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The George T. Hunting Complex, Deep Springs Valley, California

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ETHNOGRAPHIC studies have established that hunting tactics often reflect aspects of group cooperation and social organization (e.g., Steward 1938: 231; Turnbull 1962: 107; Balikci 1970: 57-58; Smith 1981: 38). Unfortunately, archaeologists frequently employ ethnographic descriptions of hunting tactics in an uncritical fashion when interpreting patterns of cooperation and social organization. Evidence of prehistoric hunting commonly consists of non-perishable stone tools used in procuring and processing game and, less often, the remains of the animals exploited. Such evidence is useful in understanding aspects of settlement patterns, season of occupation, and dietary regimes but is generally of marginal utility in reconstructing specific procurement tactics and hence patterns of cooperation and social organization (cf. Flannery 1967). Nevertheless, when hunting tactics can be identified, they provide evidence for the size of hunting parties, and thus the minimal size of the supporting social group.

Stone blinds, walls, and cairns, all of which occur throughout the Great Basin, afford direct evidence of prehistoric hunting tactics (Wallace 1976; Brook 1980; Pendelton and Thomas 1983). Previous interpretations have often assumed their use by cooperative groups, emphasizing the driving of large game animals, rather than by individuals. Although this interpretation is supported ethnograph-

ically (Muir 1901: 320-321; Steward 1933: 253, 1938: 54, 66), the presence of hunting features is not de facto evidence of cooperative group activity. By considering local environment, topography, and ethology, one can suggest hunting tactics for individual sites and complexes. This localized approach avoids the pitfalls encountered when one applies direct ethnographic parallels (e.g., Brook 1980).

The George T. Hunting Complex,¹ located in Deep Springs Valley, Inyo County, California, includes the remains of at least 27 circular and sub-circular rock features believed to be the aboriginal hunting blinds. The complex was first identified in 1984 during the course of a two-year program of probabilistic surface survey aimed at recovering information on aboriginal subsistence and settlement patterns in the valley. Similar features occur throughout the alpine highlands of the White Mountains immediately to the north (Robert Bettinger, personal communication 1984), as well as in nearby valleys (Wallace 1976; Brook 1980); however, those in Deep Springs Valley suggest evidence of prehistoric hunting tactics largely unreported in ethnographic literature (see Pippin [1977] for a review of this material).

NATURAL SETTING

Deep Springs Valley is an elongate block-faulted graben (Blanc 1958; Jones 1965) bounded to the north and west by the White Mountains and to the south and east by the

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Inyo Mountains. Precipitation in the valley is limited, averaging only 14 cm. (5.5 in.) per annum. Most of this occurs during the winter months, although torrential summer thunderstorms are not uncommon. Located on the valley floor adjacent to Deep Springs Lake, an ephemeral playa, the George T. Hunting Complex lies at an elevation of 1,510 m. (4,960 ft.). The site is characterized by two distinct plant communities. The first, an alkaline meadow along the western margin of the site encompasses several springs and two spring-fed ponds. Plants in this mesic environment include big sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus nauseosus*), greasewood (*Sarcobatus vermiculatus*), tule (*Scirpus nevadensis*), and a variety of halophytes such as saltgrass (*Distichlis spicata*). The second, a shadscale community (Billings 1951; Cronquist et al. 1972), occurs east of the springs on an alluvial fan which terminates abruptly along the Deep Springs fault scarp. This community consists primarily of saltbush (*Atriplex* sp.), spiny hopsage (*Grayia spinosa*), Nevada ephedra (*Ephedra nevadensis*), and a variety of native grasses.

Among the fauna known to frequent the site area are a number of indigenous reptiles and birds as well as migratory waterfowl. Mammalian species include black-tailed hare (jackrabbit) (*Lepus californicus*) cottontail rabbit (*Sylvilagus auduboni*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis nelsoni*), and numerous rodents from the families Sciuridae, Heteromyidae, and Cricetidae. Although pronghorn (*Antilocarpa americana*), known to have occurred in Deep Springs Valley historically, may also have been present, their former distribution within the valley is uncertain.

As indicated, the site is bisected from northeast to southwest by the Deep Springs fault (Miller 1928; Blanc 1958). The scarp along this fault, primarily unconsolidated alluvium, rises abruptly 15 m. (50 ft.) above

the springs, forming a continuous wall along the eastern margin of the springs. At the base of the scarp is a pronounced fault trough which contains two perennial spring-fed sag ponds (Jones 1965). Elsewhere along the fault trough, discontinuous ridges running parallel to the scarp form narrow steep-sided alleys leading to the spring-fed ponds. East of the fault an alluvial fan, furrowed by several deeply incised drainages, rises gently for 300 m. at which point the terrain ascends precipitously, gaining 610 m. (2,000 ft.) in 1.3 km. To the west of the site, the terrain is level, broken only by a low dune ridge, beyond which lies the extant playa of Deep Springs Lake, 600 m. west of the fault scarp (Fig. 1).

The topography of the site, particularly the near-vertical fault scarp, and an abundance of water and forage, combine to provide an area ideally suited to ambushing large game animals. Of great advantage to the prehistoric hunters would have been the ability to position themselves along the fault scarp and deep channels in the alluvial fan, well above animals making their way to the springs and ponds. Thus it appears that local terrain, as at many hunting and kill sites, was a critical factor in site location and probably in hunting strategy (Heizer and Baumhoff 1962; Frison 1978).

HUNTING BLINDS AND ASSOCIATED FEATURES

The features at the George T. Complex are located either on the rocky alluvial fan above the scarp or on the adjacent parallel ridges (Fig. 2). The structures were constructed of granitic rubble, and are virtually impossible to recognize from great distances. Thus, it was necessary to carefully survey the entire area surrounding the springs. This was accomplished by walking east/west transects spaced at 10-m. intervals across the alluvial fan and adjacent ridges. A total of 100 transects was surveyed by the author, result-

GEORGE T. HUNTING COMPLEX

Section through northern pond

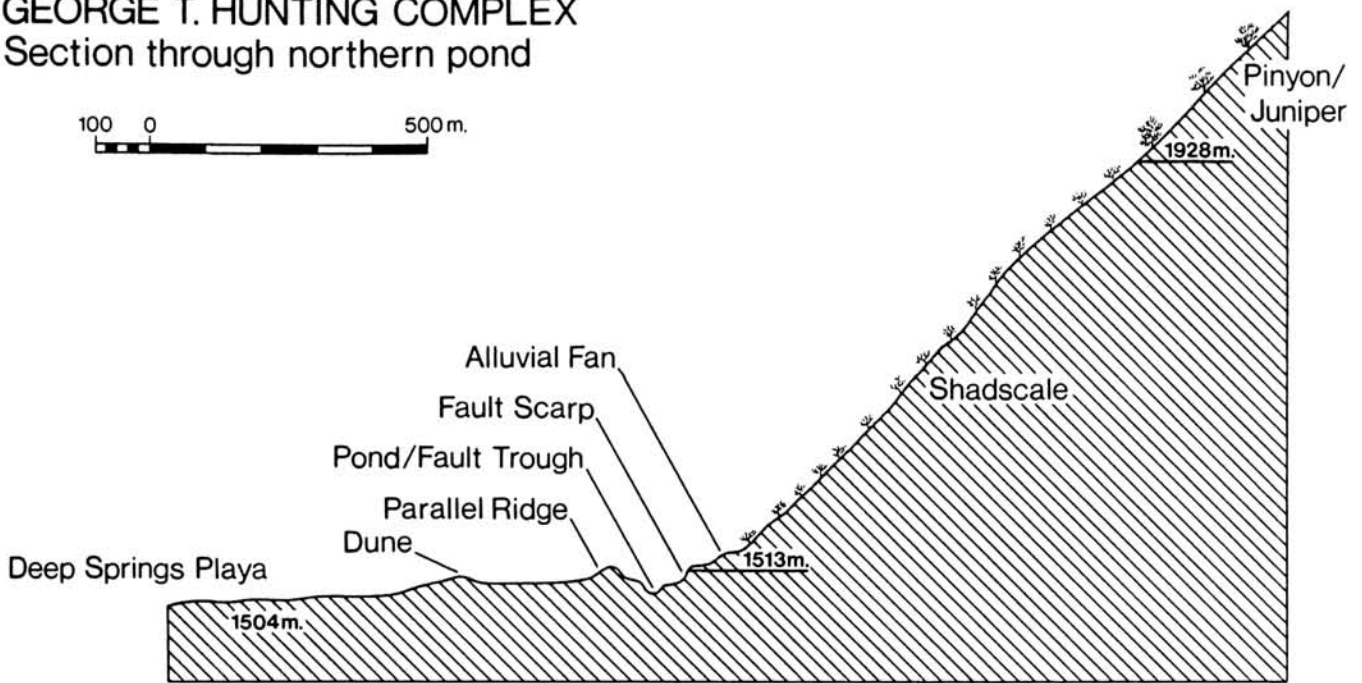


Fig. 1. Profile of the George T. Complex, showing local topography.

ing in the discovery of 33 features, most identified as aboriginal hunting blinds.

The features were constructed of angular rock stacked from two to seven courses, forming lunate walls or circular rock rings. In eight cases the central portion of the feature was dug into the alluvium, the excavated material having been piled along the edge of the resulting pit. The features range in size from 6.8 to 1.05 m. in maximum diameter (\bar{x} 2.73 m., SD 1.19 m.) with depths of from 1.10 to 0.4 m. (\bar{x} 0.71 m., SD 0.2 m.) (Figs. 3 and 5).

Of the 33 features, the location and orientation of 27 identify them as hunting blinds (Figs. 3 and 4). These blinds are located either: (1) immediately along the edge of the fault scarp; (2) along parallel ridges bordering the fault trough; or (3) along one of several deeply incised channels in the alluvial fan. All of these are locations that would have allowed concealed hunters to wait at a point above any animals that moved toward the springs and spring-fed ponds. These would

have provided excellent vantage points and wide fields of fire while at the same time reducing the probability of being seen or scented. The walls of these features are always positioned along the edge of the fault trough or drainage, thereby providing maximum concealment from below. Six of the 33 features appear to be of different function than the 27 blinds, judging from their size, location, and associated artifacts. Two of the six, features 20 and 31, are tentatively identified as domestic structures. Both are large, measuring 6.8 and 4.5 m. in diameter respectively, and neither is well situated for intercepting game. In addition, Feature 20 contained a diverse assemblage of artifacts and ecofacts including cans, a steel axe-head, biface fragments, projectile points, a steatite shaft-straightener, a milling stone, bones, and charcoal, suggesting use of the feature as a domestic structure. Feature 31 (Fig. 5) included a more limited assemblage, but again with artifact classes indicating use as a domestic structure. Included in the assemblage were two cans, a

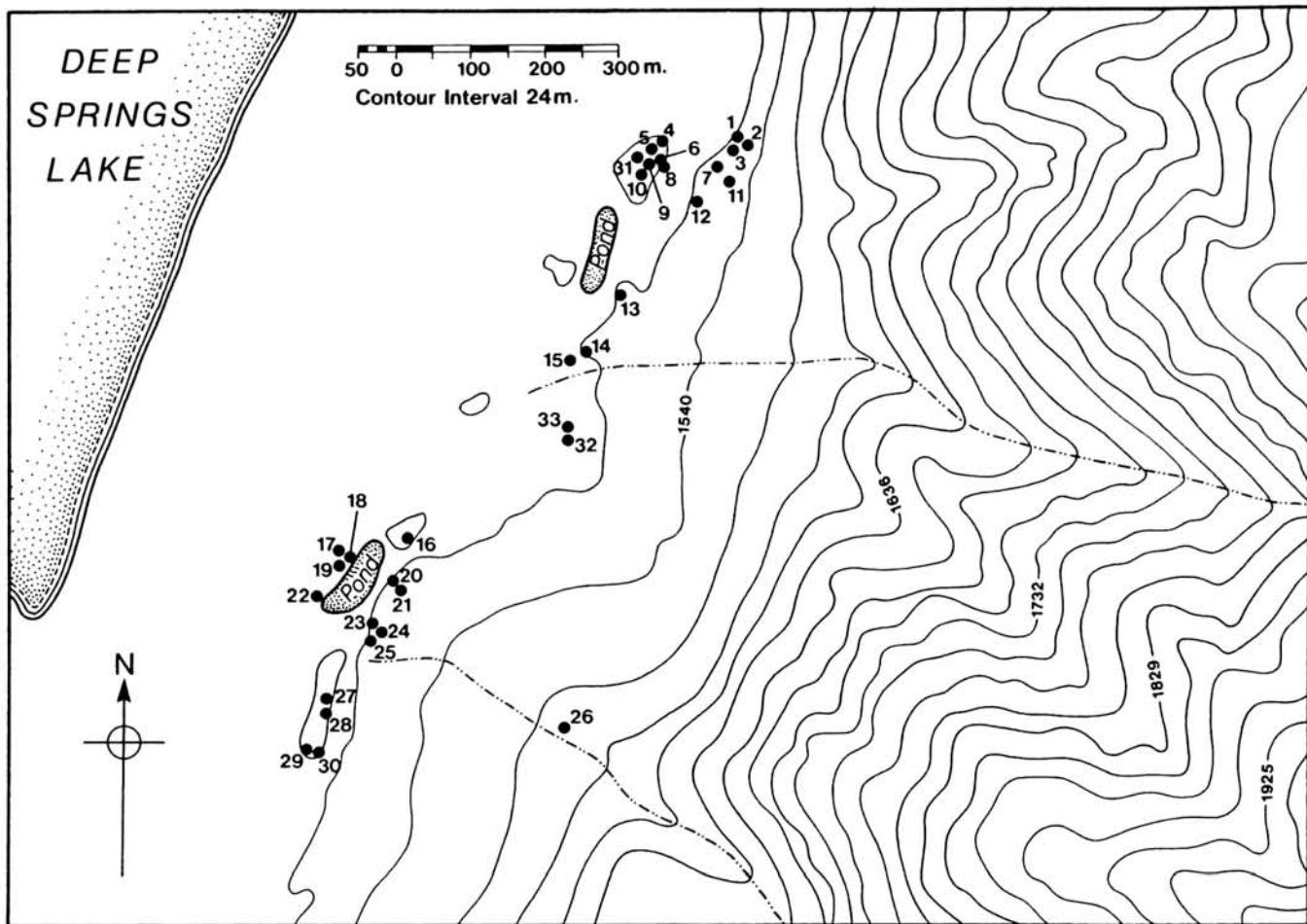


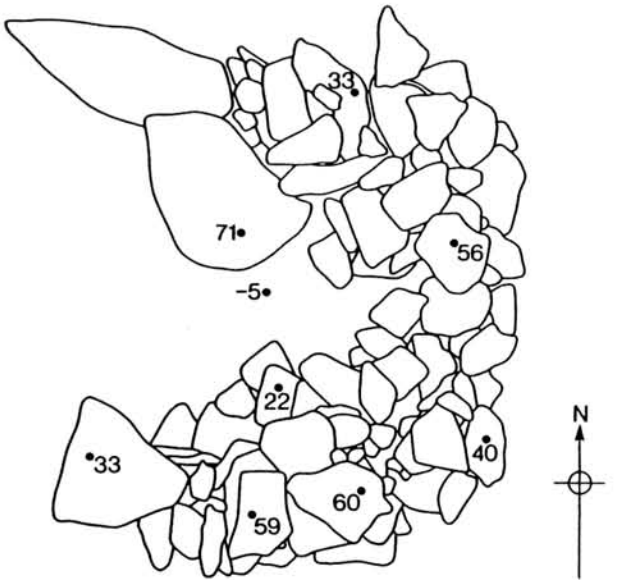
Fig. 2. Map of the George T. Complex, showing relationship of features to local terrain and spring-fed ponds.

milling stone, six Owens Valley Brown Ware ceramic sherds (Riddell 1951), and a single obsidian flake.

Among the four remaining features (17, 18, 19, 22), three are relatively large, ranging from 1.5 to 4.5 m. in diameter. All four features are located immediately adjacent to one of the spring-fed ponds and are today used as duck-hunting blinds, as indicated by numerous spent shotgun shells. Also present in three of the four features are one or more flakes or stone tool fragments. Whether these are in fact aboriginal structures subsequently reused by contemporary hunters is uncertain, but their location within 10 meters of the pond would be ill suited for the interception of most large animals coming to water.

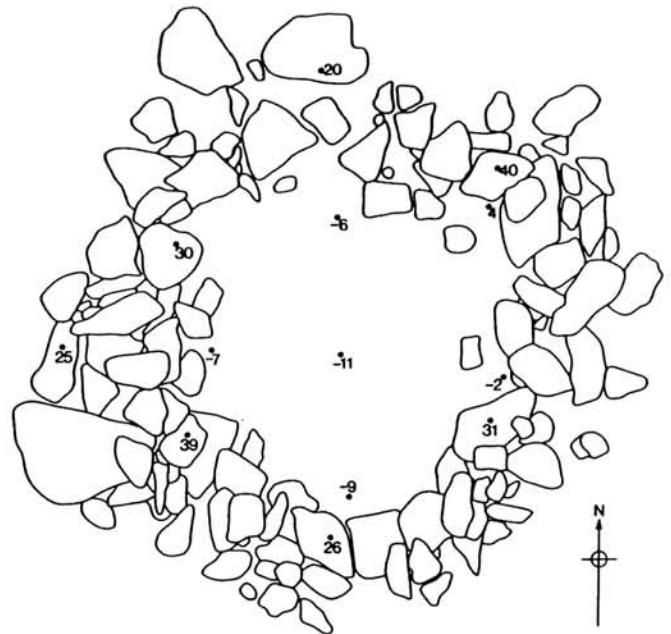
Similar duck blinds occur at Mono Lake both above and below the historic 1940 highstand of the lake (Linda Reynolds, personal communication 1985), which suggests the use of such blinds throughout the very recent past – certainly within the last 100 years.

Artifacts associated with Feature 22, however, include the brass bases from paper shotgun shells, chert and obsidian flakes, and a fragment of a faceted blue-glass bead, which collectively suggest use of the blind for waterfowl hunting somewhat earlier in the historic era. Although the presence of flakes and a glass bead do not confirm historic Native American use of this blind, such an interpretation is not unreasonable given the continuation of hunting and other traditional



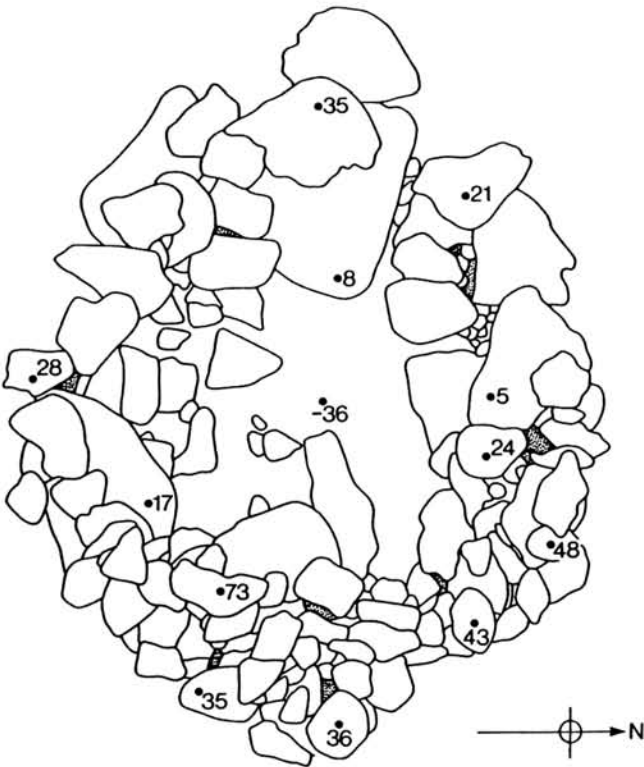
DEEP SPRINGS GEORGE T. COMPLEX
Feature 8

Fig. 3. Feature 8, lunate wall identified as a hunting blind. Numbers refer to elevations above and below ground surface.



DEEP SPRINGS GEORGE T. COMPLEX
Feature 31

Fig. 5. Feature 31, a domestic structure. Numbers refer to elevations above and below ground surface.



DEEP SPRINGS GEORGE T. COMPLEX
Feature 9

Fig. 4. Feature 9, circular rock-ring hunting blind. Numbers refer to elevations above and below ground surface.

subsistence activities well after contact (Wheat 1967). If stone blinds were in fact used in early historic or prehistoric times for hunting ducks in Deep Springs Valley, they differ from the conical tule or brush duck blinds reported from the central and western Great Basin (Steward 1933; Wheat 1967: 117; Wallace 1976).

In order to test the hypothesis that both the domestic structures and duck blinds differ from the 27 features identified as hunting blinds, a t-test (Thomas 1976) comparing their mean diameters was computed. The resulting t values of 4.83 and 2.81, respectively, indicate that the two groups of structures differ dramatically in size, these values being significant at the .01 level for a two-tailed test. These statistics do not, of course, confirm the function of the features, but given the accompanying differences in location and assemblage, a minimum of three functional types (large-mammal-hunting blinds, duck-hunting blinds, and domestic structures) is suggested.

ASSOCIATED ARTIFACTS

Relatively few artifacts were found in association with the features at the George T. Complex (Table 1). In part, this may be a result of ongoing alluvial deposition covering earlier surfaces (Lustig 1963) and extensive vandalism by illicit collectors. All the same, if the site was used primarily for hunting, to the exclusion of tool maintenance and manufacturing or butchering activities, few artifacts would have been lost or broken. Thus at sites like the George T., with a restricted range of activities such as those connected with hunting large vertebrates, the associated artifact assemblage should be limited in both size and diversity.

Among the temporally diagnostic artifacts recovered are two projectile-point fragments, six Owens Valley Brown Ware sherds, and a single fragment of a faceted blue-glass bead. The projectile points, both found in Feature 20, a probable domestic structure, are of obsidian and assigned to the Rose Spring series, dated to between A.D. 600 and A.D. 1300 (Bettinger and Taylor 1974; Thomas 1981). Similar points are common at sites throughout Deep Springs Valley and in the adjacent Owens Valley (Bettinger 1975). The occurrence of these points in Feature 20 suggests occupation as early as roughly A.D. 600; however, given the presence of several historic artifacts in this feature (see above) the possibility that the points were scavenged from an older site can not be discounted. The six sherds, all from Feature 31, also a probable domestic structure, suggest late prehistoric occupation. Finally, the single glass-bead fragment found in Feature 22 may indicate the historic use of this structure, perhaps as a duck-hunting blind.

In addition to the temporally diagnostic artifacts, a number of flaked-stone tools and a small quantity of debitage was found (Table 1). Included among these are eight biface

fragments made of obsidian and a variety of cherts: one from Feature 15, two from Feature 19, and five from Feature 20. None is sufficiently complete to warrant measurement. Also recovered were fragments of two obsidian preforms, one from Feature 19, the other from Feature 28; neither was sufficiently complete to speculate on its original size or configuration. Feature 18 yielded one obsidian uniface 2.9 cm. long, 1.4 cm. wide, and 0.5 cm. thick, which exhibits steep retouch along two parallel margins. Finally, small quantities of chert and obsidian debitage were recorded in and around eight of the 33 features. With the exception of Feature 20, in which 13 flakes were recovered, no more than six pieces were found in association with any feature. All of these flakes are thin and exhibit diffuse bulbs of percussion which suggests that they were struck in the final stages of tool manufacture or resharpening.

A shaft straightener was found cached in the rock wall of Feature 20. It was manufactured from a mottled pale-green steatite which had been shaped and smoothed over its entire surface as indicated by numerous striations. The shaft straightener is 9.7 cm. long, 5.1 cm. wide, and 4.0 cm. thick, and is generally cylindrical, tapering slightly at each end. Two polished grooves 0.9 cm. wide and 0.4 cm. deep run across one face, terminating abruptly at the margins. Both ends and a small portion of one face also show evidence of battering, with pecking scars often interrupting striations. This suggests its use as a hammer after completion of the finished tool. Given the width and depth of the grooves, which can accommodate shafts no larger than 0.8 cm. in diameter, use of this shaft straightener appears to have been restricted to arrows rather than dart shafts, the latter being too large for the grooves (Aikens 1970).

While a variety of ground stone milling equipment was observed within the boundar-

Table 1

ARTIFACTS ASSOCIATED WITH FEATURES OF THE GEORGE T. HUNTING COMPLEX

	Flakes	Biface	Preform	Uniface	Projectile Points	Historic Artifacts	Shotgun Shells	Milling Stones	Other
Feature 15	2	1							
Feature 17							3		
Feature 18	3			1			8		
Feature 19	6	2	1				15		
Feature 20	13	5			2	cans, axe		1	shaft straightener
Feature 22	5						11		glass bead
Feature 25	1								
Feature 28	3		1						
Feature 31	1					cans		1	6 sherds
Totals	34	8	2	1	2		37	2	

Table 2

ARTIFACTS ASSOCIATED WITH ADJACENT SITES

Site	Milling		Manos	Elko	Projectile Points		Bifaces	Preforms	Cores	Unifaces	Drills	Shell	
	Flakes	Stones			Eastgate/ Rose Spring	DSN/ Cottonwood						Sherds	Beads
CA-INY-264	X	X	X	—	X	X	X	X	X	X	—	X	X
CA-INY-2639	X	X	X	X	X	X	X	X	X	X	X	X	—
CA-INY-2640	X	X	X	X	X	—	X	X	X	X	X	—	X

ies of the George T. Hunting Complex, with the exception of two specimens found in features 20 and 31, ground stone does not appear to be associated with the features. Three forms or types of milling equipment were recorded during the survey: block milling stones (4 specimens); grinding slicks (3 examples); and mortars (2 specimens). All were manufactured of local granitic material. Given the ubiquitous occurrence of milling equipment in a variety of contexts throughout Deep Springs Valley, including numerous isolated specimens (Delacorte and Adams 1984), its presence at the George T. Complex is not unexpected. The availability of abundant plant resources in the immediate vicinity further suggests that this area may have been exploited for a variety of resources on different occasions.

ADJACENT SITES

As with many functionally specific sites or activity loci, interpretation of the George T. Complex requires consideration of adjacent sites which may have acted as staging areas for hunting activities. Three sites (CA-INY-264, CA-INY-2639, CA-INY-2640) tentatively identified as seasonal base camps or habitation sites have been recorded within 1.2 km. of the George T. Complex (Delacorte 1984). Each is characterized by a diverse artifact assemblage that includes a variety of flaked and ground stone tools and suggests a wide range of subsistence and maintenance activities (Table 2). Projectile points from these sites include Elko, Eastgate/Rose Spring, and Desert Side-notched / Cottonwood types. The temporal range of these point types is from

roughly 1200 B.C. through the historic era (Bettinger and Taylor 1974).

The presence of projectile points and bifaces, presumably used for hunting and butchering, suggests that large vertebrates may have been pursued from these sites. The occurrence of extremely fragmented, unidentifiable ungulate teeth at all three sites tends to corroborate this. Furthermore, the location of these sites at a minimum of 350 m. away from the springs and blinds of the George T. Complex would not disrupt movement of game to and from the springs or hunting activities associated with the blinds (cf. Gould 1968).

Many small scatters of non-diagnostic lithic artifacts were also found near the hunting complex. The relation of these scatters to the George T. Complex or the occupation sites is unclear, but their limited size and scanty assemblages suggest brief use as temporary camps or limited activity loci, perhaps for the exploitation of seasonally available riparian resources.

Finally, there are the remains of a number of historic structures, including two stone corrals, a section of stone wall, and the stone foundation of a house. Although the date of construction for these features is unknown, most are believed to have been built in the latter half of the 19th century, as the house is depicted on a U. S. Government Land Office plat map of Township 8 South, Range 36 East, MDM, dated 1880.

DISCUSSION

It is difficult to date construction and use of rock structures or alignments (Pendleton and Thomas 1983). This difficulty is compounded by the continuous use of many such features over long periods of time, often into the historic era (Brook 1980; Binford 1982: 19; Pendleton and Thomas 1983). There are currently no methods for dating these struc-

tures but it is possible to suggest whether they are of historic or prehistoric origin through a combination of ethnographic, geologic, and archaeological evidence.

One clue to the dating of the features of the George T. Complex is provided by the location of features in relation to areas of recent alluvial debris flows (Beatty 1963, 1970, 1974). Without exception, the features are situated on older portions of the alluvial fan and adjacent ridges rather than younger surfaces (Lustig 1963), where one might reasonably have expected some to occur if construction continued into the historic era. The presence of substantial lichen growth on many of the blinds, which is not found on the nearby historic structures, further suggests some antiquity.

The direct association of flaked-stone artifacts with at least eight of the features lends support to the contention that they were used in prehistoric times. Similarly, with the exception of those features thought to be duck blinds or domestic structures, historic artifacts are entirely absent. Further, Steward (1938: 60) specifically described the use of stone hunting blinds at this location in late prehistoric or protohistoric times, thus increasing the likelihood of a prehistoric origin, and the probability of the site use in hunting.

Accepting that these features are prehistoric hunting blinds, it still remains to determine which species of animal(s) were hunted (Brook 1980; Pendleton and Thomas 1983). There would seem to have been three species of large game that the aboriginal inhabitants of Deep Springs Valley could have hunted at the springs of the George T. Complex: mule deer (*Odocoileus hemionus*); pronghorn (*Antilocapra americana*); and bighorn sheep (*Ovis canadensis nelsoni*). Of these three potential prey species, only deer remain in the valley in substantial numbers today. Thus in the absence of site-specific observation of animal behavior, determining which of these was

exploited by prehistoric hunters at the springs is difficult.

Mule deer occur today throughout the White and Inyo mountains in small herds. Seasonal migration typically involves movement up-slope to higher elevations in the summer months, winter being spent on the lower slopes immediately above the valley floor. Although mule deer exhibit a wide range in diet, depending on local conditions, they generally favor browse over grass (Hill 1956). Thus the site environment including the salt-grass meadows west of the blinds and the open shadscale of the alluvial fan affords less-than-ideal habitat. Deer occasionally water at the springs but their access is restricted by their aversion to travel across the open valley floor and playa, where they are subject to predation, and their avoidance of the precipitous slopes east of the springs (Jones 1981a).

Even though the habitat of the springs and adjacent terrain is marginal for deer, deer conceivably could have been hunted from some of the blinds, particularly those along trails leading directly to the spring-fed ponds. However, blinds located somewhat higher on the alluvial fan, apparently situated to intercept animals traveling off the slope, suggest that another prey species was involved.

Pronghorn, locally extirpated in the mid-19th century, might also have been a prey species at the site. Although herd size is seasonally variable, it often exceeds 100 animals, particularly during the winter. Unlike deer, pronghorn are ideally suited to the flat open terrain of valley bottoms (Koopman 1967), since they rely on speed to escape predators (Baily 1971). The feeding habits of pronghorn include a greater proportion of grasses than do those of deer (Bailey 1971), though locally, browse may be included. Given the availability of suitable forage, it is quite possible that pronghorn watered at the springs, making them potential targets for

concealed hunters. Ethnographic accounts do mention that pronghorn were hunted in this vicinity (Steward 1938: 60); nevertheless, the blinds located well above the springs on the alluvial fan seem ill suited to this purpose — the terrain is rugged and offers access only to the steep slopes beyond, neither of which would be attractive to pronghorn.

Mountain sheep were until recently common on the steep slopes east of the site (Weaver and Mensch 1970). Today, however, few if any animals remain in the area. Unlike deer and pronghorn, mountain sheep rely on steep terrain in order to escape predators, avoiding the more open valley floors (Welles and Welles 1961; Hansen 1981a). The size of bighorn herds, although seasonally variable, is generally small, rarely exceeding ten animals (Hansen 1981b). Both the diet and feeding habits of mountain sheep differ considerably by location and season, yet generally grasses and forbs are preferred over browse when available (Browning and Monson 1981). Perhaps the most critical factor in the survival of desert bighorn is the availability of reliable water sources (Welles and Welles 1961; Turner and Weaver 1981). The importance of water to sheep is particularly evident during hot, dry summer months when most animals water daily (Turner and Weaver 1981). Thus the presence of suitable forage, water, and steep terrain adjacent to the George T. hunting blinds combine to provide an ideal habitat for mountain sheep (Weaver and Mensch 1970).

That mountain sheep were the primary target of aboriginal hunters at the George T. Complex is suggested by three further lines of evidence. First, sheep were known to use the spring-fed ponds as watering sites (Doug Powell, personal communication 1985). Second, many blinds, including those on the alluvial fan, are situated to intercept animals traveling to the springs from the steep slopes and canyons to the east, an area known to have been inhabited by sheep but not by deer

(Jones 1981a), and probably not by pronghorn. Finally, the ethnographic record specifically mentions that mountain sheep were hunted from stone blinds at these springs (Steward 1938: 60).

In summary, the behavioral characteristics and habitat requirements of the three potential prey species suggest that mountain sheep were the most likely target of hunters at the site, an hypothesis supported by ethnographic records that confirm the hunting of sheep at this location. Deer and pronghorn were present, however, and might well have been taken incidentally.

INTERPRETATION

At the outset of this paper it was suggested that the procurement tactics employed at specific prehistoric hunting stations might be deduced by an evaluation of site layout, environmental and topographical context, and patterns of local animal behavior. If so, one should be able further to infer the number of individual hunters necessary to implement those tactics and thus the minimal size of the social group needed to support hunting activity there. Unfortunately, it is seldom possible to distinguish among all the innumerable hunting tactics that might have typified a particular location — there are simply too many different tactics and too many different conditions that affect the manner in which these are implemented in specific settings. Normally, however, information of the kind noted above should make it possible to distinguish between hunting tactics of two basically different kinds: those that are *cooperative* and those that are *independent*.

By cooperative hunting I refer to those tactics that require three or more hunters and, optionally, other individuals acting as drivers or beaters. These tactics typically require deliberate planning and the cooperative effort of several nuclear families from whom are drawn the necessary participants (e.g., Stew-

ard 1938: 34-36; Turnbull 1962: 262; Balikci 1970: 57-58). Independent hunting, on the other hand, can be effectively conducted by a single hunter (e.g., Steward 1938: 36, 60) and generally its returns are not appreciably improved by the presence of additional individuals. In these cases, more than one individual may choose to hunt together, a father and son for example, but the success per hunter is not thereby increased.

The basis for the distinction drawn here between cooperative and individual hunting is somewhat different in concept from the kind of distinction Binford (1978: 169) drew between *encounter* and *intercept* hunting. His distinction emphasized behavioral responses to the predictability and concentration of game within specific seasonal and locational settings and broader constraints imposed by the adaptive systems in which hunting occurs. Encounter hunting is best suited to areas where game is dispersed and relatively unpredictable and in systems in which the acquisition of food in bulk is rare. Encounter hunting is thought to characterize such so-called "forager" adaptive systems as typify the /Gwi San (Binford 1980: 8). Intercept hunting is, by contrast, more likely to occur when game is both predictable and concentrated (conditions that are conducive to ambushing large numbers of animals) and when the seasonal round demands large amounts of stored food. Intercept hunting is said to be most common among such logistically organized groups as the Nunamiut Inuit who embrace a "collector" type adaptive system (Binford 1980: 10). Both encounter and intercept strategies are thus fundamentally embedded within a larger adaptive system which is in turn structured largely to accommodate the environment (Binford 1978: 495, 1980: 13).

The distinction between cooperative and independent hunting is more sensitive to social limitations. That is, it emphasizes con-

straints imposed by the number of individuals available to undertake a particular tactic. Hunting tactics are therefore viewed as largely independent of the structure of regional adaptive patterns and the macro-environment, but responsive to specific demographic, topographic, and local environmental situations. Regardless of the predictability or density of prey species, cooperative hunting may be precluded by an absence of sufficient individuals or a means of organization capable of structuring unified activity. While animal behavior, topography, and local environment may combine to produce conditions favorable to either an intensive intercept strategy or an extensive encounter strategy, these strategies are necessarily structured to fit local demography. Consideration of such restrictions on hunting tactics is particularly important given the high archaeological visibility of many hunting facilities (Frison 1978; Pendleton and Thomas 1983) and the tendency to conclude that these structures reflect large cooperative hunting tactics.

Regardless of one's characterization of prehistoric hunting practices, the interpretation of individual sites remains central to a discussion of local hunting patterns. As previously indicated, the George T. Complex may have functioned primarily as an area for ambushing mountain sheep coming to water at the spring-fed ponds. Given this hypothesis, it is possible to more precisely describe the specific hunting tactics employed at the site.

The need for water by mountain sheep is most acute during the hot, dry months of summer and early fall when animals often water daily (Welles and Welles 1961; Turner and Weaver 1981). Thus, despite the possibility that bighorn may have been hunted year round, summer and early fall are the most likely seasons of exploitation at the George T. Complex. The location of blinds at the ponds rather than at adjacent tule-choked spring heads may reflect the preference of sheep for

unobstructed and easy access to open water (Hansen 1981a; Turner and Weaver 1981). Furthermore, both ponds are located at the base of the fault scarp which provides immediate escape terrain.

The dependence of mountain sheep on escape terrain shapes the behavior and movement of the animals, particularly around water sources (Turner and Weaver 1981), and is thus an important consideration in understanding hunting strategies. At the George T. Complex, where comparatively small herds (Hansen 1981b) arriving to water had ready access to the safety of adjacent canyons and highlands, attempts to drive sheep would have been ineffective. As a result, the most likely hunting tactic would have been for individual hunters concealed in blinds to wait for single animals or small herds to pass on their way to water at the ponds. The same strategy, although ideally suited to hunting mountain sheep, would have been equally effective against either pronghorn or deer that happened to pass within range.

Hunting tactics at the George T. Complex can be characterized as independent, requiring only a single hunter to be effective. This strategy was in part a result of environmental and topographic conditions, but all the same prehistoric and protohistoric patterns of dispersed settlement and limited population (Steward 1938: 57-59; Delacorte 1984) mediated against alternative tactics. Cooperative hunting was possible, and communal rabbit drives were held at fall festivals (Steward 1938: 60), but more often the limited size and mobility of the resident population (Steward 1938: 48, 58) favored independent hunting.

An as yet unanswered question, however, is why so many blinds occur at this location, particularly if independent rather than cooperative hunting tactics were used. Four explanations can be posited to account for this. First, blinds may have been constructed to

intercept specific animals or herds using one of several traditional trails to and from the ponds (cf. Welles and Welles 1961; Jones 1981b). This explanation assumes that the movement of animals varies somewhat annually and seasonally, and that adjustments in the location of blinds may have been necessary to compensate for this. A second possibility is that blinds were positioned so that hunters could avoid being scented in spite of changing wind direction, thus requiring a number of blind locations. Third is the likelihood that the number of blinds merely reflects the long-term use of the area as a hunting station, which would result in an accumulation of features, many used only sporadically. This is not unreasonable given experimental data which suggest that most of the blinds require only a few minutes to construct (see Pendleton and Thomas [1983] for an alternative view). Finally, it is conceivable, though unlikely, that individual blinds were owned, each hunter or family constructing its own.

It is presently impossible to determine precisely why such a large number of blinds exists at this and other locations (e.g., Brook 1980). However, archaeological data accumulated during the course of a comprehensive survey of Deep Springs Valley suggest that prehistoric population levels were similar, or below, those recorded historically (Delacorte 1984). There is thus little doubt that the local population would have been inadequate to occupy all the blinds simultaneously, arguing in favor of an alternative explanation to account for the large number of blinds at the George T. Complex.

CONCLUSIONS

Much remains to be learned about Great Basin hunting patterns and the role of hunting in regional adaptations. Analysis of sites like George T., however, can provide data on local

patterns of resource exploitation and at times the minimal size of the supporting socio-economic group. By considering the number of individuals necessary to implement a given hunting tactic, it is possible to distinguish between tactics requiring the equivalent of large multi-family groups and those undertaken by individuals. Despite the fact that hunting patterns may not always reflect day-to-day social organization, as for example during festivals when large groups temporarily cooperated to drive rabbits or pronghorn (Steward 1938), the presence of carefully conceived and often costly facilities like stone blinds, walls, cairns, and rock art does suggest well-established patterns of behavior that may reflect social organization (Heizer and Baumbhoff 1962; Pendleton and Thomas 1983).

In the present case, site layout, animal behavior, and local topography suggest that mountain sheep were consistently hunted by individuals in Deep Springs Valley and that this required only minimal group size. Whether similar patterns occur elsewhere in the Great Basin in prehistoric contexts is unclear. Ethnographic data indicate that both cooperative and independent hunting tactics were widespread historically (Pippin 1977: 338). The importance of specific hunting patterns and their relative age thus remains critical to our understanding of local adaptations and changes within them.

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NOTE

1. Features 1-15 and 31-33 are recorded as CA-INY-3411; features 16-25 and 27-30 as CA-INY-3409; and Feature 26 as CA-INY-3410.

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