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THE TIMING OF PRECOLUMBIAN MILITARIZATION IN THE U.S. MIDWEST AND SOUTHEAST

Anthony M. Krus

Bayesian chronological modeling is used to investigate the chronology of bastioned palisades during the precolumbian period in the Midwestern and Southeastern United States. Nine precolumbian settlements in the Midwest and Southeast with bastioned palisades have been subject to scientific dating (Angel Mounds, Annis Village, Aztalan, Cahokia Mounds, Etowah, Kincaid Mounds, Jonathan Creek, Moundville, and Southwind). Complete radiocarbon datasets from these sites are presented within an interpretative Bayesian statistical framework. The results provide a glimpse into the history of Mississippi period (A.D. 1000–1700) fortifications with bastions and indicate that the analyzed fortifications were built and maintained predominantly in A.D. 1200–1400. This finding suggests a greater institutionalized role for defense and warfare in post-A.D. 1200 Mississippian societies. Additionally, modeling results further indicate that the investigated Mississippian centers continued to maintain fortifications for generations after their construction.

Modelos cronológicos Bayesianos son utilizados para investigar la cronología de empalizadas con bastiones durante el periodo Precolombino en el medio oeste y el sureste de los Estados Unidos. Nueve asentamientos precolombinos del medio oeste y el sureste con empalizadas con bastiones han sido fechados científicamente (Angel Mounds, Annis Village, Aztalan, Cahokia Mounds, Etowah, Kincaid Mounds, Jonathan Creek, Moundville y Southwind). Conjuntos de fechados de estos sitios son presentados con un marco de referencia estadístico Bayesiano. Los resultados proveen una aproximación a la historia de fortificaciones con bastiones del periodo Mississippiano (d.C. 1000–1700) e indica que las fortificaciones analizadas fueron construidas y mantenidas predominantemente entre d.C. 1200–1400. Este descubrimiento sugiere una institucionalización pronunciada para defensa y guerra entre las sociedades Mississippianas después de d.C. 1200. Adicionalmente, los resultados indican que los centros Mississippianos investigados mantuvieron las fortificaciones por generaciones luego de su construcción.

Palisades were an architectural form used by Mississippian people in the Eastern Woodlands, especially the Midwestern and Southeastern United States (Griffin 1967; Lafferty 1973; Milner 1999, 2000, 2007; Milner et al. 2013), and widespread throughout the eleventh to sixteenth centuries A.D. (Milner 1999, 2000). They are defined as either single-post or wall trench structures that surrounded settlements, sometimes with gates or externally projecting bastions that could be used to inflict flanking fire on attackers (Keeley et al. 2007:67).

Globally, palisades with a regular bastion spacing of 25–40 m correlate with the use of the bow and arrow as the main projectile weapons; presumably spacing at that interval provided an optimal defensive range (Keeley et al. 2007:70–72). Likewise, Mississippian bastion spacing varies from 21–44 m (Milner 2000:58), indicating that the most likely function of Mississippian palisades with regularly spaced bastions was as structures for organized defensive combat (Keeley et al. 2007; Milner 1999, 2000). These bastions were generally large enough to hold one or more defenders that could inflict fire onto closely approaching attackers (Keeley et al. 2007; Milner 1999, 2000, 2007) and likely increased the line of sight for defending archers while shielding their visibility (Keeley 1996:56).

Archaeologists have identified bastioned palisades at 33 Mississippian sites and estimated their ages through various dating techniques. Drawn from Milner's database (1999, 2000, 2007; Milner et al. 2013), Table 1 summarizes the results of

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Table 1. Chronological Information for Mississippian Bastioned Palisades Prior to This Study.

Site	State	Cultural Affiliation	Radiocarbon dating of palisade contexts?	Time range for when palisades may have existed	References
Gunter's Landing (1MS39)	AL	Langston	No	A.D. 1000–1200	Walthall 1980; Webb and Wilder 1951:41
Lubbub Creek SI (1PI83)	AL	Summerville I	No	A.D. 1000–1200	Blitz 1993; Cole and Albright 1983:140–196
Moundville	AL	Moundville I, Moundville II	Yes	A.D. 1200–1300	Knight 2010; Knight and Steponaitis 1998:15; Scarry 1998; Vogel and Allan 1985
Cool Branch (9QU5)	GA	Rood	No	A.D. 1100–1250	Blitz and Lorenz 2002:126–127; Schnell et al. 1981
Etowah (9BR1)	GA	Late Wilbanks	Yes	A.D. 1325–1375	Bigman et al. 2011; King 2003
King (9FL5)	GA	Barnett	No	A.D. 1525–1565	Hally 1988:5–10; Smith 1987:46, 94
Lake Acworth (9CO45)	GA	Wilbanks	No	A.D. 1200–1350	Cable 1994:26, 77, 174
Woodstock Fort (9CK85)	GA	Woodstock	No	A.D. 900–1200	Cable 1994:16, 175; Hally and Rudolph 1986:19, 29–30
Cahokia	IL	Stirling, Moorehead	Yes	A.D. 1100–1250	Anderson 1969; Fowler 1997; Holley et al. 1990; Iseminger et al. 1990; Trubitt 2003
Kincaid	IL	Kincaid	Yes	A.D. 1200–1400	Butler et al. 2011; Cole 1951
Olin (11MS133)	IL	Stirling, Moorehead	No	A.D. 1100–1325	Baltus 2014; Woods and Holley 1991:51
Orendorf LS (11F1284)	IL	Orendorf	No	A.D. 1150–1250	Harn 1994:26; Santure 1981:53–54; Wilson 2012, 2015
Angel	IN	Angel	Yes	A.D. 1200–1350	Black 1967; Green and Munson 1978; Hilgemon 2000; Peterson 2010:316–317
Southwind (12PO265)	IN	Angel	Yes	A.D. 1150–1450	Hilgemon 2000; Munson 1994; Striker 2009
Hovey Lake	IN	Caborn-Welborn	No	A.D. 1400–1450	Munson 1997; Pollack 2004
Annis Mound and Village (15BT20)	KY	Middle Mississippian	Yes	A.D. 1250–1450	Hammerstedt 2005, 2007
Corbin (15AD4)	KY	Mississippian	No	A.D. 1000–1200	Lewis 1990
Jonathan Creek F14 (14ML4)	KY	Jonathan Creek	Yes	A.D. 1160–1290	Schroeder 2006; Webb 1952
Morris (15HK49)	KY	Middle Mississippian	No	A.D. 1000–1300	Lewis 1988:31–33, 1990:412; Niquette 1991; Rolingson and Schwartz 1966:77
Snodgrass (23BU21B)	MO	Powers	No	A.D. 1275–1350	Morse and Morse 1983; Price and Griffin 1979:3
Towosahgy (Beckwith's Fort) B (23MI2)	MO	Middle Mississippian	No	A.D. 1050–1350	Chapman et al. 1977:244–255; Morse and Morse 1983:263
Pharr Village	MS	Middle Mississippian	No	A.D. 1050–1550	Futato 1989:117; Karwedsky 1980:46
Garden Creek	NC	Pisgah	No	A.D. 1250–1450	Dickens 1976:14, 86
Brown-Pack (Osborn's Place) (40CH1)	TN	Mound Bottom	No	A.D. 1200–1500	O'Brien 1977
Castalian Springs (40SU14)	TN	Middle Cumberland	No	A.D. 1200–1500	Smith 1975:34; Thruston 1897:34
Gordontown (40DV6)	TN	Late Mississippian	No	A.D. 1250–1450	Autry 1983:39; Smith 1994:110
Moss-Wright Park (40SU61)	TN	Middle Cumberland, Dowd	No	A.D. 1050–1200	Martinez 2008:59; Moore and Smith 2001:233
Rutherford-Kiser (40SU15)	TN	Middle Cumberland, Thruston	No	A.D. 1280–1480	Moore and Smith 2001; Smith 1994:110; Thruston 1897:32–33
Savannah	TN	Mississippian	No	A.D. 1200–1400	Welch 1998
Sellars (40WL1)	TN	Middle Cumberland	No	A.D. 1200–1400	Butler 1981:42–44, 56
Shiloh	TN	Mississippian	No	A.D. 1100–1300	Welch 2006
Toqua P-B (40MR6)	TN	Dallas	No	A.D. 1300–1600	Polhemus 1987:216, 653, 1217
Aztalan	WI	Middle Mississippian	Yes	A.D. 1000–1200	Barrett 1933; Birmingham and Goldstein 2005; Richards 2007; Richards and Jeske 2002

Note: Data from an updated version of the database described in Milner (1999, 2000, 2007) and Milner et al. (2013).

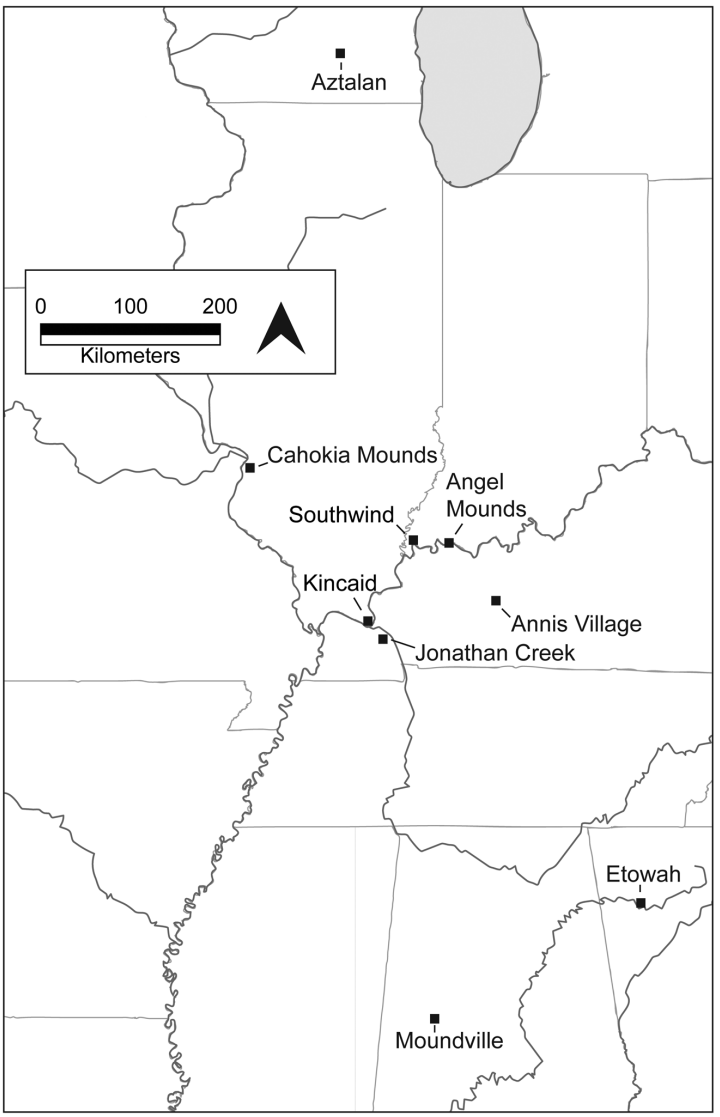

Figure 1. Map of Mississippian sites with bastioned palisades that have been subject to scientific dating.

these studies. Previous studies suggest that bastioned palisades were constructed and used from A.D. 1000–1500, with about half built prior to A.D. 1200. Recently, however, Milner (2007; Milner et al. 2013) has argued that the majority of Mississippian palisades *post*-date A.D. 1200. The precision of the time ranges for bastioned palisades provided in previous studies tends to be broad, often spanning hundreds of years and corresponding largely to established chronologies for ceramic phases (Table 1). But dating a Mississippian palisade from diagnostic pottery found in palisade trench fill is problematic because of discrepancies between the time of ceramic creation, its incorporation into palisade trench fill, and the specific association with the ceramic and the corresponding palisade context. Thus, a precise chronology for the appearance and spread of palisades, our strongest evidence for the militarization of Mississippian centers, has eluded us.

Ideally, palisade construction chronologies should be based on scientific dating of construction materials. Unfortunately, due to the lack of preserved construction materials and the high cost

of palisade excavations, there are only nine Mississippian sites with bastioned palisades that have been subject to scientific dating (Figure 1; Table 1). These dates generally come from either the remnants of charred palisade posts or organic material from palisade wall trench fills; occasionally, dates from contexts with stratigraphic relationships to palisade features are also available (Supplemental Material, Appendix A).

This paper applies a Bayesian methodology (Bronk Ramsey 2009a) to date the construction and use of the nine Mississippian bastioned palisades subject to scientific dating. Six of these sites (Angel Mounds, Aztalan, Cahokia, Etowah, Kincaid, Moundville) were some of the largest and most culturally influential (Figure 1). Using a Bayesian framework, the chronology of palisade construction can be estimated not only by radiocarbon dating, but also by using the relative dating information provided by stratigraphy, feature groupings, and other dated activity.

Methodology

The dataset used in this study includes all of the available dates from the nine sites in the sample. Dates from palisade construction materials provide direct dates for the construction and/or use of palisades, while dates from non-palisade contexts bring added clarity to palisade chronologies through stratigraphic relationships or from broad contemporaneity. This dataset consists of 367 radiocarbon dates, 14 from new measurements and 353 from the published literature. Eight of the new samples were obtained from curated archival materials in museum collections, and six of the new samples were recently excavated from Angel Mounds in Indiana (Appendix A). Samples were selected for new dating only if their context was securely associated with curatorial and excavation records. Of the 367 radiocarbon measurements, 53 were made on short-lived plant remains, 36 on wood, 205 on wood charcoal, 12 on animal bone, two on articulated human bone, one on mussel shell, nine on soot adhering to pottery, one on carbonized food residue adhering to pottery, three on bulk samples of mixed material, and 45 on unknown material.

The radiocarbon measurements are presented in Appendix A, where they are quoted in accordance with the Trondheim Convention (Stuiver and Kra 1986) as conventional radiocarbon ages (Stuiver and Polach 1977). Contextual and descriptive details for these samples are also provided in Appendix A. Calibrated date ranges were calculated using IntCal13 (Reimer et al. 2013) and OxCal v4.2 (Bronk Ramsey 2009a). They are cited in the text as 95-percent confidence intervals, with the end points rounded outwards to 10 years.

The technique used for Bayesian chronological modeling is a form of Markov Chain Monte Carlo sampling (Bronk Ramsey 2009a) and has been applied using the program OxCal v4.2 (http://c14.arch.ox.ac.uk/). The fit between the OxCal model and data is gauged with the Amodel agreement index, and values higher than 60 indicate good agreement between the model parameters and the dates (Bronk Ramsey 2009a). Resulting posterior density estimates from OxCal are calendar years and presented in *italics* as probability ranges with end points rounded to the nearest five years. The algorithms used in the models can be derived from the context matrices and the OxCal code (in Supplemental Materials Appendices B and C, respectively). Note that the posterior density estimates produced by modeling are not absolute. They are interpretative estimates, which can and will change as new data become available and as other researchers choose to model the existing data from different perspectives.

Results

Chronological models were constructed and run in OxCal, one for each site in the sample. The structure of each model is presented in the site context matrices (Appendix B) and the model code (Appendix C).

Appendix A includes an evaluation of the security of the context for each radiocarbon date through categorical rankings, an approach similar to Nolan (2012) and informed by studies on the critical evaluation of the suitability of samples and their taphonomy for radiocarbon dating (Ashmore 1999; Bayliss 1999; Bonsall et al. 2002; Fitzpatrick 2006; Taché and Hart 2013). The rankings are based on the published descriptions of the sampled material, context, and taphonomy. In many instances, the radiocarbon laboratories that processed the samples and/or the submitters provided additional information not included in the

published description. Some information was impossible to obtain, especially for radiocarbon samples submitted more than 20 years ago, due to the loss of records, the death of the responsible project personnel, and the closure of several radiocarbon laboratories used to process the samples.

The following criteria were used to score the security of context for each radiocarbon date:

(4) There is good evidence indicating that the sampled material was deposited fresh during the formation of the context from which it was recovered, such as wood charcoal from a hearth. Other examples include a bone from an articulated skeleton, or wood from a palisade post. A "4" is the top ranking in this scale.

(3) There is little evidence provided that the sampled material was deposited during the use of the context from which it was recovered. Generally, radiocarbon dates ranked "3" have vague descriptions for the relationship between the sampled material and context, such as "unidentified charcoal from a pit" or "nutshell from a house floor." For samples ranked "3," it is feasible that the sampled material may be residual, but it is also feasible that the sampled material dates the function of its context. These samples are given the benefit of the doubt and included in modeling as dating their corresponding context because this is how they are interpreted in previous chronological study. A ranking was reduced from (4) to (3) if the sampled material was potentially long-lived wood, such as a fragment of oak heartwood or soot that may have been derived from old wood (Bonsall et al. 2002:54).

(2) The sampled material likely predates the context from which it was recovered and is modeled as a *terminus post quem* (TPQ). For example, unidentified wood charcoal from within a sod block in mound fill is a TPQ for when the sod block was placed into the mound, because the wood charcoal is likely from an older context from which the sod block was removed. Likewise, most of the scattered small materials in a Mississippian palisade trench are modeled as TPQ because much of this material may have been in a different context prior to palisade construction and deposited into the trench during rapid backfilling in the initial construction stages.

(1) The lowest ranking. Either the sampled material, its relationship to the context, or the taphonomy is not entirely clear. For example, a sample with this ranking might have only a short context description such as "unidentified charcoal from Feature 777," yet "Feature 777" is not described. In several instances, the contexts are loosely described as coming from a house, but a more specific context within the house (such as wall trench, floor, pit within the house, etc.) is lacking. Likewise, the sampled material might also be labeled as "charcoal" with no further description. In several instances, sampled materials are not described at all in the published description. These samples are also given the benefit of the doubt and included in modeling as dating their corresponding context because this is how they are interpreted in previous chronological studies. However, it is entirely justified to model these samples as TPQ or to exclude them from modeling because the descriptive information needed for their evaluation is not included in the published description. Additionally, a ranking was reduced to (1) if the measurement was not corrected for fractionation and derived from either maize or an aquatic organism.

The Bayesian chronological models use charcoal outlier modeling as a strategy for accounting for the unknown inherent age offset in wood charcoal and soot samples (Bronk Ramsey 2009b). These models assume an exponential distribution, with an exponential constant τ of 1 taken over the range -10 to 0, of the charcoal dates (following Bronk Ramsey 2009b). The shifts are then scaled by a common scaling factor that can lie anywhere between 10^0 and 10^3 years.

The algorithms used for these models can be directly derived from the model structure shown in Appendices B and C. The models show good overall agreement between the radiocarbon dates and the assumptions of the models (Supplemental Materials Appendix D). Detailed results for these models are summarized in Table 2 and Figures 2–3. Models for Annis Village and Jonathan Creek are not presented because the radiocarbon data from these two sites are not robust enough to construct meaningful chronological models for palisade construction and use. Appendices A and D review the radiocarbon data from these two sites.

Alternative versions of each model were created as a sensitivity analysis by slightly modifying the primary models. Specifically, all samples ranked 1 (Appendix A) were modeled as TPQ,

Table 2. Comparison of Bayesian Modeling Probability Ranges to Previous Estimates on Mississippian Bastioned Palisades.

Event dated	Best approximate time ranges provided in previous studies	Primary model (*95.4% probability*)	Primary model (*68.2% probability*)	References
Angel Mounds palisade construction[a]	A.D. 1200–1350	*cal A.D. 1215–1285*	*cal A.D. 1225–1275*	Hilgemon 2000; Peterson 2010:316–317
Use life of Angel Mounds palisade	No estimate provided.	*50–195 years*	*85–165 years*	
End of Angel Mounds palisade use	A.D. 1200–1350	*cal A.D. 1310–1430*	*cal A.D. 1345–1415*	Hilgemon 2000; Peterson 2010:316–317
Aztalan palisade construction	A.D. 1000–1200	*cal A.D. 1045–1230*	*cal A.D. 1080–1180*	Richards 2007; Richards and Jeske 2002
Use life of Aztalan palisade	No estimate provided.	*1–130 years*	*1–60 years*	
End of Aztalan palisade use	A.D. 1000–1200	*cal A.D. 1075–1315*	*cal A.D. 1120–1230*	Richards 2007; Richards and Jeske 2002
Cahokia Mounds palisade construction	A.D. 1100–1200	*cal A.D. 1215–1355*	*cal A.D. 1245–1315*	Fowler 1997; Holley et al. 1990; Iseminger et al. 1990; Trubitt 2003
Use life of Cahokia Mounds palisade	80–200 years[b]	*20–195 years*	*55–150 years*	Iseminger 1990:35
End of Cahokia Mounds palisade use	A.D. 1200–1250	*cal A.D. 1305–1465*	*cal A.D. 1355–1440*	Fowler 1997; Holley et al. 1990; Iseminger et al. 1990; Trubitt 2003
Etowah palisade construction	A.D. 1325–1375	*cal A.D. 1100–1430*	*cal A.D. 1180–1350*	Bigman et al. 2011
Use life of Etowah palisade	14–28 years[c]	*1–320 years*	*1–160 years*	Bigman et al. 2011:45
End of Etowah palisade use	A.D. 1325–1375	*cal A.D. 1230–1590*	*cal A.D. 1280–1460*	Bigman et al. 2011
Kincaid palisade construction	A.D. 1200–1300	*cal A.D. 1155–1285*	*cal A.D. 1175–1245*	Butler et al. 2011
Use life of Kincaid palisade	No estimate provided.	*60–240 years*	*105–200 years*	
End of Kincaid palisade use	A.D. 1200–1400	*cal A.D. 1295–1440*	*cal A.D. 1325–1405*	Butler et al. 2011
Moundville palisade construction[d]	A.D. 1200	*cal A.D. 1180–1300*	*cal A.D. 1225–1275*	Knight and Steponaitis 1998:15
Use life of Moundville palisade	30–60 years[e]	*100–360 years*	*145–280 years*	Scarry 1998:82
End of Moundville palisade use	A.D. 1300	*cal A.D. 1365–1585*	*cal A.D. 1405–1515*	Knight and Steponaitis 1998:15
Southwind palisade construction	A.D. 1150–1450	*cal A.D. 1075–1295*	*cal A.D. 1160–1230*	Hilgemon 2000; Munson 1994; Striker 2009
Use life of Southwind palisade	20–60 years[f]	*65–320 years*	*115–260 years*	Munson 1994:3–4
End of Southwind palisade use	A.D. 1150–1450	*cal A.D. 1310–1470*	*cal A.D. 1320–1440*	Hilgemon 2000; Munson 1994; Striker 2009

[a]The Bayesian model used for Angel Mounds (described in Appendices B–D) is an updated version of the one used in Krus et al. (2013) and Monaghan et al. (2013).

[b]Iseminger (1990:35) estimated that a single one of Cahokia's palisade walls would have stood for 20–50 years and Cahokia's palisade appears to have been rebuilt three times.

[c]Bigman et al. (2011:14) estimated that a single one of Etowah's palisade walls would have stood for 7–14 years and Etowah's palisade appears to have been rebuilt once.

[d]The dated palisade sections come from the ECB Tract, as do four other dated features (Feature 34, Feature 19, Burial 8, Burial 9) (Scarry 1995). The primary chronological model for Moundville cannot reliably estimate the timing of palisade construction because there are no direct dates from the palisade or its use. Instead, the model provides an estimate for the beginning, ending, and span of activity for the ECB Tract.

[e]Scarry (1998:82) estimated that a single one of Moundville's palisade walls would have stood for 10–20 years and Moundville's palisade appears to have been rebuilt two times in the excavated ECB Tract area (Scarry 1995).

[f]Munson (1994:3–4) estimated that the entire duration of Southwind's occupation lasted 20–60 years.

and charcoal outlier modeling was not used. The alternative models show good overall agreement between the radiocarbon dates and the assumptions of the models (Supplemental Materials Appendix E). Overall, the posterior probabilities for the alternative models are mostly identical to the primary models, although a few are slightly older than the primary model counterparts, which was expected because the alternative models do not use charcoal outlier modeling and are thus much more sensitive to radiocarbon measurements from old wood. The results from the primary models are preferred because they account for the unknown inherent age offset in wood charcoal and soot samples with charcoal outlier modeling (Bronk Ramsey 2009b).

Discussion

The chronologies created with Bayesian modeling are more useful than previous palisade chronologies (Tables 1 and 2) because they provide an explicit chronological framework for the timing of palisades that is independent from relative artifact chronologies. Further, there is ample evidence that Bayesian posterior probabilities often provide much more definitive and precise estimates for the timing of past activity than interpretations from diagnostic horizon markers and unmodeled scientific dates (Bayliss et al. 2007; Bayliss et al. 2011; Bayliss 2009, 2015; Hamilton et al. 2015).

Here, Bayesian modeling provides posterior probabilities for the start of palisade construction, the end of palisade use, and the span of palisade use (Figures 2–3, Table 2). Appendix D describes the full details of these posterior probabilities; they generally estimate palisades as being used for longer amounts of time and later in time than previously believed.

Aztalan's palisade is clearly earlier than the others and it could be the first Mississippian palisade with bastions (Figure 2; Table 2). Modeling estimates that this palisade was constructed in *cal A.D. 1045–1230* (*95-percent probability;* Figure 2; *Aztalan: start palisade*), probably in *cal A.D. 1080–1180* (*68-percent probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1075–1315* (*95-percent probability*; Figure 2; *Aztalan: end palisade*), probably in *cal A.D. 1120–1230* (*68-percent probability*). This was not a surprise because palisades believed to date to the A.D. 1100s have been noted at settlements in Wisconsin and other northern Mississippian areas (Delaney-Rivera 2004; Finney 2000; Finney and Stoltman 1991; Milner 1999; Milner et al. 2013:Figure 2). Additionally, these posterior probabilities closely match previous interpretations for the timing of palisade use at Aztalan (Birmingham and Goldstein 2005; Richards 2007; Richards and Jeske 2002) and provide even greater certainty for these previous conclusions.

Aztalan is possibly the only Mississippian site with bastioned palisades between A.D. 1050–1150; however, from A.D. 1200–1300 bastioned palisades were in use at every other site in this study at 68-percent probability (Figure 2; Table 2). The order of palisade construction at these individual sites is difficult to decipher due to overlapping posterior probabilities, likely due to a calibration curve wiggle from A.D. 1290–1410 and older radiocarbon measurements with large standard errors (Appendix A; Krus et al. 2015). Regardless, it is clear that the dated bastioned palisades are present mainly from A.D. 1200–1400 (Figure 2; Table 2).

These results suggest that from A.D. 1200–1400 bastioned palisades defined large Mississippian towns and were an in vogue architectural style that displayed defensive military power. They marked a Mississippian landscape of political instability characterized by dramatic social changes in the A.D. 1200s and A.D. 1300s (Clay 2006; Cobb and Butler 2002, 2006; Cobb and Giles 2009; Dye 2008; Trubitt 2003). This finding dovetails with the conclusions of Milner (2007; Milner et al. 2013) that Mississippian palisades were broadly predominant post-A.D. 1200 largely due to intergroup tensions enhanced by the end of the Medieval Warm Period. This broad trend is also suggested by the posterior probabilities of this study (Figure 2), which are later than many of the chronologies for bastioned palisades not subjected to scientific dating (Table 1). Descriptions of Native American bastioned palisades by early American explorers and settlers (Clayton et al. 1995; Fundaburk 1996; Hudson 1997; Jenkins 2009; Lafferty 1973; Lee 2004) indicate that these structures continued to be built by historic-era Native American groups.

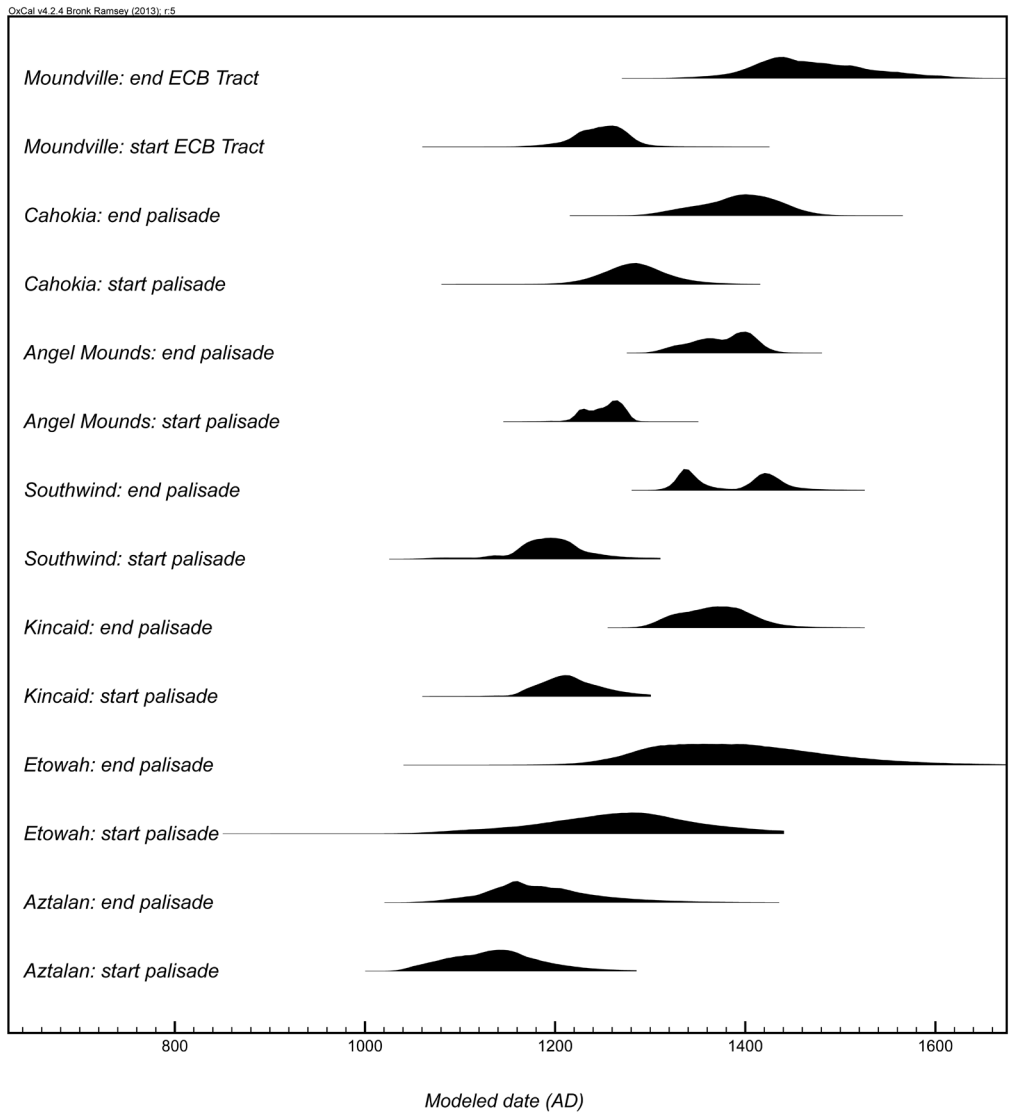

Figure 2. Posterior probability densities for the timing of palisade construction and the ending of palisade use at Angel Mounds, Aztalan, Cahokia, Etowah, Kincaid, Moundville, and Southwind.

Probability densities for the estimated spans of palisades also tend to be longer than previous estimates (Figure 3; Table 2). For example, Kincaid, Cahokia, and Angel Mounds have the most robust collection of radiocarbon dates from palisade contexts and provide the best estimate for palisade spans. At 68-percent probability these spans vary from *105–200 years* (*68-percent probability*; Figure 3; *Kincaid: palisade span*), *55–150 years* (Figure 3; *Cahokia: palisade span*), and *85–165 years* (Figure 3; *Angel Mounds: palisade span*). These results indicate that bastioned palisades were maintained for multiple generations, possibly well over a century, whereas most previous estimates for the use life of bastioned palisades are around 100 years or less (Table 2).

Previous estimates for the use life of palisades were created primarily from considering the rate of wood decay (Table 1); however, the true use life of a palisade is only partially contingent on the durability of its construction materials. The archaeological and chronological evidence make

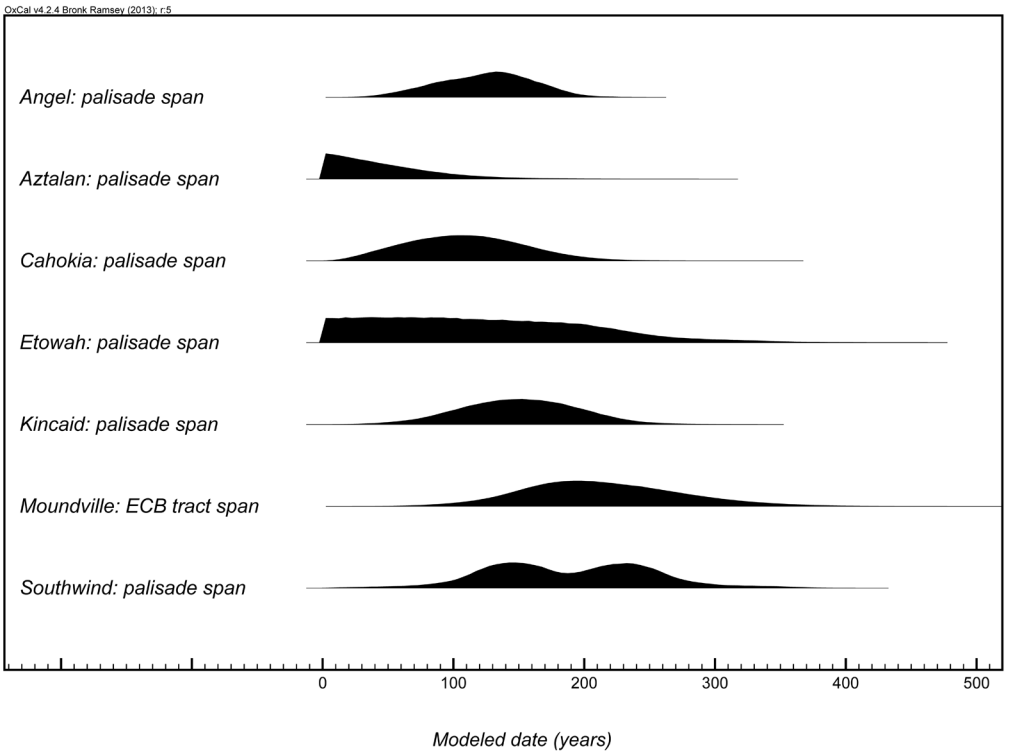

Figure 3. Posterior probability densities for the estimated spans of the palisades at Angel Mounds, Aztalan, Cahokia, Etowah, Kincaid, Moundville, and Southwind.

clear that long-term palisade use involved repairs and expansions, sometimes of massive character. Many Mississippian palisades have repair posts and trenches, as well as rebuilds and expansions of substantial proportions, which sometimes eclipse the labor involved in initial palisade construction (Allan 1984; Blitz 2008; Butler et al. 2011; Chapman et al. 1977; Cole and Albright 1983; Goldstein and Richards 1991; Hammerstedt 2005; Holley et al. 1990; Iseminger et al. 1990; Krus 2011, 2013; Lafferty 1973; Munson 1994; Peterson 2010; Santure 1981; Scarry 1998; Schroeder 2006, 2009; Trubitt 2003; Vogel and Allan 1985; Webb and Wilder 1951; Worne 2011). This archaeological evidence suggests that Mississippian people repaired and rebuilt palisade walls when needed, potentially leading to lengthy use lives. Importantly, a palisade may be dismantled from an attack or as part of a ritual (Pauketat et al. 2013), further complicating estimates for palisade use life. Likewise, experimental reconstructions of palisade walls to determine use life are somewhat marred for these reasons and because the full range of construction materials and finer architectural details are simply not known. The posterior span probabilities (Figure 3; Table 2) provide the best and most transparent estimates for the duration of use and continuous maintenance for these structures because they are produced by chronological frameworks that account for maintenance, rebuildings, and dismantlement.

This analysis suggests that the periodicity of warfare was at chronic levels in many Mississippian areas from A.D. 1200–1400, a conclusion reached by recent syntheses on Mississippian warfare (Cobb and Giles 2009; Dye 2008; Emerson 2007; Milner 1999, 2000, 2007; Milner et al. 2013; Wilson 2012). The Bayesian modeling results for palisade timing and duration supports this notion. Fine-grain analyses and comparisons are still needed to understand the historical nuances of how these individual past conflicts unfolded and how the different pulses and levels of inter-group violence played out in different parts and times of the Mississippian world.

Conclusions

The Bayesian modeling frameworks presented here for Mississippian sites with scientifically dated bastioned palisades provide high-resolution estimates for the timing and use life of these structures. It suggests that bastioned palisades were generally built later than estimates provided by earlier studies, primarily after A.D. 1200. This analysis also suggests that bastioned palisades were generally used and maintained continuously for around a century or more, which is longer than most previous estimates. This strengthens the claim that many Mississippian societies shifted to greater militarization in the early A.D. 1200s. The regional trends were observed by covering a rather large geographic area and would have been missed by focusing on a single site or area. While the discussion of the results mainly covered broad regional interpretations, some of the individual results are interesting, for example, the posterior probabilities for Cahokia's palisade indicate that it was likely first built about a century later than previously believed.

The archaeological and radiocarbon data used in this study have taken about a century to amass and have allowed for the development of a robust chronology for bastioned palisades in the U.S. Midwest and Southeast. This study demonstrates the potential that scientific dating and Bayesian modeling have for revealing more precise chronologies. Archaeologists should exploit this potential to better tease out and refine their chronologies.

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Supplemental Materials. Appendices A–E are accessible as supplemental materials linked to the online version of the paper, which is accessible via the SAA member login at www.saa.org/members-login.

Appendix A. Radiocarbon data.

Appendix B. Context matrices showing the treatment of radiocarbon measurements in the primary Bayesian models.

Appendix C. Code for OxCal models.

Appendix D. Description of Bayesian models and results.

Appendix E. Description of alternative Bayesian models and results.

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Appendix A. Radiocarbon Data

Laboratory ID	Site	Context	Material	Evaluation of context security	$\delta^{13}C$	Date B.P.	Calibration (95% confidence)	Reference
DIC-1023	Angel Mounds	Fill of a small pit (F5/Q-8-C).	Unidentified wood charcoal	3	-	360 ± 50	cal A.D. 1440–1640	Hilgeman 2000:Appendix B; Peterson 2010:193
DIC-1024	Angel Mounds	Fill of a 0.7m pit (F24B-1/Q-08-C).	Unidentified wood charcoal	3	-	510 ± 50/40[a]	cal A.D. 1300–1470	Hilgeman 2000:Appendix B; Peterson 2010:194
Beta-130353	Angel Mounds	Duplicate sample of DIC-1024.	Unidentified wood charcoal	-	-	550 ± 50	cal A.D. 1290–1450	G. William Monaghan, personal communication 2013; Peebles et al. 2011
DIC-2357	Angel Mounds	Fill of Mound F in primary mound layer.	Unidentified wood charcoal	2	-	680 ± 50	cal A.D. 1250–1400	Hilgeman 2000:Appendix B; Monaghan et al. 2013:Table 1
DIC-2358	Angel Mounds	Fill from a wall trench on Mound F's primary surface.	Unidentified wood charcoal	2	-	630 ± 45	cal A.D. 1280–1410	Hilgeman 2000:Appendix B; Monaghan et al. 2013:Table 1
DIC-2359	Angel Mounds	Fill of a posthole in the corner of a wall trench building on the primary mound surface of Mound F.	Unidentified wood charcoal	3	-	90 ± 110	cal A.D. 1520–1950	Hilgeman 2000:Appendix B; Monaghan et al. 2013:Table 1
Beta-39232	Angel Mounds	Fill of a possible pit (F12) on the primary mound surface of Mound F.	Unidentified wood charcoal	3	-	840 ± 80	cal A.D. 1030–1290	Hilgeman 2000:Appendix B; Monaghan et al. 2013:Table 1
Beta-39233	Angel Mounds	Fill of a possible pit (F12) on the primary mound surface of Mound F.	Unidentified wood charcoal	3	-	590 ± 60	cal A.D. 1280–1430	Hilgeman 2000:Appendix B; Monaghan et al. 2013:Table 1
Beta-39234	Angel Mounds	Fill from a stratum (F9/O13D) in Mound I.	Unidentified wood charcoal	2	-	750 ± 50	cal A.D. 1160–1390	Hilgeman 2000:Appendix B; McGill 2013:115
Beta-39235	Angel Mounds	Fill from a stratum (F9/O13D) in Mound I.	Unidentified wood charcoal	2	-	950 ± 80	cal A.D. 900–1260	Hilgeman 2000:Appendix B; McGill 2013:115
Beta-44768	Angel Mounds	Base of a pit (house pit #2, F5/S-11-D) within House #2.	Unidentified wood charcoal	3	-	660 ± 60	cal A.D. 1260–1420	Hilgeman 2000:Appendix B; McGill 2013:541
Beta-44769	Angel Mounds	Base of a pit (house pit #2, F5/S-11-D).	Unidentified wood charcoal	3	-	640 ± 60	cal A.D. 1270–1420	Hilgeman 2000:Appendix B; McGill 2013:541
Beta-44770	Angel Mounds	Base of a pit (house pit #3, F6/S-11-D).	Unidentified wood charcoal	3	-	530 ± 50	cal A.D. 1300–1450	Hilgeman 2000:Appendix B; McGill 2013:541
Beta-44771	Angel Mounds	Base of a pit (house pit #3, F6/S-11-D).	Unidentified wood charcoal	3	-	570 ± 50	cal A.D. 1290–1440	Hilgeman 2000:Appendix B; McGill 2013:541
Beta-130354	Angel Mounds	Fill of a possible pit (F32/Q-8-C).	Material not listed	1	-	560 ± 50	cal A.D. 1290–1440	Peebles et al. 2011
Beta-232869	Angel Mounds	Turf block from the upper platform (south) of Mound A.	Unidentified grass/grass roots	4	-9.1	890 ± 40	cal A.D. 1030–1220	Monaghan and Peebles 2010
Beta-232870	Angel Mounds	Turf block from the upper platform (south) of Mound A.	Unidentified grass/grass roots	4	-26.3	900 ± 40	cal A.D. 1030–1220	Monaghan and Peebles 2010
Beta-234734	Angel	$10cm^3$ piece of charred wood found at the	Wood charcoal	3	-	590 ± 40	cal A.D.	Bush 2010; Peterson

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
	Mounds	base of the inner palisade trench (M13D/5R3).	(*Fraxinus sp.*)				1290–1420	2010:Appendix 3; Wolforth 1983
Beta-234735	Angel Mounds	Daub feature in structure (Unit K), likely wooden structural elements of the house.	Unidentified wood charcoal	3	-25.4	910 ± 40	cal A.D. 1030–1210	Peterson 2010:Appendix 3; Peebles and Monaghan 2011:20; Reber et al. 2015
Beta-265981	Angel Mounds	Interior surface of pottery vessel (Unit K).	Residue	4	-17.9	1180 ± 40	cal A.D. 720–970	Reber et al. 2015
Beta-234736	Angel Mounds	Pit (Unit M).	Unidentified charred cane	3	-	700 ± 40	cal A.D. 1240–1400	Peterson 2010:Appendix 3; Peebles and Monaghan 2011:20-21
Beta-234737	Angel Mounds	From deposit near fireclay basin (Unit H).	Unidentified nutshell	3	-28.1	590 ± 40	cal A.D. 1290–1420	Peterson 2010:Appendix 3; Peebles and Monaghan 2011:19
Beta-234738	Angel Mounds	Small pit feature (Unit B).	Unidentified nutshell	3	-22.7	660 ± 40	cal A.D. 1270–1400	Peterson 2010:Appendix 3; Peebles and Monaghan 2011:18
Beta-234739	Angel Mounds	Pit (Unit G).	Unidentified nutshell	3	-28.2	610 ± 40	cal A.D. 1290–1410	Peterson 2010:Appendix 3; Peebles and Monaghan 2011:18
Beta-234740	Angel Mounds	Pit (Unit F/Feature 14a) in floor of a structure.	Unidentified nutshell	3	-25.2	490 ± 40	cal A.D. 1320–1470	Peterson 2010:Appendix 3; Peebles and Monaghan 2011
Beta-234742	Angel Mounds	Large pit likely superimposed by outer palisade (X-11-B/ Feature 37).	Unidentified nutshell	3	-	850 ± 40	cal A.D. 1040–1270	Black 1967; Peterson 2010:Appendix 3; Krus et al. 2013
Beta-234743	Angel Mounds	Unit A. Central habitation area feature.	Unidentified cane	3	-25.7	590 ± 40	cal A.D. 1290–1420	Peterson 2010:Appendix 3; Peebles and Monaghan 2011:17
Beta-237767	Angel Mounds	Unidentified burnt feature in the Mound A conical offset. Sample retrieved through coring.	Charred rush (*juncaceae*)	4	-10.1	890 ± 40	cal A.D. 1030–1220	Monaghan and Peebles 2010:Figure 4, Table 1
Beta-241192	Angel Mounds	Unit A. Structural feature.	Unidentified wood charcoal	3	-23.7	660 ± 40	cal A.D. 1270–1400	McGill 2013:553; Peebles and Monaghan 2011; Peterson 2010
Beta-241193	Angel Mounds	Palisade trench fill (U-9-A, possible Heavy Trench).	Wood charcoal (*Carya sp.*)	2	-	720 ± 40	cal A.D. 1220–1390	Bush 2010; Krus 2013; Peterson 2010:Appendix 3; This paper

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Laboratory ID	Site	Context	Material	Evaluation of context security	$\delta^{13}C$	Date B.P.	Calibration (95% confidence)	Reference
Beta-241194	Angel Mounds	Outer Palisade trench fill (H-20-A).	Wood charcoal (*Fraxinus sp.*)	2	-	890 ± 40	cal A.D. 1030–1220	Bush 2010; Krus et al. 2013; Peterson 2010:Appendix 3; This paper
Beta-241195	Angel Mounds	Inner palisade trench fill (N-13-C).	Unidentified wood charcoal	2	-	740 ± 40	cal A.D. 1210–1390	Bush 2010; Krus 2013; Peterson 2010:Appendix 3; Wolforth 1983; This paper
Beta-241196	Angel Mounds	Southern outer palisade bastion posthole (O-7-C).	Wood charcoal (*Ulmus rubra*)	3	-	630 ± 60	cal A.D. 1270–1420	Bush 2010; Black and Johnson 1964; Bush 2010; Krus 2013; Peterson 2010:Appendix 3; This paper
Beta-246694	Angel Mounds	Structure in Unit AC possible post mold base.	Charred cane (*Arundinaria gigantae*)	3	-25.9	690 ± 40	cal A.D. 1250–1400	Monaghan and Peebles 2010:Table 1; Peterson 2010:17
Beta-246695	Angel Mounds	Base of Unit A domestic features.	Charred wood (*Gleditsia triacanthos*)	3	-24.9	570 ± 40	cal A.D. 1290–1430	McGill 2013:553; Monaghan and Peebles 2010:Table 1
Beta-246696	Angel Mounds	Midden feature (Unit AD).	Charred wood (*acer*)	3	-22.4	610 ± 40	cal A.D. 1290–1410	Monaghan and Peebles 2010:Table 1
Beta-252377	Angel Mounds	Roof of structure near conical offset (MA/F2).	Charred nutshell (*carya*)	3	-24.7	520 ± 50	cal A.D. 1300–1460	Monaghan and Peebles 2010
Beta-252378	Angel Mounds	Base of post mold associated with Mound A upper platform structure conical offset.	Wood (*carya*)	3	-26.6	750 ± 40	cal A.D. 1200–1380	Monaghan and Peebles 2010:Table 1
Beta-252379	Angel Mounds	Pit (MA/F3) on Mound A upper platform.	Charred wood (*fraxinus*)	3	-26.2	690 ± 40	cal A.D. 1250–1400	Monaghan and Peebles 2010:Table 1
Beta-264811	Angel Mounds	Unit K domestic feature.	Unidentified charred cane	3	-26.1	760 ± 40	cal A.D. 1190–1300	Peebles and Monaghan 2011:20; Reber et al. 2015
Beta-264864	Angel Mounds	Post mold fill on old ground surface below Mound F.	Unidentified wood charcoal	3	-	760 ± 40	cal A.D. 1190–1300	G. William Monaghan, personal communication 2014; Monaghan et al. 2013:Table 1
Beta-264865	Angel Mounds	Thatch from the roof of a structure in the inner mound layer of Mound F.	Unidentified grass	4	-	910 ± 40	cal A.D. 1030–1210	Monaghan et al. 2013:Table 1
Beta-271174	Angel Mounds	Feature from under the Mound F primary mound fill.	Deer bone, element not specified	2	-	760 ± 40	cal A.D. 1190–1300	G. William Monaghan, personal communication 2014; Monaghan et al. 2013
Beta-278196	Angel Mounds	Palisade trench fill (Northern Outer Palisade, S-7-C).	Wood charcoal (*Fraxinus sp.*)	2	-	570 ± 40	cal A.D. 1290–1430	Bush 2010; Krus 2013; This paper

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
Beta-278197	Angel Mounds	Palisade trench fill (East Village Outer Palisade, V-9-A).	Wood charcoal (*Robinia pseudoacacia*)	2	-	530 ± 40	cal A.D. 1310–1450	Bush 2010; Krus 2013; This paper
Beta-278198	Angel Mounds	Palisade trench fill (East Village Outer Palisade, X-11-B).	Wood charcoal (*Carya sp.*)	2	-	790 ± 40	cal A.D. 1160–1280	Bush 2010; Krus 2013; This paper
Beta-278199	Angel Mounds	Palisade trench fill (East Village Heavy Trench, X-11-C).	Wood charcoal (*Carya sp.*)	2	-	790 ± 40	cal A.D. 1160–1280	Bush 2010; Krus 2013; This paper
Beta-284695	Angel Mounds	Palisade trench fill (Screen, W-10-B).	Unidentified wood charcoal	2	-24.4	670 ± 40	cal A.D. 1260–1400	Horton 2010; Krus 2013; This paper
Beta-284696	Angel Mounds	Palisade trench fill (Inner Palisade, Q-9-A).	Unidentified wood charcoal	2	-25.5	1160 ± 40	cal A.D. 770–980	Horton 2010; Krus 2013; This paper
Beta-284697	Angel Mounds	Wall trench fill superimposing a palisade trench (East Village Heavy Trench, W-10-D).	Wood charcoal (*Acer sp.*)	2	-26	550 ± 40	cal A.D. 1300–1440	Horton 2010; Krus 2013; This paper
Beta-286636	Angel Mounds	Palisade trench fill (Northern Outer Palisade, K-11-B).	Wood charcoal (*Quercus sp.*)	2	-	1090 ± 40	cal A.D. 780–1030	Horton 2010; Krus 2013; This paper
Beta-306318	Angel Mounds	Possible pit feature (O-13-D/F23) below Mound I.	Deer bone, element not specified	2	-	620 ± 30	cal A.D. 1290–1410	McGill 2013:550; G. William Monaghan, personal communication 2013
Beta-309045	Angel Mounds	A stratum with burned materials superimposed by the palisade trench (East Village Outer Palisade, W-10-D).	Charred cane (*Arundinaria gigantean*)	4	-25.9	790 ± 30	cal A.D. 1190–1280	Bush 2011; Krus 2013; This paper
Beta-309046	Angel Mounds	Palisade posthole (East Village Heavy Trench, W-10-D).	Unidentified bark	4	-26.9	770 ± 30	cal A.D. 1210–1290	Bush 2011; Krus 2013; This paper
Beta-309052	Angel Mounds	Fill of House Pit #1 (S-11-D).	Maize	3	-	630 ± 30	cal A.D. 1280–1400	McGill 2013:541
Beta-313068	Angel Mounds	Associated parallel wood strips, wood charcoal, river cane, and four complete ceramic vessels (X-7-D/Feature 3) on the 3rd Terrace.	Cane (*Arundinaria gigantic*)	3	-	690 ± 30	cal A.D. 1260–1390	Pike 2012:93,106; Matthew Pike, personal communication 2014
Beta-181396	Annis	Palisade trench fill (Feature 93-inner palisade).	Unidentified wood charcoal	2	-	660 ± 30	cal A.D. 1270–1400	Hammerstedt 2005:335
Beta-181397	Annis	Palisade trench fill (Feature 64C-middle palisade).	Unidentified charred nutshell	2	-	710 ± 30	cal A.D. 1250–1390	Hammerstedt 2005:335
Beta-181398	Annis	Palisade trench fill (Feature 93-inner	Unidentified wood	2	-	630 ± 30	cal A.D.	Hammerstedt 2005:336

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
		palisade).	charcoal				1280–1400	
Beta-310904	Aztalan	Preserved post bottom from a bastion (Tower B in I,4). Catalogue #39922/39923 Accession #10779.	Wood (*Quercus alba.*)	3	-27.5	940 ± 30	cal A.D. 1020–1160	Barrett 1933:102; Bush 2011; Krus 2013; This paper
Beta-310903	Aztalan	Preserved post bottom from a bastion (Tower B in I,4). Catalogue #39921 Accession #10779.	Wood (*Quercus*)	3	-26.4	910 ± 30	cal A.D. 1030–1210	Barrett 1933:Plate 17, fig. 2; Bush 2011; Krus 2013; This paper
M-1037	Aztalan	Posthole fill of rectangular structure located in riverbank enclosure.	Unidentified wood charcoal	3	-	1200 ± 75	cal A.D. 670–980	Crane and Griffin 1962:187; Richards and Jeske 2002:Table 1
DIC-3135	Aztalan	Ash dump feature (Feature 6, Str. 11).	Unidentified wood charcoal	3	-	1130 ± 55	cal A.D. 770–1020	Richards 1985:97; Richards and Jeske 2002:Table 1
DIC-3133	Aztalan	Concentration of mussel shells (Feature 20, Str. 5).	Unidentified wood charcoal	3	-	950 ± 65	cal A.D. 980–1230	Richards 1985:97; Richards and Jeske 2002:Table 1
Beta-47JE1/6	Aztalan	Charred bulrush matting from charnel house in NW mound.	Unidentified charred bulrush	4	-	940 ± 60	cal A.D. 990–1220	Richards et al. 1998:88; Johnson 2003:55; Richards and Jeske 2002:Table 1
WIS-191	Aztalan	A possible pit (Feature 30) superimposed by two episodes of riverbank palisade construction	Unidentified wood charcoal	3	-	920 ± 55	cal A.D. 1010–1230	Bender et al. 1967:535; Richards and Jeske 2002:Table 1
DIC-3044	Aztalan	Shallow pit (Feature 5) containing grit-tempered pottery in plaza area.	Unidentified wood charcoal	3	-	870 ± 50	cal A.D. 1030–1260	Richards 1985:97; Richards and Jeske 2002:Table 1
WIS-68	Aztalan	A pit (Feature 17a) east of NE mound in riverbank enclosure. Pit contains corn, shell and grit tempered pottery.	Unidentified wood charcoal	3	-	850 ± 80	cal A.D. 1020–1280	Bender et al. 1968:528; Richards and Jeske 2002:Table 1
DIC-3134	Aztalan	Str. 1110 domestic features.	Unidentified wood charcoal	3	-	850 ± 45	cal A.D. 1040–1270	Richards 1985:97; Richards and Jeske 2002:Table 1
DIC-3136	Aztalan	Str. 11 domestic feature (Feature 10).	Unidentified wood charcoal	3	-	850 ± 50	cal A.D. 1040–1270	Richards 1985:97; Richards and Jeske 2002:Table 1
WIS-160	Aztalan	Recovered by Barrett 13 feet below surface of SW mound	Unidentified wood charcoal	2	-	840 ± 70	cal A.D. 1030–1280	Bender et al. 1967:535; Richards and Jeske 2002:Table 1
WIS-73	Aztalan	Str. 1110 domestic features.	Unidentified wood charcoal	3	-	820 ± 60	cal A.D. 1040–1290	Bender et al. 1966:527; Richards and Jeske 2002:Table 1
WIS-63	Aztalan	Ash layer in pit (Feature 1) in riverbank	Unidentified wood	3	-	820 ± 80	cal A.D.	Bender et al. 1966:527;

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
		enclosure.	charcoal				1030–1300	Richards and Jeske 2002:Table 1
WIS-162	Aztalan	Wooden post from structure on SW mound.	Unidentified wood charcoal	3	-	810 ± 60	cal A.D. 1040–1290	Bender et al. 1967:535; Richards and Jeske 2002:Table 1
WIS-74	Aztalan	Pit (Feature 42) in center of riverbank enclosure.	Unidentified wood charcoal	3	-	730 ± 80	cal A.D. 1050–1410	Bender et al. 1966:527; Richards and Jeske 2002:Table 1
M-1214	Aztalan	Pit 10 in NE quadrant of site.	Unidentified wood charcoal	3	-	580 ± 100	cal A.D. 1220–1620	Ritzenthaler 1963:180; Richards and Jeske 2002:Table 1
M-642	Aztalan	NW mound charnel house.	Unidentified wood charcoal	3	-	320 ± 100	cal A.D. 1410–...	Crane and Griffin 1959:179; Richards and Jeske 2002:Table 1
A-1159	Cahokia Mounds	Sod Block (144.3 m asl) from Monks Mound east slope.	Unidentified grass-like stems and leaves	4	-14	955 ± 15	cal A.D. 1020–1160	Schilling 2010
A-1160	Cahokia Mounds	2007 Monks Mound East Slope repairs; Feature 1. Mound fill, log associated with limestone and log feature on east slope.	Unidentified grass-like stems and leaves	2	-22.2	1030 ± 15	cal A.D. 980–1030	Schilling 2010
Beta-241384	Cahokia Mounds	2007 Monks Mound East Slope repairs; Sod Block (144.3 m asl)	Unidentified grass-like stems and leaves	4	-25.1	770 ± 40	cal A.D. 1180–1290	Schilling 2010
Beta-241385	Cahokia Mounds	2007 Monks Mound East Slope repairs; Feature 1. Mound fill, log associated with limestone and log feature on east slope.	Wood (*Taxodium*)	2	-22.9	960 ± 40	cal A.D. 990–1170	Schilling 2010
Beta-207044	Cahokia Mounds	Sub-east slump of Monks Mound. Submound feature. Material retrieved through coring (Core 4).	Tiny fragments of unidentified deciduous wood and bark	2	-14.1	900 ± 40	cal A.D. 1030–1220	Hajic 2005:Table X; Schilling 2010
WIS-587	Cahokia Mounds	East lobes (N150-152) of Monks Mound. Burnt thatch layer (Feature 284) of a house in submound.	Unidentified burnt thatch	4	-12.6	925 ± 60	cal A.D. 990–1230	Bender et al. 1973b; Fowler 1997:212; Williams 1975:24
Beta-207041	Cahokia Mounds	Sub-west slump of Monks Mound. Submound feature. Material retrieved through coring (Core 3).	Charred organic material: acorn shell, grass stems; maygrass & knotweed seeds; maize	2	-25.1	950 ± 40	cal A.D. 1010–1190	Hajic 2005:Table X; Schilling 2010
Beta-207040	Cahokia	Sub-west slump of Monks Mound.	Wood (*Populus* or	2	-27.4	960 ± 60	cal A.D.	Hajic 2005:Table X; Schilling

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	Mounds	Submound feature. Material retrieved through coring (Core 1).	*Betula*)				980–1220	2010
Beta-207039	Cahokia Mounds	Sub-west slump of Monks Mound. Submound feature. Material retrieved through coring (Core 1).	Herbaceous grass	2	-9.9	980 ± 40	cal A.D. 990–1160	Hajic 2005:Table X; Schilling 2010
Beta-207042	Cahokia Mounds	Sub-west slump of Monks Mound. Submound feature. Material retrieved through coring (Core 3).	Unidentified deciduous wood and bark	2	-27.4	1010 ± 40	cal A.D. 900–1160	Hajic 2005:Table X; Schilling 2010
I-2309	Cahokia Mounds	Feature below Monks Mound. Material retrieved through coring (ISM Core).	Unidentified wood	2	-	1110 ± 70	cal A.D. 710–1040	Fowler 1997; Reed et al. 1968; Schilling 2013
ISGS-1252	Cahokia Mounds	Feature at the base of Monks Mound. From a core sample located in the center of the 4th terrace.	Unidentified diffuse charcoal (species not listed)	2	-	1190 ± 70	cal A.D. 680–990	McGimsey and Wiant 1984:viii, 34
M-1636	Cahokia Mounds	Monks Mound fill. Reed's Level L surface. From fourth terrace.	Unidentified charcoal (species not listed)	2	-	840 ± 150	cal A.D. 890–1410	Crane and Griffin 1966; Fischer 1972:19; Reed et al. 1968
I-2308	Cahokia Mounds	Feature from an apparent living surface 29 ft above base of Monks Mound. From a core sample (ISM Core) on 3rd terrace. Coring at depth 68 ft. Taken from a large section of potentially redeposited wood.	Unidentified wood	2	-	1020 ± 100	cal A.D. 770–1220	Buckley et al. 1968:281; McGimsey and Wiant 1984:34; Reed et al. 1968
WIS-525	Cahokia Mounds	Monks Mound Summit. Fourth terrace. Sample from post (Feature 1B) fragments.	Charred wood (*Carya*)	3	-28.4	870 ± 55	cal A.D. 1030–1260	Bender et al. 1973a; Reed 2009:35
WIS-527	Cahokia Mounds	Monks Mound Summit. Fourth terrace. Sample from post (Feature 1H) fragments.	Charred wood (*Carya*)	3	-26.5	890 ± 60	cal A.D. 1020–1260	Bender et al. 1973a; Reed 2009:35
WIS-528	Cahokia Mounds	Monks Mound Summit. Fourth terrace. Sample from Post 6, Feature 26.	Charred wood (*Carya*)	3	-28.3	970 ± 65	cal A.D. 900–1220	Bender et al. 1973a; Reed 2009:35
WIS-546	Cahokia Mounds	Sample from a log (log 24) lying on the floor (Feature 113) of a large burned building under the first terrace of Monks Mound.	Unidentified wood charcoal	3	-	805 ± 60	cal A.D. 1040–1290	Benchley 1975; Bender et al. 1973b
WIS-547	Cahokia Mounds	Sample from a log (log 1) lying on the floor (Feature 114) of a small burned building under the first terrace of Monks Mound.	Unidentified wood charcoal	3	-	825 ± 60	cal A.D. 1040–1290	Benchley 1975; Bender et al. 1973b

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
WIS-365	Cahokia Mounds	From a post (post 2) in a burned structure (Feature 114) below a small mound on SW corner of the 1st terrace of Monk's Mound. Post 2 was standing upright in wall trench and had broken off when structure (Feature 114) collapsed. The structure predates "primary" mound and post dates series of unburned living surfaces and possible post pit.	Wood charcoal (likely *Quercus*)	3	-	840 ± 55	cal A.D. 1040–1280	Benchley 1975; Bender et al. 1970a
M-982	Cahokia Mounds	Sample from a 0.5 in. layer of charcoal 8-10 in. above a burnt sand floor and about 6 ft below Monks Mound's 1st terrace.	Unidentified carbonized wood	3	-	850 ± 100	cal A.D. 980–1380	Benchley 1975; Crane and Griffin 1968; Schilling 2013:Table 1
WIS-443	Cahokia Mounds	Monks Mound. First terrace, Feature 113, Post 1, N/72.23 E103.19. Below platform mound.	Unidentified carbonized wood	3	-	670 ± 55	cal A.D. 1260–1410	Benchley 1975; Bender et al. 1971; Schilling 2013:Table 1
WIS-362	Cahokia Mounds	From a burned clay floor (Feature 104) underneath a small mound on SW corner of 1st terrace of Monk's Mound.	Unidentified carbonized wood	3	-	690 ± 50	cal A.D. 1220–1400	Benchley 1975; Bender et al. 1970a; Schilling 2013:Table 1
WIS-549	Cahokia Mounds	From burned wood in an ash concentration from burned basin (Feature 149, N78-80 E100-101) below primary mound in Monk's Mound 1st terrace.	Unidentified burned wood	3	-	720 ± 55	cal A.D. 1190–1400	Benchley 1975; Bender et al. 1973b
WIS-545	Cahokia Mounds	From a burned post from a burned building (Feature 139) on top of Monks Mound 1st terrace.	Carbonized wood (possibly *Quercus*)	3	-26.4	740 ± 55	cal A.D. 1160–1390	Benchley 1975; Bender et al. 1973b; Schilling 2013:Table 1
I-2947	Cahokia Mounds	From a pit (pit 137) on Monks Mound 1st terrace primary mound.	Unidentified wood charcoal	3	-	760 ± 95	cal A.D. 1040–1400	Benchley 1975; Buckley and Willis 1969; Fowler 1997:212; Hajic 2005:Table X
WIS-586	Cahokia Mounds	From a pre-ramp surface associated with a wide area of scattered burned clay and twigs or small logs in Monks Mound east lobes (N168.9).	Unidentified charred wood	3	-	640 ± 55	cal A.D. 1270–1410	Bender et al. 1973b; Williams 1975
M-1637	Cahokia Mounds	From a burned floor of a house (Feature 4) on slope on the southwest edge of Monks Mound.	Unidentified charcoal (species not listed)	1	-	670 ± 100	cal A.D. 1160–1440	Crane and Griffin 1966; Reed et al. 1968
M-1295	Cahokia Mounds	From a charred area (Feature 197) in the Powell Tract.	Unidentified charcoal (species not listed)	1	-	1915 ± 150	cal AD - 360–420	Crane and Griffin 1963:236; Fowler 1963:50, 1997:213

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M-1293	Cahokia Mounds	Fire basin (Fea 227) in center of House 15 in the Powell Tract.	Unidentified charcoal (species not listed)	1	-	1190 ± 75	cal A.D. 670–990	Crane and Griffin 1963:236; Fowler 1963:50
WIS-58	Cahokia Mounds	Repeat of M-1293.	Unidentified charcoal (species not listed)	-	-	1000 ± 65	cal A.D. 890–1190	Bender et al. 1966:533
ISGS-163	Cahokia Mounds	Refuse pit in House 13 in the Powell Tract.	Unidentified wood charcoal	3	-	1170 ± 80	cal A.D. 680–1020	Coleman 1974:115
M-1294	Cahokia Mounds	From floor of House 21 (Fea 217) in the Powell Tract.	Unidentified charcoal (species not listed)	1	-	1125 ± 75	cal A.D. 690–1030	Crane and Griffin 1963:236; Fowler 1963:50
ISGS-141	Cahokia Mounds	Pit (Fea 331) in the Powell Tract.	Maize	1	-	780 ± 150	cal A.D. 900–1440	Coleman 1974:115
M-1292	Cahokia Mounds	Charred layer of floor (Fea 234) of House 26 in Powell Tract.	Unidentified charcoal (species not listed)	1	-	1055 ± 75	cal A.D. 770–1160	Crane and Griffin 1963:236; Fowler 1963:49
ISGS-140	Cahokia Mounds	Pit (Fea 331) in Powell Tract.	Squash seeds	3	-	1000 ± 75	cal A.D. 880–1210	Coleman 1974:115
ISGS-130	Cahokia Mounds	Pit (Fea 331) in Powell Tract.	Nut shells (*Carya*)	3	-	950 ± 75	cal A.D. 900–1260	Coleman 1974:115
M-1335	Cahokia Mounds	Sample from floor of House 77 in Tract 15B.	Unidentified wood charcoal	3	-	765 ± 200	cal A.D. 770–1620	Crane and Griffin 1964:5; Fowler 1963:53
M-1332	Cahokia Mounds	From charred timbers on floor of House 43 in Tract 15B.	Unidentified wood charcoal	3	-	515 ± 100	cal A.D. 1270–1640	Crane and Griffin 1964:5; Fowler 1963:53
ISGS-3831	Cahokia Mounds	Tract 15B. House 43. Carbonized wood from log associated with burned house,	Wood (*Quercus, Erythrobalanus*)	3	-26.3	590 ± 70	cal A.D. 1280–1440	Kelly 1997
M-1333	Cahokia Mounds	Sample from central floor area of House 44 in Tract 15B	Unidentified wood charcoal	3	-	825 ± 100	cal A.D. 1010–1390	Crane and Griffin 1964:5; Fowler 1963:53
M-1336	Cahokia Mounds	Sample from House 113 in Tract 15B.	Unidentified wood charcoal	1	-	885 ± 200	cal A.D. 690–1420	Crane and Griffin 1964:5
ISGS-3836	Cahokia Mounds	Tract 15B. House 59. Carbonized wood from log associated with burned house.	Wood (*Ulmus americana*)	3	-25.8	630 ± 70	cal A.D. 1260–1430	Kelly 1997
ISGS-3835	Cahokia Mounds	Tract 15B. House 59. Carbonized wood from log associated with burned house.	Wood (*Fraxinus*)	3	-24.9	670 ± 70	cal A.D. 1220–1420	Kelly 1997
ISGS-3832	Cahokia Mounds	Tract 15B. House 43. Carbonized wood from log associated with burned house.	Wood (*Quercus, Erythrobalanus*)	3	-25.7	600 ± 70	cal A.D. 1270–1440	Kelly 1997
M-1334	Cahokia Mounds	Sample from floor of House 59 in Tract 15B.	Unidentified wood charcoal	3	-	385 ± 90	cal A.D. 1320–1950	Crane and Griffin 1964:5; Fowler 1963:53
A-1523	Cahokia Mounds	Tract 15B. Burial 2.	Articulated human bone	4	-10.4	655 ± 15	cal A.D. 1020–1160	Carbaugh et al. 2013: Table 5.1
A-1525	Cahokia	Tract 15B. Burial 4.	Articulated human	4	-20.5	945 ± 15	cal A.D.	Carbaugh et al. 2013: Table

Appendix A. Radiocarbon Data								
Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
	Mounds		bone				1280–1390	5.1
ISGS-3826	Cahokia Mounds	Merrell Tract. Large refuse pit (F341).	Nut shell fragment (*Carya*)	3	-26.1	530 ± 70	cal A.D. 1280–1480	Kelly 1997
ISGS-276	Cahokia Mounds	From garbage layer (Feature 306) in fill of house basin in Merrell Tract.	Unidentified charcoal (species not listed)	1	-	860 ± 80	cal A.D. 1020–1280	Liu et al. 1986:79; Fowler 1997:213
ISGS-3823	Cahokia Mounds	Merrell Tract. Large refuse pit (F341).	Nut shell fragment (*Carya*)	3	-25.8	610 ± 70	cal A.D. 1270–1440	Kelly 1997
ISGS-3824	Cahokia Mounds	Merrell Tract. Large refuse pit (F341).	Nut shell fragment (*Carya*)	3	-26.1	600 ± 70	cal A.D. 1270–1440	Kelly 1997
ISGS-3829	Cahokia Mounds	Merrell Tract. Smudge pit (F349).	Maize	4	-10.2	560 ± 70	cal A.D. 1280–1450	Kelly 1997
ISGS-3830	Cahokia Mounds	Merrell Tract. Smudge pit (F370).	Maize	4	-11.6	650 ± 70	cal A.D. 1250–1430	Kelly 1997
ISGS-281	Cahokia Mounds	From concentration of organic material on floor of old house (Feature 319) in the Merrell Tract.	Unidentified charcoal (species not listed)	1	-	1080 ± 80	cal A.D. 720–1160	Liu et al. 1986:79
ISGS-283	Cahokia Mounds	From concentration of organic material on floor of old house (Feature 319) in the Merrell Tract.	Unidentified organic material (species not listed)	1	-	1220 ± 80	cal A.D. 660–980	Liu et al. 1986:79
ISGS-3825	Cahokia Mounds	Merrell Tract. Smudge pit (F349).	Maize	4	-24.9	420 ± 70	cal A.D. 1400–1650	Kelly 1997
ISGS-280	Cahokia Mounds	From concentration of organic material on floor of old house (Feature 319) in the Merrell Tract.	Unidentified organic material (species not listed)	1	-	1050 ± 80	cal A.D. 770–1160	Liu et al. 1986:79
WIS-444	Cahokia Mounds	Upright burned post (Feature 28) in Palisade IV trench in Ramey Field.	Unidentified burnt wood	3	-	750 ± 55	cal A.D. 1160–1390	Bender et al. 1971:475; Schilling 2010:258
WIS-493	Cahokia Mounds	Support beam from House 4 in Ramey Field. House 4 is below palisade.	Unidentified wood	3	-27	810 ± 45	cal A.D. 1050–1290	Bender et al. 1973a:230; Schilling 2010:258
GX-859	Cahokia Mounds	Ramey Field. House feature previous to palisade construction. Palisade 1.	Material not listed	1	-	815 ± 85	cal A.D. 1020–1380	Anderson 1969:92; Fowler 1997:213; Schilling 2010:258
WIS-495	Cahokia Mounds	Ramey Field. Timber on floor of House 4. House 4 is below palisade.	Unidentified wood	3	-	850 ± 50	cal A.D. 1040–1270	Bender et al. 1973a:230; Schilling 2010:258
WIS-494	Cahokia Mounds	Ramey Field. Structural timber. Structure preceded all phases of stockade construction E of Monks Mound.	Unidentified wood	3	-	900 ± 55	cal A.D. 1020–1250	Bender et al. 1973a:230; Schilling 2010:258
GX-860B	Cahokia Mounds	Ramey Field. House 4. Same as GX-860A. Below palisade	Unidentified carbonized material	3	-	1350 ± 85	cal A.D. 530–890	Fowler 1997:213; Schilling 2010:258

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
			from inside vessel 2					
GX-860A	Cahokia Mounds	Ramey Field. House 4. Same as GX-860B. Below palisade	Unidentified carbonized material from inside vessel 2	3	-	1310 ± 65	cal A.D. 610–880	Fowler 1997:213; Schilling 2010:258
WIS-359	Cahokia Mounds	Sample from stockade log associated with Palisade IV wall trench in Ramey Field.	Unidentified wood	3	-	690 ± 55	cal A.D. 1220–1400	Bender et al. 1970a:339; Schilling 2010:258
WIS-366	Cahokia Mounds	Sample from post associated with south stockade wall trench. Southeast of Fox Mound.	Unidentified wood charcoal	3	-	890 ± 55	cal A.D. 1020–1250	Bender et al. 1970a:340; Schilling 2010
Beta-148269	Cahokia Mounds	Large trash-filled refuse basin (F-60) in west palisade excavation area with large potsherds, animal bone, lithic debris, and pieces of burned clay.	soil sample	3	-	1120 ± 70	cal A.D. 710–1030	Trubitt 2001; Mary Beth Trubitt personal communication 2015
Beta-150315	Cahokia Mounds	West palisade wall trench (F-43).	charcoal (species not listed)	2	-	960 ± 70	cal A.D. 900–1230	Trubitt 2001; Mary Beth Trubitt personal communication 2015
Beta-148266	Cahokia Mounds	Midden layer (F-34) containing a dense concentration of animal bone part of ridge that is superimposed by west palisade.	charcoal (species not listed)	1	-	950 ± 40	cal A.D. 1010–1190	Trubitt 2001; Trubitt and Kelly 2012; Mary Beth Trubitt personal communication 2015
Beta-148263	Cahokia Mounds	Burned area in west palisade wall trench (F-42).	charcoal (species not listed)	1	-	880 ± 40	cal A.D. 1030–1250	Trubitt 2001; Mary Beth Trubitt personal communication 2015
Beta-148265	Cahokia Mounds	F-39 post in west palisade wall trench (F-33). Sample Lot No. 99-242	charcoal (species not listed)	1	-	780 ± 70	cal A.D. 1040–1390	Trubitt 2001; Mary Beth Trubitt personal communication 2015
M-670	Cahokia Mounds	Mound 34. From small log lying on clay floor of burned house. Same house dated by M-672.	Unidentified wood charcoal	3	-	960 ± 250	cal A.D. 580–1440	Crane and Griffin 1959:181
M-636	Cahokia Mounds	From lowest level of a refuse pit in Mound 34.	Unidentified charcoal (species not listed)	1	-	660 ± 200	cal A.D. 900–1670	Crane and Griffin 1959:181
M-635	Cahokia Mounds	From "ceremonial fire" next to ramp on west side of Mound 34.	Wood charcoal (*Quercus* and *Carya*)	3	-	670 ± 200	cal A.D. 890–1660	Crane and Griffin 1959:181
M-33A	Cahokia Mounds	From a pit underneath the slope of Mound 34. Same as M-33B.	Unidentified charred miscellaneous plant material	1	-	700 ± 300	cal A.D. 670–...	Crane 1956:666
M-33B	Cahokia Mounds	From a pit underneath the slope of Mound 34. Same as M-33A.	Unidentified charred miscellaneous plant	1	-	900 ± 300	cal A.D. 530–1650	Crane 1956:666

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
			material (species not listed)					
M-672	Cahokia Mounds	From a basin in clay floor of Mound 34. burned house; same house dated by M-670.	Unidentified charcoal (species not listed)	1	-	480 ± 100	cal A.D. 1290–1640	Crane and Griffin 1959:182
A-1447	Cahokia Mounds	Pre-mound "refuse pit" (Feature 3) below Mound 34.	Deer humerus	2	-	870 ± 15	cal A.D. 1150–1220	Kelly and Brown 2010:Table 1; Schilling 2010
A-1448	Cahokia Mounds	Pit feature (75) w/in Mound 34 copper workshop house (Feature 82)	Deer rib	2	-	640 ± 15	cal A.D. 1280–1390	Kelly and Brown 2010:Table 1; Schilling 2010
A-1449	Cahokia Mounds	Pit feature (74) w/in Mound 34 copper workshop house (Feature 82)	Deer sternum fragment	2	-	630 ± 20	cal A.D. 1290–1400	Kelly and Brown 2010:Table 1; Schilling 2010
A-1450	Cahokia Mounds	Pit feature (75) w/in Mound 34 copper workshop house (Feature 82)	Deer innominate (pubis)	2	-	645 ± 15	cal A.D. 1280–1390	Kelly and Brown 2010:Table 1; Schilling 2010
M-1341	Cahokia Mounds	Sample from fill of Feature 174 and 369 (post pits) part of post circle No. 3 in Tract 15A.	Combined sample of unidentified charred wood and unidentified wood fragments	3	-	905 ± 120	cal A.D. 880–1380	Crane and Griffin 1964:5; Fowler 1963:54, 1997:213; Wittry 1973:45
M-1340	Cahokia Mounds	Floor of house 74 in Tract 15A.	Unidentified wood charcoal	3	-	1025 ± 110	cal A.D. 720–1250	Crane and Griffin 1964:5; Fowler 1963:54
I-2014	Cahokia Mounds	Refuse pit (Feature 289) in Tract 15A.	Unidentified wood charcoal	3	-	1000 ± 100	cal A.D. 770–1250	Fowler 1997:213; Pauketat 1998:Table 5.1
I-2070	Cahokia Mounds	Refuse pit (Feature 368) in Tract 15A.	Unidentified wood charcoal	3	-	990 ± 135	cal A.D. 720–1280	Fowler 1997:213; Pauketat 1998:Table 5.1
I-2016	Cahokia Mounds	Refuse pit (Feature 338) inside post circle 2 in Tract 15A.	Unidentified wood charcoal	3	-	980 ± 90	cal A.D. 880–1260	Fowler 1997:213; Pauketat 1998:Table 5.1
I-2012	Cahokia Mounds	Woodland refuse pit Southeast of Circle 2 in Tract 15A.	Unidentified wood charcoal	3	-	910 ± 100	cal A.D. 900–1290	Fowler 1997:213; Pauketat 1998:Table 5.1
I-9458	Cahokia Mounds	House 205 in Tract 15A.	Unidentified wood charcoal	1	-	940 ± 75	cal A.D. 970–1260	Pauketat 1998:Table 5.1
M-1337	Cahokia Mounds	From burned posts in wall trench of House 2 in Tract 15A.	Unidentified wood charcoal	3	-	805 ± 100	cal A.D. 1020–1390	Crane and Griffin 1964:5; Fowler 1963:53
I-2071	Cahokia Mounds	From Mississippian refuse pits (Features 371 and 369) in Tract 15A.	Unidentified wood charcoal	3	-	890 ± 135	cal A.D. 770–1400	Fowler 1997:213; Pauketat 1998:Table 5.1
I-2069	Cahokia Mounds	Refuse pit (Feature 153) in Tract 15A.	Unidentified wood charcoal	3	-	875 ± 105	cal A.D. 900–1300	Fowler 1997:213; Pauketat 1998:Table 5.1
M-1338	Cahokia	Tract 15A. House 32 east of Circle 2.	Unidentified wood	2	-	725 ± 100	cal A.D.	Crane and Griffin 1964:5;

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	Mounds	Sample from 0.2 feet above floor, 1.7 feet below surface. Intrudes into Circle 1 post pit 112.	charcoal				1040–1420	Fowler 1963:53, 1997:213
I-2013	Cahokia Mounds	Pit Feature 297 in Tract 15A.	Unidentified wood charcoal	3	-	920 ± 100	cal A.D. 900–1280	Fowler 1997:213; Pauketat 1998:Table 5.1, Table 6.7
I-9459	Cahokia Mounds	Pit Feature 401 in Tract 15A.	Unidentified wood charcoal	3	-	990 ± 75	cal A.D. 890–1220	Pauketat 1998:Table 5.1, Table 6.7
I-9460	Cahokia Mounds	House 209 in Tract 15A.	Unidentified wood charcoal	1	-	980 ± 75	cal A.D. 890–1220	Pauketat 1998:Table 5.1
GX-926	Cahokia Mounds	Pit Feature 311 in Tract 15A.	Unidentified wood charcoal	3	-	1135 ± 80	cal A.D. 680–1030	Pauketat 1998:Table 5.1, Table 6.7
I-9457	Cahokia Mounds	House 407 in Tract 15A.	Unidentified wood charcoal	1	-	880 ± 75	cal A.D. 1020–1270	Pauketat 1998:Table 5.1
WIS-1136	Cahokia Mounds	Post pit (Feature 618) of Circle No. 2 in Tract 15A. Same sample as WIS-1133.	Outer rings of wood (*Juniperus*) post	3	-27	990 ± 60	cal A.D. 890–1190	Bender et al. 1981:146
WIS-1133	Cahokia Mounds	Post pit (Feature 618) of Circle No. 2 in Tract 15A. Same sample as WIS-1136.	Outer rings of wood (*Juniperus*) post	3	-26.6	890 ± 60	cal A.D. 1020–1260	Bender et al. 1981:146
M-1339	Cahokia Mounds	Sample from 0.3 feet above floor of House 35 in Tract 15A.	Unidentified wood charcoal	2	-	685 ± 100	cal A.D. 1050–1440	Crane and Griffin 1964:5; Fowler 1963:54
WIS-1130	Cahokia Mounds	Post pit (Feature 601) of Circle No. 2 in Tract 15A. Same as WIS-1128.	Outer rings of wood (*Juniperus*) post	3	-24.7	920 ± 60	cal A.D. 1010–1250	Bender et al. 1981:145
WIS-1128	Cahokia Mounds	Post pit (Feature 601) of Circle No. 2 in Tract 15A. Same as WIS-1128.	Outer rings of wood (*Juniperus*) post	3	-27.3	940 ± 60	cal A.D. 990–1220	Bender et al. 1981:145
I-9464	Cahokia Mounds	House 212 in Tract 15A.	Unidentified wood charcoal	1	-	440 ± 75	cal A.D. 1320–1650	Pauketat 1998:Table 5.1
I-2015	Cahokia Mounds	Wall trench structure (Feature 108) in Tract 15A.	Unidentified wood charcoal	1	-	1060 ± 90	cal A.D. 720–1170	Fowler 1997:213; Pauketat 1998:Table 5.1
WIS-948	Cahokia Mounds	Post pit (Feature 548) of Woodhenge Circle No. 2.	Wood (*Juniperus*) fragments	3	-27.1	1085 ± 55	cal A.D. 770–1030	Bender et al. 1979:121
WIS-969	Cahokia Mounds	Post pit (Feature 548) of Woodhenge Circle No. 2.	Wood (*Juniperus*) fragments	3	-27.2	1060 ± 55	cal A.D. 770–1150	Bender et al. 1979:121
WIS-976	Cahokia Mounds	Large pit (Feature 340) of Woodhenge Circle 3, possibly associated with winter solstice sunrise post.	Unidentified charred wood	3	-25.8	760 ± 55	cal A.D. 1150–1390	Bender et al. 1979:121
WIS-984	Cahokia	Post pit (Feature 506) of Circle No. 3. Pit,	Unidentified charred	3	-26.9	685 ± 55	cal A.D.	Bender et al. 1979:121

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	Mounds	superimposed by wall trench of House 302.	wood				1240–1410	
WIS-988	Cahokia Mounds	Large pit (Feature 539) part of Circle No. 4, believed to represent winter solstice.	Unidentified charred wood	3	-25.6	1135 ± 55	cal A.D. 770–1020	Bender et al. 1979:121
Beta-19474	Cahokia Mounds	Feature 79 (Zone A) in Interpretive Center Tract II.	Wood charcoal (mixed *Pinophyta* wood)	1	-	970 ± 60	cal A.D. 970–1220	Holley 1989:456-457
Beta-19486	Cahokia Mounds	Feature 304 (Zone A) in Interpretive Center Tract II.	Wood charcoal (*Pinophyta* and *Quercus*)	1	-	1320 ± 80	cal A.D. 570–890	Holley 1989:456-457
Beta-19492	Cahokia Mounds	Feature 455 (Zone A) in Interpretive Center Tract II.	Wood charcoal (*Pinophyta* and *Carya*)	1	-	1050 ± 70	cal A.D. 770–1160	Holley 1989:456-457
Beta-19487	Cahokia Mounds	Feature 320 (Zone A) in Interpretive Center Tract II.	Wood charcoal (*Pinophyta*)	1	-	1050 ± 70	cal A.D. 770–1160	Holley 1989:456-457
Beta-19490	Cahokia Mounds	Feature 374 (Zone A) in Interpretive Center Tract II.	Wood charcoal (*Pinophyta*)	1	-	1010 ± 60	cal A.D. 890–1170	Holley 1989:456-457
Beta-19475	Cahokia Mounds	Zone B of structure (Feature 92) in Interpretive Center Tract II.	Wood charcoal (*Carya*)	1	-	1100 ± 70	cal A.D. 720–1120	Holley 1989:456-457
Beta-19485	Cahokia Mounds	Zone B of structure (Feature 287) in Interpretive Center Tract II.	Wood charcoal (*Pinophyta*)	1	-	960 ± 60	cal A.D. 980–1220	Holley 1989:456-457
Beta-19473	Cahokia Mounds	Feature 17 (Zone A) in Interpretive Center Tract II.	Wood charcoal (*Quercus*)	1	-	960 ± 100	cal A.D. 880–1270	Holley 1989:456-457
Beta-19480	Cahokia Mounds	Zone A/floor of burned structure (Feature 178) in Interpretive Center Tract II.	Wood charcoal (*Pinophyta*)	3	-	950 ± 60	cal A.D. 980–1220	Holley 1989:456-457
Beta-19478	Cahokia Mounds	Zone A/floor of burned structure (Feature 178) in Interpretive Center Tract II.	Charcoal seeds (*Diospyros*)	3	-	940 ± 80	cal A.D. 960–1260	Holley 1989:456-457
Beta-19484	Cahokia Mounds	Feature 242 (Zone A) in Interpretive Center Tract II.	Wood charcoal (*Quercus*)	1	-	930 ± 80	cal A.D. 980–1270	Holley 1989:456-457
Beta-19491	Cahokia Mounds	Feature 379 (Zone A) in Interpretive Center Tract II. A123.	Unidentified charred thatch	1	-	800 ± 80	cal A.D. 1030–1390	Holley 1989:456-457
Beta-19479	Cahokia Mounds	Log found on floor of burned structure (Feature 178) in Interpretive Center Tract II.	Wood charcoal (*Taxodium distichum*)	3	-	1030 ± 70	cal A.D. 770–1170	Holley 1989:456-457
GX-950	Cahokia Mounds	Stratum F of Mound 51.	Unidentified charred thatch	2	-	1145 ± 65	cal A.D. 710–1020	Fowler 1997:214

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WIS-351	Cahokia Mounds	Stratum F in Mound 51.	Deer bone, element not specified	2	-22	780 ± 60	cal A.D. 1050–1390	Bender et al. 1970b:642; Fowler 1997:214
WIS-352	Cahokia Mounds	Stratum H in Mound 51.	Deer bone, element not specified	2	-22.1	800 ± 65	cal A.D. 1040–1300	Bender et al. 1970b:642; Fowler 1997:214
WIS-356	Cahokia Mounds	Stratum D1 in Mound 51.	Deer bone, element not specified	2	-22.5	810 ± 50	cal A.D. 1050–1290	Bender et al. 1970b:642; Fowler 1997:214
WIS-360	Cahokia Mounds	Stratum D2 in Mound 51.	Deer bone, element not specified	2	-22.8	815 ± 60	cal A.D. 1040–1290	Bender et al. 1970b:642; Fowler 1997:214
WIS-391	Cahokia Mounds	Stratum D2 in Mound 51.	Nut shell hull (*Caraya*)	2	-27.3	850 ± 65	cal A.D. 1030–1270	Bender et al. 1970b:643; Fowler 1997:214; Schilling 2010
WIS-390	Cahokia Mounds	Stratum G in Mound 51.	Nut shell hull (*Caraya*)	2	-27.1	890 ± 55	cal A.D. 1020–1250	Bender et al. 1970b:643; Fowler 1997:214; Schilling 2010
WIS-389	Cahokia Mounds	Stratum H in Mound 51.	Nut shell hull (*Caraya*)	2	-27.2	900 ± 50	cal A.D. 1020–1230	Bender et al. 1970b:643; Fowler 1997:214; Schilling 2010
M-1784	Cahokia Mounds	Water laid material outside pit found below base of Mound 51.	Unidentified charred thatch (burned twigs and grass)	1	-	910 ± 110	cal A.D. 890–1290	Crane and Griffin 1972:208-209; Fowler 1997:214
WIS-350	Cahokia Mounds	Stratum E of Mound 51.	Deer bone, element not specified	2	-22.4	750 ± 50	cal A.D. 1160–1390	Bender et al. 1970b:641; Fowler 1997:214
ISGS-2573	Cahokia Mounds	Stratum F of Mound 51.	Unidentified charred thatch	2	-	760 ± 95	cal A.D. 1040–1400	Fowler 1997:214
WIS-355	Cahokia Mounds	Stratum G of Mound 51.	Deer bone, element not specified	2	-21.1	680 ± 60	cal A.D. 1220–1410	Bender et al. 1970b:642; Fowler 1997:214
WIS-298	Cahokia Mounds	Cribbing Log A from bottom of post pit (Feature 1) in Mound 72.	Unidentified wood	3	-	1020 ± 55	cal A.D. 890–1160	Bender et al. 1969:230; Schilling 2010
WIS-447	Cahokia Mounds	North midden (Feature 205) in Mound 72. Later used for burial of 22 individuals.	Unidentified charcoal (species not listed)	1	-	1015 ± 60	cal A.D. 890–1160	Bender et al. 1971:476; Schilling 2010:Table 35
WIS-575	Cahokia Mounds	Portion of cedar litter pole from burial #210 (Feature 229) in Mound 72.	Unidentified wood	3	-23.7	920 ± 60	cal A.D. 1010–1250	Bender et al. 1973b:612; Schilling 2010:Table 35
WIS-492	Cahokia Mounds	Central midden (Feature 227) in Mound 72.	Unidentified charcoal (species not listed)	1	-	900 ± 55	cal A.D. 1020–1250	Bender et al. 1973a:229; Schilling 2010:Table 35

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
WIS-293	Cahokia Mounds	Cribbing Log B materials from bottom of post pit (Feature 1) in Mound 72.	Unidentified wood	3	-	970 ± 50	cal A.D. 980–1190	Bender et al. 1969:230; Schilling 2010
M-1290	Cahokia Mounds	Sample taken from post molds of a round structure in Village Level V of Mound 55. Later believed to be debris washed down from last "temple" on mound.	Unidentified charcoal (species not listed)	2	-	600 ± 75	cal A.D. 1270–1440	Crane and Griffin 1963:236; Fowler 1997:214
M-1297	Cahokia Mounds	From refuse pit (Feature 1) with Sand Prairie ceramics in airport area.	Unidentified charcoal (species not listed) and charred maize	1	-	675 ± 75	cal A.D. 1210–1420	Crane and Griffin 1963:237; Fowler 1963:50, 1997:215
M-1296	Cahokia Mounds	Top of wall trench (west) fill of House 3 in airport area.	Unidentified charred wood	2	-	725 ± 75	cal A.D. 1150–1410	Crane and Griffin 1963:237; Fowler 1963:50
M-402	Etowah	Timber in a collapsed log tomb of Burial 38 of Mound C	Unidentified wood	3	-	725 ± 200	cal A.D. 880–1640	Crane and Griffin 1959:188
M-542	Etowah	Timber in a collapsed log tomb of Burial 57 of Mound C	Unidentified wood (*Juniper*)	3	-	910 ± 200	cal A.D. 690–1410	Crane and Griffin 1959:188
M-543	Etowah	Shell beads from under the shoulders of Burial 57 of Mound C.	Unidentified shell	1	-	500 ± 250	cal A.D. 1040–...	Crane and Griffin 1959:188
M-1060	Etowah	Burnt vegetable material (cat. 748) from surface of mantle no. 2 directly beneath the final mantle at Mound C.	Unidentified burnt vegetable material	2	-	225 ± 150	cal A.D. 1450–...	Crane and Griffin 1962:189
M-1061	Etowah	Charcoal from Burial no. 155, Mound C.	Unidentified charcoal (species not listed)	1	-	670 ± 200	cal A.D. 890–1660	Crane and Griffin 1962:189
M-1062	Etowah	Charred wood (cat. 2025) from Burial no. 164, Mound C.	Unidentified wood charcoal	3	-	450 ± 200	cal A.D. 1210–...	Crane and Griffin 1962:190
M-1064	Etowah	Large midden filled pit (Feature 19), Mound C.	Unidentified charcoal (species not listed)	1	-	850 ± 150	cal A.D. 880–1410	King 2003, 2007:Table 6.4
Beta-144161	Etowah	Fill of saucer 1 (below structure 1).	Soot removed from sherds	3	-24.3	990 ± 40	cal A.D. 980–1160	King 2001:Table 16, 2003:Table 8
Beta-145489	Etowah	Fill of saucer 1 (below structure 1).	Soot removed from sherds	3	-23.7	1000 ± 40	cal A.D. 970–1160	King 2001:Table 16, 2003:Table 8
Beta-144162	Etowah	Fill of saucer 2 (below western edge of Mound B).	Soot removed from sherds	3	-25	830 ± 40	cal A.D. 1050–1280	King 2001:Table 16, 2003:Table 8
Beta-144164	Etowah	Fill of saucer 3.	Soot removed from sherds	3	-25.6	810 ± 40	cal A.D. 1160–1280	King 2001:Table 16, 2003:Table 8
Beta-145491	Etowah	Fill of saucer 3.	Soot removed from sherds	3	-22.8	900 ± 40	cal A.D. 1030–1220	King 2001:Table 16, 2003:Table 8
Beta-144163	Etowah	Fill of saucer 4.	Soot removed from	3	-24.1	850 ± 40	cal A.D.	King 2001:Table 16,

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			sherds				1040–1270	2003:Table 8
Beta-145490	Etowah	Fill of saucer 4.	Soot removed from sherds	3	-23.2	1080 ± 40	cal A.D. 880–1030	King 2001:Table 16, 2003:Table 8
Beta-144811	Etowah	Fill of Black Midden (300R200).	Soot removed from sherds	3	-25	820 ± 40	cal A.D. 1050–1280	King 2001:Table 16, 2003:Table 8
Beta-145488	Etowah	Soot removed from the surface of an Early Wilbanks sherd recovered from a midden associated with a rectangular building (Structure 1).	Soot removed from sherds	3	-24.4	1540 ± 50	cal A.D. 400–620	King 2003:Table 10, 2007
Beta-67942	Etowah	Fill of a small platform (Orange Layer, Feature 64A) adjacent to Mound B.	Maize	2	-9.3	740 ± 70	cal A.D. 1150–1400	King 2001:Table 18, 2003:Table 10, 2007
Beta-67943	Etowah	Fill of a small platform (Orange Layer, Feature 64A) adjacent to Mound B.	Unidentified wood	2	-25 ± 2.5	680 ± 70	cal A.D. 1220–1420	King 2001:Table 18, 2003:Table 10, 2007
Beta-67944	Etowah	Fill of a small platform (Orange Layer, Feature 64B) adjacent to Mound B.	Maize	2	-11.6	560 ± 50	cal A.D. 1290–1440	King 2001:Table 18, 2003:Table 10, 2007
Beta-134792	Etowah	Post (different from Beta-134793) from palisade trench.	Unidentified charred wood	3	-25.7	748 ± 60	cal A.D. 1150–1390	Bigman et al. 2011
Beta-134793	Etowah	Palisade post (different from Beta-134792) from palisade trench.	Unidentified charred wood	3	-27.5	879 ± 70	cal A.D. 1020–1270	Bigman et al. 2011
Beta-180074	Jonathan Creek	From a small pit feature associated with a structure (Feature 13) that overlies a palisade (Feature 15) and underlies a palisade (Feature 6).	Maize kernel	3	-	790 ± 40	cal A.D. 1160–1280	Schroeder 2006
Beta-180075	Jonathan Creek	Within a structure (Feature 31) atop a small mound that overlies a palisade (Feature 7).	Outer rings of a piece of unidentified charred wood	1	-	780 ± 40	cal A.D. 1160–1290	Schroeder 2006, 2007:144
Beta-180076	Jonathan Creek	From a midden (Feature 38)	Unidentified charred material (species not listed)	1	-	820 ± 40	cal A.D. 1050–1280	Schroeder 2006
Beta-180077	Jonathan Creek	House Feature 44.	Unidentified charred material (species not listed)	1	-	800 ± 40	cal A.D. 1160–1280	Schroeder 2006
M-888	Kincaid	Burial Mound Pp°2, log tomb associated with the surface of three successive mound stages	Unidentified wood	3	-	675 ± 75	cal A.D. 1210–1420	Crane and Griffin 1960:35
DIC-393	Kincaid	Timber from burned structure in the lowest level of Mx°1A-41.	Unidentified charred wood	3	-	630 ± 65	cal A.D. 1270–1430	Butler 1991:270

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DIC-903	Kincaid	House 1 (Feature 7) from occupation level 4, Floor 5 of Mx°4.	Unidentified wood charcoal	3	-	1110 ± 65	cal A.D. 720–1030	Butler 1991:270; Santeford 1982
DIC-904	Kincaid	Charred remains of a house (Feature 8) on the last construction phase of Mx°10.	Unidentified charcoal (species not listed)	1	-	660 ± 55	cal A.D. 1260–1410	Butler 1991:270; Santeford 1982
UGa-3455	Kincaid	Dendro sample from premound level of Mx°4.	Unidentified wood	2	-	850 ± 65	cal A.D. 1030–1270	Butler 1991:270
UGa-3456	Kincaid	Dendro sample from premound level of Mx°4.	Unidentified wood	2	-	890 ± 65	cal A.D. 1020–1260	Butler 1991:270
UGa-3457	Kincaid	Dendro sample from premound level of Mx°4.	Unidentified wood	2	-	950 ± 70	cal A.D. 970–1250	Butler 1991:270
Beta-178763	Kincaid	From Feature XII, House III in Mx°4.	Maize	3	-8.6	780 ± 40	cal A.D. 1160–1290	Butler et al. 2011:Table 1
Beta-191044a	Kincaid	Large basin (Feature 10) in Mx°2 area.	Unidentified wood charcoal	2	-25.1	1050 ± 50	cal A.D. 880–1160	Butler and Welch 2005:Table 1; Butler et al. 2011:Table 1
Beta-191044b	Kincaid	Large basin (Feature 10) in Mx°2 area. Repeat of Beta-191044a.	Unidentified wood charcoal	-	-26.1	920 ± 40	cal A.D. 1020–1210	Butler and Welch 2005:Table 1; Butler et al. 2011:Table 1
UGAMS-4695	Kincaid	Structure, Feature 6	Unidentified thatch	3	-24.42	870 ± 25	cal A.D. 1040–1250	Butler et al. 2011:Table 1
UGAMS-4606	Kincaid	Palisade post from wall trench of western-most palisade.	Unidentified wood charcoal	3	-24.42	870 ± 25	cal A.D. 1040–1250	Butler et al. 2011:Table 1
Beta-221835	Kincaid	Palisade post from wall trench of north palisade.	Unidentified wood charcoal	3	-23.4	810 ± 60	cal A.D. 1040–1290	Butler et al. 2011:Table 1
Beta-216287	Kincaid	From the submound of the West Mound.	Unidentified thatch	2	-13	800 ± 40	cal A.D. 1160–1280	Butler et al. 2011:Table 1
Beta-216288	Kincaid	From charred debris of a thatch roof (Feature 9) in the upper level of the West Mound.	Unidentified thatch and small support sticks	4	-27.7	600 ± 40	cal A.D. 1290–1420	Butler et al. 2011:Table 1; Paul Welch, personal communication 2014
Beta-216289	Kincaid	Fragments of log or post from Structure 1 in the West Mound area.	Wood (*Carya*)	3	-26.9	780 ± 40	cal A.D. 1160–1290	Butler et al. 2011:Table 1; Paul Welch, personal communication 2014
Beta-216290	Kincaid	Partially burnt fragments of log or post from Structure 2 in the West Mound area.	Burnt wood (*Diospyros*)	3	-24.2	740 ± 50	cal A.D. 1180–1390	Butler et al. 2011:Table 1; Paul Welch, personal communication 2014
Beta-221833	Kincaid	Palisade post from the wall trench of the western palisade.	Unidentified wood charcoal	3	-23.8	610 ± 50	cal A.D. 1280–1420	Butler et al. 2011:Table 1
Beta-221834	Kincaid	Palisade post from the wall trench of the western palisade.	Unidentified wood charcoal	3	-24.6	680 ± 70	cal A.D. 1220–1420	Butler et al. 2011:Table 1

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Beta-237479	Kincaid	Post in wall trench of large circular structure (Feature 3) on Mx°8.	Unidentified wood charcoal	3	-25.1	650 ± 40	cal A.D. 1270–1400	Butler et al. 2011:Table 1
Beta-261304	Kincaid	Central post pit (Feature 4) of large circular structure on Mx°8.	Unidentified wood charcoal	3	-25.5	610 ± 60	cal A.D. 1280–1430	Butler et al. 2011:Table 1
UGAMS-4607	Kincaid	Wall post (Feature 1) of house on main plaza.	Unidentified wood charcoal	3	-23.52	620 ± 25	cal A.D. 1290–1400	Butler et al. 2011:Table 1
UGAMS-6685	Kincaid	Large pit with abundant maize on Mx°1E.	Maize	4	-10.9	810 ± 25	cal A.D. 1180–1270	Butler et al. 2011:Table 1
Uga-1662	Moundville	Posthole associated with Structure 17, 436 RW and 435 RW	Unidentified charred wood	3	-	485 ± 160	cal A.D. 1190–...	Walthall and Wimberly 1978
Uga-1661	Moundville	Cache of burned botanical material from Square 105R3-R4 in Mound W (40in bs)	Unidentified charred cane	4	-	690 ± 85	cal A.D. 1160–1420	Walthall and Wimberly 1978
DIC-1243	Moundville	From fallen wall debris in daub layer shown in profile (point B, Scarry 1986:Figure 5:5) of NR 6N2W South Wall.	Wood charcoal (*Pinaceae*)	3	-	690 ± 60	cal A.D. 1220–1400	Steponaitis 1983:Table 23; Scarry 1986
DIC-1241	Moundville	From fallen wall debris in daub layer shown in profile (point A, Scarry 1986:Figure 5:5) of NR 6N2W South Wall.	Unidentified wood charcoal	3	-	120 ± 60	cal A.D. 1660–1950	Steponaitis 1983:Table 23; Scarry 1986
DIC-1242	Moundville	Hearth like feature in Level 4, unit 6N2W	Unidentified wood charcoal	3	-	110 ± 50	cal A.D. 1670–1950	Steponaitis 1983:126; Knight et al. 1999
Beta-1289	Moundville	Midden shown in profile (point C, Scarry 1986:Figure 5:5) of NR 6N2W South Wall.	Wood charcoal (*Pinaceae*)	3	-26.6	665 ± 65	cal A.D. 1240–1420	Scarry 1986
Beta-1106	Moundville	Floor layer shown in profile (point D, Scarry 1986:Figure 5:5) of NR 6N2W South Wall.	Wood charcoal (*Pinaceae*)	3	-26.67	1010 ± 80	cal A.D. 770–1220	Scarry 1986
Beta-1290	Moundville	Either base of midden or top of pit house fill shown in profile (point E, Scarry 1986:Figure 5:5) of NR 6N2W South Wall.	Wood charcoal (*Pinaceae*)	3	-26.74	930 ± 80	cal A.D. 980–1270	Scarry 1986
Beta-1105	Moundville	Either base of midden or top of pit house fill shown in profile (point F, Scarry 1986:Figure 5:5) of NR 6N2W South Wall.	Maize and wood charcoal (*Pinaceae*)	3	-25.47	1130 ± 105	cal A.D. 660–1150	Scarry 1986
Beta-1485	Moundville	Pit house floor shown in profile (point G,	Wood charcoal	3	-	990 ± 65	cal A.D.	Scarry 1986

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		Scarry 1986:Figure 5:5) of NR 6N2W South Wall.	(*Liquidambar*)				890–1210	
Beta-1107	Moundville	SCB deposit, base of the midden zone.	Wood charcoal (*Pinaceae*)	3	-	875 ± 80	cal A.D. 1020–1280	Scarry 1986:163-164
Beta-44466	Moundville	Mound Q, 43R23, Cut 3, north flank, Midden Level 4	Unidentified wood charcoal	3	-	510 ± 60	cal A.D. 1290–1490	Knight 2010:Table 4.13
Beta-44472	Moundville	Mound Q, 43R23, Cut 3, north flank, Midden Level 4	Unidentified wood charcoal	3	-	530 ± 60	cal A.D. 1290–1460	Knight 2010:Table 4.13
Beta-44467	Moundville	Mound Q, 43R23, Cut 3, north flank, Midden Level 4	Unidentified wood charcoal	3	-	770 ± 70	cal A.D. 1040–1390	Knight 2010:Table 4.13
Beta-79972	Moundville	Mound Q, 41R23, Cut 13, north flank, Middle Level 1	Unidentified wood charcoal	3	-26.9	550 ± 60	cal A.D. 1290–1450	Knight 2010:Table 4.13; Knight et al. 1999:Table 3
Beta-79973	Moundville	Mound Q, 41R23, Cut 12, north flank, Middle Level 1	Unidentified wood charcoal	3	-27.5	570 ± 50	cal A.D. 1290–1440	Knight 2010:Table 4.13; Knight et al. 1999:Table 3
Beta-44471	Moundville	Mound Q, 26R14, control trench, P-4, west flank, Stage IV midden	Unidentified wood charcoal	3	-	650 ± 60	cal A.D. 1260–1420	Knight 2010:Table 4.13
Beta-44469	Moundville	Mound Q, 26R14, control trench, P-4, west flank, Stage IV midden	Unidentified wood charcoal	3	-	720 ± 70	cal A.D. 1160–1400	Knight 2010:Table 4.13
Beta-44470	Moundville	Mound Q, 26R14, control trench, P-4, west flank, Stage IV midden	Unidentified wood charcoal	3	-	850 ± 70	cal A.D. 1030–1280	Knight 2010:Table 4.13
Beta-44468	Moundville	Mound Q, 26R14, control trench, P-6, west flank, Stage III midden	Composite sample of unidentified wood charcoal	3	-	760 ± 80	cal A.D. 1040–1400	Knight 2010:Table 4.13
Beta-44473	Moundville	Mound Q, 24R20, Cut 3, summit, Stage IIIA	Composite sample of unidentified wood charcoal	2	-	790 ± 60	cal A.D. 1040–1380	Knight 2010:Table 4.13
Beta-79971	Moundville	A wall trench (Feature 77) associated with Structure 2 on the Mound Q summit, Stage II.	Unidentified wood charcoal	2	-27.7	450 ± 60	cal A.D. 1320–1640	Knight 2010:Table 4.13; Knight et al. 1999:Table 3
Beta-86993	Moundville	A wall trench (Feature 23) associated with Structure 1 on the Mound Q summit, Stage II.	Unidentified wood charcoal	2	-28.3	480 ± 80	cal A.D. 1290–1640	Knight 2010:Table 4.13; Knight et al. 1999:Table 3
Beta-82816	Moundville	A wall trench (Feature 34) associated with Structure 4 on the Mound Q summit, Stage II.	Unidentified wood charcoal	2	-26.2	640 ± 70	cal A.D. 1260–1430	Knight 2010:Table 4.13; Knight et al. 1999:Table 3
Beta-86994	Moundville	A partially preserved hearth (Feature 128) possibly associated with Structure 3 on	Composite sample of unidentified wood	3	-24.6	850 ± 130	cal A.D. 890–1400	Knight 2010:Table 4.13; Knight et al. 1999:Table 3

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Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
		the Mound Q summit, Stage II.	charcoal					
Beta-115826	Moundville	Mound E, Feature 2, outer rings of charred log in daub concentration, Stage IIIA, Structure I	Unidentified charred wood	3	-27.6	320 ± 60	cal A.D. 1440–1800	Knight 2010:Table 5.7; Knight et al. 1999:Table 5
Beta-79966	Moundville	Mound E, Feature 2, daub concentration, Stage IIIA, Structure I	Unidentified wood charcoal	3	-26.7	360 ± 50	cal A.D. 1440–1640	Knight 2010:Table 5.7; Knight et al. 1999:Table 5
Beta-79965	Moundville	Mound E, Feature 8, post pit, Stage IIIA	Unidentified wood charcoal	3	-27.7	590 ± 80	cal A.D. 1270–1450	Knight 2010:Table 5.7; Knight et al. 1999:Table 5
Beta-115824	Moundville	Mound E, 22R55, Cut 4, Stage III midden (upper section)	Unidentified wood charcoal	3	-26	470 ± 40	cal A.D. 1320–1610	Knight 2010:Table 5.7; Knight et al. 1999:Table 4
Beta-115825	Moundville	Mound E, 22R55, Cut 4, Stage III midden (lower section)	Unidentified wood charcoal	3	-26.7	900 ± 60	cal A.D. 1020–1250	Knight 2010:Table 5.7; Knight et al. 1999:Table 4
Beta-79969	Moundville	Mound E, Feature 5, hearth, Stage IIA organic zone	Unidentified wood charcoal	3	-	310 ± 70	cal A.D. 1440–...	Knight 2010:Table 5.7
Beta-79970	Moundville	Mound E, Feature 7, hearth, Stage IIA organic zone	Unidentified wood charcoal	3	-	470 ± 40	cal A.D. 1320–1610	Knight 2010:Table 5.7
Beta-115827	Moundville	Mound E, 22R55, Cut 6, Stage IIA organic zone	Unidentified wood charcoal	3	-	650 ± 60	cal A.D. 1260–1420	Knight 2010:Table 5.7
Beta-115822	Moundville	Mound E, Feature 75, smudge pit, Stage II, Structure 2	Unidentified charred cane	4	-	340 ± 80	cal A.D. 1420–...	Knight 2010:Table 5.7
Beta-79968	Moundville	Mound E, Feature 42, wall trench, Stage II, Structure 3	Unidentified wood charcoal	2	-25.3	570 ± 70	cal A.D. 1280–1450	Knight 2010:Table 5.7; Knight et al. 1999:Table 3
Beta-79967	Moundville	Mound E, Feature 26, post insertion ramp, Stage II, Structure 3	Unidentified wood charcoal	2	-25.8	790 ± 50	cal A.D. 1050–1300	Knight 2010:Table 5.7; Knight et al. 1999:Table 3
Beta-71696	Moundville	Mound E, 15R42, control trench, Feature 4 (large posthole), Stage II, Structure 2	Unidentified wood charcoal	3	-27	940 ± 90	cal A.D. 900–1270	Knight 2010:Table 5.7; Knight et al. 1999:Table 3; Vernon Knight, personal communication 2014
Beta-71697	Moundville	Mound E, 10R42, control trench, Cut 5, Stage II flank midden	Unidentified wood charcoal	3	-28.9	660 ± 70	cal A.D. 1220–1420	Knight 2010:Table 5.7
Beta-71695	Moundville	Sample taken from erosional sand wash (Feature 34) at the toe of Stage I in the south flank trench of Mound E.	Unidentified wood charcoal	2	-	700 ± 70	cal A.D. 1190–1410	Knight 2010:Table 5.7
Beta-137378	Moundville	From a log retrieved through core sample 3-3-4, Stage I of Mound E.	Wood charcoal (*Pinaceae*)	2	-	840 ± 60	cal A.D. 1040–1280	Knight 2010:Table 5.7

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Beta-71694	Moundville	Mound E, Feature 2, house basin, premound, old humus zone	Composite sample of unidentified wood charcoal	3	-30.2	860 ± 60	cal A.D. 1030–1270	Knight 2010:Table 5.7; Knight et al. 1999:Table 2
Beta-71692	Moundville	Mound R, 52R16, control trench, Cut 2, Stage V flank midden	Unidentified wood charcoal	3	-29.2	500 ± 60	cal A.D. 1290–1620	Knight 2010:Table 6.6; Knight et al. 1999:Table 4
Beta-71691	Moundville	Mound R, 52R16, control trench, Cut 4, Stage V fill, charred layer	Unidentified wood charcoal	3	-	640 ± 60	cal A.D. 1270–1420	Knight 2010:Table 6.6
Beta-71690	Moundville	Mound R, 52R16, control trench, Cut 5, Stage IV flank midden	Unidentified wood charcoal	3	-28.3	1160 ± 120	cal A.D. 640–1160	Knight 2010:Table 6.6; Knight et al. 1999:Table 4
Beta-82815	Moundville	Mound R, 52R16, control trench, Cut 5, Stage IV flank midden	Composite sample of unidentified wood charcoal	3	-29	520 ± 60	cal A.D. 1290–1470	Knight 2010:Table 6.6; Knight et al. 1999:Table 4
Beta-71689	Moundville	Mound R, 52R23, control trench, Cut 6, Stage IV fill, near summit	Composite sample of unidentified wood charcoal	2	-	510 ± 70	cal A.D. 1290–1620	Knight 2010:Table 6.6
Beta-115823	Moundville	Mound R, 52R16, control trench, Cut 6, Stage IV fill, charred layer	Unidentified wood charcoal	3	-	570 ± 60	cal A.D. 1290–1440	Knight 2010:Table 6.6
Beta-71688	Moundville	Mound R, 52R23, control trench, Cut 7, summit Stage III	Unidentified wood charcoal	2	-	1920 ± 130	cal AD - 350–400	Knight 2010:Table 6.6
Beta-71687	Moundville	Mound R, 52R23, Feature 1, wall trench, Stage III	Unidentified wood charcoal	2	-	930 ± 90	cal A.D. 900–1270	Knight 2010:Table 6.6; Vernon Knight, personal communication 2014
Beta-115820	Moundville	Mound R, 52R24, control trench, Feature 9, Stage III architectural feature	Unidentified wood charcoal	3	-	970 ± 60	cal A.D. 970–1220	Knight 2010:Table 6.6
Beta-115821	Moundville	Mound R, 52R16, control trench, Feature 10, Stage II downslope flank deposit	Unidentified wood charcoal	3	-	790 ± 50	cal A.D. 1050–1300	Knight 2010:Table 6.6
Beta-115828	Moundville	Mound R, 52R23, control trench, Cut 9, burned summit, Stage II	Composite sample of unidentified wood charcoal	3	-	740 ± 50	cal A.D. 1180–1390	Knight 2010:Table 6.6
Beta-71686	Moundville	Mound R, 52R23, control trench, Cut 9, burned summit, Stage II	Unidentified wood charcoal	3	-	1140 ± 90	cal A.D. 670–1030	Knight 2010:Table 6.6
Beta-71685	Moundville	Mound R, 52R23, control trench, Cut 11, burned summit, Stage I	Unidentified wood charcoal	3	-	650 ± 60	cal A.D. 1260–1420	Knight 2010:Table 6.6
Beta-115819	Moundville	Mound R, 52R23, control trench, Cut 11, burned summit, Stage I	Unidentified wood charcoal	3	-	1020 ± 110	cal A.D. 760–1250	Knight 2010:Table 6.6
Beta-71693	Moundville	Mound R, Feature 4, pit, premound features	Unidentified wood charcoal	3	-	1040 ± 80	cal A.D. 770–1170	Knight 2010:Table 6.6

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Beta-71702	Moundville	Mound F, 26R8, control trench, Cut 2, Stage III flank midden	Composite sample of unidentified wood charcoal	3	-26.2	880 ± 60	cal A.D. 1030–1260	Knight 2010: Table 6.13; Knight et al. 1999:Table 3
Beta-71701	Moundville	Mound F, 26R8, control trench, Cut 7, Stage I fill, upper zone	Unidentified wood charcoal	2	-27.7	700 ± 80	cal A.D. 1160–1420	Knight 2010: Table 6.13; Knight et al. 1999:Table 2
Beta-71700	Moundville	Mound F, 26R8, control trench, Cut 7, Stage I fill, upper zone	Unidentified wood charcoal	2	-28.2	800 ± 70	cal A.D. 1030–1300	Knight 2010: Table 6.13; Knight et al. 1999:Table 2
Beta-71699	Moundville	Mound F, 26R8, control trench, Cut 10, Stage I fill, lower zone	Unidentified wood charcoal	2	-28.5	780 ± 60	cal A.D. 1050–1390	Knight 2010: Table 6.13; Knight et al. 1999:Table 2
Beta-71698	Moundville	Mound F, 26R8, control trench, Cut 10, Stage I fill, lower zone	Unidentified wood charcoal	2	-26.9	750 ± 70	cal A.D. 1050–1400	Knight 2010: Table 6.13; Knight et al. 1999:Table 2
Beta-71706	Moundville	Mound G, 48R33, control trench, Cut 2, Stage IV fill, summit	Composite sample of unidentified wood charcoal	2	-26.5	510 ± 60	cal A.D. 1290–1490	Knight 2010: Table 6.20; Knight et al. 1999:Table 4
Beta-71711	Moundville	Mound G, 58R33, control trench, Cut 4, Stage III midden, lower flank	Unidentified wood charcoal	3	-28.6	580 ± 50	cal A.D. 1290–1430	Knight 2010: Table 6.20; Knight et al. 1999:Table 3
Beta-71705	Moundville	Mound G, 48R33, control trench, Cut 4, Stage III fill, summit	Composite sample of unidentified wood charcoal	2	-27.2	660 ± 60	cal A.D. 1260–1420	Knight 2010: Table 6.20; Knight et al. 1999:Table 3
Beta-71710	Moundville	Mound G, 60R33, control trench, Cut 6, Stage II midden, lower flank	Unidentified wood charcoal	3	-27.5	780 ± 50	cal A.D. 1150–1300	Knight 2010: Table 6.20; Knight et al. 1999:Table 3
Beta-71704	Moundville	Mound G, 48R33, control trench, Cut 5, Stage II midden, summit	Unidentified wood charcoal	3	-28.1	640 ± 70	cal A.D. 1260–1430	Knight 2010: Table 6.20; Knight et al. 1999:Table 3
Beta-71703	Moundville	Mound G, 48R33, control trench, Cut 5, Stage II fill, summit	Composite sample of unidentified wood charcoal	2	-27.7	640 ± 50	cal A.D. 1270–1410	Knight 2010: Table 6.20; Knight et al. 1999:Table 3
Beta-71709	Moundville	Mound G, 58R33, control trench, Cut 8, Stage I midden, lower flank	Unidentified wood charcoal	3	-29.5	740 ± 50	cal A.D. 1180–1390	Knight 2010: Table 6.20; Knight et al. 1999:Table 3
Beta-71708	Moundville	Mound G, 60R33, control trench, Cut 12, fill of old humus layer, under plaza fill	Composite sample of unidentified wood charcoal	2	-29.2	1010 ± 80	cal A.D. 770–1220	Knight 2010: 287, Table 6.20; Knight et al. 1999:Table 2
Beta-161959	Moundville	Mound V, Feature 8. Fill of east berm. Structure 1.	Unidentified wood charcoal	2	-26.7	590 ± 60	cal A.D. 1280–1430	Knight 2009: Table 1
Beta-161960	Moundville	Mound V, Feature 14. Corner post of Structure 2.	Unidentified wood charcoal	3	-24.8	570 ± 60	cal A.D. 1290–1440	Knight 2009: Table 1
Beta-161961	Moundville	Mound V, Roof beam, Structure 1b, Unit 79R125	Unidentified wood charcoal	3	-25.6	240 ± 60	cal A.D. 1480–...	Knight 2009: Table 1

Appendix A. Radiocarbon Data								
Laboratory ID	**Site**	**Context**	**Material**	**Evaluation of context security**	**$\delta^{13}C$**	**Date B.P.**	**Calibration (95% confidence)**	**Reference**
Beta-161962	Moundville	Mound V, Feature 33. Roof support post, Structure 1b.	Unidentified wood charcoal	3	-25.7	540 ± 50	cal A.D. 1290–1450	Knight 2009: Table 1
Beta-53393	Moundville	ECB Tract. Palisade trench fill (Feature 169). Palisade trench north of structures.	Unidentified wood charcoal	2	-27.4	1100 ± 110	cal A.D. 680–1160	Knight et al. 1999:Table 2; Scarry 1995:Table 22, 1998:70
Beta-53392	Moundville	ECB Tract. Palisade trench fill (Feature 159). Bastion trench.	Unidentified wood charcoal	2	-26.6	1270 ± 90	cal A.D. 610–970	Knight et al. 1999:Table 2; Scarry 1995:Table 22, 1998:70
Beta-53768	Moundville	ECB Tract. Palisade trench fill (Feature 173).	Unidentified wood charcoal	2	-27.2	780 ± 90	cal A.D. 1030–1390	Knight et al. 1999:Table 2; Scarry 1995:Table 22, 1998:70
Beta-53767	Moundville	ECB Tract. Palisade trench fill (Southern palisade; Feature 29).	Unidentified wood charcoal	2	-27.4	650 ± 60	cal A.D. 1260–1420	Knight et al. 1999:Table 2; Scarry 1995:Table 22, 1998:70
Beta-53389	Moundville	ECB Tract Pit (Feature 45) intruding palisade trench.	Unidentified charcoal (species not listed)	1	-26.8	880 ± 70	cal A.D. 1020–1270	Knight et al. 1999:Table 2; Scarry 1995:Table 22
Beta-53388	Moundville	ECB Tract. Pit (Feature 45) intruding palisade trench.	Unidentified charcoal (species not listed)	1	-27.6	670 ± 80	cal A.D. 1210–1430	Knight et al. 1999:Table 2; Scarry 1995:Table 22
Beta-53382	Moundville	ECB Tract. Structure 4. Pit (Feature 19) within structure.	Material not listed	3	-30.6	720 ± 120	cal A.D. 1040–1430	Knight et al. 1999:Table 2; Scarry 1995:154, Table 22
Beta-53390	Moundville	ECB Tract. Structure 6. Pit (Feature 66) within structure.	Unidentified material part of tree disturbance	3	-25.2	3400 ± 70	1890–1520 cal B.C.	Knight et al. 1999:Table 2; Scarry 1995:156, Table 22
Beta-53383	Moundville	ECB Tract. Burial 8. Burial pit (Feature 26). In pit that cuts through wall trenches associated with Structure 5 and Structure 6.	Unidentified matting from around the head of burial	4	-	640 ± 90	cal A.D. 1220–1440	Scarry 1995:200-205, Table 22
Beta-53766	Moundville	ECB Tract. Burial 8. Burial pit (Feature 26). In pit that cuts through wall trenches associated with Structure 5 and Structure 6.	Unidentified matting from around the head of burial	4	-	770 ± 60	cal A.D. 1050–1390	Scarry 1995:200-205, Table 22
Beta-53391	Moundville	ECB Tract. Burial 9. Burial pit (Feature 73). In pit that cuts through wall trenches associated with Structure 5 and Structure 6.	Unidentified matting from around the head of burial	4	-	490 ± 80	cal A.D. 1290–1640	Scarry 1995:205-211, Table 22
Beta-537668	Moundville	PA Tract. Isolated midden-filled depression (Feature 5).	Material not listed	1	-	580 ± 70	cal A.D. 1280–1440	Scarry 1995:134, Table 22

Appendix A. Radiocarbon Data

Laboratory ID	Site	Context	Material	Evaluation of context security	$\delta^{13}C$	Date B.P.	Calibration (95% confidence)	Reference
Beta-53771	Moundville	PA Tract. Midden-filled depression (Feature 110) associated with Structure 5.	Material not listed	1	-26.9	820 ± 80	cal A.D. 1030–1300	Knight et al. 1999:Table 2; Scarry 1995:117, Table 22
Beta-53770	Moundville	PA Tract. Pit (Feature 9) associated with Structures 1, 2, and 6	Unidentified charcoal (species not listed)	1	-28.6	940 ± 90	cal A.D. 900–1270	Knight et al. 1999:Table 2; Scarry 1995:112, Table 22
Beta-53398	Moundville	PA Tract. Midden-filled depression (Feature 15) associated with Structures 1, 2, and 6.	Unidentified charcoal (species not listed)	1	-27.3	940 ± 70	cal A.D. 980–1250	Knight et al. 1999:Table 2; Scarry 1995:112, Table 22
Beta-53400	Moundville	PA Tract. Structure 3. Floor of semi-subterranean structure.	Material not listed	1	-27	840 ± 70	cal A.D. 1030–1280	Knight et al. 1999:Table 2; Scarry 1995113, Table 22
Beta-53401	Moundville	PA Tract. Structure 3. Floor of semi-subterranean structure	Material not listed	1	-26.7	1100 ± 70	cal A.D. 720–1120	Knight et al. 1999:Table 2; Scarry 1995:113, Table 22
Beta-310905	Southwind	Post mold at the base of the stockade trench (Feature 01-1B, Cat003, FS 22).	Wood charcoal (*Gleditsia* or *Gymnocladus*)	3	-27.5	520 ± 30	cal A.D. 1320–1450	Bush 2011; Krus 2013; Striker 2009; This paper
Beta-310906	Southwind	Post mold at the base of the stockade trench (Feature 01-1C, Cat005, FS 17).	Wood charcoal (Diffuse-porous hardwood)	3	-25.6	850 ± 30	cal A.D. 1050–1260	Bush 2011; Krus 2013; Striker 2009; This paper
Beta-248603	Southwind	Circular stain with burnt wood and daub fragments (Feature 04-1, FS 20).	Unidentified wood charcoal	3	-27	350 ± 40	cal A.D. 1450–1640	Striker 2009
Beta-248604	Southwind	Pit feature superimposed by palisade trench (Feature 08-3, FS 23).	Unidentified wood charcoal	3	-26.3	900 ± 40	cal A.D. 1030–1220	Striker 2009
Beta-248605	Southwind	Circular stain with daub and charcoal fragments (Feature 04-14, FS 32).	Unidentified wood charcoal	3	-24	700 ± 40	cal A.D. 1240–1400	Striker 2009
Beta-248606	Southwind	Oblong soil stain with daub and charcoal fragments (Feature 05-9, FS 37).	Unidentified wood charcoal	3	-26.7	760 ± 40	cal A.D. 1190–1300	Striker 2009
Beta-248607	Southwind	Palisade bastion post mold (Feature 10-02F, FS 45).	Unidentified wood charcoal	3	-26.3	880 ± 40	cal A.D. 1030–1250	Striker 2009
Beta-248608	Southwind	Large feature that may be the possible remnants of a rectangular structure (Feature 04-13, FS 62).	Unidentified wood charcoal	2	-25.6	760 ± 40	cal A.D. 1190–1300	Striker 2009
UGa-4715	Southwind	Smudge pit, Feature PH-WB-21	Carbonized maize fragments and minor amount of unidentified carbonized wood	3	-	890 ± 135	cal A.D. 770–1400	Munson 1994:Table 15.3

[a]The larger of the two sides of the unsymmetrical distributions was entered into OxCal as the 1 σ error.

Appendix B. Context matrices showing the treatment of radiocarbon measurements in the primary Bayesian models

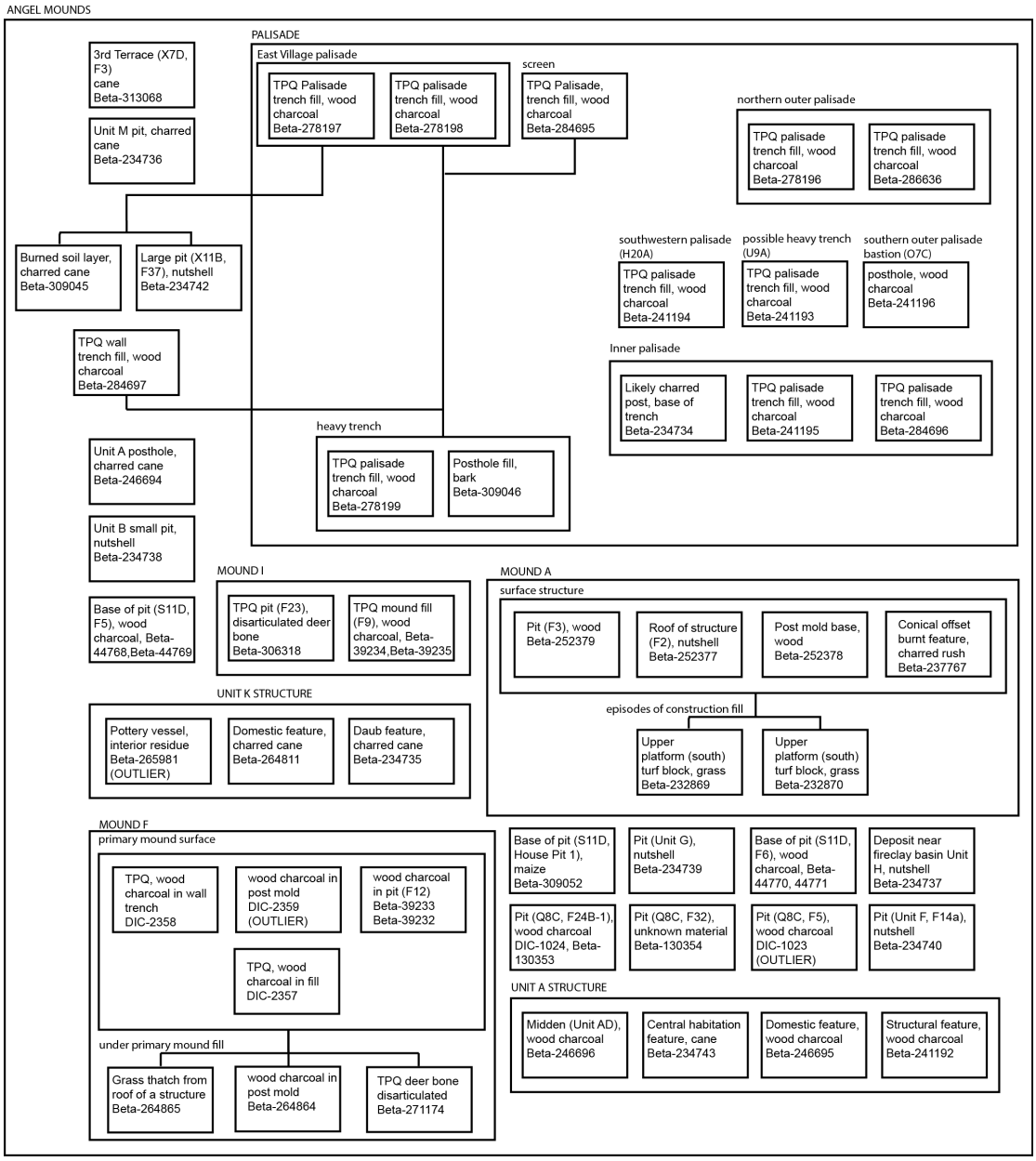

Figure B.1. Angel Mounds context matrix showing the treatment of radiocarbon measurements in the primary Bayesian model.

References for Angel Mounds context matrix: Black 1967; Black and Johnson 1964; Bush 2010; Hilgeman 2000; Horton 2010; Krus 2013; Krus et al. 2013; McGill 2013:115; Monaghan and Peebles 2010; Monaghan et al. 2013; Peebles and Monaghan 2011; Peebles et al. 2011; Peterson 2010; Pike 2012; Wolforth 1983

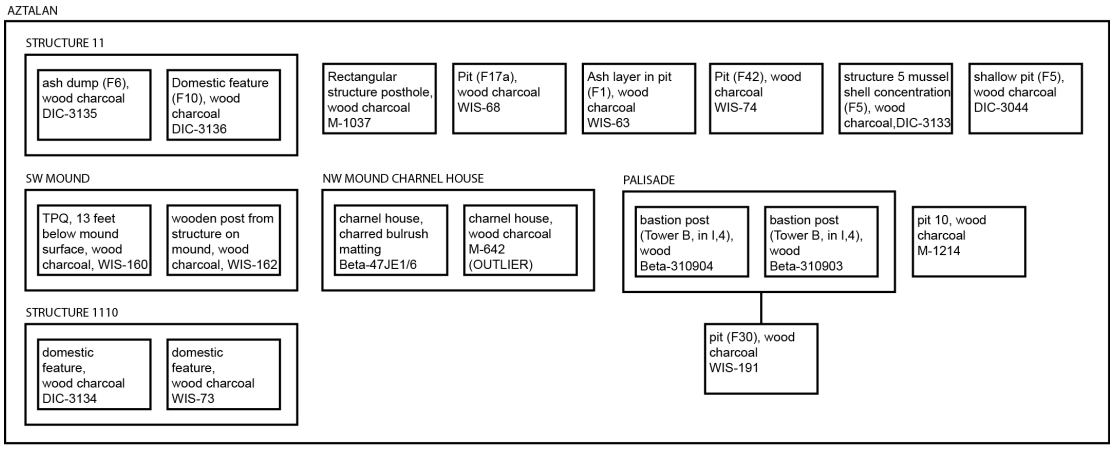

Figure B.2. Aztalan context matrix showing the treatment of radiocarbon measurements in the primary Bayesian model.

References for Aztalan context matrix: Barrett 1933; Bender et al. 1966; Bender et al. 1967, 1968; Bush 2011; Crane and Griffin 1959, 1962; Johnson 2003; Krus 2013; Richards 1985; Richards and Jeske 2002; Richards et al. 1998; Ritzenthaler 1963

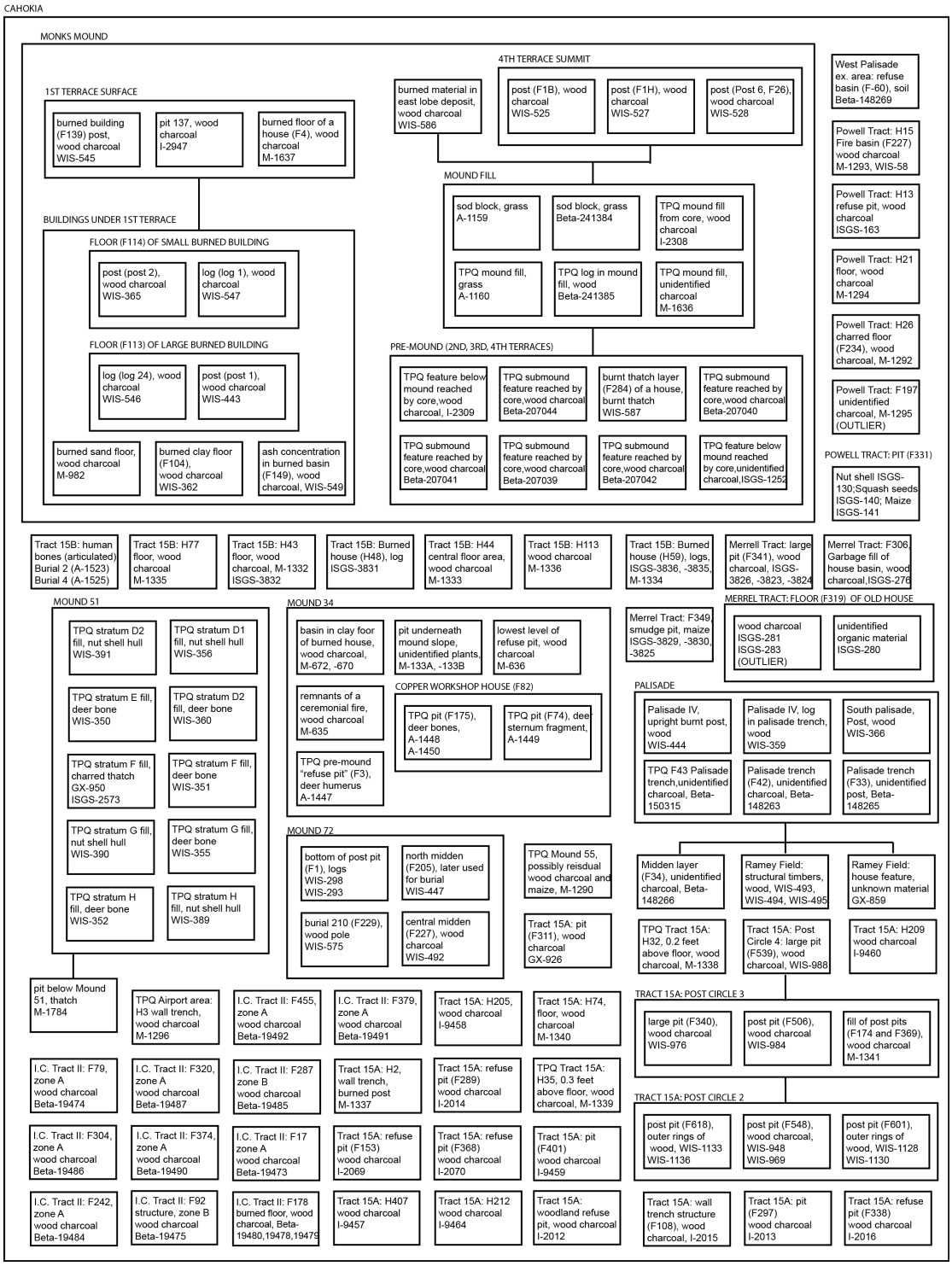

Figure B.3. Cahokia context matrix showing the treatment of radiocarbon measurements in the primary Bayesian model.

References for Cahokia context matrix: Anderson 1969:92; Benchley 1975; Bender et al. 1966,1970a, 1970b, 1971, 1973a, 1973b, 1979, 1981; Buckley et al. 1968:281; Buckley and Willis 1969; Carbaugh et al. 2013; Coleman 1974:115; Crane 1956; Crane and Griffin 1959, 1962, 1963, 1964, 1966, 1968,1972; Fischer 1972; Fowler 1963,1997; Hajic 2005; Holley 1989, Holley et al. 1990; Iseminger 1990; Kelly 1997; Kelly and Brown 2010; Liu et al. 1986:79; McGimsey and Wiant 1984; Milner 1998; Pauketat 1998; Reed 2009; Reed et al. 1968; Schilling 2010, 2012, 2013; Trubitt 2001; Trubitt and Kelly 2012; Williams 1975; Wittry 1973, 1996

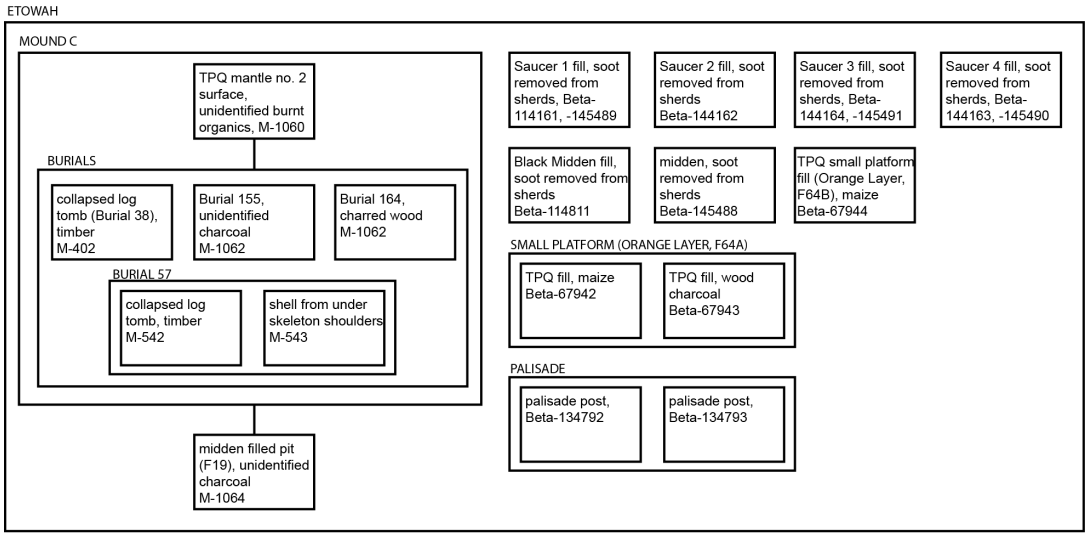

Figure B.4. Etowah context matrix showing the treatment of radiocarbon measurements in the primary Bayesian model.

References for Etowah context matrix: Bigman et al. 2011; Crane and Griffin 1962; King 2001, 2003, 2007; Larson 1971, 1972

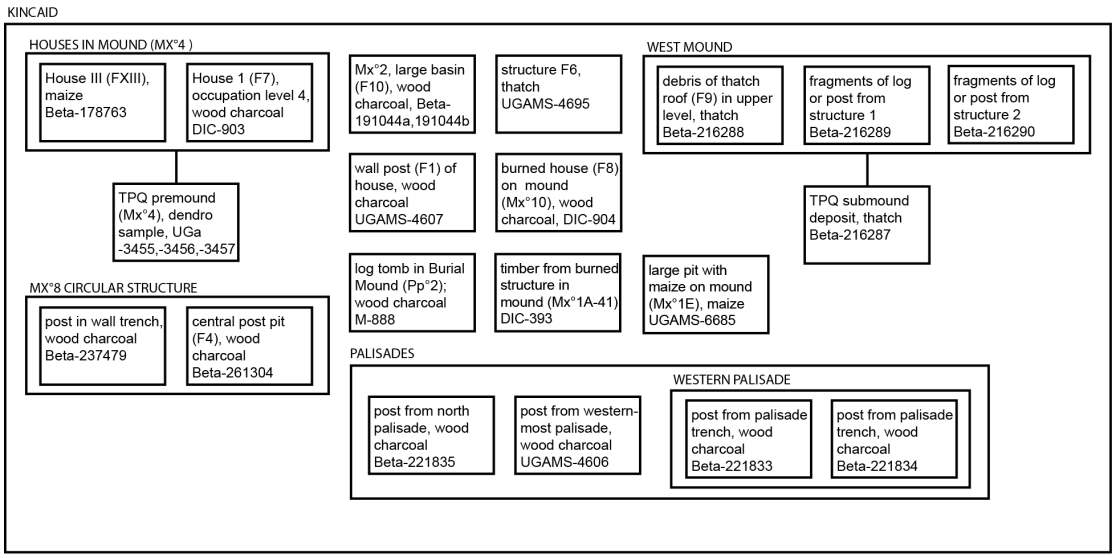

Figure B.5. Kincaid context matrix showing the treatment of radiocarbon measurements in the primary Bayesian model.

References for Kincaid context matrix: Butler 1991; Butler et al. 2011; Cole 1951; Crane and Griffin 1960; Santeford 1982

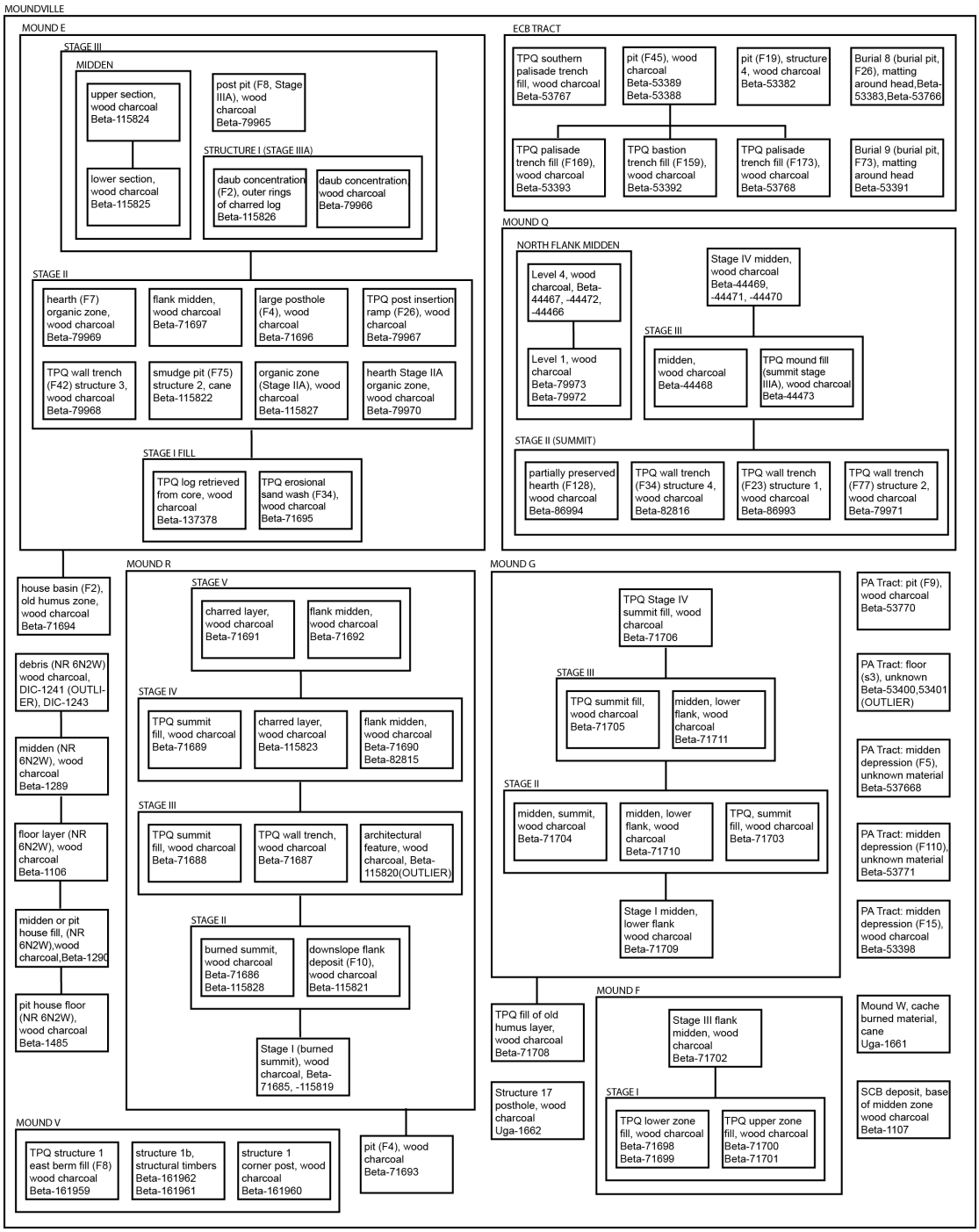

Figure B.6. Moundville context matrix showing the treatment of radiocarbon measurements in the primary Bayesian model.

References for Moundville context matrix: Allan 1984; Blitz 2007; Blitz 2008; Davis et al. 2015; Knight et al. 1999; Knight 2009,2010; Scarry 1986,1995, 1998; Steponaitis 1983:Table 23; Vogel and Allan 1985; Walthall and Wimberly 1978

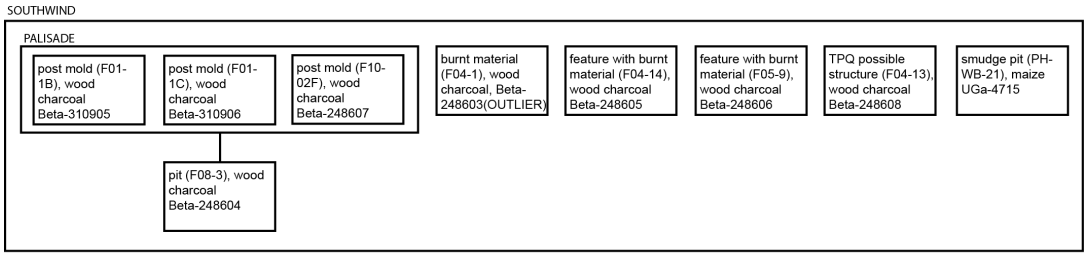

Figure B.7. Southwind context matrix showing the treatment of radiocarbon measurements in the primary Bayesian model.

References for Southwind context matrix: Krus 2013; Munson 1994; Striker 2009

Appendix C. Code for OxCal models

Angel Mounds

```
Plot()
 {
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence()
  {
   Boundary("start Angel");
   Phase("Angel")
   {
    Sequence("Mound F")
    {
     Phase("under primary mound fill")
     {
      R_Date("Grass thatch from the roof of a structure in the inner mound layer of
Mound F: Beta-264865", 910, 40);
      After("Deer bone under primary mound")
      {
       R_Date("Beta-271174", 760, 40);
      };
      R_Date("Post mold fill: Beta-264864", 760, 40)
      {
       Outlier("Charcoal", 1);
      };
     };
     Phase("Primary surface")
     {
      R_Date("Fill of a posthole in the corner of a wall trench building: DIC-2359", 90,
110)
      {
       Outlier();
      };
      After("wall trench fill")
      {
       R_Date("DIC-2358", 630, 45)
       {
        Outlier("Charcoal", 1);
       };
      };
      Phase("pit fill (F12)")
      {
       R_Date("Beta-39233", 590, 60)
       {
        Outlier("Charcoal", 1);
       };
       R_Date("Beta-39232", 840, 80)
       {
        Outlier("Charcoal", 1);
```

```
    };
   };
   After("fill in primary layer")
   {
    R_Date("DIC-2357", 680, 50);
   };
  };
 };
 Sequence("Mound A")
 {
  Phase("upper platform construction")
  {
   R_Date("Grass from turf block from the upper platform (south): Beta-232869",
890, 40);
   R_Date("Grass from turf block from the upper platform (south): Beta-232870",
900, 40);
  };
  Phase(top of upper platform)
  {
   R_Date("Charred rush from burnt feature in the conical offset: Beta-237767",
890, 40);
   R_Date("Charred nutshell from roof of structure near conical offset (MA/F2):
Beta-252377", 520, 50);
   R_Date("Base of post mold: Beta-252378", 750, 40)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Pit (MA/F3): Beta-252379", 690, 40)
   {
    Outlier("Charcoal", 1);
   };
  };
 };
 Phase("Palisade")
 {
  First("start palisade");
  sequence("East Village Palisade Sequence")
  {
   Phase("heavy trench")
   {
    After("heavy trench fill")
    {
     R_Date("Beta-278199", 790, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
    R_Date("Bark from posthole: Beta-309046", 770, 30);
   };
   Phase()
```

```
    {
     After("Screen trench fill")
     {
      R_Date("Beta-284695", 670, 40)
      {
       Outlier("Charcoal", 1);
      };
     };
     Phase("EV palisade")
     {
      After("palisade trench fill")
      {
       R_Date("Beta-278197", 530, 40)
       {
        Outlier("Charcoal", 1);
       };
      };
      After("palisade trench fill")
      {
       R_Date("Beta-278198", 790, 40)
       {
        Outlier("Charcoal", 1);
       };
      };
     };
    };
   };
   Phase("inner palisade")
   {
    R_Date("Likely charred post found at the base of the palisade trench: Beta-
234734", 590, 40)
    {
     Outlier("Charcoal", 1);
    };
    After("Palisade trench fill")
    {
     R_Date("Beta-241195", 740, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
    After("Palisade trench fill")
    {
     R_Date("Beta-284696", 1160, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
   };
   After("H-20-A; southwestern palisade trench fill")
```

```
    {
     R_Date("Beta-241194", 890, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
    After("U-9-A palisade trench fill")
    {
     R_Date("Beta-241193", 720, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
    R_Date("Southern outer palisade bastion posthole (O-7-C): Beta-241196", 630,
60)
    {
     Outlier("Charcoal", 1);
    };
    Phase("Northern outer palisade")
    {
     After("palisade trench fill")
     {
      R_Date("Beta-278196", 570, 40)
      {
       Outlier("Charcoal", 1);
      };
     };
     After("palisade trench fill")
     {
      R_Date("Beta-286636", 1090, 40)
      {
       Outlier("Charcoal", 1);
      };
     };
    };
    Last("end palisade");
    Span("span palisade");
   };
   Sequence()
   {
    Phase()
    {
     R_Date("Charred cane in burned soil layer: Beta-309045", 790, 30);
     R_Date("Nutshell from large pit (X-11-B, F37): Beta-234742", 850, 40);
    };
    Date("=EV palisade");
   };
   Sequence()
   {
    Date("=heavy trench");
```

```
 After("Wall trench fill (W-10-D)")
 {
  R_Date("Beta-284697", 550, 40)
  {
   Outlier("Charcoal", 1);
  };
 };
};
Phase("Mound I (O-13-D)")
{
 After("Possible pit (F23) below Mound I")
 {
  R_Date("Disarticulated deer bone: Beta-306318", 620, 30);
 };
 Phase("mound fill (F9)")
 {
  After()
  {
   R_Date("Beta-39234", 750, 50)
   {
    Outlier("Charcoal", 1);
   };
  };
  After()
  {
   R_Date("Beta-39235", 950, 80)
   {
    Outlier("Charcoal", 1);
   };
  };
 };
};
Phase("Unit K, structure")
{
 R_Date("Charred cane from domestic feature: Beta-264811", 760, 40);
 R_Date("daub feature in structure: Beta-234735", 910, 40)
 {
  Outlier("Charcoal", 1);
 };
};
R_Date("Charred cane in Unit M pit: Beta-234736", 700, 40);
R_Date("Feature 3, X-7-D, 3rd Terrace: Beta-313068", 690, 30)
{
};
R_Date("Charred cane in Unit A posthole: Beta-246694", 690, 40)
{
};
R_Date("Nutshell in Unit B small pit: Beta-234738", 660, 40);
Combine("S-11-D, base of pit (F5)")
 {
```

```
    R_Date("Beta-44768", 600, 60)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Beta-44769", 640, 60)
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("Maize from S-11-D House Pit 1: Beta-309052", 630, 30)
   {
   };
   R_Date("Nutshell in Unit G pit: Beta-234739", 610, 40);
   R_Date("Nutshell from deposit near fireclay basin (Unit H): Beta-234737", 590,
40);
   Combine("Base of House Pit 3, S-11-D (F6)")
   {
    R_Date("Beta-44770", 530, 50)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Beta-44771", 570, 50)
    {
     Outlier("Charcoal", 1);
    };
   };
   Combine("Pit (Q-08-C, F24B-1)")
   {
    R_Date("DIC-1024", 510, 50)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Beta-130353", 550, 50)
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("Q-08-C, small pit, Feature 5: DIC-1023", 360, 50)
   {
    Outlier();
   };
   R_Date("Unknown material from possible pit (Q-08-C, F32: Beta-130354", 560,
50);
   Phase("Unit A, structure")
   {
    R_Date("Midden (Unit AD): Beta-246696", 610, 40)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Cane in central habitation area feature: Beta-234743", 590, 40);
```

```
    R_Date("Base of domestic feature: Beta-246695", 570, 40)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Structural feature: Beta-241192", 660, 40)
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("Nutshell in pit (Unit F, F14a): Beta-234740", 490, 40);
  };
  Boundary("end Angel");
};
 };
```

Angel (Alternative model)

```
Plot()
 {
  Sequence()
  {
   Boundary("start Angel");
   Phase("Angel")
   {
    Sequence("Mound F")
    {
     Phase("under primary mound fill")
     {
      R_Date("Grass thatch from the roof of a structure in the inner mound layer of
Mound F: Beta-264865", 910, 40);
      After("Deer bone under primary mound")
      {
       R_Date("Beta-271174", 760, 40);
      };
      R_Date("Post mold fill: Beta-264864", 760, 40);
     };
     Phase("Primary surface")
     {
      R_Date("Fill of a posthole in the corner of a wall trench building: DIC-2359", 90,
110)
      {
       Outlier();
      };
      After("wall trench fill")
      {
       R_Date("DIC-2358", 630, 45);
      };
      Phase("pit fill (F12)")
      {
       R_Date("Beta-39233", 590, 60);
       R_Date("Beta-39232", 840, 80);
      };
      After("fill in primary layer")
      {
       R_Date("DIC-2357", 680, 50);
      };
     };
    };
    Sequence("Mound A")
    {
     Phase("upper platform construction")
     {
      R_Date("Grass from turf block from the upper platform (south): Beta-232869",
890, 40);
      R_Date("Grass from turf block from the upper platform (south): Beta-232870",
```

```
900, 40);
    };
    Phase(top of upper platform)
    {
     R_Date("Charred rush from burnt feature in the conical offset: Beta-237767",
890, 40);
     R_Date("Charred nutshell from roof of structure near conical offset (MA/F2):
Beta-252377", 520, 50);
     R_Date("Base of post mold: Beta-252378", 750, 40);
     R_Date("Pit (MA/F3): Beta-252379", 690, 40);
    };
   };
   Phase("Palisade")
   {
    First("start palisade");
    sequence("East Village Palisade Sequence")
    {
     Phase("heavy trench")
     {
      After("heavy trench fill")
      {
       R_Date("Beta-278199", 790, 40);
      };
      R_Date("Bark from posthole: Beta-309046", 770, 30);
     };
     Phase()
     {
      After("Screen trench fill")
      {
       R_Date("Beta-284695", 670, 40);
      };
      Phase("EV palisade")
      {
       After("palisade trench fill")
       {
        R_Date("Beta-278197", 530, 40);
       };
       After("palisade trench fill")
       {
        R_Date("Beta-278198", 790, 40);
       };
      };
     };
    };
    Phase("inner palisade")
    {
     R_Date("Likely charred post found at the base of the palisade trench: Beta-
234734", 590, 40);
     After("Palisade trench fill")
     {
```

```
     R_Date("Beta-241195", 740, 40);
    };
    After("Palisade trench fill")
    {
     R_Date("Beta-284696", 1160, 40);
    };
   };
   After("H-20-A; southwestern palisade trench fill")
   {
    R_Date("Beta-241194", 890, 40);
   };
   After("U-9-A palisade trench fill")
   {
    R_Date("Beta-241193", 720, 40);
   };
   R_Date("Southern outer palisade bastion posthole (O-7-C): Beta-241196", 630,
60);
   Phase("Northern outer palisade")
   {
    After("palisade trench fill")
    {
     R_Date("Beta-278196", 570, 40);
    };
    After("palisade trench fill")
    {
     R_Date("Beta-286636", 1090, 40);
    };
   };
   Last("end palisade");
   Span("span palisade");
  };
  Sequence()
  {
   Phase()
   {
    R_Date("Charred cane in burned soil layer: Beta-309045", 790, 30);
    R_Date("Nutshell from large pit (X-11-B, F37): Beta-234742", 850, 40);
   };
   Date("=EV palisade");
  };
  Sequence()
  {
   Date("=heavy trench");
   After("Wall trench fill (W-10-D)")
   {
    R_Date("Beta-284697", 550, 40);
   };
  };
  Phase("Mound I (O-13-D)")
  {
```

```
    After("Possible pit (F23) below Mound I")
    {
     R_Date("Disarticulated deer bone: Beta-306318", 620, 30);
    };
    Phase("mound fill (F9)")
    {
     After()
     {
      R_Date("Beta-39234", 750, 50);
     };
     After()
     {
      R_Date("Beta-39235", 950, 80);
     };
    };
   };
   Phase("Unit K, structure")
   {
    R_Date("Charred cane from domestic feature: Beta-264811", 760, 40);
    R_Date("daub feature in structure: Beta-234735", 910, 40);
   };
   R_Date("Charred cane in Unit M pit: Beta-234736", 700, 40);
   R_Date("Feature 3, X-7-D, 3rd Terrace: Beta-313068", 690, 30)
   {
   };
   R_Date("Charred cane in Unit A posthole: Beta-246694", 690, 40)
   {
   };
   R_Date("Nutshell in Unit B small pit: Beta-234738", 660, 40);
   Combine("S-11-D, base of pit (F5)")
   {
    R_Date("Beta-44768", 600, 60);
    R_Date("Beta-44769", 640, 60);
   };
   R_Date("Maize from S-11-D House Pit 1: Beta-309052", 630, 30)
   {
   };
   R_Date("Nutshell in Unit G pit: Beta-234739", 610, 40);
   R_Date("Nutshell from deposit near fireclay basin (Unit H): Beta-234737", 590,
40);
   Combine("Base of House Pit 3, S-11-D (F6)")
   {
    R_Date("Beta-44770", 530, 50);
    R_Date("Beta-44771", 570, 50);
   };
   Combine("Pit (Q-08-C, F24B-1)")
   {
    R_Date("DIC-1024", 510, 50);
    R_Date("Beta-130353", 550, 50);
   };
```

```
    R_Date("Q-08-C, small pit, Feature 5: DIC-1023", 360, 50)
    {
     Outlier();
    };
    After()
    {
     R_Date("Unknown material from possible pit (Q-08-C, F32: Beta-130354", 560,
50);
    };
    Phase("Unit A, structure")
    {
     R_Date("Midden (Unit AD): Beta-246696", 610, 40);
     R_Date("Cane in central habitation area feature: Beta-234743", 590, 40);
     R_Date("Base of domestic feature: Beta-246695", 570, 40);
     R_Date("Structural feature: Beta-241192", 660, 40);
    };
    R_Date("Nutshell in pit (Unit F, F14a): Beta-234740", 490, 40);
   };
   Boundary("end Angel");
};
 };
```

Aztalan

```
Plot()
 {
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence()
  {
   Boundary("Start Aztalan");
   Phase("Aztalan")
   {
    Phase("Structure 11")
    {
     R_Date("Ash dump (F6): DIC-3135", 1130, 55)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("Domestic feature (F10): DIC-3136", 850, 50)
     {
      Outlier("Charcoal", 1);
     };
    };
    R_Date("Rectangular structure posthole: M-1037", 1200, 75)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Pit (F17a): WIS-68", 850, 80)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Ash layer in pit (F1): WIS-63", 820, 80)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Pit (F42): WIS-74", 730, 80)
    {
     Outlier("Charcoal", 1);
    };
    Phase("SW Mound")
    {
     After("13 feet below mound surface")
     {
      R_Date("WIS-160", 840, 70)
      {
       Outlier("Charcoal", 1);
      };
     };
     R_Date("Wooden post from structure on mound: WIS-162", 810, 60)
     {
      Outlier("Charcoal", 1);
     };
```

```
   };
   Phase("NW mound charnel house")
   {
    R_Date("Charred bulrush matting from charnel house: Beta-47JE1/6", 940, 60);
    R_Date("charnel house: M-642", 320, 100)
    {
     Outlier();
    };
   };
   R_Date("Concentration of mussel shells associated with structure 5 (F20): DIC-
3133", 950, 65)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Shallow pit (F5): DIC-3044", 870, 50)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Pit 10 in NE quadrant of site: M-1214", 580, 100)
   {
    Outlier("Charcoal", 1);
   };
   Phase("Str. 1110")
   {
    R_Date("Domestic feature: DIC-3134", 850, 45)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Domestic feature: WIS-73", 820, 60)
    {
     Outlier("Charcoal", 1);
    };
   };
   Sequence("palisade")
   {
    R_Date("Pit (F30): WIS-191", 920, 55)
    {
     Outlier("Charcoal", 1);
    };
    Phase("Palisades")
    {
     First("start palisade");
     R_Date("Preserved post bottom from a bastion (Tower B in I,4): Beta-310904",
940, 30)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("Preserved post bottom from a bastion (Tower B in I,4): Beta-310903",
910, 30)
     {
```

```
      Outlier("Charcoal", 1);
     };
     Last("end palisade");
     Span("span palisade");
    };
   };
  };
  Boundary("End Aztalan");
};
};
```

Aztalan (Alternative model)

```
Plot()
 {
  Sequence()
  {
   Boundary("Start Aztalan");
   Phase("Aztalan")
   {
    Phase("Structure 11")
    {
     R_Date("Ash dump (F6): DIC-3135", 1130, 55)
     {
     };
     R_Date("Domestic feature (F10): DIC-3136", 850, 50)
     {
     };
    };
    R_Date("Rectangular structure posthole: M-1037", 1200, 75)
    {
    };
    R_Date("Pit (F17a): WIS-68", 850, 80)
    {
    };
    R_Date("Ash layer in pit (F1): WIS-63", 820, 80)
    {
    };
    R_Date("Pit (F42): WIS-74", 730, 80)
    {
    };
    Phase("SW Mound")
    {
     After("13 feet below mound surface")
     {
      R_Date("WIS-160", 840, 70)
      {
      };
     };
     R_Date("Wooden post from structure on mound: WIS-162", 810, 60)
     {
     };
    };
    Phase("NW mound charnel house")
    {
     R_Date("Charred bulrush matting from charnel house: Beta-47JE1/6", 940, 60);
     R_Date("charnel house: M-642", 320, 100)
     {
      Outlier();
     };
    };
```

```
   R_Date("Concentration of mussel shells associated with structure 5 (F20): DIC-
3133", 950, 65)
   {
   };
   R_Date("Shallow pit (F5): DIC-3044", 870, 50)
   {
   };
   R_Date("Pit 10 in NE quadrant of site: M-1214", 580, 100)
   {
   };
   Phase("Str. 1110")
   {
    R_Date("Domestic feature: DIC-3134", 850, 45)
    {
    };
    R_Date("Domestic feature: WIS-73", 820, 60)
    {
    };
   };
   Sequence("palisade")
   {
    R_Date("Pit (F30): WIS-191", 920, 55)
    {
    };
    Phase("Palisades")
    {
     First("start palisade");
     R_Date("Preserved post bottom from a bastion (Tower B in I,4): Beta-310904",
940, 30)
     {
     };
     R_Date("Preserved post bottom from a bastion (Tower B in I,4): Beta-310903",
910, 30)
     {
     };
     Last("end palisade");
     Span("span palisade");
    };
   };
  };
  Boundary("End Aztalan");
};
 };
```

Cahokia

```
Plot()
 {
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence()
  {
   Boundary("Start Cahokia");
   Phase("Cahokia")
   {
    Phase("Monks Mound")
    {
     Sequence("1st terrace")
     {
      Phase("buildings under 1st terrace")
      {
       Phase("floor (F114) of small burned building")
       {
        R_Date("Post (post 2): WIS-365", 840, 55)
        {
         Outlier("Charcoal", 1);
        };
        R_Date("Log (log 1): WIS-547", 825, 60)
        {
         Outlier("Charcoal", 1);
        };
       };
       Phase("floor (F113) of large burned building")
       {
        R_Date("Log (log 24): WIS-546", 805, 60)
        {
         Outlier("Charcoal", 1);
        };
        R_Date("Post (post 1): WIS-443", 670, 55)
        {
         Outlier("Charcoal", 1);
        };
       };
       R_Date("burned clay floor (F104): WIS-362", 690, 50)
       {
        Outlier("Charcoal", 1);
       };
       R_Date("burnt sand floor: M-982", 850, 100)
       {
        Outlier("Charcoal", 1);
       };
       R_Date("ash concentration from burned basin (F149): WIS-549", 720, 55)
       {
        Outlier("Charcoal", 1);
       };
```

```
 };
 Phase("1st terrace surface")
 {
  R_Date("burned building (F139) post: WIS-545", 740, 55)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("pit 137: I-2947", 760, 95)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("burned floor of a house (F4), SW edge of mound: M-1637", 670, 100)
  {
   Outlier("Charcoal", 1);
  };
 };
};
Sequence("2nd, 3rd, 4th terraces")
{
 Phase("pre-mound (2nd, 3rd, 4th terraces)")
 {
  After("Feature below Monks Mound.  Material retrieved through coring")
  {
   R_Date("I-2309", 1110, 70)
   {
    Outlier("Charcoal", 1);
   };
  };
  After("Submound feature.  Material retrieved through coring (Core 4).")
  {
   R_Date("Beta-207044", 900, 40)
   {
    Outlier("Charcoal", 1);
   };
  };
  R_Date("Thatch from burnt thatch layer (F284) of a house: WIS-587", 925, 60);
  After("Submound feature.  Material retrieved through coring (Core 1).")
  {
   R_Date("Beta-207040", 960, 60)
   {
    Outlier("Charcoal", 1);
   };
  };
  After("Submound feature.  Material retrieved through coring (Core 3).")
  {
   R_Date("Charred organic material: Beta-207041", 950, 40);
  };
  After("Submound feature.  Material retrieved through coring (Core 1).")
  {
   R_Date("Grass: Beta-207039", 980, 40);
```

```
    };
    After("Submound feature.  Material retrieved through coring (Core 3).")
    {
     R_Date("Beta-207042", 1010, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
    After("Feature at the base of Monks Mound.  Core sample in the 4th terrace
center.")
    {
     R_Date("Unidentified charcoal: ISGS-1252", 960, 40)
     {
     };
    };
   };
   Phase("mound fill")
   {
    After("Monks Mound fill.  Reed's Level L surface.  From fourth terrace.")
    {
     R_Date("Unidentified charcoal: M-1636", 840, 150)
     {
     };
    };
    After("Mound fill.  Core sample from potentially redeposited wood.")
    {
     R_Date("I-2308", 1020, 100)
     {
      Outlier("Charcoal", 1);
     };
    };
    R_Date("grass from sod block: A-1159", 955, 15);
    R_Date("grass from sod block: Beta-241384", 770, 40);
    After("mound fill")
    {
     R_Date("grass: A-1160", 1030, 15);
     R_Date("log: Beta-241385", 960, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
   };
   Phase()
   {
    R_Date("surface deposit with burned material in east lobes: WIS-586", 640, 55)
    {
     Outlier("Charcoal", 1);
    };
    Phase("4th terrace summit")
    {
```

```
      R_Date("post (F1B): WIS-525", 870, 55)
      {
       Outlier("Charcoal", 1);
      };
      R_Date("post (F1H): WIS-527", 890, 60)
      {
       Outlier("Charcoal", 1);
      };
      R_Date("post (Post 6, F26): WIS-528", 970, 65)
      {
       Outlier("Charcoal", 1);
      };
     };
    };
   };
  };
  Combine("Powell Tract: Fire basin (F227) in center of House 15")
  {
   R_Date("M-1293", 1190, 75)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Repeat of M-1293: WIS-58", 1000, 65)
   {
    Outlier("Charcoal", 1);
   };
  };
  R_Date("Powell Tract: House 13 refuse pit: ISGS-163", 1170, 80)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("Powell Tract: House 21 floor: M-1294", 1125, 75)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("Powell Tract: charred layer of floor (F234) of House 26: M-1292", 1055,
75)
  {
   Outlier("Charcoal", 1);
  };
  Phase("Powell Tract: Pit (F331)")
  {
   R_Date("Maize: ISGS-141", 780, 150);
   R_Date("Squash seeds: ISGS-140", 1000, 75);
   R_Date("Nut shell: ISGS-130", 950, 75);
  };
  R_Date("Tract 15B (Burial 2): A-1523", 655, 15);
  R_Date("Tract 15B (Burial 4): A-1525", 945, 15);
  R_Date("Tract 15B: floor of House 77: M-1335", 765, 200)
  {
```

```
 Outlier("Charcoal", 1);
};
Phase("Tract 15B: floor of House 43")
{
 R_Date("M-1332", 515, 100)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("ISGS-3832", 600, 70)
 {
  Outlier("Charcoal", 1);
 };
};
R_Date("Tract 15B: log associated with burned House 48: ISGS-3831", 590, 70)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15B: central floor area of House 44: M-1333", 825, 100)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15B: House 113: M-1336", 885, 200)
{
 Outlier("Charcoal", 1);
};
Phase("Tract 15B: logs associated with burned House 59")
{
 R_Date("ISGS-3836", 630, 70)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("ISGS-3835", 670, 70)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("M-1334", 385, 90)
 {
  Outlier("Charcoal", 1);
 };
};
Phase("Merrell Tract: large refuse pit (F341)")
{
 R_Date("ISGS-3826", 530, 70)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("ISGS-3823", 610, 70)
 {
  Outlier("Charcoal", 1);
 };
```

```
    R_Date("ISGS-3824", 600, 70)
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("Merrell Tract: garbage layer (F306) in fill of house basin: ISGS-276",
860, 80)
   {
    Outlier("Charcoal", 1);
   };
   Phase("Merrell Tract: floor of old house (F319)")
   {
    R_Date("ISGS-281", 1080, 80)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("ISGS-283", 1220, 80)
    {
     Outlier();
    };
    R_Date("unidentified organic material: ISGS-280", 1050, 80);
   };
   Phase("Merrell Tract: smudge pit (F349)")
   {
    R_Date("maize: ISGS-3829", 560, 70);
    R_Date("maize: ISGS-3830", 650, 70);
    R_Date("maize: ISGS-3825", 420, 70);
   };
   Sequence()
   {
    Phase("palisade sequence & Ramey Field structures")
    {
     Phase("House 4")
     {
      R_Date("support beam: WIS-493", 810, 45)
      {
       Outlier("Charcoal", 1);
      };
      R_Date("timber on floor: WIS-495", 850, 50)
      {
       Outlier("Charcoal", 1);
      };
     };
     R_Date("structural timber: WIS-494", 900, 55)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("unknown material from house feature: GX-859", 815, 85);
     R_Date("Midden layer (F-34): Beta-148266", 950, 40)
     {
```

```
      Outlier("Charcoal", 1);
     };
    };
    Phase("Palisade")
    {
     First("start palisade");
     R_Date("upright burned post (F28) in Palisade IV trench: WIS-444", 750, 55)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("log associated with Palisade IV trench: WIS-359", 690, 55)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("post associated with south palisade: WIS-366", 890, 55)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("post in west palisade wall trench (F-33): Beta-148265", 780, 70)
     {
      Outlier("Charcoal", 1);
     };
     After("West palisade wall trench (F-43 & F-42)")
     {
      R_Date("Beta-150315", 960, 70)
      {
       Outlier("Charcoal", 1);
      };
      R_Date("Beta-148263", 880, 40)
      {
       Outlier("Charcoal", 1);
      };
     };
     Last("end palisade");
     Span("span palisade");
    };
   };
   R_Date("refuse basin (F-60) in west palisade excavation area: Beta-148269", 1120,
70)
   {
    Outlier("Charcoal", 1);
   };
   Phase("Mound 34")
   {
    Phase("basin in clay floor of burned house")
    {
     R_Date("M-672", 480, 100)
     {
      Outlier("Charcoal", 1);
     };
```

```
 R_Date("M-670", 960, 250)
 {
  Outlier("Charcoal", 1);
 };
};
R_Combine("pit underneath the slope of Mound 34")
{
 R_Date("Unidentified charred miscellaneous plant material: M-33A", 700, 300);
 R_Date("Repeat of M33A: M-33B", 900, 300);
};
R_Date("lowest level of refuse pit: M-636", 660, 200)
{
 Outlier("Charcoal", 1);
};
R_Date("remnants of a ceremonial fire: M-635", 670, 200)
{
 Outlier("Charcoal", 1);
};
After("Pre-mound "refuse pit" (F3) below Mound 34")
{
 R_Date("deer humerus: A-1447", 870, 15);
};
Phase("copper workshop house (F82)")
{
 After("pit (F75)")
 {
  R_Date("Disarticulated deer rib: A-1448", 640, 15);
  R_Date("Disarticulated deer innominate (pubis): A-1450", 645, 15);
 };
 After("pit (F74)")
 {
  R_Date("Disarticulated deer sternum fragment: A-1449", 630, 20);
 };
};
};
After("Tract 15A: House 32.  Sample from 0.2 feet above floor, 1.7 feet below
surface.")
{
 R_Date("M-1338", 725, 100)
 {
  Outlier("Charcoal", 1);
 };
};
Sequence("Tract 15A post circles")
{
 Phase("Post Circle 2")
 {
  Combine("Post pit (F618)")
  {
   R_Date("outer rings of wood: WIS-1133", 890, 60)
```

```
 {
  Outlier("Charcoal", 1);
 };
 R_Date("repeat of WIS-1133: WIS-1136", 990, 60)
 {
  Outlier("Charcoal", 1);
 };
};
Phase("Post pit (F548)")
{
 R_Date("WIS-948", 1085, 55)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("WIS-969", 1060, 55)
 {
  Outlier("Charcoal", 1);
 };
};
Combine("Post pit (F601)")
{
 R_Date("Outer rings of wood: WIS-1128", 940, 60)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("repeat of WIS-1128: WIS-1130", 920, 60)
 {
  Outlier("Charcoal", 1);
 };
};
};
Phase("Post Circle 3")
{
 R_Date("large pit (F340): WIS-976", 760, 55)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("post pit (F506): WIS-984", 685, 55)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("from fill of post pits (F174 and F369): M-1341", 905, 120)
 {
  Outlier("Charcoal", 1);
 };
};
R_Date("Post Circle 4, large pit (F539): WIS-988", 1135, 55)
{
 Outlier("Charcoal", 1);
};
```

```
};
R_Date("Tract 15A: floor of house 74: M-1340", 1025, 110)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: refuse pit (F289): I-2014", 1000, 100)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: refuse pit (F368): I-2070", 990, 135)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: refuse pit (F338): I-2016", 980, 90)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: woodland refuse pit: I-2012", 910, 100)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: House 205: I-9458", 940, 75)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: burned posts in wall trench of House 2: M-1337", 805, 100)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: refuse pit (F153): I-2069", 875, 105)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: pit (F297): I-2013", 920, 100)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: pit (F401): I-9459", 990, 75)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: House 209: I-9460", 980, 75)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: pit (F311): GX-926", 1135, 80)
{
 Outlier("Charcoal", 1);
};
R_Date("Tract 15A: House 407: I-9457", 880, 75)
```

```
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Tract 15A: House 212: I-9464", 440, 75)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Tract 15A: wall trench structure (F108): I-2015", 1060, 90)
   {
    Outlier("Charcoal", 1);
   };
   After("Tract 15A: Sample from 0.3 feet above floor of House 35")
   {
    R_Date("M-1339", 685, 100)
    {
    };
   };
   R_Date("Interpretive Center Tract II: F79 (Zone A): Beta-19474", 970, 60)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: F304 (Zone A): Beta-19486", 1320, 80)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: F455 (Zone A): Beta-19492", 1050, 70)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: F320 (Zone A): Beta-19487", 1050, 70)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: F374 (Zone A): Beta-19490", 1010, 60)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: structure (F92, Zone B): Beta-19475", 1100,
70)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: structure (F287, Zone B): Beta-19485", 960,
60)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: F17 (Zone A): Beta-19473", 960, 100)
   {
    Outlier("Charcoal", 1);
```

```
   };
   Phase("Interpretive Center Tract II: floor of burned structure (F178, Zone A)")
   {
    R_Date("Beta-19480", 950, 60)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Beta-19478", 940, 80)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("log found on floor: Beta-19479", 1030, 70)
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("Interpretive Center Tract II: F242 (Zone A): Beta-19484", 930, 80)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Interpretive Center Tract II: thatch from F379 (Zone A): Beta-19491",
880, 80);
   Sequence("Mound 51")
   {
    R_Date("thatch from water laid material outside pit found below base of mound:
M-1784", 910, 110);
    Phase("mound fill")
    {
     After("stratum H fill")
     {
      R_Date("deer bone: WIS-352", 800, 65);
      R_Date("nut shell hull: WIS-389", 900, 50);
     };
     After("stratum G fill")
     {
      R_Date("nut shell hull: WIS-390", 890, 55);
      R_Date("deer bone: WIS-355", 680, 60);
     };
     After("stratum F fill")
     {
      R_Date("charred thatch: GX-950", 1145, 65);
      R_Date("deer bone: WIS-351", 780, 60);
      R_Date("charred thatch: ISGS-2573", 760, 95);
     };
     After("stratum E fill")
     {
      R_Date("deer bone: WIS-350", 750, 50);
     };
     After("stratum D2 fill")
     {
```

```
     R_Date("deer bone: WIS-360", 815, 60);
     R_Date("nut shell hull: WIS-391", 850, 65);
    };
    After("stratum D1 fill")
    {
     R_Date("deer bone: WIS-356", 810, 50);
    };
   };
  };
  Phase("Mound 72")
  {
   Phase("bottom of post pit (F1)")
   {
    R_Date("cribbing log A: WIS-298", 1020, 55)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("cribbing log B: WIS-293", 970, 50)
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("North midden (F205) in Mound 72: WIS-447", 1015, 60)
   {
   };
   R_Date("Pole from burial 210 (F229): WIS-575", 920, 60)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("central midden (F227): WIS-492", 900, 55)
   {
    Outlier("Charcoal", 1);
   };
  };
  After("potentially residual material in post molds of a structure in Village Level V
of Mound 55.")
  {
   R_Date("unidentified charcoal and maize: M-1290", 600, 75)
   {
   };
  };
  After("Top of wall trench (west) fill of House 3 in airport area.")
  {
   R_Date("M-1296", 725, 75)
   {
    Outlier("Charcoal", 1);
   };
  };
  R_Date("pit (F1) in airport area: M-1297", 675, 75);
 };
```

```
   Boundary("End Cahokia");
};
 };
```

Cahokia (Alternative model)

```
Plot()
 {
  Sequence()
  {
   Boundary("Start Cahokia");
   Phase("Cahokia")
   {
    Phase("Monks Mound")
    {
     Sequence("1st terrace")
     {
      Phase("buildings under 1st terrace")
      {
       Phase("floor (F114) of small burned building")
       {
        R_Date("Post (post 2): WIS-365", 840, 55);
        R_Date("Log (log 1): WIS-547", 825, 60);
       };
       Phase("floor (F113) of large burned building")
       {
        R_Date("Log (log 24): WIS-546", 805, 60);
        R_Date("Post (post 1): WIS-443", 670, 55);
       };
       R_Date("burned clay floor (F104): WIS-362", 690, 50);
       R_Date("burnt sand floor: M-982", 850, 100);
       R_Date("ash concentration from burned basin (F149): WIS-549", 720, 55);
      };
      Phase("1st terrace surface")
      {
       R_Date("burned building (F139) post: WIS-545", 740, 55);
       R_Date("pit 137: I-2947", 760, 95);
       After()
       {
        R_Date("burned floor of a house (F4), SW edge of mound: M-1637", 670, 100);
       };
      };
     };
     Sequence("2nd, 3rd, 4th terraces")
     {
      Phase("pre-mound (2nd, 3rd, 4th terraces)")
      {
       After("Feature below Monks Mound.  Material retrieved through coring")
       {
        R_Date("I-2309", 1110, 70);
       };
       After("Submound feature.  Material retrieved through coring (Core 4).")
       {
        R_Date("Beta-207044", 900, 40);
```

```
    };
    R_Date("Thatch from burnt thatch layer (F284) of a house: WIS-587", 925, 60);
    After("Submound feature.  Material retrieved through coring (Core 1).")
    {
     R_Date("Beta-207040", 960, 60);
    };
    After("Submound feature.  Material retrieved through coring (Core 3).")
    {
     R_Date("Charred organic material: Beta-207041", 950, 40);
    };
    After("Submound feature.  Material retrieved through coring (Core 1).")
    {
     R_Date("Grass: Beta-207039", 980, 40);
    };
    After("Submound feature.  Material retrieved through coring (Core 3).")
    {
    };
    After("Feature at the base of Monks Mound.  Core sample in the 4th terrace
center.")
    {
     R_Date("Unidentified charcoal: ISGS-1252", 960, 40)
     {
     };
    };
   };
   Phase("mound fill")
   {
    After("Monks Mound fill.  Reed's Level L surface.  From fourth terrace.")
    {
     R_Date("Unidentified charcoal: M-1636", 840, 150)
     {
     };
    };
    After("Mound fill.  Core sample from potentially redeposited wood.")
    {
     R_Date("I-2308", 1020, 100);
    };
    R_Date("grass from sod block: A-1159", 955, 15);
    R_Date("grass from sod block: Beta-241384", 770, 40)
    {
     Outlier();
    };
    After("mound fill")
    {
     R_Date("grass: A-1160", 1030, 15);
     R_Date("log: Beta-241385", 960, 40);
    };
   };
   Phase()
   {
```

```
    R_Date("surface deposit with burned material in east lobes: WIS-586", 640, 55);
    Phase("4th terrace summit")
    {
     R_Date("post (F1B): WIS-525", 870, 55);
     R_Date("post (F1H): WIS-527", 890, 60);
     R_Date("post (Post 6, F26): WIS-528", 970, 65);
    };
   };
  };
 };
 After()
 {
  Combine("Powell Tract: Fire basin (F227) in center of House 15")
  {
   R_Date("M-1293", 1190, 75);
   R_Date("Repeat of M-1293: WIS-58", 1000, 65);
  };
 };
 R_Date("Powell Tract: House 13 refuse pit: ISGS-163", 1170, 80);
 After()
 {
  R_Date("Powell Tract: House 21 floor: M-1294", 1125, 75);
 };
 After()
 {
  R_Date("Powell Tract: charred layer of floor (F234) of House 26: M-1292", 1055,
75);
 };
 Phase("Powell Tract: Pit (F331)")
 {
  After()
  {
   R_Date("Maize: ISGS-141", 780, 150);
  };
  R_Date("Squash seeds: ISGS-140", 1000, 75);
  R_Date("Nut shell: ISGS-130", 950, 75);
 };
 R_Date("Tract 15B (Burial 2): A-1523", 655, 15);
 R_Date("Tract 15B (Burial 4): A-1525", 945, 15);
 R_Date("Tract 15B: floor of House 77: M-1335", 765, 200);
 Phase("Tract 15B: floor of House 43")
 {
  R_Date("M-1332", 515, 100);
  R_Date("ISGS-3832", 600, 70);
 };
 R_Date("Tract 15B: log associated with burned House 48: ISGS-3831", 590, 70);
 R_Date("Tract 15B: central floor area of House 44: M-1333", 825, 100);
 After()
 {
  R_Date("Tract 15B: House 113: M-1336", 885, 200);
```

```
  };
  Phase("Tract 15B: logs associated with burned House 59")
  {
   R_Date("ISGS-3836", 630, 70);
   R_Date("ISGS-3835", 670, 70);
   R_Date("M-1334", 385, 90);
  };
  Phase("Merrell Tract: large refuse pit (F341)")
  {
   R_Date("ISGS-3826", 530, 70);
   R_Date("ISGS-3823", 610, 70);
   R_Date("ISGS-3824", 600, 70);
  };
  After()
  {
   R_Date("Merrell Tract: garbage layer (F306) in fill of house basin: ISGS-276",
860, 80);
  };
  After("Merrell Tract: floor of old house (F319)")
  {
   R_Date("ISGS-281", 1080, 80);
   R_Date("ISGS-283", 1220, 80);
   R_Date("unidentified organic material: ISGS-280", 1050, 80);
  };
  Phase("Merrell Tract: smudge pit (F349)")
  {
   R_Date("maize: ISGS-3829", 560, 70);
   R_Date("maize: ISGS-3830", 650, 70);
   R_Date("maize: ISGS-3825", 420, 70);
  };
  Sequence()
  {
   Phase("palisade sequence & Ramey Field structures")
   {
    Phase("House 4")
    {
     R_Date("support beam: WIS-493", 810, 45);
     R_Date("timber on floor: WIS-495", 850, 50);
    };
    R_Date("structural timber: WIS-494", 900, 55);
    After()
    {
     R_Date("unknown material from house feature: GX-859", 815, 85);
    };
    After()
    {
     R_Date("Midden layer (F-34): Beta-148266", 950, 40);
    };
   };
   Phase("Palisade")
```

```
    {
     First("start palisade");
     R_Date("upright burned post (F28) in Palisade IV trench: WIS-444", 750, 55);
     R_Date("log associated with Palisade IV trench: WIS-359", 690, 55);
     R_Date("post associated with south palisade: WIS-366", 890, 55);
     After()
     {
      R_Date("post in west palisade wall trench (F-33): Beta-148265", 780, 70);
     };
     After("West palisade wall trench (F-43 & F-42)")
     {
      R_Date("Beta-150315", 960, 70);
      R_Date("Beta-148263", 880, 40);
     };
     Last("end palisade");
     Span("span palisade");
    };
   };
   R_Date("refuse basin (F-60) in west palisade excavation area: Beta-148269", 1120,
70);
   Phase("Mound 34")
   {
    Phase("basin in clay floor of burned house")
    {
     After()
     {
      R_Date("M-672", 480, 100);
     };
     R_Date("M-670", 960, 250);
    };
    After()
    {
     R_Combine("pit underneath the slope of Mound 34")
     {
      R_Date("Unidentified charred miscellaneous plant material: M-33A", 700, 300);
      R_Date("Repeat of M33A: M-33B", 900, 300);
     };
    };
    After()
    {
     R_Date("lowest level of refuse pit: M-636", 660, 200);
    };
    R_Date("remnants of a ceremonial fire: M-635", 670, 200);
    After("Pre-mound "refuse pit" (F3) below Mound 34")
    {
     R_Date("deer humerus: A-1447", 870, 15);
    };
    Phase("copper workshop house (F82)")
    {
     After("pit (F75)")
```

```
    {
     R_Date("Disarticulated deer rib: A-1448", 640, 15);
     R_Date("Disarticulated deer innominate (pubis): A-1450", 645, 15);
    };
    After("pit (F74)")
    {
     R_Date("Disarticulated deer sternum fragment: A-1449", 630, 20);
    };
   };
  };
  After("Tract 15A: House 32.  Sample from 0.2 feet above floor, 1.7 feet below
surface.")
  {
   R_Date("M-1338", 725, 100);
  };
  Sequence("Tract 15A post circles")
  {
   Phase("Post Circle 2")
   {
    Combine("Post pit (F618)")
    {
     R_Date("outer rings of wood: WIS-1133", 890, 60);
     R_Date("repeat of WIS-1133: WIS-1136", 990, 60);
    };
    Phase("Post pit (F548)")
    {
     R_Date("WIS-948", 1085, 55);
     R_Date("WIS-969", 1060, 55);
    };
    Combine("Post pit (F601)")
    {
     R_Date("Outer rings of wood: WIS-1128", 940, 60);
     R_Date("repeat of WIS-1128: WIS-1130", 920, 60);
    };
   };
   Phase("Post Circle 3")
   {
    R_Date("large pit (F340): WIS-976", 760, 55);
    R_Date("post pit (F506): WIS-984", 685, 55);
    R_Date("from fill of post pits (F174 and F369): M-1341", 905, 120);
   };
   R_Date("Post Circle 4, large pit (F539): WIS-988", 1135, 55)
   {
    Outlier();
   };
  };
  R_Date("Tract 15A: floor of house 74: M-1340", 1025, 110);
  R_Date("Tract 15A: refuse pit (F289): I-2014", 1000, 100);
  R_Date("Tract 15A: refuse pit (F368): I-2070", 990, 135);
  R_Date("Tract 15A: refuse pit (F338): I-2016", 980, 90);
```

```
R_Date("Tract 15A: woodland refuse pit: I-2012", 910, 100);
After()
{
 R_Date("Tract 15A: House 205: I-9458", 940, 75);
};
R_Date("Tract 15A: burned posts in wall trench of House 2: M-1337", 805, 100);
R_Date("Tract 15A: refuse pit (F153): I-2069", 875, 105);
R_Date("Tract 15A: pit (F297): I-2013", 920, 100);
R_Date("Tract 15A: pit (F401): I-9459", 990, 75);
After()
{
 R_Date("Tract 15A: House 209: I-9460", 980, 75);
};
R_Date("Tract 15A: pit (F311): GX-926", 1135, 80);
After()
{
 R_Date("Tract 15A: House 407: I-9457", 880, 75);
};
After()
{
 R_Date("Tract 15A: House 212: I-9464", 440, 75);
};
After()
{
 R_Date("Tract 15A: wall trench structure (F108): I-2015", 1060, 90);
};
After("Tract 15A: Sample from 0.3 feet above floor of House 35")
{
 R_Date("M-1339", 685, 100)
 {
 };
};
After()
{
 R_Date("Interpretive Center Tract II: F79 (Zone A): Beta-19474", 970, 60);
};
After()
{
 R_Date("Interpretive Center Tract II: F304 (Zone A): Beta-19486", 1320, 80);
};
After()
{
 R_Date("Interpretive Center Tract II: F455 (Zone A): Beta-19492", 1050, 70);
};
After()
{
 R_Date("Interpretive Center Tract II: F320 (Zone A): Beta-19487", 1050, 70);
};
After()
{
```

```
    R_Date("Interpretive Center Tract II: F374 (Zone A): Beta-19490", 1010, 60);
   };
   After()
   {
    R_Date("Interpretive Center Tract II: structure (F92, Zone B): Beta-19475", 1100,
70);
   };
   After()
   {
    R_Date("Interpretive Center Tract II: structure (F287, Zone B): Beta-19485", 960,
60);
   };
   After()
   {
    R_Date("Interpretive Center Tract II: F17 (Zone A): Beta-19473", 960, 100);
   };
   Phase("Interpretive Center Tract II: floor of burned structure (F178, Zone A)")
   {
    R_Date("Beta-19480", 950, 60);
    R_Date("Beta-19478", 940, 80);
    R_Date("log found on floor: Beta-19479", 1030, 70);
   };
   After()
   {
    R_Date("Interpretive Center Tract II: F242 (Zone A): Beta-19484", 930, 80);
   };
   After()
   {
    R_Date("Interpretive Center Tract II: thatch from F379 (Zone A): Beta-19491",
880, 80);
   };
   Sequence("Mound 51")
   {
    After()
    {
     R_Date("thatch from water laid material outside pit found below base of mound:
M-1784", 910, 110);
    };
    Phase("mound fill")
    {
     After("stratum H fill")
     {
      R_Date("deer bone: WIS-352", 800, 65);
      R_Date("nut shell hull: WIS-389", 900, 50);
     };
     After("stratum G fill")
     {
      R_Date("nut shell hull: WIS-390", 890, 55);
      R_Date("deer bone: WIS-355", 680, 60);
     };
```

```
    After("stratum F fill")
    {
     R_Date("charred thatch: GX-950", 1145, 65);
     R_Date("deer bone: WIS-351", 780, 60);
     R_Date("charred thatch: ISGS-2573", 760, 95);
    };
    After("stratum E fill")
    {
     R_Date("deer bone: WIS-350", 750, 50);
    };
    After("stratum D2 fill")
    {
     R_Date("deer bone: WIS-360", 815, 60);
     R_Date("nut shell hull: WIS-391", 850, 65);
    };
    After("stratum D1 fill")
    {
     R_Date("deer bone: WIS-356", 810, 50);
    };
   };
  };
  Phase("Mound 72")
  {
   Phase("bottom of post pit (F1)")
   {
    R_Date("cribbing log A: WIS-298", 1020, 55);
    R_Date("cribbing log B: WIS-293", 970, 50);
   };
   After()
   {
    R_Date("North midden (F205) in Mound 72: WIS-447", 1015, 60)
    {
    };
   };
   R_Date("Pole from burial 210 (F229): WIS-575", 920, 60);
   After()
   {
    R_Date("central midden (F227): WIS-492", 900, 55);
   };
  };
  After("potentially residual material in post molds of a structure in Village Level V
of Mound 55.")
  {
   R_Date("unidentified charcoal and maize: M-1290", 600, 75)
   {
   };
  };
  After("Top of wall trench (west) fill of House 3 in airport area.")
  {
   R_Date("M-1296", 725, 75);
```

```
    };
    After()
    {
     R_Date("pit (F1) in airport area: M-1297", 675, 75);
    };
   };
   Boundary("End Cahokia");
};
 };
```

Etowah

```
Plot()
 {
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence()
  {
   Boundary("Start Etowah");
   Phase()
   {
    Sequence("Mound C")
    {
     R_Date("Unidentified charcoal from large midden filled pit (F19): M-1064", 850,
150);
     Phase("Mound C burials")
     {
      R_Date("timber in a collapsed log tomb of Burial 38: M-402", 725, 200)
      {
       Outlier("Charcoal", 1);
      };
      Phase("Burial 57")
      {
       R_Date("timber in a collapsed log tomb: M-542", 910, 200)
       {
        Outlier("Charcoal", 1);
       };
       R_Date("shell from under the shoulders of Burial 57: M-543", 500, 250);
      };
      R_Date("Unidentified charcoal from Burial no. 155: M-1061", 670, 200)
      {
      };
      R_Date("Charred wood from Burial no. 164: M-1062", 450, 200)
      {
       Outlier("Charcoal", 1);
      };
     };
     After("surface of mantle no. 2")
     {
      R_Date("Unidentified burnt vegetable material: M-1060", 225, 150)
      {
      };
     };
    };
    Phase("Saucer 1 fill")
    {
     R_Date("Soot removed from sherds: Beta-144161", 990, 40)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("Soot removed from sherds: Beta-145489", 1000, 40)
```

```
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("Saucer 2 fill: Soot removed from sherds: Beta-144162", 830, 40)
   {
    Outlier("Charcoal", 1);
   };
   Phase("Saucer 3 fill")
   {
    R_Date("Soot removed from sherds: Beta-144164", 810, 40)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Soot removed from sherds: Beta-145491", 900, 40)
    {
     Outlier("Charcoal", 1);
    };
   };
   Phase("Saucer 4 fill")
   {
    R_Date("Soot removed from sherds: Beta-144163", 850, 40)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Soot removed from sherds: Beta-145490", 1080, 40)
    {
     Outlier("Charcoal", 1);
    };
   };
   R_Date("Black Midden fill: Soot removed from sherds: Beta-144811", 1080, 40)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Soot removed from the surface of a sherd from a midden associated with
Structure 1: Beta-145488", 1540, 50)
   {
    Outlier("Charcoal", 1);
   };
   Phase("Fill of a small platform (Orange Layer, F64A)")
   {
    After()
    {
     R_Date("maize: Beta-67942", 740, 70);
    };
    After()
    {
     R_Date("Beta-67943", 680, 70)
     {
      Outlier("Charcoal", 1);
```

```
    };
   };
  };
  After("Fill of a small platform (Orange Layer, F64B)")
  {
   R_Date("maize: Beta-67944", 560, 50);
  };
  Phase("Palisade")
  {
   First("start palisade");
   R_Date("Post (different from Beta-134793) from palisade trench: Beta-134792",
748, 60)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Palisade post (different from Beta-134792) from palisade trench: Beta-
134793", 879, 70)
   {
    Outlier("Charcoal", 1);
   };
   Last("end palisade");
   Span("palisade span");
  };
 };
 Boundary("End Etowah");
};
```

Etowah (Alternative model)

```
Plot()
 {
  Sequence()
  {
   Boundary("Start Etowah");
   Phase()
   {
    Sequence("Mound C")
    {
     After()
     {
      R_Date("Unidentified charcoal from large midden filled pit (F19): M-1064", 850,
150);
     };
     Phase("Mound C burials")
     {
      R_Date("timber in a collapsed log tomb of Burial 38: M-402", 725, 200);
      Phase("Burial 57")
      {
       R_Date("timber in a collapsed log tomb: M-542", 910, 200);
       After()
       {
        R_Date("shell from under the shoulders of Burial 57: M-543", 500, 250);
       };
      };
      After()
      {
       R_Date("Unidentified charcoal from Burial no. 155: M-1061", 670, 200)
       {
       };
      };
      R_Date("Charred wood from Burial no. 164: M-1062", 450, 200);
     };
     After("surface of mantle no. 2")
     {
      R_Date("Unidentified burnt vegetable material: M-1060", 225, 150)
      {
      };
     };
    };
    Phase("Saucer 1 fill")
    {
     R_Date("Soot removed from sherds: Beta-144161", 990, 40);
     R_Date("Soot removed from sherds: Beta-145489", 1000, 40);
    };
    R_Date("Saucer 2 fill: Soot removed from sherds: Beta-144162", 830, 40);
    Phase("Saucer 3 fill")
    {
```

```
    R_Date("Soot removed from sherds: Beta-144164", 810, 40);
    R_Date("Soot removed from sherds: Beta-145491", 900, 40);
   };
   Phase("Saucer 4 fill")
   {
    R_Date("Soot removed from sherds: Beta-144163", 850, 40);
    R_Date("Soot removed from sherds: Beta-145490", 1080, 40);
   };
   R_Date("Black Midden fill: Soot removed from sherds: Beta-144811", 1080, 40);
   R_Date("Soot removed from the surface of a sherd from a midden associated with
Structure 1: Beta-145488", 1540, 50);
   Phase("Fill of a small platform (Orange Layer, F64A)")
   {
    After()
    {
     R_Date("maize: Beta-67942", 740, 70);
    };
    After()
    {
     R_Date("Beta-67943", 680, 70);
    };
   };
   After("Fill of a small platform (Orange Layer, F64B)")
   {
    R_Date("maize: Beta-67944", 560, 50);
   };
   Phase("Palisade")
   {
    First("start palisade");
    R_Date("Post (different from Beta-134793) from palisade trench: Beta-134792",
748, 60);
    R_Date("Palisade post (different from Beta-134792) from palisade trench: Beta-
134793", 879, 70);
    Last("end palisade");
    Span("palisade span");
   };
  };
  Boundary("End Etowah");
};
 };
```

Kincaid

```
Plot()
 {
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence("Mississippian Occupation")
  {
   Boundary("Start Kincaid");
   Phase(Kincaid village)
   {
    Sequence("Mx°4")
    {
     After("premound level, context not provided")
     {
      Combine("dendro sample")
      {
       R_Date("UGa-3455", 850, 65)
       {
        Outlier("Charcoal", 1);
       };
       R_Date("UGa-3456", 890, 65)
       {
        Outlier("Charcoal", 1);
       };
       R_Date("UGa-3457", 950, 70)
       {
        Outlier("Charcoal", 1);
       };
      };
     };
     Phase("houses")
     {
      R_Date("maize from House III (FXIII): Beta-178763", 780, 40);
      R_Date("House 1 (F7), occupation level 4: DIC-903", 1110, 65)
      {
       Outlier("Charcoal", 1);
      };
     };
    };
    After("Mx°2, large basin (F10)")
    {
     Combine()
     {
      R_Date("Beta-191044a", 1060, 50)
      {
       Outlier("Charcoal", 1);
      };
      R_Date("Beta-191044b", 910, 40)
      {
       Outlier("Charcoal", 1);
```

```
    };
   };
  };
  R_Date("thatch from structure (F6): UGAMS-4695", 870, 25);
  Sequence("West Mound")
  {
   After("submound deposit")
   {
    R_Date("thatch: Beta-216287", 800, 40);
   };
   Phase()
   {
    R_Date("charred debris of a thatch roof (F9) in the upper level of the mound:
Beta-216288", 600, 40)
    {
    };
    R_Date("fragments of log or post from structure 1 in the mound area: Beta-
216289", 780, 40)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("fragments of log or post from structure 2 in the mound area: Beta-
216290", 740, 50)
    {
     Outlier("Charcoal", 1);
    };
   };
  };
  Phase("Mx°8 circular structure")
  {
   R_Date("post in wall trench: Beta-237479", 650, 40)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("central post pit (F4): Beta-261304", 610, 60)
   {
    Outlier("Charcoal", 1);
   };
  };
  R_Date("wall post (F1) of house on main plaza: UGAMS-4607", 620, 25)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("charred remains of a house (F8) on the last construction phase of mound
(Mx°10): DIC-904", 660, 55)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("log tomb in Burial Mound (Pp°2): M-888", 675, 75)
  {
```

```
    Outlier("Charcoal", 1);
   };
   R_Date("timber from burned structure in the lowest level of mound (Mx°1A-41):
DIC-393", 630, 65)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("maize from large pit with abundant maize on mound (Mx°1E): UGAMS-
6685", 810, 25);
   Phase("palisades")
   {
    First("start palisade");
    R_Date("palisade post from trench of north palisade: Beta-221835", 810, 60)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("palisade post from trench of western-most palisade: UGAMS-4606", 870,
25)
    {
     Outlier("Charcoal", 1);
    };
    Phase("Western palisade")
    {
     R_Date("palisade post from palisade trench: Beta-221833", 610, 50)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("palisade post from palisade trench: Beta-221834", 680, 70)
     {
      Outlier("Charcoal", 1);
     };
    };
    Last("end palisade");
    Span("span palisades");
   };
  };
  Boundary("End Kincaid");
};
 };
```

Kincaid (Alternative model)

```
Plot()
 {
  Sequence("Mississippian Occupation")
  {
   Boundary("Start Kincaid");
   Phase(Kincaid village)
   {
    Sequence("Mx°4")
    {
     After("premound level, context not provided")
     {
      Combine("dendro sample")
      {
       R_Date("UGa-3455", 850, 65);
       R_Date("UGa-3456", 890, 65);
       R_Date("UGa-3457", 950, 70);
      };
     };
     Phase("houses")
     {
      R_Date("maize from House III (FXIII): Beta-178763", 780, 40);
      R_Date("House 1 (F7), occupation level 4: DIC-903", 1110, 65)
      {
       Outlier();
      };
     };
    };
    After("Mx°2, large basin (F10)")
    {
     Combine()
     {
      R_Date("Beta-191044a", 1060, 50);
      R_Date("Beta-191044b", 910, 40);
     };
    };
    R_Date("thatch from structure (F6): UGAMS-4695", 870, 25);
    Sequence("West Mound")
    {
     After("submound deposit")
     {
      R_Date("thatch: Beta-216287", 800, 40);
     };
     Phase()
     {
      R_Date("charred debris of a thatch roof (F9) in the upper level of the mound:
Beta-216288", 600, 40)
      {
      };
```

```
     R_Date("fragments of log or post from structure 1 in the mound area: Beta-
216289", 780, 40);
     R_Date("fragments of log or post from structure 2 in the mound area: Beta-
216290", 740, 50);
    };
   };
   Phase("Mx°8 circular structure")
   {
    R_Date("post in wall trench: Beta-237479", 650, 40);
    R_Date("central post pit (F4): Beta-261304", 610, 60);
   };
   R_Date("wall post (F1) of house on main plaza: UGAMS-4607", 620, 25);
   After()
   {
    R_Date("charred remains of a house (F8) on the last construction phase of mound
(Mx°10): DIC-904", 660, 55);
   };
   R_Date("log tomb in Burial Mound (Pp°2): M-888", 675, 75);
   R_Date("timber from burned structure in the lowest level of mound (Mx°1A-41):
DIC-393", 630, 65);
   R_Date("maize from large pit with abundant maize on mound (Mx°1E): UGAMS-
6685", 810, 25);
   Phase("palisades")
   {
    First("start palisade");
    R_Date("palisade post from trench of north palisade: Beta-221835", 810, 60);
    R_Date("palisade post from trench of western-most palisade: UGAMS-4606", 870,
25);
    Phase("Western palisade")
    {
     R_Date("palisade post from palisade trench: Beta-221833", 610, 50);
     R_Date("palisade post from palisade trench: Beta-221834", 680, 70);
    };
    Last("end palisade");
    Span("span palisades");
   };
  };
  Boundary("End Kincaid");
};
 };
```

Moundville

```
Plot()
 {
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence()
  {
   Boundary("Start Moundville");
   Phase("Moundville")
   {
    R_Date("Structure 17 posthole: Uga-1662", 485, 160)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("cane from cache of burned botanical material in Mound W (105R3-R4):
Uga-1661", 690, 85);
    Sequence("NR 6N2W South Wall.")
    {
     R_Date("Pit house floor shown in profile: Beta-1485", 990, 65)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("Possible midden or pit house fill: Beta-1290", 930, 80)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("Floor layer: Beta-1106", 1010, 80)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("Midden: Beta-1289", 930, 80)
     {
      Outlier("Charcoal", 1);
     };
     Phase("fallen wall debris in daub layer")
     {
      R_Date("DIC-1241", 120, 60)
      {
       Outlier();
      };
      R_Date("DIC-1243", 690, 60)
      {
       Outlier("Charcoal", 1);
      };
     };
    };
    R_Date("SCB deposit, base of midden zone: Beta-1107", 875, 80)
    {
     Outlier("Charcoal", 1);
    };
```

```
Phase("ECB Tract")
{
 First("start ECB Tract");
 After("Southern palisade trench fill (F29)")
 {
  R_Date("Beta-53767", 650, 60)
  {
   Outlier("Charcoal", 1);
  };
 };
 Sequence()
 {
  Phase()
  {
   After("Palisade trench fill (F169) north of structures")
   {
    R_Date("Beta-53393", 1100, 110)
    {
     Outlier("Charcoal", 1);
    };
   };
   After("Bastion trench fill (F159)")
   {
    R_Date("Beta-53392", 1270, 90)
    {
     Outlier("Charcoal", 1);
    };
   };
   After("Palisade trench fill (F173)")
   {
    R_Date("Beta-53768", 780, 90)
    {
     Outlier("Charcoal", 1);
    };
   };
  };
  Phase("Pit (F45)")
  {
   R_Date("Beta-53389", 880, 70)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("Beta-53388", 670, 80)
   {
    Outlier("Charcoal", 1);
   };
  };
 };
 R_Date("Pit (F19) within structure 4: Beta-53382", 720, 120);
 Phase("Burial 8 (burial pit, F26)")
```

```
    {
     R_Date("matting from around the head of burial: Beta-53383", 640, 90);
     R_Date("matting from around the head of burial: Beta-53766", 770, 60);
    };
    R_Date("Burial 9 (burial pit, F73), matting from around the head of burial: Beta-
53391", 490, 80);
    Last("end ECB Tract");
    Span("span ECB Tract");
   };
   R_Date("PA Tract: Unknown material in isolated midden-filled depression (F5):
Beta-537668", 580, 70);
   R_Date("PA Tract: Unknown material in midden-filled depression (F110)
associated with Structure 5.: Beta-53771", 820, 80);
   R_Date("PA Tract: Pit (F9) associated with Structures 1, 2, and 6: Beta-53770",
940, 90)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("PA Tract: Midden-filled depression (F15) associated with Structures 1, 2,
and 6: Beta-53398", 940, 70)
   {
    Outlier("Charcoal", 1);
   };
   Phase("PA Tract: floor of semi-subterranean (structure 3)")
   {
    R_Date("unknown material: Beta-53400", 840, 70);
    R_Date("unknown material: Beta-53401", 1100, 70)
    {
     Outlier();
    };
   };
   Phase("Mound Q")
   {
    sequence("construction stages")
    {
     Phase("Stage II (summit)")
     {
      R_Date("Partially preserved hearth (F128) possibly associated with Structure 3:
Beta-86994", 850, 130)
      {
       Outlier("charcoal", 1);
      };
      After("Wall trench (F34) associated with Structure 4")
      {
       R_Date("Beta-82816", 640, 70)
       {
        Outlier("Charcoal", 1);
       };
      };
      After("Wall trench (F23) associated with Structure 1")
```

```
 {
  R_Date("Beta-86993", 480, 80)
  {
   Outlier("Charcoal", 1);
  };
 };
 After("wall trench (F77) associated with Structure 2")
 {
  R_Date("Beta-79971", 450, 60)
  {
   Outlier("Charcoal", 1);
  };
 };
};
Phase("Stage III")
{
 R_Date("midden: Beta-44468", 760, 80)
 {
  Outlier("charcoal", 1);
 };
 After("summit (Stage IIIA)")
 {
  R_Date("Beta-44473", 790, 60)
  {
   Outlier("Charcoal", 1);
  };
 };
};
Phase("Stage IV")
{
 R_Date("midden: Beta-44469", 720, 70)
 {
  Outlier("charcoal", 1);
 };
 R_Date("midden: Beta-44471", 650, 60)
 {
  Outlier("charcoal", 1);
 };
 R_Date("midden: Beta-44470", 850, 70)
 {
  Outlier("charcoal", 1);
 };
};
};
sequence("north flank midden")
{
 Phase("Level I")
 {
  R_Date("Beta-79973", 570, 50)
  {
```

```
   Outlier("charcoal", 1);
  };
  R_Date("Beta-79972", 550, 60)
  {
   Outlier("charcoal", 1);
  };
 };
 Phase("Level 4")
 {
  R_Date("Beta-44467", 770, 70)
  {
   Outlier("charcoal", 1);
  };
  R_Date("Beta-44472", 530, 60)
  {
   Outlier("charcoal", 1);
  };
  R_Date("Beta-44466", 510, 60)
  {
   Outlier("charcoal", 1);
  };
 };
};
};
sequence("Mound E")
{
 R_Date("premound house basin (F2), old humus zone: Beta-71694", 860, 60)
 {
  Outlier("charcoal", 1);
 };
 After("Stage I")
 {
  R_Date("log retrieved through core: Beta-137378", 840, 60);
  R_Date("erosional sand wash (F34): Beta-71695", 700, 70);
 };
 Phase("Stage II")
 {
  R_Date("hearth (F7), organic zone: Beta-79969", 310, 70)
  {
   Outlier("charcoal", 1);
  };
  R_Date("flank midden: Beta-71697", 660, 70)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("large posthole (F4): Beta-71696", 940, 90)
  {
   Outlier("charcoal", 1);
  };
  After()
```

```
    {
     R_Date("post insertion ramp (F26): Beta-79967", 790, 50)
     {
      Outlier("charcoal", 1);
     };
    };
    After("wall trench (F42) of structure 3")
    {
     R_Date("Beta-79968", 570, 70)
     {
     };
    };
    R_Date("cane from smudge pit (F75), associated with structure 2: Beta-115822",
340, 80);
    R_Date("organic zone (Stage IIA): Beta-115827", 650, 60)
    {
     Outlier("charcoal", 1);
    };
    R_Date("hearth in Stage IIA, organic zone: Beta-79970", 470, 40)
    {
     Outlier("charcoal", 1);
    };
   };
   Phase("Stage III")
   {
    Phase("structure I (Stage IIIA)")
    {
     R_Date("Outer rings of charred log in daub concentration (F2): Beta-115826",
320, 60)
     {
      Outlier("Charcoal", 1);
     };
     R_Date("Daub concentration: Beta-79966", 360, 50)
     {
      Outlier("Charcoal", 1);
     };
    };
    R_Date("Post pit (F8, Stage IIIA): Beta-79965", 590, 80)
    {
     Outlier("charcoal", 1);
    };
    Sequence("midden")
    {
     R_Date("lower section of midden: Beta-115825", 900, 60)
     {
      Outlier("charcoal", 1);
     };
     R_Date("upper section of midden: Beta-115824", 470, 40)
     {
      Outlier("charcoal", 1);
```

```
  };
 };
};
};
sequence("Mound R")
{
 R_Date("premound pit (F4): Beta-71693", 1040, 80)
 {
  Outlier("charcoal", 1);
 };
 Phase("Stage I (burned summit)")
 {
  R_Date("Beta-71685", 650, 60)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("Beta-115819", 1020, 110)
  {
   Outlier("Charcoal", 1);
  };
 };
 Phase("Stage II")
 {
  R_Date("burned summit: Beta-71686", 1140, 90)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("burned summit: Beta-115828", 740, 50)
  {
   Outlier("Charcoal", 1);
  };
  R_Date("downslope flank deposit (F10): Beta-115821", 790, 50)
  {
   Outlier("Charcoal", 1);
  };
 };
 Phase("stage III")
 {
  After()
  {
   R_Date("summit fill: Beta-71688", 1920, 130)
   {
    Outlier("Charcoal", 1);
   };
   R_Date("wall trench: Beta-71687", 930, 90)
   {
    Outlier("Charcoal", 1);
   };
  };
  R_Date("architectural feature: Beta-115820", 970, 90)
```

```
 {
  Outlier();
 };
};
Phase("Stage IV")
{
 After()
 {
  R_Date("fill near summit: Beta-71689", 510, 60)
  {
   Outlier("charcoal", 1);
  };
 };
 R_Date("charred layer: Beta-115823", 570, 60)
 {
  Outlier("charcoal", 1);
 };
 R_Date("flank midden: Beta-71690", 1160, 120)
 {
  Outlier("charcoal", 1);
 };
 R_Date("flank midden: Beta-82815", 520, 60)
 {
  Outlier("charcoal", 1);
 };
};
Phase("Stage V")
{
 R_Date("charred layer: Beta-71691", 640, 60)
 {
  Outlier("charcoal", 1);
 };
 R_Date("flank midden: Beta-71692", 500, 60)
 {
  Outlier("charcoal", 1);
 };
};
};
sequence("Mound F")
{
 After("Stage I")
 {
 R_Date("fill, lower zone: Beta-71698", 750, 70)
  {
  Outlier("Charcoal", 1);
 };
 R_Date("fill, lower zone: Beta-71699", 780, 60)
 {
  Outlier("Charcoal", 1);
 };
```

```
 R_Date("fill, upper zone: Beta-71700", 800, 70)
 {
  Outlier("Charcoal", 1);
 };
 R_Date("fill, upper zone: Beta-71701", 700, 80)
 {
  Outlier("Charcoal", 1);
 };
};
R_Date("Stage III flank midden: Beta-71702", 880, 60)
{
 Outlier("charcoal", 1);
};
};
sequence("Mound G")
{
 After("fill of old humus layer")
 {
 R_Date("Beta-71708", 1010, 80)
  {
  Outlier("charcoal", 1);
 };
};
R_Date("Stage I midden, lower flank: Beta-71709", 740, 50)
{
 Outlier("Charcoal", 1);
};
Phase("Stage II")
{
 R_Date("midden, summit: Beta-71704", 640, 70)
  {
  Outlier("charcoal", 1);
 };
 R_Date("midden, lower flank: Beta-71710", 780, 50)
 {
  Outlier("charcoal", 1);
 };
 After("fill, summit")
 {
  R_Date("Beta-71703", 640, 50);
 };
};
Phase("Stage III")
{
 After("fill, summit")
 {
  R_Date("Beta-71705", 660, 60);
 };
 R_Date("midden, lower flank: Beta-71711", 580, 50)
 {
```

```
    Outlier("charcoal", 1);
   };
  };
  After("stage IV fill, summit")
  {
   R_Date("Beta-71706", 510, 60);
  };
 };
 Phase("Mound V")
 {
  After("fill of east berm, structure 1 (F8)")
  {
   R_Date("Beta-161959", 590, 60)
   {
   };
  };
  Phase("structure 1b")
  {
   R_Date("roof support post (F33): Beta-161962", 540, 50)
   {
    Outlier("charcoal", 1);
   };
   R_Date("roof beam: Beta-161961", 240, 60)
   {
    Outlier("charcoal", 1);
   };
  };
  R_Date("corner post of structure 2: Beta-161960", 570, 60)
  {
   Outlier("charcoal", 1);
  };
 };
};
Boundary("End Moundville");
};
};
```

Moundville (Alternative model)

```
Plot()
 {
  Sequence()
  {
   Boundary("Start Moundville");
   Phase("Moundville")
   {
    R_Date("Structure 17 posthole: Uga-1662", 485, 160);
    R_Date("cane from cache of burned botanical material in Mound W (105R3-R4):
Uga-1661", 690, 85);
    Sequence("NR 6N2W South Wall.")
    {
     R_Date("Pit house floor shown in profile: Beta-1485", 990, 65);
     R_Date("Possible midden or pit house fill: Beta-1290", 930, 80);
     R_Date("Floor layer: Beta-1106", 1010, 80);
     R_Date("Midden: Beta-1289", 930, 80);
     Phase("fallen wall debris in daub layer")
     {
      R_Date("DIC-1241", 120, 60)
      {
       Outlier();
      };
      R_Date("DIC-1243", 690, 60);
     };
    };
    R_Date("SCB deposit, base of midden zone: Beta-1107", 875, 80);
    Phase("ECB Tract")
    {
     First("start ECB Tract");
     After("Southern palisade trench fill (F29)")
     {
      R_Date("Beta-53767", 650, 60);
     };
     Sequence()
     {
      Phase()
      {
       After("Palisade trench fill (F169) north of structures")
       {
        R_Date("Beta-53393", 1100, 110);
       };
       After("Bastion trench fill (F159)")
       {
        R_Date("Beta-53392", 1270, 90);
       };
       After("Palisade trench fill (F173)")
       {
        R_Date("Beta-53768", 780, 90);
```

```
     };
    };
    After("Pit (F45)")
    {
     R_Date("Beta-53389", 880, 70);
     R_Date("Beta-53388", 670, 80);
    };
   };
   R_Date("Pit (F19) within structure 4: Beta-53382", 720, 120);
   Phase("Burial 8 (burial pit, F26)")
   {
    R_Date("matting from around the head of burial: Beta-53383", 640, 90);
    R_Date("matting from around the head of burial: Beta-53766", 770, 60);
   };
   R_Date("Burial 9 (burial pit, F73), matting from around the head of burial: Beta-
53391", 490, 80);
   Last("end ECB Tract");
   Span("span ECB Tract");
  };
  After()
  {
   R_Date("PA Tract: Unknown material in isolated midden-filled depression (F5):
Beta-537668", 580, 70);
  };
  After()
  {
   R_Date("PA Tract: Unknown material in midden-filled depression (F110)
associated with Structure 5.: Beta-53771", 820, 80);
  };
  After()
  {
   R_Date("PA Tract: Pit (F9) associated with Structures 1, 2, and 6: Beta-53770",
940, 90);
  };
  After()
  {
   R_Date("PA Tract: Midden-filled depression (F15) associated with Structures 1, 2,
and 6: Beta-53398", 940, 70);
  };
  After("PA Tract: floor of semi-subterranean (structure 3)")
  {
   R_Date("unknown material: Beta-53400", 840, 70);
   R_Date("unknown material: Beta-53401", 1100, 70)
   {
    Outlier();
   };
  };
  Phase("Mound Q")
  {
   sequence("construction stages")
```

```
    {
     Phase("Stage II (summit)")
     {
      R_Date("Partially preserved hearth (F128) possibly associated with Structure 3:
Beta-86994", 850, 130);
      After("Wall trench (F34) associated with Structure 4")
      {
       R_Date("Beta-82816", 640, 70);
      };
      After("Wall trench (F23) associated with Structure 1")
      {
       R_Date("Beta-86993", 480, 80);
      };
      After("wall trench (F77) associated with Structure 2")
      {
       R_Date("Beta-79971", 450, 60)
       {
        Outlier();
       };
      };
     };
     Phase("Stage III")
     {
      After()
      {
       R_Date("midden: Beta-44468", 760, 80);
      };
      After("summit (Stage IIIA)")
      {
       R_Date("Beta-44473", 790, 60);
      };
     };
     Phase("Stage IV")
     {
      R_Date("midden: Beta-44469", 720, 70);
      R_Date("midden: Beta-44471", 650, 60);
      After()
      {
       R_Date("midden: Beta-44470", 850, 70);
      };
     };
    };
    sequence("north flank midden")
    {
     Phase("Level I")
     {
      R_Date("Beta-79973", 570, 50);
      R_Date("Beta-79972", 550, 60);
     };
     Phase("Level 4")
```

```
    {
     After()
     {
      R_Date("Beta-44467", 770, 70);
     };
     R_Date("Beta-44472", 530, 60);
     R_Date("Beta-44466", 510, 60);
    };
   };
  };
  sequence("Mound E")
  {
   R_Date("premound house basin (F2), old humus zone: Beta-71694", 860, 60);
   After("Stage I")
   {
    R_Date("log retrieved through core: Beta-137378", 840, 60);
    R_Date("erosional sand wash (F34): Beta-71695", 700, 70);
   };
   Phase("Stage II")
   {
    R_Date("hearth (F7), organic zone: Beta-79969", 310, 70)
    {
     Outlier();
    };
    R_Date("flank midden: Beta-71697", 660, 70);
    After()
    {
     R_Date("large posthole (F4): Beta-71696", 940, 90);
    };
    After()
    {
     R_Date("post insertion ramp (F26): Beta-79967", 790, 50);
    };
    After("wall trench (F42) of structure 3")
    {
     R_Date("Beta-79968", 570, 70)
     {
     };
    };
    R_Date("cane from smudge pit (F75), associated with structure 2: Beta-115822",
340, 80)
    {
     Outlier();
    };
    R_Date("organic zone (Stage IIA): Beta-115827", 650, 60);
    R_Date("hearth in Stage IIA, organic zone: Beta-79970", 470, 40)
    {
     Outlier();
    };
   };
```

```
    Phase("Stage III")
    {
     Phase("structure I (Stage IIIA)")
     {
      R_Date("Outer rings of charred log in daub concentration (F2): Beta-115826",
320, 60);
      R_Date("Daub concentration: Beta-79966", 360, 50);
     };
     R_Date("Post pit (F8, Stage IIIA): Beta-79965", 590, 80);
     Sequence("midden")
     {
      After()
      {
       R_Date("lower section of midden: Beta-115825", 900, 60);
      };
      R_Date("upper section of midden: Beta-115824", 470, 40);
     };
    };
   };
   sequence("Mound R")
   {
    R_Date("premound pit (F4): Beta-71693", 1040, 80);
    Phase("Stage I (burned summit)")
    {
     R_Date("Beta-71685", 650, 60)
     {
      Outlier();
     };
     R_Date("Beta-115819", 1020, 110);
    };
    Phase("Stage II")
    {
     After()
     {
      R_Date("burned summit: Beta-71686", 1140, 90);
     };
     R_Date("burned summit: Beta-115828", 740, 50);
     R_Date("downslope flank deposit (F10): Beta-115821", 790, 50);
    };
    Phase("stage III")
    {
     After()
     {
      R_Date("summit fill: Beta-71688", 1920, 130);
      R_Date("wall trench: Beta-71687", 930, 90);
     };
     R_Date("architectural feature: Beta-115820", 970, 90)
     {
      Outlier();
     };
```

```
};
Phase("Stage IV")
{
 After()
 {
  R_Date("fill near summit: Beta-71689", 510, 60);
 };
 R_Date("charred layer: Beta-115823", 570, 60);
 After()
 {
  R_Date("flank midden: Beta-71690", 1160, 120);
 };
 R_Date("flank midden: Beta-82815", 520, 60);
};
Phase("Stage V")
{
 R_Date("charred layer: Beta-71691", 640, 60);
 R_Date("flank midden: Beta-71692", 500, 60);
};
};
sequence("Mound F")
{
 After("Stage I")
 {
 R_Date("fill, lower zone: Beta-71698", 750, 70);
 R_Date("fill, lower zone: Beta-71699", 780, 60);
 R_Date("fill, upper zone: Beta-71700", 800, 70);
 R_Date("fill, upper zone: Beta-71701", 700, 80);
 };
 R_Date("Stage III flank midden: Beta-71702", 880, 60);
};
sequence("Mound G")
{
 After("fill of old humus layer")
 {
 R_Date("Beta-71708", 1010, 80);
 };
 R_Date("Stage I midden, lower flank: Beta-71709", 740, 50);
 Phase("Stage II")
 {
 R_Date("midden, summit: Beta-71704", 640, 70);
 R_Date("midden, lower flank: Beta-71710", 780, 50);
 After("fill, summit")
 {
  R_Date("Beta-71703", 640, 50);
 };
 };
 Phase("Stage III")
 {
 After("fill, summit")
```

```
    {
     R_Date("Beta-71705", 660, 60);
    };
    R_Date("midden, lower flank: Beta-71711", 580, 50);
   };
   After("stage IV fill, summit")
   {
    R_Date("Beta-71706", 510, 60);
   };
  };
  Phase("Mound V")
  {
   After("fill of east berm, structure 1 (F8)")
   {
    R_Date("Beta-161959", 590, 60)
    {
    };
   };
   Phase("structure 1b")
   {
    R_Date("roof support post (F33): Beta-161962", 540, 50);
    R_Date("roof beam: Beta-161961", 240, 60)
    {
     Outlier();
    };
   };
   R_Date("corner post of structure 2: Beta-161960", 570, 60);
  };
 };
 Boundary("End Moundville");
};
};
```

Southwind

```
Plot()
 {
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence()
  {
   Boundary("Start Southwind");
   Phase("Southwind")
   {
    Sequence()
    {
     R_Date("Pit (F08-3): Beta-248604", 900, 40)
     {
      Outlier("Charcoal", 1);
     };
     Phase(palisade)
     {
      First("start palisade");
      R_Date("Post mold at the base of the stockade trench (F01-1B): Beta-310905",
520, 30)
      {
       Outlier("Charcoal", 1);
      };
      R_Date("Post mold at the base of the stockade trench (F01-1C): Beta-310906",
850, 30)
      {
       Outlier("Charcoal", 1);
      };
      R_Date("Palisade bastion post mold (F10-02F): Beta-248607", 880, 40)
      {
       Outlier("Charcoal", 1);
      };
      Last("end palisade");
      Span("span palisade");
     };
    };
    R_Date("Circular stain with burnt wood and daub fragments (F04-1): Beta-
248603", 350, 40)
    {
     Outlier();
    };
    R_Date("Circular stain with daub and charcoal fragments (F04-14): Beta-248605",
700, 40)
    {
     Outlier("Charcoal", 1);
    };
    R_Date("Oblong soil stain with daub and charcoal fragments (F05-9): Beta-
248606", 760, 40)
    {
```

```
     Outlier("Charcoal", 1);
    };
    After("Large feature that may be the possible remnants of a rectangular structure
(F04-13)")
    {
     R_Date("Beta-248608", 760, 40)
     {
      Outlier("Charcoal", 1);
     };
    };
    R_Date("maize from smudge pit (PH-WB-21): UGa-4715", 890, 135);
   };
   Boundary("End Southwind");
};
 };
```

Southwind (Alternative model)

```
Plot()
 {
  Sequence()
  {
   Boundary("Start Southwind");
   Phase("Southwind")
   {
    Sequence()
    {
     R_Date("Pit (F08-3): Beta-248604", 900, 40)
     {
     };
     Phase(palisade)
     {
      First("start palisade");
      R_Date("Post mold at the base of the stockade trench (F01-1B): Beta-310905",
520, 30)
      {
      };
      R_Date("Post mold at the base of the stockade trench (F01-1C): Beta-310906",
850, 30)
      {
      };
      R_Date("Palisade bastion post mold (F10-02F): Beta-248607", 880, 40)
      {
      };
      Last("end palisade");
      Span("span palisade");
     };
    };
    R_Date("Circular stain with burnt wood and daub fragments (F04-1): Beta-
248603", 350, 40)
    {
     Outlier();
    };
    R_Date("Circular stain with daub and charcoal fragments (F04-14): Beta-248605",
700, 40)
    {
    };
    R_Date("Oblong soil stain with daub and charcoal fragments (F05-9): Beta-
248606", 760, 40)
    {
    };
    After("Large feature that may be the possible remnants of a rectangular structure
(F04-13)")
    {
     R_Date("Beta-248608", 760, 40)
     {
```

```
    };
   };
   R_Date("maize from smudge pit (PH-WB-21): UGa-4715", 890, 135);
  };
  Boundary("End Southwind");
};
};
```

Appendix D. Description of Bayesian models and results

Angel Mounds

Fifty-six radiocarbon results from Angel Mounds have been modeled (Appendix A). One radiocarbon result (Beta-309046) is from a sample of unidentified bark found in a palisade posthole (W-11-D) in a section of the palisade (East Village heavy trench) superimposed by separate dated palisade section (East Village palisade) and a house dated (Beta-284697) through a wood charcoal (*Acer sp*.) sample from wall trench fill. Three radiocarbon results (Beta-278197, Beta-278198, Beta-284697) from the East Village palisade come from wood charcoal (*Robinia pseudoacacia*, *Carya sp*., and *Acer sp*.) found in palisade trench fill. A different palisade section (East Village screen) shares an architectural relationship with the East Village palisade, suggesting contemporaneity (Black 1967). A radiocarbon result (Beta-284695) from the East Village screen comes from unidentified wood charcoal found in palisade trench fill. A radiocarbon result (Beta-309045) comes from charred cane (*Arundinaria gigantean*) found in a stratum of burned materials (W-10-D) superimposed by the East Village palisade. An additional radiocarbon result comes from unidentified nutshell from a large pit (X-11-B/ Feature 37) that appears to underlie the East Village palisade (Black 1967; Peterson 2010).

A radiocarbon result (Beta-234734) is also available from a large piece of charred wood (*Fraxinus sp.*) found at the base of a palisade trench (M13D/5R3). An additional radiocarbon result (Beta-241196) is from a sample of wood charcoal (*Ulmus rubra)* found in a posthole of a palisade bastion (0-7-C). Seven additional

radiocarbon results (Beta-284695, Beta-241195, Beta-284696, Beta-241193, Beta-278196, Beta-286636, Beta-278199) come from wood charcoal (*Cary sp., Fraxinus sp., Quercus sp.,* and unidentified) found in palisade trench fill. All wood charcoal dates from palisade trench and wall trench fill are modeled as *TPQ* because the origin of the dated wood charcoal is unknown and very well may come from a time prior to palisade construction.

The remaining dated contexts are described in Appendix A and the stratigraphic relationships between samples are shown in Appendix B. Two dates (DIC-2359, DIC-1023) from unidentified wood charcoal were excluded from modeling because they are clear outliers when compared to the other dates due to their much younger age. Six additional dates (M-2, M-4, M-9, M-5, M-7, M-10) were excluded from modeling because they are early Michigan dates run with carbon black and were noted to not be reliable by the Michigan radiocarbon laboratory (Crane and Griffin 1964:8). Additionally, a date (Beta-265981) from residue adhering to the interior surface of a Mississippian pottery sherd is excluded from analysis because it has been found to be an outlier much earlier than the other dates (Reber et al. 2015).

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=86.7) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1215–1285* (*95% probability*; Figure 2; *Angel Mounds: start palisade*), probably in *cal A.D. 1225–1275* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1310–1430* (*95% probability*; Figure 2; *Angel Mounds: end*

palisade), probably in *cal A.D. 1345–1415* (*68% probability*). The palisade is estimated to have lasted for *50–195 years (95% probability*; Figure 3; *Angel Mounds: palisade span*), probably for *85–165 years* (*68% probability)*.

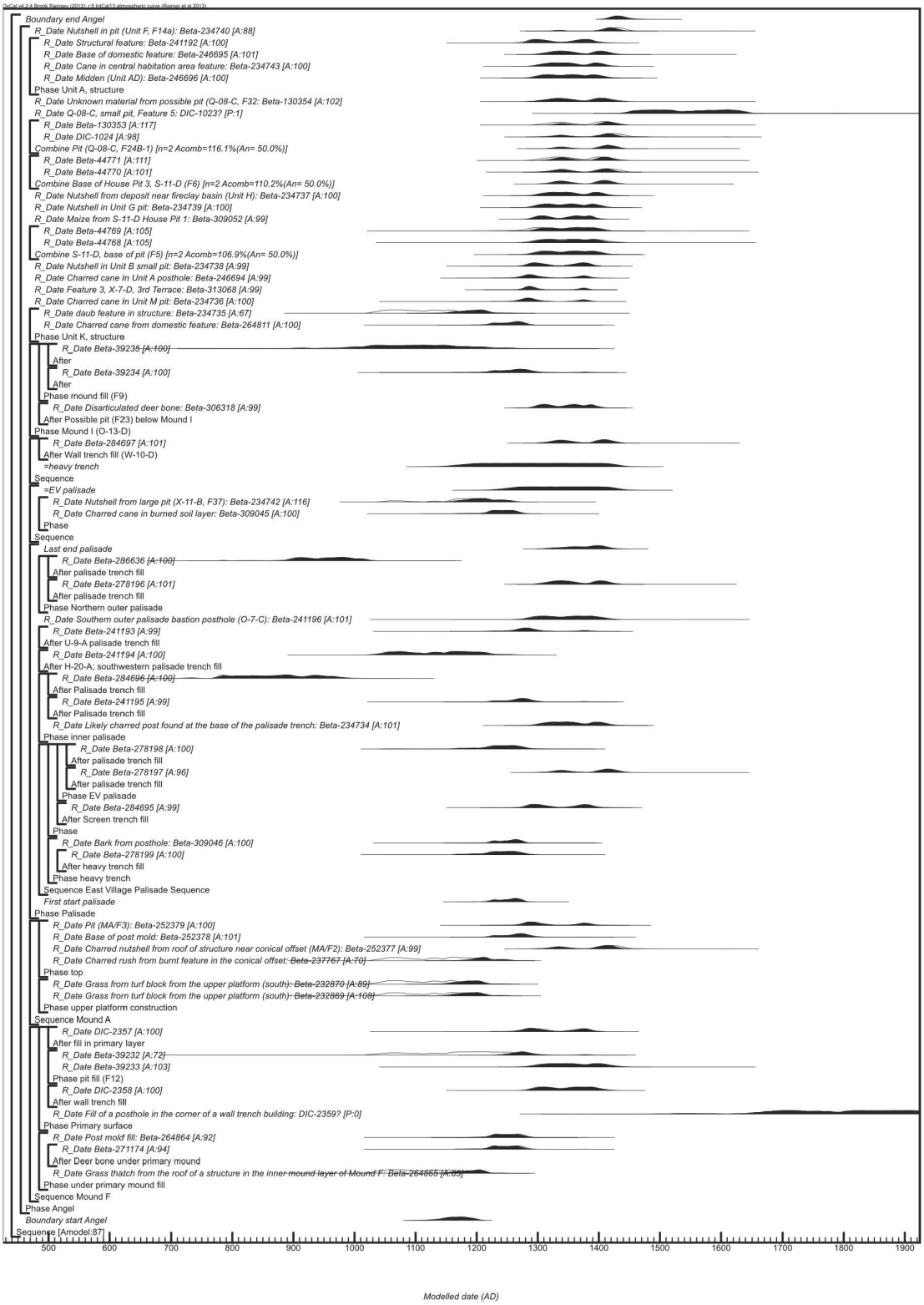

Figure D.1. Results and structure of the primary chronological model for Angel Mounds. The brackets and keywords define the model structure. The outlined distribution is the result of radiocarbon calibration and the solid distributions are the chronological model results

Aztalan

Seventeen radiocarbon results from Aztalan have been modeled (Appendix A). Two of these (Beta-310903, Beta-310904) are from the outer rings of two preserved posts from a palisade bastion (Tower B in 1,4). It is feasible that these two samples are the same age, as the measurements pass a chi-square test (T=0.5; df=1; T'(0.05)=3.8), suggesting that the palisade may have been constructed in the time range of their combined date (cal A.D. 1030–1160, 95% probability). The palisade superimposes a possible pit (Feature 30) dated with a sample of unidentified wood charcoal (WIS-191). The remaining dated contexts are described in Appendix A and the stratigraphic relationships between samples are shown in Appendix B. One result was excluded from modeling (M-642), this sample was submitted for radiocarbon dating in the 1950s to the Michigan laboratory and is a clear outlier when compared to the other dates due to its much younger age.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=82) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1045–1230* (*95% probability;*

Figure 2; *Aztalan: start palisade*), probably in *cal A.D. 1080–1180* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1075–1315* (*95% probability*; Figure 2; *Aztalan: end palisade*), probably in *cal A.D. 1120–1230* (*68% probability*). The palisade is estimated to have lasted for *1–130 years* (*95% probability*; Figure 3; *Aztalan: palisade span*), probably for *1–60 years* (*68% probability)*.

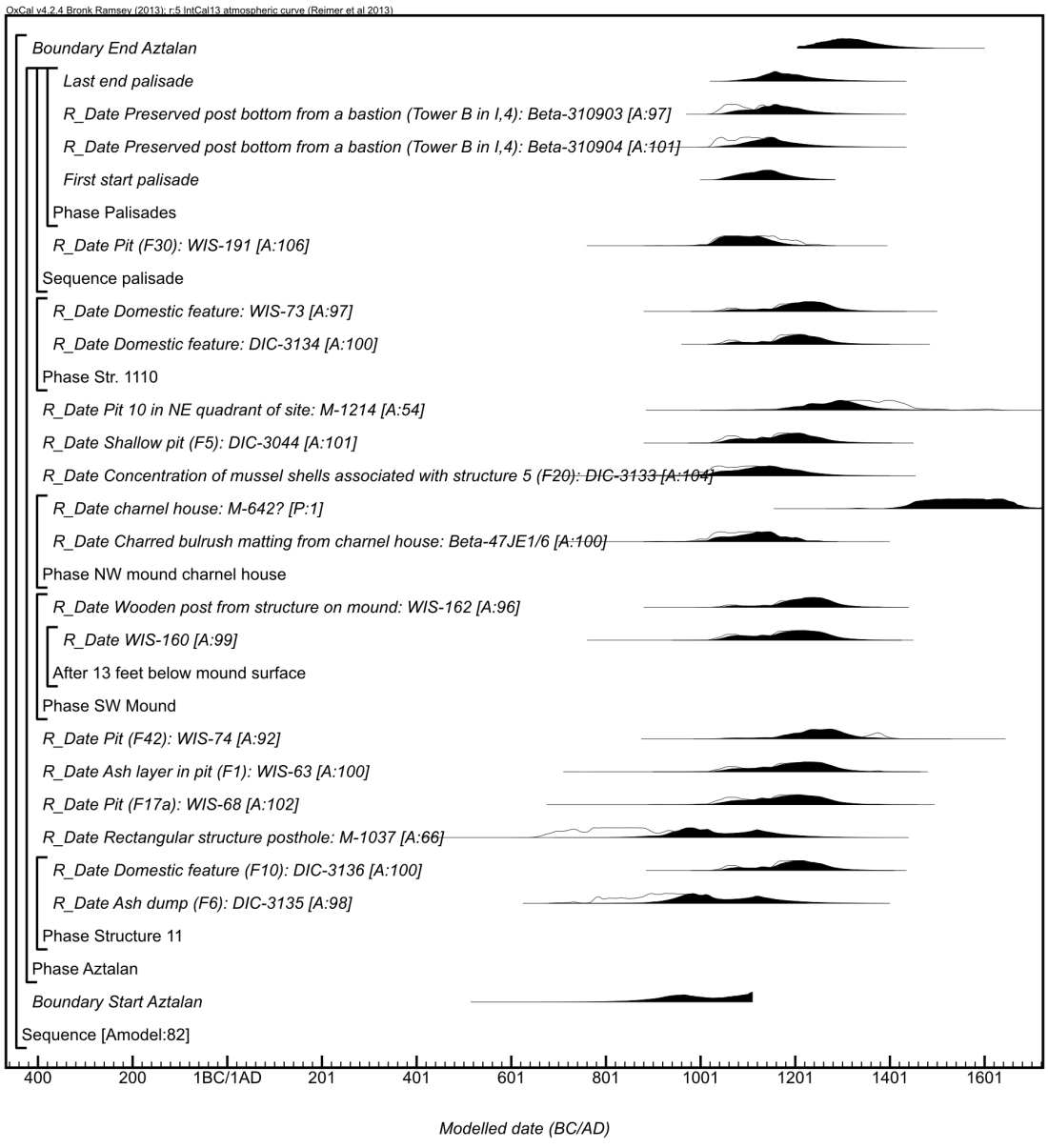

Figure D.2. Results and structure of the primary chronological model for Aztalan. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Cahokia

One hundred forty-four radiocarbon results from Cahokia have been modeled (Appendix A). The palisade is dated through four radiocarbon results from samples of preserved wooden posts (WIS-444, WIS-359, WIS-366, Beta-148265) from different palisade sections and two samples from unidentified charcoal (Beta-150315, Beta-148263) from palisade trench contexts. Three radiocarbon results (WIS-493, WIS-494, WIS-495) are also available from preserved timbers from structures superimposed by the palisade. An additional radiocarbon result (GX-859) is available from unidentified material found in a house feature underlying the palisade (Anderson 1969:92) and a radiocarbon result (Beta-148266) is available from unidentified charcoal from a midden layer superimposed by the palisade (Trubitt 2001; Trubitt and Kelly 2012). The remaining dated contexts are described in Appendix A and the stratigraphic relationships between samples are shown in Appendix B. Two radiocarbon results (ISGS-283, M-1295) from unidentified organic material were excluded from modeling because they are clear outliers when compared to the other dates due to their much older ages and also because exactly what was dated is unclear (Crane and Griffin 1963:236; Fowler 1963:50, 1997:213; Liu et al. 1986:79).

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement

(A_{model}=100.5) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1215–1355* (*95% probability*; Figure 2; *Cahokia: start palisade*), probably in *cal A.D. 1245–1315* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1305–1465* (*95% probability*; Figure 2; *Cahokia: end palisade*), probably in *cal A.D. 1355–1440* (*68% probability*). The palisade is estimated to have lasted for *20–195 years (95% probability*; Figure 3; *Cahokia: palisade span*), probably for *55–150 years* (*68% probability*).

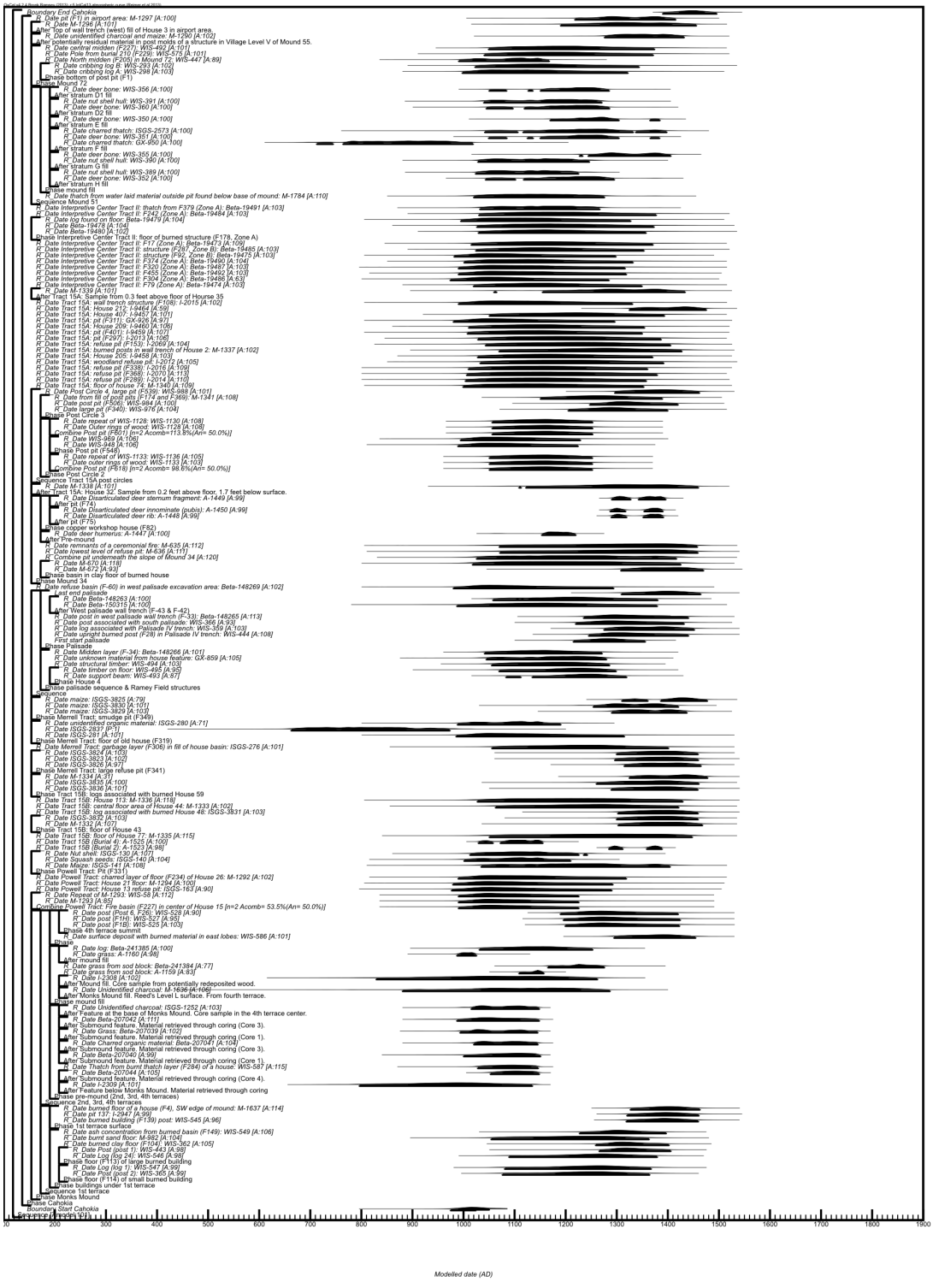

Figure D.3. Results and structure of the primary chronological model for Cahokia. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Etowah

Twenty-one radiocarbon results from Etowah have been modeled (Appendix A). Two of these (Beta-134792, Beta-134793) are from charred wooden palisade posts. The remaining dated contexts are described in Appendix A and the stratigraphic relationships between samples are shown in Appendix B.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=106.9) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1100–1430* (*95% probability*; Figure 2; *Etowah: start palisade*), probably in *cal A.D. 1180–1350* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1230–1590* (*95% probability*; Figure 2; *Etowah: end palisade*), probably in *cal A.D. 1280–1460* (*68% probability*). The palisade is estimated to have lasted for *1–320 years (95% probability*; Figure 3; *Etowah: palisade span*), probably for *1–160 years* (*68% probability*).

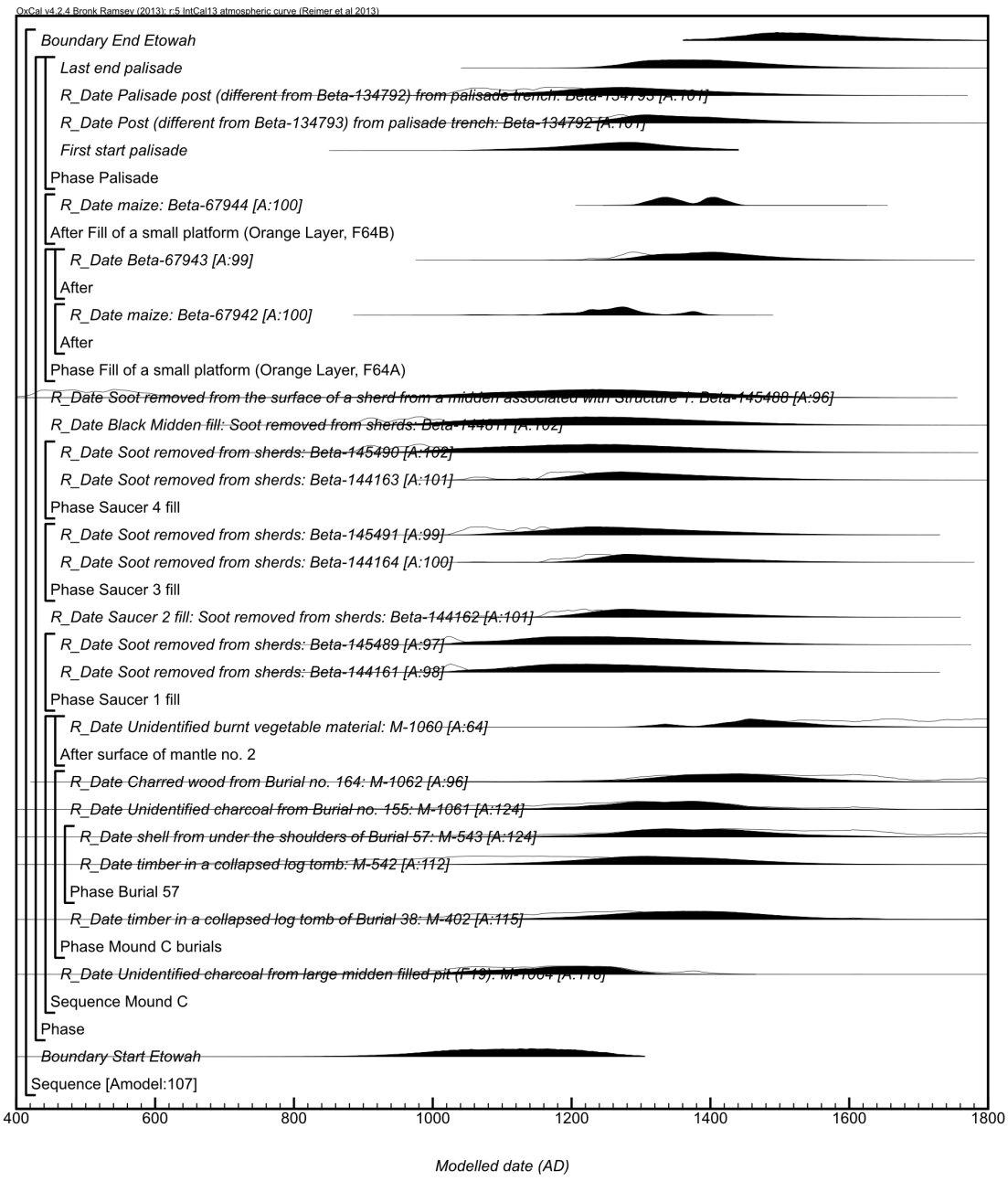

Figure D.4. Results and structure of the primary chronological model for Etowah. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Kincaid

Twenty-three radiocarbon results from Kincaid have been modeled (Appendix A).

Four of these (Beta-221835, UGAMS-4606, Beta-221833, Beta-221834) are from charred wooden palisade posts. The remaining dated contexts are described in Appendix A and the stratigraphic relationships between samples are shown in Appendix B.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=89.4) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1155–1285* (*95% probability*; Figure 2; *Kincaid: start palisade*), probably in *cal A.D. 1175–1245* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1295–1440* (*95% probability*; Figure 2; *Kincaid: end palisade*), probably in *cal A.D. 1325–1405* (*68% probability*). The palisade is estimated to have lasted for *60–240 years (95% probability*; Figure 3; *Kincaid: palisade span*), probably for *105–200 years* (*68% probability)*.

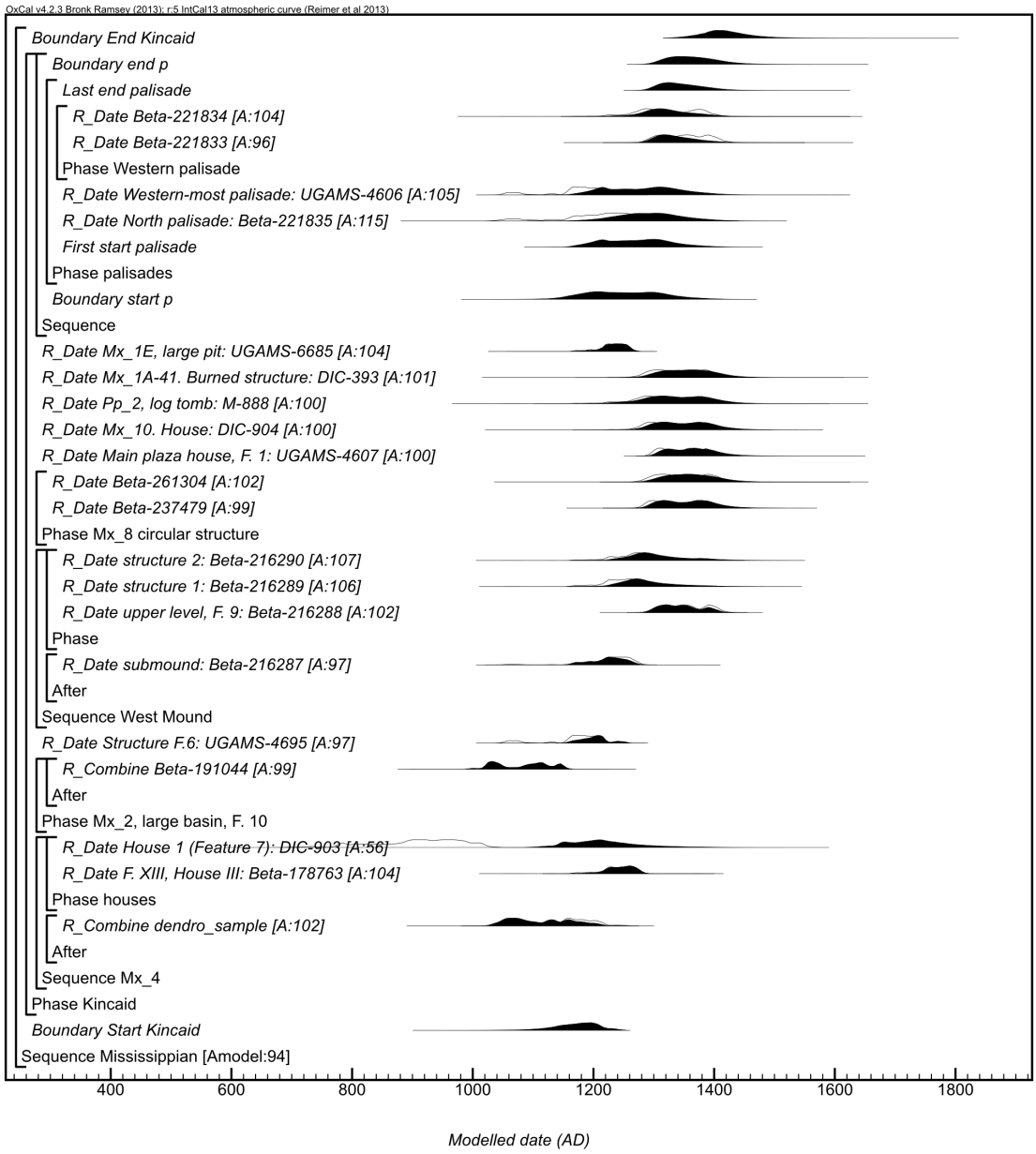

Figure D.5. Results and structure of the primary chronological model for Kincaid. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Moundville

Ninety radiocarbon results from Moundville have been modeled (Appendix A). Four of these (Beta-53767, Beta-53393, Beta-53392, Beta-53668) come from unidentified

wood charcoal found in palisade trenches (Feature 29, Feature 169, Feature 159, Feature 173). Three of these (Feature 169, Feature 159, Feature 173) are superimposed by a pit (Feature 34) dated through unidentified charcoal (Beta-53389, Beta-53388). The unidentified wood charcoal dates from palisade trenches are modeled as *TPQ* because the origin of the dated wood charcoal is unknown and very well may come from a time prior to palisade construction.

The dated palisade sections come from the ECB Tract, as do four other dated features (Feature 34, Feature 19, Burial 8, Burial 9). The chronological model for Moundville cannot reliably estimate the timing of palisade construction because there are no direct dates from the palisade or its use. Instead, the model provides an estimate for the beginning, ending, and span of activity for the ECB Tract. The dated contexts are described in Appendix A and the stratigraphic relationships between samples are shown in Appendix B. Two results were excluded from modeling (DIC-1241, Beta-53401) because they are clear outliers when compared to the other dates, calibrating to cal A.D. 1660–1950 and cal A.D. 720–1120, respectively. Another result (Beta-115820) was also excluded from modeling because its context is unclear from the published description.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=86.8) between the radiocarbon dates and the model assumptions. The model estimates that activity in the ECB Tract began in *cal A.D. 1180–1300* (*95% probability*; Figure 2; *Moundville: start ECB Tract*), probably in *cal A.D. 1225–1275* (*68% probability*). The final activity associated with the ECB Tract is estimated to

have occurred in *cal A.D. 1365–1600* (*95% probability*; Figure 2; *Moundville: end ECB Tract*), probably in *cal A.D. 1400–1520* (*68% probability*). Activity in the ECB Tract is estimated to have lasted for *100–360 years* (*95% probability*; Figure 3; *Moundville: ECB Tract span*), probably for *145–280 years* (*68% probability)*.

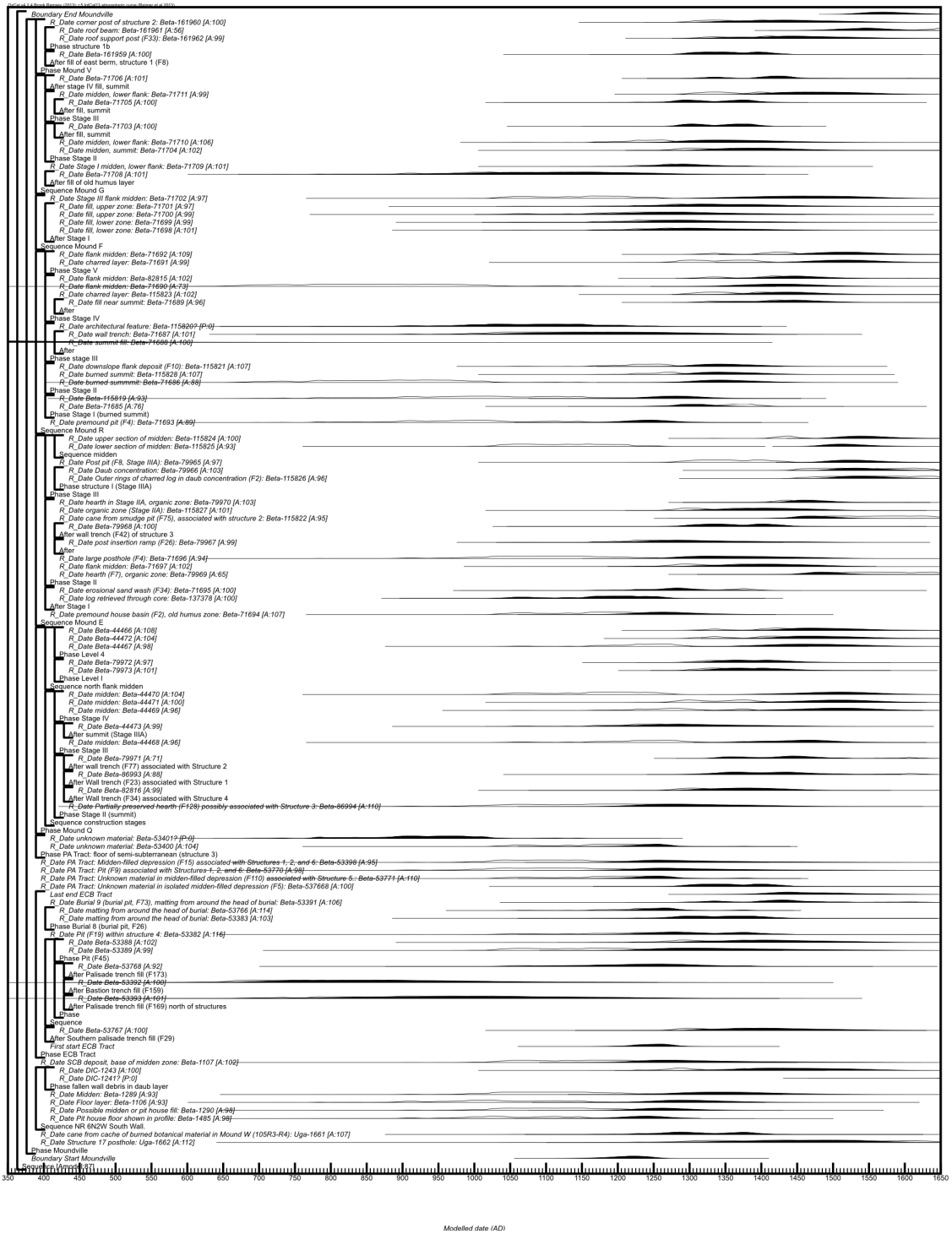

Figure D.6. Results and structure of the primary chronological model for Moundville. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Southwind (12PO265)

Nine radiocarbon results from Southwind have been modeled (Appendix A). Three of these (Beta-310905, Beta-310906, Beta-248607) are from wood charcoal (*Gleditsia* or *Gymnocladus,* Diffuse-porous hardwood*,* and unidentified) samples found in palisade post molds. The palisade overlies a pit (Feature 08-3) dated (Beta-248604) with a sample of unidentified wood charcoal. The remaining dated contexts are described in Appendix A and the stratigraphic relationships between samples are shown in Appendix B. One result was excluded from modeling (Beta-248603) because it is a clear outlier when compared to the other dates due to its much younger age. Four dates (UGa-4645, UGa-4646, UGa-4647, UGa-4716) from Southwind have unknown age offsets from coal contamination and were not included in modeling (Munson 1994:Table 15.3; Tankersley et al. 1987).

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=93.5) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1075–1295* (*95% probability*; Figure 2; *Southwind: start palisade*), probably in *cal A.D. 1160–1230* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1310–1470* (*95% probability*; Figure 2; *Southwind: end*

palisade), probably in *cal A.D. 1320–1440* (*68% probability*). The palisade is estimated to have lasted for *65–320 years (95% probability*; Figure 3; *Southwind: palisade span*), probably for *115–260 years* (*68% probability)*.

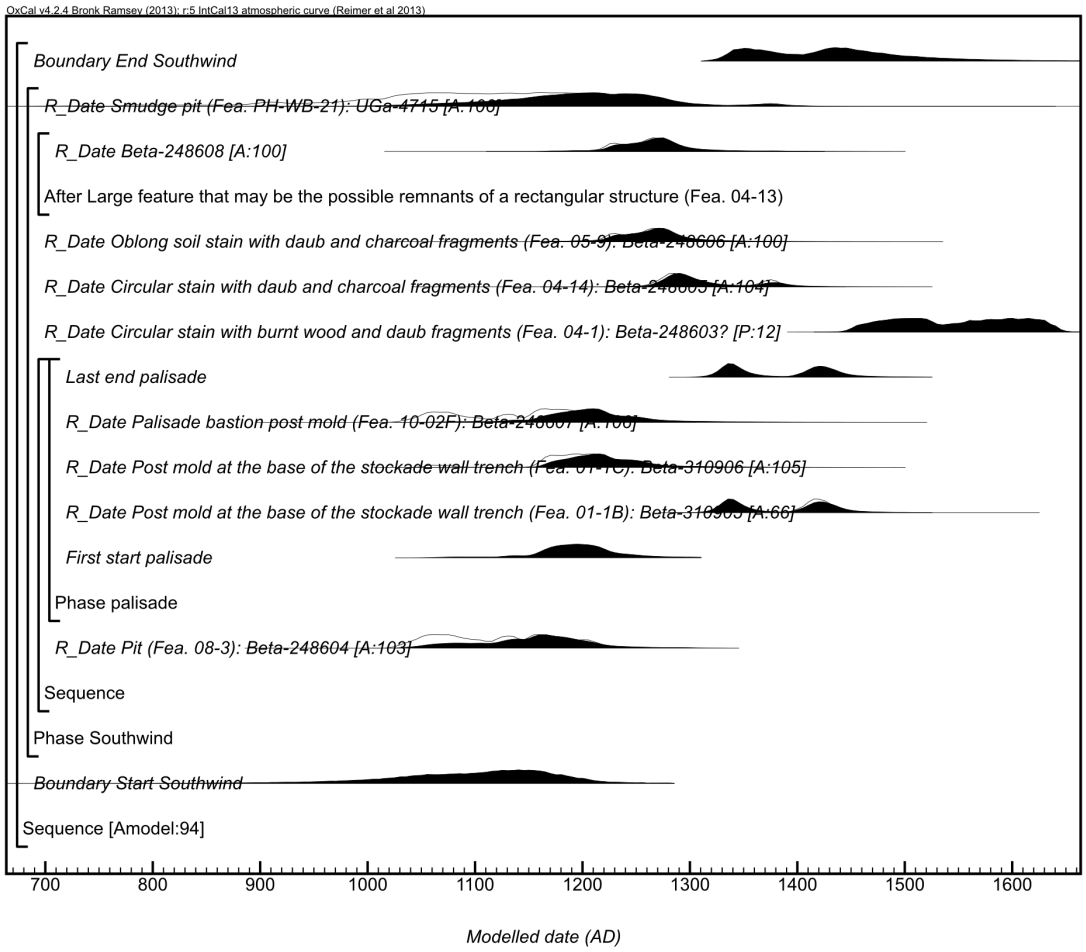

Figure D.7. Results and structure of the primary chronological model for Southwind. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Annis Village

Three radiocarbon results from Annis Village are available (Appendix A). Two of these (Beta-181396, Beta-181398) are from unidentified wood charcoal fragments

found in palisade trench fill. An additional radiocarbon result (Beta-181397) is from unidentified charred nutshell found in palisade trench fill. These three results serve as *TPQ* for palisade construction because the origin of the dated samples is unknown and very well may come from a time prior to palisade construction. These results were not modeled because the Annis Village radiocarbon dataset is not robust enough to construct a meaningful chronological model. The 95% calibrations for the three dates ranges are cal A.D. 1270–1400 (Beta-181396), cal A.D. 1280–1400 (Beta-181398), and cal A.D. 1250–1390 (Beta-181397) (Appendix A), suggesting that the palisade was constructed after cal A.D. 1250–1390 (Beta-181397).

Jonathan Creek

Four radiocarbon results from Jonathan Creek are available (Appendix A). One radiocarbon result (Beta-180074) is from a maize kernel found in a small pit associated with a structure (Feature 13) that overlies a palisade (Feature 15). Another radiocarbon result (Beta-180075) is from the outer rings of unidentified charred wood fragment from a structure (Feature 31) on a small mound that overlies a palisade (Feature 7). While the Jonathan Creek radiocarbon database is not robust enough to construct a meaningful chronological model, these two dates likely date a time after the palisade construction started and have 95% calibrations at cal A.D. 1160–1280 and cal A.D. 1160–1290, respectively (Appendix A), suggesting that the palisade was likely constructed before cal A.D. 1160–1290 (Beta-180074). The end of palisade construction at Jonathan Creek is effectively unknown, although the available radiocarbon data does not extend into the A.D. 1400s (Appendix A; Schroeder 2006).

Appendix E. Description of alternative Bayesian models and results

Angel Mounds (alternative)

An alternative Bayesian model was created for Angel Mounds by slightly modifying the primary model described in Appendix D. Specifically, all samples ranked 1 (Appendix A) were modeled as *TPQ* and charcoal outlier modeling was not used.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=84.4) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1215–1285* (*95% probability*), probably in *cal A.D. 1225–1275* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1305–1420* (*95% probability*), probably in *cal A.D. 1340–1410* (*68% probability*). The palisade is estimated to have lasted for *45–190 years (95% probability*), probably for *80–160 years* (*68% probability)*.

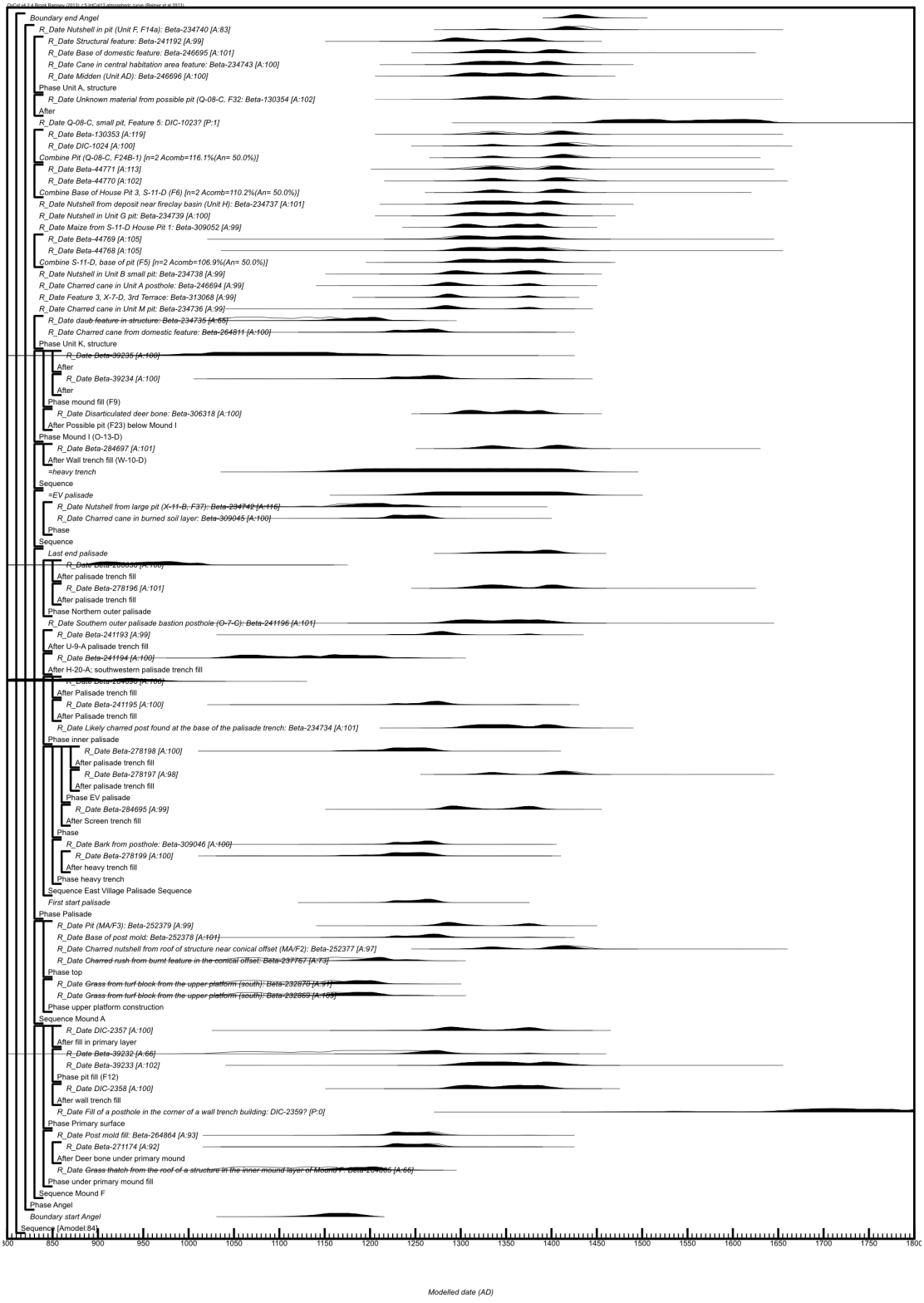

Figure E.1. Results and structure of the alternative chronological model for Angel Mounds. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Aztalan (alternative)

An alternative Bayesian model was created for Aztalan by slightly modifying the primary model described in Appendix D. Specifically, all samples ranked 1 (Appendix A) were modeled as *TPQ* and charcoal outlier modeling was not used.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=78.6) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1035–1155* (*95% probability;* Figure 2), probably in *cal A.D. 1060–1140* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1070–1210* (*95% probability*), probably in *cal A.D. 1100–1170* (*68% probability*). The palisade is estimated to have lasted for *1–105 years* (*95% probability*), probably for *1–55 years* (*68% probability)*.

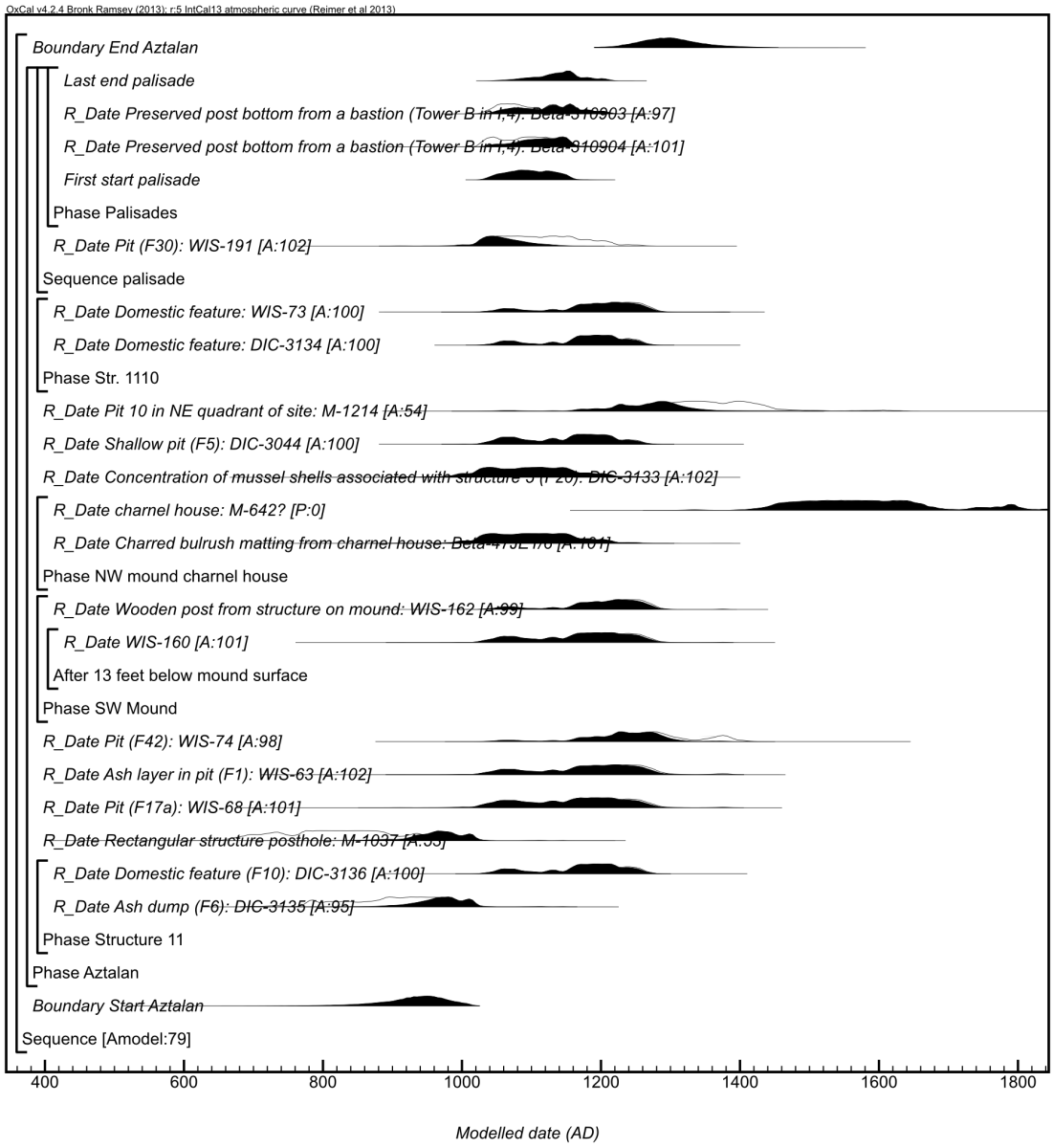

Figure E.2. Results and structure of the alternative chronological model for Aztalan. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Cahokia (alternative)

An alternative Bayesian model was created for Cahokia by slightly modifying the primary model described in Appendix D. Specifically, all samples ranked 1

(Appendix A) were modeled as *TPQ* and charcoal outlier modeling was not used. Without the charcoal outlier modeling, a date (WIS-988) had to be excluded from the model due to its much older age and a second date (Beta-241384) due to its much younger age.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=77.2) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1175–1270* (*95% probability*), probably in *cal A.D. 1205–1260* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1255–1400* (*95% probability*), probably in *cal A.D. 1270–1390* (*68% probability*). The palisade is estimated to have lasted for *10–190 years (95% probability*), probably for *30–155 years* (*68% probability*).

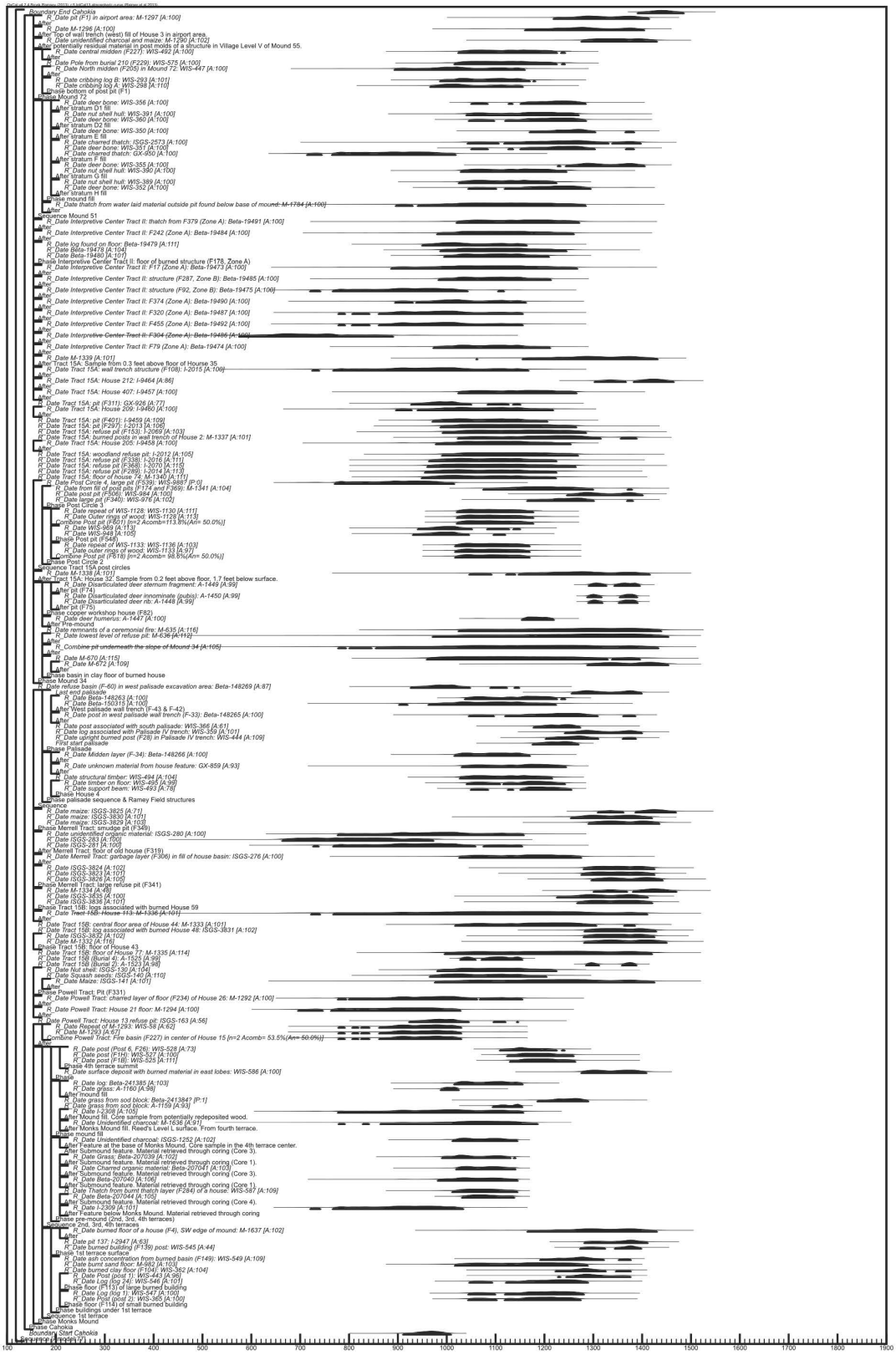
OxCal 4.4 Bronk Ramsey (2021); r:5 IntCal20 atmospheric curve (Reimer et al 2020)
Boundary End Cahokia
Phase Tract 15A
R_Date pit (F1) in airport area: M-1297 [A:100]
After
R_Date M-1296 [A:100]
After Top of wall trench (west) fill of House 3 in airport area.
R_Date unidentified charcoal and maize: M-1290 [A:102]
After Potentially residual material in post molds of a structure in Village Level V of Mound 55.
R_Date central midden (F227): WIS-492 [A:100]
After
R_Date Pole from burial 210 (F229): WIS-575 [A:100]
R_Date North midden (F205) in Mound 72: WIS-447 [A:100]
After
R_Date cribbing log B: WIS-293 [A:101]
R_Date cribbing log A: WIS-298 [A:110]
Phase bottom of post pit (F1)
Phase Mound 72
R_Date deer bone: WIS-356 [A:100]
After stratum D1 fill
R_Date nut shell hull: WIS-391 [A:100]
R_Date deer bone: WIS-360 [A:100]
After stratum D2 fill
R_Date deer bone: WIS-350 [A:100]
After stratum E fill
R_Date charred thatch: ISGS-2573 [A:100]
R_Date deer bone: WIS-351 [A:100]
R_Date charred thatch: GX-950 [A:100]
After stratum F fill
R_Date deer bone: WIS-355 [A:100]
R_Date nut shell hull: WIS-390 [A:100]
After stratum G fill
R_Date nut shell hull: WIS-389 [A:100]
R_Date deer bone: WIS-352 [A:100]
After stratum H fill
Phase mound fill
R_Date thatch from water laid material outside pit found below base of mound: M-1784 [A:100]
After
Sequence Mound 51
R_Date Interpreitve Center Tract II: thatch from F379 (Zone A): Beta-19491 [A:100]
After
R_Date Interpretive Center Tract II: F242 (Zone A): Beta-19484 [A:100]
After
R_Date log found on floor: Beta-19479 [A:111]
R_Date Beta-19479 [A:104]
R_Date Beta-19480 [A:101]
Phase Interpreitve Center Tract II: floor of burned structure (F178, Zone A)
R_Date Interpretive Center Tract II: F17 (Zone A): Beta-19473 [A:100]
After
R_Date Interpretive Center Tract II: structure (F287, Zone B): Beta-19485 [A:100]
After
R_Date Interpretive Center Tract II: structure (F92, Zone B): Beta-19475 [A:100]
After
R_Date Interpretive Center Tract II: F374 (Zone A): Beta-19490 [A:100]
After
R_Date Interpretive Center Tract II: F320 (Zone A): Beta-19487 [A:100]
After
R_Date Interpretive Center Tract II: F455 (Zone A): Beta-19492 [A:100]
After
R_Date Interpretive Center Tract II: F304 (Zone A): Beta-19486 [A:100]
After
R_Date Interpretive Center Tract II: F79 (Zone A): Beta-19474 [A:100]
After
R_Date M-1339 [A:101]
After Tract 15A: Sample from 0.3 feet above floor of Hourse 35
R_Date Tract 15A: wall trench structure (F108): I-2015 [A:106]
After
R_Date Tract 15A: House 212: I-9464 [A:86]
After
R_Date Tract 15A: House 407: I-9457 [A:100]
After
R_Date Tract 15A: pit (F311): GX-926 [A:77]
R_Date Tract 15A: House 209: I-9460 [A:100]
After
R_Date Tract 15A: pit (F401): I-9459 [A:109]
R_Date Tract 15A: pit (F297): I-2013 [A:106]
R_Date Tract 15A: refuse pit (F153): I-2069 [A:103]
R_Date Tract 15A: burned posts in wall trench of House 2: M-1337 [A:101]
R_Date Tract 15A: House 205: I-9458 [A:100]
After
R_Date Tract 15A: woodland refuse pit: I-2012 [A:105]
R_Date Tract 15A: refuse pit (F338): I-2016 [A:111]
R_Date Tract 15A: refuse pit (F368): I-2070 [A:115]
R_Date Tract 15A: refuse pit (F289): I-2014 [A:113]
R_Date Tract 15A: floor of house 74: M-1340 [A:111]
R_Date Post Circle 4, large pit (F539): WIS-9887 [P:0]
R_Date from fill of post pits [F174 and F369): M-1341 [A:104]
R_Date post pit (F506): WIS-984 [A:100]
R_Date large pit (F340): WIS-976 [A:102]
Phase Post Circle 3
R_Date repeat of WIS-1128: WIS-1130 [A:111]
R_Date Outer rings of wood: WIS-1128 [A:113]
Combine Post pit (F801) [n=2 Acomb=113.8%(An= 50.0%)]
R_Date WIS-969 [A:113]
R_Date WIS-949 [A:105]
Phase Post pit (F548)
R_Date repeat of WIS-1133: WIS-1136 [A:103]
R_Date outer rings of wood: WIS-1133 [A:97]
Combine Post pit (F818) [n=2 Acomb= 98.6%(An= 50.0%)]
Phase Post Circle 2
Sequence Tract 15A post circles
R_Date M-1338 [A:101]
After Tract 15A: House 32: Sample from 0.2 feet above floor, 1.7 feet below surface.
R_Date Disarticulated deer sternum fragment: A-1449 [A:99]
After pit (F74)
R_Date Disarticulated deer innominate (pubis): A-1450 [A:99]
R_Date Disarticulated deer rib: A-1448 [A:99]
After pit (F75)
Phase copper workshop house (F82)
R_Date deer humerus: A-1447 [A:100]
After Pre-mound
R_Date remnants of a ceremonial fire: M-635 [A:116]
R_Date lowest level of refuse pit: M-636 [A:112]
After
R_Combine pit underneath the slope of Mound 34 [A:105]
After
R_Date M-670 [A:115]
R_Date M-672 [A:109]
After
Phase basin in clay floor of burned house
Phase Mound 34
R_Date refuse basin (F-60) in west palisade excavation area: Beta-148269 [A:87]
Last end palisade
R_Date Beta-148263 [A:100]
R_Date Beta-150315 [A:100]
After West palisade wall trench \F-43 & F-42)
R_Date post in west palisade wall trench (F-33): Beta-148265 [A:100]
After
R_Date post associated with south palisade: WIS-366 [A:61]
R_Date log associated with Palisade IV trench: WIS-359 [A:101]
R_Date upright burned post (F28) in Palisade IV trench: WIS-444 [A:109]
First start palisade
Phase Palisade
R_Date Midden layer (F-34): Beta-148266 [A:100]
After
R_Date unknown material from house feature: GX-859 [A:93]
After
R_Date structural timber: WIS-494 [A:104]
R_Date timber on floor: WIS-495 [A:99]
R_Date support beam: WIS-493 [A:78]
Phase House
Phase palisade sequence & Ramey Field structures
Sequence
R_Date maize: ISGS-3825 [A:71]
R_Date maize: ISGS-3830 [A:101]
R_Date maize: ISGS-3829 [A:103]
Phase Merrell Tract: smudge pit (F349)
R_Date unidentified organic material: ISGS-280 [A:100]
R_Date ISGS-283 [A:100]
R_Date ISGS-281 [A:100]
After Merrell Tract: floor of old house (F319)
R_Date Merrell Tract: garbage layer (F306) in fill of house basin: ISGS-276 [A:100]
After
R_Date ISGS-3824 [A:102]
R_Date ISGS-3823 [A:101]
R_Date ISGS-3826 [A:105]
Phase Merrell Tract: large refuse pit (F341)
R_Date M-1334 [A:95]
R_Date ISGS-3835 [A:100]
R_Date ISGS-3836 [A:101]
Phase Tract 15B: logs associated with burned House 59
R_Date Tract 15B: House 113: M-1336 [A:101]
After
R_Date Tract 15B: central floor area of House 44: M-1333 [A:101]
R_Date Tract 15B: log associated with burned House 48: ISGS-3831 [A:102]
R_Date ISGS-3832 [A:102]
R_Date GX-33124 [A:101]
Phase Tract 15B: floor of House 43
R_Date Tract 15B: floor of House 77: M-1335 [A:114]
R_Date Tract 15B (Burial 4): A-1525 [A:99]
R_Date Tract 15B (Burial 2): A-1523 [A:98]
R_Date Nut shell: ISGS-130 [A:104]
R_Date Squash seeds: ISGS-140 [A:110]
R_Date Maize: ISGS-141 [A:101]
After
Phase Powell Tract: Pit (F331)
R_Date Powell Tract: charred layer of floor (F234) of House 26: M-1292 [A:100]
After
R_Date Powell Tract: House 21 floor: M-1294 [A:100]
After
R_Date Powell Tract: House 13 refuse pit: ISGS-163 [A:56]
R_Date Repeat of M-1293: WIS-58 [A:62]
R_Date M-1293 [A:67]
Combine Powell Tract: Fire basin (F227) in center of House 15 [n=2 Acomb= 53.5%(An= 50.0%)]
After
R_Date post (Post 6, F26): WIS-528 [A:73]
R_Date post (F1H): WIS-527 [A:100]
R_Date post (F1B): WIS-525 [A:111]
Phase 4th terrace summit
R_Date surface deposit with burned material in east lobes: WIS-586 [A:100]
Phase
R_Date log: Beta-241385 [A:103]
R_Date grass: A-1160 [A:99]
After mound fill
R_Date grass from sod block: Beta-241384? [P:1]
R_Date grass from sod block: A-1159 [A:93]
R_Date I-2308 [A:100]
After Mound fill, Core sample from potentially redeposited wood.
R_Date Unidentified charcoal: M-1636 [A:97]
After Monks Mound fill. Reed's Level L surface. From fourth terrace.
Phase Monks
R_Date Unidentified charcoal: ISGS-1252 [A:102]
After Feature at the base of Monks Mound. Core sample in the 4th terrace center.
After Submound feature. Material retrieved through coring (Core 3).
R_Date Grass: Beta-207039 [A:102]
After Submound feature. Material retrieved through coring (Core 1).
R_Date Charred organic material: Beta-207041 [A:103]
After Submound feature. Material retrieved through coring (Core 3).
R_Date Beta-207040 [A:106]
After Submound feature. Material retrieved through coring (Core 1).
R_Date Thatch from burnt thatch layer (F284) of a house: WIS-587 [A:109]
R_Date Beta-207044 [A:105]
After Submound feature. Material retrieved through coring (Core 4).
R_Date I-2309 [A:101]
After Feature below Monks Mound. Material retrieved through coring
Phase pre-mound (2nd, 3rd, 4th terraces)
Sequence 2nd, 3rd, 4th terraces
R_Date burned floor of a house (F4), SW edge of mound: M-1637 [A:102]
After
R_Date pit 137: I-2947 [A:63]
R_Date burned building (F139) post: WIS-545 [A:44]
Phase 1st terrace surface
R_Date ash concentration from burned basin (F149): WIS-549 [A:109]
R_Date burnt sand floor: M-982 [A:103]
R_Date burned clay floor (F104): WIS-362 [A:104]
R_Date Post (post 7): WIS-443 [A:90]
R_Date Log (log 24): WIS-546 [A:101]
Phase floor (F13) of large burned building
R_Date Log (log 1): WIS-547 [A:100]
R_Date Post (post 2): WIS-365 [A:100]
Phase floor (F-114) of small burned building
Phase buildings under 1st terrace
Sequence 1st terrace
Phase Monks Mound
Phase Cahokia
Boundary Start Cahokia
Sequence Tract 15A
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
Modelled date (AD)

Figure E.3. Results and structure of the alternative chronological model for Cahokia. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Etowah (alternative)

An alternative Bayesian model was created for Etowah by slightly modifying the primary model described in Appendix D. Specifically, all samples ranked 1 (Appendix A) were modeled as *TPQ* and charcoal outlier modeling was not used.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=96.6) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1025–1255* (*95% probability*), probably in *cal A.D. 1045–1225* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1160–1390* (*95% probability*), probably in *cal A.D. 1220–1295* (*68% probability*). The palisade is estimated to have lasted for *1–260 years (95% probability*), probably for *1–180 years* (*68% probability*).

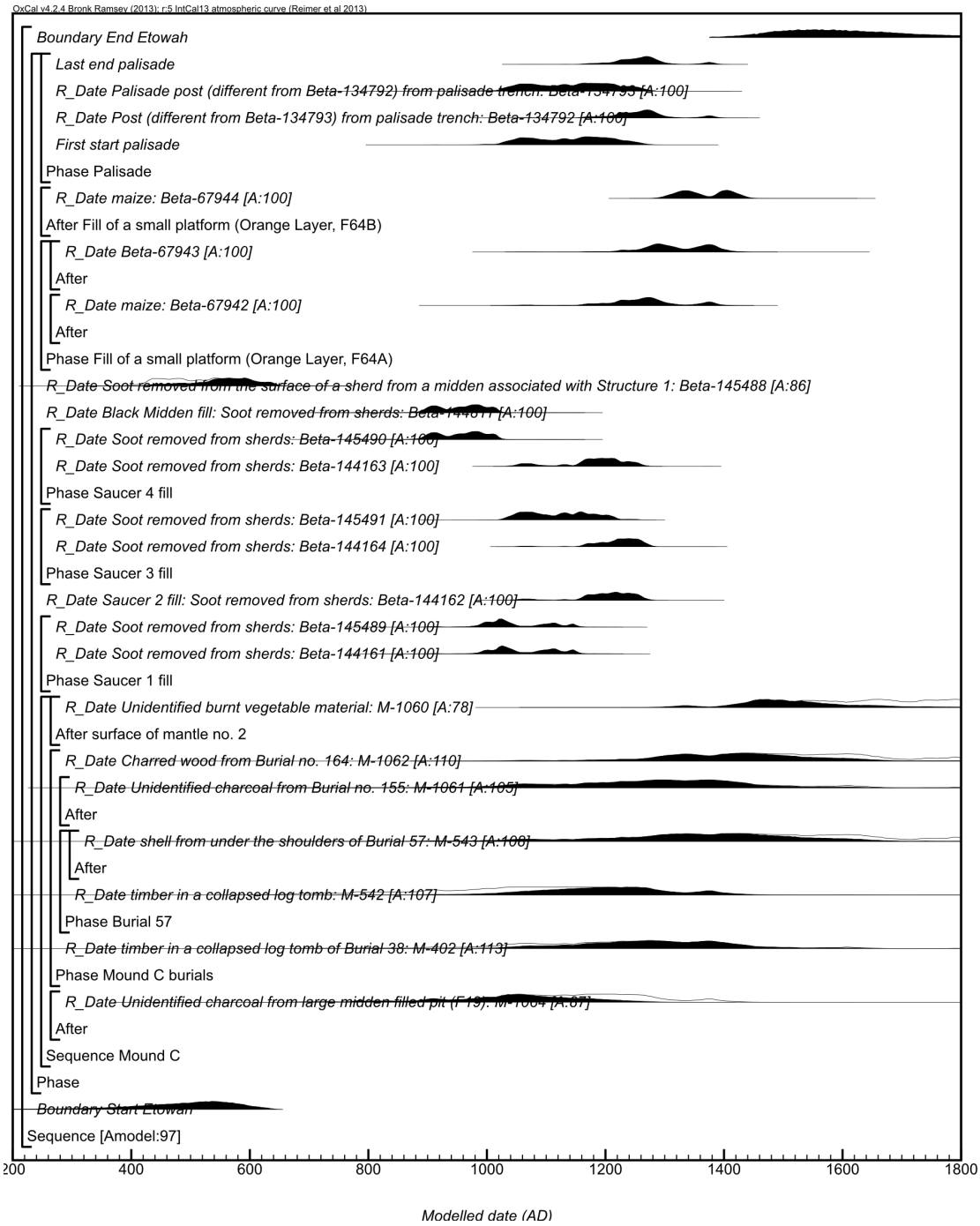

Figure E.4. Results and structure of the alternative chronological model for Etowah. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Kincaid (alternative)

An alternative Bayesian model was created for Kincaid by slightly modifying the primary model described in Appendix D. Specifically, all samples ranked 1 (Appendix A) were modeled as *TPQ* and charcoal outlier modeling was not used. Without the charcoal outlier modeling, a date (DIC-903) had to be excluded from the model due to its much older age.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=67.1) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1155–1245* (*95% probability*), probably in *cal A.D. 1180–1220* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1285–1400* (*95% probability*), probably in *cal A.D. 1300–1380* (*68% probability*). The palisade is estimated to have lasted for *70–220 years (95% probability*), probably for *100–185 years* (*68% probability)*.

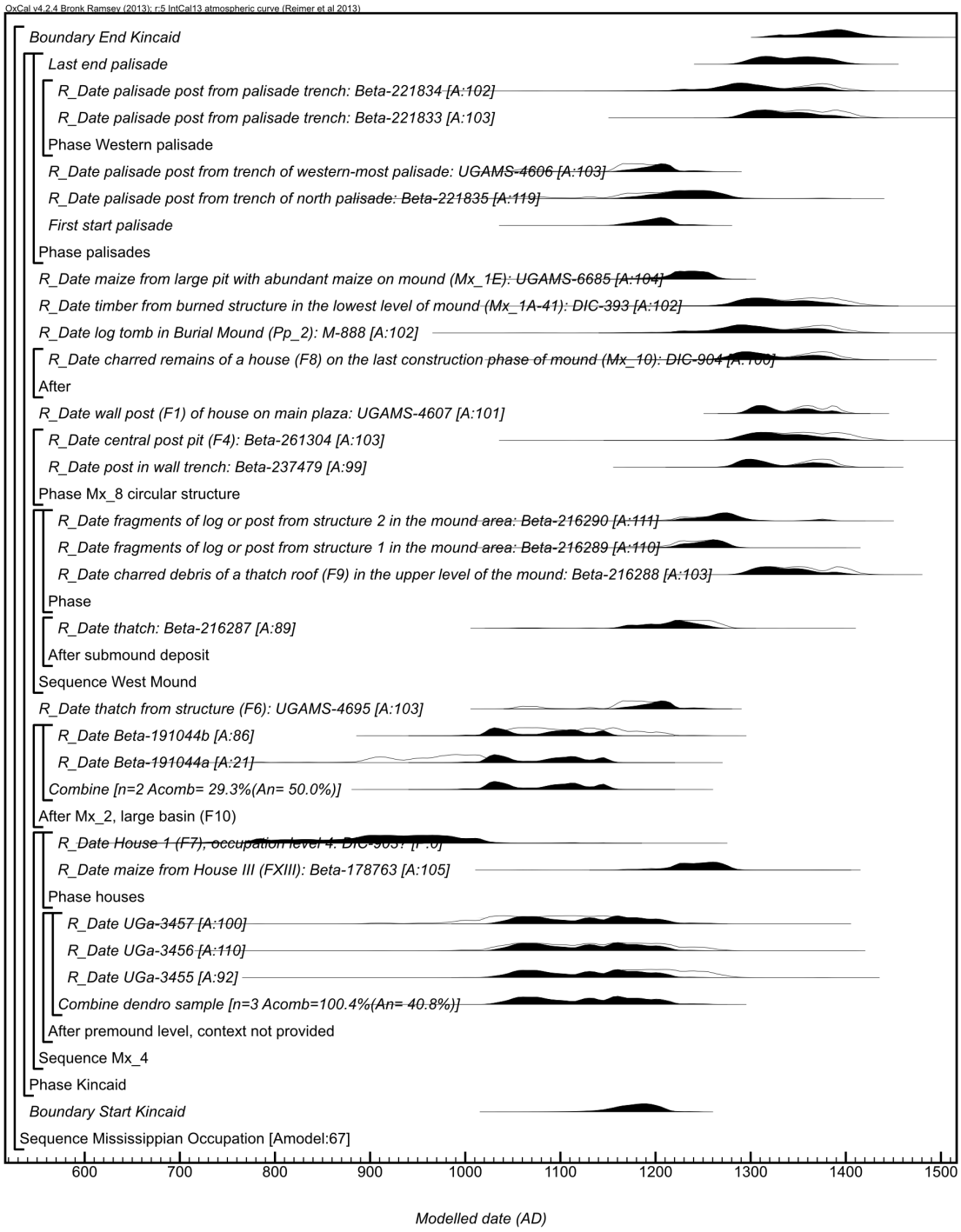

Figure E.5. Results and structure of the alternative chronological model for Kincaid. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Moundville (alternative)

An alternative Bayesian model was created for Moundville by slightly modifying the primary model described in Appendix D. Specifically, all samples ranked 1 (Appendix A) were modeled as *TPQ* and charcoal outlier modeling was not used. Without the charcoal outlier modeling, seven dates (Beta-71690, Beta-71686, Beta-115825, Beta-44470, Beta-44467, Beta-71696, Beta-44468) had to be modeled as *TPQ* due their much older age and six dates (Beta-79970, Beta-115822, Beta-79969, Beta-79971, Beta-71685, Beta-161961) had to be excluded from modeling due to their much younger age.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=61.7) between the radiocarbon dates and the model assumptions. The model estimates that activity in the ECB Tract began in *cal A.D. 1125–1295* (*95% probability*), probably in *cal A.D. 1185–1275* (*68% probability*). The final activity associated with the ECB Tract is estimated to have occurred in *cal A.D. 1320–1480* (*95% probability*), probably in *cal A.D. 1380–1460* (*68% probability*). Activity in the ECB Tract is estimated to have lasted for *70–300 years* (*95% probability*), probably for *130–250 years* (*68% probability)*.

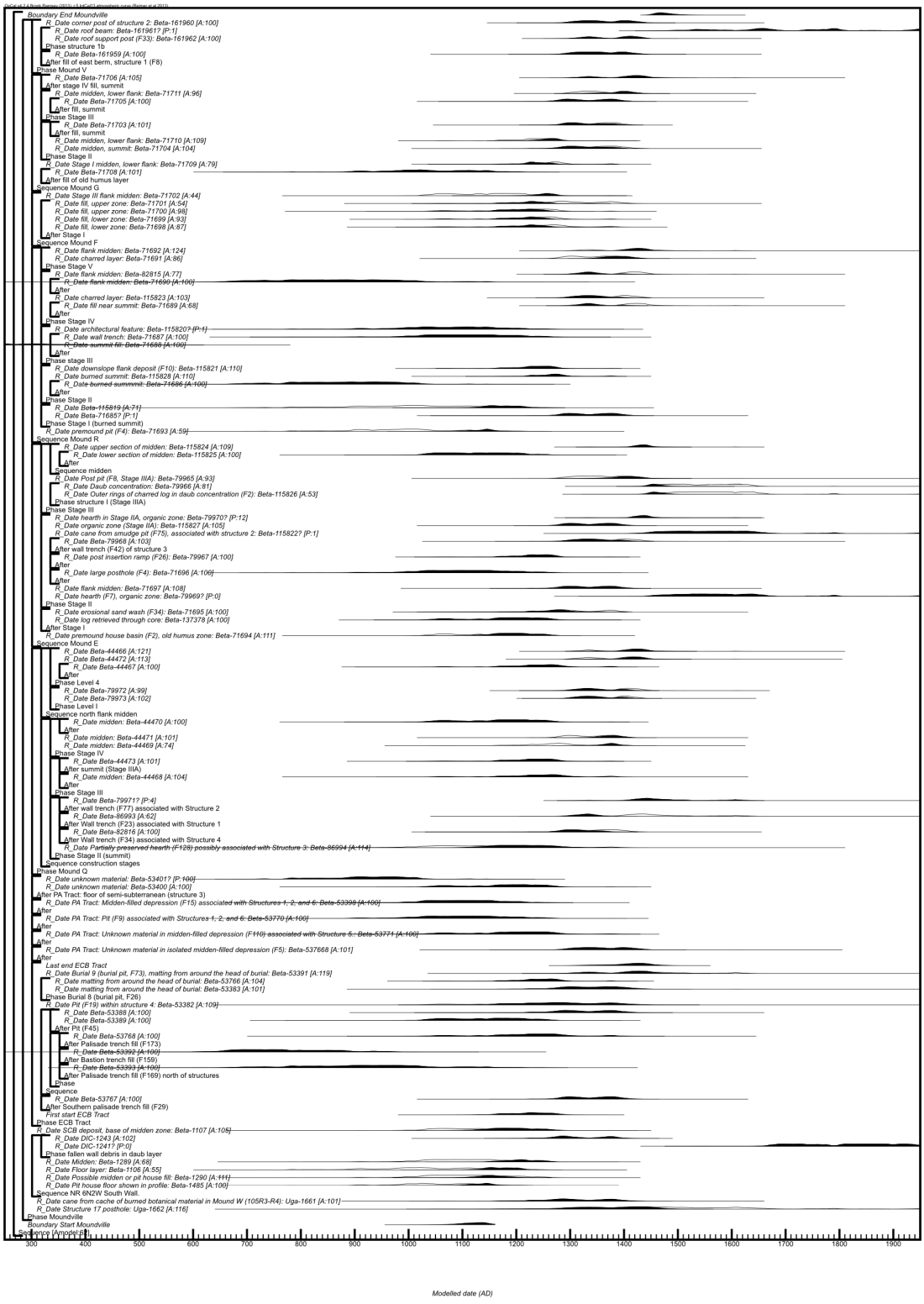

Figure E.6. Results and structure of the alternative chronological model for Moundville. The brackets and keywords define the model structure. The format is as described in Figure D.1.

Southwind (12PO265) (alternative)

An alternative Bayesian model was created for Southwind by slightly modifying the primary model described in Appendix D. Specifically, all samples ranked 1 (Appendix A) were modeled as *TPQ* and charcoal outlier modeling was not used.

The algorithm used for this model can be directly derived from the model structure shown in Appendix B and Appendix C. The model shows good overall agreement (A_{model}=92.9) between the radiocarbon dates and the model assumptions. The model estimates that the palisade was constructed in *cal A.D. 1065–1245* (*95% probability*), probably in *cal A.D. 1160–1210* (*68% probability*). The final activity associated with the palisade is estimated to have occurred in *cal A.D. 1310–1440* (*95% probability*), probably in *cal A.D. 1320–1430* (*68% probability*). The palisade is estimated to have lasted for *90–300 years (95% probability*), probably for *115–260 years* (*68% probability)*.

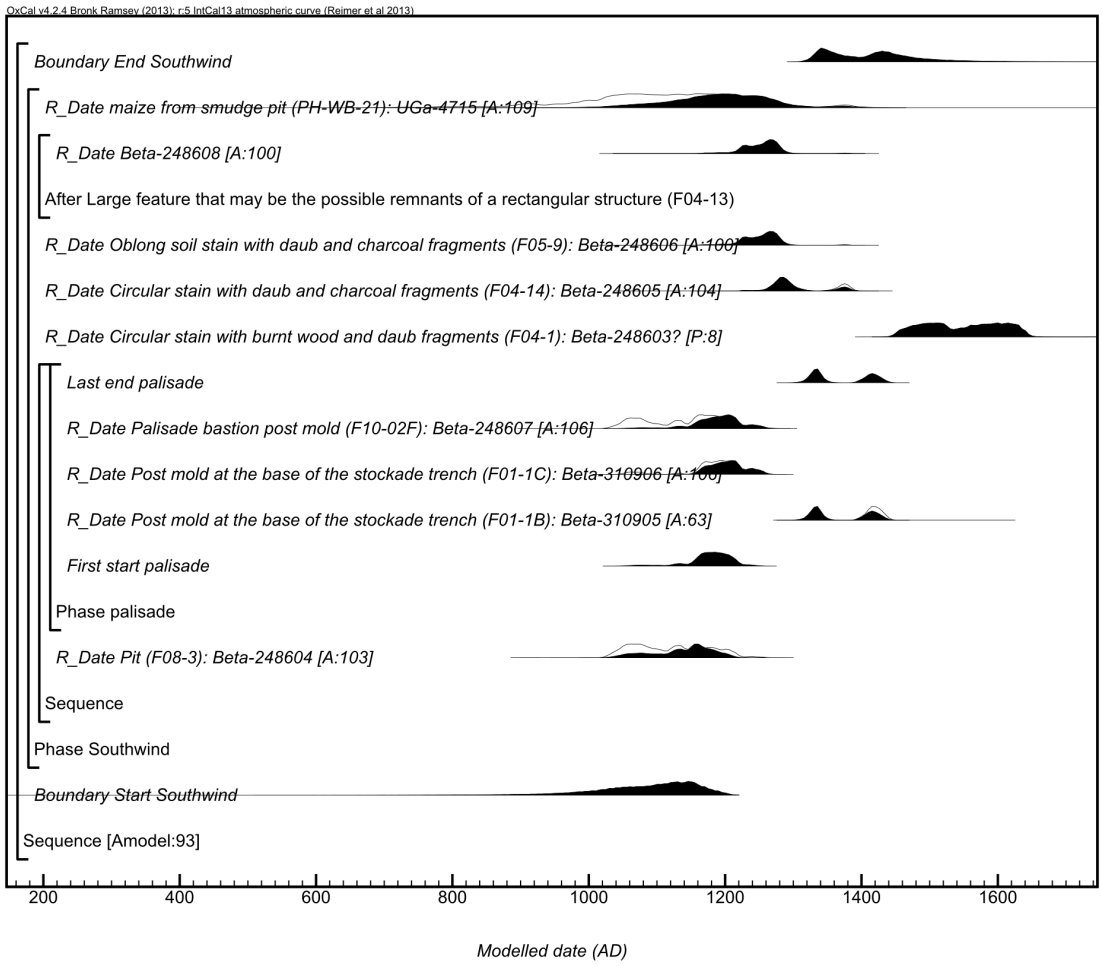

Figure E.7. Results and structure of the alternative chronological model for Southwind. The brackets and keywords define the model structure. The format is as described in Figure D.1.

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