a sample of the directly affected cultural resources can be studied intensively (King 1981; Knudson et al. 1981); therefore, the distribution of those intensive studies among the cultural resources has a most important bearing on the success of the mitigation effort. The main conceptual scheme employed by the DAP to guide these choices is the mitigation design (Knudson et al. 1981). One part of this document is a research design, which provides a framework for determining the information needed to mitigate the effects of cultural resource loss on prehistoric cultural systems--in this case, those of the Escalante Sector. The second is an implementation design, which governs the distribution of work among the resources actually affected. A key concept in the latter is the temporal-functional matrix, in which prehistoric sites known from inventory survey are classed by functional site type (Kane 1981a) and by phase or subphase (Kane 1981a, 1981b). Creation of such a matrix assists in selection of sites for Track 1 through 3 studies. The objective is to obtain data sets relevant to research design questions from a sample of sites that adequately

represents temporal and functional variability among sites in the area affected by the Dolores Project.

At the DAP, site selection and allocation of Track 1 through 3 effort has been carried out judgmentally, with the research and implementation designs as guides. Although an attempt has been made to obtain coverage of the various site-type/temporal-unit cells in the matrix, allocation of effort has not been proportional to the number of sites in each cell. Several factors have led to an emphasis on habitation sites, at least for the Anasazi portion of the record. First, a number of research design questions revolve around social organization at the household through community levels. Because this kind of information ordinarily can be obtained only through excavation of habitation sites, most of the Track 1 and 2 effort has been devoted to this type of site. Second, sites vary in size and complexity, more or less in direct proportion to the numbers of people who used the site and the amount of time they spent there. Consequently, habitation sites generally contain more features and artifacts, and more heterogeneous distributions of both, than do seasonal or limited activity loci. (Refer to Knudson et al. [1981] for an attempt to quantify this kind of variation in site size.) In any case, the concentration of a major part of the Anasazi archaeological record in habitation sites has also resulted in the allocation to habitation sites of a large share of the time spent in intensive data recovery.

The DAP data recovery effort is focused primarily on the five localities most directly affected by the construction of the McPhee Dam and Reservoir. Selection of a sample of sites for intensive study has been accomplished for this set of localities considered as a whole, rather than for each locality considered individually. Nonetheless, the

research design requires that intercommunity and geographic variability be studied as one important source of information about the operation of and change in the cultural systems that occupied the Escalante Sector. Consequently, a discussion of survey coverage, site selection for Track 1 through 3 work, and adequacy of mitigative data recovery to date are in order for the Grass Mesa Locality, keeping in mind that it is part of a larger study unit and will be only part of the burden of responding to the DAP mitigation design.

Figure 1 shows the portions of the Grass Mesa Locality that have been sampled and intensively surveyed, and table 1 provides basic information on survey results. Although most of the Grass Mesa Locality is within the Dolores Project takeline, only about 48 percent of the locality by area has been surveyed. The majority of survey effort has been focused on the valley floor and lower portion of the valley wall; the middle and upper portions of the steep valley sides have only been sampled by randomly located quadrats, by judgmentally chosen units, and by upward extensions of the full pool survey and downward extensions of the takeline survey that concentrated on the uplands. The valley wall sampling appears to have been adequate to characterize the population of sites associated with this landform. These sites appear to be predominantly limited activity loci (see tables 1 and 2), with a low percentage of habitation sites and seasonal loci. Because the portions of the valley wall that were sampled rather than being completely surveyed are outside the primary impact features of the Dolores Project, mitigative data recovery beyond the basic Track 4 inventory level would not generally be funded. The survey, or Track 4, studies of these valley wall sites, however, did include surface collections and the completion of fairly detailed site maps. Consequently,

usable data that can contribute to addressing research design questions is available from these sites. Furthermore, data from these sites appear to be adequate to permit extension to them of generalizations drawn from more intensive studies of similar sites located in the direct impact areas.

The survey of the valley floor and lower portions of the valley walls approaches complete coverage, at least within the portion of the locality that will be inundated by the reservoir pool. The section of the valley downstream from the dam site, however, was surveyed during a reconnaissance undertaken in 1973 (Toll 1974); this survey did not constitute a systematic inventory. In addition, University of Colorado survey crews have checked the toe of the north valley wall in this area, in conjunction with assessing effects of the widening of the public road in this area by the Dolores Project (Goulding and Walkenhorst 1982). Because the lower slopes of the valley wall were not systematically checked during these surveys, the sites in this portion of the valley may be underrepresented. The results of survey in the full pool area in the Grass Mesa Locality and elsewhere demonstrate that most habitation sites are located on terraces, fans, or benches at the base of the valley wall or in the lower part of its slope. Seasonal and limited activity loci are also common in this zone. As is the case with the survey of the middle and upper portions of the valley walls, that of the valley floor and lower slopes appears adequate to represent the population of sites found in this physiographic zone within the Grass Mesa Locality. The focus of this portion of the survey, of course, was on the direct impact zones (i.e., McPhee Dam, McPhee Reservoir, borrow area B, and Lone Dome Road project features in table 1); it is from these zones that sites must be selected for intensive mitigative study.

Ideally, when selecting sites for Track 1 through 3 work, the Track 4 inventory or sampling surveys would be completed, so that the population of sites in the primary impact areas would be known. It would also be desirable to have at least sample surveys, if not actual inventories, for the secondary impact areas (in this case, the land between the takeline and the primary impact areas) and also for as much of the culturally determined target study area (in this case, the locality and the sector) as is feasible. As previously noted, this latter requirement exists because the adverse effects of a development project generally apply to cultural systems that extend outside the primary impact areas, yet mitigative data recovery is usually limited to the primary areas proper. It follows that selection of sites for mitigative data recovery should be undertaken with as full knowledge as possible of the cultural universe (cf. Knudson et al. 1981) to which data recovery results will need to be extended.

In the Grass Mesa Locality, the only survey data available at the start of the DAP mitigation studies in 1978 were the results of the reconnaissances performed in 1972 (Breternitz and Martin 1973) and 1973 (Toll 1974). Consequently, the reconnaissance surveys were expanded to include inventory-level coverage at the same time that the mitigation phase of the project was begun. In the Grass Mesa Locality, as elsewhere, selection of the first sites for excavation or testing was based on the earlier reconnaissances. Fortunately, for reconnaissance-level work, the 1972 and 1973 surveys were quite thorough; 25 of the 50 sites now known from the locality were recorded by these early surveys; furthermore, these 25 sites included 22 of the 36 sites now known in the primary impact areas.

The only Grass Mesa Locality site excavated during the 1978 field season was LeMoc Shelter (5MT2151). This site was selected not only because it appeared to be a Pueblo I period habitation, but because its location in a large rockshelter and the depth of its deposits suggested that it might have yielded Basketmaker II or Archaic remains in its lower levels. In 1979, excavation at LeMoc Shelter was completed and work began on Grass Mesa Village (5MT23). Also during this season, Track 1 testing was conducted at Prince Hamlet (5MT2161), a large hamlet that appeared to be of the McPhee Phase. Track 2 testing was undertaken at Hanging Rock Hamlet (5MT4650) and at Calmate Shelter (5MT4651), a site near LeMoc Shelter that appeared to have been a small, Sagehen Phase hamlet. In addition, Track 3 intensive surface collection was carried out at Sites 5MT2160 and 5MT2169, in order to better define these sites and to determine their site type and approximate temporal assignment. Thus, the 1979 work resulted in the building of a sample of intensively investigated sites that was representative of variation in the locality. Selections made in that year also took into account the new survey data that was available (although the sites in the "2000" series of numbers were recorded in the early 1970's, Sites 5MT4650 and 5MT4651 were brought into the record by the DAP inventory survey that started with the program in 1978.)

In 1980, Track 1 investigations at Grass Mesa Village and at Prince Hamlet continued. Results of additional Track 2 work at Hanging Rock Hamlet during this field season indicated that this site was also a large hamlet of the late Sagehen or early McPhee Phase, and work here was expanded to include the excavation of a probablistic sample of test pits. Toward the end of the 1980 field season, with the completion of the inventory-level survey of primary impact zones in the locality, a Track 2

and 3 testing program was instituted in order to increase a sample that would represent the temporal and functional variability among the cultural resources in the locality. Tested at the Track 2 level were Dos Cuartos House (5MT2174), a probable field house of the late Sagehen Phase; Quasimodo Cave (5MT4789), a shelter that had been thought to have a possible preceramic component but that proved to be a Sundial Phase limited activity site; and Cougar Springs Cave (5MT4797), a shelter, with meager surface evidence, that proved to contain substantial evidence of a late Archaic, or more probably, Basketmaker II, seasonal occupation. Also included in the Track 2 work in 1980 was a buried site discovered by construction crews and labeled the DTA Site (5MT5361). These buried deposits were investigated by WSU archaeologists and proved to be redeposited materials of possibly Archaic but more probably Anasazi origin. A Track 3 effort was also mounted, to obtain better surface assemblage collections and site feature descriptions from a number of sites that could not be placed with much confidence in the DAP site typology and phase scheme. Sites investigated as part of this program were 5MT2165, 5MT2166, 5MT2170, 5MT2173, 5MT2175, 5MT2211, 5MT2212, 5MT2213, 5MT2216, and 5MT2381. This work met its goals with moderate success.

By the end of the 1980 field season, work at 21 sites in the Grass Mesa Locality had been taken beyond the basic Track 4 survey level of data recovery, and approximately 98 crew-weeks (calculated on the basis of standard 10-person crews) had been spent to accomplish these Track 1 through 3 investigations. Approximately 90 percent of this effort had been in Track 1 work at 3 habitation sites, approximately 8 percent had been devoted to Track 2 sampling at 6 sites, and the remaining 2 percent had been allocated to Track 3 surficial investigations at 12 sites

(table 1). These investigations reflected an attempt to distribute the data recovery effort in such a way as to sample the cultural variability present in the Grass Mesa Locality through time. In 1980, it was anticipated that, although a major effort would be required to complete work at the huge Grass Mesa Village site, funds would be available for some additional sampling at the Track 2 and 3 levels.

In 1981, however, the decision was made by the Bureau of Reclamation that adequate mitigation could be achieved with less fieldwork than had been anticipated. In consultation with the senior principal investigator and other members of the DAP Senior Staff, the WSU co-principal investigators, William Lipe and Timothy Kohler, decided that the highest priority for work in the Grass Mesa Locality was to complete work at Grass Mesa Village, and to cut back on other projected investigations. No field work was undertaken in the locality in 1981; in 1982, approximately 24 crew-weeks of excavation were carried out at Grass Mesa Village, while 0.6 crew-weeks were spent in completing excavation at Cougar Springs Cave. Investigations in the locality are expected to conclude in the summer of 1983, with approximately 8 crew-weeks at Grass Mesa Village.

Apart from the 1982 and 1983 work at Grass Mesa Village and the 1982 work at Cougar Springs Cave, the investigation of cultural variability through time in the Grass Mesa Locality will rest on the adequacy of work conducted from 1978 through 1980. It is recognized, of course, that excavation at a site of a given type and phase does not ensure that a data set adequate for use in planned comparative and synthetic studies will be recoverable or will in fact be recovered. However, there is at least a fair chance of obtaining such data if the work is done, but no chance if it is not. It is also recognized that adequacy of mitigation will

ultimately be judged for the project area as a whole and not for each locality considered independently. Nevertheless, because of the need to consider geographic and intercommunity variability in the overall mitigation effort, it is necessary to attempt a preliminary evaluation of the adequacy of at least the data sampling effort in the Grass Mesa Locality, as of the end of the 1980 field season. In other words, has the work effort been distributed so as to secure data representative of the functional and temporal variability of prehistoric settlements in the locality?

The adequacy of survey coverage of the locality--that is, the extent to which the numbers and locations of prehistoric sites in the locality are known--has already been discussed and found to be generally acceptable. By distributing this set of sites in a temporal-functional matrix (Knudson et al. 1981) and by identifying the level of investigation at the various sites, the adequacy of the distribution of work among the various cells can be evaluated.

Before doing this, however, the level of agreement between functional and temporal assignments made on the basis of Track 4 survey data, as opposed to those made on the basis of more intensive study, must be assessed. Obviously, if sites classed on the basis of survey results as Sagehen Phase limited activity loci consistently are found to be McPhee Phase villages when subjected to more intensive study, the initial assessment of variablilty was in error, and the temporal-functional matrix will be useful only if all the sites in it are subjected to study more intensive than the Track 4 level. Site type and temporal assignments made on the basis of Track 4 survey evidence alone (as in table 1) are compared in table 3 with the same assignments made on the basis of the fuller

Table 3. Comparison of site type and temporal assignments from Track 4 and Track 1 through 3 investigations

Site No.	Site type		Temporal assignment (A.D.)	
	Track 4	Tracks 1-3	Track 4	Tracks 1-3
5MT23	Habitation	Habitation	No collection	725-910
5MT2151	Habitation	Habitation; seasonal	No collection	725-1050
5MT2160	Limited activity	Seasonal	No collection	700-910
5MT2161	Habitation	Habitation	825-910	725-875
5MT2165	Seasonal	Seasonal	725-825	775-825
5MT2166	Habitation	Habitation	600-725	775-825
5MT2169	Limited activity	Seasonal	725-925	725-825
5MT2170	Habitation	Habitation (?)	725-825	600-950
5MT2173	Limited activity	Limited activity	Aceramic	Aceramic
5MT2174	Seasonal	Seasonal	825-910	725-825
5MT2175	Limited activity	Seasonal	Aceramic	Aceramic
5MT2211	Seasonal	Habitation	800-910	725-910
5MT2212	Limited activity	Limited activity	600-825; 910-1300	600-825; 900-1300
5MT2213	Limited activity	Limited activity	725-825; 910-1300	600-825
5MT2216	Habitation	Seasonal (?)	600-950; 910-1300	910-1300
5MT2381	Limited activity	Seasonal (?)	600-900	725-825; 910-1300
5MT4650	Habitation	Habitation	825-910	840-910
5MT4651	Habitation	Habitation and seasonal	600-825	725-825; 1050-1200
5MT4789	Seasonal	Limited activity	Aceramic	910-1050
5MT4797	Seasonal	Seasonal	Aceramic	BMII*
5MT5361	Limited activity	Other	Archaic; 600-900	Archaic? 600-825

* BMII - Basketmaker II.

knowledge provided by Track 1 through 3 investigations. In 13 of the 21 cases, the survey assignment to site type is supported by the evidence from more intensive work. Most of the disagreements pertain to whether a site should be classed as seasonal or limited activity rather than whether it should be classed as habitation or limited activity. Keeping in mind that the 16 sites with numbers in the 2000's or below represent reconnaissance-level survey in which either no surface collections or only grab sample collections were made, the agreement appears to be generally good.

Agreement between temporal assignments is somewhat more difficult to assess, but it also appears to be fairly good. Only one of the four sites considered aceramic on the basis of survey was found to yield sherds when it was tested. For ceramic sites, most of the differences stemmed from narrowing of date ranges based on the larger collections that resulted from pooling the samples derived from survey and from the later, more intensive work. This was a desirable difference, because one of the goals of the Track 2 and 3 testing was to refine the dating of the sites examined. Unfortunately, the Track 3 approach did not always result in narrowing of the date range assigned a site, particularly if the site was in an area of heavy vegetative cover (Kohler 1983b) or was a rockshelter (Gross 1983) where overburden from postoccupational spalling and decomposition of the shelter roof had occurred.

In general, however, the agreement between survey and Track 1 through 3 temporal-functional assignments appears to be fairly good. Although greater confidence can be placed in assignments based on the more intensive levels of work, comparisons can still reasonably be made between these sites and ones known only from survey. Tables 4 and 5 are

Table 4. Distribution of levels of investigation among site types and time periods, primary impact areas, Grass Mesa Locality

Site type*	Level of investigation	Temporal assignment†									
		Aceramic indet	Archaic/ BM II	Sagehen Phase			McPhee Phase		Sundial Phase	Indet Anasazi	Total§
				Tres Bobos	Sagehill	Dos Casas	Periman	Grass Mesa			
Habitation	Track 1					0023 2151 2161		**			3
	Track 2					4651	4650				2
	Track 3					2170 2211 2166		††			3
	Track 4					4787					1
Seasonal	Track 1							2151			1
	Track 2		4797			2174			4651		3
	Track 3	2175				2160 2165 2169			2216		5
	Track 4	5089				5087 5091			2188		4
Limited Activity	Track 2								4789		1
	Track 3	2173			2212 2213						3
	Track 4	2163 2172 2383 4781 4785 4791 4795			2171		2164				9
Other	Track 2				5361						1
	Track 4									2207 2240	2
Total components per time period per track	Track 1	0	0	0	2	3	4	2	1	0	
	Track 2	0	2	1	3	4	1	0	2	0	
	Track 3	2	0	3	6	8	3	3	2	0	
	Track 4	8	0	1	2	5	2	1	1	2	
	Total	10	2	5	13	20	10	6	6	2	

* Site type based on judgmental assessment of all information available, as of 1983.
† Temporal assignment based on all information available, as of 1983. When Track 1 through 3 work was done, resultant collections were combined with those from Track 4 in arriving at ceramic date assessments.
§ Totals add to 38 because 2 sites (5MT2151 and 5MT4651) appear in more than one site type.
** Portion of temporal assignment considered firm is shown with a solid line; portion considered probable is shown with a dotted line.
†† Dashed line indicates temporal assignment based on small ceramic collection; assignment does not carry high level of confidence.

NOTES: BM II - Basketmaker II.
Indet - Indeterminate.

please lowercase the a

Table 5. Distribution of levels of investigation among site types and time periods, secondary impact area, Grass Mesa Locality

Site type*	Level of investigation	Temporal assignment†									
		Aceramic indet	Archaic/ BM II	Sagehen Phase			McPhee Phase		Sundial Phase	Indet Anasazi	Total
				Tres Bobos	Sagehill	Dos Casas	Periman	Grass Mesa			
Hab	Track 4					---5923--§					1
Seasonal	Track 3					---2381--			-----		1
	Track 4			----------5307----------						6694	2
Limited activity	Track 4	5306 5899 6658 6659 6662		----------5308----------							10
				----------6660----------							
				----------6692----------							
							---2167----------			5898	
Total components per time period per track	Track 3	0	0	0	1	1	0	0	1	0	
	Track 4	5	0	4	5	6	5	5	1	2	
	Total	5	0	4	6	7	5	5	2	2	

* Site type based on judgmental assessment of all information available as of 1983.
† Temporal assignment based on all information available as of 1983. Where Track 1 through 3 work was done, resultant collections were combined with those from Track 4 in arriving at ceramic date assessments.
§ Dashed line indicates temporal assignment based on small ceramic collection; assignment does not carry high level of confidence.

NOTE: Hab - Habitation.
BM II - Basketmaker II.
Indet - Indeterminate.

temporal-functional matrices constructed by using the site type and temporal assignments that stem from the most intensive level of work that has been done at the site.[3] Table 4 lists the sites that are in the project's primary impact zones; table 5 lists those in secondary impact zones. Because of the placement of project features, the former group can be considered a relatively complete listing of sites that occur on the valley walls in the upstream two-thirds of the Grass Mesa Locality. It is also from this set of directly affected sites that all or virtually all of the selections for Track 1 through 3 work must be made. The sites listed in table 5 represent a sample of sites found in the remainder of the locality, with the upper and middle valley walls being the predominant landform represented. Only one site in this group received work beyond the Track 4 level; investigations at this site consisted of brief visits for Track 3 study.

Table 4 shows that all the temporal-functional cells that have sites display some amount of work beyond the Track 4 level at some of the sites in the cell. It also shows that, as expected, habitation sites have received the highest proportion of Track 1 through 3 work, followed by seasonal loci, and then by limited activity loci. If only Tracks 1 and 2 are considered, there is still a fairly good distribution of effort, but the difference is more pronounced between work allocated to habitation and seasonal sites, on the one hand, and limited activity loci, on the other. Only 1 out of 13 of the limited activity loci has been subjected to Track 2 investigation, and none have been approached at a Track 1 level.

---

[3]Note that subphase designations appear immediately below the phases listed on tables 4 and 5.

When the data presented in table 5 are added, the ratio becomes 1 out of 23. Furthermore, the secondary impact areas have only been sampled by the survey teams, rather than having been fully inventoried. Because limited activity loci appear to be the most common site type in the sampled area (which is composed mostly of middle and upper valley walls), the total number of limited activity loci to be found in the locality as a whole is probably considerably greater--perhaps half again as many--than the 23 sites accounted for by the surveys summarized in tables 4 and 5.

The addition of the Track 3 level work at three limited activity loci (table 4) brings the ratio of work beyond the basic survey level to 4 out of 23+. This is a better ratio, but still weak. It can be argued, however, that many limited activity loci are so small and have such shallow cultural deposits that Track 2 work would add little more information than Track 3 work. In many cases, this is certainly true. On the other hand, there are some circumstances in the Grass Mesa Locality where surface estimates of subsurface characteristics and assemblage composition are quite difficult to make. These include sites covered with very dense vegetation, such as oak brush (Kohler 1983b); sites that have been considerably disturbed by recent human activity, such as road building; and sites that occur in rockshelters (Gross 1983). In the latter case, spalling from and decomposition of the roofs of rockshelters formed in the Junction Creek Sandstone have resulted in the deposition of materials that can obscure artifacts and even structures on shelter floors. Also, some rockshelters have been used by domestic or wild animals, leading to the formation of a postoccupational deposit of dung that can also obscure site characteristics and artifacts. In all these situations, the obscuring of surficial evidence can lead to sites being

falsely classified as limited activity loci when additional information might lead to their being considered as seasonal or habitation sites. Table 3 suggests that in terms of functional classification at the Track 4 level, the limited activity class is the "softest." Of eight sites judged on the basis of survey evidence to be limited activity, four were reassigned to the seasonal locus class on the basis of Track 2 or 3 work. Several of these sites had been chosen for study in part because it had not been possible to assign them confidently to a site type or date range on the basis of the Track 4 site description or surface collections. Of the four, one (Site 5MT2381) is a rockshelter and one (Site 5MT2160) had very dense vegetative cover (Kohler 1983b:30).

A glance at the estimated temporal extent of sites, as described in tables 4 and 5, shows that many sites apparently span several subphases or phases. In many cases, these are sites that yielded very small surface collections, and consequently had few temporally diagnostic sherds. Most of these sites have been studied using only Track 3 or 4 methods. Results of Track 1 and 2 work at similar sites suggest that spans of occupation are typically shorter; consequently, it seems likely that the actual occupations of sites such as 5MT2170, 5MT2171, 5MT2212, and 5MT2213 may not have been as long as suggested in table 4.

This conclusion has implications for the adequacy of the sampling of early Sagehen Phase sites in the Grass Mesa Locality. Except for the DTA Site (5MT5361), all the candidates for occupation during the Tres Bobos Subphase have very long estimated spans of occupation and are known only from Track 3 or 4 work. The DTA Site also has a long occupation span, but was investigated at the Track 2 level. This site, however, is a special case. It was a deeply buried cultural deposit discovered during

construction activities. Only a small volume of deposit could be studied, and the resultant sherd collection is very small and is poorly diagnostic for dating the occupation. It is suspected that if, through Track 1 or Track 2 studies, larger and more diagnostic sherd collections or other dating evidence could be obtained from some of the possible Tres Bobos components, many of these components would be found to have narrower date ranges and to have occupations that began somewhat later than originally estimated. On the basis of available evidence, and given present methods of ceramic date assignment, however, this suspicion can be neither confirmed nor denied.

Another possibly weak area in Track 1 through 3 coverage of the temporal and functional variability in the locality is in the treatment of aceramic sites. In the primary impact zone (table 4), there are 12 of these components, and another 5 are reported from the secondary impact area (table 5). Two of these 17 components have received Track 2 treatment, and 2 have been investigated at the Track 3 level. In the Track 2 cases, Cougar Springs Cave (5MT4797) clearly seems to be a very late Archaic or Basketmaker II seasonal occupation, while the DTA Site is believed to have a possible Archaic component primarily on the basis of carbon-14 dating. However, the carbon-14 dates from the site are not in good agreement, the lithic assemblage does not closely resemble others from the project area that are thought to be Archaic, and the site materials appear to be redeposited, though not from far away (Gross 1983). Even though the assemblage from this site consists predominantly of lithic items, Gross (1983) believes it is possible that the entire assemblage is contemporaneous with the sherd that was found, and therefore is associated with an Anasazi occupation.

The remaining sites, most of which are classed as limited activity loci, can only be characterized as "aceramic" with regard to dating assignment. It seems likely that many are, in fact, Anasazi limited activity loci at which no pots were broken, but some may be pre-Anasazi. This problem is being approached on a project-wide basis by intensive work at selected aceramic sites and by the definition of "lithic profiles" characteristic of Archaic versus Anasazi assemblages (Phagan 1981). Results of these studies may eventually help clarify the status of the aceramic sites in the Grass Mesa Locality. Whether additional fieldwork at such sites in the locality would clarify their temporal placement is not clear; it cannot be claimed with confidence that such work would have a high probability of resolving this problem.

In conclusion, an analysis of the distribution of Track 1 through 3 effort among the temporal and functional variability exhibited by known Grass Mesa Locality sites indicates that, in general, the sampling has been good. It probably would have been desirable to conduct more Track 2 work at (1) sites classed as limited activity loci on the basis of survey data; (2) sites that because of small sherd collections can be assigned only to very broad time spans; and (3) sites of any category (though many are probably classed initially as limited activity sites) where surface collection of artifacts and assessment of site features was severely hampered by dense vegetation, postoccupational overburden in rockshelters, or disturbance due to human or animal activity. Sites (mostly classed as limited activity) lacking ceramics also posed a problem in terms of temporal placement, but it could not be claimed with confidence that additional Track 2 or 3 work would resolve the problem.

Despite these areas of weakness in the distribution of Track 1 through 3 coverage, funds available for post-1980 fieldwork in the Grass Mesa Locality were allocated to pursuing Track 1 excavations at the large, complex Grass Mesa Village site, with a small amount of additional work (approximately 0.6 crew weeks) being devoted to completing excavations at Cougar Springs Cave (5MT4797). It was thought that the Track 1 through 3 sampling of temporal and functional variety in the locality was adequate, although not perfect, and that it was more advantageous to adequately sample and more fully understand the Grass Mesa Village site. It is clear from the amount and density of cultural remains at Grass Mesa Village that this site is the location where the majority of inhabitants of the Grass Mesa Locality spent most of their time, at least from late Sagehen through McPhee Phase times. Understanding the cultural patterns represented by this site therefore appears to be a key part of understanding the Anasazi occupation of the Grass Mesa Locality as a whole.

One additional point regarding the adequacy of knowledge regarding the site population in the direct impact area of the Grass Mesa Locality is raised by the discovery of the buried DTA Site. The discovery of this site raises the possibility that an unknown number of settlements that once existed in the locality have become inaccessible to archaeological study because they have been buried by alluvial or colluvial deposits. Gross (1983) believes that the DTA Site primarily consists of material redeposited from a site or sites not far upslope. Sites 5MT2165 and 5MT2166, which are located on the lower part of the valley slope above the DTA Site, are obvious candidates.

The dam contractor has also conducted considerable test excavation in order to study subsurface deposits; in the course of these operations,

large areas of the valley floor have been stripped to a depth of several meters. This work has been monitored, on a sampling basis, by Bureau of Reclamation archaeologists, and the contractor's employees have been instructed to report archaeological remains that are encountered. No other buried concentrations of archaeological materials comparable to those from the DTA Site have been reported from the Grass Mesa Locality. If buried sites were numerous, it seems unlikely that all but the DTA Site would have been missed by the monitoring program or have gone unreported by the contractor, at least if these sites were habitations or limited activity loci sites having large artifact assemblages. It is quite possible, of course, that if there were only a few buried sites having low densities of artifacts and few features, they might have been missed. The evidence to date, however, suggests that buried sites do not represent a large component of the archaeological record in the Grass Mesa Locality. Consequently, it appears likely that the extant site sample derived from survey is a reasonably good representation of the prehistoric sites in the locality.

REFERENCES CITED

Ahlstrom, Richard V. N., and Karen Dohm
1981 Excavations at Area 4, Grass Mesa (Site 5MT0023), 1979 Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Benz, Bruce F.
1981a Contemporary vegetation studies--a review In Environmental studies report compiled by Bruce F Benz and Vickie L Clay, pp 67-96 Dolores Archaeological Program Technical Reports DAP-061. First draft submitted to the U S Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No 8-07-40-S0562.

1981b Present-day faunal investigations. In Environmental studies report, compiled by Bruce F Benz and Vickie L. Clay, pp. 97-104. Dolores Archaeological Program Technical Reports DAP-061. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Benz, Bruce F., and Vickie L. Clay (compilers)
1981 Environmental studies report. Dolores Archaeological Program Technical Reports DAP-061. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Breternitz, Cory D.
1982 Excavations at Area 3, Grass Mesa (Site 5MT0023), 1979. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Breternitz, David A.
1981 An overview of the Dolores Archaeological Program. In Dolores Archaeological Program synthetic report, 1978-1981 DAP-055, pp. 1-11. Final report submitted to the Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Breternitz, David A., and Daniel W. Martin
1973 Report of the Dolores River Project archaeological reconnaissance, 1972-1973. Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Bye, Robert A., Jr.
1982 Botanical studies--1979. Dolores Archaeological Program Technical Reports DAP-047. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Bye, Robert A., Jr., and Rita Shuster
1981 Developing an integrated model for contemporary and archaeological subsistence systems, Part I. Paper presented at the 46th Annual Meeting of the Society for American Archaeology, San Diego.

Darsie, Richard F., III
1983 Prehistoric agricultural potential and site location in the Dolores River valley, southwest Colorado. Unpublished M.A. thesis, Washington State University, Pullman, Washington.

Goulding, Douglas A., and Roger N. Walkenhorst
1982 Archaeological survey of the Glade-Lone Dome-Williams Draw Road Improvements--Ormiston Point Road construction feature, Dolores Project, Colorado. Report submitted to the U.S. Bureau of Reclamation, Cortez Projects Office.

Gross, G. Timothy
1983 The Grass Mesa Locality testing program. Ms. in preparation for Dolores Archaeological Program, Dolores, Colorado.

Hogan, Patrick
1983 Excavations at LeMoc Shelter (Site 5MT2151), a multiple-occupation Anasazi site. Dolores Archaeological Program Technical Reports DAP-083. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Holliday, Vance T., and Lucy A. Piety
1981 Surficial geological investigations--1980. In Environmental studies report, compiled by Bruce F. Benz and Vickie L. Clay. Dolores Archaeological Program Technical Reports DAP-061, pp. 111-157. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Kane, Allen E.
1981a Introduction to field investigations and analysis. Dolores Archaeological Program Technical Reports DAP-001. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

1981b The prehistory of the Dolores Project area. In Dolores Archaeological Program synthetic report, 1978-1981 DAP-055, pp. 49-138. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

King, Thomas J., Jr.
1981 Dolores Project cultural resources mitigation report, FY1981. Water and Power Resources Service, Upper Colorado Region, Salt Lake City, Utah.

Knudson, Ruthann, Steven E. James, Allen E. Kane, William D. Lipe, and Timothy A. Kohler
1981 The Dolores Project cultural resources mitigation design. Dolores Archaeological Program Technical Reports DAP-057. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Kohler, Timothy
1983a Grass Mesa Village (Site 5MT23) overview and surface collection results: 1979 and 1980. Dolores Archaeological Program Technical Report DAP-084. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

1983b The Grass Mesa Locality overview, 1979. Dolores Archaeological Program Technical Reports DAP-119. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Kohler, Timothy A., William D. Lipe, Mary E. Floyd, and Robert A. Bye, Jr.
1981 Modeling wood resource depletion in the Grass Mesa Locality. In Dolores Archaeological Program synthetic report, 1978-1981 DAP-055, pp. 252-270. Submitted to the U.S. Bureau of Reclamation, Upper Colorado Region, Salt Lake City, in compliance with contract No. 8-07-40-S0562.

Leonhardy, Frank C., and Vickie L. Clay
1982 Geology of the Dolores Project area. Dolores Archaeological Program Technical Reports DAP-050. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Neusius, Sarah W., and Carl Phagan
1983 Patterns of large and small game procurement among the Dolores Anasazi, A.D. 600-950. Paper presented at the 1983 Anasazi Symposium, Farmington, New Mexico.

Petersen, Kenneth Lee
1982 Reconstruction of droughts and summer warmth for the Dolores Archaeological Project area, southwest Colorado: A.D. 550-950. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

1983 Natural vegetation map, ca. 1920, for the Dolores Archaeological Program area. Ms. on file, Dolores Archaeological Program, Dolores.

Phagan, Carl J.
1981 Lithic profiles. In Dolores Archaeological Program synthetic report, 1978-1981 DAP-055, pp. 393-412. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. District, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Schlanger, Sarah H.
1982 Population size and density--working paper for the Mesa Verde meetings. Paper presented at the DAP Modeling Seminar, Mesa Verde National Park, 1982.

Schlanger, Sarah H., and Patrick L. Harden
1983 1979 and 1980 probability survey of Cline Crest, Grass Mesa, Beaver Point, Trimble Point, and Hoppe Point Localities. Dolores Archaeological Program Technical Reports DAP-118. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Sebastian, Lynne
1983 Excavations at Prince Hamlet (Site 5MT2161), a Pueblo I habitation site. Dolores Archaeological Program Technical Reports DAP-082. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Shuster, Rita
1981 Factors affecting productivity in subsistence agriculture. Unpublished M.A. thesis, Department of Environmental, Population, and Organismic Biology, University of Colorado, Boulder.

Shuster, Rita A.
1983 Preliminary report, demonstration and experimental garden studies, 1979 and 1980. Dolores Archaeological Program Technical Reports DAP-062. First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Shuster, Rita, and Robert A. Bye, Jr.
1981 Preliminary results from the Dolores Archaeological Program gardens. Part II of Developing an integrated model for contemporary and archaeological agricultural subsistence systems. In Dolores Archaeological Program synthetic report, 1978-1981 DAP-055, pp. 235-251. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Toll, Henry Wolcott, III
1974 Archaeological resources in the Dolores River canyon below the proposed McPhee Reservoir, Montezuma, Dolores, and San Miguel Counties, Colorado. Department of Anthropology, University of Colorado, Boulder. Submitted to the State Director, Bureau of Land Management in partial compliance with Contract No. 14-11-0008-3159.