PALEOINDIAN LIFEWAYS OF THE CODY COMPLEX

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Introducing the Cody Complex

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Mention of the "Cody complex" usually evokes certain thoughts among those familiar with this cultural complex: late Paleoindian period, Great Plains, stemmed Eden and Scottsbluff points, Cody knife, early Holocene, large bison kills, and a handful of key sites (e.g., Finley, Horner, Olsen-Chubbuck, MacHaffie, and Scottsbluff). These perceptions of the Cody complex developed through work conducted during the last seven decades, mostly from individual site-based treatments of Cody sites. These perceptions are true and reasonably characterize the Cody complex; however, a more nuanced understanding of Cody complex lifeways has not been elucidated, in part because until now a detailed, wide-ranging, behavior-oriented synthesis devoted to the Cody complex has not been written. Several such syntheses exist for Clovis and Folsom (e.g., Amick 1999; Bonnichsen et al. 2005; Bradley et al. 2010; Clark and Collins 2002), but none for the Cody complex. The lack of such a synthesis for Cody is significant considering that it is one of the longest-lasting North American Paleoindian traditions (~2,800 calendar years) and is second only to Clovis in geographic expanse (extending from the Great Basin to the St. Lawrence River and from the Canadian plains to the Texas Gulf Coast; see Figure 1.2). The contributors to this book seek to remedy the situation for the Cody complex by offering behavior-oriented syntheses that significantly expand knowledge of Cody complex lifeways. This expanded understanding would not be possible without prior research on the Cody complex, and we recognize and summarize previous important contributions to establish a framework that allows the chapters in this book to highlight new insights about the Cody complex rather than recapitulate past findings.

This chapter begins by summarizing prior knowledge of Cody complex technology, chronology, geographic range, subsistence practices, land use, and worldview. Then the new contributions to the Cody literature contained in this book are briefly introduced, providing a road map for the chapters that follow.

Lithic Technology and Chronology

Jepsen (1951:24) first coined the term "Cody complex" to describe the co-occurrence of Eden and Scottsbluff projectile points recovered from the Horner site near Cody, Wyoming. Previously, Eden and Scottsbluff points were subsumed under the broadly defined "Yuma" projectile point type (see discussion in Wormington 1957:103; also Wedel 1987). After Collateral Yuma points were found at the Finley site, located in the Eden Valley of Wyoming, and a second variety of Yuma point was found near Scottsbluff, Nebraska, called Scottsbluff Yuma, H. Marie Wormington (1948; also 1957:106) suggested dropping the term "Yuma" and simply renaming them "Eden" and "Scottsbluff," respectively. It was under this framework that in 1951 Jepsen suggested that the co-occurring Eden and Scottsbluff points at the
Horner site be considered part of a single cultural complex—the Cody complex. In 1957, Worthington further elaborated on the concept of a complex, which she defined as "a group of related traits or characteristics that combine to form a complete activity, process, or cultural unit. Lithic complexes are identified by the presence of several key implement or tool types in association" (p. 273). Worthington (1957) ultimately went on to identify the co-occurrence of Eden and Scottsbluff points and Cody knives as hallmark indicators of the Cody complex (Figure 1.1).

Since then, many researchers have considered the Alberta point type a distinct yet direct antecedent of the Cody complex (e.g., Agenbroad 1978; Bradley 1993, 2009, 2010; Frison 1991; Stanford 1999). However, results of detailed point production analyses (Bradley 1993, 2010; Bradley and Frison 1987) and the recognition that Alberta radiocarbon dates and geographic distribution overlap with Eden and Scottsbluff has led most archaeologists to include the Alberta point within the Cody complex (e.g., Agenbroad 1978; Amick, this volume; Bamforth 1991; Bradley 1993, 2009, 2010; Bradley and Frison 1987; Hoffman and Graham 1998; Knell 2007; Muniz 2005). For our purposes here, we consider the Cody complex to represent a taxonomic classification of early Holocene hunter-gatherers who shared distinctive projectile and knife technologies that set them apart from their contemporaries; these groups shared other important aspects of their lifeways, such as an emphasis on bison hunting and extensive long-term use of the Great Plains and Rocky Mountains. We make no assumptions about other cultural aspects such as language, ideology, or social organization, which may have varied between groups. Undoubtedly, smaller subdivisions of the Cody complex can be made depending on which characteristics are emphasized, and the researchers in this book may differ in their applications.

**Projectile Point Technology**

In the decades following Worthington's seminal publication, researchers named many more "types" of Cody projectile points, generally basing the distinctions on variations in degree of shouldering, blade outline shape, length of stem, and final rounds of pressure flaking (Agenbroad 1978; Bamforth 1991; Beck and Jones 1997; Bradley and Frison 1987; Bradley and Stanford 1987; Forbes 1968; Frison 1991; M. G. Hill et al. 1995; Hofman and Graham 1998; Justice 1987; Mason 1997; Stanford 1999; Theler and Boszhardt 2003; Wheat 1972, 1979; also see Knudson, this volume; Bamforth, this volume). For example, Wheat (1972) added the Firstview type and provided a partic-
ularly informative description of the subtle differences between the Eden, Scottsbluff, Firstview, San Jon, and Milnesand types on the Great Plains. Hofman and Graham (1998) noted a potential association between Cody and Milnesand points from the southern Plains, and LaRelle (2002) documented a co-occurrence with James Allen points in eastern Colorado; however, we do not consider Milnesand or James Allen part of the Cody complex. Thus, the primary named point types associated with the Cody complex throughout the Great Plains, Rocky Mountains, and Great Basin are Alberta, Alberta/Cody I, Alberta/Cody II, Kersey, Firstview, Eden, Scottsbluff I, and Scottsbluff II (Figure 11). Other named Cody point variants include the enigmatic Scottsbluff III (Great Plains and Rocky Mountains), Eared Scottsbluff/Eden and Remier variants (western Great Lakes), San Jon (Llano Estacado region), and Texas Scottsbluff (southern Texas). The Har- din point type from the central Midwest is considered by many (Justice 1987; Mason 1997; Theler and Boszhardt 2003) to be either a stylistic variant or direct descendant of the Scottsbluff type. Some Holland points from the central Midwest have characteristic Cody point attributes (Holland 1971), but many researchers consider them Dalton variants (Justice 1987). Around the western Great Lakes, archaeologists have named several cultural phases and complexes (e.g., Interlakes composite, Lakehead complex, Minoqua phase, Reservoir Lakes complex) that include Cody points and variants (Fox 1975; Harrison et al. 1995; Ross 1997; Salter 1974; Steinbrinck 1974). However, these complexes also include unrelated, nonfluted Paleoindian point styles (e.g., Agate Basin, Hell Gap, Angola, and variants) that lack exclusively Cody traits.

Regardless of the specific named type, the basic Cody complex projectile point has a straight-sided (sometimes slightly expanding or contracting) squared base that may range from slightly convex to flat to slightly concave, squared to rounded shoulders that are occasionally subtle when ground or absent (e.g., Firstview), a lanceolate parallel-sided blade (that may range from convex to triangular) often with well-executed parallel collateral flaking (sometimes irregular), and a cross section ranging from biconvex (sometimes flattened) to median ridged (sometimes di-

amond shaped). In the Midwest, the Eared Scottsbluff/Eden type has small ears extending outward from the bottom of the base (as do some Holland points, to a much lesser extent), and Hardin points have broad corner-notches and a pronounced expanding stem.

**Cody Knife**

The Cody knife is the other diagnostic artifact type for the Cody complex (Figure 11) and, like the projectile points, has a plethora of morphological varieties (Agenbroad 1978; Blackmar 1998; Bradley and Frison 1987; Bradley and Stanford 1987; Dick and Mountain 1966; Worthington 1957). Cody knives generally have square bases and asymmetrical blades, and are usually—but not always—stemmed on at least one margin. Blackmar (1998) noted that within the Great Plains, Colorado (n = 15) and Wyoming (n = 15) have the most frequent occurrence of the classic Cody knife as defined by Worthington. Furthermore, Blackmar found that the majority of knives recovered from the two states came from the Claypool site in Colorado (n = 11) and the Horner site in Wyoming (n = 8). More recently, three Cody knives were found at the Osage Beach site, Yellowstone National Park, Wyoming (Johnson et al. 2004). Unlike the case of projectile points, our understanding of Cody knives remains somewhat enigmatic because this artifact type has received less discussion regarding its morphological variability or chronological or cultural implications. Recent high-magnification use-wear analyses by Muniz (2005) on several Cody knives from the western and northwestern Plains identify these tools as butchering implements—a pattern consistent with their frequent recovery from bison kill sites.

**Radiocarbon Chronology**

The chronometric relationship between the various projectile point styles is complex because of several factors: the paucity of radiocarbon dates associated with all the point styles except Eden and Scottsbluff, the implications of reversals and plateaus in the radiocarbon calibration curve, and variability in the morphological continuum exhibited by many of the point styles. With these limitations in mind, we briefly analyse chronological and geographic trends in the development
of Cody complex point styles. Radiocarbon dates are presented throughout this book, followed (in most cases) by the two standard error (95 percent confidence interval) calibrated year BP date range as appropriate. The radiocarbon dates were calibrated using CALIB 6.0.2 based on the INTCAL09 calibration curve (Reimer et al. 2009).

Several of the stemmed projectile point types from the Plateau and Great Basin have radiocarbon dates prior to 11,000 ¹⁴C yrs BP (see dates in Beck and Jones 2010), and may have been precursors to the stemmed point varieties on the Great Plains that appear around 10,000 ¹⁴C yrs BP (11,600–11,340 cal BP). The cultural and chronological relationships between Cody complex peoples from the Great Basin, Great Plains, Plateau, and Rocky Mountains are underresearched topics that hold great importance for understanding Cody complex origins (but see Amick, this volume), the stability of this early Holocene cultural tradition, and relationships with descendant early Archaic groups.

To explore the date range of the Cody complex, we provide summary data that include 64 radiocarbon dates from 41 Cody complex components at 31 sites (Table 1.1). We attempted to focus on single components as much as possible to reduce complications from mixed assemblages, although undoubtedly some components are mixed. The 31 sites we use to evaluate the Cody chronological record are generally located on the western Great Plains and Rocky Mountains, as most Cody complex research has been conducted there; the resulting analysis is probably affected by this bias. Despite the bias, the ten U.S. states and two Canadian provinces containing radiocarbon-dated sites (Figure 1.2, Tables 1.1 and 1.2) represent a wide swath of North America that should allow for the identification of temporal patterning resulting from large-scale geographical trends in occupation and possible colonization of territory by Cody groups.

A second potential source of bias in understanding time-space systematics for the Cody complex comes from the continuous nature of the technological attributes used to classify the diagnostic point styles. For example, identifying an extra round of pressure shaping or the emphasis a specific researcher places on degree of development and shape of shoulders may result in a slightly different point style classification. Generally, we relied on the typological classifications made by the original investigators with the understanding that different researchers may create slightly different groupings.

To assess the current state of the Cody chronology and to provide a chronological baseline for the chapters that follow, we developed a ranking system to organize the radiocarbon dates in Table 1.1. We included only those published radiocarbon dates that are most directly associated with each cultural deposit. The degree of association (from most to least associated) was ranked in the following tiers:
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1. The dated material is in direct association with the cultural deposit in the form of a cultural feature (e.g., hearth, bonebed), and consists of charcoal, seed, or bone collagen (preferably dated in the mid-1990s or later due to advances in bone dating techniques that occurred during this time).

2. The dated material is in indirect association with the cultural deposit because the sample is from the same stratum (either geologic or pedogenic) but spatially separated from the deposit and the dated material consists of charcoal, seed, or bone collagen (preferably dated in the mid-1990s or later).

3. The dated material is bulk sediment (e.g., humates, humic acid, "residue") in either direct or indirect association with the cultural deposit.

In order to better understand the chronologically trends for specific point styles, we further analyzed the tier 1 and 2 dates (82.8 percent of the sample). The tier 3 samples lack direct association with the cultural deposit because they are bulk samples subject to the mixing effects of younger pedogenic processes; consequently, we excluded them from analysis. Also excluded were bracketing dates from super- or subjacent strata. Although Wheat's (1972) original date for Olsen-Chubbuck was made directly on bone from the bonebed, it was excluded both because of the very large standard error (500 years) and because the site was redated by Holliday and colleagues (1999) using better techniques.

Figure 1.3 illustrates the distribution of the 53 tier 1 and 2 uncalibrated radiocarbon dates by point style with a two-sigma error. When we consider single point styles from unmixed components, the Alberta/Cody components from the Hornor II and Wallman Bison sites (10,500-9620 14C yrs BP; 12,540-10,850 cal yr BP) are oldest; however, this very small sample may not fully represent Alberta/Cody and must be considered cautiously. Alberta points are the next oldest, based on seven dates from five sites; when a two-sigma range is used, this point style dates from 10,065 to 8155 14C yrs BP (11,720-10,030 cal yr BP). The youngest date, from Swan Landing, Alberta, is an extreme outlier, and if it is removed, the range terminates at 9440 14C yrs BP (ca. 10,655 cal yr BP). Following Alberta and Alberta/Cody is a florescence of point styles that include Eden, Scottsbluff, Firstview, and Kersey.

Two sites from Alberta, Canada—Fletcher and DJPI-1—provide data relevant to the termination of the Alberta phase and the initiation of Scottsbluff. The Fletcher site has a mixed Alberta and Scottsbluff component that was recently dated to 9540 ± 110 14C yrs BP (11,185-10,575 cal yr BP) (see Dawe, this volume), a date that overlaps with the previously reported maximum bracketing age of 9580 ± 110 14C yrs BP (10,265-11,072 cal yr BP) (Vickers and Beaudoin 1989). The new Fletcher date is also one of the earliest dates yet recorded for Scottsbluff. A minimum bracketing date of 9410 ± 95 14C yrs BP (11,031-10,300 cal yr BP) was determined for the Alberta component at Locality I, Hell Gap (Haynes 2009) and provides further support for a terminal date for the Alberta style of about 9440 14C yrs BP (ca. 10,655 cal yr BP). Site DJPI-16 produced two dates—9660 ± 210 and 9450 ± 230 14C yrs BP—on a mixed Alberta and Scottsbluff component that average 9525 14C yrs BP (see Dawe, this volume). Although large standard errors exist for the DJPI-16 dates, they provide further support for a pre-9500 14C yr BP origin for the Scottsbluff style.

The earliest components with only Scottsbluff points occur at two sites in Alberta (EdPi-480, EkPu-8) and the Malin Fishing Hole site in Montana, which together range from 9900 to 9490 14C yrs BP (11,320-10,580 cal yr BP). These sites are separated by 321 radiocarbon years (442 calendar years) from the remaining Scottsbluff component sites and possibly suggest that the Scottsbluff style originated in Alberta before spreading southward; more dates are needed to evaluate this issue (see Dawe, this volume).

The four other sites with Scottsbluff-only components date from 9100 to 7500 14C yrs BP (10,250-8330 cal yr BP). The youngest date, from MacHaffie, was run shortly after the advent of radiocarbon dating and has a large standard error (Forbis and Sperry 1952). As Figure 1.3 shows, several of the youngest Scottsbluff dates (MacHaffie, Red Rock Canyon) have large errors; we feel that a terminal date closer to 8000 14C yrs BP (8990-8785 cal yr BP) is more likely.

The date range for single-component Eden occupations is much narrower than for Scottsbluff.
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1 AC (Alberta/Cody), AL (Alberta), CK (Cod, C), ED (Eden), FB (Ft. Wash), KA (Kersey), SB (Scottsbluff).
2 Dates (Wheat 1972) not used for this analysis because of very large standard error and relating of site by Holliday et al. 1999.
3 Beta 64318; Beta-64320; Beta-65276; Beta-65277.
4 CAMS-10364, CAMS-12681.
5 NSRL-2801 CAMS-31812; NSRL-2797 CAMS-31813; NSRL-2797 CAMS-32682; NSRL-2799 CAMS-32683; NSRL-2799 CAMS-32684; NSRL-2801 CAMS-32684; NSRL-2799 CAMS-31814.
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Three sites (Hell Gap Locality V, Heron Eden, Hudson-Meng) with six single-component Eden occupations range in age from 9049 to 8660 ¹⁴C yrs BP (11,610–9525 cal yr BP). The raw dates (without errors) indicate that these components are generally older than single-component Scottsbluff sites, although there is considerable overlap. The oldest Eden date is from Hudson-Meng (9339 ± 55 ¹⁴C yrs BP; 10,679–11,101 cal yr BP) (Muhlb 2010) and is essentially identical to the oldest Scottsbluff dates. Although the sample size is small, the data lead to the hypothesis that Scottsbluff and Eden developed contemporaneously, with Scottsbluff to the north (southern Alberta and Montana) and Eden to the south (Nebraska–central High Plains).

Examples of both Eden and Scottsbluff projectile points in the same component occur in ten components at nine sites, and range from 10,100 to 8140 ¹⁴C yrs BP (11,760–9220 cal yr BP). The oldest date, from Locality 1 at Hell Gap, has a large standard error (Haynes 2009); thus, a more accurate estimate for the maximum date may be the 9819 ¹⁴C yr BP (11,240–11,220 cal yr BP) date from Lindemeyer (Haynes et al. 1992). As Figure 1.3 illustrates, the termination of the co-occurring Eden-Scottsbluff occupations appears to correlate with the end of Eden, since the Scottsbluff style continues for many centuries afterward. Radiocarbon dates for eight Firstview components at four sites (Blackwater Draw, Lubbock Lake, Olsen Chubbuck, San Jon) largely mirror those for the later Scottsbluff grouping. The majority (75 percent) of these dated components are from just two sites: Blackwater Draw and Lubbock Lake. The similarity in temporal range to the more northerly Scottsbluff sites may indicate distinct regional foci for groups making these styles (Firstview in the south; Scottsbluff in the north), as noted by Bamforth (1991) and Holliday (1997).

If we take into consideration the temporal overlap at the end of Eden and beginning of Firstview, the lack of distinctive shouldering that typifies both styles, and the general southerly orientation in relation to Scottsbluff, the intriguing possibility is raised that Firstview evolved from an Eden precursor. Detailed technological analyses should be conducted to evaluate this possibility.

The final dated components in the sample include mixed deposits with Alberta/Cody, Eden, and Scottsbluff points, and the Kersey type as defined by Wheat (1979) at the Jurgens site. The mixed components at Horner I include Alberta/Cody, Eden, and Scottsbluff points that date to 8800 ¹⁴C yrs BP (ca. 9905–5740 cal yr BP). Frison et al. (1987) noted the possibility that the Horner I deposit represents a palimpsest accumulation and that the Alberta/Cody points may date to an older occupation. Otherwise, the Alberta/Cody component at Horner I is at least 900 ¹⁴C years younger than expected; however, the small Alberta/Cody sample may significantly bias this interpretation. The two dates from Medicine Lodge Creek are from a stratum with Eden and possibly Alberta/Cody points. The dates are more consistent with Eden, but as with Horner I, the lack of Alberta/Cody sites in the database may cause this
FIGURE 1.3. Cody complex radiocarbon dates: AC = Alberta/Cody; A = Alberta; ED = Eden; SB = Scottsbluff I and II; FV = Firstview; KR = Kersey; combinations also indicated.
apparent anomaly. Finally, the radiocarbon date for the "Kersey component" at the Jurgens site fits well with both Eden and Scottsbluff dates and, as several researchers have noted (Bradley 1995; 2010; Muñiz 2005; Stanford 1999), represents a local stylistic variant rather than a separate cultural complex as originally proposed by Wheat (1979).

The Bradbury Brook site in east-central Minnesota was not included in this analysis but produced a date of 9220 ± 75 (10,568–10,240 cal BP) from charcoal in association with a Cody complex point base (Malik and Bakken 1999). The site has a dense lithic deposit with more than 125,000 artifacts from stone tool manufacturing, and represents the presence of Cody complex peoples in the upper Midwest woodlands. The projectile point (base and proximal blade fragment) was originally identified as Alberta (Malik and Bakken 1999) but could be Scottsbluff, which would make the radiocarbon date consistent with this attribution.

The Hardin point type occurs along the eastern Plains and southern Midwest and is estimated to date back to between 10,000 and 7500 14C yrs BP (Justice 1987). Based on similarities in production strategy, flake scar patterns, and overall morphology, many Midwest researchers interpret the Hardin point style as deriving directly from Scottsbluff (Justice 1987; Mason 1997; Theler and Boxhardt 2003). If this is the case, then Hardin may be one of the final vestiges of the Cody complex and may represent an adaptation to the prairie-woodland environment of the lower Midwest that extended into the early Archaic period. However, the frequency of beveled blade edges through resharpening is reminiscent of southeastern early Archaic point styles; the cultural connection between Hardin points and the Cody complex thus remains enigmatic.

Generally, then, for the Great Plains and Rocky Mountain region, Alberta/Cody, Alberta, Eden, Scottsbluff, and Firstview depict temporal continuity between about 10,000 and 8000 14C yrs BP, a period that spans some 2,815 calendar years (11,600–8785 cal BP), making it one of the longest known Paleoindian cultural traditions. If stemmed point sites from the Great Basin and Plateau, and Hardin sites from the Midwest, are added to this, the temporal range could expand at least another 700 radiocarbon years earlier (but see Amick, this volume) and perhaps another 600 radiocarbon years later.

Assuming that the many plateaus and reversals in the radiocarbon curve are not artificially structuring the chronological relationship of the various Cody point styles, it seems likely that for well over 2,500 years there were continuous Cody cultural "neighborhoods" or populations that covered vast territories and probably interacted with their surroundings in different ways. The use of different adaptive strategies by Cody peoples living in different environmental settings resulted in the unique and regionally specific mobility and subsistence strategies noted in the literature and in the chapters in this book.

The recognition that there were almost certainly contemporaneous groups making slightly different projectile points and practicing slightly different subsistence-settlement strategies (see Knudson, this volume) raises very important questions: how did Cody peoples vary their approaches to negotiating the social landscape and how did different settlement-subistence strategies influence the development of social networks during the Cody era? Some of these issues are addressed below and in the chapters that follow.

Geography

The Cody complex is a widespread cultural phenomenon; however, examination of Figure 1.2 (also see Table 1.2) makes clear that most excavated Cody sites are located in the Great Plains and Rocky Mountains. Cody sites occur on the grasslands/rolling hills and alluvial valleys of the Great Plains, extending from Alberta and Saskatchewan in the north to the Gulf Coast of Texas in the south, and from the Rocky Mountain Front Range on the west to Illinois on the east (e.g., Dawe, this volume; Frison et al. 1996; Hofman 1996; Hofman and Graham 1998; Justice 1987). Many other Cody sites occur in the foothills (mostly east of the Continental Divide) of the North, Central, and Southern Rocky Mountain Front Range as well as higher mountain zones (e.g., Brunswig 2007; Hill and Knell, this volume; Jodry 1999; Pitblado 2003). Outside the Great Plains, Cody projectiles and sites have been recovered from the Black Rock Desert in northern Nevada, in Idaho, and as far east as the Great Lakes
Knell and Muriz

woodlands of Minnesota, Wisconsin, southern Manitoba, and Ontario, as well as into New England (e.g., Amick, this volume; Beck and Jones 1997; Cox 2001; C.L. Hill 2007; M.G. Hill 1994; M.G. Hill et al. 1998; Julig 1994, 2002; Malik and Bakken 1999; Mason 1981; Mason and Irwin 1960; Pettigrew 1976; Salzer 1974; Stoltman 1997; Theler and Bosthardt 2003; Wallman and Amick 1991). This geographic range is vast and encompasses considerable variation: in latitude and longitude and thus significant variability in temperature and precipitation; in elevation; in vegetation and fauna and how Cody peoples respond to environmental change; in availability of water, wood, and toolstone; and probably also in differential rates of population pressure. Cody complex sites occur across several biomes and throughout many ecozones with differing resource structure, which, as research has demonstrated time and again, influences Paleoindian subsistence and land-use strategies (e.g., Amick 1994; M.E. Hill 2007; Knell 2007; this volume; Knell and Hill 2012; Labelle 2005). Consequently, it is not surprising that prior (e.g., Blackmar 2001; Johnson 1989; Knell 2007; Knell and Hill 2012; Muriz 2009; Pittblado 2003) and current (Amick; Dawe; Hill; Hill and Knell; Muriz; and Root et al., this volume) studies demonstrate considerable variability in Cody subsistence and land-use patterning across space.

The widespread distribution of Cody complex projectile points across much of North America is also fairly unique among Paleoindian cultural complexes. This distribution is on par with that of Clovis, making the Cody complex one of the most geographically expansive cultural complexes in the prehistory of North America. The reasons for this widespread distribution are not entirely understood; however, some authors in this book (Amick; Dawe; Muriz [Chapter 2]) suggest that the expansion occurred as Cody peoples sought new niches during favorable times of the early Holocene.

Subsistence

The extremely wide geographic expanse of Cody site distributions and the associated variability in plants and animals that must accompany such a geographic range indicate that Cody peoples developed successful subsistence strategies wherever they lived—whether the Great Basin, Rocky Mountains, Great Plains, Texas Hill Country, eastern prairies, Great Lakes region of the Upper Midwest, or Midwest woodlands. Common to the subsistence strategy in all these areas is an emphasis on bison, which clearly played an important part (but not an exclusive one, as we see below) in the Cody economic strategy.

To demonstrate this point, we acquired subsistence data from 23 Cody complex sites in the Rocky Mountains and greater northwestern and northern Great Plains (Table 1.3). Of these sites, all but one (Blue Point) has identifiable bison remains, and in all cases the minimum number of individual (MNI) bison is higher than for any other faunal type. The average bison MNI for these sites is 51.6 (excluding Hudson-Meng), a number that is skewed by some extremely large kill/processing sites on the grassland plains (e.g., Jurgen’s [n = 68], Olsen-Chabuck [n = 191]). (This average estimate for bison MNI is very close to that reported by Hill [this volume] for a larger sample of Cody sites.) The average bison MNI drops drastically in the foothills-mountains and uplands, where Jerry Craig has an MNI of seven (Richings-Germain 2002), as does Hell Gap locality V (Knell et al. 2009); large, lower-elevation basins in the foothills-mountains zone seem to portray a different pattern, as indicated by the large bison kills at Horner I and II (Prison and Todd 1987). While the low MNI values at Jerry Craig and Hell Gap may not readily suggest an emphasis on bison, it is still the case that Cody people preferentially hunted bison in the mountains to a greater extent than did contemporary late Paleoindian groups (see Hill and Knell, this volume).

Little is said here regarding bison seasonality data obtained from analyses of bison maxillary and mandibular dentitions because Hill (this volume) covers this topic in considerably more detail. However, using the data in Table 1.4 and Figure 1.4, we briefly note some general trends. These data indicate that Cody hunter-gatherers dispatched bison throughout the year, with much of the hunting occurring in fall and early winter, and to some extent late summer. Cody subsistence strategies outside the Great Plains and Rocky Mountains are unknown; however, Hill’s (this volume) finding that bison hunting patterns varied between the northern and southern Great
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<td>Olsen-Chubbuck</td>
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<td>Osprey Beach</td>
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<td>Scotts Bluff</td>
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| MNI Average          | 51.6               | 3.3   | 2             | 1.6     | 1.6 | 2.8       | 1.2         | 1    | 1      | 1      |         |      |        |                  |

Note: Species richness excludes canid remains. Environmental zone: FHM = foothills-mountains, PGR = plains grasslands, PAV = plains alluvial valleys.
Plains suggests that differences between regions are likely.

Though bison figured prominently in the Cody subsistence strategy, many other nonbison species such as elk, pronghorn, and mule deer were hunted, along with smaller animals such as beaver, marmot, lagomorphs, and rodents (Table 1.3). Avian and aquatic species also occur in some Cody assemblages. If we consider species richness counts by environmental zone (Figure 1.5), a wider variety of animals was taken in the alluvial valleys compared with the plains grasslands, where bison, and particularly bison kills, dominate the patterning. While Cody complex peoples were obviously highly skilled bison hunters, understanding of their subsistence strategies remains incomplete until we better comprehend the role nonbison prey and plant resources played.
and until we identify a wider range of late winter through early summer occupations. Thus, the subsistence data mimic the projectile point data in terms of their defining influence on our understanding of the Cody complex. Despite the similarity among sites that show an emphasis on bison hunting, the variability around this trend indicates that Cody complex hunter-gatherers were dynamic and, above all, adaptable to local conditions. The ability to adjust to local conditions was critical to their survival, especially under the evolving climate and paleoenvironmental regimes they experienced during the early Holocene (see Muñiz, this volume [Chapter 2]; Widga, this volume) as well as changes in bison morphology and herd structure (increasing gregariousness; see Widga, this volume).

**Land Use**

Prior studies of Cody land-use patterns also shed light on important characteristics of the complex. To date, four main Cody complex land-use strategies have been postulated. First is the apparent focus on local regions or eczones for lengthy periods, sometimes as part of a seasonal round. Evidence for the focus on local regions usually comes from the predominance of local toolstone recovered at sites and seasonality data that depict a long-term or everwintering strategy. On the regional scale, Blackmar (2000) suggests this pattern for the southern Plains, as do Knell and Hill (2012) for the northern and northwestern Plains. At the site scale, Johnson et al. (2004) identify this pattern for the Osprey Beach site in Yellowstone National Park, Wyoming; Knell (2007, this volume) for the Hell Gap site; and Richards-Germain (2002) for the Jenny Craig site in Middle Park, Colorado. It thus appears that in some places and situations Cody complex peoples restricted their land use to specific eczones for a considerable length of time.

Second, some Cody groups responded to variations in resource structure by preferentially exploiting the Rocky Mountain foothills habitats and the wider variety of resources available there during certain seasons (Amick 1994; Frison 1993; Frison and Bonnichsen 1996; Johnson et al. 2004; Knell and Hill 2012; also see Hill and Knell, this volume). Johnson et al. (2004) suggest, for example, that cold stress increased the likelihood that Cody complex hunter-gatherers exploited the more biotically diverse foothills and adjacent plains rather than high mountains during the cold season. Amick (1994) identified altitudinal
variation in Cody complex sites and isolated projectile points in the Basin and Range versus plains of New Mexico. Isolated projectile points in this area occur, on average, 365 m higher than the residential sites, placing the isolated points in upland settings where solitary game lived. In contrast, residential sites generally occur in lower-elevation Basin and Range settings closer to wetlands and grasslands, which provided a higher diversity of resources. Frison (1992; Frison and Bonnichsen 1996) proposed that early Holocene climatic warming (environmental stress) affected the availability and distribution of resources, leading Cody complex groups to increasingly exploit foothills-mountains habitats when bison herd size dwindled on the plains grasslands. Cody complex settlement and subsistence strategies thus varied in accordance with the distribution of biotic resources, which demonstrates Cody hunter-gatherers' ability to adjust their land use to accommodate local variations in resource structure (also see Amick; Hill and Knell; Knell and Root et al., this volume).

The third pattern depicts Cody groups as having maintained a seasonally transhumant land-use strategy (Blackmar 2001; Johnson et al. 2004). Blackmar (2001) found that Cody groups on the southern High Plains regularly incorporated marginal environments into their land-use strategy, likely during times of environmental stress (but see Johnson 1980). Despite suggestions of a seasonally transhumant land-use pattern, these studies are limited in scope and require additional large, regional-scale studies that more fully tie the patterning into variations in resource structure and bison seasonality data.

The fourth pattern of Cody land use occurs among High Plains sites older than 9000 14C yrs BP (10,220–10,85 cal BP) that document long-distance travel from opposing directions across the western Plains and converge on large-scale bison kill sites during the fall. Muñiz (2005) interprets this convergent pattern as evidence for seasonal communal bison hunting on the western Plains at the Claypool, Jurgens, and Olsen-Chubbuck sites. Based on distance to lithic raw material sources, Muñiz documents that after 9000 14C yrs BP, Cody groups reduced the maximum distance traveled (or traded) before a bison kill by 340 km on average; in addition, travel from opposite directions to a bison kill ceased. The post-9000 14C yrs BP decrease in travel and trade probably reflects range restrictions on the western Plains in response to deteriorating grassland environments resulting from climate change (Muñiz 2005).

A significant gap exists in our understanding of Cody land-use strategies for the Great Lakes and Midwest. Sites such as Bradbury Brook (Minnesota); Robinson, Renier, and Pope (Wisconsin); Sheguiandah (Ontario); and areas with abundant isolated finds such as Reserve Lakes (Minnesota) and Carberry Plain (Manitoba) indicate extensive use of the region by Cody groups. Researchers have noted general late Paleoindian movement between the Thunder Bay (Ontario) and Boundary Waters (Minnesota) regions along the north shore of Lake Superior (Fox 1975; Julig 1994; Ross 1997), and what appears to be extensive use of local aquatic and woodland resources in northern Wisconsin (Kuehn 1998; Sneider 1974). However, patterns specific to the Cody complex have not yet been clearly identified.

A theme commonly used to explain Cody land-use organization is macrogroup-level adaptation to variations in biotic resource structure, primarily adjustments to the distribution and availability of bison. These resource structure-based explanations fall into three types. The first includes those that view human and animal movements as responses to cold stress, with animals and thus humans congregating in lower-elevation foothills and basins during the cold season (e.g., Johnson et al. 2004; Poblado 2003). The second group views climatic stress as influencing resource structure, with Cody complex hunter-gatherers responding to major fluctuations in grassland productivity and, ultimately, the distribution of bison (Amick, this volume; Blackmar 2001; Frison 1992; Frison and Bonnichsen 1996; Johnson 1980; Muñiz 2005; Stanford 1990). The third perspective uses optimal foraging theory, particularly diet breadth, to explain why Cody complex hunter-gatherers positioned their residential campsites closer to a wide, rather than narrow, diversity of resources (Amick 1994; Knell and Hill 2012). With the exception of Amick's and Knell and Hill's optimal foraging-based studies, these Cody land-use reconstructions lack an overly theoretical explanatory framework. Sev-
eral chapters in this book—Hill and Knell: Knell: Muniz (Chapter 10); and Root et al.—seek to address this issue.

**Social Organization/Worldview**

Little, if anything, concrete is known about Cody social organization or worldview. Nearly five decades ago, Mason and Irwin (1960) published a description of a Cody complex cremation burial in northeastern Wisconsin, called the Renier site. The Renier site contained the cremated remains of an adolescent that had been interred along a low sandy ridge overlooking the shore of modern Green Bay on the east coast of Wisconsin. In association with the cremated remains were 11 points—two Eden, eight Scottsbluff, and one St. Charles/Thebes—that were also badly burned. Another probable association between Scottsbluff and Eden points and a cremation burial comes from the Pope site in east-central Wisconsin (Rittenhauer 1972).

The only clear example of Cody artwork comes from the Jurgens site. Wheat (1979:137-138) recovered a bison ulna with a series of linear and geometrical engravings that occur in pairs and triplets across the lateral and medial faces. The ulna was intentionally decorated, but unfortunately the image is unclear and one can only speculate as to its meaning.

Jurgens also produced the only known example of a Cody pipe (Wheat 1979:129). The implement was shaped from a naturally hollow iron silicate concretion that shows a high degree of polish from use. We can only guess what role a pipe may have played in the social or religious life of Cody people. The pipe demonstrates, however, that pipe smoking extends back to the Paleoindian period.

Aside from these brief glimpses of how Cody complex peoples treated their dead, created art, and used pipes, we have almost no understanding of their spirituality or ideology. The lack of emphasis in this direction naturally results from the unavailability of pertinent analogues, artifacts, and human remains, though there is no reason why researchers could not begin thinking along these lines. Comprehending the Cody worldview obviously would improve our understanding of Cody lifeways as a whole.

**Organization of the Book**

The chapters in this book use behavior-oriented approaches to expand our current understanding of the Cody complex. While the Cody complex is one of the better-represented and geographically widespread Great Plains Paleoindian cultural complexes, this volume is the first major attempt at a synthesis. Before this book, the only major behavior-based analyses of the Cody complex were the dissertations by Muniz (2005) and Knell (2007). Predating these dissertations, of course, is the Horner site monograph by Frison and Todd (1987), which is a detailed site report. We hope that the current volume places the Cody complex among the better-understood Paleoindian cultural complexes.

The first set of chapters, by Muniz and Widga, reconstructs the early Holocene environment faced by Cody complex peoples and examines the impacts of climate on Cody lifeways. In reconstructing the early Holocene environment, these authors use multiple types of proxy data: fire frequency, gastropods, sand dune geomorphology, insects, isotopes, macrofossils, packrat middens, phytoliths, pollen, soil development, and sympathy of small mammalian assemblages. More specifically, Muniz (Chapter 2) finds that the first half of the Cody era (-10,000-9000 14C yrs BP; 11,000-10,850 cal BP) was generally conducive to abundant biotic production in a variety of ecozones throughout the central and northern U.S. Great Plains and adjacent Rocky Mountains. After about 9000 14C yrs BP (10,210-10,185 cal BP), some regions began to dry out, and this trend became substantially amplified after 8500 14C yrs BP (9530-9490 cal BP). Cody groups repeatedly selected for ecotonal settings that combined springs, streams, and riverbanks with grassland and foothill habitats. As many ecosystems substantially dried after 8500 14C yrs BP (9530-9490 cal BP), the number of Cody sites also "dried up." This apparent correlation leads to the hypothesis that Cody complex peoples on the Great Plains and in the adjacent Rocky Mountains made significant adaptive changes to meet substantial environmental challenges.

Widga (Chapter 3) considers what the taxonomic diversity of small mammalian fauna indicates about past environments in the central and eastern United States between 21,000 and 8100
in the key geographic areas inhabited by Cody peoples; however, additional research in the southern Great Plains and Midwest would considerably round out this understanding.

Root et al. (Chapter 5) test a model of Cody land-use organization in western North Dakota and southern Saskatchewan. Lithic-based variables from several key Cody sites from the Knife River flint (KRF) quarry area, the Missouri Coteau, and Glaciated Plains are evaluated and applied to the land-use model. Root et al. find that Cody groups tethered their movements to the KRF region for parts of the year but in late summer and fall geared up with KRF for rapid, long-distance movements north of the Missouri River to hunt bison. Such movements fit the expectations of the land-use model evaluated in this chapter.

Dawe (Chapter 6) provides a substantial overview of the Cody complex in Alberta, Canada. This data-heavy chapter not only summarizes many unpublished and hard-to-access reports, making it a gold mine for documenting the Cody occupation of Alberta, but also significantly improves our understanding of the lifeways of Cody groups in the northern limits of their geographic range. Dawe suggests, based on the spatial and temporal distribution of Cody sites, that a transition occurred from an early reliance on exotic lithic materials to a later reliance on local lithic raw materials. Based on ecological considerations, he interprets this pattern as resulting from the earliest Alberta/Cody inhabitants of Alberta being unfamiliar with the region and reducing risk by relying on nonlocal stones, with later Cody groups settling into Alberta and using the locally available resources. Dawe thus characterizes how Cody complex peoples colonized the northern latitudes of their geographic range.

Chapter 7, by Hill and Knell, is the first of two chapters that directly consider Cody lifeways beyond the grasslands and rolling hills of the Great Plains. While specifically evaluating Cody subsistence and land-use organization in the Rocky Mountains, the authors compare this patterning with Cody sites in the Great Plains as well as with contemporaneous Paleoindian complexes in the Rocky Mountains and Great Plains. As in some other chapters in this book, these patterns are considered within the framework of a land-use
model. The analyses suggest that Cody foragers in the Rocky Mountains more narrowly focused on bison hunting than did contemporaneous groups in the mountains (particularly during the summer and fall), and restricted their movements to this area for long periods of time, but less so than their non-Cody mountain counterparts. By highlighting how Cody groups interacted with their contemporaries, this chapter offers significant insights about Cody adaptive strategies.

The chapter by Amick (Chapter 8) on Cody in the northwestern Great Basin is unique to the book in its examination of Cody evidence from outside the Great Plains/Rocky Mountains heartland. Amick considers two main issues. The first concerns the typological and chronological position of Cody-style projectile points in the northwestern Great Basin compared with those from the Great Plains. Despite a paucity of data, he concludes in part that Cody complex occupations are present but rare, occurred later in the Cody period, and likely reflect sporadic use of the northwestern Great Basin. The second issue concerns patterns of land use, mobility, and subsistence. Amick finds that Cody peoples were highly adaptable foragers who made range extensions from the Great Plains into the Great Basin during times of declining grassland productivity and bison population size. Amick's chapter complements Davis's in the sense that Amick too considers Cody complex colonization, or more aptly range expansion, into an area beyond the traditionally identified Cody heartland.

The next set of chapters, by Knell, Muñiz, and Knudson, develop and test models of Cody land-use and technological organization and reconsider how the Scottsbluff projectile point evolved into a temporal diagnostic. These chapters are less oriented than the prior group and are somewhat more synthetic in their attempts to establish theoretical frameworks or models that explain Cody complex lifeways.

In Chapter 9, Knell evaluates and tests an optimal foraging-inspired model of land use that predicts how Cody peoples organized their movements across multiple zones of the northern portion of the Great Plains. This model has been tested elsewhere at the regional scale (Knell and Hill 2012), but here Knell tests the model at the local scale (at the Hell Gap site, Wyoming). The analyses indicate that Cody complex hunter-gatherers in biotically productive uplifts with high-quality toolstone sources, much like those in the Hartville Uplift where the Hell Gap site is located, optimally tethered their land use to these areas for reasonably long periods of time. When using such a strategy at Hell Gap, the Cody hunter-gatherers repetitively and intensively exploited the locally available Hartville Uplift resources for a protracted portion of the year. This chapter contributes to our understanding of Cody land-use dynamics by identifying the local-scale archaeological signatures for a restricted land-use strategy, and then explaining the conditions of resource structure under which Cody hunter-gatherers optimally employed this strategy.

Muñiz (Chapter 10) analyzes the technological organization strategies employed at Jurgens and Hell Gap Locality V using a risk management model. The predictions of the optimization-based model are compared with the actual decisions Cody people made regarding tool manufacture and maintenance, hunting, butchery, and hide working. High-magnification microwear analysis and independent lines of geological and biological evidence are used to evaluate the closeness of fit between the model predictions and observed behaviors. Muñiz identifies aspects of the technological strategy in which Cody people optimally managed risk, and explores reasons why their behaviors sometimes diverged from model predictions.

Knudson (Chapter 11) considers the historical development of the Cody complex based on the evolution of Scottsbluff point typology, our understanding of the Scottsbluff Bison Quarry site, and other contemporaneous Paleoindian sites on the central Plains. Recent analyses of the bison bone, the original excavators' notes, and current geomorphological evidence lead Knudson to conclude that the Scottsbluff Bison Quarry was probably a single-component bison kill event. The implications of the morphological variability in the projectile points used for this single kill event lead Knudson to some important considerations about the archaeological construct called the "Cody complex." This variability also leads her to suggest that as we define and refine Paleoindian typologies and culture histories, we be mindful of
local scale patterns and the fluidity of the social groups we study.

Finally, Bamforth (Chapter 12) offers insightful discussions and thoughtful directions for future research that will further the aims of the studies presented in this book. Bamforth notes the bias that results from basing our concept of the Cody complex on a single fossiliferous deposit (e.g., Cody point or knife) and the meaning this has for how we conceive of the actual groups of people who created the "Cody" archaeological record. For Bamforth, the lack of fit between how archaeologists currently define Cody groups and the original intent of the taxonomic categories used to shape the definition of the complex results in a late Paleolithic cultural construct without ethnographic parallels. Bamforth discusses the ambiguity stemming from defining late Paleoindian sites as Cody, and he identifies important directions for future research that should focus on understanding the actual social organization reflected by our archaeological constructs. Does Cody represent a cohesive group of people who shared a broadly similar culture, a technologically continuous horizon that moved through existing populations, or some variable combination of the two? While Bamforth unites many of the themes addressed in the contributed chapters, he also leaves the reader with several potent questions that will provide archaeologists fodder for subsequent research on the Cody and other late Paleoindian complexes.

Together the chapters in this book provide an integrated and wide ranging understanding of the Cody complex that significantly improves our understanding of the lifeways that comprise what archaeologists know as the Cody complex. The long overdue synthesis of the Cody complex has finally arrived.

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