For those who have visited an archaeological site with Leigh Kuwanwisi-wma and other Hopi Cultural Preservation Office (HCPO) advisors, the scene is familiar (figure 5.1). The HCPO group gathers at a high point and begins looking at distant landmarks, talking in Hopi and pointing. Unlike archaeologists, whose gaze is typically fixed on the ground, HCPO advisors scan the horizon. After a period of private conversation, a member of the HCPO group calls over to the archaeologist to interpret and summarize the discussion.

On visits to some well-known archaeological sites like Chavez Pass or Homol'ovi II, HCPO advisors have recounted well-documented migration stories that match accounts given to archaeologists like Fewkes and Mindeleff almost a century ago. But some site visits have involved places previously unknown to the HCPO group—either because the ancestral village was too small or short-lived for oral traditions about it to survive the centuries or because the advisors were not members of the clan that held the relevant information. In these cases, the HCPO advisors were still able to offer ideas about the clans who once occupied the site, but they candidly noted that they were not recounting memorized oral traditions. Instead, they were pooling their cultural knowledge about places on the landscape and comparing it to the

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VISUAL PROMINENCE AND THE STABILITY OF CULTURAL LANDSCAPES

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The bare vastness of the Hopi landscape emphasizes the visual impact of every plant, every rock, every arroyo... So little lies between you and the sky. So little lies between you and the earth.


The Hopi landscape is a living theater.

visual information available from the vantage point of the ancestral village. Using a logical process both inductive and deductive, the group identified socially significant landforms—sometimes with effort, given that these features were being viewed from an unfamiliar angle or from a great distance. They then situated their vantage point on a mental map crisscrossed with the migration pathways of dozens of different clans, oriented the entire map with reference to the Hopi mesas, and finally inferred the clan ancestors who must have moved through that location.

This chapter will reflect on the epistemology that enables HCPO advisors to interpret landscapes far removed in time and space from contemporary Hopi villages. In particular, the focus will be on a central paradox of Pueblo history and cosmology: Pueblo peoples are deeply grounded in their local landscapes, but their histories were dominated by movement that constantly shifted the definition of local.

The analytical approach applied in this chapter is explicitly that of the Southwestern School of Landscape Archaeology. A fundamental premise of this approach is that Native American intellectuals are “interlocutors with distinct epistemological stances who have their own contributions to make toward the theorization of cultural landscapes” (Fowles 2010:453). Hopi epistemology is leveraged to guide and
facilitate interpretation of a geographic information system (GIS) analysis of ancient landscapes.

**PUEBLO PERSPECTIVES ON THE LANDSCAPE**

As Alfonso Ortiz (1972:17–25) showed in his analysis of Tewa ritual space, in contemporary Pueblo thought the village is often considered to be the center of the world where the six primary axes (up, down, north, south, east, and west) converge. Each village is surrounded by a nested set of landscape features that mark cardinal directions, sacred places, and boundaries, giving physical definition to the notion of centeredness. The horizon often symbolizes the boundary between known and unknown, safe and dangerous, familiar and foreign (Tuan 1974), and it organizes the year by the movement of the sun (McCluskey 1977; Zeilik 1985). Whiteley (2011) described how contemporary Hopi religious practice “draws the powers of life into the center from the periphery” by ritually visiting, dramatizing, and singing named localities on the landscape. It is in this sense that the Hopi landscape is a “living theater” of Hopi action and imagination (Whiteley 2011:91, 105).

Rundstrom (1995; see also Pearce and Louis 2008) used the term *process cartography* to contrast the incorporative, embodied nature of such Indigenous mapping with the inscriptive, result-based nature of Western mapping. Interestingly, there is a recent movement in Western GIS toward place-based rather than space-based cartography, in which a map would emphasize relational links between named places rather than Euclidean distances in x y coordinate space (e.g., Goodchild 2011). The motivation for this switch from “spatial to platial” approaches is to avoid the false precision of coordinate space and to better operationalize the place-based nature of human way-finding (turn left at the Eiffel Tower as opposed to turn left at latitude y, longitude x). That is, Pueblo mental maps are not designed to locate objects in Cartesian space but are rather stages upon which action and history occurs. This contrast matches that drawn by Zedeño (2000) between the space-bound landscape approach that typifies archaeology, which defines an arbitrary space (a study area or region) and locations within it, and Indigenous relational and place-based approaches. Indigenous cognitive maps tend to consist of a network of relationships among landforms, each of which is understood relative to other landforms.

This contrast helps to explain a puzzling paradox of Puebloan cosmologies: the anchoring of ritual practice to the landscape despite the frequent shifts in ancestral Puebloan village locations. Archaeological evidence suggests that, despite their large size and sturdy construction, most ancestral Puebloan villages were occupied for little more than a generation or two before populations dispersed to reform new
villages (Bernardini 2005). Movement was so common among precontact agricultural Puebloan populations that Fox (1967:2.4) described them as “urbanized nomads.” But locally anchored cosmologies can be reconciled with dynamic movement if we allow that the principle of anchoring outweighed the details of any one landscape. In fact, Naranjo (1995:249) clarified that “specific [geographic] boundaries are not the important elements because as the people moved, their mountain boundaries also moved. The idea was to have boundaries to create a place—to fix a place—temporarily within a larger idea of movement.”

We can further resolve the paradox by recognizing that, while cognitive maps are heavily informed by one’s lived bodily experience with the landscape, their range can be extended by information transmitted across space (social interaction) and especially over time (oral tradition). Schachner (2011:435), for example, suggested that we might trace a change in the nature of socially significant connections between points on the landscape to a shift in settlement patterns between circa AD 900 and 1300. Across that interval, populations in the American Southwest contracted into fewer larger villages, leaving behind ever more ancestral places. Whereas previously most connections may have been between groups across space (e.g., an outlying great house to Chaco Canyon), by the fourteenth century important connections were increasingly being made between points in time—between contemporary and ancestral villages and landscapes. Physical movement on the landscape was restricted after Spanish contact, but connections to ancestral places were preserved through oral tradition and pilgrimage (Bernardini 2008).

Fowles (2011) encouraged archaeologists to understand ancestral Puebloan migration specifically in relation to Indigenous perceptions of space and place. He argued that, from a Puebloan perspective, “movement to and from one’s village or within a community’s existing cosmic boundaries was not ‘migration’ nor were temporary excursions to foreign lands. Rather, a ‘migration’ was when the center of the world shifted, when new cosmic landmarks were adopted” (Fowles 2011:note 2). Thus, we could define migration in Pueblo terms as “a residential move that leads to the establishment of a new spiritual center or middle place as well as the redefinition of a group’s major cosmological boundaries” (Fowles 2011:52).

**ANALYZING PRE-HISPANIC PUEBLOAN VISUAL LANDSCAPES**

This chapter employs a method for operationalizing an Indigenous spatial lens that can identify likely cosmological landmarks. With this method, it is possible to suggest the boundaries of ancestral Puebloan visual landscapes and identify the migrations that
would have been necessary to transcend these boundaries (e.g., Bernardini and Peeples 2015). A robust literature in spatial cognition suggests that people organize their spatial knowledge about an environment through a hierarchy of landmarks (Allen and Kirsch 1985; Couclelis et al. 1987; Tversky 1993). The main methodological challenge in ancient landscapes, when actors cannot be queried about their cognitive maps, involves the quantification of visual prominence—that is, identification of the landforms that would likely have been visual anchors (Golledge 1978) for local cosmologies.

A number of approaches from geographic information science have been suggested, but most employ a global measure of prominence: how big a bump does a mountain make on the planet’s surface as seen from a planar perspective (e.g., Podobnikar 2012)? What is needed, however, is a more local measure—an assessment of the prominence of a landform not from the air but from the particular vantage point of a Pueblo village. Measuring local prominence is difficult because the same landform can look different depending on which direction one is viewing it from and from what distance.

The GIS-based method of calculating local prominence employed in this chapter is outlined in greater detail elsewhere (Bernardini et al. 2013) and summarized briefly here (figure 5.2). For each viewing location, points on the horizon skyline are analyzed to determine their relative importance in characterizing the shape of the skyline. Points that project farther above a flat horizon and that rise steeply relative to their neighbors receive higher prominence values. A horizon skyline is progressively simplified until only the most prominent points remain. The mountains that comprise the most prominent vertices would have been the most visually conspicuous parts of the local skyline. Prominence values were calculated in this manner for a database of 1,116 sites consisting of fifty rooms or more across the Southwest dating from AD 1200 to 1700, resulting in prominence values for about 171,000 total landforms.

The social significance of a landform is a function of both its visual qualities and the number of people who can see it. As with the proverbial tree in the forest, a mountain must first be seen before it can be interpreted as prominent. To factor the number of people who could view a peak at a given point in time into its prominence measure, prominence values were multiplied by the number of people living at each site who could see a given peak. These population prominence values were then summed for each peak to obtain the peak’s social prominence within the broader region. This was done for all peaks for each fifty-year interval from AD 1200 to AD 1700.

**CASE STUDY: PATKI CLAN MIGRATION**

Hopi traditional knowledge about migration is held individually by each Hopi clan, which curates songs and stories about the ancestral villages and landscapes it once
inhabited (e.g., Fewkes 1900). Migration patterns recounted in Hopi traditional knowledge are complex and nonlinear; when plotted together, the movements of Hopi clans produce a reticulate or braided stream pattern of connections among sites (Bernardini 2005; Terrell 2001). Even the traditions of a single clan are amalgamations of the experiences of many composite subclans (Bernardini 2008). Yet the apparent disarray of Hopi clan traditions need not be an indication of their inaccuracy. In fact, the social units and patterns of movement recorded in Hopi clan migration traditions better match the archaeological record than do the geographic regions and migration models conventionally used by many archaeologists. For example, while archaeologists traditionally use the culture area or the village as the unit of social identity or movement, the spatial distribution of totemic petroglyphs and patterns of long-distance exchange suggest that small social units, perhaps analogous to contemporary clans, acted independently of either of these larger analytical units (e.g., Bernardini 2005).

**FIGURE 5.2** Illustration of the line simplification method for calculating prominence: (a) a horizon skyline mapped in profile; (b) the skyline simplified at a 1° elevation angle; (c) the skyline simplified at a 2° elevation angle; (d) the skyline simplified at a 3° elevation angle.

= vertex retained during simplification

= simplified line
A case study of Patki (Water) Clan migration traditions (figure 5.3) is used to explore the definition of migration as “a residential move that leads to the establishment of a new spiritual center or middle place as well as the redefinition of a group’s major cosmological boundaries” (Fowles 2011:52). The migration traditions of the Patki Clan have been recorded repeatedly over the last one hundred years, creating one of the better documented Hopi migration accounts (see Ferguson and Lomaomvaya 1999). The case study will use movements described in Patki Clan traditions to consider when and where movements occurred that would have broken a line-of-sight connection with a prominent visual anchor and to identify new landforms that may have been adopted in their place.

FIGURE 5.3 The Patki Clan migration pathway (after Ferguson and Lomaomvaya 1999: figure 27).
Most Patki Clan accounts begin in Palatkwapi, the “Red-Walled City” (Hopi Dictionary Project 1998:383), whose location is uncertain but may have been as far south as central Mexico (Waters 1963:68). From Palatkwapi the Patki Clan moved north first to the Tucson valley, next to Casa Grande in the Phoenix Basin, and then through Wukoskyavi, the area near Roosevelt Lake (Ferguson and Lomaomvaya 1999). From here some Patki people went toward Payson, Arizona, and then to Chavez Pass, while others went to Pasiovi (Elden Pueblo) and Wupatki near Flagstaff, Arizona, before rejoining their clan-mates at Chavez Pass (Fewkes 1900; Siweumptewa 1998). From Chavez Pass, Patki Clan members moved to Homol’ovi, then to the Hopi Buttes, and finally into villages on First and Second Mesa (Nequatewa 1967:100–101).

The Patki Clan migration crossed at least nine major archaeological regions (Chihuahua, Tucson Basin, Phoenix Basin, Tonto, Verde, Chavez Pass, Flagstaff, Homol’ovi, Hopi Buttes, and Hopi Mesas), each containing villages that were occupied primarily between AD 1200 and AD 1400/1450 (Adams and Duff 2004). By AD 1400/1450, most of these regions were largely depopulated, with the notable exception of the Hopi Mesas. Changes in population density across Arizona between AD 1200 and AD 1450 leave little doubt that many people did indeed migrate north and east toward destinations in the Hopi and Zuni regions and to points farther east along the Rio Grande (Hill et al. 2004).

The Patki Clan pathway transcends huge environmental and topographic variability: the Basin and Range Province of southern Arizona, characterized by closely spaced north-south trending mountain ridges; the transitional zone of central Arizona, characterized by eroded, low rolling hills; and the Colorado Plateau of northern Arizona, a high flat plain punctuated by tall isolated mountains. The distinctive topographic qualities of each physiographic zone provided different contexts for grounding cosmologies in the landscape, including the distance to the horizon, the local relief of landforms above the surrounding terrain, and the relative clustering or isolation of tall landforms.

Using the GIS method outlined above, population prominence values were calculated for all points on the horizons of villages along the Patki Clan migration pathway. The analysis identified five peaks that would have dominated local horizons along this pathway: Wasson Peak, San Tan Mountain, the Superstition Mountains, the Four Peaks, and the San Francisco Peaks. The visual significance of each of these landforms will be explored in more detail below.

In the Tucson Basin, the horizon would have been dominated by Wasson Peak, the highest point in the Tucson Mountains (figure 5.4). At 1,400 meters Wasson Peak is only half the height of the rolling Santa Catalina and Rincon Mountains to the east, but its isolation in the middle of the Tucson Basin makes it a more visually striking part of the horizon from the perspective of Tucson Basin villages. All of the large
sites in the Tucson Basin between AD 1250 and AD 1400 were located to the north of Wāsson Peak; therefore, this landform would almost certainly have been assigned meanings relating to the southern cardinal direction. The modest elevation of Wāsson Peak and the basin and range topography, with closely spaced north-south trending mountain ranges, largely limited the range over which Wāsson Peak was visible as a prominent landform to the Tucson Basin.

Movement to Casa Grande on the eastern side of the Phoenix Basin would have caused a significant disruption in the visual landscape of ancestral Paki Clan migrants (figure 5.5). Wāsson Peak would no longer have been visible. In its place, two nearby peaks and one distant peak (or cluster of peaks) would have dominated the horizon:
the local San Tan Mountains and Superstition Mountains and the more distant Four Peaks. Although the San Tan Mountains rise only 250 meters above the valley floor, they are tall and steep enough to break the line of sight to the east for sites located within the eastern Phoenix Basin. From Casa Grande, the San Tan Mountains would have dominated the western horizon, although there were contemporaneous sites located on all sides of this landform. The San Tan Mountains were accessible—low and close enough to villages that religious practices could happen on them. The Superstition Mountains to the northeast of the basin are only slightly higher (450 meters), but they were still a high point on the western edge of the range that dramatically projected into the horizon, possibly marking the summer solstice sunset. The San Tan

**FIGURE 5.5** The visual landscape near Casa Grande showing the Superstition Mountains and San Tan Mountain, their viewsheds, and sites occupied between AD 1250 and AD 1400 with a prominent view of these peaks.
Mountains and the western prominence of the Superstition Mountains were strictly local prominences, visible only from viewpoints in the Phoenix Basin.

Thirty kilometers further northeast behind the Superstitions are the Four Peaks, a dramatically steep-sided cluster of four prominences. These peaks are much higher (2,300 meters) and are often snowcapped in the winter. They are tall enough to project into the northeastern skyline of the Phoenix Basin and would have constituted the most significant “big mountain” visible from the basin. The Four Peaks would also have been visible to sites to the northeast in the Tonto Basin, making them the first landform on the Patki Clan migration pathway to have had visual prominence across multiple regions. Having visual anchors in common across multiple regions could have meant that spatially separated populations shared common aspects of their cosmology, united in their use of a common landform to mark directions and measure time on solar calendars.

The next step in the Patki Clan migration, to the Lake Roosevelt/Tonto Basin area, would have involved both continuity and disruption of previous visual landscapes (figure 5.6). The movement would have broken visual contact with the peaks in the Phoenix Basin (the San Tan Mountains and the western prominence of the Superstition Mountains), the previous eastern and northeastern prominences. But the movement would have also increased proximity to the Four Peaks—previously visible as distant projections on the northeastern horizon but now the dominant landform on the western horizon. This change in proximity and placement on the horizon must have involved changes in the social significance attributed to the Four Peaks. They likely took on new and deeper meanings, made more powerful because the Four Peaks cluster was the one part of the horizon that could still be connected to the previous visual landscape of the Phoenix Basin.

When a portion of the Patki Clan moved from the Lake Roosevelt region to the area around Payson, Arizona, they entered the broken landscape of the transitional zone physiographic province. This rolling terrain provides few distinctive landforms on local horizons and inhibits line of sight to larger landforms that lie beyond it. Residents of this area would have had no significant visual contact with the Four Peaks nor could they see larger landforms to the north like the San Francisco Peaks. From a visual perspective, this region is isolated from more striking landscapes to the north and south. The impact of movement into the transitional zone on local cosmologies was likely significant, involving breaking contact with the Four Peaks landmark that may have anchored generations of ancestors. The local landscape provided no remotely comparable landform for substitution.

In contrast, movement of another portion of the Patki Clan from Lake Roosevelt to the Flagstaff area brought it into visual contact with the single most prominent landform in all of Arizona, the San Francisco Peaks (Nuvatukya‘ovi; figure 5.7). This is the largest landform in the state at 3,850 meters, rising over 1,800 meters from the surrounding
plateau, visible up to 150 km away. Snowcapped almost half of the year, Nuvatukya’ovi is the most significant peak to the Hopi Tribe. It is the residence of the katsinam, Hopi ancestors who travel in the form of clouds and rain to sustain life on the Hopi Mesas.

Movement from the Flagstaff and Payson areas to Chavez Pass brought travelers to one of the primary “staging areas” (Bernardini 2005) from which clans would negotiate entrance into a village on the Hopi Mesas. Although Chavez Pass lies at the very northeast edge of the transition zone province, from high points near the pass the San Francisco Peaks are clearly visible. For migrants from the south, this would be the first village horizon they had experienced that would have brought them into visual contact with the San Francisco Peaks. For migrants moving south from the Flagstaff area, the
ability to maintain visual connection to the San Francisco Peaks would have enabled
some continuity in their social constructions of the landscape. All immigrants arriving
at Chavez Pass, regardless of differences in language, religion, and material culture,
would have been united in their common visual orientation to the San Francisco Peaks.

The next step of the migration, from Chavez Pass to the Homol'ovi region, took
migrants to a flat expanse of the Colorado Plateau from which the distant San Fran-
cisco Peaks were visible from many (though not all) village locations. Some sites,
like Homol'ovi III, were built on top of small landforms that may have been specif-
ically chosen to enable a view to the peaks (Adams 2002:137). A kiva in the plaza of
Homol'ovi II contained a mural of the San Francisco Peaks, attesting to its importance.

**FIGURE 5.7** The visual landscape in northern Arizona showing the San Francisco Peaks,
their viewshed, and sites occupied between AD 1250 and AD 1400 with a prominent view
of the San Francisco Peaks.

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Homol'ovi II contained a mural of the San Francisco Peaks, attesting to its importance.
to the residents of that village (Adams 2002:161). From the Homol’ovi area the Hopi Buttes (a cluster of extinct volcanic cores) would also have been visible to the north-east. These are distinctive points on the horizon, but most rise only a few hundred feet above the local terrain and their clustering reduces the visual impact of any one landform.

The final steps of the migration, to the area of the Hopi Buttes and then to the Hopi Mesas proper, maintained visual contact with the San Francisco Peaks from almost all villages occupied between AD 1200 and AD 1400–1500. In the Hopi Mesas region thirty of thirty-four sites (88%) occupied between AD 1250 and AD 1300 had a view of the San Francisco Peaks, likely a reflection of deliberate choices in site location to optimize this view.

**DISCUSSION**

Although the Patki Clan migration tradition is likely a composite of experiences by multiple small social units, the different visual landscapes experienced along its path nevertheless provide an idea of the visual changes that might have been experienced by ancestral Puebloan migrants. Routes north through Arizona required movement through a number of discrete geologic areas, beginning with the bowl-like landscapes of the Tucson and Phoenix Basins. The horizons of these landscapes were formed by relatively low nearby landforms that encircled the basins, creating a relatively small-diameter visual landscape. Movement north from these basins into the broken terrain of the transitional zone physiographic province quickly severed visual contact with most prominent points on these earlier horizons, requiring a nearly total reset of cosmological landscape reference points. In Fowles’s definition, these were significant migrations. Movements among villages in the transitional zone, even if distances were not great, were also often sufficient to break visual contact with the low landforms of the region, suggesting that many of these relocations could also be considered migrations from a visual perspective.

A turning point in the northward migrations of ancestral Puebloan groups would have come when they reached Chavez Pass, a place from which, for the first time, they lived within daily sight of the San Francisco Peaks. The continuous prominence of the San Francisco Peaks for northern Arizona populations for more than eight hundred years and across hundreds of square kilometers must have been a kind of social glue for the ancestral Puebloan populations who shared that view. When individuals and groups gathered in villages like those in the Chavez Pass or Homol’ovi areas or on the Hopi Mesas, many would have brought with them personal visual experiences of the peaks and also the multigenerational knowledge of culture that had been generated about the peaks. Although not all of this information would necessarily
have been compatible—with different names, different languages, and different ritual associations—the common visual orientation of populations in northern Arizona toward the San Francisco Peaks must have helped to unite people when they found themselves living together.

The persistence of the San Francisco Peaks as a visual anchor must have facilitated continuity and stability in the cultural construction of the northern Arizona landscape. Such stability is in vivid contrast to the short-lived and/or local nature of visual anchors in central and southern Arizona from which many residents of the Hopi originally derived. We might even suggest that the stability of the visual landscape around the Hopi Mesas—the fact that populations for 100 kilometers and eight hundred years were oriented around the same dominant landform—could have been part of what made the Hopi Mesas a successful destination for migrants in the late prehistoric period. In contrast to many of the places from which migrants had come, like the Arizona Mountains, Upper Little Colorado River, Verde Valley, or Tonto Basin, the landscape around the Hopi Mesas provided a common visual framework around which diverse village and regional populations could orient themselves.

**CONCLUSION**

This chapter began with a reflection on the epistemology of Hopi cultural advisors that enables them to reconcile present and past social landscapes. Puebloan ancestors must have engaged in the same practice as migrations carried them beyond sight of familiar landmarks and into view of new ones. The substitution or reinterpretation of landmarks within a cosmological framework must have required negotiation among co-residents, with the outcomes of these negotiations favoring some groups and histories over others. The complexity of these changes can only be suggested here, but it is hoped that the model outlined in this chapter has provided a method of identifying the times and places where such changes must have occurred. Now that we know where to look, we may find evidence to deepen our understanding of the evolution of social landscapes in the archaeological record and in traditional knowledge.

**REFERENCES CITED**


