

Landscapes, Land Use, and the History of Territory Formation: An Example from the Puebloan Southwest

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Territories are spatial units that encompass the broadest range of a society's land-use behaviors as well as the history of human interactions with the natural landscape. Drawing from published documents pertaining to the North American Indian Land Claims and to the prehistory and history of land use among the Hopi Indians of Arizona, this paper integrates spatial, material, and historical variables of land use behavior (1) to formulate an empirical definition of territory and (2) to develop a generalized life history of territory formation that can be applied explicitly to the archaeological record.

KEY WORDS: landscape; land use; territory formation; life history; Hopi history; Hopi prehistory.

*An Indian will never ask to what nation or tribe or
body of people another Indian
belongs to but "to what land do you belong and
how are you land[-]named?" Thus the very name
of the Indian is his title deed to his home . . .*

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INTRODUCTION

In search of a unit of observation and analysis that conveys the broadest range of behaviors characteristic of a particular society, archaeologists have devised numerous spatial frameworks for documenting variability in

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prehistoric economic, social, and political organization. It is generally accepted that the development of preindustrial societies is inextricably linked to the land and its resources and, thus, cannot be wholly understood outside the context of relationships between societies and the territory they occupied. However, the scale, content, and historical relevance of units of observation and analysis that best approximate a territory have changed repeatedly to accommodate contrasting theoretical perspectives and research interests. For example, if one were interested in subsistence strategies from an ecological perspective, the territorial unit considered as behaviorally relevant would be the ecosystem (e.g., Dyson-Hudson and Smith, 1978; Winterhalder and Smith, 1981), the range or exploitation territory (Binford, 1982; Lee, 1969; Vita-Finzi and Higgs, 1970), the domain (Stanner, 1965), or the ecological landscape (Kelso and Most, 1990; papers in Rossignol and Wandsnider, 1992). If, on the other hand, sociopolitical organization is the research topic, the settlement system, the site cluster, or the region would be appropriate territorial units of analysis (e.g., Parsons, 1972; Upham, 1982; Plog, 1994; Kintigh, 1985; cf. Duff, 1996; Teltser, 1995). For the cultural historian, the territorial boundaries of social units would be demarcated by the spatial clustering of formally homogeneous artifacts and features (Kidder, 1924). Cross-cutting most perspectives is the premise that patterned distributions of material culture represent distinct social groups with territorial membership (De Atley and Findlow, 1984; Graves, 1994a, b; Hegmon, 1994; Peterson, 1979; Sampson, 1988; Wobst, 1974; cf. Binford, 1982).

Since the units we define are ultimately tailored to fit a variety of conceptual frameworks, the correspondence between analytical spatial units and the actual territories used by a particular society is a subject that requires empirical investigation. Four limitations of existing research models of past land and resource use preclude a comprehensive documentation of prehistoric territories. First is the lack of time depth in many studies; emphasis is placed on synchronic spatial organization rather than on the long-term dynamics of land and resource use (Dewar, 1991; Dewar and McBride, 1992, p. 227). Second is the restricted range of land-use behaviors being investigated: most studies focus on subsistence strategies and exploitative technologies, whereas those addressing the social organization of space seldom document explicitly the relationships between the built environment and the natural landscape (Rossignol, 1992, p. 4; but see Adler, 1994). Third is the prevalence of dichotomizing typologies of socioeconomic and political organization (e.g., hunter-gatherers vs. farmers), which in turn determine the researcher's conceptualization and documentation of land use [see Ingold's (1986, pp. 131–158) discussion on this issue]. Fourth and

last is the lack of parsimonious criteria for delimiting boundaries and, consequently, the use of *ad hoc* scales to define territorial units (Allen and Hoekstra, 1992, p. 11). A related problem is the overwhelming reliance on portable artifacts to identify boundary markers without reference to the surrounding landscape.

Alternatively, I argue that territories are spatial units that result from the cumulative use of land and resources through time. All realms of societal life involve human-land interactions, a large number of which modify the landscape permanently; these modifications eventually enter the archaeological record. Therefore, inferences that attempt to delimit territories would be stronger if they were based on a body of principles articulating a broad range of land-use behaviors with their material correlates, which may be reconstructible from the archaeological record. The historical record is one place to begin building such theory.

This paper presents a generalized life history of territory as an empirical unit that encompasses the record of a society's interaction with the land [*society* here refers to a particular group of people, *sensu* Giddens (1984, p. 164)]. To illustrate this approach, the paper introduces a brief history of Hopi aboriginal territory. Because of its rich archaeological, historic, and ethnographic records of land-use, Hopi society provides a strong analytical case for building correlates of land use behavior. Ethnohistoric documents suggest that Hopi society resisted acculturation during the Spanish rule of the American Southwest (Adams, 1989). Although the introduction of European crops and domestic animals forced the Hopi to make adjustments in their patterns of land use, most Hopi traditional practices were preserved alongside European innovations until the midnineteenth century, when the Hopi territory became part of the United States. Additionally, recent transformations of Hopi society and territory, because of their modifying effects on the landscape, can be readily incorporated into a generalized life history.

The paper develops as follows. First, I formulate a definition of territory that can be applied to the archaeological record. Published documents pertaining to North American Indian aboriginal land claims provide an empirical base for formulating this definition. Next I examine the range of land uses and landscape modifications that were present at Hopi shortly before the establishment of the reservation in 1882. Hopi land-use behaviors are then placed within an historic context to explore the processes responsible for the formation, maintenance, and transformation of the archaeological record of their aboriginal territory. Finally, implications for archaeological research are discussed.

TERRITORIALITY VERSUS TERRITORY: EMPIRICAL FOUNDATIONS OF A LIFE-HISTORY APPROACH

Theoretical approaches to the study of territoriality in living societies worldwide have concentrated almost exclusively on the analysis of boundary-reinforcing behaviors and attitudes toward the possession and defense of vital resources (Ingold, 1986, p. 135). These approaches include the analysis of instinctive territorial demarcation (Malmberg, 1980, p. 47ff), competition for resources (Harner, 1977; Smith, 1983, p. 61), political aggression (Wilmsen, 1973, p. 4), and cognitive affirmation of membership (Casimir, 1992, p. 20). In these studies, the territories themselves are rather poorly defined, being treated as implicit backgrounds for human action. For example, territories serve as subsistence resource pools in functional ecology (Dyson-Hudson and Smith, 1978, p. 23; Malmberg, 1980, p. 47ff), political "arenas" in cultural anthropology (Barnard and Woodburn, 1988, p. 10; Myers, 1988, p. 65), symbols of individual group identity in psychology (Taylor, 1988), and commodities in Western political economy (Soja, 1971, p. 10). These disparate views about the nature and scale of territory provide neither adequate analogues nor material correlates for archaeological reconstructions. We need, therefore, to formulate a definition of territory that encompasses material and historical dimensions, one that can be explicitly applied to the archaeological record. Documentary information on aboriginal land use and territory formation gathered through the North American Indian land claims process provides a solid empirical foundation for identifying the necessary and sufficient conditions of such a definition.

Scale, Content, and Historical Relevance of Aboriginal Territories

The National Archives holds thousands of documentary records pertaining to American Indian aboriginal territory claims. From the signing of the Indian Claims Commission Act by President Truman in 1946 to the early 1980s, the U.S. Department of Justice and the Indian tribes sought the expert advice of anthropologists to gather background information on aboriginal land and resource use that would support their competing claims. Thus, many of the documentary records are the result of over three decades of expert witness research conducted by eminent anthropologists, such as Alfred Kroeber and Julian Steward, with the assistance of Indian elders, archaeologists, historians, geographers, and wildlife biologists (Beals, 1985, p. 142; Sutton, 1985, pp. 91-113). These records contain a wealth of empirical data on the formation of aboriginal North American territories. It is important to mention here, however, that the "aboriginal" territories as

determined by the Indian Claims Commission or the U.S. Claims Court represent exclusive land use at a specific point in time. Nonetheless, expert witness research covered a much broader time period, beginning with pre-historic traces of occupation. Legal aboriginal territory determinations are therefore less useful than the expert witness testimonies themselves.

As the intellectual and legal debate carried out during the land claims process and in its aftermath demonstrates, the key to piecing together evidence of aboriginal land use and ownership rested on the conceptualization of *territory* (Beals, 1985, pp. 149–153; Price, 1981, p. 18). Western common-sense notions of territories as homogeneous, clearly bounded, and stable spatial units were set aside (Barney, 1974, p. 14). Instead, a territory had to be conceived in terms of the aboriginal forms of effective land use and ownership, which did not fit the narrow definitions of the law. In the absence of “tribal legal titles” to aboriginal lands, judges, attorneys, and expert witnesses needed to solve the practical problem of delimiting territorial units based on material evidence of the history of land use as well as on ethnohistoric documents and oral tradition (Barney, 1974, p. 14).

In examining the configuration of land claims, Imre Sutton (1985, p. 111) points out that, although each Indian land claim was unique in extent and content, claims shared several characteristics. Aboriginal territories, as conceived in the collective memory of an Indian society as well as documented through research, comprised aggregates of “tenures” held at different times throughout the term of occupancy (Sutton, 1985, p. 129). Tenures consisted of single places, portions of land (e.g., landmarks, fields), natural resources (e.g., wild herds, tree stands, mineral ores), and the material record of human use of both the land and its resources (e.g., burial grounds, villages, encampments, trails, shrines). Tenures represented a broad range of activities carried on since “time immemorial” until aboriginal lands were lost to European conquest and colonization. These activities included housing, hunting, farming, fishing, ceremonial pilgrimages, burial rituals, trade, migration, and warfare (Kroeber, 1963; Price, 1981; Wishart, 1985).

Although aboriginal territories were bounded spaces (Stewart, 1966, p. 191; Wishart, 1985, p. 171), their boundaries were not neatly demarcated. Rather, research demonstrated that aboriginal boundaries were buffer zones frequently used by more than one society and usually coincided with major geographic features, trade routes, migratory patterns of wild game, (e.g., Price, 1981, p. 18), or ancestral places (Hawley-Ellis, 1974; Hester, 1962). Nonetheless, researchers were able to find that, for the most part, within those broadly drawn boundaries there was indeed a record of the history of land use by particular groups (Stewart, 1966, p. 191).

More often than not, the Indian Claims Commission and the U.S. Claims Court looked favorably upon expert witness testimony that depicted aboriginal territories as "nuclear" units delimited by a record of exclusive, long-term, and intensive use of the land; buffer zones or joint use areas were not admitted as rightful claims for aboriginal territory determinations (Beals, 1985, p. 142). However, the bulk of evidence gathered during the land claims trials indicates that a much larger scale, a deeper time frame, and a more inclusive examination of the range of human-land interactions than those allowed for "nuclear" territorial units are needed to comprehend the full extent and content of American Indian territories (see Ferguson, 1995; Hawley-Ellis, 1974; Kroeber, 1963).

In short, three decades of anthropological research on Indian land claims have furnished important insights for reconstructing both variability in and unifying principles of aboriginal land- and resource-use behaviors. The data accumulated through the land claims process provide the necessary criteria for conceptualizing territory as a society's total bounded space, wherein a broad range of human-land interactions takes place through time. Within this bounded space, there are three material elements: land, natural resources, and human-made objects. Such conceptualization brings into focus the three essential dimensions of a territory: the range of human-land interactions, the spatial scale of these interactions, and the historical processes of land and resource use. This paper integrates the three dimensions into a systematic framework for defining territorial units and organizing the material record of territory formation in archaeological contexts.

Territories as Object Aggregates

Here I define a territorial unit as an aggregate of three kinds of objects: land, natural resources, and objects of human manufacture—both stationary features and portable artifacts. Landforms and natural resources form the natural landscape upon which human-made objects stand (Allen and Hoekstra, 1992, p. 47; Jackson, 1984, p. 6; Rossignol, 1992, p. 4). Human modifications of the natural landscape are often called "built environments" by historical archaeologists (e.g., Anderson and Moore, 1988) and "rural" or "vernacular" landscapes by geographers, architects, and historians (e.g., Copps, 1995; Cronon, 1984; Jackson, 1984; Kelso, 1994; McClelland, 1991; Sauer, 1925). The term "cultural" or "social" landscape has been advanced by cultural anthropologists and archaeologists to convey the integration of the natural and built environments (e.g., Adler, 1994; Greider and Garkovich, 1994; Stoffle *et al.*, 1996). Landscapes also have been de-

defined as social and ideological constructs that signify relationships of power and meaning (Tilley, 1994, pp. 31–34; see also papers in Bender, 1993).

Superficially, the proposed definition of territory approximates that of “cultural” or “social” landscape in that this type of landscape, too, may be defined as an aggregate of land, natural resources, and objects of human manufacture. In practice, however, a territory differs from a landscape at two fundamental points. First, landscapes are, by definition, contiguous spaces that can be comprehended at a glance (Allen and Hoekstra, 1992, p. 47; Jackson, 1984, p. 8), whereas a society’s territory may encompass two or more noncontiguous spaces or even discrete sites or places [for a detailed discussion of place-bound territorial units see Ingold (1986)]. And second, landscapes are units whose boundaries are perceived by the viewer (Allen and Hoekstra, 1992, pp. 47, 69; Copps, 1995, p. 55), whereas territory boundaries are established by (a) the society that uses and controls a given space and (b) other social groups that use and control adjacent spaces (Soja, 1971, p. 34; Morehouse, 1996). It follows that a territory may be regarded as a single landscape or, alternatively, as a composite arrangement of landscapes. Thus, for the purpose of this study—and to avoid confusion—I use the term “landscape” with exclusive reference to the land and its natural resources and use the words “landscape modifications” to identify objects of human manufacture.

Conceiving a territory as an aggregate of land, natural resources, and objects of human manufacture allows one to integrate spatial, temporal, and material dimensions in a single, empirical “life history” [defined here as the cycle of formation, use, and transformation of objects and object aggregates (see Schiffer, 1972, 1987, p. 13; Walker and LaMotta, 1995)]. Land, resources, and objects of human manufacture each have their own life histories. Territories as object aggregates, in turn, follow specific trajectories that are the combined result of the natural history of the land and its resources *and* the social history of land and resource use. Societies establish, maintain, and transform territories through a variety of interactions and activities. These interactions and activities include not only effective use of the landscape but also relationships of land and resource ownership within a society as well as between the society and its neighbors (Ingold, 1986). Through time, the material record of these interactions and activities reflects adjustments of land-use strategies to a changing environment as well as changes in the landscape owing to human modification. The history of Hopi land and resource use illustrates this definition of territory, and ultimately, it shows that territories are empirical units whose life histories are amenable to systematic reconstruction.

HOPÍ TERRITORY

In the Spring of 1858, Lieutenant Joseph Ives and J. S. Newberry visited the Hopí mesas in northeastern Arizona on their way to the Colorado River of the West. Ives and his party ascended Second Mesa and came upon the town of Musangnuvi.² In this official description of an American visit to the area, Ives (1861, pp. 119–131) recounted the vastness of the country and its landscape. From the vantage point of Musangnuvi's rooftops, the lieutenant could make out the outline of five trails that radiated in straight lines from the mesa, roughly pointing in the direction of shrines, petroglyphs, ancient ruins, and natural promontories marking the edge of Hopí territory.

The trails traversed the land Hopí had used and modified for many centuries. In the mid-1800s, their territory covered at least 14,000 mi², extending approximately from the San Juan River on the north to the Little Colorado River on the south, and from Canyon de Chelly on the east to Marble Canyon on the west (Fig. 1) (Hawley-Ellis, 1974; Page and Page, 1982, p. 610). Occupying a central position within the territory were seven Hopí villages on the mesa tops. Agricultural fields and summer farmsteads were scattered within a 20-mi radius of the villages, along the floodplain of the Tusayan washes, and on the dunes of the Jeddito Valley. Sheep corals were constructed on the benches immediately below the mesa tops, while grazing areas were confined to a 10- to 15-mi radius of the villages. Cattle ranges were located 40 to 60 mi away from the mesas. Hunting grounds surrounded this nucleus and also included numerous mineral and plant collecting locations, springs, petroglyphs, shrines, eagle nests, turtle nests, and ancestral villages (Beaglehole, 1936, p. 22; Fewkes, 1900, pp. 693–700; Hough, 1915; Page, 1954, pp. 9–14; Page and Page, 1982, pp. 610–611; Stephen, 1936, pp. 566–569; Whiting, 1939). The outer portion of this area was shared by neighboring groups, such as the Zuni (Ferguson and Hart, 1985, p. 45), the Southern Paiute (James, 1900, p. 239), and the Navajo (McPherson 1992, p. 20), who collected certain resources, engaged in trade, or made pilgrimages to sacred places (Fig. 2). Similarly, the Hopí exploited resources and visited sacred places, such as the Zuni Salt Lake, which were located beyond their traditional territory (Ferguson and Don-goske, 1994, p. 34).

Extensive research on Hopí social and economic organization indicates that, in the nineteenth century, ancestral practices still governed Hopí land use at the household, lineage, clan, village, and societal levels (Beaglehole, 1936; Bradfield, 1971; Eggan, 1949, 1950, 1967; Fewkes, 1897, 1900; Forde,

²Hopí village names are written according to orthographic rules of the Hopí Dictionary.

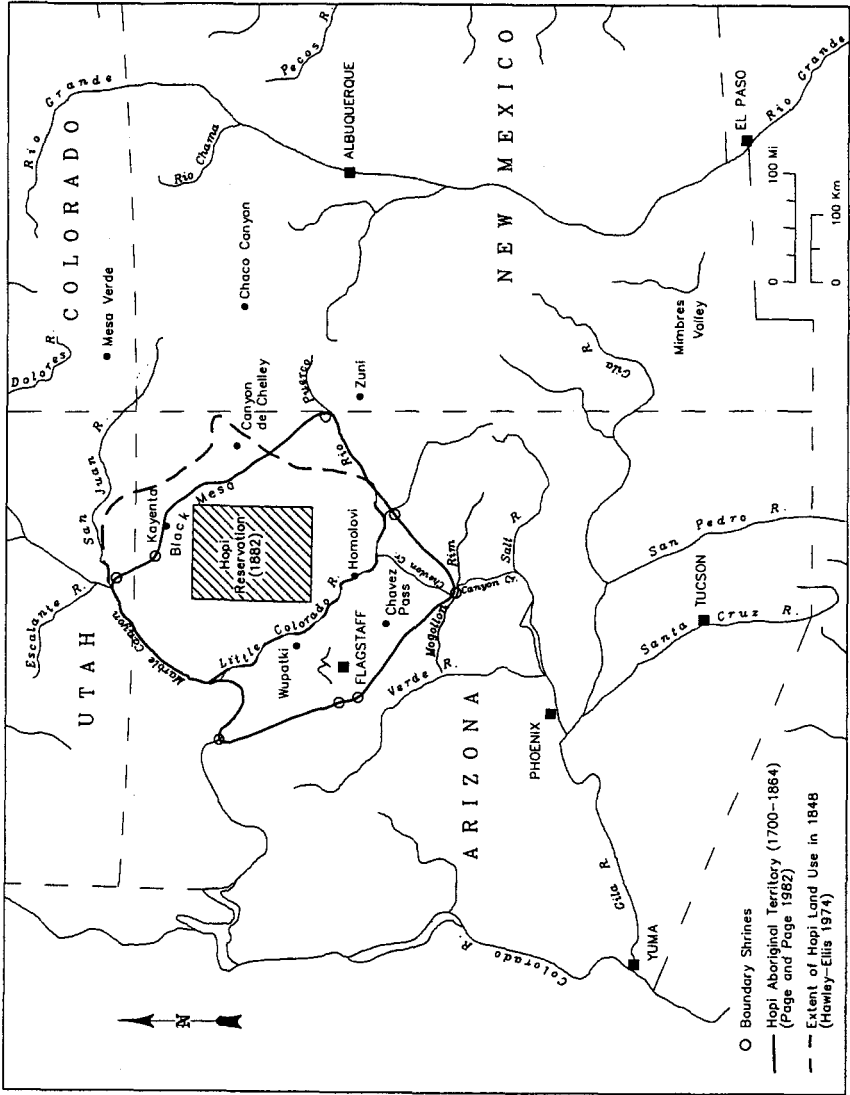


Fig. 1. Location of Hopi land and places mentioned in the text.

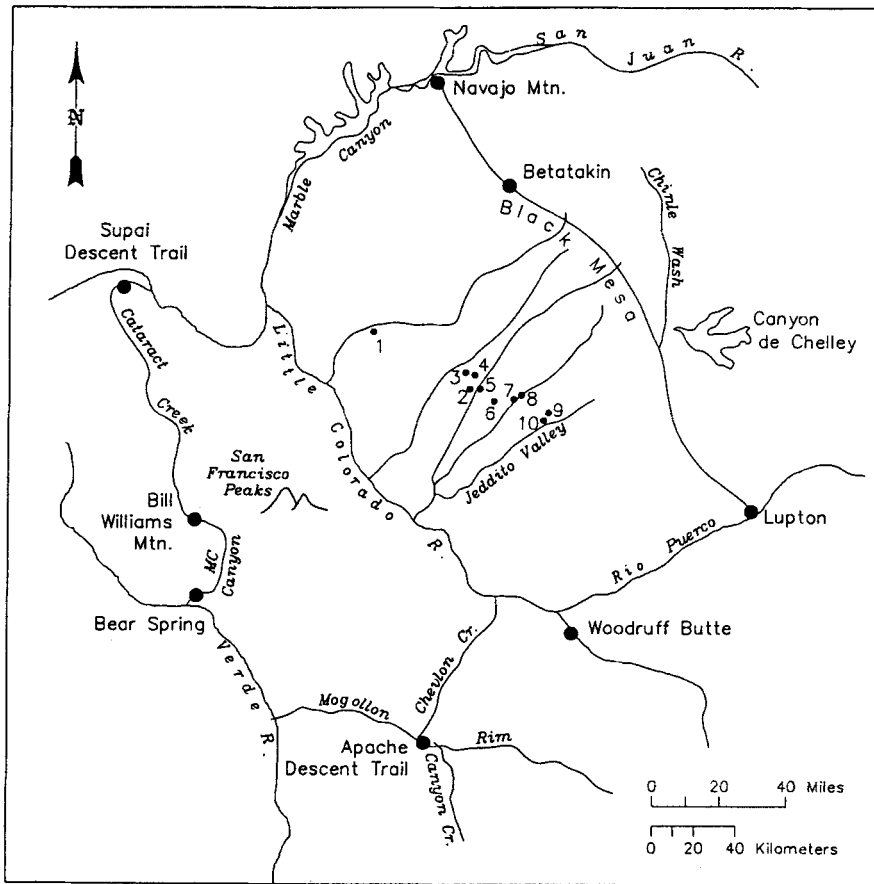


Fig. 2. Hopi villages, boundary shrines, and landmarks: (1) Munqapi; (2) Songoopavi; (3) Orayvi; (4) Payupka; (5) Musangnovi; (6) Walpi; (7) Haano; (8) Sikyatki; (9) Kawaika-a; (10) Awatovi.

1931; Hack, 1942; Levy, 1992; Mindeleff, 1989; Page, 1954; Schlegel, 1992; Stephen, 1936; Titiev, 1992; Whiteley, 1985, 1986, 1988). Of these, clan ownership rights to agricultural lands, ritual facilities, springs, shrines, eagle nests, and ancestral villages were the dominant form of control over relatively large, albeit discontinuous, portions of the territory. Oral history describes how these ancient rights were obtained by the lineages of matrilineal Hopi clans; prime agricultural lands were taken by immigrating clans that first arrived at the mesas, whereas marginal lands were assigned by the founder clans to the latecomers (Courlander, 1987; Fewkes, 1897; Stephen,

1936; Mindeleff, 1989). This system survived into the twentieth century (Bradfield, 1971, p. 50; Titiev, 1992, p. 62).

Within the village, domestic architecture was the property of a household; natural reservoirs or *tinajas* could be owned by a household, groups of women relatives (e.g., same clan or lineage), or even an individual woman (Stephen, 1936, p. 134). Villages owned communal lands and major water sources that were defended against other villages; these lands could be planted by marginal lineages or landless individuals upon approval by the village chief. Village and clan lands were clearly partitioned and marked with boundary stones and cairns (Forde, 1931; Hack, 1942, p. 71; Stephen, 1936, p. 390). Hunting, ranching, and plant collecting were conducted on communal, supravillage lands. Crops, sheep, and cattle were owned by individuals and tended by extended families. Thus, from the perspective of effective use and ownership, Hopi territory comprised the totality of land, specific places, and resources controlled by the society as a whole *and* by sectors thereof, such as individual villages, and also included areas shared with neighboring groups. Eight known shrines marked the boundaries of this territory (Page and Page, 1982, pp. 610–611).

The Spatial Scale and Range of Land-Use Activities

This brief ethnographic account of Hopi land use in the mid-1800s provides key points of reference for examining the spatial scale and range of land- and resource-use activities carried out within a territory and the ways in which these activities likely modified the natural landscape in pre-historic and historic times. Two concepts—place as the discrete activity locus and space as the integrated totality of loci—are crucial to the characterization of Hopi land and resource use.

At the geographical center of the territory one finds the record of activities involving the organization and partition of *living space* (Fig. 3A). Landscape modifications include the construction of villages and associated supporting facilities such as access routes and defensive structures. At Hopi, for example, villages were connected to each other by trails, which were defended from outsiders and were dotted with commemorative inscriptions and shrines. Hopi pueblos located atop mesas obtained water from local cisterns and nearby reservoirs and springs (Mindeleff, 1989; Colton and Baxter, 1932, p. 41; Thompson and Joseph, 1944, p. 30).

The record of activities targeting food production occurs within as well as in the surroundings of the living space (Fig. 3B). Landscape modifications associated with *food production space* include the partition and use of agricultural lands and construction of supporting facilities such as farm-

steads, terraces, retention walls, and irrigation devices, as well as soil and water conservation features. The success of traditional Hopi agriculture depended on the ability to farm in different locations and at different elevations to secure water supplies in the face of extreme temporal and spatial variation and to avoid loss due to short growing seasons. As a result, the fields were spread over a wide area and were farmed using a variety of technologies (Bradfield, 1971; Hack, 1942, p. 26). Agricultural fields were often marked with stone alignments, many of which depicted clan ownership inscriptions (Hawley-Ellis, 1974, p. 153). Stock raising also required supporting facilities such as corrals and watering holes. Cairns and scarecrow features were built around the fields to warn sheep herders and to keep herds and predators away from the unfenced crops (Stephen, 1936, p. 390).

The next set of activity records corresponds to the procurement of resources to obtain food and nonfood materials for a variety of secular uses (Fig. 3C). Modifications of the *procurement space* include the physical removal of materials from the landscape and the creation of associated logistic facilities such as temporary camps for shelter and resource processing, access and transportation routes, and locational markings. As described above, Hopi hunting and resource collecting grounds covered a huge area, practically the entire extent of the area crosscut by major trails. Resource locations were associated with numerous petroglyphs, shrines, and cairns (Forde, 1931, pp. 366–370). Certain resources, such as native plants and potting clay, were located in the vicinity of the villages and fields, thus overlapping with other activity spaces.

Activities that involve ritual and ceremonialism produce landscape modifications that crosscut all other spaces and articulate with all other land-use behaviors, at least in the case of Hopi and other Pueblo societies (see Ford, 1972). Facilities associated with *ritual space* include ceremonial structures, shrines, cemeteries, caches, household burials, locations containing plants, animals, and minerals used in ritual activities, and ancestral sites, and thus they are also found in living, food production, and procurement spaces (Fig. 3D). Many of these locations and facilities were used exclusively by certain sectors of Hopi society (Fewkes, 1900; Stephen, 1936, pp. 1076–1081; Titiev, 1992, pp. 60–62), whereas other sacred places, such as the San Francisco Mountains, were shared by the Hopi with other groups.

In sum, Hopi territory in the nineteenth century encompassed the systemic record of all human–land interactions aimed at securing a wide variety of resources. The space taken up by most interactions and activities overlapped only slightly; living, food production, and procurement spaces were adjacent and their uses complementary. While living and food production spaces took up relatively restricted, noncontiguous areas, the space

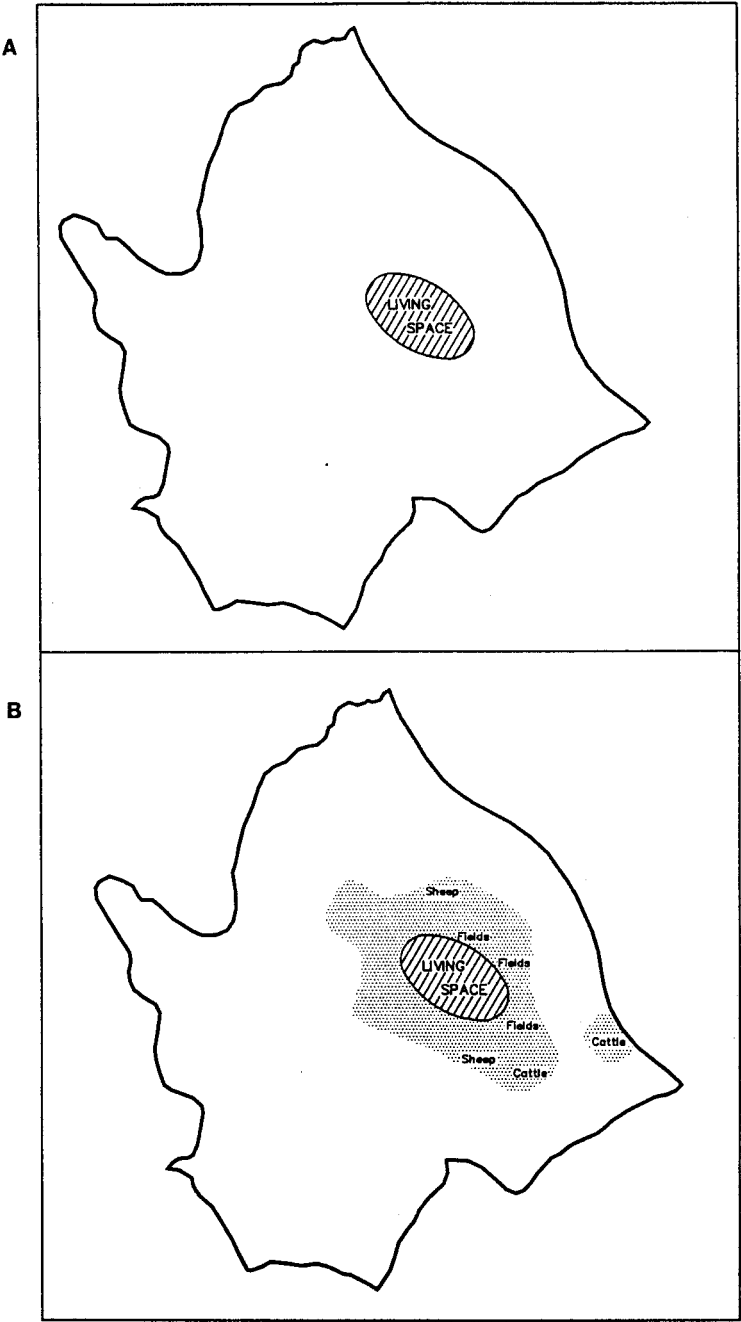
needed for the procurement of food and nonfood resources extended well beyond the mesas and was bounded by four major geographic features; Marble Canyon, the Colorado River, Canyon de Chelly, and the Mogollon Rim. Sacred trails connected the boundary shrines with the villages and thus served to integrate all spaces. Because ritual activities were involved in all realms of everyday life at Hopi, ritual space crosscut the entire area. Ancestral homes represented the material link between the nineteenth-century Hopi and their unwritten past.

Also contained within those boundaries was the material record of Hopi ancestral history of land use in a changing environment. By examining the contemporary distribution of preserved territory-related traces in the archaeological record, and complementing these data with ethnohistoric documentation and oral history, one may begin to reconstruct the formation of the Hopi territory. The reconstruction that follows offers insights on how portions of land, different types of natural resources, and objects of human manufacture that are now distributed in a large geographic and archaeological region were aggregated through time, eventually becoming a single territory.

Historical Relevance: The Formation of Hopi Territory

The Hopi mesas and adjacent valleys were apparently occupied since about AD 700 (Adams, 1982; Colton, 1936; Daifuku, 1961; Gumerman and Dean, 1989). The record of early settlements has been largely obscured by long-term use of the mesas; however, information from neighboring regions suggests that the general area was colonized and eventually settled by Pueblo people by AD 1100 (Powell, 1983; Gumerman and Dean, 1989). Small masonry villages with kiva structures were built on the Hopi mesas; population expanded into peripheral areas during the twelfth century (Adams, 1982, p. 12). Orayvi, the oldest still-occupied Hopi village, was founded circa AD 1150. Continued expansion of agricultural fields, farming villages, and hunting ranges was likely stimulated by a period of favorable climatic conditions for agriculture (Euler *et al.*, 1979).

Expansion ceased during the thirteenth century; populations withdrew from peripheral areas, and by the mid-1200s, a few formally organized and densely inhabited villages were built on the Hopi mesas and in neighboring regions such as Tsegi Canyon, the middle Little Colorado River Valley, and the Jeddito Valley (Gumerman and Dean, 1989). Associated with these villages were intensively cultivated fields and soil and water conservation facilities. With the onset of the Great Drought in AD 1276, agricultural fields and ranges shrank even further. By AD 1300, Tsegi Canyon, northern Black



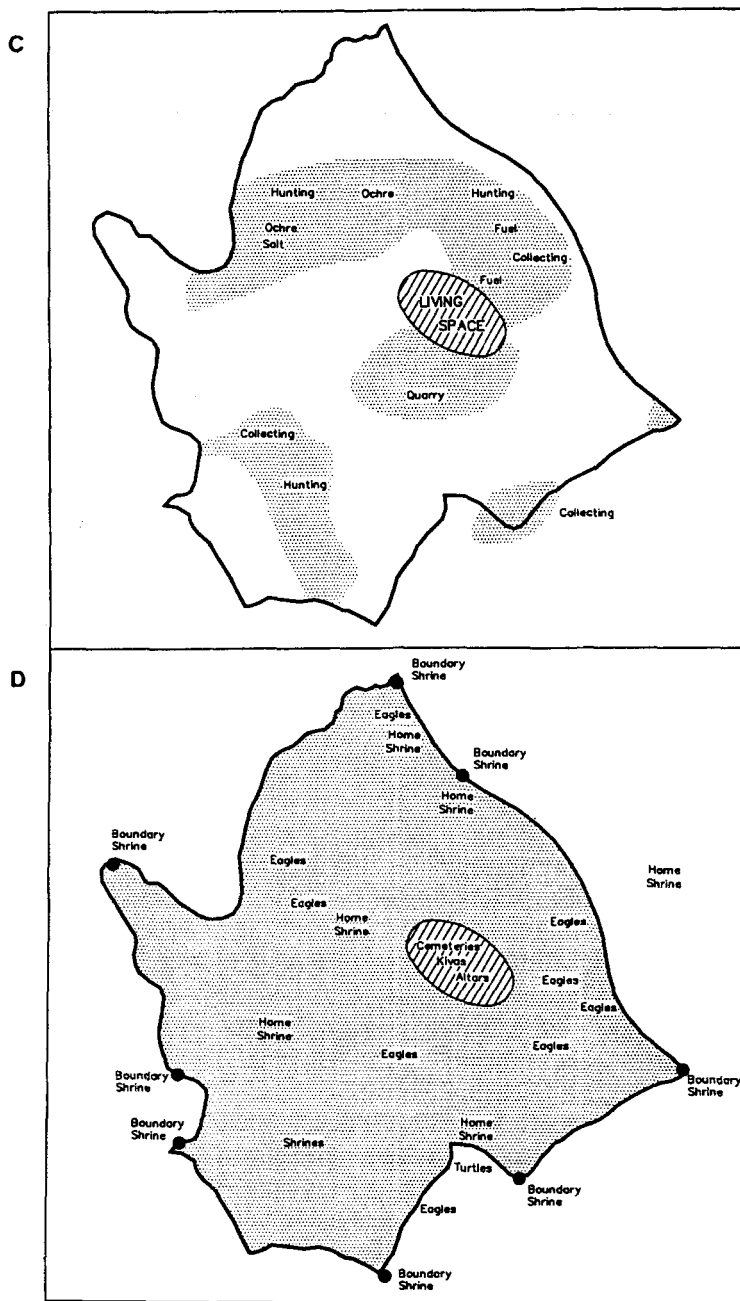


Fig. 3. Hopi land use. (A) Living space. (B) Production space. (C) Procurement Space. (D) Ritual Space.

Mesa, and the Hopi Buttes were abandoned (Dean, 1969; Gumerman and Dean, 1989; Gumerman *et al.*, 1972). The bulk of population apparently moved south to the Hopi mesas, the Jeddito Valley, and the middle Little Colorado, where there was enough water to support incoming people throughout the drought (Adams, 1982, 1991a, b, 1996; Hack, 1942; Hargrave, 1931; Hawley-Ellis, 1974).

Coinciding with the abandonment of the four corners area and large portions of the southern Colorado Plateau between AD 1250 and AD 1325, the prehistoric Hopi villages underwent a process of rapid expansion. Large towns organized around public and ritual facilities, such as Orayvi, Soon-goopavi, Old Walpi (Qootsaptuvela), Hoyapi, Musangnuvi, and about 40 more, sprang up on or below the mesa tops. Populous villages, such as Awatovi, Sikyatki, and Kawaika-a, and numerous—at least 125—smaller towns also flourished along the Jeddito floodplain. A similar process took place in the Little Colorado River Valley, where villages may have received an influx of population from the expanding Hopi villages and from the Silver Creek areas (Adams, 1996). Expansion likely continued until the end of the fourteenth century, when a second wave of immigration may have resulted from the abandonment of villages along the Middle Little Colorado River Valley and the Mogollon highlands. Population was concentrated in a few enormous villages, some up to 2000 rooms or more (Adams, 1996). Munkapi, an agricultural colony, was founded in the 1400s and lasted until the turn of the nineteenth century (Hawley-Ellis, 1974, p. 44).

Several lines of evidence suggest that, by the end of the fifteenth century, Hopi had a territory of a size similar to or even larger than that occupied in the 1800s. According to oral tradition and ethnographic sources, Hopi aboriginal territory incorporated the ancestral lands of many clans who in ancient times migrated into the mesas and joined the local population (Courlander, 1987; Dongoske *et al.*, 1993; Fewkes, 1897; Mindeleff, 1989; Stephen, 1936). Although reconstructing specific prehistoric events from clan migration traditions is difficult at best, in a broad sense these traditions accord with the massive population relocation that took place in the northern Southwest at the end of the thirteenth century (Adams, 1982, p. 15; Dongoske *et al.*, 1993, p. 27).

It was probably during the fifteenth century that the Hopi aboriginal territory, as known historically, was established. This is suggested by several factors: first, the presence of a heterogeneous population inhabiting large formally organized villages that combined habitations with public and ritual facilities (Adams, 1982; James, 1990; Levy, 1992; Rushforth and Upham, 1992; Whiteley, 1988); second, the development of a resilient agricultural economy that took advantage of the arid regional environment through a variety of productive technologies and soil and water conservation strategies

(Bradfield, 1971; Hack, 1942; Levy, 1992); third, access to an expanded area wherein numerous resources were available for exploitation (Fewkes, 1900; Hawley-Ellis, 1974; Whiting, 1939); and fourth, a ritual complex that crosscut all other developments (Adams, 1991a; Fewkes, 1900; Stephen, 1936; Voth, 1905). But of all these, I suggest that it was the multiethnic character of the Hopi population that contributed to the establishment of their territory.

According to oral tradition, the clans that eventually joined the local Hopi population immigrated from a number of regions (Nequatewa, 1936; Courlander, 1987; Dongoske *et al.*, 1993; Fewkes, 1897; Mindeleff, 1989). Northern clans came from Tsegi Canyon and Navajo Mountain; western clans, from the Grand Canyon, the San Francisco Mountains, and Wupatki; eastern clans, from the Chama Valley via Canyon de Chelly; and southern clans, from the Gila-Salt River Basin, perhaps via Homol'ovi. Although most of the ancestral homelands of these clans lie outside Hopi territory, clans developed ties to those areas where, during their migration toward Hopi, they were said to have stopped, lived, and buried their dead. As a result, many of these areas were incorporated into Hopi territory once the clans were admitted and settled on the mesas and adjacent valleys.

The oral history contributes crucial information for understanding the processes of Hopi territory formation, because it outlines general patterns of population movement and intergroup relationships, types of settlement, and use of the landscape. According to Hawley-Ellis (1974, p. 254), the locations of many ancestral homes claimed by the clans coincide with archaeological remains and with the range of ceramic variation found in thirteenth- and fourteenth-century sites in the Jeddito Valley and Hopi mesas (see also Adams, 1982; Fewkes, 1897; Smith, 1971). Evidence for multiethnic communities can also be found at Homol'ovi (Adams, 1991a, b).

Multiple origins and ancestral connections acknowledged by the different clans apparently translated into specific human-land interactions that continued into historic times. These interactions included (1) reorganization of public and ritual space to accommodate complex ritual developments that in turn stimulated integration [e.g., the katsina cult (Adams, 1991a)]; (2) adjustments in the system of land allotment and introduction of irrigation technologies that allowed the production of cotton; (3) expansion of hunting, gathering, and ritual space into ancestral territories of immigrant groups; and (4) establishment of ownership rights to, and strict boundary demarcation of, living space, ritual facilities and practices, agricultural fields, water sources (natural springs, cisterns, and reservoirs), and ritual resources such as eagle and turtle nests. In historic times, ties with ancestral homes were maintained through regular visits to the sites, use of

the ritual facilities at or near those sites, and continued exploitation of nearby resources (Hawley-Ellis, 1974, p. 154).

Two reasons for having maintained ties to ancestral homes are suggested. First, the abandonment patterns in areas where some of these clans may have originated, such as Tsegi Canyon and specifically Kiet Siel Ruin, suggest that the people perhaps intended to return (Dean, 1969, p. 142). Maintaining ownership rights to their former territories may have been a way to ensure that they could indeed return if economic or political conditions required them to leave Hopi. For example, the Asa clans-people of Walpi, who it is said came from the Chama Valley of New Mexico via Canyon de Chelly, returned to the canyon during a drought and lived among Navajo settlers there. According to the oral history, after two or three generations the Asa people came back to Walpi, where they became guardians of the main access trail (Mindeleff, 1989, p. 30). And second, in exchange for land and living space, immigrant clans incurred ritual obligations that had to be constantly fulfilled. Many of the resources necessary to conduct these rituals could be found only in the ancestral lands of each clan, the resource distribution tending to coincide with archaeological sites that the clans claimed as theirs. For example, the Snake Clan, one of the oldest clans of Walpi, obtained sacred eagle feathers from their eagle nests in Tokonabi, near Navajo Mountain (Fewkes, 1900, pp. 693-700; Hough, 1915, p. 169; Stephen, 1936, p. 568). Through these mechanisms the clans kept regenerating their rights to the ancestral territories while maintaining their ownership rights in the host territory as well. Hopi ownership rights were, in other words, continuously reaffirmed through land-use interactions and activities whose scale increased exponentially to reach the farthest areas claimed as ancestral homes.

Thus, by AD 1500 the limits of Hopi aboriginal territory were marked by ancestral homes, or what Schlanger (1992) would call "persistent places," which over generations were visited for hunting, gathering, and ritual purposes. Some of these persistent places were the eagle nests near Navajo Mountain, Pueblo Colorado, and Black Falls; the salt deposits, red ocher mines, and eagle nests at the mouth of the Little Colorado River, the shrines in Navajo Mountain, Lupton Point, Grand Canyon, the San Francisco Mountains, and Bear Springs; the turtle nests near Homol'ovi; and ancestral homes such as Betatakin Ruin and Canyon de Chelly (Hawley-Ellis, 1974, p. 109; Page and Page, 1982, p. 610).

From 1540 to 1700, Hopi territory apparently underwent a process of consolidation, with frequent village fission owing to population imbalance, political struggle, and the impact of the Spanish Rule on the local economy (Whiteley, 1988). The destruction of Franciscan Awatovi in 1700 and the reallocation of Awatovi ancestral lands to those villages and clans that

adopted Awatovi women illustrate the political struggle brought about by the imposition of Catholicism (Montgomery, 1949; Hawley-Ellis, 1974, p. 101; Courlander, 1987, pp. 175–188). After the Pueblo Revolt of 1680 and the last episode of immigration of Tewa people from the Rio Grande, Hopi further consolidated their remote positions by moving all the villages to the mesa tops (Adams, 1982, p. 16). As a result of violent threats, peripheral areas may have been vacated, thus opening the way for colonization and settlement by other groups. For example, in 1776 the Franciscan missionary Francisco Garcés noted the presence of Southern Paiute farmsteads scattered in the area between of Munqapi Wash and Marble Canyon (Garcés, 1900) (see Fig. 2).

Since 1800, a growing portion of the hunting, collecting, ranching, and ritual areas was occupied by European immigrants (i.e., Mormon communities) and Navajo settlers, forcing the Hopi to withdraw from their farthest ancestral territories. The first Hopi reservation, a 3900-mi² rectangle of land drawn around the mesas, was established by the U.S. government in 1882; this area was later partitioned between the Hopi and the Navajo tribes. A large portion of this area is still in dispute (see Brugge, 1994; Ferguson and Dongoske, 1994).³ The Orayvi Split in 1906 illustrates how the distressing influence of U.S. policy on Hopi society and the increasing internal tensions produced by the vastly reduced access to land contributed to the fissioning of this ancient Hopi village [Levy, 1992; Titiev, 1992; see Whiteley (1988) for alternative views of this process]. Nevertheless, many of the ancient land and resource use strategies survived into the early twentieth century.

RECONSTRUCTING TERRITORY LIFE HISTORIES

The generalized life history presented here briefly summarizes the processes of Hopi territory formation and the land-use and modification strategies linked to these processes. Using Hopi as a case study, we may further sketch a life history of territory formation that could be used for comparison with prehistoric cases.

³The major archive of research files and evidentiary exhibits produced during the Hopi Land Claims trials is the John Boyden Collection in the Special Collections of the Harold B. Lee Library of Brigham Young University. Other documents are archived in the John Boyden Collection at the Marriott Library of the University of Utah (Ferguson and Dongoske, 1994, p. 15). These unpublished sources explain at length the discrepancies between the small size of the land adjudicated to the Hopi Tribe on the grounds of exclusive use in modern times and the full extent of the territory they once occupied.

Specific trajectories of territory formation do not necessarily include all the processes specified in this analysis, nor are they necessary stages in its life history. Abandonment may occur at any point in the sequence, thereby interrupting territory formation and opening the possibility for other human groups to begin their own interactions. Furthermore, there are contextually specific processes, such as instances of war or conquest, that may be brought to light through the empirical examination of the archaeological record of land use by particular societies.

Regardless of contextual specificities, though, there exist three types of human-land interactions that, as shown for the Hopi case, underlie the life history of a territory: (1) interactions between a given society and the landscape, which translate into effective use of land and resources (e.g., Adler, 1994; Binford, 1982; Ingold, 1986; papers in Rossignol and Wandsnider, 1992), (2) interactions between sectors of a society, which determine the internal frontiers or boundaries of effective use and ownership (e.g., Schlegel, 1992; Kopytoff, 1987; Mills *et al.*, 1996), and (3) interactions between the society and its neighbors, which determine the external frontiers or boundaries of effective use and ownership (e.g., Peterson, 1979; Morehouse, 1996; papers in De Atley and Findlow, 1984; Prescott, 1978). In principle, the material record of many such interactions may be documented archaeologically. The processes outlined below (Fig. 4) provide a framework for organizing the material record of a broad range of human-land interactions in historical perspective. Although this schematic life history is directly applicable to semisedentary and sedentary societies, a similar approach may be used to reconstruct territory formation trajectories for mobile hunter-gatherer societies (see Binford, 1983, "Hunters in a Landscape").

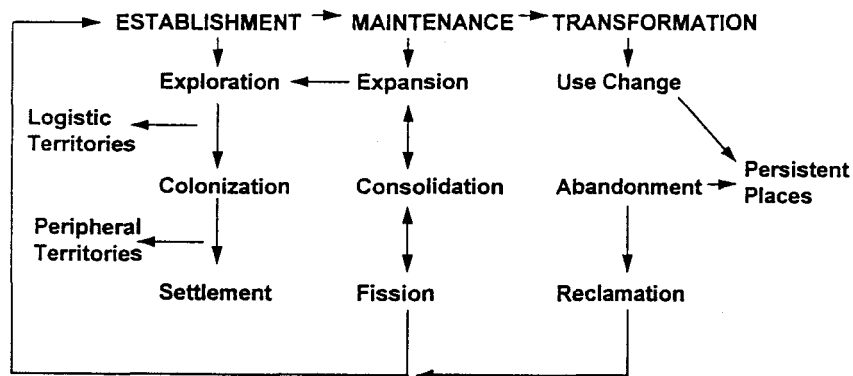


Fig. 4. A schematic representation of territory life history.

Territory Establishment

A territory life history begins with the establishment of a group of people in a particular area (Table I). Three associated processes may be outlined: exploration, colonization, and settlement (Fig. 5). These processes correspond to the early prehistory of the Hopi mesas and adjacent regions, where Pueblo groups experimented with agricultural technologies and resource exploitation in marginal environments.

Exploration

Exploration is a reconnaissance of potential resource areas, these being either empty lands or joint-use lands, by scouts, task groups, or even small suprafamily groups. Exploration generally involves temporary land and resource use and may be limited to (1) exploitation of food and nonfood resources for immediate use, (2) logistic exploitation of resources of restricted distribution, (3) marking of specific places for future use with inscriptions or cairns, (4) construction of ephemeral shelters and warmth features, and (5) caching of resources for future use [see Binford (1982) for a detailed discussion of these activities]. Explored areas are logistic territories in their own right and can be incorporated into a preexisting territory, through either exclusive or joint exploitation of certain resources.

Table I. Territory Establishment

Process	Associated activities	Material correlates
Exploration	Reconnaissance Temporary uses Restricted resource exploitation	Ephemeral shelters Caches Markings/cairns
Colonization	Prolonged uses Annual ranges Semipermanent settlements	Premanent/semipermanent housing Agricultural features Ritual facilities
Settlement	Fixed ranges Permanent settlement Formalized partition of space	Functionally diverse structures and sites Productive facilities Integrative facilities Boundary markers

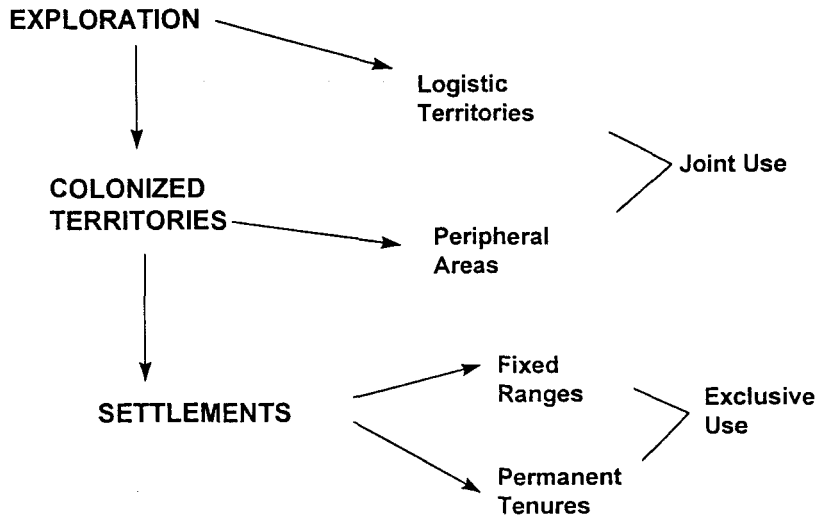


Fig. 5. Territory establishment.

Colonization

Colonization entails the initial movement of a group, usually a scout group of a few families, into a newly explored area. Colonization is first and foremost a prolonged period of experimentation, when a group is able to evaluate the life-supporting capabilities of the natural landscape. During this process decisions are made as to whether the area now occupied could be more permanently settled or, in the case of mobile populations, repeatedly used as a home base and associated range. Land modifications may include the establishment of (1) permanent or semipermanent living quarters, (2) agricultural fields, hunting, grazing, and collecting ranges, (3) expedient soil conservation and water control facilities, and (4) exploitation of raw materials for tools, containers, and other needs. Ritual facilities are likely present and may involve shrines, altars, caches, and burials. Marginal territories under colonization can be incorporated into preexisting territories. The prehistoric record of human land use across the Hopi ancestral territory suggests that, because of the high mobility of prehistoric Pueblo societies (see Cameron, 1995; Dean, 1996), small groups of people may have engaged in prolonged periods of colonization that did not always lead to successful settlement or that limited the duration of settlement processes to no more than one or two generations.

Settlement

If resource potential in the colonized area fulfills minimum requirements, a group may decide either to settle permanently or to turn the area into a fixed range or area repeatedly inhabited and exploited by a mobile group (Binford, 1982, p. 12). It is during the settlement process that living space may be permanently organized, beginning with the partition of space for building and production. Long-term ritual and integrative facilities appear with village construction. Similarly, long-term modifications to the landscape result from continued exploitation and construction of associated facilities. The settlement process may include the demarcation of internal and external use and ownership boundaries.

The specific forms that these three processes actually take depend on whether there is land available for establishing a territory. If a society attempts to settle in an area already occupied by other groups, as was the case in the Hopi area after AD 700, then different mechanisms for obtaining land and for exploiting resources could develop. These mechanisms may range from peaceful negotiation of use and ownership rights to war and conquest. The archaeological record of late prehistoric societies in the American Southwest, where massive population movement and reorganization occurred between AD 1285 and AD 1450, contains abundant evidence for documenting the exploration, colonization, and settlement of occupied territories by immigrant groups.

As discussed in the previous section, peaceful negotiation of clan land and resource ownership appears as a key mechanism in the establishment of the Hopi aboriginal territory as it is known historically. However, competition and violent conflict both within Hopi society (i.e., the destruction of Awatovi, the Orayvi split) and between the Hopi and other groups (i.e., Hopi-Navajo land dispute) also played a dominant role in the maintenance and transformation of this aboriginal territory.

Territory Maintenance

Settled territories can be maintained successfully through a variety of processes, depending on specific requirements of the settled population, presence of neighboring groups, long-term productivity of the landscape, or mechanisms of integration (Table II). Three basic processes are outlined here: expansion, consolidation, and fission (Fig. 6). As described above, all three processes were active at different times throughout formation of the Hopi territory, but particularly since the fifteenth century. These processes resulted in the development of internal boundaries or frontiers between

Table II. Territory Maintenance

Process	Associated activities	Material correlates
Expansion	Use of marginal lands Exploitation of diverse ecozones Boundary shifts Adjustment of living space Expansion of communication networks	Appearance of satellite villages Increase in volume and diversity of food and nonfood stuffs Expansion of domestic and integrative facilities Expansion of road and trail networks
Consolidation	Increase in ritual/integrative activities Increase in political control/bellic activities Increase in population and resource control	Expansion/modification of integrative facilities Defensive architecture Soil/water control features Slow growth of domestic facilities
Fission	Fragmentation of communities Colonization of distant areas Consolidation activities in fragmented community	Partial abandonment of domestic facilities Abandonment of peripheral lands Rapid growth of distant satellite communities Colonization begins outside fragmented territory

clan, lineage, and village lands and resources (Schlegel, 1992; Levy, 1992; Whiteley, 1988) as well as external boundaries between the Hopi and neighboring groups.

Expansion

Settled territories tend to expand when occupied intergenerationally or in less time if they are open to immigration and assimilation of newcomers. For example, the rapid expansion of the Hopi territory after AD 1300 likely resulted from the complex system of annexation of territories

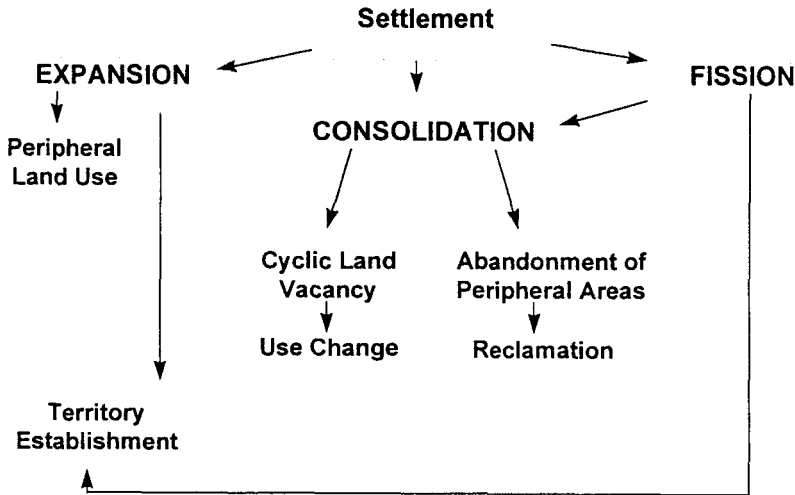


Fig. 6. Territory maintenance.

previously owned by immigrants. Some of the immediate consequences of expansion are (1) a boundary shift to accommodate population and the concomitant appearance of satellite communities within primary or alternate lands, (2) adjustment of living space and associated facilities, (3) adjustment of agricultural field allotments, and (4) construction of roads and trails that open access to newly settled areas. Expansion tends to stimulate exploration and colonization of peripheral areas that may be suitable for food production (Grebinger, 1971; Reid, 1973).

Consolidation

Although in theory a single territory could expand *ad infinitum*, in practice expansion is limited to productive areas available for colonization and settlement. If limitations to expansion appear, societies tend to secure the land they already control through consolidation. Consolidation is achieved when a group develops successful integrative strategies. Crucial to the process of consolidation, for example, is the ability to integrate political and ritual activities or to achieve a balance between resource production and conservation. At the same time, consolidation may require the development of punitive and defensive strategies to control access to, and maintain possession of, the land. Population control and resource conser-

vation activities may increase to maintain a balance among available space, resource potential, and productive/exploitative technologies. At Hopi, consolidation processes are most clearly illustrated in the developments that occurred after the Pueblo Revolt of 1680 and the destruction of Awatovi in 1700, when the Hopi moved their villages to the mesa tops.

Fission

An alternative process is fission, or the fragmentation of a territorial unit into two or more segments. Fission occurs when a group fails to integrate organizational, productive, and conservational strategies, or when it fails to resolve political conflicts that lead to civil war or invasion. If resource depletion reaches a critical threshold, or if the territory expands beyond the integrative capabilities of a society, a territorial unit could split, with groups colonizing empty or joint-use lands. Fission leads to a new process of consolidation wherein the society, having rid itself of excess population, may increase the chance of integrating all activities. A consequence of this process may be a shrinkage of the total landscape needed to secure resources; living space may be partially abandoned and productive lands may be freed to recover from overexploitation. Fission triggers new sequences of territory formation either within the external boundaries of the territorial unit or beyond. The Orayvi Split of 1906, which triggered the formation of two new villages at Hopi—Bacavi and Hotevilla—illustrates the fissioning process.

Territory Transformation

A territory undergoes transformation when the total area, or a significant portion thereof, changes in function or becomes part of another society's territory (Table III; Fig. 7).

Use Change

Change in the use patterns of land and facilities may occur repeatedly and within relatively short periods of time throughout a territory's life history. A common change in land use occurs when agricultural lands have been overexploited or ranges overgrazed. Active use is shifted to other areas to stimulate the rejuvenation of depleted land and resources (see Anyon and Ferguson, 1984; Nelson and Anyon, 1996). This shifting mechanism may bring marginal lands into active production. Use change, particularly

Table III. Territory Transformation

Process	Associated activities	Material correlates
Use change	Shifts in location of production areas and villages within the territory Changes in the function of structures Exploitation of formerly pristine areas within the territory	Abandonment of fields and structures Architectural remodeling Village construction soil and water control facilities
Abandonment	Permanent population relocation outside the territory Sporadic or regular visiting/use of abandoned facilities	Dilapidated structures Persistent places
Reclamation	Colonization of territories formerly occupied by a related population Usurpation of territories through war and conquest	Reoccupation of abandoned facilities Drastic changes in material culture inventories Violent death Defensive facilities Weaponry

land shifts, may introduce new landscape modifications (i.e., productive facilities) into formerly pristine areas. If agricultural fields are shifted to distant areas, entire villages may be moved closer to the fields (Anyon and Ferguson, 1984). Thus, use change in the land and associated productive facilities also affects the organization of living space. Villages and individual structures undergo use change as part of their own life histories (Cameron, 1990).

Abandonment

Numerous factors are at play in the process of village and territory abandonment. For example, throughout prehistory, Pueblo societies had to cope with environmental conditions, such as cycles of land erosion and aggradation and prolonged droughts, that forced people to leave an area per-

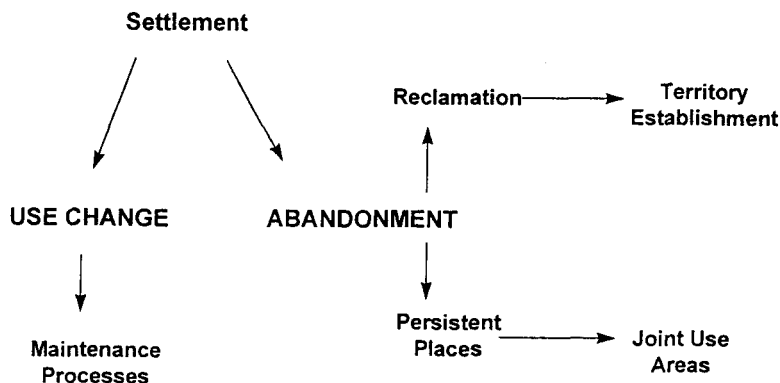


Fig. 7. Territory transformation.

manently (Hack, 1942; Dean *et al.*, 1985; Kintigh, 1985; papers in Cameron and Tomka, 1993). In many areas, Pueblo societies would not even settle down for long periods of time (more than a generation) until late in the late prehistoric period or even until the Spanish Entrada in 1539 (Dean *et al.*, 1985; Reid, 1989). Internal and external conflict, real or perceived threats, and disease were also influential in the abandonment of villages and entire regions in prehistoric and historic times (papers in Cameron, 1995; Rushforth and Upham, 1992).

It appears, however, that the lands once inhabited were never completely abandoned; as discussed previously, ancestral lands, villages, and features were incorporated into the Hopi aboriginal territory as procurement and ritual spaces (see also Ferguson and Hart, 1985; Ford, 1972 for additional information on Pueblo ancestral lands). Many ancestral homes or "persistent places" (Schlanger, 1992) contain evidence of visiting, temporary occupation, and logistic uses such as hunting. Shrines located near these places are often kept clean and well maintained, offerings and prayer sticks being periodically replenished (Haury, 1945, Fig. 128).

Reclamation

Reclamation refers to the recycling, takeover, or even usurpation of a previously occupied territory by another group, with subsequent reuse of landscape modifications left by former occupants. In other words, reclamation constitutes the beginning of the formation of a society's territory where a former unrelated group once resided. Historically, the movement of

Ataphaskan-speaking people and Anglo settlers, such as the Mormon communities, into the Southwest caused drastic transformations in Pueblo aboriginal territories. An excellent example of reclamation of a territory is the occupation of Pueblo ancestral lands, villages, and other facilities by the Navajo (Kelley and Francis, 1994; McPherson, 1991), who have incorporated these into their own territory, oral history, and religious and secular practices.

DISCUSSION

In this paper I have argued that, to reconstruct prehistoric territories, one must first identify the entire range of land- and resource-use behaviors. Methodologies that focus only on the most obvious and readily observable land modifications, such as permanent or semipermanent architecture, will not provide the necessary information about all the strategies used to secure resources. Nor will nuclear ecological perspectives inform us about the total space used by a given society. Consider, for example, the range of land-use activities carried out beyond the immediate boundaries of Hopi villages and agricultural fields in the midnineteenth century. Stock raising, hunting, gathering of food and nonfood resources, and rituals associated with these activities were critical to the survival of Hopi society at that time. Documenting the material record of such a range of activities would require a drastic reevaluation of the scale of spatial units traditionally used for reconstructing past land and resource use. As Lekson (1992, p. 29) points out in his discussion of prehistoric land-use strategies in the Mimbres area of New Mexico,

It has taken a series of modern Indian land claims cases to bring home just how large an area a "sedentary" Southwestern community with a traditional economy needs to survive . . . scales that make sense for human adaptation in the Southwest [are] not a valley, or even a drainage, but major physiographic provinces—half a state and even larger.

To reconstruct the full range of activities carried out within a territorial unit, we also need to incorporate a variety of other types of archaeological remains, such as petroglyphs, cairns, isolated features, and evidence of site reoccupation. Although many of these remains are difficult to date accurately, once created they constitute stationary landscape modifications that mark specific places and resources and that may be known and used from generation to generation (Stoffle *et al.*, 1995). Additional information may be provided by examining the range of environmental variability represented in food and nonfood remains. These remains may bring clues about

the extent of procurement space beyond immediate living and food production spaces.

Information about the total space used by a given society is critical for interpreting distributions of portable artifacts. For example, a very common assumption is that artifacts whose raw material sources are located at some distance from a site represent trade or exchange. However, as I have shown for the Hopi case and discussed elsewhere (Zedeño, 1994), prehistoric people may have obtained distant resources directly rather than through exchange, either because resources were within their territories or because they could access resources in joint-use areas. One implication of this argument is that variability in the archaeological record of many areas, and particularly the American Southwest, may be the result of frequent population movement over a large region or the existence of enormous territories, rather than exchange networks alone (e.g., Lekson, 1992; Nelson and Anyon, 1996; Mills *et al.*, 1996; Reid, 1989).

Focusing on the material record of different types of human-land interactions rather than on the mere distribution of habitations and portable artifacts forces us to consider a broader range of evidence than we are accustomed to when delimiting boundaries of prehistoric territories. Both stationary landscape modifications and natural resource distribution may be reliable indicators of territory boundaries and should be used to test the utility of artifactual criteria for delimiting boundaries (i.e., patterning of stylistic traits in ceramics). For example, Stewart (1966, p. 191) was able to delimit the extent and content of the Western Shoshone traditional territory in the Great Basin by superimposing 13 criteria for demarcating boundaries, such as hunting and plant collecting areas, ceremonial and social gathering locations, seasonal camp and permanent village locations, trade routes, and resource distribution across ecological zones. He found that these criteria conformed to similar boundary locations.

Undoubtedly, natural landmarks such as rivers, canyons, mountain ranges, or major discontinuities in ecological zones are the most conspicuous boundary markers. The natural limits of the Hopi aboriginal territory in the mid-1800s, for example, were two permanent streams and two great canyons. Boundary shrines were also placed at or near landmarks such as Navajo Mountain, Lupton Point, Woodruff Butte, Bear Springs, and the mouth of the Little Colorado River (see Fig. 2). Unfortunately, landmarks that lie outside the immediate vicinity of sites and features are seldom considered explicitly as integral parts of the archaeological record of prehistoric societies and territories.

While specific activities provide an ample view of the range of land- and resource-use strategies at a given point in time, life-history reconstructions allow us to interpret these activities in a dynamic perspective, to de-

scribe the specific processes of territory formation, and to identify variability in land- and resource-use through time. Although the generalized life history and study case presented here do not account for all possible situations that archaeologists may encounter when documenting prehistoric land-use behaviors, they do offer a basis to expand existing analytical frameworks for reconstructing the extent and content of territories. As the Hopi case shows, land and resource use strategies cannot be thoroughly understood except in the context of historic processes that shape the way in which a society relates to the landscape. This study, therefore, offers an alternative framework from which to view territory formation and identifies processes that may be applicable to other times and places.

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REFERENCES CITED

- Adams, E. C. (1982). Synthesis and interpretation. In *Walpi Archaeological Project*, Museum of Northern Arizona, Flagstaff.
- Adams, E. C. (1989). Passive resistance: Hopi responses to Spanish contact and conquest. In Thomas, D. H. (ed.), *Columbian Consequences*, Smithsonian Institution Press, Washington, DC, pp. 77-91.
- Adams, E. C. (1991a). *The Origin and Development of the Pueblo Katsina Cult*, University of Arizona Press, Tucson.
- Adams, E. C. (1991b). Homol'ovi in the 14th century. In Adams, E. C., and Hayes, K. A. (eds.), *Homol'ovi II: Archaeology of an Ancestral Hopi Village, Arizona*, Anthropological Papers of The University of Arizona 55, Tucson, pp. 116-122.
- Adams, E. C. (1996). The Pueblo III-Pueblo IV transition in the Hopi area, Arizona. In Adler, M. (ed.), *The Prehistoric Pueblo World A.D. 1150-1350*, University of Arizona Press, Tucson, pp. 48-58.
- Adler, M. (1994). Population aggregation and the Anasazi social landscape. In Wills, W. H., and Leonard, R. D. (eds.), *The Ancient Southwestern Community*, University of New Mexico Press, Albuquerque, pp. 85-102.
- Allen, T. F., and Hoekstra, T. W. (1992). *Toward a Unified Ecology*, Columbia University Press, New York.
- Anderson, T. B., and Moore, R. G. (1986). Meaning and the built environment. In Leone, M. P., and Potter, P. B., Jr. (eds.), *The Recovery of Meaning*, Smithsonian Institution Press, Washington, DC, pp. 379-406.

- Anyon, R., and Ferguson, T. J. (1984). Settlement patterns and changing adaptations in the Zuni region after AC 1000. Paper presented at the 1983 Anasazi Symposium, San Juan Archaeological Center and Library, Bloomfield, NM.
- Barnard, A., and Woodburn, J. (1988). Property, power, and ideology in hunter-gatherer societies: An introduction. In Ingold, T., Riches, D., and Woodburn, J. (eds.), *Hunters and Gatherers*, Vol. 2, Berg, Oxford, pp. 4-31.
- Barney, R. A. (1974). The Indian Claims commission. In Horr, D. A. (ed.), *Hopi Indians*, Garland Series, New York, pp. 13-16.
- Beaglehole, E. (1936). *Hopi Hunting and Hunting Ritual*, Yale University Publications in Anthropology 4, New Haven, CT.
- Beals, R. L. (1985). The anthropologist as expert witness: Illustrations from the California Indian land claims case. In Sutton, I. (ed.), *Irredeemable America*, University of New Mexico Press, Albuquerque, pp. 139-156.
- Bender, B. (ed.) (1993). *Landscape: Politics and Perspectives*, Berg, Oxford.
- Binford, L. R. (1982). The archaeology of place. *Journal of Anthropological Archaeology* 1: 5-31.
- Binford, L. R. (1983). *In Pursuit of the Past*, Thames and Hudson, London.
- Bradfield, M. (1971). *The Changing Pattern of Hopi Agriculture*, Royal Anthropological Institute of Great Britain and Ireland, Occasional Paper 30, London.
- Brugge, D. (1994). *The Navajo-Hopi Land Dispute: An American Tragedy*, University of New Mexico Press, Albuquerque.
- Cameron, C. (1990). *Architectural Change at a Southwestern Pueblo*, Unpublished Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.
- Cameron, C. (guest ed.) (1995). Migration and the movement of Southwestern peoples. *Journal of Anthropological Archaeology* 14: No. 2.
- Cameron, C., and Tomka, S. (eds.) (1993). *Abandonment of Settlements and Regions: Ethnoarchaeological and Archaeological Approaches*, Cambridge University Press, Cambridge.
- Casimir, M. J. (1992). The dimensions of territoriality: An introduction. In Casimir, M. J., and Rao, A. (eds.), *Mobility and Territoriality*, Berg, Oxford, pp. 1-26.
- Colton, H. S. (1936). The rise and fall of the prehistoric population of northern Arizona. *Science* 84(2181): 337-343.
- Colton, H. S., and Baxter, F. (1932). *Days in the Painted Desert and the San Francisco Mountains*, Museum of Northern Arizona Bulletin 2, pp. 23-65.
- Copp, D. H. (1995). *Views from the Road*, Island Press, Washington, DC.
- Courlander, H. (1987). *The Fourth World of the Hopis*, University of New Mexico Press, Albuquerque. (Reprinted from Crown, New York, 1971.)
- Cronon, W. (1984). *Changes in the Land: Indians, Colonists, and the Ecology of New England*, Hill and Wang, New York.
- Daifuku, H. (1961). *Jeddito 264: A Report on the Excavation of a Basketmaker III-Pueblo I Site in Northeastern Arizona, with a Review of Some Current Theories in Southwestern Archaeology*, Papers of the Peabody Museum of American Archaeology and Ethnology 33(1), Harvard University, Cambridge, MA.
- Dean, J. S. (1969). *Chronological Analysis of Tsegi Phase Sites in Northeastern Arizona*, Papers of the Laboratory of Tree-Ring Research 3, University of Arizona Press, Tucson.
- Dean, J. S. (1996). Kayenta Anasazi settlement transformations in northeastern Arizona: 1150 to 1350. In Adler, M. (ed.), *The Prehistoric Pueblo World A.D. 1150-1350*, University of Arizona Press, Tucson, pp. 29-47.
- Dean, J. S., Euler, R. C., Gumerman, G. J., Plog, F., Hevly, R. H., and Karlstrom, T. N. (1985). Human Behavior, Demography, and Paleoenvironment on the Colorado Plateaus. *American Antiquity* 50: 537-554.
- De Atley, S. P., and Findlow, F. J. (1984). Exploring the limits: Introduction. In De Atley, S. P., and Findlow, F. J. (eds.), *Exploring the Limits: Frontiers and Boundaries in Prehistory*. BAR International Series 223, Oxford, pp. 1-4.
- Dewar, R. E. (1991). Dynamic settlement systems and remnant settlement patterns. *American Antiquity* 56: 604-620.

- Dewar, R. E., and McBride, K. A. (1992). Remnant settlement patterns. In Rossignol, J., and Wandsnider, L. (eds.), *Space, Time, and Archaeological Landscapes*, Plenum Press, New York, pp. 227-253.
- Dongoske, K., Jenkins, L., and Ferguson, T. J. (1993). Understanding the past through Hopi oral history. *Native Peoples* 6(2): 24-31.
- Duff, A. (1996). When is a region? Paper presented at the Fourth Southwest Symposium, Tempe, AZ.
- Dyson-Hudson, I., and Smith, E. A. (1978). Human territoriality: An ecological reassessment. *American Anthropology* 80: 21-41.
- Eggan, F. (1949). The Hopi and the lineage principle. In Fortes, M. (ed.), *Social Structure: Studies Presented to A. R. Radcliffe-Brown*, Russell and Russell, New York, pp. 121-144.
- Eggan, F. (1950). *Social Organization of the Western Pueblos*, University of Chicago Press, Chicago.
- Eggan, F. (1967). From history to myth: A Hopi example. In Hymes, D., and Bittle, W. (eds.), *Studies in Southwestern Ethnolinguistics*, Mouton, The Hague, pp. 33-53.
- Euler, R. C., Gumerman, G. J., Karlstrom, T. N., Dean, J. S., and Hevly, R. H. (1979). The Colorado plateaus: Cultural dynamics and paleoenvironment. *Science* 205: 1089-1101.
- Ferguson, T. J. (1995). An anthropological perspective on Zuni land use. In Hart, E. R. (ed.), *Zuni and the Courts*, University Press of Kansas, Lawrence, pp. 103-120.
- Ferguson, T. J., and Dongoske, K. (1994). *Navajo Transmission Project EIS: Hopi Ethnographic Overview*, Submitted to Dames & Moore, Phoenix, Hopi Cultural Preservation Office and Institute of North American West, Tucson.
- Ferguson, T. J., and Hart, E. R. (1985). *A Zuni Atlas*, University of Oklahoma Press, Norman.
- Fewkes, J. W. (1897). *Tusayan Migration Traditions*, Bureau of American Ethnology Annual Report 19(2), Government Printing Office, Washington, DC.
- Fewkes, J. W. (1900). Property-right in Eagles among the Hopi. *American Anthropologist* 2: 690-707.
- Ford, R. I. (1972). An ecological perspective on the eastern pueblos. In Ortiz, A. (ed.), *New Perspectives on the Pueblos*, University of New Mexico Press, Albuquerque, pp. 1-18.
- Forde, C. D. (1931). Hopi agriculture and land ownership. *Journal of the Royal Anthropological Institute* 61: 357-405.
- Garcés, Francisco (1900). *On the Trail of a Spanish Pioneer*, Coues, E. (ed., trans.), 2 vols., Francis P. Harper, New York.
- Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration*, Polity Press, Cambridge.
- Graves, M. W. (1994a). Kalinga regional community boundaries: An evolutionary explanation of style and territoriality. Paper presented at the 59th Annual Meeting of the Society for American Archaeology, Anaheim, CA.
- Graves, M. W. (1994b). Community boundaries in late prehistoric Puebloan society: Kalinga ethnoarchaeology as a model for the Southwestern production and exchange of pottery. In Wills, W. H., and Leonard, R. D. (eds.), *The Ancient Southwestern Community*, University of New Mexico Press, Albuquerque, pp. 149-169.
- Grebinger, P. (1971). *Hohokam Cultural Development in the Middle Santa Cruz Valley*, Unpublished Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.
- Greider, T., and Garkovich, L. (1994). Landscapes: The social construction of nature and the environment. *Rural Sociology* 59(1): 1-24.
- Gumerman, G. J., and Dean, J. S. (1989). Prehistoric cooperation and competition in the western Anasazi area. In Cordell, L. S., and Gumerman, G. J. (eds.), *Dynamics of Southwest Prehistory*, Smithsonian Institution Press, Washington, DC, pp. 99-148.
- Gumerman, G. J., Westfall, D., and Weed, C. S. (1972). *Black Mesa: Archaeological Investigations on Black Mesa: the 1969-1970 Seasons*, Prescott College, Prescott, AZ.
- Hack, J. T. (1942). *The Changing Physical Environment of the Hopi Indians of Arizona*, Papers of the Peabody Museum of Archaeology and Ethnology 35(1), Harvard University, Cambridge, MA.

- Hargrave, L. L. (1931). *First Mesa*, Museum Notes 10(2), Museum of Northern Arizona, Flagstaff, pp. 33–44.
- Harner, M. (1977). The ecological basis for Aztec sacrifice. *American Ethnologist* 4(1): 117–135.
- Haury, E. W. (1945). *The Excavation of Los Muertos and Neighboring Ruins in the Salt River Valley, Southern Arizona*, Papers of the Peabody Museum of American Archaeology and Ethnology 24(1), Harvard University, Cambridge, MA.
- Hawley-Ellis, F. H. (1974). The Hopi: Their history and use of lands. In Horr, D. A. (ed.), *Hopi Indians*, Garland Series, New York, pp. 25–277.
- Hegmon, M. (1994). Boundary-making strategies in early Pueblo societies: Style and architecture in the Kayenta and Mesa Verde Regions. In Wills, W. H., and Leonard, R. D. (eds.), *The Ancient Southwestern Community*, University of New Mexico Press, Albuquerque, pp. 171–183.
- Hester, J. J. (1962). *Early Navajo Migrations and Acculturations in the Southwest*, Museum of New Mexico Papers in Anthropology 6.
- Hough, W. (1915). *The Hopi Indians*, Torch Press, Cedar Rapids, IA.
- Ingold, T. (1986). *The Appropriation of Nature*, Essays on Human Ecology and Social Relations, Manchester University Press, Manchester.
- Ives, J. (1861). *Report upon the Colorado River of the West*, 36th Congress House of Representatives Executive Document, Washington, DC, pp. 119–131.
- Jackson, J. B. (1984). *Discovering the Vernacular Landscape*, Yale University Press, New Haven, CT.
- James, G. W. (1900). *In and Around the Grand Canyon*, Little, Brown, Boston.
- James, H. C. (1990). *Pages from Hopi History*, University of Arizona Press, Tucson.
- Kelley, K. B., and Francis, H. (1994). *Navajo Sacred Places*, Indiana University Press, Bloomington.
- Kelso, G. K. (1994). Palynology in historical rural-landscape studies: Great Meadows, Pennsylvania. *American Antiquity* 59(2): 359–372.
- Kelso, W. M., and Most, R. (1990). *Earth Patterns: Essays in Landscape Archaeology*, University Press of Virginia, Charlottesville.
- Kidder, A. V. (1924). *An Introduction to the Study of Southwestern Archaeology with a Preliminary Account of the Excavations at Pecos*, Yale University Press, New Haven, CT.
- Kintigh, K. (1985). *Settlement, Subsistence, and Society in Late Zuni Prehistory*, Anthropological Papers of the University of Arizona 44, University of Arizona Press, Tucson.
- Kopytoff, I. (1987). The internal African Frontier: The making of African political culture. In Kopytoff, I. (ed.), *The African Frontier*, Indiana University Press, Bloomington, pp. 3–86.
- Kroeber, A. L. (1963). The nature of land-holding groups. In Heizer, R. F. (ed.), *Aboriginal America: Three Studies in Culture History*, Smithsonian Institution, Washington, DC, pp. 225–235.
- Lee, R. (1969). !Kung Bushmen subsistence: An input-output analysis. In Vayda, A. P. (ed.), *Environment and Cultural Behavior*, Natural History Press, New York, pp. 47–79.
- Lekson, S. H. (1992). *Archaeological Overview of Southwestern New Mexico*, Prepared for New Mexico State Historic Preservation Division, Project No. 35-88-30120.004, Human Systems Research, Las Cruces, NM.
- Levy, J. (1992). *Orayvi Revisited*, School of American Research Press, Santa Fe.
- Malmberg, T. (1980). *Human Territoriality*, Mouton, The Hague.
- McClelland, L. F. (1991). Imagery, ideals, and social values: The interpretation and documentation of cultural landscapes. *The Public Historian* 13(2).
- McPherson, R. S. (1991). *Sacred Land, Sacred View*, Brigham Young University Press, Salt Lake City, UT.
- Mills, B., Herr, S., and Newcomb, J. (1996). Migration, integration, and community reorganization in the Silver Creek area, east-central Arizona. Paper presented at the 61st Annual Meeting of the Society for American Archaeology, New Orleans.

- Mindeleff, V. (1989). *A Study of Pueblo Architecture, Tusayan and Cibola*, Smithsonian Institution Press, Washington, DC. (Reprinted from the 8th Annual Report of the Bureau of American Ethnology, 1891.)
- Montgomery, R. G. (1949). *Franciscan Awatovi*, Papers of the Peabody Museum of American Archaeology and Ethnology 36, Harvard University, Cambridge, MA.
- Morehouse, B. (1996). A functional approach to boundaries in the context of environmental issues. *Journal of Borderlands Studies* 10(2): in press.
- Myers, F. (1988). Burning the truck and holding the country: Property, time, and the negotiation of identity among Pintupi aborigines. In Ingold, T., Riches, D., and Woodburn, J. (eds.), *Hunters and Gatherers*, Vol. 2, Berg, Oxford, pp. 52-74.
- Nelson, B., and Anyon, R. (1996). Fallow valleys: Asynchronous occupation in southwestern New Mexico. *Kiva* 61(3), in press.
- Nequatewa, E. (1936). *Truth of a Hopi: Stories Relating to the Origin Myths and Clan Histories of the Hopi*, Museum of Northern Arizona Bulletin 8, Flagstaff.
- Page, G. B. (1954). Hopi land patterns. In *Hopi Agriculture*, Museum of Northern Arizona Reprint Series 5, Flagstaff, pp. 8-15.
- Page, J., and Page, S. (1982). Inside the sacred Hopi homeland. *National Geographic* 162(5): 607-629.
- Parsons, J. R. (1972). Archaeological settlement patterns. *Annual Reviews of Anthropology* 1: 127-150.
- Peterson, N. (1979). Territorial adaptations among desert hunter-gatherers: The !Kung and Australians compared. In Burham, P. C., and Ellen, R. F. (eds.), *Social and Ecological Systems*, ASA Monographs 18, Academic Press, New York, pp. 111-129.
- Plog, S. (1994). Introduction: Regions and boundaries in the prehistoric Southwest. In Wills, W. H., and Leonard, R. D. (eds.), *The Ancient Southwestern Community*, University of New Mexico Press, Albuquerque, pp. 147-148.
- Powell, S. (1983). *Mobility and Adaptation: The Anasazi of Black Mesa, Arizona*, Southern Illinois University Press, Carbondale.
- Prescott, J. R. (1978). *Boundaries and Frontiers*, Croom Helm, London.
- Price, L. (1981). Proving aboriginal title via expert testimony: Lessons from the Indian Claims Commission. *American Indian Journal* 7(2): 16-24.
- Reid, J. J. (1973). *Growth and Response to Stress at Grasshopper Pueblo*, Ph.D. dissertation, University of Arizona, Tucson, University Microfilms, Ann Harbor.
- Reid, J. J. (1989). A grasshopper perspective on the Mogollon of the Arizona mountains. In Cordell, L. S., and Gumerman, G. J. (eds.), *Dynamics of Southwest Prehistory*, Smithsonian Institution Press, Washington, DC, pp. 65-97.
- Rossignol, J. (1992). Concepts, methods, and theory building: A landscape approach. In Rossignol, J., and Wandsnider, L. (eds.), *Time, Space, and Archaeological Landscapes*, Plenum Press, New York, pp. 3-19.
- Rossignol, J., and Wandsnider, L. (eds.) (1992). *Time, Space, and Archaeological Landscapes*, Plenum Press, New York.
- Rushforth, S., and Upham, S. (1992). *A Hopi Social History*, University of Texas Press, Austin.
- Sampson, C. G. (1988). *Stylistic Boundaries Among Mobile Hunter-Gatherers*, Smithsonian Institution Press, Washington, DC.
- Sauer, C. O. (1925). The morphology of landscape. *University of California Publications in Geography* 2(2): 19-53.
- Schlanger, S. H. (1992). Recognizing persistent places in Anasazi settlement systems. In Rossignol, J., and Wandsnider, L. (eds.), *Space, Time, and Archaeological Landscapes*, Plenum Press, New York, pp. 91-112.
- Schiffer, M. B. (1972). Archaeological context and systemic context. *American Antiquity* 37: 156-165.
- Schiffer, M. B. (1987). *Formation Processes of the Archaeological Record*, University of New Mexico Press, Albuquerque.
- Schlegel, A. (1992). African political models in the American Southwest: Hopi as an internal frontier society. *American Anthropologist* 94: 376-397.

- Smith, E. A. (1983). Comment on E. Cashdan: "Territoriality Among Human Foragers: Ecological Models and an Application to Four Bushman Groups." *Current Anthropology* 24(1): 47-66.
- Smith, W. (1971). *Painted Ceramics of the Western Mound at Awatovi*, Papers of the Peabody Museum of American Archaeology and Ethnology 38, Harvard University, Cambridge, MA.
- Soja, E. W. (1971). *The Political Organization of Space*, Commission on College Geography Resource Paper 8, Association of American Geographers, Washington, DC.
- Stanner, W. E. H. (1965). Aboriginal territorial organization: Estate, range, domain, and regime. *Oceania* 36(1): 1-26.
- Stephen, A. (1936). *Hopi Indian Journal*, 2 vols., Parsons, E. C. (ed.), Columbia Contributions to Anthropology 23, New York.
- Stewart, O. C. (1966). Tribal distributions and boundaries in the Great Basin. In d'Azevedo, W. L. (ed.), *The Current Status of Anthropological Research in the Great Basin: 1964*, Desert Research Institute, Reno, NV pp. 167-237.
- Stoffle, R., Loendorf, L., Austin, D., Halmo, D., Bullets, A., and Fulfroost, B. (1995). *Tumpituxwinap (Storied Rocks)*, Prepared for Glen Canyon Environmental Studies, Bureau of Reclamation, Southern Paiute Consortium and Bureau of Applied Research in Anthropology, University of Arizona, Tucson.
- Stoffle, R. W., Halmo, D. B., and Austin, D. E. (1996). Cultural landscapes and traditional cultural properties: A Southern Paiute view of the Grand Canyon and Colorado River. *American Indian Quarterly* (in press).
- Sutton, I. (1985). Configurations of land claims. In Sutton, I. (ed.), *Irredeemable America*, University of New Mexico Press, Albuquerque, pp. 111-132.
- Taylor, R. B. (1988). *Human Territorial Functioning*, Cambridge University Press, Cambridge.
- Teltser, P. (1995). Settlement as a unit of measurement: Issues of validity and reliability. Paper presented at the 60th Annual Meeting of the Society for American Archaeology, Minneapolis.
- Thompson, L., and Joseph, A. (1944). *The Hopi Way*, University of Chicago Press, Chicago.
- Tilley, C. (1994). *A Phenomenology of Landscape*, Berg, Oxford.
- Titiev, M. (1992). *Old Oraibi*, University of New Mexico Press, Albuquerque. [Reprinted from Papers of the Peabody Museum of American Archaeology and Ethnology 22 (1944)].
- Upham, S. (1982). *Politics and Power: An Economic and Political History of the Western Pueblo*, Academic Press, New York.
- Vita-Finzi, C., and Higgs, E. S. (1970). Prehistoric economy in the Mount Carmel area of Palestine: Site catchment analysis. *Proceedings of the Prehistoric Society* 36: 1-37.
- Voth, H. R. (1905). *The Traditions of the Hopi*, Field Columbian Museum, Chicago.
- Walker, W., and LaMotta, V. (1995). Life-histories as units of analysis. Paper presented at the 60th Annual Meeting of the Society for American Archaeology, Minneapolis.
- Whiteley, P. M. (1985). Unpacking Hopi "clans": Another vintage model out of Africa? *Journal of Anthropological Research* 41: 359-374.
- Whiteley, P. M. (1986). Unpacking Hopi "clans," II. Further questions about Hopi descent groups. *Journal of Anthropological Research* 42: 69-80.
- Whiteley, P. M. (1988). *Deliberate Acts: Changing Hopi Culture Through the Oraibi Split*, University of Arizona Press, Tucson.
- Whiting, A. F. (1939). *Ethnobotany of the Hopi*, Museum of Northern Arizona Bulletin 15, Flagstaff.
- Wilmsen, E. N. (1973). Interaction, spacing behavior, and the organization of hunting bands. *Journal of Anthropological Research* 29(1): 1-31.
- Winterhalder, B., and Smith, E. A. (eds.) (1981). *Hunter-Gatherer Foraging Strategies*, University of Chicago Press, Chicago.
- Wishart, D. J. (1985). The Pawnee claims case, 1947-64. In Sutton, I. (ed.), *Irredeemable America*, University of New Mexico Press, Albuquerque, pp. 157-186.
- Wobst, H. M. (1974). Boundary conditions for paleolithic social systems: A simulation approach. *American Antiquity* 39: 147-178.

Zedeño, M. N. (1994). *Sourcing Prehistoric Ceramics at Chodistaas Pueblo, Arizona*, Anthropological Papers of the University of Arizona **58**, University of Arizona Press, Tucson.