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**Lithic Resource Survey of the Upper Little River Drainage:
Raw Material Availability and Use at the Townsend Sites**

**A Thesis
Presented for the
Master of Arts Degree
The University of Tennessee, Knoxville**

**Jeremy Lee Sweat
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Abstract

From 1999 to 2002, the Transportation Center at the University of Tennessee, Knoxville, conducted a number of archaeological investigations associated with the widening of State Route 73 (U.S. 321) through Townsend, Tennessee. The excavations at the Townsend sites resulted in the recovery of a large assemblage of chipped and ground stone tools. A lithic resource survey of the upper Little River drainage was undertaken to identify the likely source areas of raw materials used for the manufacture of the chipped and ground stone tools recovered during the Townsend excavations. These data were then used to identify local versus non-local materials use by prehistoric peoples in Tuckaleechee Cove. The results of this research are presented in this thesis.

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1. Introduction

The availability and distribution of lithic resources across the landscape was an important factor in the settlement and subsistence patterns of prehistoric peoples, and the procurement and use of stone for tool manufacture was an important part of prehistoric settlement systems (Amick 1984; Daniel 2001; McCollough and Faulkner 1976; Steponaitis et. al 2006). An understanding of the distribution of lithic materials is preliminary to any study of lithic technology and creates a context for the interpretation of artifacts recovered through archaeological investigations (Kimball 1985:88; Steponaitis et. al 2006:2). While lithic resource surveys are not consistently or frequently undertaken as part of archaeological research in eastern Tennessee, archaeological investigations in the Mid-south have demonstrated that assessing the significance of a lithic resource base to local prehistoric activity will undoubtedly help researchers better understand the prehistoric settlement patterns of the region (Amick 1984; Chapman 1980; Daniel 2001; Faulkner and McCollough 1977; Johnson 1981; Johnson and Meeks 1994; Kimball 1985; Steponaitis et. al 2006).

This study was conducted to aid in the interpretation of a large collection of stone tools recovered during the excavations of sites 40BT89, 40BT90 and 40BT91 in Townsend, Tennessee, conducted by the Transportation Center at the University of Tennessee. Townsend is located in Tuckaleechee Cove, which is a large, erosional mountain cove with complex bedrock and surficial geology (Neuman and Nelson 1965). The Townsend sites were located on the south side of the Little River, which flows east to west through Tuckaleechee Cove.

This research had two main goals. The first was to undertake a lithic resource survey to determine the likely source areas of raw materials used for the manufacture of chipped and ground stone tools recovered during the Townsend excavations. The second goal was to examine the artifacts recovered during the Townsend excavations to determine local versus non-local raw materials use and patterns of raw materials selection by the prehistoric peoples of Tuckaleechee Cove. In this study, local materials are defined as raw materials available within 25 miles of Townsend.

The lithic resource survey also tested a number of questions and assumptions concerning the occurrence of raw materials in the Blue Ridge portion of the upper Little River drainage. The first was whether the materials used to manufacture stone tools at Townsend were locally available in geologic units that occur in or around Tuckaleechee Cove. Based on geologic mapping, this area is known to produce a variety of rocks, many of which were used as raw materials for the manufacture of chipped and ground stone tools recovered during the Townsend excavations. It was thought that most of the sedimentary, metasedimentary and metamorphic materials used for stone tool manufacture were available in the Blue Ridge portion of the upper Little River drainage and that the Little River provided most, if not all, of these lithic raw materials in the form of stream cobbles and gravel. This assumption was based on attributes of ground stone artifacts recovered during the Townsend excavations, many of which appeared to have been manufactured from river worn cobbles and boulders.

The second question was whether the Knox group Jonesboro limestone that comprises much of the cove floor of Tuckaleechee Cove provided prehistoric groups with a source of the high quality Knox chert that was used to manufacture most of the chipped

stone tools recovered during the Townsend excavations. While previous research had suggested that Jonesboro limestone did not represent a source of artifact quality materials, no research had been undertaken in Tuckaleechee Cove to corroborate this conclusion (Bass 1977; Sweat 2005).

The third question concerned the occurrence of chalcedony and jasper, which were recovered during the Townsend excavations. Kimball (1985,1996) suggested that Shady dolomite formations in Miller Cove, near the town of Walland, were a source of chalcedony. The association of this material with Shady dolomite is well supported by geologic mapping and archaeological research in other areas of eastern Tennessee (Boyd 1986; Kimball 1985; Neuman and Nelson 1965). It was assumed that chalcedony derived from the Shady dolomite formation in Miller Cove was the raw material source of chalcedony artifacts recovered during the Townsend excavations. Jasper that was recovered during the Townsend excavations was assumed to have come from either the Del Rio area of Cocke County or from Shady dolomite formations in the Cherokee National Forest in Cocke County (Paul Matchem, Personal Communication).

While geologic literature and mapping indicated that much of the raw material represented by the Townsend artifact assemblage might have been locally available, archaeologists had undertaken no serious geologic research or field survey and the distribution of specific raw materials and discreet source areas was not known. To address these questions, a lithic resource survey was conducted of the portion of the Little River between its confluence with the Middle Prong of the Little River at the eastern end of Tuckaleechee Cove and the confluence of the Little River and Crooked Creek, near Maryville, Tennessee. During this research 22 locations were surveyed. These survey

areas include both streams and terrestrial locales. Each of these survey areas was investigated to determine the occurrence of potential raw materials.

During the analysis of the Townsend lithic assemblage, numerous attributes were recorded for each of the lithic artifacts. These attributes included provenience, metric data, artifact type, raw material type and morphology. Raw material identifications were made macroscopically using a chert type collection. The resulting database can be queried by researchers to generate data about the Townsend artifact collection. In this thesis, the Townsend database was used to examine the use of raw materials by the prehistoric inhabitants of Tuckaleechee Cove.

This thesis is organized into seven chapters. Chapter 2 provides an overview of the physiography of the region, the local geology of the project area, a brief summary of the archaeological investigations at Townsend, previous lithic resource surveys in eastern Tennessee and an overview of regional stone tool use. Chapter 3 describes the methodology employed for the lithic resource survey of the upper Little River drainage and the Townsend lithic analysis. Chapter 4 introduces the reader to the lithic raw material categories that were identified during the Townsend archaeological analysis. Chapter 5 presents each of the study areas that were examined during the lithic resource survey of the upper Little River drainage, and the results of the lithic resource survey. Chapter 6 examines the use of local and non-local raw material using the data generated by the Townsend lithic analysis and provides a brief discussion of raw material use and selection for each of the artifact classes. Chapter 7 provides the summary and conclusions of this research.

2. Background

This chapter presents an environmental and cultural background for the upper Little River drainage. The first section discusses the physiography and regional geology of the western Blue Ridge and eastern Ridge and Valley physiographic provinces. The second section describes the local geology of the upper Little River drainage, from its source in the highlands of the Great Smoky Mountains east to the Wildwood area of Blount County in the Ridge and Valley. The third section provides an overview of the Townsend archaeological project. The fourth section provides a review of previous lithic resource surveys in eastern Tennessee. The fifth and last section is a discussion of regional stone tool use.

Physiography

The Townsend Archaeological Project consisted of multiple archaeological excavations conducted on the south side of the Little River near the town of Townsend, in Tuckaleechee Cove, Blount County, Tennessee (Figure 1). Tuckaleechee Cove is located in the upper Little River Drainage, on the western edge of the Blue Ridge physiographic Province. The cove is located east of Chilhowee Mountain, which is the local boundary between the Blue Ridge and the Ridge and Valley physiographic provinces (Tucker 1951). The Upper Little River project area includes portions of the western Blue Ridge and eastern Ridge and Valley. The Blue Ridge is a belt of ridges and highlands, stretching from southern Pennsylvania to Northern Alabama, forming the southeastern edge of the Appalachian Mountain system (Fenneman 1938; Reed 1970:195). In the southern Appalachians, the Blue Ridge is bound to the east and west by the Piedmont and Ridge and Valley provinces, respectively. The westernmost ranges of the Blue Ridge are

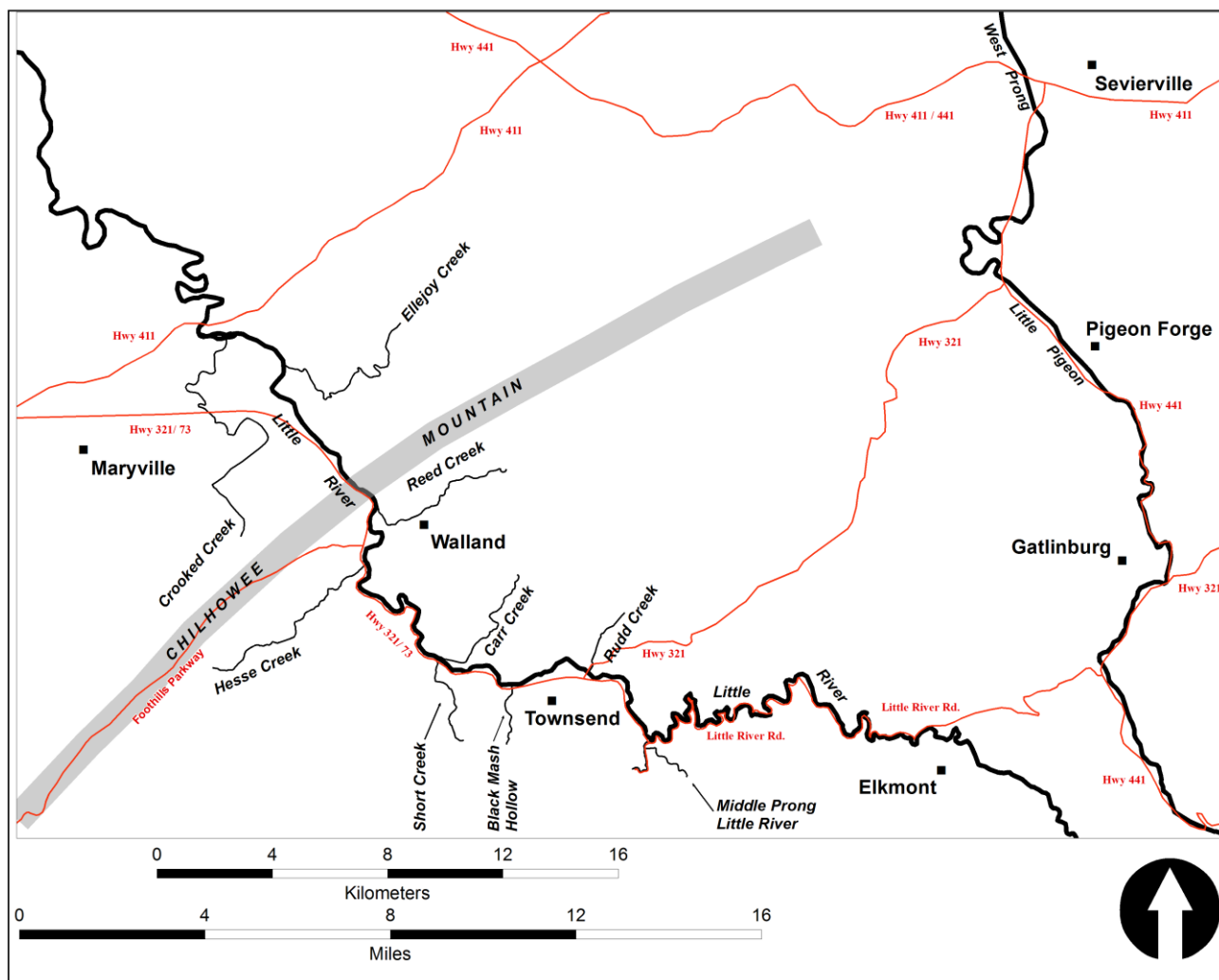


Figure 1. Overview map of the upper Little River drainage.

referred to collectively as the Unakas, and include the Great Smoky Mountains and Chilhowee Mountain (Fenneman 1938:174).

The oldest rocks in the Blue Ridge are granitic gneisses, granites and associated metamorphic rocks that form the foundation of the Appalachian Basin onto which the clastic, sedimentary and volcanic rocks were subsequently deposited (Reed 1970:197). In the southern Appalachians, the plutonic and metamorphic Precambrian rocks of the Blue Ridge moved northwest along a low angle thrust fault across the unmetamorphosed Paleozoic sedimentary rocks of the Ridge and Valley (Hatcher and Goldberg 1991:11; Reed 1970:197).

The western Blue Ridge can be divided into two sections: the highlands and the foothills (Southworth et al. 2003; Southworth et al. 2005). The highlands, which represent the eastern portion of the survey area, are predominantly underlain by metasedimentary rocks of the Great Smoky Group and Snowbird Group (Southworth et al. 2003:6; Southworth et al. 2005). The foothills section, which represents the portion of the survey area from the eastern boundary of Tuckaleechee Cove west to Chilhowee Mountain, is characterized by rolling hills and coves. The bedrock of the foothills is predominantly fine- to coarse-grained metasedimentary rocks of the Walden Creek Group, fine-grained metasedimentary rocks of the Snowbird Group, sandstone of the Chilhowee Group, Jonesboro Limestone and minor metasandstone of the Great Smoky Group (Neuman and Nelson 1965; Southworth et al. 2003:7; Southworth et al. 2005). The high knobs in the foothills are composed primarily of coarse-grained and quartzose rocks. The valley and cove floors are underlain by carbonates and siltstones (Southworth et al. 2003:7).

The Ridge and Valley is a series of narrow, linear ridges and intervening narrow valleys resulting from the differential erosion of a thick sequence of unmetamorphosed Paleozoic sedimentary rocks (Pettijohn 1970:1). In the southern Appalachians, the Ridge and Valley physiographic province is bound to the east and west by the Blue Ridge and Cumberland Plateau, respectively. The Ridge and Valley is underlain by a diverse sequence of mostly unmetamorphosed Cambrian to Paleozoic sedimentary rocks that have been strongly faulted and folded (Fisher et. al. 1970). These narrow ridges persist over great distances, parallel to each other and the trend of the mountain chain. Between the ridges are similarly extensive parallel valleys and belts of irregular knobby topography (Fisher et. al. 1970). South of Knoxville, the Ridge and Valley is characterized by low ridges, knobs and stream valleys that were carved from the valley floor (Fenneman 1938:271). This portion of the ridge and valley, which represents the portion of the survey area west of Chilhowee Mountain, is underlain by Ordovician limestone and thin siliciclastic rocks interbedded with limestone (Southworth et al. 2003:8).

Local Geology

From its headwaters in the Great Smoky Mountains, the Little River flows in a generally northwestern direction, exposing diverse Precambrian, Cambrian and Ordovician age strata and transporting large amounts of geologic materials downstream into the Ridge and Valley (Figure 2) (Neuman and Nelson 1965). The study area includes the portions of the Little River drainage from its sources in the highlands of the western Blue Ridge, through the foothills of the western Blue Ridge and into the eastern portion of the Ridge and Valley Physiographic province, southeast of Maryville, Tennessee.

Significant topographic features of the upper Little River project area from east to west include the Great Smoky Mountains, Tuckaleechee Cove, Millers Cove and Chilhowee Mountain. The following section will briefly describe the geology of each of these areas.

The Little River begins near the Collins Gap in the Great Smoky Mountains. The headwaters of the Little River are underlain by members of the Ocoee Supergroup (also referred to as the Ocoee Series) (Hadley and Goldsmith 1963; Neuman and Nelson 1965; Southworth et al. 2003; Southworth et al. 2005). The Ocoee supergroup is a thick body of unfossiliferous sedimentary and metasedimentary rock that underlies many of the mountainous areas of Tennessee and North Carolina (Hadley 1970:247; Hadley and Goldsmith 1963; Neuman and Nelson 1965:5). The Ocoee Supergroup members in the upper Little River drainage include the Great Smoky Group, Snowbird Group and Walden Creek Group (Hadley 1970; Hadley and Goldsmith 1963; Neuman and Nelson 1965; Southworth et al. 2003; Southworth et al 2005). The Great Smoky Group forms the main part of the Great Smoky Mountains and is represented in the upper Little River drainage by a range of sandstones and shale units (Hadley and Goldsmith 1963; Neuman

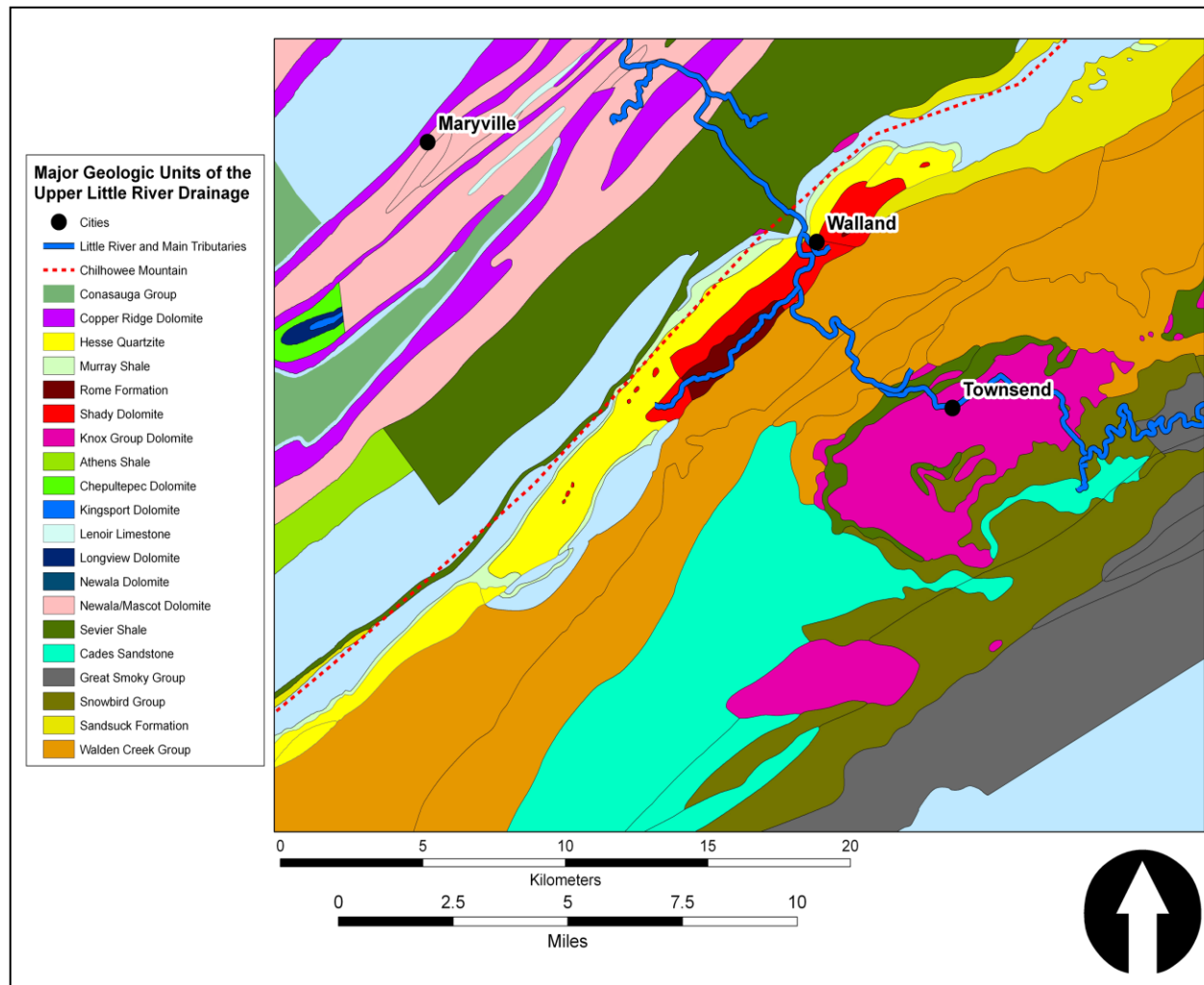


Figure 2. Major geologic units of the upper Little River drainage

and Nelson 1965; Southworth et al. 2003; Southworth et al. 2005). The Snowbird Group is represented in the project area by Metcalf phyllite, a green, chloritic metamorphic rock that is a major geologic unit of the Upper Little River drainage (Neuman and Nelson 1965). The Walden Creek Group is represented in the upper Little River drainage by formations containing numerous units of sandstone, phyllite, siltstone and conglomerate (Neuman and Nelson 1965; Southworth et al. 2003; Southworth et al. 2005).

The source streams of the Little River are underlain by coarse-grained sandstone and fine-grained conglomerate, with dark slate or schist partings (Neuman and Nelson 1965). From its headwaters, the Little River flows generally northwest for approximately 15 kilometers (km) before turning west near Elkmont. From Elkmont, the Little River meanders west for approximately 20 km through areas underlain by sandstone and Metcalf phyllite, before joining with the Middle Prong and West Prong of the Little River southeast of Townsend at an area locally known as the “Y”. From its confluence with the West Prong, the Little River flows northwest into Tuckaleechee Cove.

Tuckaleechee Cove is a large, roughly oval cove, rimmed by high ridges surrounding a broad valley floor. The valley floor of Tuckaleechee Cove is approximately 430 square kilometers or 265 square miles. Tuckaleechee Cove has a wide diversity of bedrock geology and surficial deposits (Neuman and Nelson 1965:71). Tuckaleechee Cove was formed by erosion, cutting through the rocks of the Great Smoky thrust sheet and exposing Ordovician rocks characteristic of the Ridge and Valley in the cove floor (Neuman and Nelson 1965). The Great Smoky Fault acts as a boundary between the rocks of the Great Smoky thrust sheet and the Ordovician rocks of the cove floor (Figure 3) (Neuman and Nelson 1965). Tuckaleechee Cove is oriented roughly east and west,

with the eastern boundary near the Line Spring fault and the western boundary near Kinzel Springs. From Kinzel Springs, Tuckaleechee Cove hooks south and southeast to terminate at White Oak Sinks, in the Great Smoky Mountains National Park.

The geology of Tuckaleechee Cove is dominated by members of the Ocoee Supergroup, which form high ridges bordering the cove, and Middle and Lower Ordovician carbonate rocks that form the cove floor (Neuman and Nelson 1965; Southworth et al. 2003; Southworth et al. 2005).

The ridges that form the northern border of Tuckaleechee Cove above the Great Smoky Fault are composed of siltstone, sandstone and conglomerate of the Walden Creek Group (Neuman and Nelson 1965). The ridges southwest of the Dry Valley area of southwestern Tuckaleechee Cove are formed by Ocoee series sandstone above the Great Smoky Fault, with large areas of Metcalf phyllite occurring below the Great Smoky Fault from east of Rich Mountain Gap to the southern portion of White Oak Sinks (Neuman and Nelson 1965). The entire southern border of Tuckaleechee Cove from White Oak Sinks east to the Line Spring Fault is composed primarily of Metcalf phyllite above and below the Great Smoky Fault (Neuman and Nelson 1965). The floor of Tuckaleechee Cove is covered largely by surficial deposits of Quaternary alluvium and colluvium underlain primarily by Knox Group Jonesboro Limestone, a light to medium gray, fine-grained limestone that occurs throughout much of southeastern Tennessee (Neuman and Nelson 1965:33). Nodular chert is sparse in fresh rock, but concentrated in residuum. The nodular chert is either black and dense or white and porcellaneous. While Jonesboro limestone contains chert, previous survey of Jonesboro outcrops and exposures in Cades Cove did not identify any high quality chert in this rock unit (Sweat 2005).

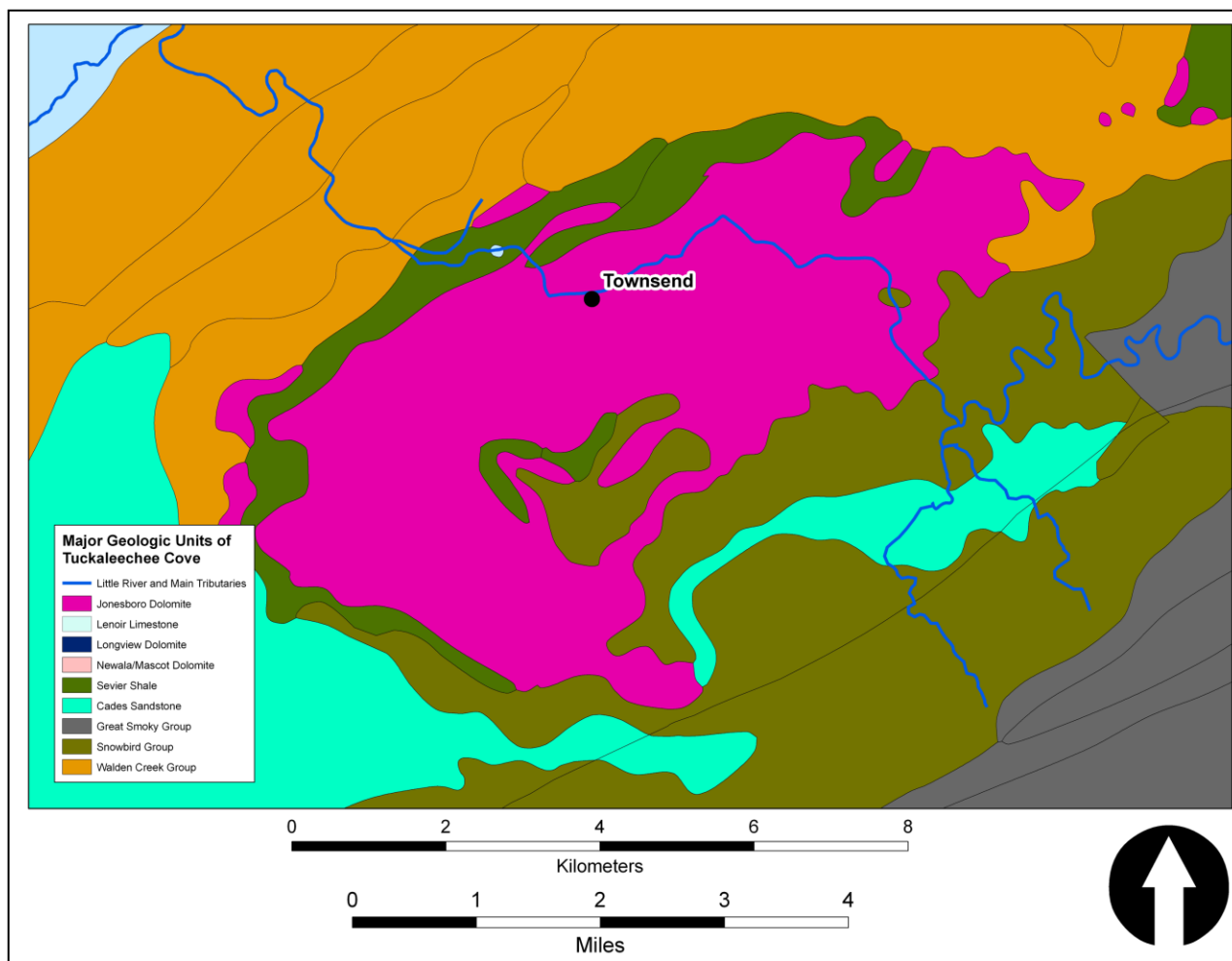


Figure 3. Major geologic units of Tuckaleechee Cove

This finding supported Bass (1977), who concluded that the limestone in the cove areas of the Great Smoky Mountains did not represent a source of tool quality chert. The Little River exits Tuckaleechee Cove near Kinzel Springs and continues flowing northwest, turning north near the town of Walland in Miller Cove. Miller Cove is an elongated lowland cove, approximately 7 miles southeast of Maryville, Tennessee (Tucker 1951:1). Miller Cove is bordered to the northwest by Chilhowee Mountain and to the southeast by Miller Cove Mountain and Hurricane Mountain (Tucker 1951:1).

The ridges that form the southeast border of Miller Cove are composed primarily of Walden Creek Group argillite, shale and sandstone. (Figure 4) (Neuman and Nelson 1965). The ridges that form the northwestern border of Miller Cove are composed primarily of members of the Chilhowee Group and Shady Dolomite (Neuman and Nelson 1965). The Chilhowee Group is a sequence of quartzites and interbedded siltstone and shale, typically exposed on Chilhowee Mountain (Neuman and Nelson 1965). Shady Dolomite consists of several kinds of light gray, medium to coarse-grained crystalline dolomite, interbedded with dolomitic shale. Shady dolomite commonly contains round to irregular masses of very fine-grained chalcedonic chert (Neuman and Nelson 1965:31). In southwest Miller Cove, Shady dolomite and resulting soils produce large quantities of jasperoid, which occurs both as dense massive siliceous rocks and siliceous breccia (Neuman and Nelson 1965:32). The floor of Miller Cove is underlain primarily by Shady dolomite, with portions of the cove floor bordering Hesse Creek and Reed Creek covered by Quaternary alluvium (Neuman and Nelson 1965; Tucker 1951).

The Little River flows northwest out of Miller Cove through a gap in Chilhowee Mountain, entering northwest of Rocky Branch and into the Ridge and Valley. This gap,

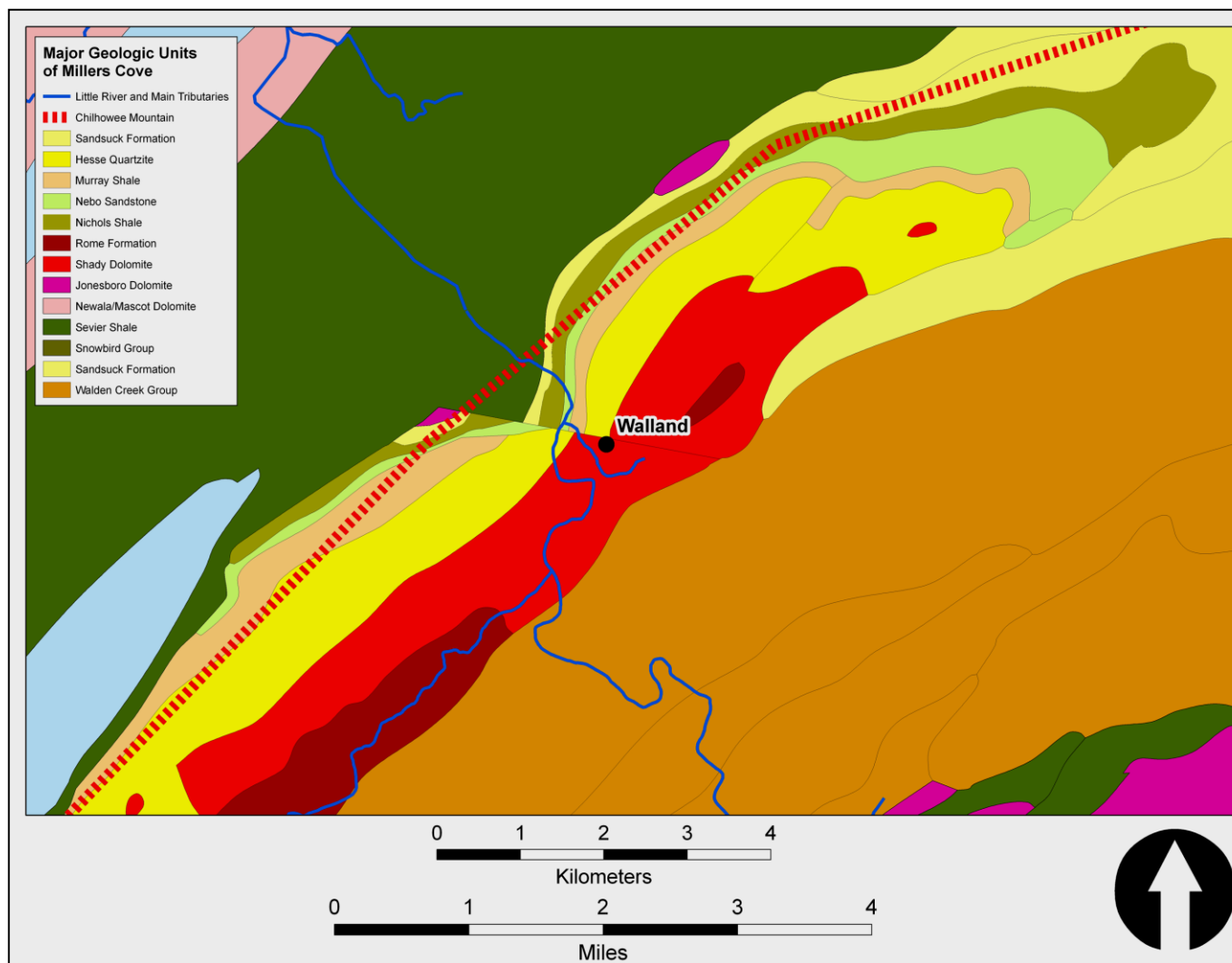


Figure 4. Major geologic units of Miller Cove

which is the present location of U.S. 73, is the only gap or low pass present along Chilhowee Mountain for many miles, and provides the only practical entrance into Miller Cove from the Ridge and Valley (Tucker 1951:8).

This gap creates a natural pathway from the Ridge and Valley into the Great Smoky Mountains via the Little River. This route would have been the easiest means of movement between the Ridge and Valley and Tuckaleechee Cove. After exiting the Blue Ridge on the west side of Chilhowee Mountain, the Little River enters the southeastern portion of the Ridge and Valley and continues flowing northwest, through Maryville, joining the Tennessee River south of Knoxville, Tennessee.

The southeastern portion of the Ridge and Valley is characterized by slaty knobs and low ridges (Fenneman 1938; Neuman and Nelson 1965). Northwest from Chilhowee Mountain, the Little River first crosses areas underlain by Middle Ordovician Sevier and Tellico Formation shales (Figure 5). The Sevier Formation consists of a sequence of calcareous shale and sandstone (Neuman and Nelson 1965:38). The Tellico Formation is a sequence of medium-gray silty and sandy calcareous shale (Neuman and Nelson 1965:37). Near the confluence of the Little River and Ellejoy Creek, the local geology becomes dominated by the chert-bearing Lower Ordovician Knox Formation Limestone (Neuman and Nelson 1965). Knox Formation units in the project area include Copper Ridge, Chepultepec and Longview dolomites as well as members of the Newala Formation and undifferentiated Knox units.

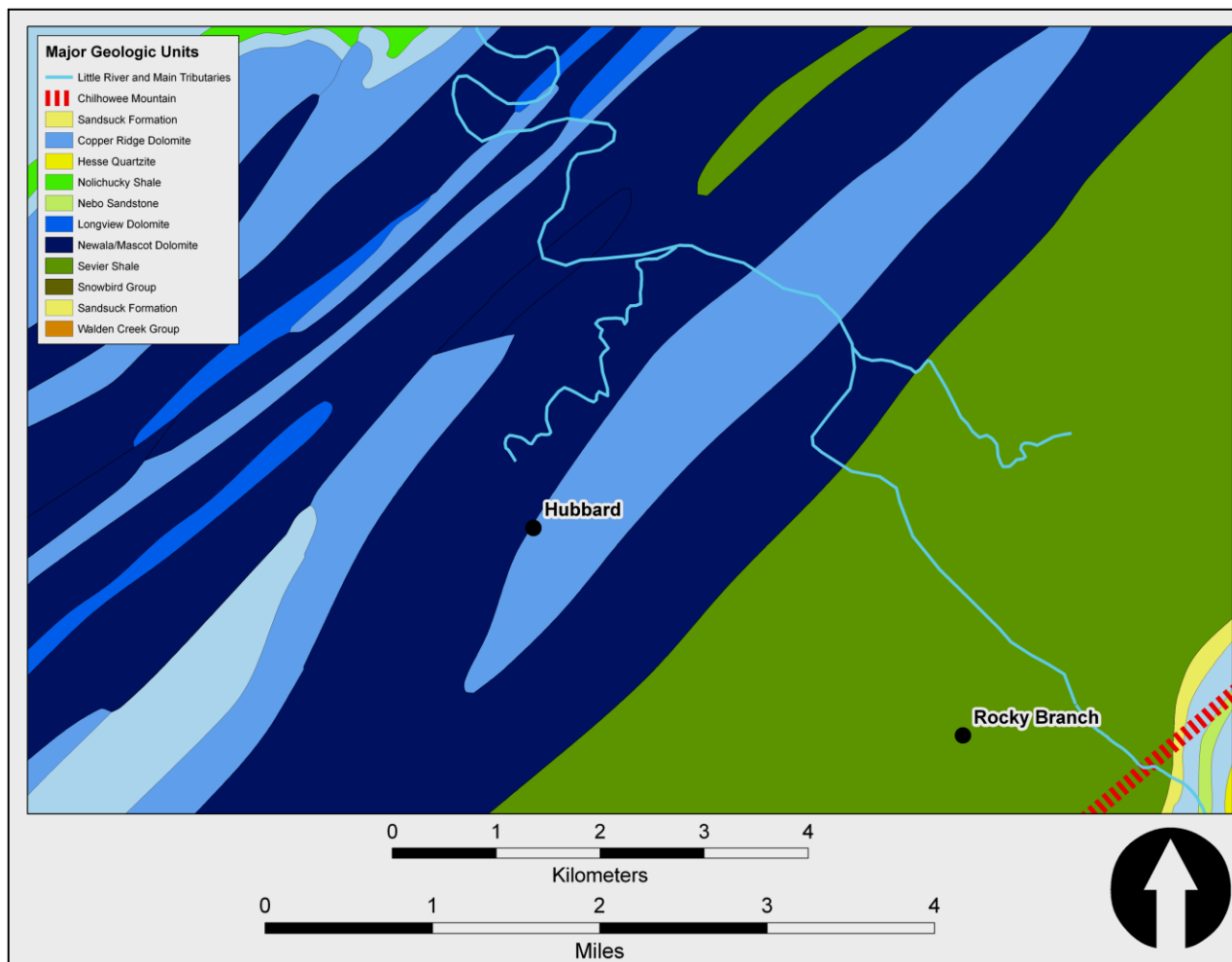


Figure 5. Major geologic units of the southeast Ridge and Valley portion of the upper Little River drainage.

Townsend Project

From 1999 to 2002, the Transportation Center at the University of Tennessee, Knoxville, conducted a number of archaeological investigations associated with the widening of State Route 73 (U.S. 321) through Townsend, Tennessee. The project area is on the south side of the Little River in Tuckaleechee Cove, and consisted of an area 7.9 km in length, running from Kinzel Springs Road on the west end of Tuckaleechee Cove east to the entrance of Great Smoky Mountains National Park (Kim and Riggs 1999). The investigations included intensive Phase I survey, Phase II testing and Phase III data recovery of portions of the project area (Kim and Riggs 1999). The Phase I survey included visual examinations of the entire project area with selective soil probing, shovel testing, surface collection of plowed transects and backhoe trenching.

Eight sites were identified during the Phase I survey of the project area. Based on the data collected during the Phase I survey, 40BT89, 40BT90, 40BT91, 40BT93 and 40BT94, were recommended for Phase II testing (Kim and Riggs 1999). The Phase II testing consisted of controlled surface collection, hand excavation of 1 m x 1 m test units, machine testing of 5 m x 5 m blocks, and hand excavation of possible cultural features. Three sites, 40BT89, 40BT90 and 40BT91 were deemed eligible for inclusion in the National Register of Historic Places (NRHP) under criterion (D) (Kim and Riggs 1999). These three sites, 40BT89, 40BT90 and 40BT91, constitute a nearly continuous site complex located on extensive east-to-west trending terraces on the south side of the Little River near the western end of Tuckaleechee Cove and occupy 2.45 km, or 31% of the total 7.90 km project area (Kim and Riggs 1999:1). To mitigate the adverse effects that the construction activities posed to these resources, the University of Tennessee

Transportation Center conducted Phase III archaeological data recovery on 40BT89, 40BT90 and 40BT91 (Figure 6) (Kim and Riggs 1999). Site 40BT94 was completely excavated during an intensive Phase II excavation. These sites are collectively referenced here as the Townsend site.

The archaeological investigations recovered large numbers of chipped and ground stone artifacts manufactured from local and non-local lithic materials. While diagnostic stone tools recovered from the Townsend site represent many of the major cultural periods in eastern Tennessee, the majority of artifacts recovered ranged from the Late Archaic (5,000-3,000 B.P.) to Historic Cherokee (A.D. 1600-1819) periods. Early Woodland (3,000 B.P.-A.D. 200) occupations are especially well represented at 40BT89 and to a lesser extent at 40BT90 (Kim and Riggs 1999:5). Extensive and discrete Middle Woodland (A.D. 200-600) components were represented at 40BT90 (Kim and Riggs 1999:5). Both 40BT90 and 40BT91 have substantial Mississippian (A.D. 900-1600) components (Kim and Riggs 1999:6). These sites include substantial components attributed to early Historic Cherokee residential occupations (Kim and Riggs 1999:6). Due to their close proximity and similar geologic and physiographic situation, the lithic artifacts recovered from sites 40BT89, 40BT90, 40BT91 and 40BT94 will be treated as a single assemblage in this study.

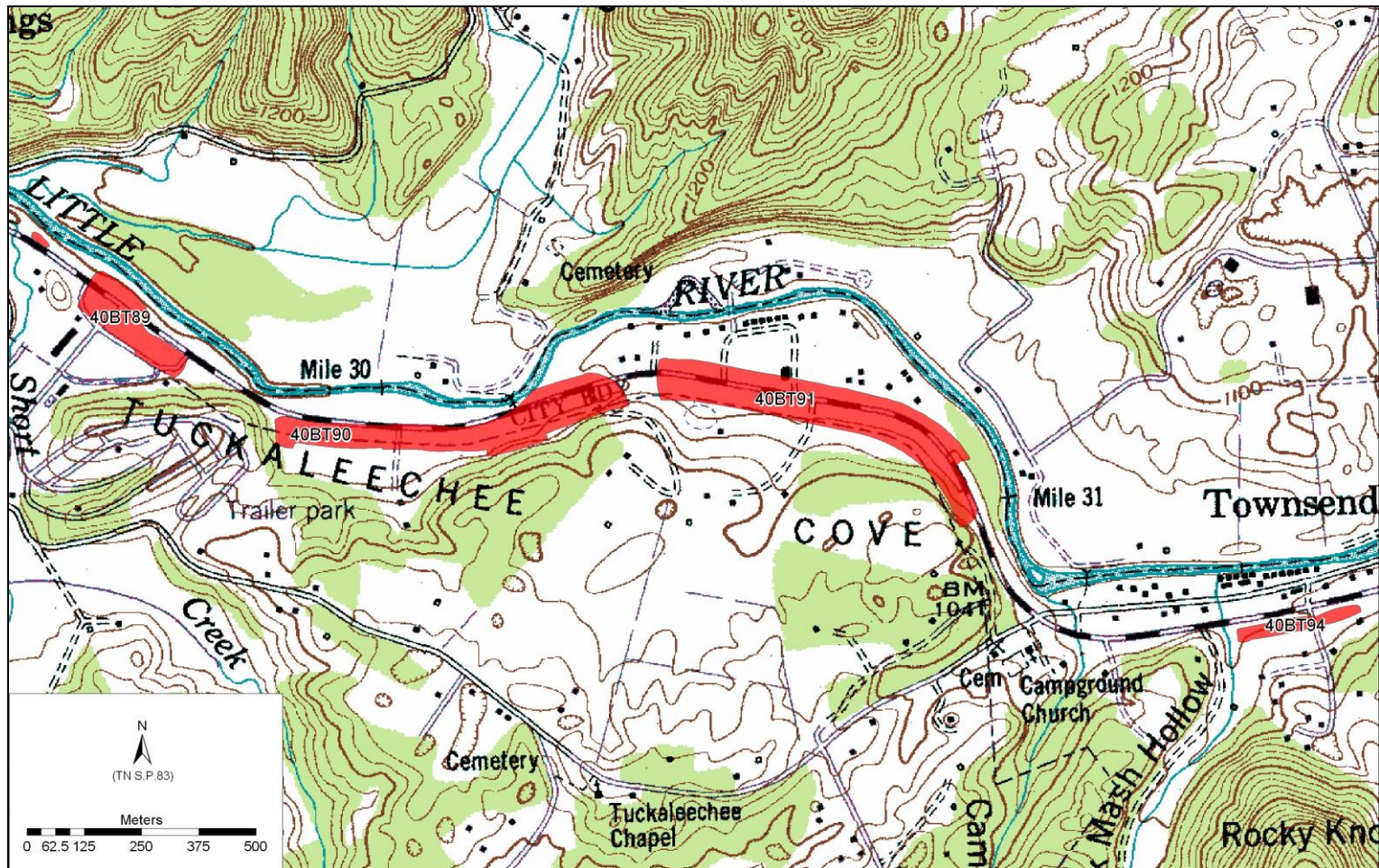


Figure 6. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of sites 40BT89, 40BT90, 40BT91 and 40BT94.

Previous Lithic Research in Eastern Tennessee

While there is an abundance of geologic literature detailing the surficial and bedrock geology of Tennessee, little literature has been devoted to the study of lithic resources as they pertain to archaeology. Notable exceptions are the works of Amick (1984), Bass (1977), Boyd (1986), Chapman (1979), Faulkner and McCullough (1976), Kimball (1985) and McIlhenny (1978), all of which included surveys and descriptions of local lithic resources in their respective archaeological investigations. While many of these investigations provided important data regarding lithic resource procurement and utilization, they are unfortunately the exceptions in a large body of archaeological literature that has been published in Tennessee. Two of these studies, Bass's *Prehistoric Settlement and Subsistence Patterns in the Great Smoky Mountains National Park* (1977) and Kimball's *The 1977 Archaeological Survey: An Overall Assessment of the Archaeological Resources of the Tellico Reservoir* (1985) made important contributions to the study of lithic raw materials in southeastern Tennessee and western North Carolina.

Bass's (1977) work, while focused largely on sites on the North Carolina side of Great Smoky Mountains National Park, remains the largest and most important archaeological investigation of the Great Smoky Mountains. Many of Bass's (1977) conclusions with regard to changes in the use of raw material type, upland subsistence patterns and seasonal land use continue to influence the practice of archaeology in the Great Smoky Mountains National Park and surrounding region. Of particular importance to this study is Bass's (1977) examination of temporal changes in the use of lithic raw materials, which he relates to changes in mobility and settlement patterns during different time periods. According to Bass, in the Early Archaic period there is a preference for high quality chert

obtained from the Ridge and Valley. There is a shift to the use of easily obtainable but lesser quality quartz and quartzite during the Middle and Late Archaic periods, which may reflect a decrease in mobility, which resulted in the increased use of locally available materials (Bass 1977). The use of chert obtained from the Ridge and Valley increases during the Woodland periods and continues into the Mississippian and Cherokee periods, which Bass (1977) relates to increased trade and group interaction (Bass 1977). Bass (1977) also concluded that the Jonesboro dolomite that occurs extensively in the Cades Cove, Tuckaleechee Cove and Wears Cove did not represent a source of usable chert.

The most extensive lithic resource survey undertaken in eastern Tennessee to date is Kimball's (1985) lithic resource study of the Tellico Reservoir. This research was undertaken as part of a large salvage archaeology project conducted prior to the inundation of large portions of the Little Tennessee River drainage by the Tennessee Valley Authority's Tellico Reservoir. This lithic resource survey documented and collected specimens from 24 chert source areas and identified non-local source areas for jasper and chalcedony based on previous survey work and geologic literature. The resulting data were used to examine the distribution of lithic raw materials in the Little Tennessee River drainage, identify the major chert bearing units of Knox limestone and dolomite and create categories to describe the macroscopic characteristics of Knox chert that occurs in southeastern Tennessee. Kimball's (1985) work remains the most influential lithic resource study conducted in eastern Tennessee to date and the classification scheme for Knox chert is widely used in describing chert derived from Knox group limestone and dolomite.

Regional Stone Tool Use

This section presents an overview of the chronology of stone tool use in the eastern Ridge and Valley and Western Blue Ridge, including portions of eastern Tennessee and western North Carolina. When possible, temporal changes in technology, tool forms and raw materials are discussed. In the following section, historical type names are used to describe projectile point/knife types. Despite the questionable utility of type names, they provide a widely understood and well precedented means of describing common stone tools. While it is generally accepted that many projectile points may have been multifunctional tools, the following chapter uses the term projectile point to refer to any tool whose primary function was as a hafted spear, dart or arrow tip. All date ranges in the following section are general and are not meant to reflect specific radiocarbon dates.

Paleo-Indian Period (c.a. 11,500-10,000 B.P.)

The initial human occupation of the southeastern U.S. likely occurred between 15,000 and 11,000 radiocarbon years B.P., during the Late Glacial Era (Anderson et al. 1996:3; Lane and Anderson 2001:93). The Paleo-Indian period is the earliest generally accepted cultural period in the Mid-South and represents the initial arrival of people in the Southeastern United States (Ward and Davis 1999:29). The Paleo-Indian period is often characterized by small, highly mobile bands of hunters and gatherers with collector or logistically based subsistence adaptations (Anderson et al. 1996). This mobility is represented by the almost exclusive use of high quality cryptocrystalline materials for the manufacture of stone tools during the Paleo-Indian period. Characteristic Paleo-Indian tools include well-made, formal lithic artifacts such as large fluted and non-fluted lanceolate projectile points, bifaces, hafted end and side scrapers, graters, spoke shaves

and blades (Anderson et al. 1996:6; Chapman 1985:34; Ward and Davis 1999:29).

Diagnostic Paleo-Indian projectile points that occur in eastern Tennessee include Clovis, Cumberland, Quad, Beaver Lake and Dalton Types.

While archaeological sites in eastern Tennessee are known to produce numerous Paleo-Indian projectile points and tools, the majority of published Paleo-Indian archaeological sites are located in middle and western Tennessee (Broster and Norton 1996:291). Archaeological excavations in eastern Tennessee have not identified any intact, stratified Paleo-Indian sites. Paleo-Indian artifacts, as Lane and Anderson (2001) point out, are even more infrequent in the central and more mountainous regions of the southern Appalachians. No Paleo-Indian artifacts were found during Bass's (1977) survey of the Great Smoky Mountains and only four Paleo-Indian projectile points were recovered from the Townsend excavations.

The recovery of Paleo-Indian artifacts makes it certain that Paleo-Indian groups utilized eastern Tennessee in some capacity. Most archaeologists believe that the lack of Paleo-Indian sites in eastern Tennessee may be related to site preservation. Lane and Anderson (2001) point out that mountainous terrain, such as the southern Appalachians, is composed of erosional rather than depositional environments, which may affect the likelihood of site preservation (Lane and Anderson 2001:90). This erosion may have resulted in the destruction of many Paleo-Indian sites, especially during the early Holocene, when increased run-off at the end of the Wisconsin glaciation may have resulted in scouring of floodplain sites (Chapman 1985:36).

The Archaic Period (10,500 –3,000 B.P.)

The Early Archaic Period (c.a. 10,500-8,000 B.P.) is generally viewed as the period when native populations began to adapt to Holocene climatic conditions (Ward and Davis 1999:51). In east Tennessee, excavations conducted under the direction of Jefferson Chapman as part of the Tellico Reservoir project defined the Early Archaic chronology in eastern Tennessee. The excavation of deeply stratified Early Archaic components at the Rose Island, Icehouse Bottom, Bacon Farm and Calloway Island sites remain the most definitive studies of Early Archaic settlement in eastern Tennessee to date (Chapman 1973,1975,1977,1978).

While most of the tools that were present in the Paleo-Indian tool kit continue to be used during the Early Archaic, there were dramatic changes in projectile point morphology, with the fluted lanceolate projectile point form being replaced by side-notched and corner-notched forms. Chapman (1979) states that the projectile point/knife is the most sensitive single object to stylistic change during the Archaic Period (Chapman 1979:23). The shift from lanceolate spear points to corner notched forms was likely related to the change from a thrusting type spear to a spear propelled by an atlatl, though atlatl weights are not known in eastern Tennessee until the Kirk Stemmed Phase of the Middle Archaic (Chapman 1985). Blade tools became more frequent during the Early Archaic in the Tellico Reservoir, including utilized blades, retouched blades, knives and side scrapers (Chapman 1978:73). In eastern Tennessee, the majority of Early Archaic tools continue to be manufactured from high quality cryptocrystalline materials such as chert and chalcedony.

The first half of the Early Archaic period in the Little Tennessee River Valley is represented by the Lower Kirk and Upper Kirk Phases (10,500-8,800 B.P.) (Davis 1990:57; Kimball 1996). The oldest Early Archaic component identified during the Tellico excavations was the Lower Kirk component, represented by Kirk Corner-Notched projectile points with large, ground excurvate bases similar in form to Lost Lake, Plevna and Charleston Corner-Notched types (Chapman 1977:24; Kimball 1996:158). Excavation of the Lower Kirk levels at the Icehouse Bottom site identified evidence of textiles and basketry (Chapman and Adovasio 1977).

The subsequent Upper Kirk component identified at Tellico is represented by a variety of large Kirk Corner-Notched and small Kirk Corner-Notched forms. These forms exhibit both ground and unground bases and are similar to the Palmer, Pine Tree, Autauga, Ecusta and Cocke Serrated types (Chapman 1978; Kimball 1996:158). Lithic tools associated with the Upper Kirk Phase at Tellico include formalized end scrapers, bifacial knives, pièce esquillès and pitted cobbles (Davis 1990:57).

The latter part of the Early Archaic period (8,900-7,800 B.P.) is represented in eastern Tennessee by bifurcate projectile point types such as LeCroy, St. Albans, MacCorkle and Kanawha forms (Baden 1983; Chapman 1978; Davis 1990; Kimble 1985). The bifurcate tradition is marked by the occurrence of projectile points with distinct bifurcate bases, a decrease in the use of some formalized lithic tool types and an increase in bipolar lithic reduction (Chapman 1978; Davis 1990:57; Kimball 1996). The frequency of blade tools decreased during the latter part of the Early Archaic and flakes become commonly used as tool blanks (Chapman 1978:74). The use of high quality cryptocrystalline materials continues through the end of the Early Archaic. The increased use of bipolar technology

in the latter part of the Early Archaic Period in eastern Tennessee may be an adaptation to the small size of local Knox chert nodules (Chapman 1979:250). At Tellico, the production of teardrop end scrapers and teardrop end scrapers with graver spurs, which begun in the Paleo-Indian and continued through the Dalton and Kirk Phases, declined during the bifurcate Phase and disappeared altogether by the Middle Archaic (Kimball 1996:165). Other lithic tools used in the Early Archaic include chipped and ground stone celts and plant processing materials such as pitted cobbles, manos and metates (Chapman 1978, 1985).

The Middle Archaic Period (8,000 – 5,000 B.P.) in eastern Tennessee and Western North Carolina is marked by the appearance of stemmed projectile points, ground-stone atlatl weights, net sinkers, and the increased use of locally available, lower quality lithic resources (Bass 1977; Chapman 1977, 1978; Davis 1990; Keel 1976; Ward and Davis 1999). The chronological relationship of many of the Middle Archaic projectile point types in eastern Tennessee was established at the Howard site in the Tellico Reservoir (Chapman 1977, 1978, 1979; Davis 1990). Middle Archaic projectile points occurring in eastern Tennessee and western North Carolina generally possess stemmed hafting elements and include the Kirk Stemmed, Stanly, Morrow Mountain I, Morrow Mountain II and Sykes types (Baden 1983; Chapman 1977, 1978, 1979; Coe 1964; Keel 1976; Kimball 1985). Lanceolate Guilford projectile points occur in North Carolina, but occur rarely on sites in eastern Tennessee (Bass 1977).

The earliest Middle Archaic Phases in eastern Tennessee and western North Carolina are the Kirk Stemmed phase (8,000-7,800 B.P.) and Stanly phase (7,800 – 7,500 B.P.), characterized by Kirk Stemmed and Stanly Stemmed projectile points, respectively

(Chapman 1978; Davis 1990:57). While these two point types differ typologically, excavations at the Howard site in the Tellico Reservoir identified little difference between the lithic assemblages associated with the Kirk Stemmed and Stanly Phases (Davis 1990).

The first firm evidence for the use of the atlatl is during the Kirk Stemmed Phase in eastern Tennessee and the Stanly Phase in western North Carolina (Chapman 1985; Ward and Davis 1999:63). Net sinkers also appear during the Kirk Stemmed Phase in eastern Tennessee (Chapman 1978). All of the Kirk Stemmed points recovered from the Howard Site were manufactured from high quality cryptocrystalline materials, primarily local Knox chert (Chapman 1979). The Stanly Phase at the Icehouse Bottom site was marked by the appearance of significant amounts of quartz and quartzite (Chapman 1977:25).

The Morrow Mountain Phase (7,500-7,000 B.P) is characterized by Morrow Mountain I and Morrow Mountain II type projectile points, expedient tools and the use of mainly hard hammer percussion in the manufacture of chipped stone tools. While there was a reduction in the use of high quality chert during the Morrow Mountain Phase at Icehouse Bottom, the majority of the Morrow Mountain I and Morrow Mountain II points from the Howard Site were manufactured from flakes of local Knox chert (Chapman 1977a:25; Chapman 1979:25). Chapman (1979) noted that most of the Morrow Mountain I points from the Howard Site also exhibited cortex, suggesting the small nodule size of most locally available Knox chert (Chapman 1979:25). The latter part of the Middle Archaic period (7,000-5,000 B.P.) in Tellico is represented by the sporadic occurrence of Guilford and Sykes type projectile points (Davis 1990:58).

As mentioned above, there is a shift in many areas to the use of lower quality non-cryptocrystalline lithic materials during the Middle Archaic. Bass (1977) noted an increased utilization of quartz and quartzite during the Middle Archaic in the Great Smoky Mountains. The use of formal tools decreased during the Middle Archaic and there is an increase in the use of expedient tools (Davis 1990; Ward and Davis 1999:63). Expedient tools are generally ones manufactured quickly for a particular purpose and then discarded, whereas formal tools are well-made tools that are curated and reused. Other lithic tools associated with the Middle Archaic include ground stone axes and scrapers (Keel 1976).

The Late Archaic Period (5,000-3,000 B.P.) is generally characterized by increased sedentism and a dramatic increase in population (Chapman 1985; Davis 1990; Ward and Davis 1999). Diagnostic Late Archaic projectile points occurring in eastern Tennessee and western North Carolina are generally large, broad bladed, stemmed projectile points such as the Savannah River/Appalachian Stemmed, Iddins and Otarre types (Baden 1983; Bass 1977; Keel 1976; Kimble 1985; Ward and Davis 1999). In southeastern Tennessee, the Late Archaic has been divided into the Savannah River and Iddins Phases (Davis 1990; Ward and Davis 1999).

The Savannah River Phase (5,000-3,800 B.P) is marked by the presence of large, Savannah River type spear points (Davis 1990; Dickens 1976; Keel 1972; Ward and Davis 1999). Artifacts associated with the Savannah River Phase include grooved axes, notched net weights, mortars, pestles and fragments of steatite vessels (Dickens 1976; Keel 1972). The excavation of the Savannah River Phase levels at the Bacon Bend site recovered evidence for domesticated squash. Savannah River points were recovered in

association with Early Woodland materials at Phipps Bend, suggesting that the form may have continued into the Early Woodland period in northeastern Tennessee (Lafferty 1981).

The later Iddins Phase (3,800-3,200 B.P.) is characterized by the presence of Iddins Undifferentiated Stemmed, Ledbetter and Otarre type projectile points (Chapman 1981; Davis 1990; Ward and Davis 1999). The occurrence of undifferentiated stemmed points in the Late Archaic is widespread in eastern Tennessee. This “catch all” category refers to the high degree of morphological variation in Late Archaic stemmed points. Artifacts associated with the Iddins Phase at Tellico include notched pebble sinkers, grooved axes and carved steatite vessels (Davis 1990:58).

While steatite was used in the manufacture of atlatl weights during the Middle and Late Archaic periods, the use of steatite became increasingly more widespread during the Late Archaic with the appearance of steatite cooking stones and carved steatite vessels (Keel 1976; Ward and Davis 1999; Wells 2006). During the latter half of the Late Archaic period there was an intensive exploitation of steatite across the southeastern U.S. for the manufacture of carved stone vessels (Ward and Davis 1999; Wells 2006). The use of steatite vessels in eastern Tennessee and western North Carolina continued, albeit with less frequency, into the Swannanoa Phase of the Early Woodland (Keel 1972; Schroedl 1975). Other lithic artifacts associated with the Late Archaic period include grooved ground stone axes, bar gorgets, elbow pipes, and notched net weights (Chapman 1985; Davis 1990; Keel 1976; Schroedl 1975).

As previously mentioned, the Late Archaic period in the western Blue Ridge and much of the eastern Ridge and Valley is dominated by large stemmed and

undifferentiated stemmed projectile points, such as the Savannah River and Iddins types.

During the latter part of the Late Archaic, there is a great deal of variation in projectile point forms in parts of Middle Tennessee and Northern Alabama. Barbed Terminal Archaic forms such as the Wade, Delhi, Cotaco Creek and Buck Creek types occur later than the large, stemmed Late Archaic forms (Faulkner and McCollough 1973; Futato 1977:235). These projectile point types represent the terminal preceramic occupation in the Normandy area of Middle Tennessee, but occur in association with ceramics in North Alabama (Futato 1983; Shaw 2000; Walthall 1980). Justice (1987) suggests that eastern Tennessee lies at or just beyond the easternmost range of the Delhi and Wade types.

The Woodland Period (2,900 B.P. – A.D. 900)

As a whole, the Woodland period in the southeastern U.S. is viewed as a time when prehistoric groups began the gradual shift towards agriculturally based economies and permanent sedentary societies (Ward and Davis 1999:3). The Woodland period is generally characterized by the adoption of horticulture and the florescence of ceramic technologies, both of which had their beginnings in the Late Archaic period, but became widespread during the Woodland period (Ferguson 1988:76). The Woodland period in the southeastern U.S. is also seen as a time during which societies became more internally complex, developed elaborate mortuary rituals, constructed earthen mounds and developed long distance trade networks (Ward and Davis 1999:3). During the Woodland Period, projectile points and other lithic artifacts become less important to archaeologists as temporal markers. Simple projectile point forms such as large triangular forms, small triangular forms and spike forms become predominant during the Early

Woodland and continue over long periods of time. One of the major changes in lithic technology during the Woodland Period is the introduction of the bow and arrow (Dickens 1976; Ward and Davis 1999). While the timing of this introduction is debated, it was undoubtedly introduced sometime during the Woodland Period in eastern Tennessee and western North Carolina (Dickens 1976; Ward and Davis 1990).

The Early Woodland (3,000 B.P – A.D. 200) in eastern Tennessee is characterized by the presence of crushed quartz-tempered or crushed quartzite-tempered Watts Bar and limestone-tempered Longbranch ceramics (Calabrese 1976; Chapman 1981; Davis 1990; Kimball 1985; Lewis and Kneberg 1946; Schroedl 1975). No definitive projectile point type for this temporal unit was identified during the Tellico excavations. In most of eastern Tennessee and western North Carolina, the Early Woodland is dominated by small, stemmed and triangular forms (Dickens 1976; Kimball 1985; Keel 1972, 1976; Lafferty 1981; Schroedl 1975, 1978). Early Woodland projectile points occurring in eastern Tennessee include stemmed forms like the Coosa and Ebenezer types and large triangular forms such as the Candy Creek, Camp Creek, Greeneville and Nolichucky types (Kimball 1985; Lafferty 1981; Schroedl 1975, 1978). The recovery of stemmed Adena type projectile points and non-local raw materials during the Tellico excavations may suggest interaction with Early Woodland groups in the Ohio River drainage, which continued into Middle Woodland times (Chapman 1979, 1985; Keel 1972, 1976; Dickens 1976).

In western North Carolina, the early Woodland is characterized by crushed quartz-tempered, crushed quartzite-tempered and coarse sand-tempered Swannanoa ceramics and small-stemmed points such as the Swannanoa, Plott Stemmed and Gypsy types

(Dickens 1976; Keel 1972,1976; Ward and Davis 1999:143). Based on the association of Early Woodland stemmed projectile point forms and large triangular forms such as the Transylvania Triangular forms, Ward and Davis (1999) suggest that the bow and arrow may have been introduced during the Early Woodland period in western North Carolina. Other artifacts associated with the Early Woodland period in western North Carolina include expanded bar gorgets, net weights, tubular ceramic pipes and steatite vessels (Dickens 1976; Keel 1972, 1976).

Excavations at Phipps Bend recovered Ebenezer stemmed points in association with Swannanoa pottery. This association led Lafferty (1981:225) to conclude that the Ebenezer type was introduced into northeastern Tennessee during the Swannanoa Phase, further suggesting that the Ebenezer and Swannanoa stemmed types are not only contemporaneous but may be culturally related. Spike type forms such as the Bradley Spike and Flint River Spike also occur in eastern Tennessee during the Early Woodland and continue into the Middle Woodland period (Lafferty 1981; Schroedl 1975). Grooved axes, which are generally associated with the Late Archaic, are occasionally recovered in Early Woodland contexts in eastern Tennessee (Schroedl 1975:88). Other lithic artifacts associated with the Early Woodland are flake scrapers and gravers, stone discs, celts, steatite tubes and tubular pipes, pendants and gorgets (Davis 1990:59; Dickens 1976; Keel 1972). Excavations at the Calloway Island, Harrison Branch, Thirty Acre Island, Rose Island and Warren Wilson sites identified postholes, representing the earliest evidence of permanent structures in eastern Tennessee and western North Carolina (Chapman 1985:67; Keel 1972:299).

The Middle Woodland period (A.D. 200 – 600) in eastern Tennessee is characterized by complex trade networks, increased use of cultigens and the use of limestone-tempered ceramics such as the Candy Creek and Longbranch types (Chapman 1985; Davis 1990; Schroedl 1975). Middle Woodland projectile points in eastern Tennessee are large triangular and spike forms that first appeared during the Early Woodland (Baden 1983; Davis 1990; Keel 1976; Kimball 1985; Schroedl 1975, 1986). The Middle Woodland in western North Carolina is characterized by the occurrence of quartz-tempered Pigeon and sand-tempered Connestee ceramics (Keel 1972, 1976). Lithic artifacts associated with the Pigeon and Connestee Phase are small side-notched and triangular projectile points, expanded-center bar gorgets, grooved axes, stone disks, groundstone pipes, celts and abraded pigment stones (Dickens 1976; Keel 1972; Ward and Davis 1999). During the later part of the Middle Woodland there is evidence of long distance trade in both eastern Tennessee and western North Carolina. Excavations at Tellico and in the Appalachian Summit of Western North Carolina recovered exotic raw materials such as Flint Ridge chalcedony and non-local chert, as well as prismatic blades, Hopewellian pottery sherds, and copper artifacts, much of which apparently had origins in the Ohio River Valley (Chapman and Keel 1979; Davis 1990; Keel 1976; Ward and Davis 1999:151).

The cultural dynamics and stylistic markers that characterize the Late Woodland Period (A.D. 600 – 900) in both the Tellico Reservoir and the mountainous areas of the western Blue Ridge are poorly understood (Davis 1990; Dickens 1976; Ward and Davis 1999:157). The Late Woodland in eastern Tennessee is characterized by the occurrence of limestone-tempered Hamilton and Candy Creek ceramics, burial mounds and small, triangular Hamilton incurvate projectile points (Lewis et al. 1995; Lewis and Kneberg

1946; Schroedl 1976). Other diagnostic projectile points for the Late Woodland include the Bradley Spike type and small triangular forms including the Connestee Triangular (Davis 1990; Kimball 1985). Keel (1972) suggests that Connestee Phase continues in North Carolina until around 1,000 AD making it contemporaneous with the Early Mississippian Martin Farm and Hiwassee Island Phases in eastern Tennessee (Keel 1982:306).

Mississippian Period (A.D. 900 – 1600)

The Mississippian Period is characterized by the widespread adoption of maize agriculture, increased political complexity, elaborate and well developed religious ceremonialism, and an increase in population and territoriality (Chapman 1985:74). While there is some variation in the style and manufacture of projectile points during the Mississippian, projectile point forms are generally small, thin triangular and pentagonal forms that first appeared during the Late Woodland (e.g. Hamilton, Madison and Jacks Reef types). The manufacture of small, triangular projectile point forms spans the whole of the Mississippian Period, making the identification of cultural affiliation based on these tools problematic in the absence of other diagnostic artifacts (Russ and Chapman 1983:69). As in the preceding Woodland period, Mississippian chronology is best defined by ceramic types.

The Martin Farm Phase (A.D. 900 – 1100) is the initial Mississippian unit in eastern Tennessee, representing an in-situ development of the Mississippian cultural expression in eastern Tennessee (Davis 1990:60; Kimball 1985:147). The excavation of the Martin Farm site identified pottery attributes associated with the preceding Late Woodland and subsequent emergent Mississippian Hiwassee Island Phase (Kimball 1985:148).

Diagnostic projectile points are small, triangular and pentagonal forms such as the Hamilton and Jacks Reef types (Kimball 1985). Other stone tools associated with the Early Mississippian include celts, mortars, scrapers and ground stone earspools (Chapman 1985). During the Martin Farm Phase at Tellico, there is evidence for a greater reliance on maize agriculture, and increased residential site size and complexity, suggesting sociopolitical patterns not present in earlier periods (Davis 1990:60).

The Hiwassee Island Phase (A.D. 1100–1300) represents cultural continuity from the Martin Farm Phase (Davis 1990:60). During the Hiwassee Island Phase, habitation sites become more numerous, with some habitations becoming disproportionately larger, reflecting greater socio-political complexity (Davis 1990:60; Lewis and Kneberg 1995). Ceramic types became almost exclusively shell-tempered and there was an expansion in vessel forms and decoration (Davis 1990:60; Lewis et al. 1995; Lewis and Kneberg 1946). Diagnostic projectile points are indistinguishable between the Martin Farm and Hiwassee Island Phase and are represented by small triangular and pentagonal forms such as the Hamilton, Madison and Jacks Reef types (Kimball 1985).

The Late Mississippian (A.D. 1300– 1600) in eastern Tennessee is represented primarily by the Dallas and Mouse Creek Phases, characterized by Dallas and Mouse Creek shell tempered pottery assemblages (Lewis and Kneberg 1946; Polhemus 1987). Projectile point forms during the Dallas Phase continue to be small, well made triangular projectile points such as the Dallas excurvate form (Lewis and Kneberg 1946; Schroedl 1986). Other lithic artifacts associated with the Dallas Phase include knives, celts, adzes, drills, discoidals, mortars, pestles, pipes, stone pendants, stone disks (Lewis et al. 1995; Lewis and Kneberg 1946).

The Historic Cherokee (A.D. 1600 -1819) represents the material culture of the Overhill Cherokee from the time of European contact through their removal in 1819 (Kimball 1985). The term Overhill refers to the Cherokee settlements situated in the Ridge and Valley physiographic province of eastern Tennessee (Dickens 1979). Prior to the establishment of European trade, projectile points continued to be small, thin, well made triangular forms (Schroedl 1986; Polhemus 1987). Other stone tools include chipped stone flake scrapers, side scrapers, drills and native made gunflints and ground stone celts, stone pipes and discoidals (Keel 1976:215). During the early 1700s, traders established sustained contact with the Cherokee, including the Overhill towns in the Little Tennessee Valley (Keel 1976:216; Schroedl 1986:7). European goods commonly traded to the Cherokee included guns, ammunition, blankets, knives, axes, hoes, beads, paint and alcohol (Keel 1976; King 1979; Schroedl 1986). Many of these materials were recovered from Overhill Cherokee sites in eastern Tennessee such as Chota-Tenasee and Mialoquo (Russ and Chapman 1984; Schroedl 1986).

Chapter 3. Methodology

The following chapter presents the field and laboratory methodology used during the lithic resource survey of the Upper Little River drainage. The field survey portion of this research focused on the location and documentation of lithic raw material source areas. The laboratory portion of this research compared the raw materials collected from the field with artifacts from the Townsend assemblage and examined raw material use and selection.

Field Methods

The field survey of the upper Little River drainage was accomplished using a combination of systematic streambed surveys and opportunistic streambed and terrestrial surveys. Systematic stream surveys were conducted using an areal grid method to sample the amount of variation present in the specific streams and to identify the materials that were transported from smaller streams into the Little River. The areal grid method, modified from Amick's (1984) study of lithic variability in the Duck River basin, provides a means of quantitatively sampling for materials in a streambed context (Amick 1984:81). The areal grid method refers to the collection of gravels from a specified surface area, with a specified limit on the number and size of particles collected (Amick 1984:81). During the lithic resource survey of the upper Little River drainage, 50 specimens were collected and tested from a 4 m² portion of each survey area. To achieve this collection strategy, a 2 x 2 m area was measured off and 50 specimens were randomly collected. In order to ensure that the specimens were randomly collected, the areal grid was divided into 4 quadrants and the specimens were selected individually from each of these 1 m² quadrants. One specimen was selected from each quadrant,

moving counter-clockwise, until 50 specimens had been collected. Each specimen was broken (tested) and attributes recorded for each included length, width and material type. Some specimens were collected and returned to the Archaeological Research Laboratory (ARL) for identification or comparison with artifacts. Most specimens was tested, recorded and discarded in the field. All survey areas located on tributaries of the Little River were situated a sufficient distance from the main channel to ensure that the materials were not deposited by the Little River at or near the confluence by high water. The seven locations of these systematic stream surveys are discussed in the following chapter.

Opportunistic surveys were conducted in areas where geologic literature identified a high probability of particular lithic material occurring or where local informants identified a source for a particular raw material. The term “opportunistic” is used in this case to refer to areas where the areal grid method was not used. Opportunistic survey was generally chosen to identify particular raw materials. While this method does not allow for quantitative sampling, it is much faster than the areal grid method. Opportunistic survey was conducted in both streambed and terrestrial locations including river channels, gravel bars, eroded banks, bedrock exposures, talus slopes, colluvium and stream terraces. Four additional areas in Cades Cove were previously surveyed by the author as part of a preliminary lithic resource survey of Cades Cove (Sweat 2005). The results of that opportunistic survey are also discussed in this thesis.

The location of each survey area was plotted on a USGS 7.5' quadrangle map. While some areas were small sites or single outcrops, others were large survey areas. GPS locations were recorded for small sites or outcrops but not for the larger areas. All

surveys conducted on private land were done with the permission of landowners or with local informants. A single survey area was located on federal property. An ARPA permit was obtained for this site, which was located in the Great Smoky Mountains National Park (GRSM). However, no archeological materials were collected from federal property. Visual survey was conducted and geologic samples were collected from the GRSM. All the geologic samples collected from the Park will be returned to the GRSM for inclusion in the Natural History collection or discarded in accordance with the wishes of the GRSM museum curator. All geologic samples recovered from private property were returned to the Archaeological Research Laboratory at the University of Tennessee for analysis and retained as part of the lithic comparative collection at the Archaeological Research Laboratory.

Laboratory Methodology

In the laboratory, the geologic samples were compared macroscopically with artifacts from the Townsend collection. These data were used to identify patterns of raw material selection in the Townsend lithic assemblage. The macroscopic comparison of raw materials and tools has been successful in the identification of lithic material sources in the Mid-South (Faulkner and McCullough 1973; Johnson and Meeks 1994; Kimball 1985; Randall 2000; Skrivan and King 1983).

The artifacts recovered during the Townsend excavations were analyzed by the staff of the Archaeological Research Laboratory and graduate students from the University of Tennessee Department of Anthropology. Each specimen within each of the lithic tool classes was assigned a material type. These were then compared with the results of the lithic resource survey to identify patterns of locally available versus non-locally available

lithic raw materials. This analysis identified patterns of raw material acquisition for particular classes of artifacts, allowing inferences to be made about procurement strategies used by prehistoric people in Tuckaleechee Cove.

In this research, there was a focus on documenting sources of high quality raw materials, particularly in reference to chipped stone raw materials. Quality in this sense is used to describe the suitability of a raw material for manufacturing a stone tool. The highest quality raw materials for chipped stone tools are dense, homogenous, fine-grained materials that are free from any inclusions or incipient fractures, allowing for consistent and predictable flaking. Low quality materials are those that have physical properties that make them less suitable for stone tool manufacture, such as small size, incipient fracture planes or inclusions. Hardness is also a factor, since extremely hard tools are difficult to knap and extremely soft materials result in inferior tools.

Chapter 4. Material Types

This chapter provides a brief description of each of the raw material types identified during the analysis of the Townsend lithic tool assemblage (Table 1). For the purpose of this study, raw materials refers to any stones or minerals that could be or were used by prehistoric people for the manufacture of stone tools, ornamental and ceremonial objects, gaming pieces or pigment.

Knox Chert

Knox chert is a common term applied to any chert derived from rocks of the Knox Group. The Knox group is the most widespread rock unit of eastern Tennessee, consisting of a massive sequence of Late Cambrian and Ordovician age limestones and dolomites which are subdivided into numerous smaller units based on minor lithological differences (Hershey and Maher 1963:52). Rocks of the Knox Group, especially dolomites, are well known for producing a variety of cherts, some of which were widely used prehistorically throughout east Tennessee (Cattermole 1962; Kimball 1985). Important chert bearing members of the Knox Group include Longview, Chepultepec and Copper Ridge Dolomites, and the Newala and Kingsport formations (Hardeman 1966:23; Kimball 1985). All of the major chert bearing Knox units are present within the study area.

Fort Payne Chert

Fort Payne chert is derived from the Fort Payne formation, a thickly bedded, highly siliceous Lower Mississippian carbonate formation well known for producing large, thick beds of chert and large amounts of chert in the overlying residuum (Hardeman 1966; Hershey and Maher 1963).

Table 1. Lithic Raw Material Types

I. Sedimentary Lithics
Chert Chalcedony Jasper/Jasperoid Limestone / Dolomite Shale Siltstone Sandstone Conglomerate
II. Metamorphic Lithics
Slate Quartzite Gneiss Chlorite Schist Steatite Greenstone
III. Igneous Lithics
Rhyolite Diabase Granite Vein Quartz
IV. Minerals
Hematite

This material is well known as an important source of raw material for prehistoric chipped stone tools throughout the Mid-South (Amick 1981, 1985, 1987; Faulkner and McCollough 1976; Johnson and Meeks 1994). The Fort Payne formation is widespread throughout large portions of northeastern Alabama and Middle Tennessee (Hardeman 1966; Johnson and Meeks 1994:67; Adams et al. 1926:162-163).

Fort Payne chert is generally a buff, weathered chert, occurring in irregular nodular beds. It occurs in a variety of colors, including salt-and-pepper, black, blue-gray, gray and brown, yellow and white varieties (Amick 1987; Johnson and Meeks 1994). According to Amick (1987) most color variability is related to the basic blue-gray and tan types (44). There is a great deal of textural variability among Ft. Payne formation cherts, ranging from nearly vitreous to gritty, chalky or almost quartzitic (Amick 1987:44). Inclusions are common, occurring in nearly all forms of Ft. Payne chert, and include crinoids and small specks of chalcedony (Amick 1987:44). This material is available throughout Middle Tennessee, and occurs in terrestrial settings as nodules and angular fragments and as stream gravel in alluvial settings (Amick 1987:44).

St. Louis Chert

St. Louis chert is derived from the St. Louis formation, a coarse grained, thick bedded, fossiliferous limestone. In northeastern Alabama and southern Tennessee, St. Louis formation limestone overlies Warsaw limestone and underlies the St. Genevieve limestone (Adams et al. 1926:173). The St. Louis formation is widespread in the eastern Highland Rim and northwestern portion of the Western Highland Rim of Middle Tennessee (Hardeman 1966). The St. Louis formation of Middle Tennessee contains three distinctive varieties of chert, described by Amick (1987:45) as fossiliferous,

semibanded and cannonball types. These materials range from a spongy, porous chert to spherical nodules of dense pale-blue to bluish-gray chert (Amick 1987:45). Collins (1979) describes St. Louis chert in southern Kentucky as a dull, moderately fine grained to moderately coarse chert, ranging in color from dark greenish gray, light olive gray and pale brown (Collins 1979:72).

Other Non-Local Cherts

A number of other non-local cherts were identified occasionally during the analysis of the Townsend lithic assemblage. These include Middle and West Tennessee chert types such as Brassfield, Dover, Bigby-Cannon, and Monteagle. Other varieties with more distant source areas include Flint Ridge Chalcedony, Kanawha Black Flint and Coastal Plains cherts.

Chalcedony

Chalcedony is a transparent variety of quartz possessing a fibrous crystalline structure, resulting in a distinctive waxy appearance (Kimball 1985:118). It is formed by the precipitation of silica from groundwater, which is deposited in cavities in rock. Color varies and has been observed in eastern Tennessee to include black, dark gray, pink, and milky white (Kimball 1985:118). While chalcedony can occur in a variety of rock types, in eastern Tennessee it is most commonly associated with Shady Dolomite (Boyd 1986; Kimball 1985; McIlhany 1978). Shady Dolomite is a thick Cambrian age formation of light gray dolomite and thinly bedded limestone exposed in discontinuous patches along the eastern edge of the Ridge and Valley in east Tennessee, near its contact with the Blue Ridge (McIlhany 1978; Neuman and Nelson 1965). It outcrops in the mountainous parts of Monroe, Blount, Cocke, Greene, Unicoi, Carter and Johnson counties, where it is

generally exposed in valleys or coves (Hardeman 1966:15; Hershey and Maher 1963:48; Kimball 1985; McIlhany 1978:46; Neuman and Nelson 1965). This unit of rock is distinguished by the presence of jasperoid and commonly contains irregular masses of very fine-grained chalcedonic chert (Neuman and Nelson 1965:31). While the Shady Dolomite often produces nodular chert and chalcedony, jasperoid chert is the most common cryptocrystalline material occurring in the formation, occurring in the residuum and as large, irregular blocks as much as eight meters across (Hershey and Maher 1963:48; Neuman and Nelson). Exposures of jasperoid and chalcedony bearing Shady Dolomite have been recorded by archaeologists and geologists in Walland, Tellico Plains and in northeast Tennessee (Boyd 1986; Kimball 1985, 1996; McIlhany 1978; Neuman and Nelson 1965). Kimball (1985) suggests that the Shady Dolomite in Walland is a source of chalcedony and possibly jasper, but until this survey, the actual distribution of these materials and the quality of stone occurring in Walland was not known.

Jasper

Jasper is an iron-rich dull, opaque variety of quartz, occurring locally in blocks within the upper weathered portions of Shady Dolomite, Honaker Dolomite and Rome formations (Kimball 1985:119). Jasper is generally mustard yellow, but will turn a deep rich red if heat treated. The terms jasperoid and jasperoid chalcedonic chert are also used interchangeably in geologic literature to describe the material occurring in the Shady Dolomite formation in Millers Cove, near the town of Walland (Neuman and Nelson 1965).

Limestone and Dolomite

Limestone and dolomite are both dense sedimentary rocks. Limestone and dolomite differ technically in their composition, with limestone consisting of at least 50% calcium carbonate and dolomite consisting of at least 50% calcium magnesium carbonate (Chesterman 1979). However, the terms limestone and dolomite are often used interchangeably and many of the limestone and dolomite units in eastern Tennessee contain various proportions of both types of rock (Cattermole 1962; Neuman and Nelson 1965; R. Wilson 1979).

Siltstone and Shale

Siltstone is a sedimentary rock composed of silt-sized and clay-sized particles (Chesterman 1979). Siltstone occurs throughout many of the units of the Great Smoky Group, Walden Creek Group and Chilhowee Group (Neuman and Nelson 1965).

Sandstone

Sandstone is an even-grained sedimentary rock composed of clastic particles held together by compaction or cementation by clay, silica, carbonates and iron oxides (Chesterman 1979:715). Sandstone occurs throughout the upper Little River drainage and is a major component of the Ocoee Supergroup and Chilhowee Group.

Conglomerate

Conglomerate is an uneven-grained, coarse-grained sedimentary rock with well-rounded rock fragments of pebble, cobble or boulder size, held together by various kinds of cementing materials (Chesterman 1979:717). A rock composed of angular fragments is referred to as a breccia (Chesterman 1979). Conglomerate occurs frequently in the upper

Little River drainage and is a component of the Great Smoky Group and Walden Creek Group (Neuman and Nelson 1965).

Slate

Slate is a dense, crystalline rock formed from the metamorphism of mudstone or shale (Chesterman 1979). Slate is generally dark gray to black but can occur in a range of colors. Slate splits readily along parallel planes and relic bedding is sometimes visible as colored bands (Chesterman 1979:732). Slate is a widespread rock, occurring throughout the upper Little River drainage in members of the Great Smoky Group, Walden Creek Group, Snowbird Group and in massive formations west of Chilhowee Mountain.

Quartzite

Quartzite is a sedimentary or metasedimentary rock composed of quartz grains bound by silica (Bass 1977; Chesterman 1979). Whereas sandstone is commonly distinguished by the cement or matrix, in quartzite the cement as well as the detrital grains is quartz, resulting in a hard, non-porous crystalline rock (Chesterman 1979:732). Due to the cementation of the grains by silica, quartzite will fracture through the grains, rather than around them like sandstone, giving some vitreous quartzite a conchoidal fracture (Chesterman 1979).

Gneiss

Gneiss is a medium to coarse-grained metamorphic rock composed of a wide range of igneous, sedimentary and metamorphic parent materials (Chesterman 1979:737). Gneiss occurs in the western Blue Ridge of North Carolina, south of the Great Smoky Mountains (Hadley and Goldsmith 1963).

Chlorite Schist

Schist is a medium to coarse-grained crystalline rock formed from the metamorphism of sedimentary, igneous or metamorphic rocks (Chesterman 1979). Specific schistose rocks are named for the dominant minerals, such as mica, chlorite, talc or biotite (Chesterman 1979). Chlorite schist occurs in the western Blue Ridge and has been mapped in formations along Clingmans Dome and the north shore of Fontana Lake in the Great Smoky Mountains (Southworth 2005:37). This chlorite schist contains talc and quartz which gives it a greasy luster, similar to steatite (Southworth 2005:40).

Steatite

Steatite, commonly known as soapstone, is a metamorphic rock widely used in the manufacture of ground and carved stone vessels, tools and ornaments (Wells 2006). Soapstone outcrops occur mainly in the Piedmont physiographic province, east of the Appalachian Mountains, along a belt extending from eastern Alabama to North Carolina (Wells 2006). Soapstone vessels occur across the Southeast, with concentrations occurring in eastern Tennessee, western North Carolina and the Poverty Point area of southwestern Louisiana (Wells 2006). The excavation of 40BT90 recovered a large assemblage of steatite artifacts (Wells 2006).

Greenstone

Greenstone is a dense, crystalline rock formed from the metamorphism of ferromagnesian igneous rocks such as basalt and gabbro (Chesterman 1979:741). Greenstone has a dull luster and ranges in color from light grayish-green to dark green depending on the proportions of chlorite or other minerals present in the rock (Chesterman 1979:741). The nearest sources of greenstone are in the Great Smoky

Mountains, occurring as intrusives in the metasedimentary rocks of the Snowbird and Great Smoky Group near Clingmans Dome, Mount LeConte and Greenbrier, Tennessee (Southworth 2005:39). This greenstone is described as fine-grained chlorite greenstone, occurring as dark cobbles and a green, variegated texture (Southworth 2005:39).

Rhyolite

Rhyolite is a very fine-grained igneous rock, composed mainly of quartz and feldspar, with smaller amounts of accessory minerals such as biotite, hornblende and iron oxides (Daniel and Butler 1996:9). Metavolcanic materials in Tennessee are restricted to outcrops of the Mount Rogers formation, which occur in the northeastern corner of Johnson County, near the North Carolina and Virginia border (Boyd 1986:84). The most common source of rhyolite is the Piedmont area of North Carolina (Daniel 2001; Daniel and Butler 1996; Steponaitis et. al 2006).

Diabase

Diabase is a form of gabbro, which is a coarse-grained igneous rock with a highly interlaced crystalline structure that creates a tough, strong material with a high crushing strength (Chesterman 1979:708). Diabase and metadiabase occurs as intrusives in the metasedimentary rocks of the Snowbird and Great Smoky Groups in the highlands of the Blue Ridge, outcropping in association with chloritic greenstone on the north side of Clingmans Dome and on the north shore of Lake Fontana in the Great Smoky Mountains (Hadley and Goldsmith 1963:1; Southworth 2005:39).

Granite

Granite is a medium to coarse-grained igneous rock composed primarily of quartz, potash and feldspar (Chesterman 1979:694). Granite is common in the Blue Ridge of North Carolina, south of the Great Smoky Mountains (Hadley and Goldsmith 1963).

Quartz

Quartz is a common mineral that occurs in a variety of forms. For the purpose of this study, the term quartz refers specifically to varieties of non-cryptocrystalline quartz. Two types of quartz were identified during the Townsend analysis: vein quartz and crystal quartz. The term crystal quartz was used to describe clear or colorless quartz crystal that was likely derived from a single quartz crystal. Vein quartz is the result of the deposition of silica along preexisting cracks or voids in other rock, resulting in thin layers of quartz (Kooyman 2000). Pure, high quality vein quartz is light colored, and exhibits a greasy or vitreous luster and conchoidal fracture (Chesterman 1979:314).

Southworth (2005) noted vein quartz occurring in all of the metamorphic rock units mapped in the Great Smoky Mountains. In the western Blue Ridge, vein quartz occurs as pods, dikes, lenses and tabular bodies as much as 9 m thick (Southworth 2005:41). Boulders of vein quartz as much as 10 feet in diameter are common in creek beds in association with fine-grained rocks of the Great Smoky Group and Metcalf phyllite. Vein quartz occurs in Cambrian and Precambrian formations throughout the Blue Ridge and frequently occurs in streams and rivers throughout eastern Tennessee and was widely used as a raw material by prehistoric people in eastern Tennessee (Bass 1977; Boyd 1986; Davis 1990; Kimball 1985; McIlhany 1978).

Hematite

Hematite is a form of iron oxide, which occurs in a variety of forms. Hematite occurs in a range of colors including black, dark gray, dark red and bright red (Chesterman 1976:397). Locally, hematite occurs in the Cochran Formation, which is exposed along portions of Chilhowee Mountain (Neuman and Nelson 1965; Southworth 2005:47).

Ochre is a granular or earthy form of hematite that is characterized by its red color (Chesterman 1979:397). Kimball (1996) suggested that hematite derived from Chilhowee Mountain was the likely source of hematite recovered from sites excavated during the Tellico archaeological project.

5. Survey Areas

This chapter presents detailed descriptions of the areas that were surveyed as part of the lithic resource survey of the upper Little River drainage. It is divided into two sections. The first section provides a description of each of the areas that was systematically surveyed. The second section provides a description of each of the opportunistic survey areas as well as data from a previous lithic resource survey of Cades Cove (Sweat 2005). Each of the following survey locations includes soil descriptions, descriptions of the stream or landform, bedrock geology and a map showing the location of each survey area on a USGS 7.5' quadrangle map. Each survey area also includes results and photographs of some specimens recovered from the survey areas.

Systematic Stream Survey Areas

Survey Area 1 is a portion of Short Creek, approximately 25 meters south of the bridge where U.S. 73 crosses Short Creek near its confluence with the Little River (Figure 7). It is located on the USGS 7.5' Kinzel Springs quadrangle map, at UTM 247450 E 3952175 N. Short Creek flows west from its source approximately 500 m west of Tuckaleechee Caverns, northwest around the west end of Little Mountain and joins numerous smaller streams before flowing into the Little River. Short Creek flows through areas underlain by Ordovician Jonesboro dolomite, Ordovician Sevier shale and members of the Precambrian Walden Creek group. The soils on both sides of this portion of Short Creek are mapped as Staser fine sandy loam, a loamy alluvium derived from interbedded sedimentary rock and characteristic of flood plains (USDA, NRCS 2008). All specimens

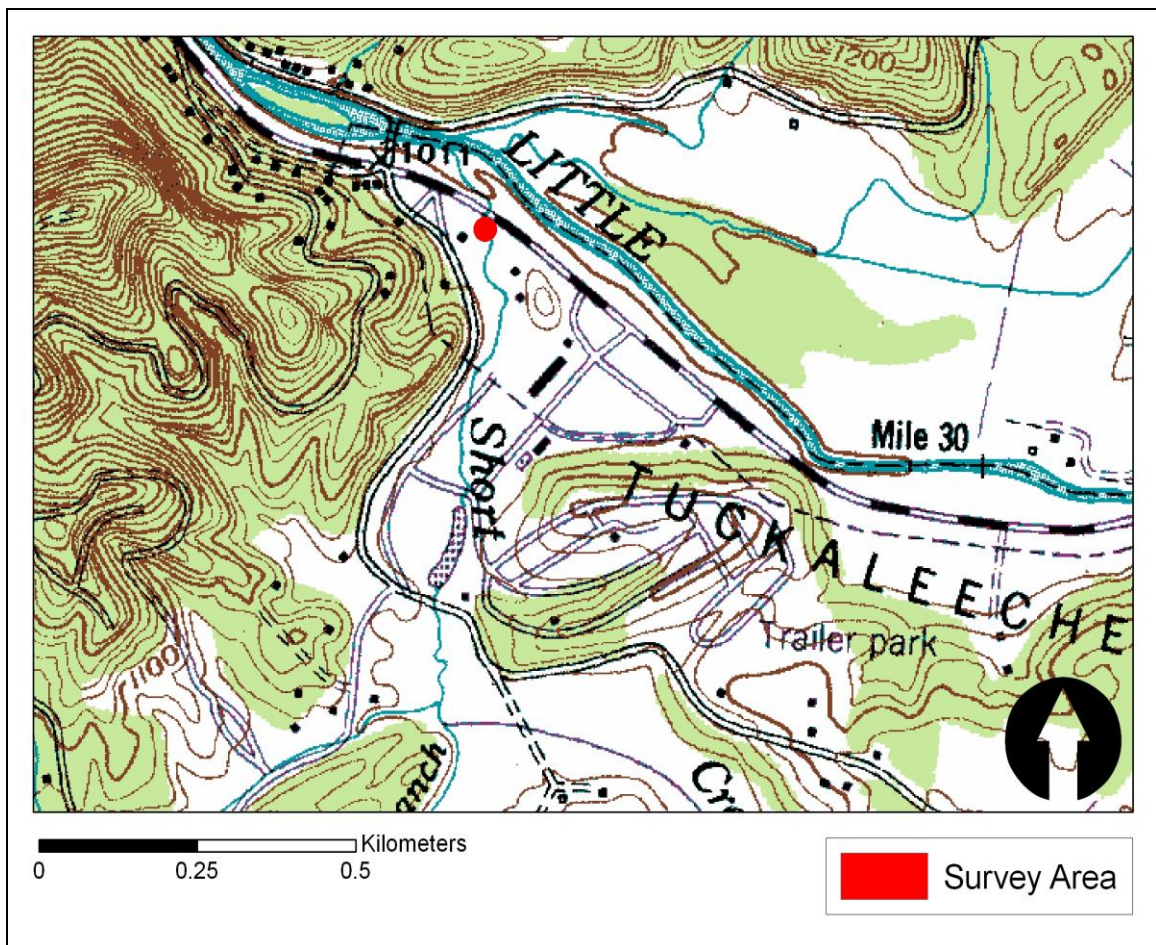


Figure 7. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 1.

were collected from a 4 m² area in the middle of the stream channel, directly east of the Back Porch Restaurant. Fifty specimens were tested at this area. Specimens tested at this locale included sandstone (58%), siltstone (14%), limestone (12%), quartzite (8%), quartz (4%), slate (2%) and phyllite (2%). All the specimens tested were consistent with the mapped geologic formations that underlie Short Creek and its tributaries.

Survey Area 2 is a section of Carr Creek located at a bridge crossing along Rudd Road. It is located on the USGS 7.5' Kinzel Springs quadrangle map, southeast of Mark Mountain, north of the Little River, at UTM 248656E 3952526N (Figure 8). Carr Creek is a long, southwest flowing tributary of the Little River. Carr Creek flows for approximately 12 km, from its headwaters on the south side of Bates Mountain, near the Sevier-Blount County line, to its confluence with the Little River. Carr Creek flows through areas underlain by Jonesboro dolomite, Sevier Shale and members of the Walden Creek group.

Soils at this location were mapped as Barbourville silt loam, sloping phase, and Dandridge silt loam, steep phase. Barbourville silt loam is described as a loamy colluvium over loamy alluvium derived from sandstone and shale, generally occurring at the base of hill-slopes (USDA, NRCS 2008). Dandridge silt loam formed in residuum of calcareous shale and is characteristic of highly dissected uplands (USDA, NRCS 2008). Specimens were collected from the middle of the stream channel, which was shallow at the time of the survey. Fifty specimens were tested at this area.

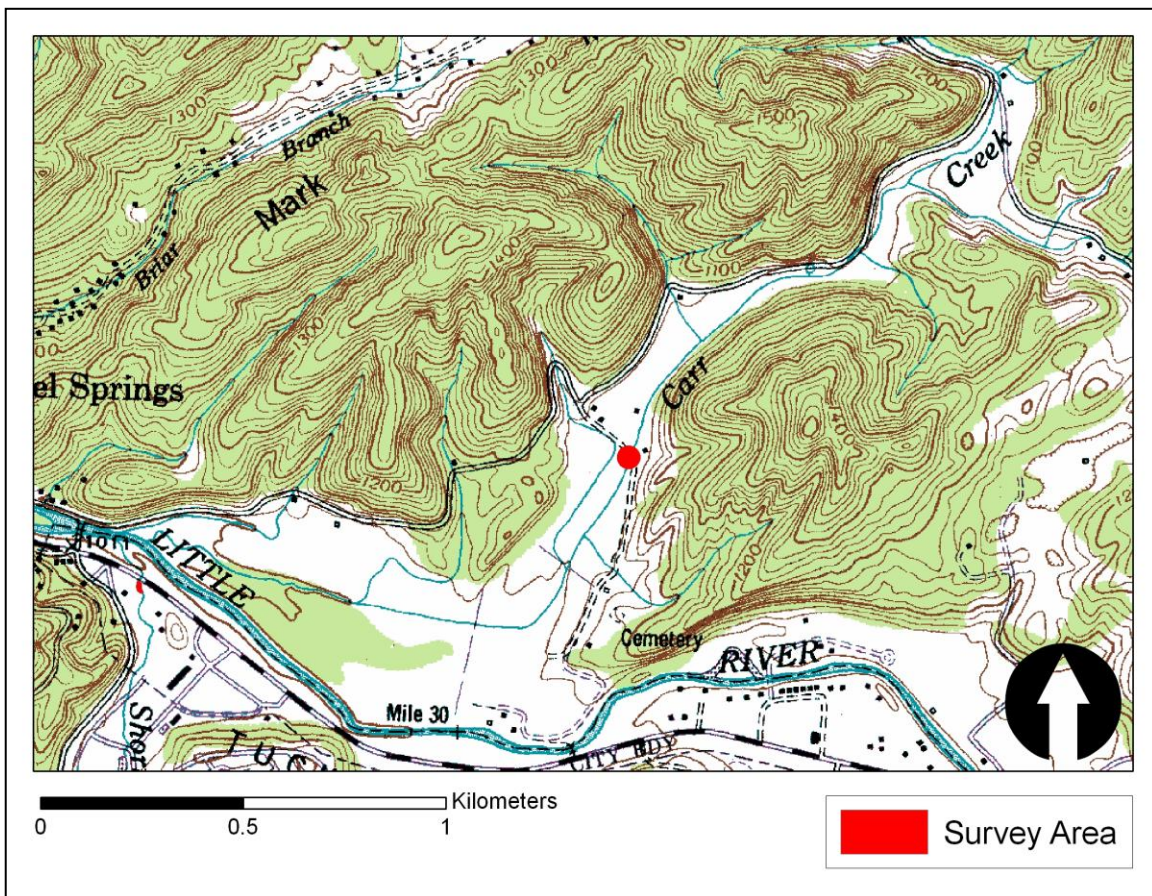


Figure 8. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 2.

Specimens tested at this locale included sandstone (58%), slate (18%), quartzite (12%), siltstone (4%), conglomerate (2%), chert (2%), limestone (2%) and quartzite/sandstone (2%). A single angular specimen of chert was recovered. The chert was dark brownish-gray and was extremely poor quality, exhibiting incipient fractures and inclusions (Figure 9). This chert was consistent in appearance and quality with other specimens of chert recovered from Tuckaleechee Cove. No other chert or cryptocrystalline materials were located at this site. Blue and gray banded slate was recovered from Survey Area 2 (Figure 10). This slate was similar in appearance to slate artifacts recovered from the Townsend excavations. All of the specimens tested were consistent with the mapped geologic formations that underlie Carr Creek and its tributaries.

Survey Area 3 is a portion of a small unnamed stream flowing north from Black Mash Hollow, on the USGS 7.5' Kinzel Springs quadrangle map (Figure 11). This stream originates on the northeast side of Little Ridge and flows north for 2.3 km, passing between Zack Ridge and Rocky Knob and joining with the Little River just north of U.S. 73. The southern portion of this stream, near its headwaters, is underlain by Sevier Shale. The northern portion of the stream is underlain by Jonesboro dolomite. The sample area was located on the south side of U.S. 73, approximately 130 m south of the confluence of this stream and the Little River at UTM 250041E 3951217. A total of 50 specimens were tested at this site. The specimens tested included sandstone (76%), quartzite (14%), limestone (6%), slate (2%) and quartz (2%). No cryptocrystalline materials were located.



Figure 9. Knox chert located at Survey Area 2.



Figure 10. Banded slate recovered from Survey Area 2.

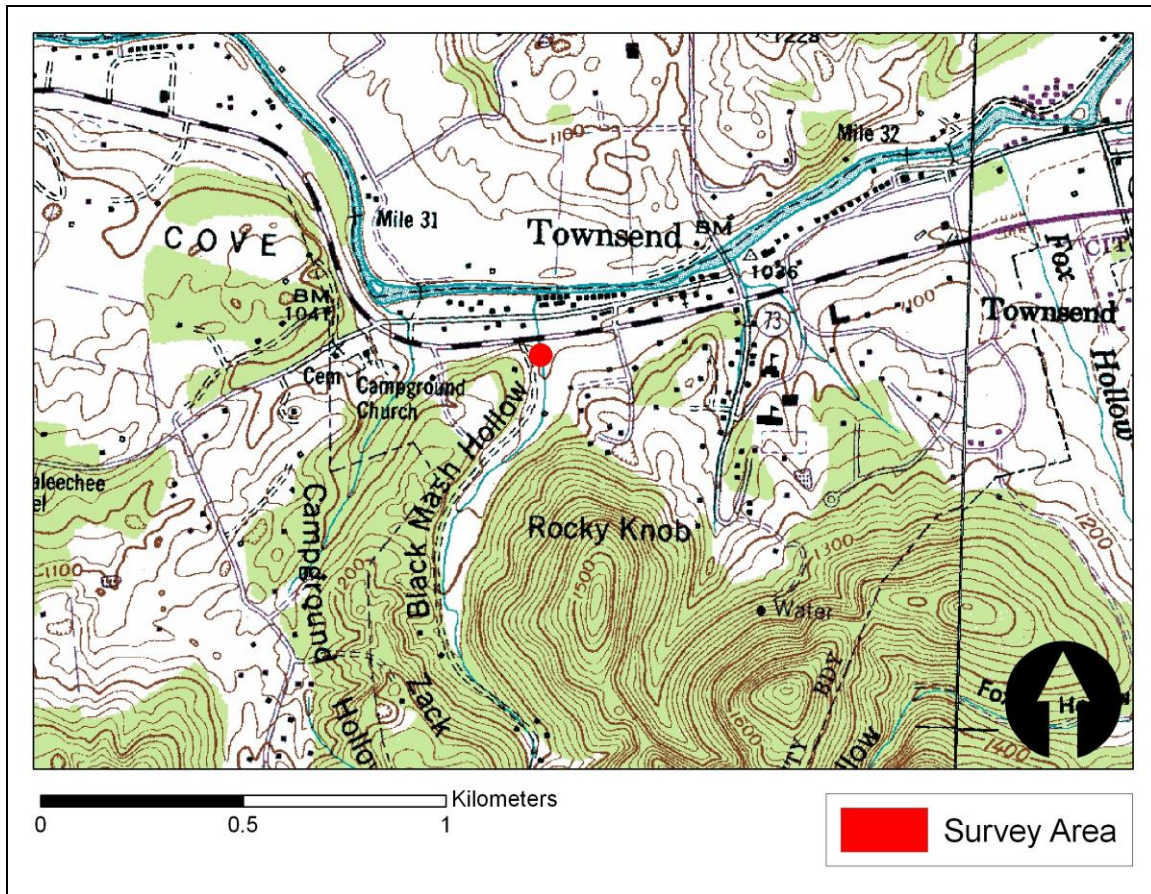


Figure 11. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 3.

Survey Area 4 is a portion of Hesse Creek on the west side of U.S. 73, approximately 60 m south of the confluence of Hesse Creek and the Little River, located on the USGS 7.5' Kinzel Springs quadrangle map, at UTM 244939 E 3955480 N (Figure 12). Hesse Creek is a major tributary of the Little River, draining large areas of land northwest of Cades Cove and all of West Millers Cove. From its headwaters near the summit of Double Mountain, Hesse Creek flows northwest for approximately 9 km, joining with numerous smaller streams, through the rugged area surrounding Beard Cane Mountain and Hatcher Mountain, before entering the west end of West Millers Cove where it flows northeast for approximately 8 km and joins with the Little River near present day U.S. 73.

From its headwaters to its confluence with the Little River, Hesse Creek flows over areas underlain by numerous geologic units, including Cades Sandstone, Nebo Sandstone, Hesse Sandstone, Shady Dolomite and undifferentiated members of the Rome formation and Walden Creek group. The area surrounding this survey area is mapped as Sequatchie silt loam, a fine, loamy, siliceous soil formed from loamy alluvium derived from interbedded sedimentary rock (USDA, NRCS 2008). The area surveyed was a gravel bar on the southeast side of the stream.

A total of 50 specimens were tested at this site. The specimens tested included sandstone (48%), quartzite (38%), slate (4%), phyllite (2%), siltstone (2%), conglomerate (2%), dolomite (2%) and jasperoid (2%). While this portion of Hesse Creek passes through the Shady Dolomite formation, only one specimen of dolomite and one specimen of jasperoid were noted during the survey. The jasperoid collected from Hesse Creek was a small, badly weathered tan fragment. No high quality cryptocrystalline materials were located at this site.

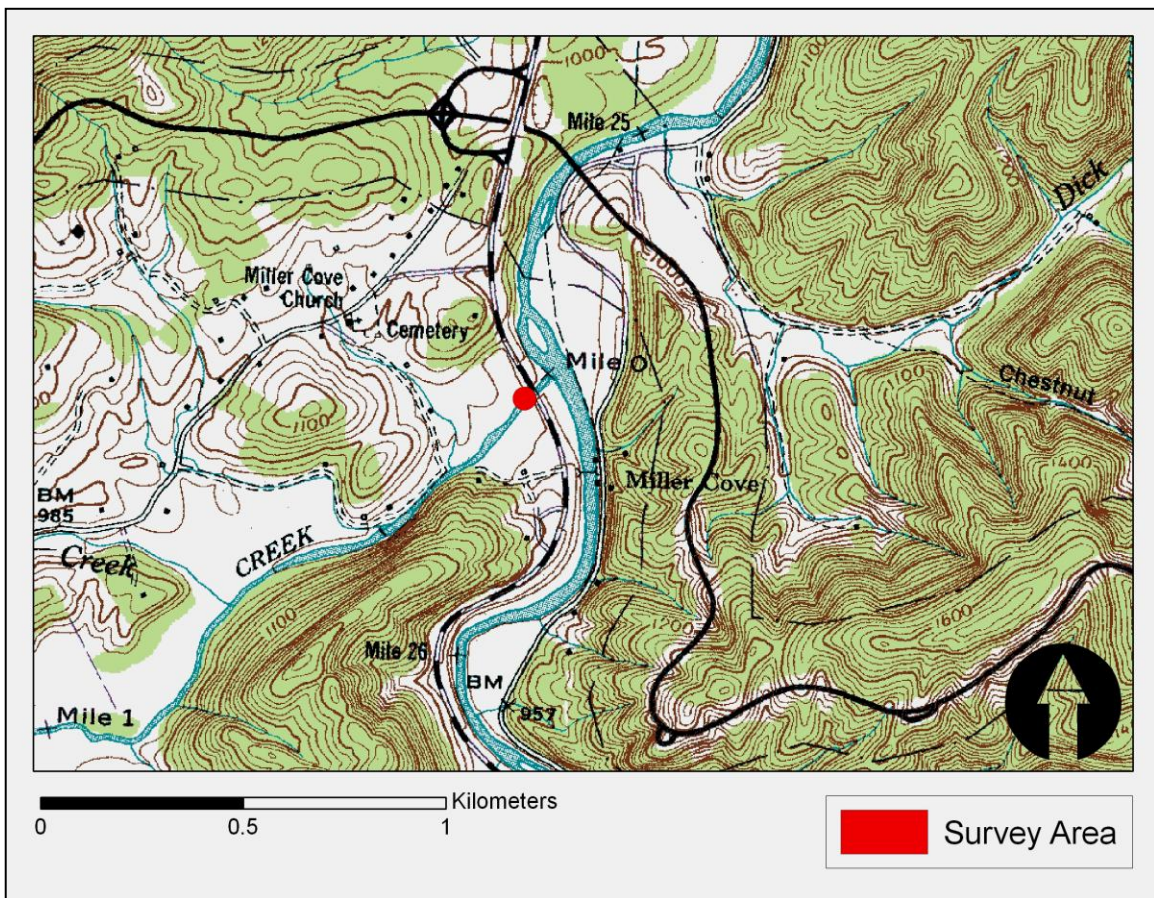


Figure 12. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 4.

Survey Area 5 is a portion of Reed Creek, located approximately 60 m southeast of the confluence of Reed Creek and the Little River, on the east side of U.S. 73 (Figure 13). It is located on the USGS 7.5' Kinzel Springs quadrangle map, at UTM 245397 E 3957429 N. Reed Creek is a major tributary of the Little River, with origins north of Bates Mountain, near the Blount-Sevier County line. It flows southwest from its headwaters, joining with numerous smaller streams before entering the northeast end of East Millers Cove.

Reed Creek flows approximately 9 km from its source to the southwest end of East Millers Cove where it turns northwest near the town of Walland and enters the Little River just south of Chilhowee Mountain. From its headwaters to its confluence with the Little River, Reed Creek and its major tributaries flow across areas underlain by numerous geologic units, including Shady Dolomite, Murray Shale and undifferentiated members of the Sandsuck and Rome formations and Walden Creek group. Soils surrounding the survey area are mapped as Bruno fine sandy loam, a sandy, alluvial flood plain soil (USDA, NRCS 2008).

Fifty specimens were tested at this site. The specimens tested included sandstone (48%), quartzite (44%), chert (4%), siltstone (2%) and slate (2%). Two specimens of chert were located at this locale. One was light gray and the other white. Both chert specimens were extremely poor quality and exhibited numerous incipient fracture planes. This survey area produced large amounts of light colored, hard, vitreous quartzite (Figures 14 and 15). It is most likely derived from the Hesse quartzite, which is a widespread rock unit in Miller Cove and the surrounding area.

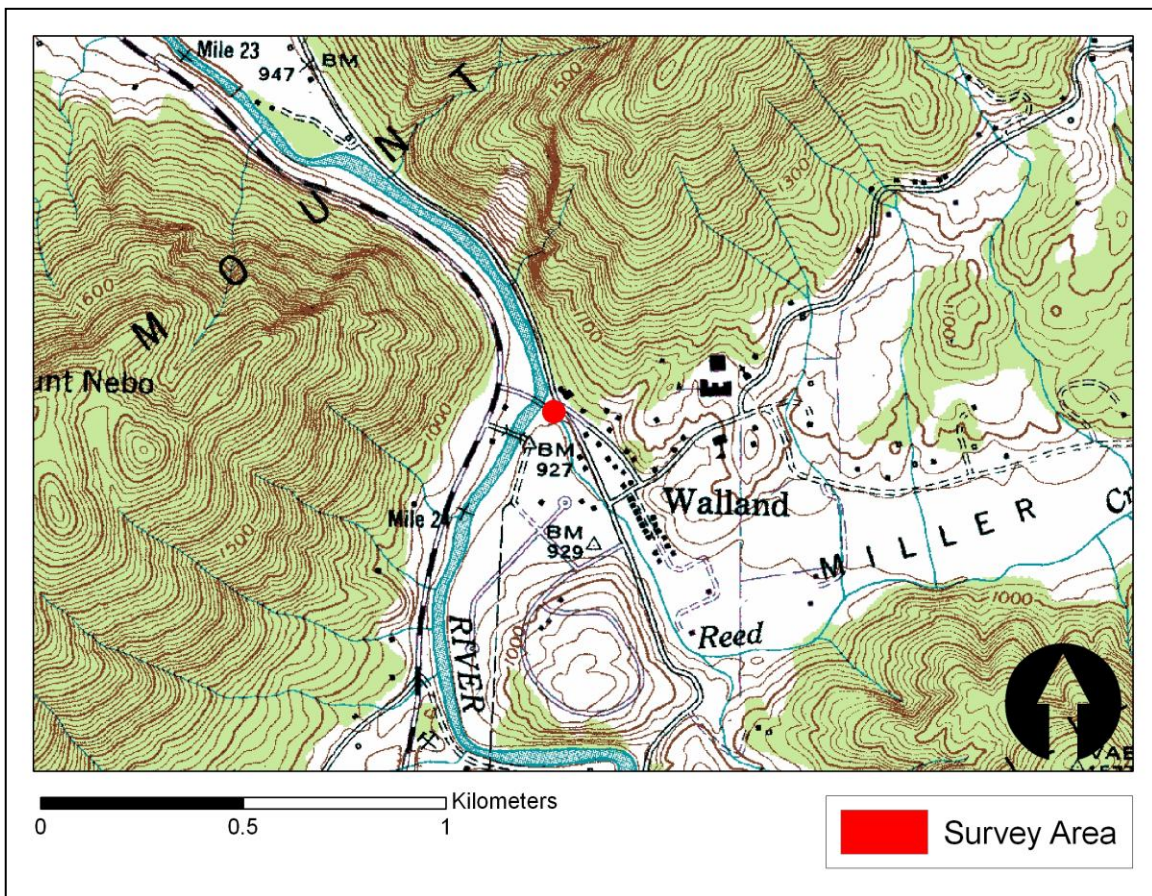


Figure 13. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 5.



Figure 14. Quartzite recovered from Survey Area 5.



Figure 15. Quartzite recovered from Survey Area 5 with water worn cortex.

Survey Area 6 is a section of Ellejoy Creek, approximately 160 m southeast of the confluence of Ellejoy Creek and the Little River, on the USGS 7.5' Wildwood quadrangle map (Figure 16). This survey area is located at the bridge crossing, near the Davis Farm, at UTM 242334 E 3962237 N. Ellejoy Creek is a major tributary of the Little River. The headwaters of Ellejoy Creek begin north of Bluff Mountain, southeast of the town of Ellejoy, located on the USGS 7.5' Wildwood quadrangle map. Ellejoy flows southwest for approximately 17 km from its headwaters near Chilhowee Mountain to its confluence with the Little River, crossing numerous geologic units including Chilhowee group conglomerate, Sevier shale, Longview dolomite, Chepultepec dolomite and Newala dolomite. Soils surrounding the survey area are mapped as Etowah silt loam, a cherty soil formed from colluvium or alluvium underlain by limestone residuum (USDA, NRCS 2008).

Fifty specimens were tested at this site. The specimens tested included limestone (26%), sandstone (16%), chert (6%) and quartz (2%). The chert tested at this location ranged in color from dark gray to light gray. All the specimens collected were small, poor quality fragments and exhibited incipient fractures, inclusions or heavy weathering that made them unsuitable as a raw material for the manufacture of chipped stone tools.

Dense, light colored quartzite cobbles were noted throughout this survey area.

Survey Area 7 is a section of the Little River located just west of the Boundary of the Great Smoky Mountains National Park, on the north side of U.S. 441 (Figure 17). The sample area was located on the south side of the Little River on a large gravel bar. Soils on the northeast side of this survey area are mapped as Ramsey slaty silt loam, steep

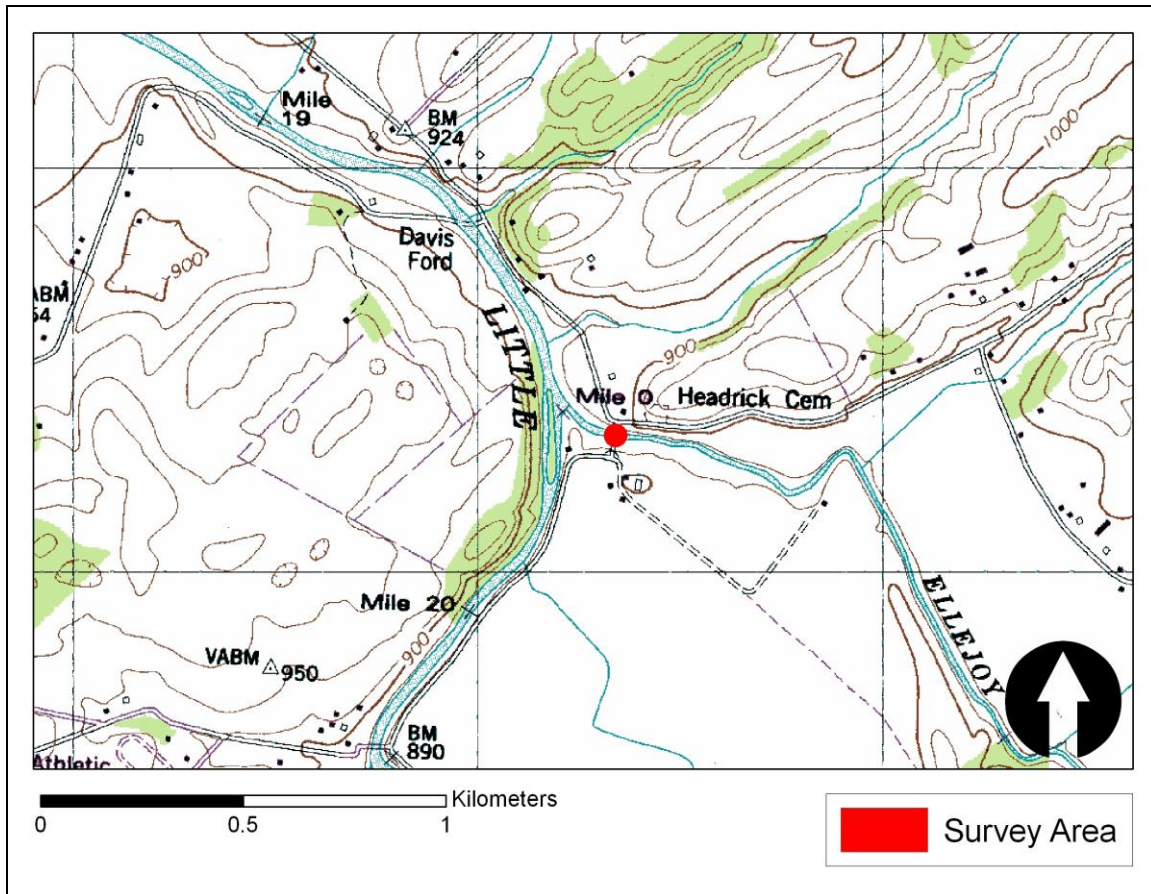


Figure 16. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 6.

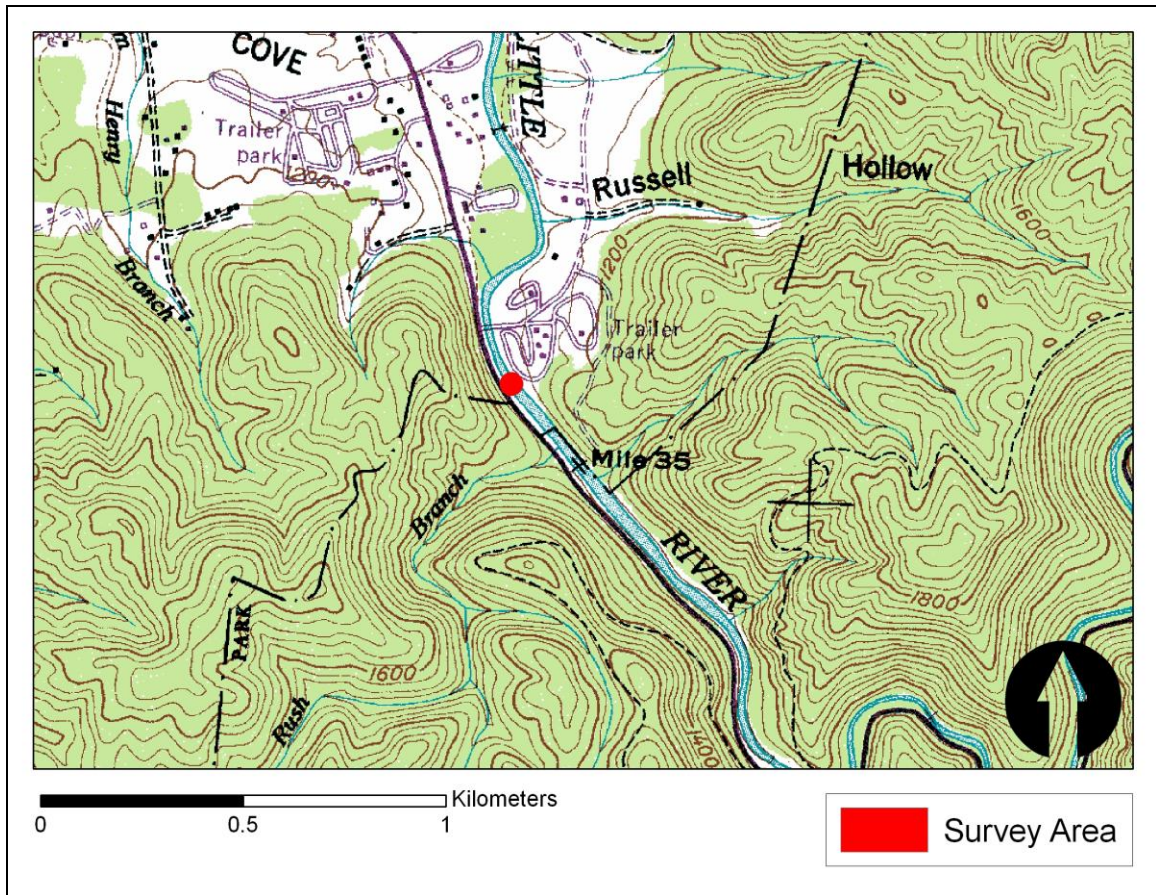


Figure 17. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 7.

phase, a loamy residuum weathered from sandstone, occurring on hill slopes (USDA, NRCS 2008). Soils on the southwest side of the survey area are mapped as Junaluska-Tsali complex, a loamy residuum weathered from metasedimentary rocks and occurring on steep mountain slopes (USDA, NRCS 2008). From its headwaters to this area, the Little River flows across areas underlain by Thunderhead sandstone, Elkmont sandstone, Anakeesta Formation and Metcalf phyllite (Neuman and Nelson 1965).

Fifty specimens were tested at this site. The specimens tested included sandstone (44%), slate (40%), phyllite (8%), conglomerate (2%) and slate-quartz (2%). The slate-quartz specimen was a single rock that graded from slate into vein quartz. All of the materials recovered at this survey area are consistent with geologic mapping of the formations underlying the portions of the Little River upstream from this locale.

Opportunistic Survey Areas

Survey Area 8 is an area of exposed Jonesboro dolomite located on the south bank of the Little River in Townsend, near the Tuckaleechee Cove Cultural marker, just west of the Special People's Park. It is located on the USGS 7.5' Kinzel Springs quadrangle map, at UTM 247630 E 3952121 N (Fig 18). The soils surrounding this exposure of dolomite are mapped as Staser fine sandy loam, a flood plain soil type formed from mixed colluvium. The exposure was visually surveyed (USDA, NRCS 2008). This survey included a visual inspection of the portion of the exposure that is in contact with the Little River to identify chert or other more resistant materials that might be eroding from the exposure where it was exposed to frequent stream erosion. A large gravel bar located along the edge of the Little River north of the exposure was also opportunistically surveyed.

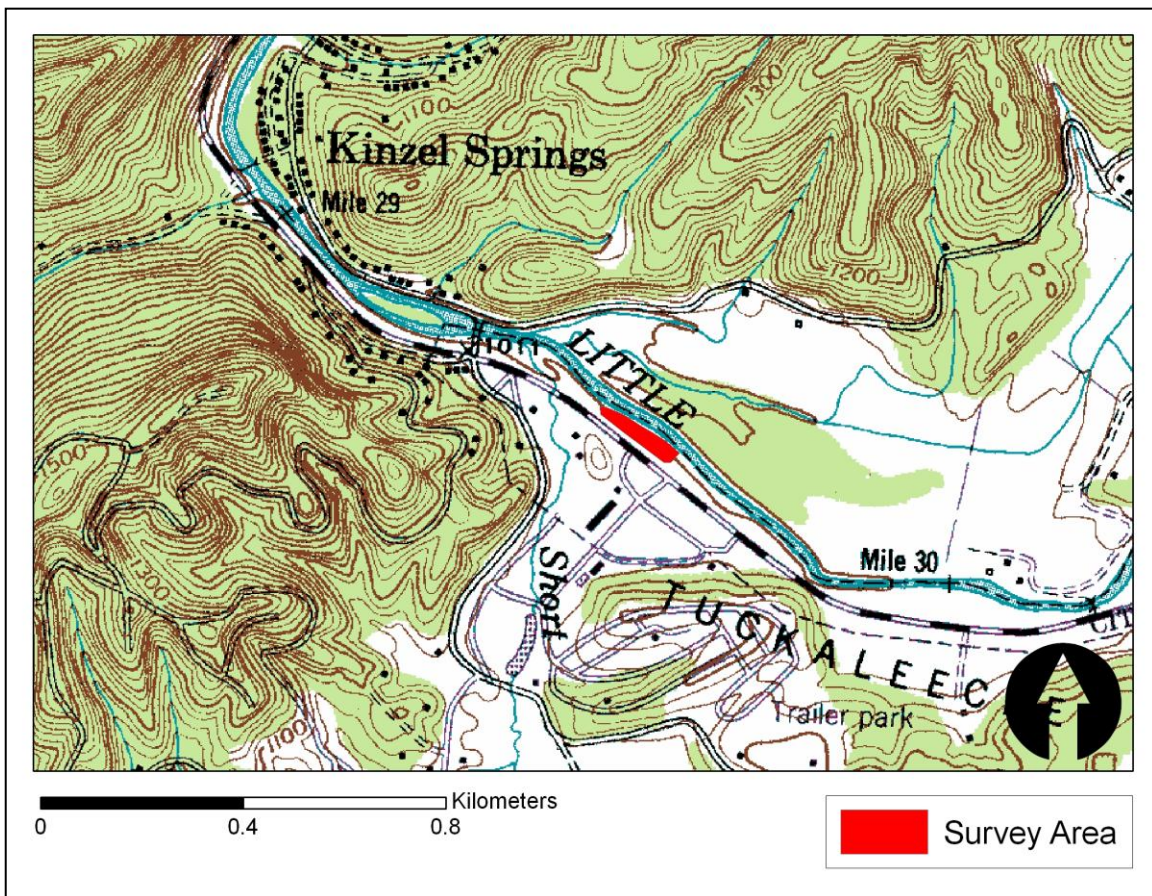


Figure 18. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 8.

Two specimens of poor quality black chert were collected eroding from the bank near the outcrop, but it is not clear if they eroded from a primary source or were part of the fill deposited during the construction or widening of U.S. 73. These specimens are both small broken nodules of poor quality chert, exhibiting numerous inclusions and incipient fractures. It is consistent in appearance and quality with chert derived from Jonesboro series dolomite. Materials noted in the gravel bar below the outcrop included dense, light colored vein quartz cobbles.

Survey Area 9 is located in West Millers Cove, east and southeast of Millers Cove Church and south of Hatcher Creek. It is a large survey area that includes portions of Hesse Creek, a section of an unnamed tributary of Hesse Creek, outcrops of Shady Dolomite along a ridge on the southeast side of Hesse Creek and portions of a ridge southeast of Hatcher Branch (Figure 19). Soils at this site are mapped predominantly as Sequatchie loam and Sequatchee fine sandy loam, which are both formed from loamy alluvium (USDA, NRCS 2008). Shady Dolomite underlies the south side of Hesse Creek at this location. The ridge on the north side of Hesse Creek is composed of Rome formation shale (Neuman and Nelson 1965). Two specimens of jasperoid were collected from Hesse Creek, near the confluence of Hesse Creek and an unnamed tributary. One jasperoid specimen is dark red and occurred in an amorphous block (Figure 20). The second specimen is yellowish-brown and occurred in a large amorphous boulder (Figure 21). Numerous chalcedony cobbles were also noted throughout this survey area. These chalcedony specimens were consistent in appearance with that located at Survey Area 13 and Survey Area 14.

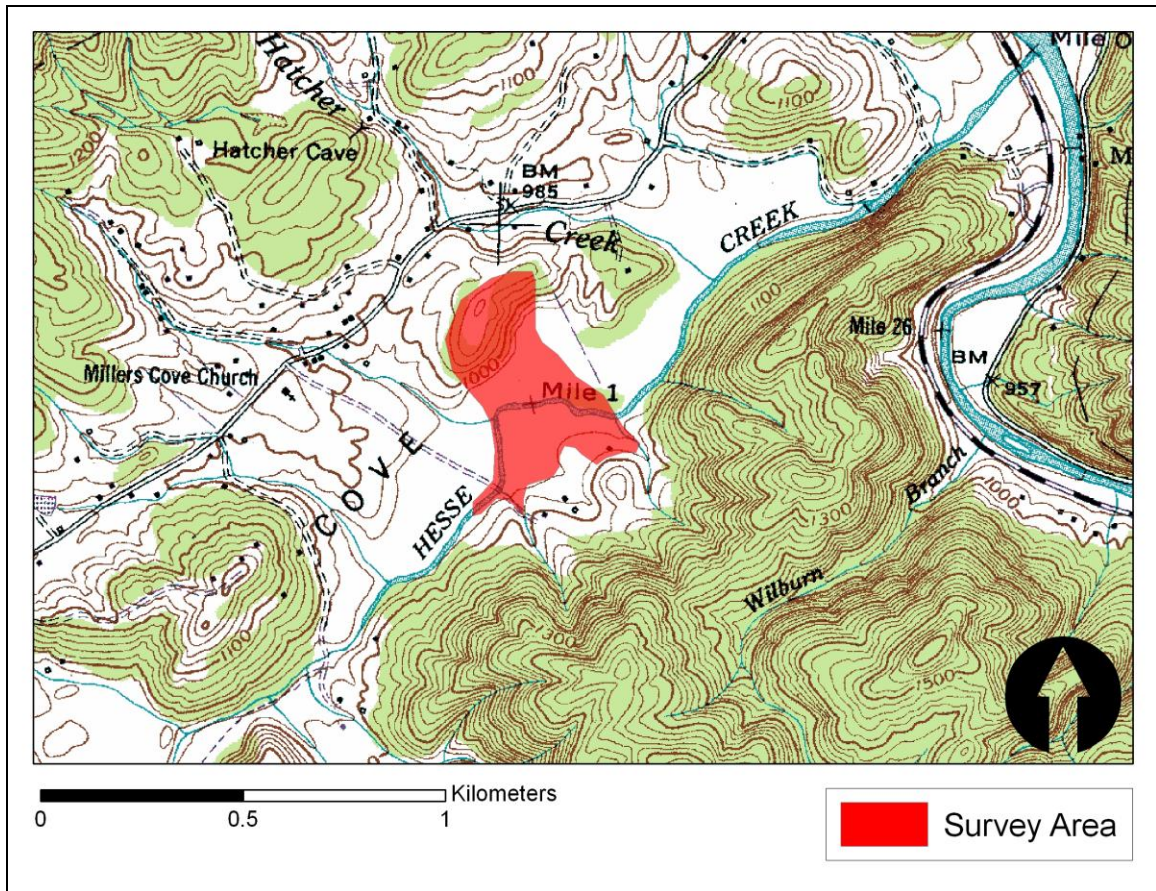


Figure 19. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 9.



Figure 20. Red Jasperoid recovered from Survey Area 9.



Figure. 21. Yellowish-Brown Jasperoid recovered from Survey Area 9.

Survey Area 10 is located in West Millers Cove and includes a portion of Wolf Creek and a ridge south of Wolf Creek (Figure 22). Specimens were collected from two locations at this survey area. The first is an eroded bank on the west side of Wolf Creek Road, at the junction of Wolf Creek Road and West Millers Cove Road. The second collection site is a section of Wolf Creek on the south side of West Millers Cove Road. Both of the collection sites at this area are mapped as Dunmore silty clay, a cherty soil type formed from limestone residuum (USDA, NRCS 2008). On the south side of West Miller Cove Road, this area is underlain by Rome formation. The road and the area where the cut bank was surveyed are underlain by Shady Dolomite (Neuman and Nelson 1965).

Survey of the ridge south of Wolf Creek did not locate any lithic raw materials. The ridge was covered with red soil and slate indicative of the Rome Formation, which overlies the Shady Dolomite in this portion of Miller Cove. The presence of Rome Formation on the ridge made it likely that Shady Dolomite would be located at a lower elevation. A survey of Wolf Creek on the south side of West Millers Cove Road did identify materials characteristic of Shady Dolomite. Visual survey of this portion of Wolf Creek located numerous specimens of chalcedony, chert and jasperoid. There was a wide range of variation present in the specimens collected from Wolf Creek. This includes milky white, gray and black chalcedony, red jasperoid, yellow jasperoid and gray and brown chert. These materials were collected in the stream channel of Wolf Creek and from exposures of rock on the eroded south bank of Wolf Creek.

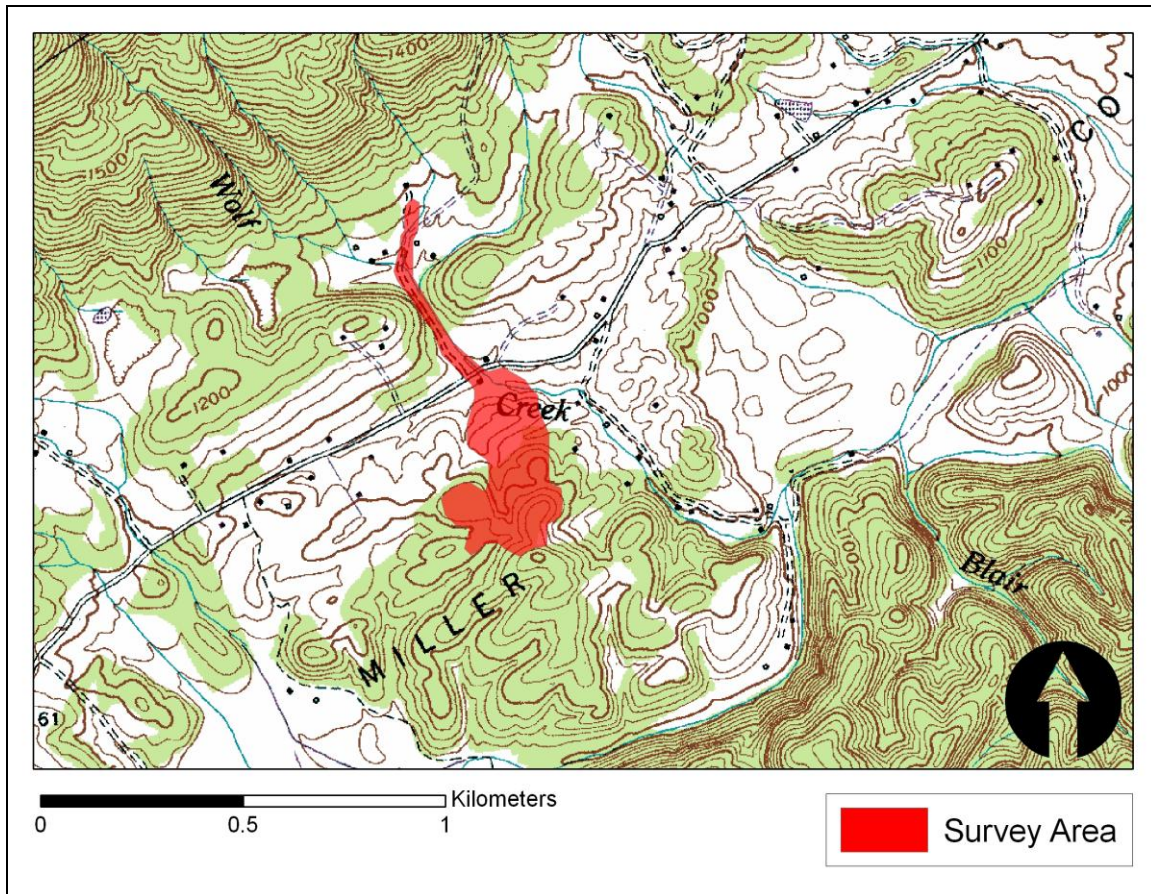


Figure 22. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 10.

Most of the chert collected from Wolf Creek occurred in small nodules and in large lenses within weathered dolomite. All of the chert recovered from this survey area was poor quality, exhibiting incipient fracture planes and inclusions. A specimen of light gray, banded chert was collected from a cut bank north of Millers Cove Road and west of Wolf Creek Rd (Figure 23). This specimen of chert was tabular and exhibited alternating light and dark gray bands. The chert was poor quality and fractured in angular, blocky fractures when struck. All the specimens recovered from Survey Area 10 were either or poor quality. There were no materials located that would have been desirable raw materials.

Survey Area 11 is a section of the Little River located approximately 460 m northeast of Heritage High School. Portions of the east and west bank of the Little River were surveyed, near the junction of Old Walland Highway, Tuckaleechee Pike and Ellejoy Road (Figure 24). Additionally, on the east side of the Little River, a gravel bar was surveyed for lithic raw materials. On the west side of the Little River, south of the bridge, the limestone exposures were surveyed for chert. Soils on the west side of the Little River are mapped as Cumberland silty clay and Cumberland silty clay loam, which are cherty small soils formed from alluvium overlying limestone residuum (USDA, NRCS 2008). Soils on the east side of the river are mapped as Staser loam, a floodplain soil type (USDA, NRCS 2008). The majority of materials noted at this location were sandstone, limestone and quartzite. A specimen of poor quality chert was located and collected from a gravel bar on the east side of the Little River.



Figure 23. Banded Gray chert from Survey Area 10.

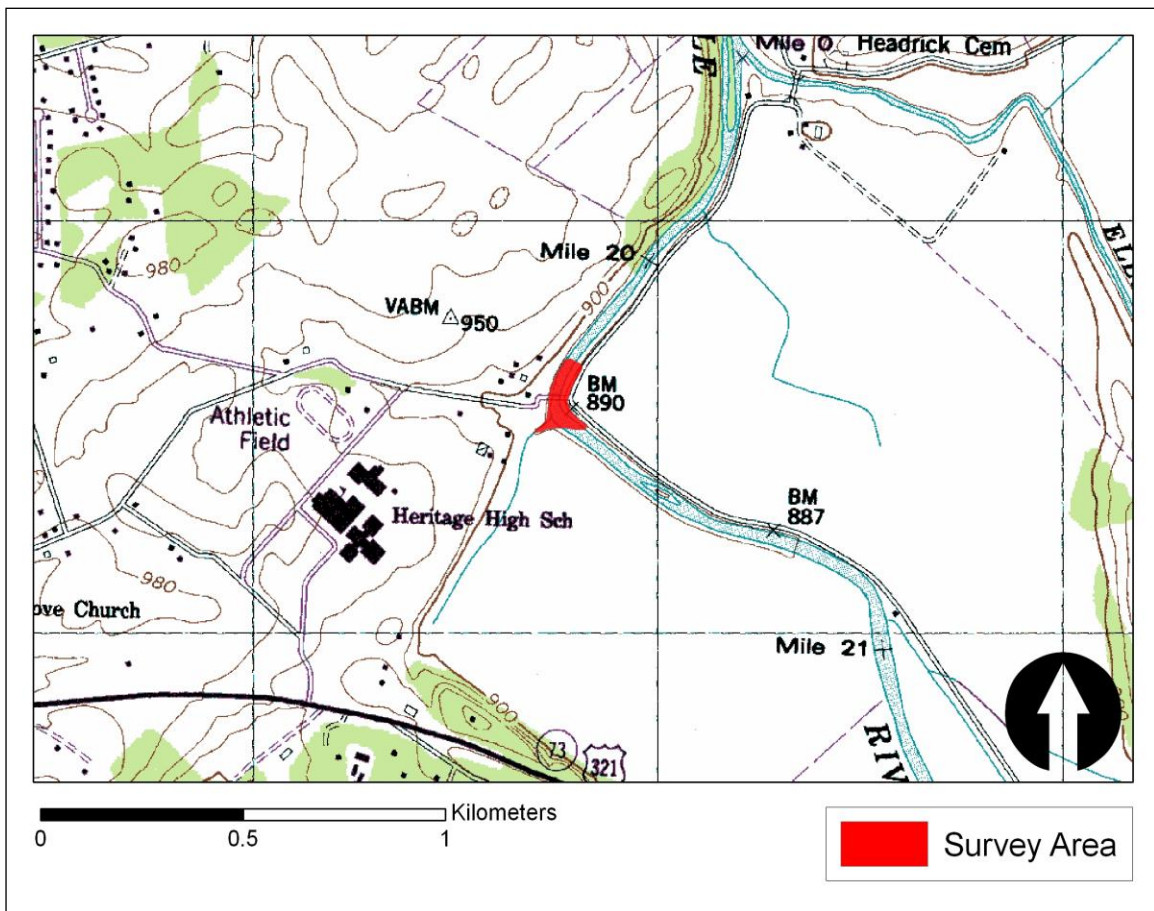


Figure 24. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 11.

On the west side of the Little River, south of the bridge, the limestone/dolomite exposures were surveyed for chert. No chert was located within these primary outcrops. Several specimens of poor quality chert were collected from the west bank of the river. These specimens were small and exhibited incipient fracture planes and inclusions. Numerous white vein quartz cobbles were noted in the river.

Survey Area 12 is an exposure of Jonesboro dolomite on the south side of a slope along Rudd Road, southeast of Carr Creek and northwest of the Little River, in Tuckaleechee Cove (Figure 25). There are exposures of Jonesboro dolomite throughout this area. A large exposure located on the north side of Rudd Road was visually surveyed. Soils at this location are mapped as Staser silt loam, a flood plain soil type formed from mixed colluvium (USDA, NRCS 2008). No chert or other cryptocrystalline materials were located at this area. This is consistent with other terrestrial exposures of Jonesboro dolomite in Tuckaleechee and Cades Coves.

Survey Area 13 is an area just northwest of Survey Area 5, on the north side of Hesse Creek, southeast of Miller Cove Church. This site is located on the west side of U.S. 73, on the USGS 7.5' Kinzel Springs quadrangle map, at UTM 244806E 3955821N (Figure 26). It is located on the property of the CADA Hereford Cattle Farm. Survey Area 6 is a southwest facing hill slope and adjacent field that is littered with chalcedony cobbles and some quarry debris. Soils at this area are mapped primarily as Barbourville silt loam and Dunmore silty clay loam. Barbourville silt loam is formed from colluvial or alluvial material weathered from acid sandstone and shale (USDA, NRCS 2008).

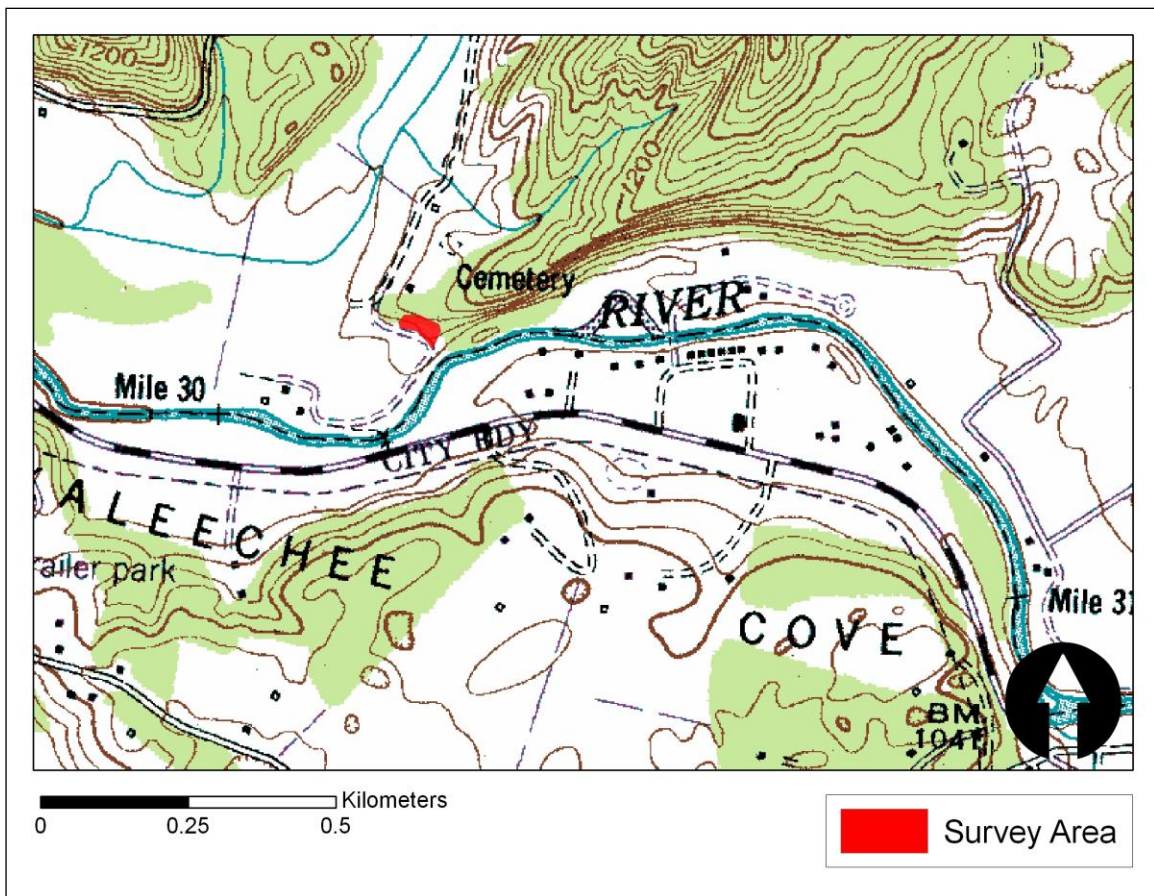


Figure 25. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 12.

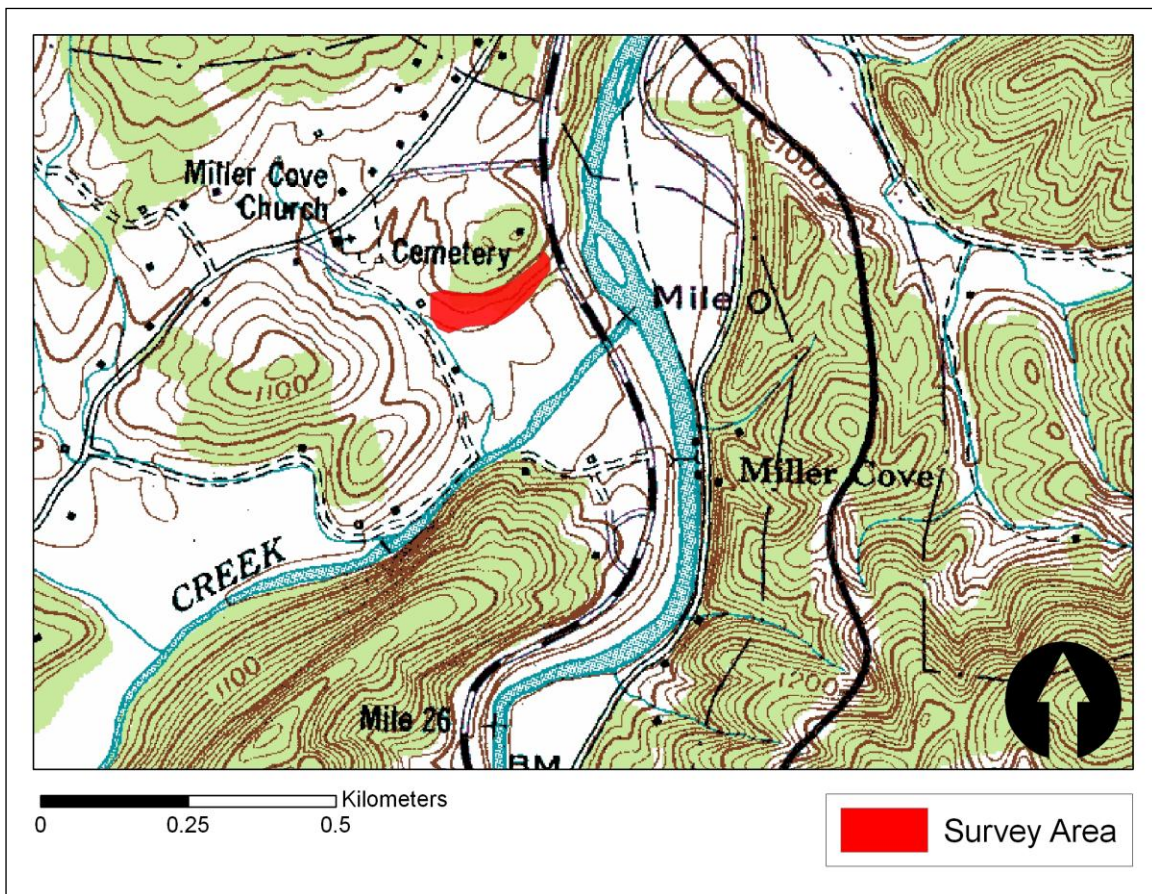


Figure 26. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 13.

Dunmore silt clay loam is formed in residuum of limestone on uplands (USDA, NRCS 2008). This area is underlain primarily by Shady Dolomite (Neuman and Nelson 1965).

Survey conducted at this area located several exposures of Shady Dolomite. The area on the south and southwest side of the hill, southwest of U.S. 73 is littered with chalcedony. Chalcedony was observed in large quantities scattered across the base of the slope and the surrounding cattle pastures. This chalcedony occurs in large, amorphous boulders and cobbles (Figures 27, 28 and 29). This material appears to be eroding from bedrock on the slope and being incorporated into colluvium. Chalcedony boulders are scattered across the fields surrounding the hill. Visual survey noted chert and chalcedony flakes on the southwest side of the hill and it is likely that this area was a quarry site for chalcedony.

Survey Area 14 is a large field on the south side of East Miller Cove Road, northwest of East Mountain View Church, on the USGS 7.5' Kinzel Springs quadrangle map, at UTM 247382E 3958367N (Figure 30). The soils at this location are mapped as Hayter silt loam, sloping phase, which is a soil type formed from the weathering of sandstone, shale or limestone colluvium. This area is underlain entirely by Shady Dolomite (Neuman and Nelson 1965). Survey of this area identified numerous exposures and large boulders of Shady Dolomite. A large boulder of chalcedony was located in a pasture on the south side of East Millers Cove Road (Figure 31), approximately 200 m past the intersection of Loop Road and East Miller Cove Road, near the Watertown area of East Miller Cove.



Figure 27. Chalcedony from Survey Area 13, West Miller Cove.



Figure 28. Chalcedony from Survey Area 13, West Miller Cove.



Figure 29. Chalcedony from Survey Area 13, West Miller Cove.

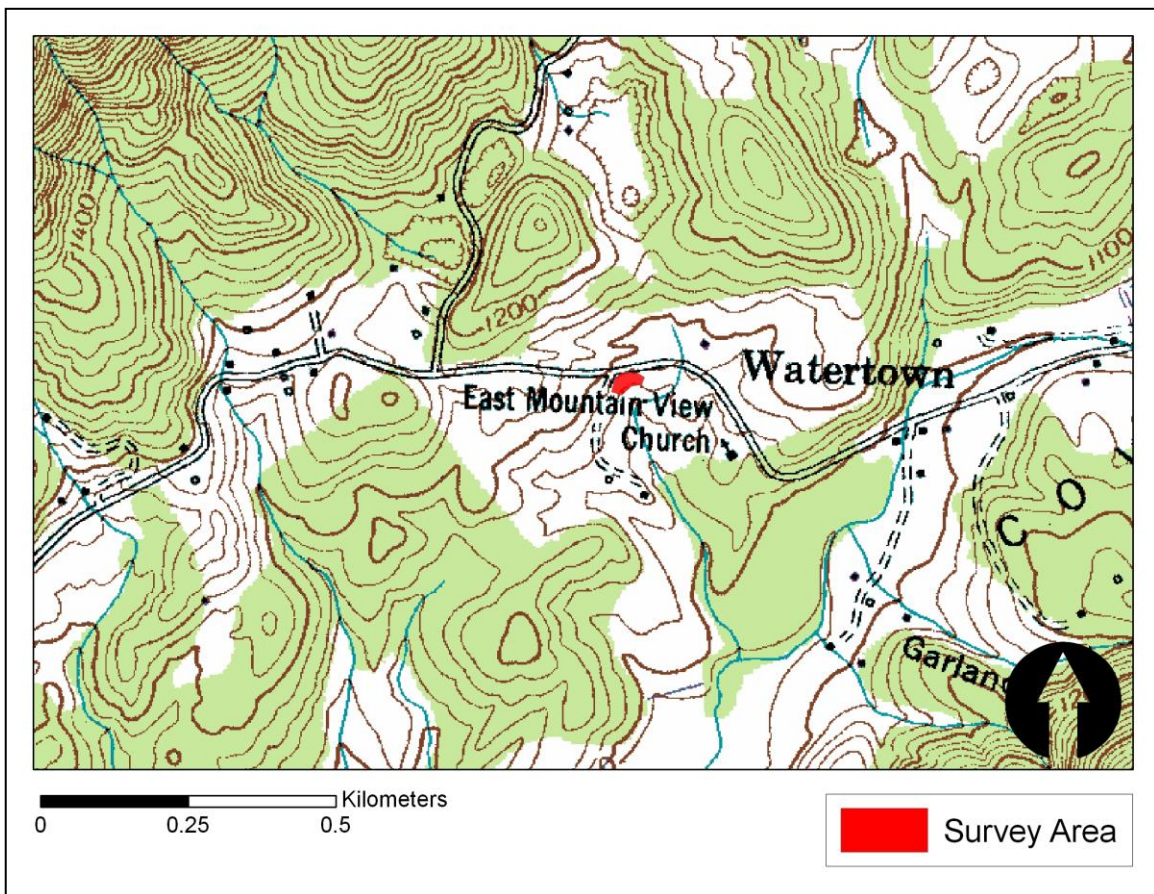


Figure 30. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 14.



Figure 31. Fragment of a chalcedony boulder from Survey Area 14, East Millers Cove.

The boulder was approximately 40 cm in diameter and consisted primarily of chalcedony and smaller amounts of dolomite. The parent material and chalcedony were visually similar to materials collected and observed in the Hesse Creek area of West Millers Cove. This single specimen contained fine-grained black chalcedony, coarse-grained white and pale gray chalcedony and an inner cavity filled with quartz crystals, similar to a geode.

Survey Area 15 is a hill located in the western portion of Dry Valley, in southwestern Tuckaleechee Cove (Figure 32). It is situated north of Rich Mountain and southeast of Kelly Ridge, at UTM 246176E 3949262N. This site is located on the property of Mr. Steve Vananda, the owner of Tuckaleechee Caverns. This survey area is located in a very karstic environment, with exposures of limestone/dolomite and sinkholes evident across the site. The survey area is a round hill located on the north side of the access road, opposite an old barn. This area is underlain by Jonesboro limestone. Soils in this area are mapped as Rockland Limestone, moderately steep, formed from loamy colluvium. Survey at this area located large amounts of chert, occurring in both rough amorphous pieces and small nodules. The majority of chert ranged in color from dark gray to black. A single piece of banded bluish gray chert was also recovered. The most prevalent variety of chert occurring at this site was a dark gray or black chert, occurring in rough and amorphous nodules and fragments. This material was observed to be eroding from the soil across the site. All the specimens of dark gray and black chert were extremely poor quality and exhibited numerous incipient fracture planes (Figure 33).

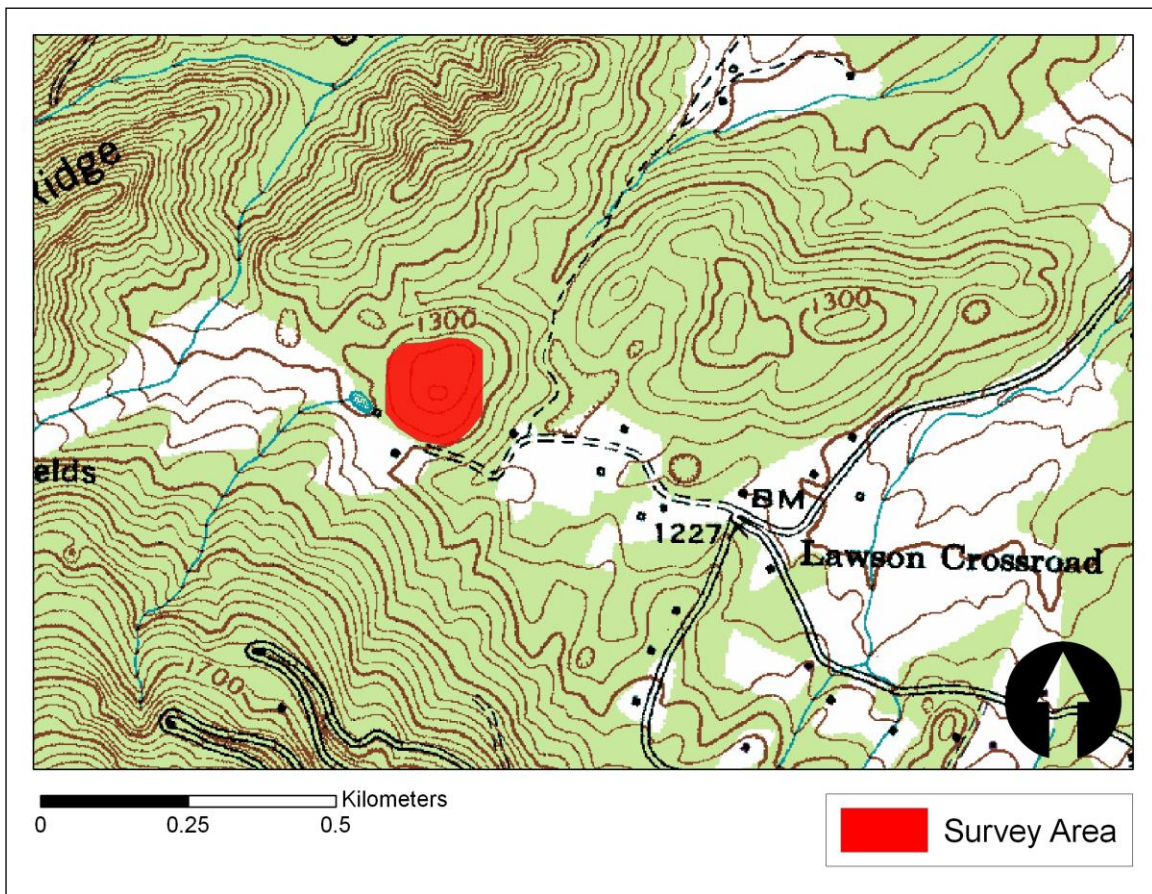


Figure 32. Portion of the USGS 7.5' Kinzel Springs quadrangle map showing the location of Survey Area 15.



**Figure 33. Sample of chert derived from Survey Area 15,
Tuckaleechee Cove.**

The cortex of the dark gray and black chert exhibited what could be described as a “box-work” pattern, apparently the result of the re-silicification of the fracture planes in the chert, which were more resistant to erosion than the original chert matrix (Figure 34). One small nodule of banded bluish gray chert and one small broken nodule of good quality black chert were collected, both of which were very different in appearance from the other chert that was prevalent at this site (Figure 35). Both the bluish gray and the good quality black chert occurred in small, ovoid nodules and appeared homogenous and free of any incipient fractures or flaws. While these chert nodules appeared to be free from flaws, both were too small to be suitable for most tool production. This site was intensively surveyed and no other visually similar chert was located. No archaeological materials or evidence of lithic procurement or reduction was noted at this site.

Survey Area 16 is an eroded hillside located on the west side of River Ford Road at the intersection of River Road and Sevierville Road (Figure 36). Large amounts of chert were observed eroding from the soil at this location. Soils at this survey area are mapped as Dunmore silty clay, an upland soil formed from limestone residuum (USDA, NRCS 2008). This area is underlain by Longview dolomite (Cattermole 1962). All the specimens collected from this location were poor quality, light colored porcellaneous chert. This chert was badly weathered and was not suitable as a raw material for the manufacture of stone tools. It is possible this chert represents nodules that were badly eroded and desilicified, resulting in a brittle, chalky cortex and white porcellaneous chert.



Figure 34. Sample of chert derived from Survey Area 15, Tuckaleechee Cove, showing the box-work pattern on cortex.



**Figure 35. Small nodular chert derived from Survey Area 15,
Tuckaleechee Cove.**

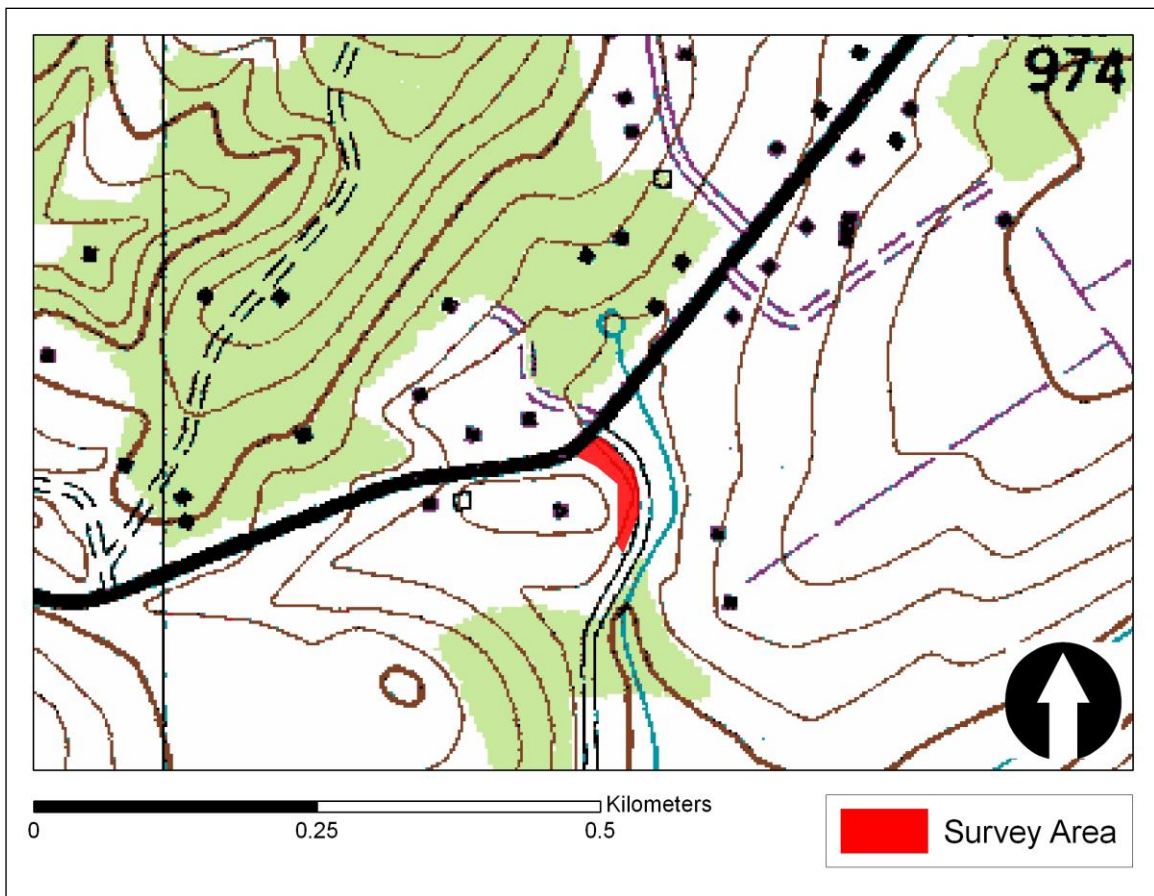


Figure 36. Portion of the USGS 7.5' Wildwood quadrangle map showing the location of Survey Area 16.

Survey Area 17 is located on the south side of Davis Ford Road, in a large pasture on the south side of Crooked Creek, between Mile 1 and Mile 2 on the USGS 7.5' Maryville quadrangle map (Figure 37). Chert nodules were located eroding from a hillside above the south bank of Crooked Creek, in an area of distinctive red soil. Soils at this area are mapped predominantly as Cumberland silty clay loam and Etowah silt loam. Cumberland silty clay loam is a cherty soil type formed from weathered alluvium underlain by limestone residuum. Etowah is formed from alluvium or colluvium underlain by limestone residuum (USDA, NRCS 2008). This area is underlain by Mascot and Newala Dolomite (Cattermole 1962).

Large quantities of Knox black and Knox black and gray-banded chert nodules were located and collected in this area (Figures 38-42). They were present in large amounts as residuum in a reddish brown, clay loam soil, and were absent in areas of brown soil. Associated with the concentrations of chert nodules were large amounts of primary chert debitage, tested nodules and other archaeological materials. No diagnostic materials were noted.

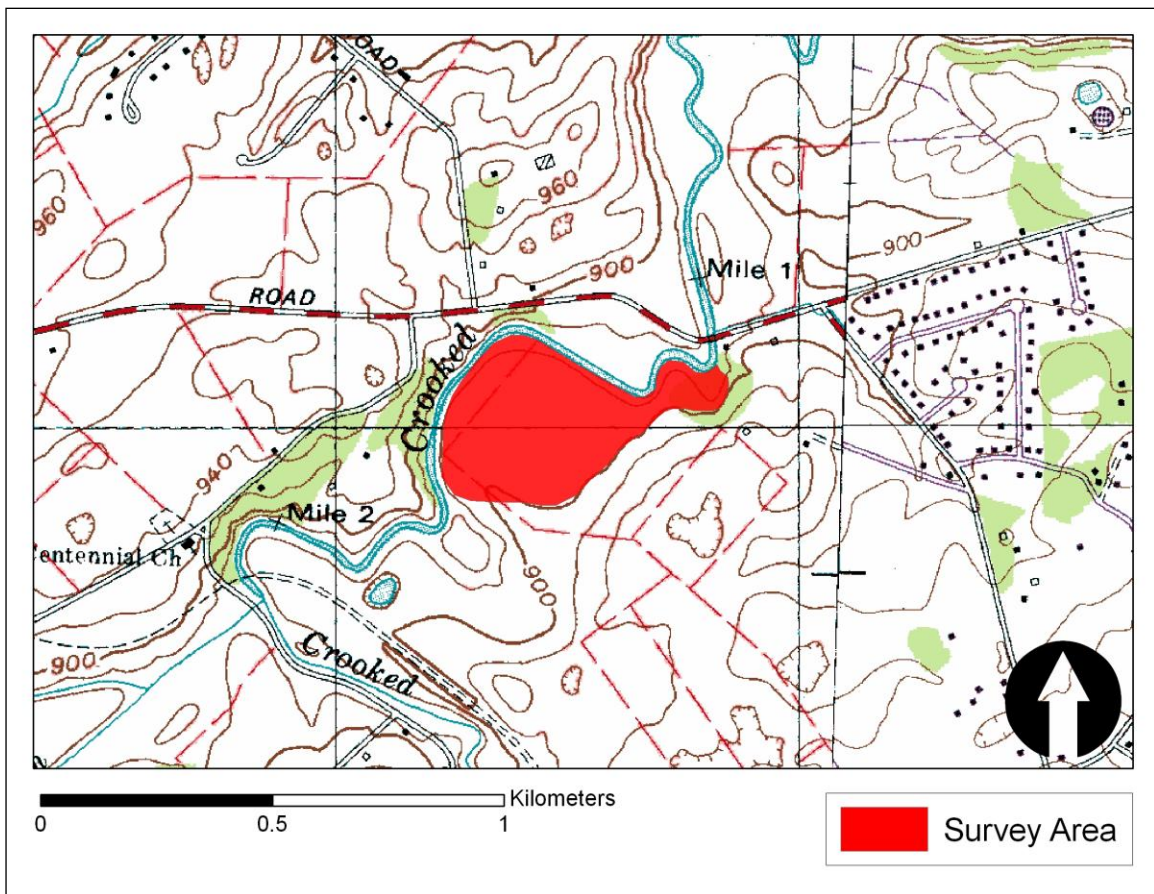


Figure 37. Portion of the USGS 7.5' Wildwood quadrangle map showing the location of Survey Area 17.



Figure 38. Knox Black Chert recovered from Survey Area 17.



Figure 39. Knox Black chert from Survey Area 17.



Figure 40. Knox gray chert from Survey Area 17.



Figure 41. Knox gray and black banded chert from Survey Area 17.



Figure 42. Knox chert samples from Survey Area 17.

Survey Area 18 is located on a level hilltop just north of the Centennial Church cemetery, near the junction of Centennial Church Road and Helton Road, approximately 190 m northwest of Crooked Creek (Figure 43). This survey area is located at UTM 238608E 3962037N. This area was chosen based on the presence of distinctive red soil, which had previously been shown to be an indicator of chert residuum. This location is the site of a future subdivision and will likely be destroyed in the near future. An area surveyed was just north of the Centennial Church cemetery, where erosion from nearby construction had exposed a large area of ground surface. Soils at this site are mapped as Decatur silty clay loam, a soil type formed from limestone residuum (USDA, NRCS 2008). This area is underlain by Mascot and Newala Dolomite (Cattermole 1962).

Survey at this location located a prehistoric lithic scatter. Portions of the site had been destroyed by the construction of a house foundation, but portions further east of this house foundation appear intact. Surface collection located primary and secondary chert debitage, biface fragments, and tested and natural chert nodules (Figures 44 and 45). Based on the surface survey of an eroded area of this site, this location represents a lithic extraction/reduction area. No diagnostic materials were located. Samples of chert debitage and nodules were collected and returned to the ARL for analysis. This site, along with any others located on this landform, will be destroyed by the construction of a large subdivision.

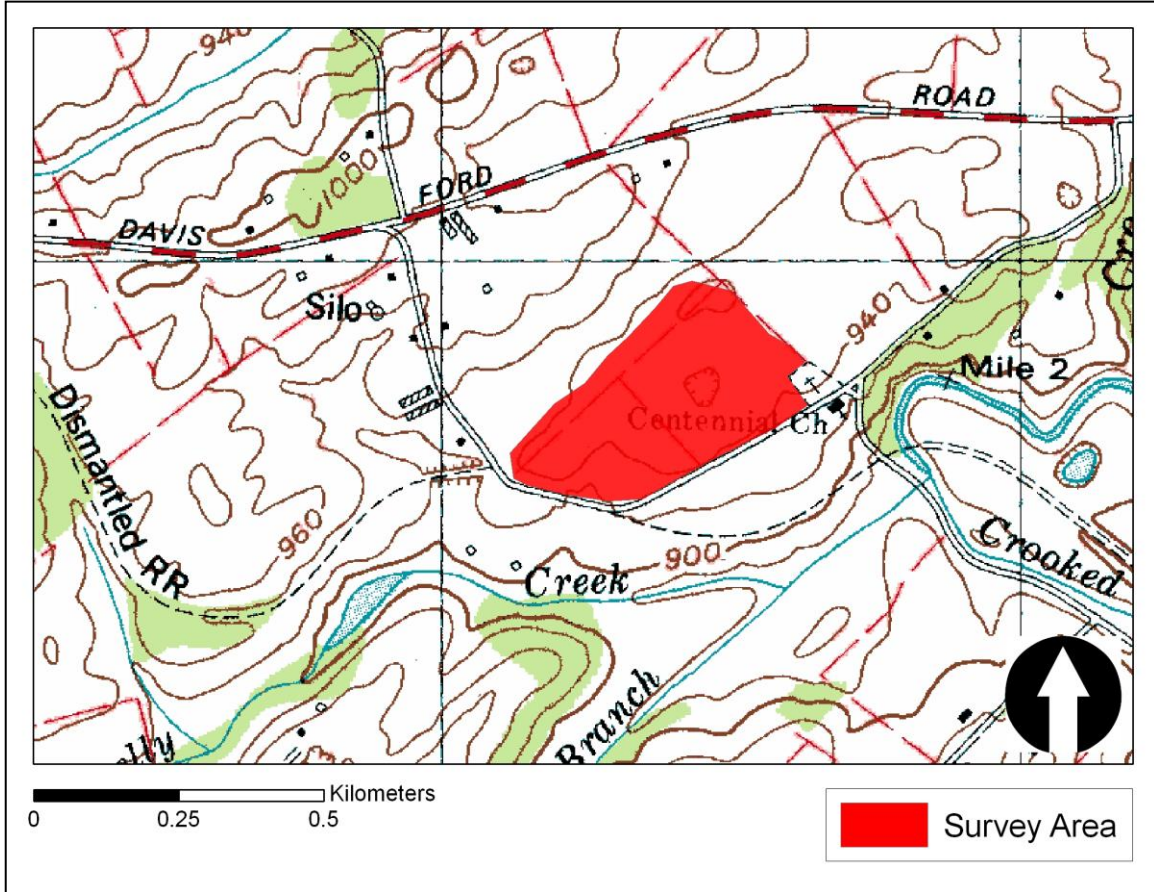


Figure 43. Portion of the USGS 7.5' Wildwood quadrangle map showing the location of Survey Area 18.



Figure 44. Knox Chert from Survey Area 18.



Figure 45. Decortation flakes collected from Survey Area 18.

Survey Area 19 is located on the southeastern face of a long ridge, located approximately 200 m northeast of the Little River and approximately 350 m northwest of the confluence of the Little River and Ellejoy Creek (Figure 46). Two separate locations were surveyed at this area. The first is a large outcrop of limestone located near the corner of Panoramic View Drive and River Ford Road. The second location was an area selected based on the presence of red soil, evident where the construction of a new home had exposed areas of soil on a hillside on the north side of Panoramic View Drive. Soils at both locations are mapped predominantly as Dunmore silty clay loam, an upland soil formed from limestone residuum. This area is underlain by Mascot and Newala dolomite (Cattermole 1962).

Survey of this area identified large amounts of chert nodules and chert debitage. Numerous tested and untested chert nodules and chert debitage were collected in the eroded area surrounding the new home and along the driveway. Most samples were Knox black and Knox black and gray-banded chert (Figures 47-50). Smaller amounts of chalcedony were also recovered from this location (Figure 51). These samples were returned to the ARL for analysis. The presence of tested nodules and primary debitage, along with the absence of secondary and tertiary debitage, makes it likely this site represents a lithic extraction/reduction site. Roadside survey of eroded areas along Panoramic View Drive also identified chert nodules and nodule fragments along the north side of the road.

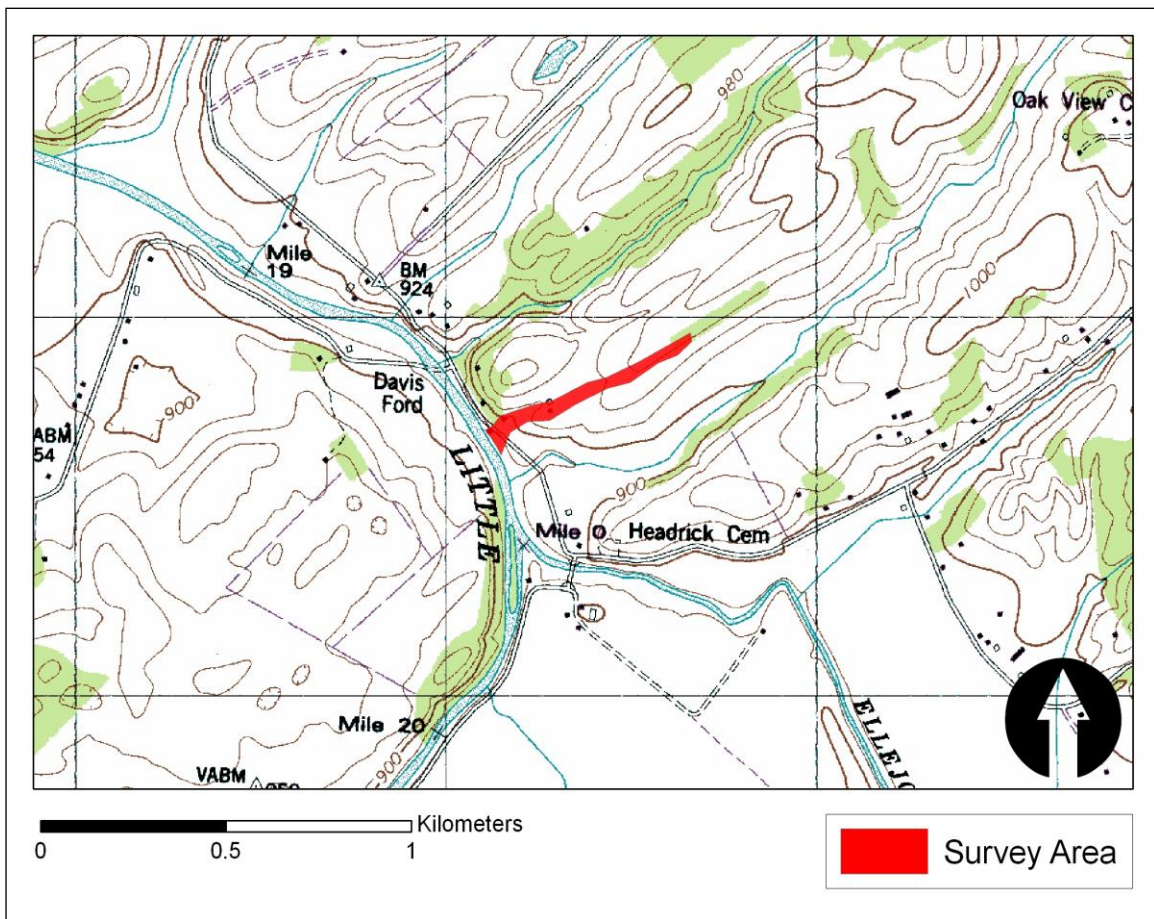


Figure 46. Portion of the USGS 7.5' Wildwood quadrangle map showing the location of Survey Area 19.



Figure 47. Knox black and gray-banded chert from Survey Area 19.



Figure 48. Black and Black and gray banded chert cobbles from Survey Area 19.



Figure 49. Knox gray and black chert nodule from Survey Area 19.



Figure 50. Knox Banded chert from Survey Area 19.



Figure 51. Chalcedony from Survey Area 19.

Survey Area 20 is a large area of eroded ground between Pea Ridge Road and Lorena Ln., on the northeast side of Nola View Drive (Figure 52). The area was selected based on geologic mapping. This area is mapped as Cumberland silty clay, a cherty soil type formed from weathered alluvium underlain by limestone residuum. This area is underlain by Copper Ridge Dolomite (Cattermole 1962).

Survey at this location recovered numerous small fragments of Knox chert. The samples included light gray, light brown and light blue-gray varieties (Figures 53 and 54). Some samples from this location were oolitic and had a coarse-grained appearance. All the samples collected at this location were small and most were poor quality.

Survey Area 21 is at the location of “Hold your Horses” horse farm, located on the west side of River Ford Road, east of the Little River, on the USGS 7.5’ Wildwood quadrangle map (Figure 55). This survey area is located northeast of the Little River on the west side of River Ford Road, east of the confluence of Crooked Creek and the Little River.

The survey area includes a high knob and areas of floodplain on the south and east side of the knob. Soils at this area are mapped as Dunmore silty clay loam and Linside silt loam. Dunmore silty clay loam is an upland soil formed from limestone residuum.

Linside silt loam is a floodplain soil type formed from alluvium (USDA, NRCS 2008). This area is underlain by Mascot and Newala Dolomite (Cattermole 1962).

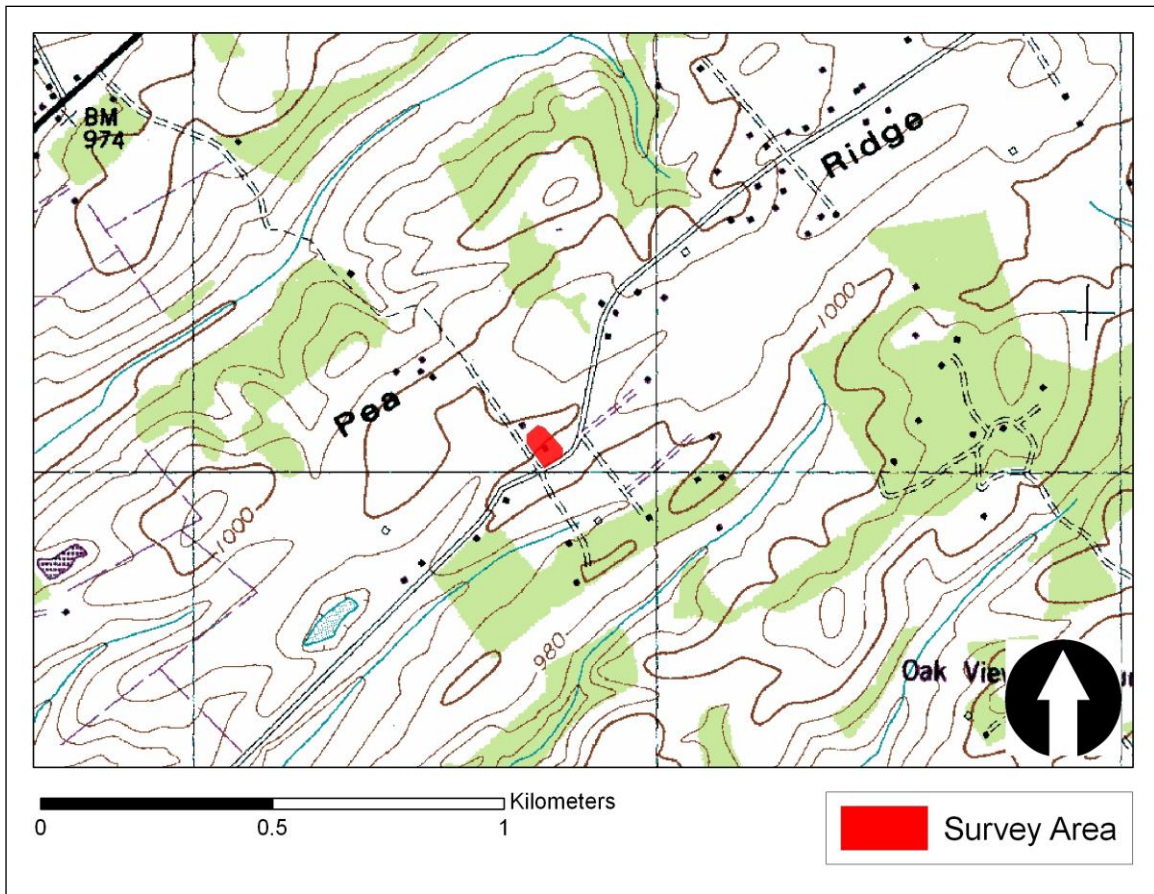


Figure 52. Portion of the USGS 7.5' Wildwood quadrangle map showing the location of Survey Area 20.



Figure 53. Knox chert from Survey Area 20.



Figure 54. Knox chert from Survey Area 20.

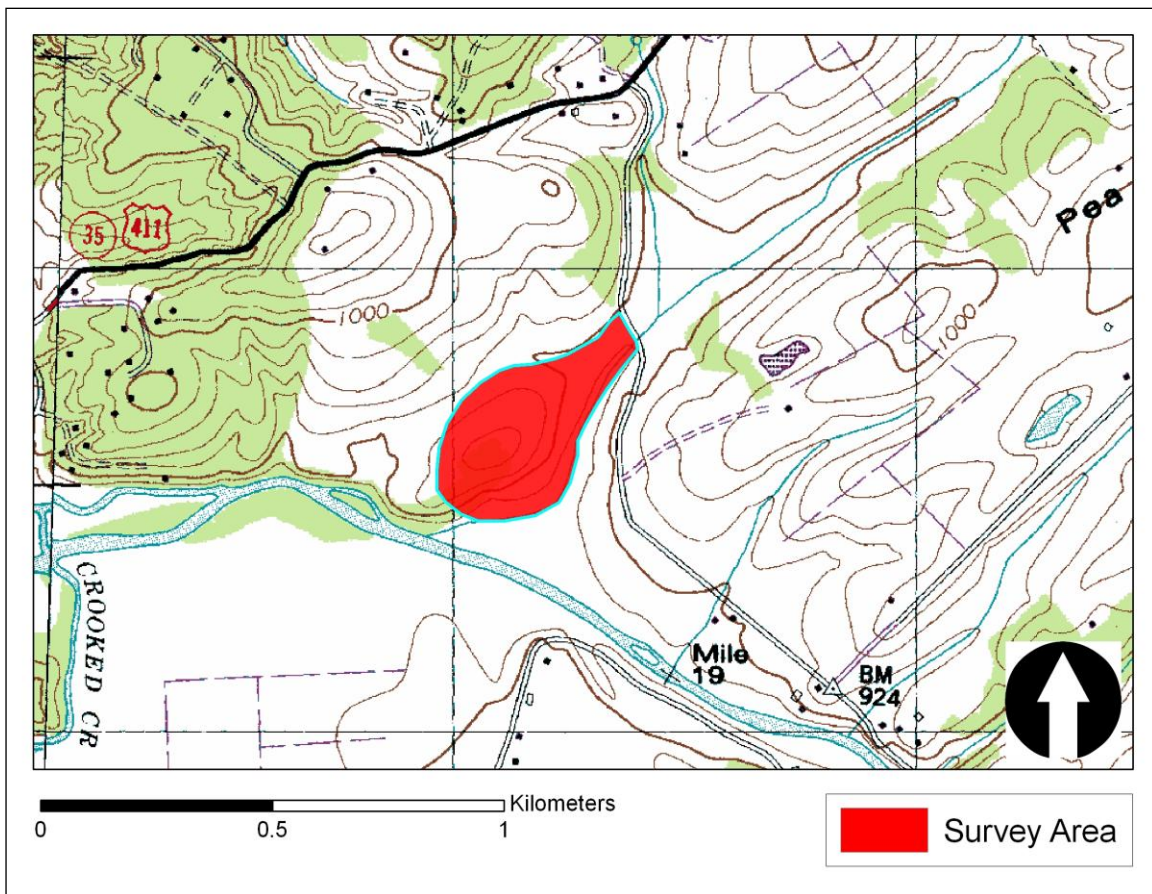


Figure 55. Portion of the USGS 7.5' Wildwood quadrangle map showing the location of Survey Area 21.

Survey at this location recovered numerous nodules of Knox chert. The samples included Knox black, Knox black and gray-banded, and Knox mottled gray and white varieties (Figures 56-62). Chert at this site included good and poor quality chert. This site exhibited the most variation in chert of any site surveyed. Chert was collected from the hilltop, slope, fields and stream channel at this site. The highest quality chert was recovered from the surface of the ground on the hilltop and slope. Samples of chert collected from the stream were mostly poor quality and weathered (Figures 63 and 64).

Survey Area 22 is Whiteoak Blowhole Cave. This cave is a deep, limestone cave located in the Whiteoak Sinks area of the Great Smoky Mountains National Park (Figure 65). The interior of the cave was surveyed to identify exposures of Knox chert cobbles that were reported to be eroding from the cave walls. This cave is an erosion formation, formed in Jonesboro dolomite.

Survey of Whiteoak Blowhole cave located large amounts of Knox black chert, occurring in thick beds in the interior of the cave (Figure 66). Numerous samples of this chert were tested. All samples were poor quality and exhibited dense fracture planes. This chert was consistent with other Knox chert derived from Jonesboro limestone in Cades and Tuckaleechee Cove. This survey area is not a source of artifact quality Knox chert.



Figure 56. Knox chert recovered from Survey Area 21.



Figure 57. Knox black chert recovered from Survey Area 21.



Figure 58. Knox gray and black and gray-banded chert recovered from Survey Area 21.



Figure 59. Large, poor quality chert nodule recovered from Survey Area 21.



Figure 60. Large, poor quality chert nodule recovered from Survey Area 21.



Figure 61. Large Knox black and gray-banded chert nodule recovered from Survey Area 21.



Figure 62. Small Knox black and gray-banded chert nodule recovered from Survey Area 21.



Figure 63. Knox black chert recovered from the stream channel at Survey Area 21.



Figure 64. Knox black chert recovered from the stream at Survey Area 21.

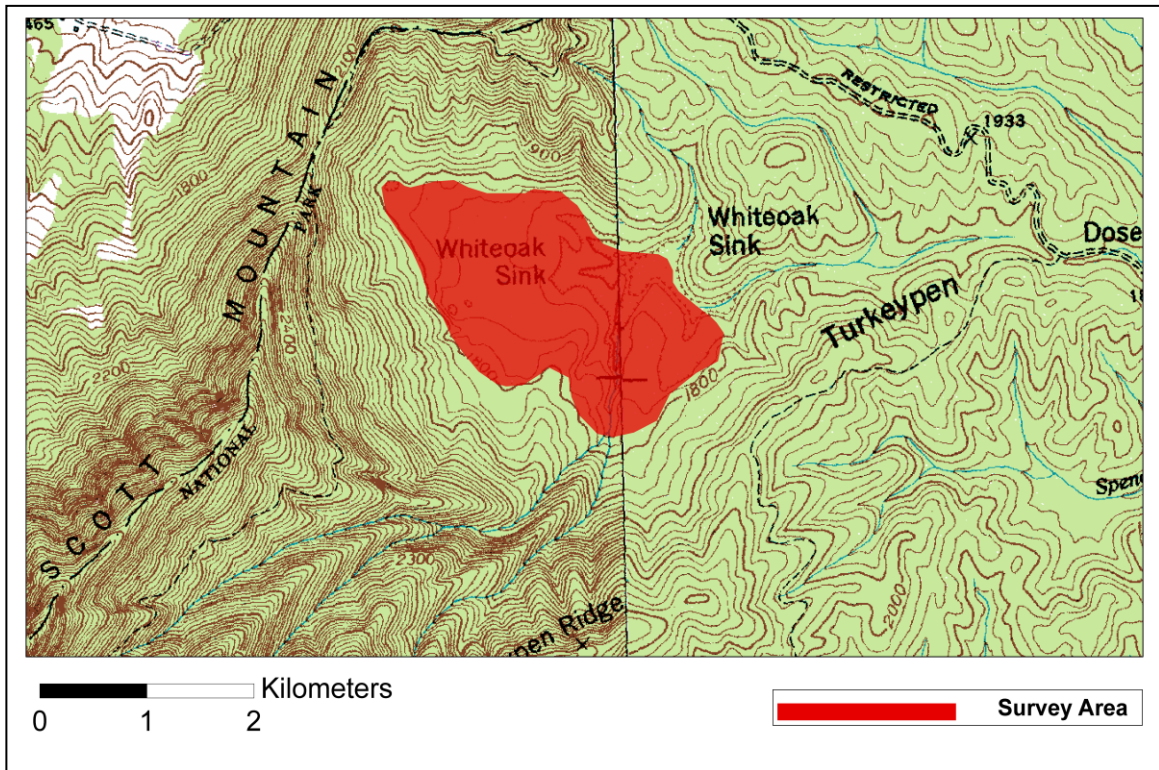


Figure 65. Portion of the Kinzel Springs quadrangle map showing the location of Whiteoak Sinks.



Figure 66. Bedded chert nodules inside Whiteoak Blow Hole Cave.

Survey Area 23 is an area on the west side of Martha's Branch, southwest of the John Oliver Cabin site in Cades Cove. This site is located at UTM 246615 E 3943827 N (Figure 67). The survey area includes the streambed of Martha's Branch and a large portion of the ridge west of the stream channel (Sweat 2005). Soils at this area are mapped as Cades silt loam and Lonon silty clay loam. Cades silt loam is formed from alluvium derived from weathered metasedimentary rocks such as phyllite and metasandstone. Lonon silty clay loam is formed from colluvium and alluvium derived from weathered metasedimentary rocks such as quartzite, phyllite and metasandstone (USDA, NRCS 2008). The northern portion of this survey area is underlain by Metcalf phyllite. The southern portion of the survey area is underlain by Jonesboro limestone (Southworth 2005). No high quality chert or cryptocrystalline materials were located at this site.

Survey Area 24 is the area surrounding and including Gregory's Cave. This area is centrally located along the northern edge of Cades Cove, north of Cades Cove Loop Road, on the south side of Cave Ridge (Sweat 2005). This survey area is located at UTM 245823 E 3944259 N. Gregory's Cave is a prominent limestone cave surrounded by an extensive outcrop of Jonesboro limestone. The cave itself and the surrounding limestone exposures were surveyed to identify potential chert sources (Sweat 2005). The soil surrounding Gregory's Cave is mapped as Lonon silty clay loam and is formed from colluvium and alluvium derived from weathered metasedimentary rocks such as quartzite, phyllite and metasandstone (USDA, NRCS 2008). Chert nodules were located near the base of Gregory Ridge, south of the entrance of Gregory's Cave. All chert

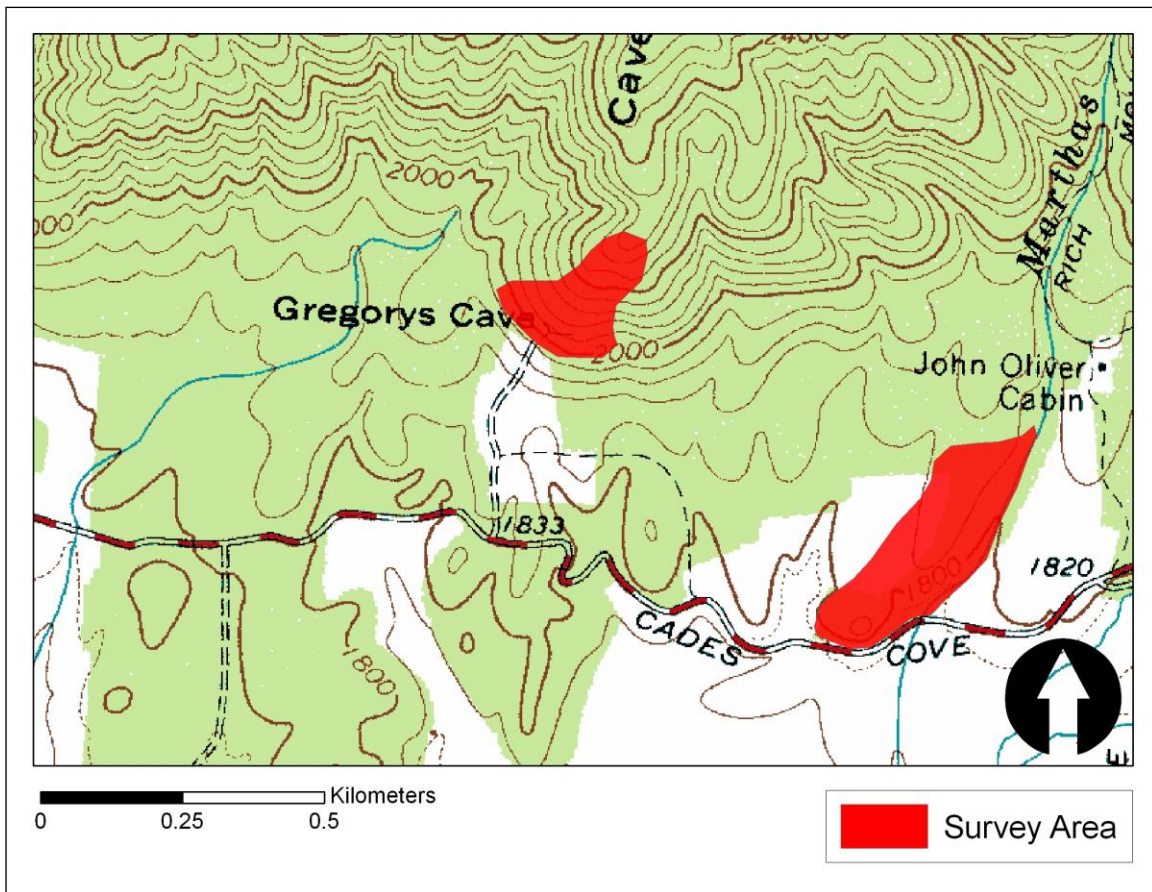


Figure 67. Portion of the USGS 7.5' Wildwood quadrangle map showing the location of Survey Areas 23 and 24.

specimens located were poor quality and exhibited numerous incipient fracture planes. This material is consistent in appearance and quality with other chert derived from Jonesboro series dolomite.

Survey Area 25 is a group of prominent exposures of Jonesboro limestone just north of the Cades Cove Loop Road in the western portion of Cades Cove, west of Hyatt Lane, (Figure 68) (Sweat 2005). Three exposures of limestone were surveyed at this site. All three are adjacent to the south bank of Abram's Creek. The first is located on the north slope of the ridge south of Abrams Creek. This exposure consists of a group of large Jonesboro limestone boulders that may be a collapsed limestone cave entrance (Sweat 2005). There is a small spring flowing from beneath the boulders that flows north into Abram's Creek. The second exposure consists of a large outcrop just south of the confluence of Abram's Creek and Feezel Branch. The third is a large exposure of Jonesboro Limestone along Abram's Creek. It is located at the base of a ridge east of the confluence of Abrams Creek and Feezel Branch (Sweat 2005). Soils at this survey area are mapped as Toxaway silty clay loam, a mountain-valley soil type formed from loamy alluvial deposits on level flood plains (USDA, NRCS 2008). Small amorphous fragments of weathered chert were located at this site. No good quality chert was located.

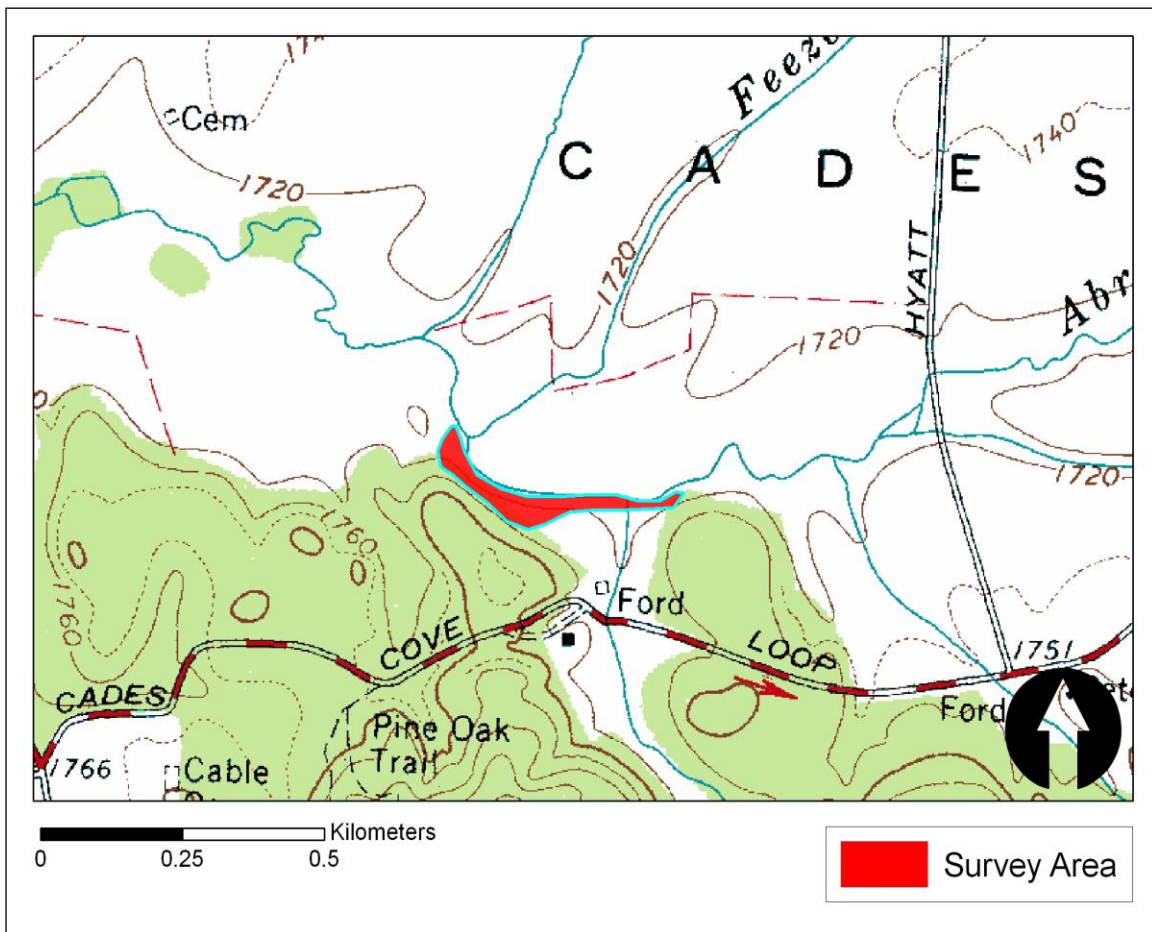


Figure 68. Portion of the USGS 7.5' Cades Cove quadrangle map, showing the location of Survey Area 25.

Table 2. Summary of Survey Areas

Survey Area	Groundstone Raw Materials	Chipped Stone Raw Materials	Quarry/Early Stage Reduction Site
1	X	-	-
2	X	-	-
3	X	-	-
4	X	-	-
5	X	-	-
6	X	-	-
7	X	-	-
8	X	-	-
9	X	X	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	X	X
14	-	X	-
15	-	-	-
16	-	-	-
17	-	X	X
18	-	X	X
19	-	X	X
20	-	-	-
21	-	X	-
22	-	-	-
23	-	-	-
24	-	-	-
25	-	-	-

6. Materials Use at Townsend

This chapter examines the use of raw materials recovered from the Townsend excavations. The lithic artifacts at Townsend were organized into four broad categories: Formal Tools, Flake Tools, Bifaces and Ground Stone Tools. The Formal Tools category contains all the bifacially worked, formal tools such as hafted end scrapers, projectile point/knives, bifacial drills and perforators, and bifacial wedges. The Flake Tools category refers to unifacial tools manufactured on flakes and include blades, unifacial scrapers, graters, unifacial drills and perforators, graters and wedges. The biface category contains the chipped stone tools that were not classified under the previous categories, including bifaces and cores. The Ground Stone category refers to all ground stone tools and ornaments. While use-wear studies are ongoing on the formal and flake tools recovered during the Townsend excavation, no definitive results are yet available. Therefore tool function in the below categories is based on tool morphology and previously established types.

In the following sections, each of the major tool classes is presented using artifact tables organized according to site and raw material. Each table presents the artifact type, the number of specimens manufactured from each of the raw material types and a brief summary of the total of the percentages of raw material present in each artifact type. Each tool class section is followed by a summary of the total raw material use for each of the tool classes.

Formal Tools

The Formal Tool category refers to finished, bifacially worked tools such as projectile points, hafted end scrapers, bifacial end scrapers, bifacial drills and perforators, chipped stone hafted percussion tools and wedges.

Bifacial Scrapers

End scrapers generally exhibit steep angled, regular retouch transverse to the longitudinal axis of the implement, resulting in a straight or convex working edge (Kimball 1985:60). Bifacial end scrapers do not exhibit any hafting element and were presumably used to scrape hides and process animal skins. A total of 112 bifacial scrapers was recovered during the Townsend excavations (Table 3). The majority (99.11%) was manufactured out of locally available Knox chert (95.53%), chalcedony (1.79%) and quartz (1.79%). A single specimen was manufactured from non-local material resembling St. Louis chert (0.89%).

Bifacial Drills and Perforators

Bifacial drills and perforators are hafted tools exhibiting bifacial retouch along the major portion of the implement, resulting in a parallel-sided, rod shaped projection that functioned as a drill (Kimball 1985:60). These tools may have been used to drill a variety of materials including stone, shell, pottery and wood.

A total of 107 bifacial drills and perforators was recovered during the Townsend excavations (Table 4). The majority (93.46%) was manufactured from locally available Knox chert (88.79%), chalcedony (3.74%) and quartz (0.93%). Seven specimens were manufactured from non-local materials resembling Ft. Payne chert (6.54%).

Table 3. Bifacial Scrapers

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	10	97	0	0	107
Chalcedony	0	2	0	0	2
Quartz	0	2	0	0	2
St. Louis Chert	0	1	0	0	1
Total	10	102	0	0	112

Table 4. Drills and Perforators

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	15	80	0	0	95
Chalcedony	1	3	0	0	4
Quartz	0	1	0	0	1
Ft Payne Chert	0	7	0	0	7
Total	16	91	0	0	107

Hafted End Scrapers

Hafted end scrapers generally exhibit steep angled, regular retouch transverse to the longitudinal axis of the implement, resulting in a straight or convex working edge (Kimball 1985:60). Hafted end scrapers refer to those exhibiting a hafting element such as a stem, corner notched base or side notched base. These tools were affixed to a handle and presumably used to scrape hides and process animal skins. A total of 25 hafted end-scrapers was recovered from the Townsend excavations (Table 5). The majority was manufactured from locally available Knox chert (92%). Two were manufactured from non-local material resembling Ft. Payne chert (8%).

Bifacial Wedges

Bifacial wedges are small, wedge shaped implements produced by bipolar percussion. This category is referable to the pièce esquillès category identified in previous research (Kimball 1985). A total of 46 bifacial wedges was recovered during the Townsend excavations (Table 6). The majority (95.65%) of these were manufactured from locally available Knox chert. Two specimens were manufactured from non-local material resembling Ft. Payne chert (4.35%).

Chipped Stone Hafted Percussion Tools

Chipped stone hafted percussion tools are chipped stone artifacts whose primary function is to remove material from an objective piece through percussion with a cutting edge. This artifact category includes axes, celts, adzes and chisels. Tools in this category are most commonly manufactured from pecked and ground stone. Chipped stone adzes and celts are less common, but a single specimen was recovered from the Townsend excavations (Table 7). This artifact was manufactured from locally available Knox chert.

Table 5. Hafted End Scrapers

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	1	22	0	0	23
Chalcedony	0	0	0	0	0
Quartz	0	0	0	0	0
Ft Payne Chert	0	2	0	0	2
Total	1	24	0	0	25

Table 6. Bifacial Wedges

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	8	36	0	0	44
Ft Payne Chert	0	2	0	0	2
Total	8	38	0	0	46

Table 7. Chipped Stone Hafted Percussion Tools

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	0	1	0	0	1

Erratic Chipped Stone Artifact

A single erratic chipped stone artifact was recovered during the Townsend excavations (Table 8). The term erratic is used here to describe an unusually shaped chipped stone artifact that has no known function. This artifact was manufactured from locally available Knox chert.

Projectile Points

Projectile points refer to any artifact that functioned primarily as a tip for a spear, dart or arrow. These tools exhibit bifacial retouch along the lateral edges of the tool that converges to point at the distal end and retouch on the proximal end to facilitate hafting (Davis 1990:141; Kimball 1985:60). While it is accepted that many artifacts in this category also functioned as hafted cutting tools, artifacts in this category were used primarily to tip projectiles. A total of 1,921 projectile points was recovered during the Townsend excavations (Table 9). The majority of these artifacts were manufactured from locally available Knox chert (80.79%), chalcedony (5.57%), quartz (6.14%), quartzite (0.31%), slate (0.68%), siltstone (0.31%), and jasper (0.26%). Non-local materials include materials resembling Ft. Payne chert (3.85%), Dover chert (0.16%), Brassfield chert (0.05%), Monteagle chert (0.05%), Bigby-Cannon chert (0.05%), St. Louis chert (1.15%), Rhyolite (0.05%), and Tallahatta quartzite (0.05%). Seven specimens were manufactured from an indeterminate raw material (0.36%).

Table 8. Erratic Chipped Stone Artifact

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	1	0	0	0	1

Table 9. Projectile Points

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	206	1,143	191	12	1,552
Chalcedony	11	79	17	0	107
Jasper	1	3	1	0	5
Quartz	23	76	18	1	118
Quartzite	3	3	0	0	6
Slate	3	6	3	1	13
Siltstone	3	2	1	0	6
Limestone	2	0	0	0	2
Ft. Payne Chert	10	50	13	1	74
Dover Chert	1	2	0	0	3
Brassfield Chert	0	1	0	0	1
Monteagle Chert	0	1	0	0	1
Bigby-Cannon	0	1	0	0	1
St. Louis Chert	0	21	1	0	22
Kanawha Black chert	0	1	0	0	1
Rhyolite	0	1	0	0	1
Tallahatta Quartzite	0	1	0	0	1
Indeterminate	0	7	0	0	7
Total	263	1,398	245	15	1,921

Of the 1,921 projectile points recovered, 1,853 could be assigned to one or more temporal-cultural periods based on diagnostic morphological attributes. Most of the identifiable projectile points were assigned to the Late Archaic, Middle Woodland and Late Woodland-Mississippian Periods. Some projectile point forms, such as large and small triangular types, occurred over long periods of time, and were assigned to more than one temporal-cultural period. While stylistic changes in projectile point morphology do not allow exact dating, they do provide a means of examining the change in raw materials use. Locally available Knox chert was the dominant material used to manufacture projectile points during every cultural period represented at the Townsend sites. There is an increase in the use of non-local materials during the Late Archaic and Early Woodland Periods (Table 10). The use of non-local materials decreases during the Middle Woodland and continues to decrease during the subsequent Mississippian and Historic Indian Periods.

Formal Tool Discussion

A total of 2,213 formal tools was analyzed from the Townsend excavations (Table 11). The majority of formal tools were manufactured from Knox chert, which accounts for 82.38% of the total formal tool assemblage. Other local materials account for 12.02% of the total assemblage, with quartz and chalcedony representing 10.57% of the total formal tool assemblage. Non-local materials consisted mainly of chert resembling Ft. Payne and St. Louis varieties. There is a strong preference for Knox chert in all of the formal tool categories. Of the total number of formal tools analyzed, Knox chert accounts for 99.1% of bifacial scrapers, 92% of all hafted end-scrapers, 88.79% of drills and perforators, 95.65% of wedges and 80.79% of projectile points.

Table 10. Changes in Local Versus Non-local Raw Material Use in Projectile Points

Temporal-Cultural Period	Percent of Total Assemblage	Local Raw Materials	Non-local raw materials
Early Archaic (N=45)	2.29%	96%	4%
Middle Archaic (N=30)	1.53%	93%	7%
Late Archaic (N=258)	13.13%	87%	12%
Transitional L. Archaic-E. Woodland (N=237)	12.06%	95%	5%
Early Woodland (N=49)	2.49%	86%	12%
Middle Woodland (N=511)	26.00%	93%	6%
Late Woodland-Mississippian (N=558)	28.40%	98%	2%
Late Mississippian-Historic Indian (N=20)	1.02	100%	0%

Table 11. Formal Tool Raw Materials Types

Raw Material	Total
Knox Chert	1,823
Quartz	121
Chalcedony	113
Ft Payne Chert	85
St. Louis Chert	23
Slate	13
Indeterminate	7
Quartzite	6
Siltstone	6
Jasper	5
Dover Chert	3
Limestone	2
Bigby-Cannon	1
Brassfield Chert	1
Kanawha Black chert	1
Monteagle Chert	1
Rhyolite	1
Tallahatta Quartzite	1
Total	2,213

Non-local materials are dominated by chert resembling Ft. Payne and St. Louis varieties, which together account for 4.88% of the total formal tool assemblage. The greatest variation in raw material types is in the projectile point category, which contains a variety of non-local chert resembling the St. Louis, Ft. Payne, Dover, Brassfield, Bigby-Cannon and Monteagle varieties. The projectile point category also contains a single specimen manufactured from rhyolite and one that resembles Tallahatta quartzite. Since projectile points were curated tools and the assemblage contains projectile points dating from the Paleo-Indian through Historic Cherokee periods, it is not surprising that there is a larger amount of variation in raw material types for projectile points than for other tool classes.

The examination of the projectile point category by temporal cultural period shows that Knox chert was used consistently throughout the cultural periods. While there is an increase in the use of non-local materials for the manufacture of projectile points during the Late Archaic and Early Woodland Periods, locally available materials never represent less than 86% of the total projectile point assemblage.

Flake Tools

The flake tool class refers to unifacial tools manufactured from flakes or flakes that were modified or used as expedient tools. This includes retouched blades, flake drills, flake graters, unifacial scrapers, flake wedges and modified flakes. Unifacial scrapers recovered from Townsend were classified according to morphology and include incurvate, ovoid and humpback scrapers. This category does not include formal, bifacial tools made on flakes.

Retouched Blades

Retouched blades are flakes that are twice as long as wide; many appear to have been removed from a prepared core. All of the blades recovered from the Townsend collection exhibited some retouch, much of which likely resulted from use. There were a total of 244 blades recovered during the Townsend excavations (Table 12). Most blades were recovered in Middle Woodland contexts. The majority of blades (97.13%) were manufactured from locally available Knox chert (85.66%), chalcedony (9.84%) and quartz (1.64%). Non-local materials include chert resembling Fort Payne (1.64%), St. Louis (0.82%) and Flint Ridge (0.41%) varieties.

Flake Drills

Flake drills are unifacial tools manufactured from flakes. As with bifacial drills, they exhibit retouch along the major portion of the implement, resulting in a parallel-sided, rod shaped projection that functioned as a drill (Kimball 1985:60). A total of 23 flake drills was recovered during the Townsend excavations (Table 13). All the flake drills recovered were manufactured from locally available Knox chert (91.30%) and chalcedony (8.70%).

Flake Gravers

Flake gravers are unifacial flake tools exhibiting fine retouch, resulting in a triangular projection (Kimball 1985:60). These tools were presumably used as wood or bone working implements. A total of 9 flake gravers was recovered during the Townsend excavations (Table 14). All flake gravers were manufactured from locally available Knox Chert (88.89%) and quartz (11.11%).

Table 12. Retouched Blades

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	45	142	22	0	209
Chalcedony	6	17	1	0	24
Quartz	1	3	0	0	4
Ft. Payne Chert	1	2	1	0	4
Flint Ridge Chalcedony	0	1	0	0	1
St. Louis Chert	0	2	0	0	2
Total	53	167	24	0	244

Table 13. Flake Drills

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	4	15	2	0	21
Chalcedony	0	1	1	0	2
Total	4	16	3	0	23

Table 14. Flake Gravers

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	0	7	0	1	8
Quartz	0	1	0	0	1
Total	0	8	0	1	9

Incurvate Scrapers

Incurvate scrapers are unifacial tools that exhibit steep retouch along one edge, resulting in a convex working edge. They were presumably used to work wood or bone. A total of 53 incurvate scrapers was recovered during the Townsend excavations (Table 15). All incurvate scrapers were manufactured from locally available Knox chert (90.57%), chalcedony (5.66%) and slate (3.77%).

Humpback Scrapers

Humpback scrapers are unifacial tools that exhibit steep retouch along one or more edge and have a convex or "humpback" surface on one side. They were presumably used to scrape hides and process animal skins. A total of 20 humpback scrapers was recovered during the Townsend excavations (Table 16). All were manufactured from locally available Knox chert (90%) and chalcedony (10%).

Ovate Scrapers

Ovate scrapers are unifacial tools that exhibit steep retouch along one or more edge, resulting in an ovate shape. They were presumably used to scrape hides and process animal skins. A total of 24 ovate scrapers was recovered during the Townsend excavations (Table 17). The majority (95.9%) was manufactured from locally available Knox chert (91.66%) and chalcedony (4.17%). A single specimen was manufactured from non-local material resembling St. Louis chert (4.17%).

Table 15. Incurvate Scrapers

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	11	35	1	1	48
Chalcedony	2	1	0	0	3
Slate	0	2	0	0	2
Total	13	38	1	1	53

Table 16. Humpback Scrapers

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	0	16	2	0	18
Chalcedony	0	1	1	0	2
Total	0	17	3	0	20

Table 17. Ovate Scrapers

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	6	14	1	1	22
Chalcedony	0	0	1	0	1
St. Louis Chert	0	1	0	0	1
Total	6	15	2	1	24

Flake Wedges

Flake wedges are wedge shaped artifacts manufactured on flakes, similar to bifacial wedges and referable to the pièce esquillée category identified in previous research (Kimball 1985). These artifacts may represent bipolar flakes or intentionally manufactured tools. A total of 14 wedges was recovered during the Townsend excavations (Table 18). All of the wedges were manufactured from locally available Knox chert (85.71%) and chalcedony (14.29%).

Flake Scrapers

Flake scrapers are flakes that exhibit steep retouch along one edge. They were presumably used to scrape hides and process animal skins. A total of 516 flake scrapers was recovered from the Townsend excavations (Table 19). The majority (95.92%) was manufactured from locally available Knox chert (85.66%), chalcedony (8.33%), quartz (1.74%) and jasper (0.19%). Non-local materials include chert resembling Fort Payne chert (3.49%) and St. Louis (0.58%) varieties.

Modified Flakes

Modified flakes are flakes exhibiting retouch or modification indicative of use as a tool. A total of 732 modified flakes was recovered from the Townsend excavations (Table 20). The majority (94.67%) was manufactured from locally available Knox chert (78.01%), chalcedony (8.61%), quartz (5.05%), slate (1.64%), jasper (0.96%) and siltstone (0.41%). Non-local materials include chert resembling Fort Payne chert (5.19%) and Kanawha Black Flint (0.14%).

Table 18. Flake Wedges

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	1	10	1	0	12
Chalcedony	0	2	0	0	2
Total	1	12	1	0	14

Table 19. Flake Scrapers

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	77	318	44	3	442
Chalcedony	16	22	4	1	43
Quartz	3	6	0	0	9
Ft. Payne Chert	5	12	1	0	18
Jasper	0	1	0	0	1
St. Louis Chert	0	3	0	0	3
Total	101	362	49	4	516

Table 20. Modified Flakes

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	120	277	173	1	571
Chalcedony	13	37	12	1	63
Quartz	5	25	6	1	37
Jasper	1	1	5	0	7
Slate	2	8	2	0	12
Siltstone	0	2	1	0	3
Ft. Payne Chert	5	25	8	0	38
Kanawha Black Flint	0	1	0	0	1
Total	146	376	207	3	732

Flake Tool Discussion

A total of 1,635 flake tools was recovered during the Townsend excavations (Table 21). Local materials accounted for 95.84% of the total flake tool assemblage. The majority of flake tools were manufactured from locally available Knox chert (82.63%), chalcedony (8.56%), quartz (3.12%), slate (0.86%), jasper (0.49%) and siltstone (0.18%). Non-local chert accounted for 4.16% of the total flake tool assemblage. Non-local materials included chert resembling Fort Payne (3.67%), St. Louis (0.37%), Kanawha Black (0.06%) and Flint Ridge (0.06%) varieties. These data show a strong preference for cryptocrystalline materials, which account for 95.84% of all artifacts in the flake tool assemblage. Locally available cryptocrystalline materials account for 91.68% of the overall flake tool assemblage. Non-local cryptocrystalline materials make up 4.16%.

Retouched blades account for 14.92% of the total flake tool assemblage. There is a strong preference for cryptocrystalline materials, which account for 98.36% of the blades in the Townsend assemblage. Blades were manufactured almost exclusively from locally available materials. The blade assemblage was predominantly Knox chert, with smaller amounts of chalcedony, quartz and non-local chert.

Unifacial flake drills account for 1.41% of the total flake tool assemblage. All of the drills were manufactured from locally available Knox chert and chalcedony. There is a preference for Knox chert, which comprises 91.30% of the unifacial drills.

Gravers account for 0.55% of the total flake tool assemblage. All the gravers were manufacture from locally available Knox chert and quartz.

Table 21. Flake Tool Raw Materials Types

Raw Materials	Total
Knox Chert	1,351
Chalcedony	140
Ft. Payne Chert	60
Quartz	51
Slate	14
Jasper	8
St. Louis Chert	6
Siltstone	3
Flint Ridge Chalcedony	1
Kanawha Black Flint	1
Total	1,635

Unifacial scrapers account for 5.93% of the total flake tool assemblage. These tools show a strong preference for cryptocrystalline materials. The majority was manufactured from locally available Knox Chert, which accounts for 90.72% of the total. Chalcedony accounted for 6.19% and slate accounted for 2.06%. Non-local materials are represented by a single specimen manufactured from chert resembling St. Louis chert, which accounted for 1.03% of the total unifacial scrapers.

Flake scrapers account for 31.59% of the total flake tool assemblage. These tools show a strong preference for cryptocrystalline materials, which account for 98.25% of the total; 94.18% of the cryptocrystalline materials are locally available, represented primarily by Knox chert, which accounts for 85.66% of the total. Chalcedony accounts for 8.33% and jasper accounts for 0.19% of the total. Non-local Fort Payne chert accounts for 3.49% and non-local St. Louis chert accounts for 0.58%. The remaining 1.74% is represented by locally available quartz.

Wedges account for 0.86% of the total flake tool assemblage. All of the wedges were manufactured from locally available materials. Knox chert accounted for 85.71% of the total and chalcedony accounted for the remaining 14.29%.

Modified flakes are the largest category of flake tools, accounting for 44.77% of the total flake tool assemblage. The majority of the modified flakes were manufactured from locally available cryptocrystalline materials. Knox chert accounted for 78.01% of the total. Chalcedony accounted for 8.61% and quartz accounted for 5.05%. Slate and siltstone account for 1.64% and 0.41% respectively. Non-local Fort Payne chert accounted for 5.19% and Kanawha Black flint accounted for 0.14%.

Cores

A core is any objective piece from which flakes have been removed for the purpose of manufacturing stone tools. Cores recovered during the Townsend excavation include bipolar cores, unidirectional cores and bifacial cores. Bifacial cores were included in the bifaces category and are represented by the crude bifaces and stage bifaces categories.

Bipolar Cores

Bipolar cores are identified by the presence of smashing or end damage resulting from the use of a hammer and anvil reduction technique. Bipolar cores recovered during the Townsend excavation were generally small, wedge shaped cores from which flakes had been removed using bipolar reduction. This reduction method is commonly used on raw materials that occur in small package sizes, such as locally available Knox chert. A total of 292 bipolar cores was recovered from the Townsend excavations (Table 22). The majority was manufactured from locally available Knox chert (95.89%), chalcedony

(1.71%) and quartz (1.71%). Non-local materials included Ft. Payne chert (0.34) and Brassfield chert (0.34%).

Unidirectional Cores

Unidirectional cores are those in which flakes have been removed along the same axis. A total of 33 unidirectional cores was recovered from the Townsend excavations (Table 23). The majority was manufactured from locally available Knox chert (84.85%), chalcedony (9.09%) and quartz (3.03%). Non-local materials were represented by a single specimen manufactured from Ft. Payne chert (3.03%).

Core Fragments

A total of 732 core fragments was recovered during the Townsend excavation (Table 24). The majority was manufactured from locally available Knox chert (87.02%), quartz (8.74%), chalcedony (2.87%), jasper (0.41%) and slate (0.14%). Non-local materials include chert resembling Monteagle chert (0.27%), Fort Payne chert (0.14%) and St. Louis chert (0.14%). Two specimens were manufactured from an unidentified raw material (0.27%).

Table 22. Bipolar Cores

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	44	188	46	2	280
Chalcedony	3	2	0	0	5
Quartz	0	1	4	0	5
Ft. Payne Chert	0	1	0	0	1
Brassfield Chert	0	1	0	0	1
Total	47	193	50	2	292

Table 23. Unidirectional Cores

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	2	23	3	0	28
Chalcedony	0	3	0	0	3
Quartz	1	0	0	0	1
Ft. Payne Chert	1	0	0	0	1
Total	4	26	3	0	33

Table 24. Core Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	71	460	95	11	637
Chalcedony	2	11	3	5	21
Quartz	11	36	12	5	64
Slate	0	1	0	0	1
Jasper	0	2	1	0	3
Ft. Payne Chert	0	1	0	0	1
Monteagle Chert	0	2	0	0	2
St. Louis	0	1	0	0	1
Indeterminate	0	2	0	0	2
Total	84	516	111	21	732

Tested Cobbles

Tested cobbles are stones that have had flakes removed by prehistoric people, presumably to determine the suitability of the stone as a raw material. A total of 227 tested cobbles was recovered during the Townsend excavations (Table 25). The majority was manufactured from locally available Knox chert (90.75%), quartz (6.61%), chalcedony (1.76%) and quartzite (0.44%). A single specimen was manufactured from non-local chert resembling Monteagle chert (0.44%).

Core Discussion

A total of 1,057 artifacts recovered from the Townsend excavations were identified as cores and core fragments. Local materials account for 99.15% of the total number of artifacts identified as cores and core fragments. The majority of these artifacts (89.40%) were manufactured from locally available Knox chert. Non-local chert types account for 0.66% of the total. Indeterminate raw materials account for 0.19% of the total. The majority of the identifiable cores recovered from the Townsend excavation were bipolar cores manufactured primarily from Knox chert. The high proportion of bipolar cores is probably related to the small size of Knox chert nodules and nodule fragments that occur in eastern Tennessee.

Table 25. Tested Cobbles

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	5	201	0	0	206
Chalcedony	0	4	0	0	4
Quartz	0	15	0	0	15
Quartzite	0	1	0	0	1
Monteagle Chert	0	1	0	0	1
Total	5	222	0	0	227

Bifaces

Bifaces are any tool that exhibits a worked edge along the entire perimeter of the artifact. Bifaces recovered from Townsend were broadly classified according to lithic reduction stages.

Crude Bifaces and Crude Biface Fragments

Crude bifaces and biface fragments represent initial stages in biface reduction, expedient bifaces and other crude bifacial tool fragments. A total of 2,104 crude bifaces and biface fragments was recovered during the Townsend excavations (Table 26). The overwhelming majority of crude bifaces and crude biface fragments was manufactured from locally available Knox chert (76.47%), quartz (9.36%), chalcedony (4.85%), slate (1.00%), jasper (0.67%) and siltstone (0.24%). Non-local materials included chert resembling Ft. Payne chert (5.66%), St. Louis chert (1.14%), Dover (0.19%), Kanawha Black flint (0.14%), Coastal Plains chert (0.05%) and Brassfield chert (0.05%). Four specimens were manufactured from indeterminate (0.19%) materials.

Stage Bifaces

The stage biface category refers to bifaces that represent an early stage in the reduction process. This category refers to artifacts that may represent crude cutting tools, early stage projectile point performs or early stage tool blanks. They exhibit early stage flake removal with a low degree of thinning and secondary retouch. A total of 422 stage bifaces was recovered during the Townsend excavations (Table 27). The majority was manufactured from locally available Knox chert (61.14%), quartz (25.59%), chalcedony (6.40%), jasper (0.95%) and siltstone (0.24%). Non-local materials included chert resembling Ft. Payne (4.50%) and Bigby-Cannon chert (0.24%).

Table 26. Crude Bifaces and Crude Biface Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	17	1,590	2	0	1,609
Chalcedony	0	102	0	0	102
Jasper	0	14	0	0	14
Quartz	6	191	0	0	197
Slate	0	21	0	0	21
Siltstone	0	5	0	0	5
Ft. Payne Chert	0	119	0	0	119
Dover Chert	0	4	0	0	4
Brassfield Chert	0	1	0	0	1
St. Louis Chert	0	24	0	0	24
Kanawha Black Flint	0	3	0	0	3
Coastal Plains Chert	0	1	0	0	1
Indeterminate	0	4	0	0	4
Total	23	2,079	2	0	2,104

Table 27. Stage Bifaces and Stage Biface Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	8	250	0	0	258
Chalcedony	3	24	0	0	27
Jasper	0	4	0	0	4
Quartz	10	98	0	0	108
Siltstone	0	1	0	0	1
Cortex	0	1	0	0	1
Ft. Payne Chert	2	17	0	0	19
Bigby Cannon Chert	0	1	0	0	1
Indeterminate	0	3	0	0	3
Total	23	399	0	0	422

Three specimens were manufactured from indeterminate raw materials (0.71%). A single specimen was manufactured from cortex (0.24%) of an unidentified chert.

Trimmed Bifaces and Trimmed Biface Fragments

The trimmed biface category refers to late stage bifaces. These bifaces exhibit bifacial thinning and secondary retouch. This category includes artifacts that may have been late stage preforms, late stage tool blanks and late stage bifacial cutting tools. A total of 29 trimmed bifaces and trimmed biface fragments was recovered during the Townsend excavations (Table 28). The majority was manufactured from locally available Knox chert (82.76%), chalcedony (3.45%) and quartz (3.45%). A single specimen was manufactured from non-local chert resembling Ft. Payne chert (3.45%). Two specimens were manufactured from indeterminate material (6.90%).

Refined Bifaces and Refined Biface Fragments

The refined biface category refers to well made, late stage biface fragments. These fragments represent thinned tool fragments exhibiting secondary retouch. Most of the tools in this category are likely projectile point tips and projectile point fragments. A total of 388 refined bifaces was recovered during the Townsend excavations (Table 29). The majority was manufactured from locally available Knox chert (91.75%), chalcedony (3.61%), quartz (1.12%) and jasper (0.26%). Non-local materials include chert resembling Ft. Payne (3.35%).

Table 28. Trimmed Bifaces and Trimmed Biface Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	0	24	0	0	24
Chalcedony	0	1	0	0	1
Quartz	0	1	0	0	1
Ft. Payne Chert	0	1	0	0	1
Indeterminate	0	2	0	0	2
Total	0	29	0	0	29

Table 29. Refined Bifaces and Refine Biface Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	7	349	0	0	356
Chalcedony	1	13	0	0	14
Quartz	0	4	0	0	4
Jasper	0	1	0	0	1
Ft. Payne Chert	0	13	0	0	13
Total	8	380	0	0	388

Tabular Bifaces and Tabular Biface Fragments

Tabular bifaces are a category used to describe large, crudely made bifaces manufactured from flat tabular stone. The majority of the tabular bifaces are chipped stone hoes and digging implements. A total of 262 tabular bifaces was recovered during the Townsend excavations (Table 30). The majority was manufactured from locally available slate (80.92%), siltstone (13.36%), quartzite (1.91%), Knox chert (1.91%), sandstone (0.38%) and limestone (0.38%). Non-local materials included steatite (0.38%), chert resembling Ft. Payne chert (0.38%) and indeterminate raw material (0.38%).

Biface Discussion

A total of 3,205 bifaces and biface fragments was recovered during the Townsend excavations. The majority was manufactured from locally available Knox chert (70.27%), quartz (9.67%), slate (7.27%), chalcedony (4.49%), siltstone (1.28%), jasper (0.59%), quartzite (0.16%), limestone (0.03%) and sandstone (0.03%). Non-local materials include chert resembling Ft. Payne chert (4.77%), St. Louis chert (0.75%), steatite (0.03%) and other non-local cherts (0.31%). Four specimens were manufactured from indeterminate raw materials (0.31%) and a single artifact was manufactured from cortex, likely from Knox chert (0.31%).

The majority of crude bifaces, stage bifaces, trimmed bifaces and refined bifaces was manufactured from Knox chert. Sedimentary and metamorphic materials such as slate and siltstone dominated the tabular biface category. The tabular biface category mainly represents chipped stone hoes, which were manufactured out of large, tabular raw materials.

Table 30. Tabular Bifaces and Tabular Biface Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	0	5	0	0	5
Sandstone	0	1	0	0	1
Slate	0	212	0	0	212
Quartzite	1	4	0	0	5
Siltstone	0	35	0	0	35
Limestone	0	1	0	0	1
Ft. Payne Chert	0	1	0	0	1
Steatite	0	1	0	0	1
Indeterminate	0	1	0	0	1
Total	1	261	0	0	262

Debitage

A total of 238,388 flakes was recovered during the Townsend excavations. Blocky shatter was also collected during the Townsend excavations but is not included in this section. All flakes were size graded using nested sieves. The following tables present thedebitage data by size categories. These categories are used to infer stages of lithic reduction. Flakes less than 0.25 inches (in.) were likely from the final stages of lithic manufacture or tool re-sharpening (Table 31). Flakes between 0.25 in and 0.5 in. may be the result of either re-sharpening or late stage lithic reduction (Table 32). Flakes between 0.5 in. and 1.0 in. likely represent thinning or early stage lithic manufacture (Table 33). Flakes greater than 1.0 in. represent early stage lithic reduction (Table 34). These categories allow inferences to be made about the importation of raw materials.

Debitage Discussion

A total of 238,388 flakes was recovered during the Townsend excavations. The flakes were sorted by size, site and raw material type. Knox chert was dominant in every size category, comprising 78.46% of the total flake assemblage. Knox chert comprised 84.04% of the < 0.25 in. flakes and 78.91% of the > 0.25 < 0.50 in. flakes. While non-local cherts were represented in everydebitage size grade, non-local materials account for an extremely small fraction of the totaldebitage assemblage. Ft. Payne chert, which was the most abundant non-local material in thedebitage category, accounts for less than 2% of all thedebitage size grades.

Table 31. Flakes less than 0.25 in.

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	1,816	18,591	2,317	77	22,801
Chalcedony	51	641	76	10	778
Quartz	446	1185	305	16	1,952
Quartzite	13	27	9	0	49
Jasper	5	215	164	0	384
Shale	5	6	0	4	15
Slate	241	565	15	0	821
Ft. Payne	25	248	7	0	280
Brassfield	1	6	0	0	7
St. Louis Chert	0	8	0	0	8
Dover	0	1	0	0	1
Limestone	3	0	3	0	6
Sandstone	0	5	0	0	5
Schist	0	1	0	0	1
Indeterminate	7	9	8	0	24
Total	2,613	21,508	2,904	107	27,132

Table 32. Flakes between 0.25 in. and 0.5 in.

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	12,456	117,871	14,111	683	145,121
Chalcedony	649	4,591	379	220	5,839
Quartz	3,862	13,420	2,091	116	19,489
Quartzite	200	309	86	4	599
Jasper	95	2,168	1,099	1	3,363
Shale	28	39	0	0	67
Slate	1,702	3,796	114	20	5,632
Ft. Payne	284	2,568	112	51	3,015
Brassfield	40	72	3	0	115
St. Louis	19	161	1	2	183
Dover	0	10	0	0	10
Limestone	31	130	10	1	172
Sandstone	16	2	3	0	21
Schist	0	1	0	0	1
Mica	0	1	0	0	1
Indeterminate	48	134	89	0	271
Total	19,430	145,273	18,098	1,098	183,899

Table 33. Flakes between 0.5 in. and 1.0 in.

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	1452	13,745	3,044	90	18,331
Chalcedony	127	588	72	52	839
Quartz	852	2,890	423	21	4,186
Quartzite	21	55	11	3	90
Jasper	17	266	264	0	547
Shale	8	809	0	0	817
Slate	376	6	25	0	407
Ft. Payne	25	386	11	15	437
Brassfield	2	13	1	0	16
St. Louis	3	63	0	0	66
Dover	0	4	0	0	4
Limestone	8	42	6	0	56
Sandstone	6	2	0	0	8
Greenstone	0	1	0	0	1
Indeterminate	11	12	7	0	30
Total	2,908	18,882	3,864	181	25,835

Table 34. Flakes greater than 1.0 in.

	40BT89	40BT90	40BT91	40BT94	Total
Knox Chert	61	449	282	2	794
Chalcedony	9	20	8	3	40
Quartz	48	240	67	3	358
Quartzite	2	6	2	0	10
Jasper	1	2	28	0	31
Shale	2	1	0	0	3
Slate	81	179	9	1	270
Ft. Payne	2	6	0	0	8
St. Louis	0	2	0	0	2
Limestone	1	3	0	0	4
Sandstone	0	0	1	0	1
Indeterminate	0	1	0	0	1
Total	207	909	397	9	1,522

Ground Stone Artifacts

Four major categories of ground stone tools were identified during the Townsend analysis. These categories are adapted from Adams (2002) and are used to describe artifacts according to functional attributes. Additional categories were also used to describe ground stone artifacts that did not fit into the four tool categories.

Abrading, Smoothing and Polishing Tools

Abrading, smoothing and polishing tools are any artifacts whose primary function is to modify the surface of an object. This includes abraders, polishing stones, burnishing stones and similar artifacts. A total of 91 abrading, smoothing and polishing tools was recovered during the Townsend excavations (Table 35). The majority of these tools (95.60%) were manufactured from locally available sandstone (42.86%), slate (37.36%), siltstone (8.79%) and quartzite (6.59%). A single specimen (1.10%) was manufactured from non-local greenstone. The three indeterminate specimens likely represent a locally available sedimentary or metamorphic stone.

Grinding and Pulverizing Tools

Grinding and Pulverizing tools include any artifact used to grind or pulverize plant materials, pigments or other materials. The grinding and pulverizing category includes pestles, manos, metates, anvil stones, nutting stones, pitted cobbles, bipolar anvils and other artifacts whose primary function is grinding and pulverizing. A total of 550 grinding and pulverizing tools was recovered during the Townsend excavations (Table 36).

Table 35. Abrading, Smoothing and Polishing Tools

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	1	34	4	0	39
Slate	4	24	4	2	34
Quartzite	0	4	2	0	6
Siltstone	6	2	0	0	8
Greenstone	0	0	0	1	1
Indeterminate	0	2	1	0	3
Total	11	66	11	3	91

Table 36. Grinding and Pulverizing Tools

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	135	39	2	176
Slate	3	6	0	0	9
Quartzite	43	185	111	2	342
Siltstone	2	0	0	0	2
Conglomerate	0	12	0	0	12
Limestone	0	1	0	0	1
Quartz	0	2	2	0	4
Rhyolite	0	3	0	0	3
Indeterminate	0	1	0	0	1
Total	48	345	152	4	550

The majority (99.27%) was manufactured from locally available quartzite (62.18%), sandstone (32%), conglomerate (2.18%), slate (1.63%), quartz (0.73%), siltstone (0.36%) and limestone (0.18%). A single specimen was manufactured from non-local rhyolite (0.55%). The indeterminate specimen likely represents a locally available sedimentary or metamorphic stone.

Ground Stone Hafted Percussion Tools

Ground Stone Hafted Percussion tools are ground stone artifacts whose primary function is to remove material from an object through percussion with a cutting edge. This artifact category includes axes, celts, adzes and chisels. While these tools differ in morphology, they are treated as a single category in this analysis. A total of 64 hafted percussion tools was recovered during the Townsend excavations (Table 37). The majority (85.94%) was manufactured from locally available sandstone (48.44%), quartzite (23.44%), slate (9.38%), siltstone (4.69%) and quartz (1.56%). Four specimens were manufactured from non-local rhyolite (4.69%) and diabase (1.56%). Four specimens (6.25%) were manufactured from an indeterminate raw material.

Percussion Tools

Percussion tools are used to remove unwanted portions of an object through the application of percussive force. These artifacts are generally referred to as hammerstones and were generally used in the reduction of chipped stone tools, but might have been used for other percussion tasks. A total of 117 percussion tools was recovered during the Townsend excavations (Table 38).

Table 37. Ground Stone Hafted Percussion Tools

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	1	27	3	0	31
Slate	1	1	3	1	6
Quartzite	0	12	3	0	15
Siltstone	0	2	1	0	3
Diabase	0	1	0	0	1
Rhyolite	0	3	0	0	3
Quartz	0	1	0	0	1
Indeterminate	0	4	0	0	4
Total	2	51	10	1	64

Table 38. Percussion Tools

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	15	3	0	18
Slate	0	1	0	0	1
Quartzite	7	41	23	2	73
Siltstone	1	0	0	0	1
Chalcedony	2	0	0	0	2
Conglomerate	0	6	0	0	6
Quartz	2	10	3	0	15
Gneiss	0	1	0	0	1
Total	12	74	29	2	117

The majority (99.15%) was manufactured from locally available quartzite (62.39%), sandstone (15.38%), quartz (12.82%), conglomerate (5.13%), slate (0.85%), chalcedony (1.71%) and siltstone (0.85%). A single specimen was manufactured from non-local gneiss (0.85%).

Atlatl Weights

This category refers to ground stone artifacts that were affixed near the distal end of an atlatl (Kimball 1985:63). These artifacts range in morphology and functioned primarily to add weight and momentum to an atlatl. Atlatl weight forms are not differentiated here. A total of 13 atlatl weights was recovered during the Townsend excavations (Table 39). The majority (76.92%) was manufactured from locally available sandstone (46.15%), slate (15.38%) and siltstone (15.38%). A single specimen was manufactured from non-local steatite (7.69%). Two specimens were manufactured from an indeterminate raw material (15.38%).

Chunky Stones, Discoidals and Gaming Pieces

This category includes large and small ground stone disks that were likely used as chunky stones and gaming pieces. These artifacts range in size but are generally disk shaped stone artifacts with a ground depression in each side. A total of 13 chunky stones, discoidals and gaming pieces was recovered during the Townsend excavations (Table 40). All the artifacts in this category were manufactured from locally available quartzite (46.15%), sandstone (23.08%), slate (23.08%) and siltstone (7.69%).

Table 39. Atlatl Weights

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	3	3	0	6
Slate	0	1	1	0	2
Siltstone	0	2	0	0	2
Steatite	0	1	0	0	1
Indeterminate	0	2	0	0	2
Total	0	9	4	0	13

Table 40. Chunkey Stones, Discoidals and Gaming Pieces

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	1	2	0	3
Slate	2	0	1	0	3
Siltstone	0	1	0	0	1
Quartzite	2	3	1	0	6
Total	4	5	4	0	13

Gorgets and Gorget Fragments

This category refers to tabular, bar shaped ground stone ornaments. These artifacts are usually rectangular or bar-shaped and exhibit two holes that presumably allowed the ornament to be hung around an individual's neck. These artifacts were usually fragmentary and were often identified based on the presence of drill holes. A total of 116 identifiable gorgets and gorget fragments was recovered from the Townsend excavations (Table 41). The majority (96.55%) was manufactured from locally available slate (73.28%), sandstone (18.97%) and siltstone (4.31%). Two specimens were manufactured from non-local steatite (1.72%) and two specimens were manufactured from an indeterminate raw material (1.72%).

Netsinkers

This category refers to artifacts that were used to weight down fishing nets. They are generally notched pebbles with two opposing percussion notches at the lateral edges, presumably for attachment to a net (Kimball 1985:61). A total of 120 netsinkers was recovered during the Townsend excavations (Table 42). The majority (98.33%) was manufactured from locally available quartzite (66.33%), sandstone (27.50%), slate (3.33%), siltstone (2.50%), quartz (0.83%) and conglomerate (0.83%). Two specimens were manufactured from an indeterminate raw material (1.67%), which likely represents a locally available sedimentary or metamorphic rock.

Table 41. Gorgets and Gorget Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	18	4	0	22
Slate	1	72	12	0	85
Siltstone	1	3	1	0	5
Steatite	0	2	0	0	2
Indeterminate	0	1	1	0	2
Total	2	96	18	0	116

Table 42. Netsinkers

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	1	23	9	0	33
Slate	0	3	1	0	4
Siltstone	0	3	0	0	3
Quartzite	2	53	21	0	76
Quartz	0	1	0	0	1
Conglomerate	0	1	0	0	1
Indeterminate	0	0	2	0	2
Total	3	84	33	0	120

Ground Stone Pipes

This category refers to artifacts that functioned as smoking pipes, presumable for tobacco and dried herbs. Ground stone pipes range in morphology. Ground stone pipe forms are not differentiated here. A total of 17 pipe fragments was recovered during the Townsend excavation (Table 43). The majority (64.71%) was manufactured from locally available sandstone (35.29%), siltstone (23.53%) and chlorite schist (5.88%). Chlorite schist is known to occur in the Blue Ridge but the exact distribution of this material is presently unknown. Six specimens were manufactured from non-local steatite (29.41%) and greenstone (5.88%).

Beads

Three stone beads were recovered during the Townsend excavations (Table 44). All were manufactured from locally available siltstone (66.67%) and slate (33.33%).

Ground and Chipped Stone Choppers

This category refers to crudely made tools that exhibit a single, bifacially worked edge and manufactured from tabular ground stone fragments. They were likely used as cutting or chopping tools. The crude manufacture and poor quality materials that characterize this tool category suggest that they were expedient tools. Seven ground and chipped stone choppers were recovered during the Townsend excavations (Table 45). The majority was manufactured from locally available slate (57.14%), sandstone (14.29%) and quartzite (14.29%). A single indeterminate specimen (14.29%) likely represents a locally available sedimentary or metamorphic material.

Table 43. Ground Stone Pipes

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	3	2	1	6
Siltstone	0	4	0	0	4
Steatite	0	4	1	0	5
Quartz	1	0	0	0	1
Greenstone	0	1	0	0	1
Total	1	12	3	1	17

Table 44. Beads

	40BT89	40BT90	40BT91	40BT94	Total
Siltstone	2	0	0	0	2
Slate	0	1	0	0	1
Total	2	1	0	0	3

Table 45. Ground and Chipped Stone Choppers

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	1	0	0	1
Quartzite	0	1	0	0	1
Slate	0	4	0	0	4
Indeterminate	0	0	1	0	1
Total	0	6	1	0	7

Pigment

This category refers to minerals that were ground down to extract powder for use as a pigment, such as hematite and ochre (Kimball 1985:63). Hematite recovered from the Townsend excavations usually occurred as small pieces of stone with ground facets. A total of 14 specimens of pigment was recovered during the Townsend excavations (Table 46). Both hematite (64.29%%) and ochre (35.71%) are known to occur locally, but the distribution of these materials is not currently known.

Carved Stone Vessel Fragments

The carved stone vessel category refers to fragments of carved stone vessels that were presumably used for food storage or cooking. A total of 532 carved stone vessel fragments was recovered from Townsend (Table 47). The majority (99.62%) was manufactured from steatite. One (0.19%) was manufactured from locally available sandstone. One (0.19%) was manufactured from non-local rhyolite.

Table 46. Pigment

	40BT89	40BT90	40BT91	40BT94	Total
Hematite	2	2	5	0	9
Ochre	0	4	0	1	5
Total	2	6	5	1	14

Table 47. Carved Stone Vessel Fragments

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	1	0	0	1
Steatite	0	530	0	0	530
Rhyolite	0	1	0	0	1
Total	0	532	0	0	532

Indeterminate Ground Stone

This category includes all of the ground stone artifacts that could not be classified in any of the preceding categories. This category is primarily fragmentary ground stone. This category also includes scratched and incised stones, carved stone objects and slightly modified ground stone objects. While this category contains artifacts that may represent art or ornamental objects, they are not addressed individually in this thesis. A total of 255 indeterminate ground stone artifacts were recovered during the Townsend excavations (Table 48). The majority (94.12%) was manufactured from locally available slate (50.20%), quartzite (18.82%), sandstone (14.51%), siltstone (8.63%), quartz (1.18%) and conglomerate (0.78%). Rhyolite (1.18%), granite (0.39%) and steatite (0.39%) represent non-local materials. Ten specimens were manufactured from indeterminate raw materials.

Ground Tool Discussion

A total of 1,912 ground stone artifacts were recovered from sites 40BT89, 40BT90, 40BT91 and 40BT94 (Table 49). The majority (68.97%) of the materials used to manufacture ground stone tools at Townsend was locally available sedimentary and metamorphic stone. Non-local (29.71%) materials consisted primarily of metamorphic and igneous rock with source areas in the Piedmont and Blue Ridge such as rhyolite, steatite, gneiss and greenstone.

Table 48. Indeterminate Ground Stone

	40BT89	40BT90	40BT91	40BT94	Total
Sandstone	0	25	12	0	37
Slate	27	68	33	0	128
Quartzite	1	15	32	0	48
Siltstone	8	6	8	0	22
Conglomerate	0	1	1	0	2
Quartz	1	1	1	0	3
Granite	0	1	0	0	1
Steatite	0	0	1	0	1
Rhyolite	0	3	0	0	3
Indeterminate	1	6	2	1	10
Total	38	126	90	1	255

Table 49. Ground Stone Tool Raw Materials Types

Raw Materials	Total
Quartzite	567
Steatite	539
Sandstone	373
Slate	277
Siltstone	53
Indeterminate	25
Quartz	25
Conglomerate	21
Rhyolite	10
Hematite	9
Ochre	5
Chalcedony	2
Greenstone	2
Diabase	1
Gneiss	1
Granite	1
Limestone	1
Total	1,912

The large number of steatite vessel fragments recovered from 40BT90 account for 27.72% of the non-local materials, resulting in a high percentage of non-local materials. Three materials, hematite, ochre and chlorite schist, are known to occur in local geologic units, but the actual distribution of these materials is not presently known. The indeterminate materials (1.31%) undoubtedly represent locally available sedimentary and metamorphic rock that was not recognizable based on macroscopic attributes. These materials might be positively identified through the use of chemical or microscopic techniques.

Grinding and pulverizing tools represent the largest category of ground stone tools recovered during the Townsend excavations, accounting for 28.77% of the total ground stone assemblage. These tools were manufactured primarily out of coarse-grained sedimentary and metamorphic rock such as quartzite, sandstone and conglomerate. The coarse texture of these materials makes them well suited to grinding plant materials and minerals. Sandstone, quartzite and conglomerate are locally available materials available throughout the region and occur as cobbles and boulders throughout the Little River and its tributaries. Three of these artifacts were manufactured from rhyolite, likely derived from source areas in the Piedmont of North Carolina.

Carved stone vessel fragments were the second largest category of ground stone tools, representing 27.82% of the groundstone tools. Steatite accounts for 99.62% of the carved stone vessel fragments.

Abrading, smoothing and polishing tools account for 4.76% of the ground stone assemblage. These tools were manufactured of both coarse-grained and fine-grained sedimentary and metamorphic stone including sandstone, slate, siltstone and quartzite.

Hafted percussion tools account for 3.35% of the total ground stone assemblage. These tools were manufactured primarily from locally available sedimentary and metamorphic materials including sandstone, quartzite, slate, siltstone and quartz. Four of the artifacts, manufactured from volcanic rhyolite and diabase, likely derived from source areas in the Piedmont of North Carolina.

Percussion tools account for 6.12% of the total ground stone assemblage. These tools were manufactured primarily from locally available sedimentary and metamorphic materials including quartzite, sandstone and quartz. One artifact in this category was manufactured from gneiss, likely derived from source areas in the Blue Ridge of North Carolina.

Netsinkers account for 6.28% of the total ground stone assemblage. They were manufactured primarily from locally available quartzite and sandstone. These artifacts were manufactured from small, flat river cobbles of sedimentary and metamorphic rock available throughout the Little River and its tributaries.

Chunkey stones, discoidals and gaming pieces account for 0.68% of the total lithic assemblage at Townsend. All were manufactured from locally available quartzite, sandstone, slate and siltstone.

Gorgetts and gorget fragments account for 6.07% of the total lithic assemblage. They were primarily manufactured from locally available metamorphic and sedimentary materials such as slate, sandstone and siltstone. Two were manufactured from steatite. There is a strong preference for locally available slate and it is likely that the large amount of ground slate fragments in the indeterminate category represent broken and

rejected gorgets and gorget blanks. This material is widely available in the Little River and its tributaries.

Pipe fragments accounted for 0.89% of the total lithic assemblage. They were primarily manufactured from locally available sedimentary and metamorphic materials such as sandstone, siltstone and chlorite schist. Six specimens were manufactured from steatite and a single specimen was manufactured from greenstone, both of which were likely derived from the Blue Ridge or Piedmont of North Carolina.

Ground stone beads account for 0.16% of the total ground stone assemblage. Two of the beads were manufactured from siltstone and a single bead was manufactured from slate.

Ground and chipped stone choppers account for 0.37% of the total lithic assemblage. They were manufactured primarily from locally available sedimentary and metamorphic materials such as slate, sandstone and quartzite.

Atlatl weights accounted for 0.68% of the total ground stone assemblage. Many of the ground stone fragments and other unidentifiable ground stone artifacts in the indeterminate category may represent broken or rejected fragments of atlatl weights. The majority of atlatl weights were manufactured from locally available sedimentary and metamorphic materials including sandstone, slate and siltstone. Only one of the atlatl weights recovered from Townsend was manufactured from steatite.

Ground mineral pigments account for 0.73% of the ground stone assemblage. Nine ground fragments of hematite and 5 fragments of ochre were identified. Both are iron rich minerals used as pigment. Hematite generally occurs in solid masses while ochre is a mineral soil or powder.

Indeterminate ground stone artifacts represent the second largest category of ground stone artifacts recovered during the Townsend excavations and account for 13.34% of the total ground stone assemblage. The majority of these artifacts are ground and polished fragments of slate, which are likely gorget fragments and blanks. Other artifacts in this category represent fragments of ground stone tools, atlatl blanks and fragments, ground and polished stone ornament fragments and other modified fragments of stone that could not be assigned to other categories.

7. Summary and Conclusions

Summary

Prior to the survey of the upper Little River drainage, the distribution of locally available lithic raw materials was not known. The goal of this study was to determine the likely source areas of raw materials used for the manufacture of chipped and ground stone tools recovered during the Townsend excavations and examine the artifacts recovered during the Townsend excavations to determine local versus non-local raw materials use and patterns of raw materials selection by the prehistoric inhabitants of Tuckaleechee Cove. The lithic resource survey also tested a number of questions and assumptions concerning the occurrence of raw materials in the Blue Ridge portion of the upper Little River drainage. These questions included the local availability of raw materials in Tuckaleechee Cove, the occurrence of Knox chert in the Jonesboro Limestone and the quality and distribution of chalcedony and jasper from the Shady Dolomite in Miller Cove.

In order to address these questions, 22 sites were surveyed in the upper Little River drainage. Seven sites were systematically collected using an areal grid method to obtain quantitative data concerning the distribution of raw materials present in the Little River and its tributaries. At each of these seven sites, fifty specimens were collected from a 2 x 2 meter grid to determine the content of the streambeds. Systematic survey locations included Short Creek, Carr Creek, Black Mash Hollow, Hesse Creek, Reed Creek, Ellejoy Creek and the main channel of the Little River at the east end of Tuckaleechee Cove. The remaining 15 survey areas were selected and opportunistically surveyed based on geologic literature and local informants. These surveys were conducted to collect

qualitative data concerning cryptocrystalline raw materials such as chalcedony, jasper and chert. Data from 3 localities surveyed as part of a 2005 lithic resource survey of Cades Cove are also included (Sweat 2005).

The survey of the Upper Little River drainage identified source areas for nearly all the lithic raw materials that were used to manufacture the majority of chipped and ground stone artifacts recovered during the Townsend excavation. This survey confirmed the local occurrence of sedimentary, metasedimentary and metamorphic materials reflected in the Townsend lithic assemblage, examined the quality and distribution of chalcedony and jasper derived from Shady Dolomite in Miller Cove and identified sources of high quality Knox chert materials in close proximity to Tuckaleechee Cove. Based on the results of the lithic resource survey of the upper Little River drainage, it is clear that prehistoric groups in Tuckaleechee Cove relied primarily on locally available raw materials, which account for over 91% of all the chipped and ground stone tools recovered from Townsend. The survey provided information that addressed all of the goals and research questions, allowing conclusions to be drawn regarding the acquisition of lithic raw materials by prehistoric peoples and historic Native Americans. The results of this study also raise questions about the presence of the non-local materials in the Townsend lithic assemblage.

Conclusions

The Little River was the most important source of raw materials for the manufacture of ground stone tools, providing access to the sandstone, slate, quartzite, quartz and siltstone used to manufacture groundstone tools recovered from the Townsend

excavations. These materials were abundant in the main channel of the Little River adjacent to the Townsend sites and were also found in most of the tributaries of the Little River in Tuckaleechee Cove. Sandstone, quartzite and quartz all occur as rounded river cobbles suitable for expedient use as percussion tools, grinding and pulverizing tools and net sinkers. These materials were also used to manufacture crude cutting tools, celts, adzes, axes, discoidals and other ground stone implements.

Slate and siltstone occur in the Little River as flat, polished gravels that were easily shaped into gorgets, celts, atlatl weights, choppers and other artifacts. Many of the gorgets in the Townsend collection appear to have been made from minimally modified river gravels selected because of their shape and thickness. The same is true of celts, many of which were manufactured from suitably shaped, flat river worn slate. Slate and siltstone also occur in terrestrial contexts in Tuckaleechee Cove as large, tabular slabs. These larger slabs of siltstone were shaped into large crude bifaces that were used as hoes or other implements. The only important ground stone raw material that was not available from the Little River is steatite, which was used to manufacture nearly all of the carved stone vessel fragments that were recovered from the Townsend excavations. While steatite is not available in Tuckaleechee Cove, there are known sources 25 miles to the east of Townsend (Wells 2006).

No sources of high quality chert were located in Tuckaleechee Cove. Knox black chert was widespread in residuum derived from Jonesboro dolomite and also occurred as gravels in the Little River and its tributaries. All the samples collected from Tuckaleechee Cove exhibited high amounts of fractures and inclusions that would have made this material a poor choice for the manufacture of most chipped stone tools. While Knox chert

derived from Jonesboro limestone may have been used to manufacture small tools such as wedges or modified flakes, it was not suitable for the production of larger lithic implements. The Knox chert used by prehistoric groups in Tuckaleechee Cove was derived from source areas approximately 18 km northwest of Tuckaleechee Cove, in the southeastern Ridge and Valley portion of the Little River drainage. This area, between Chilhowee Mountain and Maryville, is the closest source of high quality Knox black and Knox banded cherts.

The only materials that occur in Tuckaleechee Cove that were suitable raw materials for the manufacture of chipped stone tools are quartz and quartzite. Both these materials occur throughout the Little River and its tributaries in Tuckaleechee Cove. While both materials were used extensively as raw materials for ground stone tools, they represent a minor component of the chipped stone category. This is especially true of quartzite which, though abundant in Tuckaleechee Cove, was rarely used for chipped stone tool production. This is an important fact, since quartzite is the most widely used raw material in the Great Smoky Mountains, which lie just 10 miles to the south of Tuckaleechee Cove (Bass 1977).

The closest source of usable cryptocrystalline materials to Tuckaleechee Cove is the Shady Dolomite formation in Millers Cove, which is located approximately 12 kilometers northwest of Townsend by river. Shady Dolomite is a source of chalcedony and jasper. Chalcedony is widespread in Miller Cove, occurring in streams, fields and as colluvium in areas underlain by Shady Dolomite. This supports previous research and confirms the assumption that Miller Cove is the closest local source of chalcedony to Tuckaleechee Cove (Kimball 1985). The discovery of fine-grained red and yellow jasper in Miller Cove

suggests that the Shady dolomite was also the source of jasper artifacts recovered during the Townsend excavations.

Artifacts made from chalcedony represent a minor component of the overall lithic assemblage. Relatively few formal tools made from chalcedony were recovered from the Townsend excavations. Chalcedony was used most frequently for the manufacture of crude cutting tools and expedient tools, though it rarely represented more than 10% of the tools from any chipped stone tool category. The preference for more distant Knox chert over chalcedony is related to the tractability of chalcedony compared with Knox chert. Chalcedony in Miller Cove is a dense, hard material that is difficult to flake and breaks less predictably than Knox chert. Much of the chalcedony located during the survey of Miller Cove occurred in amorphous boulders that were full of fractures and inclusions.

Jasper, like chalcedony, occurs in areas of Miller Cove underlain by Shady Dolomite. Based on the survey conducted in Miller Cove, jasper occurs less frequently than chalcedony. Good quality jasper is even less common, though it should be noted that only a small portion of Miller Cove was surveyed in relation to the total area underlain by Shady Dolomite. Jasper represents a very minor component of the Townsend lithic assemblage and occurs less frequently than non-local chert in most categories. Like chalcedony, jasper sources are located much nearer to Tuckaleechee Cove than Knox chert. The infrequent use of jasper is probably related both to quality and abundance of the material. Most of the jasper located during the survey was poor quality and the better quality specimens were hard and difficult to flake compared with Knox chert. Based on the selection of Knox chert over more easily accessible materials such as quartz, quartzite

and chalcedony, it appears that quality was a more important factor in the selection of raw materials by prehistoric groups at Townsend than distance.

The Little River provides a natural pathway between the Townsend sites and chert source areas west of Chilhowee Mountain. While portions of the Little River would have been navigable by watercraft, it is most likely that prehistoric people traveled by foot following the path of the Little River and crossed Chilhowee Mountain through the water gap formed by the Little River near Walland.

The densest areas of good quality chert are from the confluence of Ellejoy Creek and the Little River west to the confluence of Crooked Creek and the Little River. The river terraces and low hills in this area provided an abundant and easily accessible source of Knox black and Knox banded chert. In many of these areas, chert nodules occur near the surface and can easily be pried out of the ground and collected from tree fall and areas of exposed soil. The chert was likely acquired by digging nodules from soil or collecting nodules from banks or other eroded areas along the Little River. While no evidence of quarrying activity was seen at these areas, early stage decortation flakes, tested cobbles and discarded tools were noted. Knox chert nodules occur near the ground surface, so quarrying would have resulted in little if any noticeable ground disturbance. Any evidence of quarry pits would have undoubtedly been destroyed by subsequent historic and modern agriculture.

Prehistoric peoples collected chert nodules from source areas west of Ellejoy Creek where the bedrock geology is predominated by chert bearing Knox dolomite. Chert nodules were collected from residual soils and some if not most of the early stage lithic reduction was probably done at the collection sites. The blanks or performs were then

transported back up the Little River valley to the sites at Townsend where they were manufactured into a variety of chipped stone tools.

The lithic resources of the upper Little River drainage provided prehistoric groups at Townsend with a rich and easily accessible source of lithic raw materials. The Little River and its tributaries provided most of the raw materials that prehistoric groups used to manufacture ground stone tools. The exception is steatite, which has source areas to the east of Tuckaleechee Cove. Knox chert was the highest quality locally available raw material used to manufacture chipped stone tools. This material was obtained from source areas west of Chilhowee Mountain at the eastern edge of the Ridge and Valley. This material was transported southeast along the Little River drainage and into Tuckaleechee Cove. The Little River drainage provides a natural east-west corridor from the uplands of the Great Smoky Mountains, through the rugged foothills surrounding Tuckaleechee and Miller Cove, west to the Ridge and Valley. This corridor would have also provided an easy means of transporting materials such as steatite from the Blue Ridge into the Ridge and Valley.

It is clear from the results of the lithic resource survey and the analysis of raw material use that prehistoric groups in Tuckaleechee Cove had access to locally available raw materials, which were used to manufacture nearly all the stone tools recovered during the Townsend excavations. Yet the Townsend lithic assemblage contains significant amounts of non-local materials. Small amounts of non-local raw material are expected due to trade and hunter-gatherer mobility. This is especially true of curated tools such as projectile points. There is, however, a surprising amount of non-local chert in the Townsend lithic assemblage. Non-local chert, especially varieties resembling Ft. Payne

and St. Louis chert, were used to manufacture a wide variety of tools that were used in Tuckaleechee Cove. Ft. Payne and St. Louis chert, which have source areas in Middle Tennessee, are widely used raw materials throughout the Mid-South and the occurrence of projectile points or reworked tools such as hafted end scrapers manufactured from these materials is not surprising. What is surprising is the variety of artifacts in the Townsend lithic assemblage manufactured from these materials. This includes 119 crude bifaces and biface fragments made from Ft. Payne chert, which suggests that blanks or preforms made of Ft. Payne chert were being transported into Tuckaleechee Cove. The Townsend assemblage also contains smaller amounts of other non-local cherts resembling Dover, Brassfield and Monteagle cherts. These materials, like Ft. Payne and St. Louis chert, have source areas in Middle and West Tennessee. While they were more poorly represented in the Townsend lithic assemblage than Ft. Payne or St. Louis, a wide range of artifacts made from these non-local materials was recovered.

This raises the question of why there is such a variety of non-local chert recovered from the Townsend sites. Bass (1977) did not identify any non-local cherts during his survey and analysis of lithic materials from the Great Smoky Mountains National Park. Given the proximity of Tuckaleechee Cove to the Great Smoky Mountains and the movement of raw materials such as steatite from the Appalachian Summit into the Ridge and Valley, it is surprising that non-local chert, which was present in Tuckaleechee Cove, was not represented in the Great Smoky Mountains assemblage.

Even more surprising is the contrast between the Townsend lithic assemblage and the materials recovered during the Tellico Reservoir project. The Tellico reservoir is approximately 35 miles southwest of Tuckaleechee Cove. Both Tuckaleechee Cove and

the Tellico Reservoir are located near the boundary of the Blue Ridge and Ridge and Valley provinces. Given the proximity and the similar physiographic situation of the two areas, it would be reasonable to assume that the lithic assemblages would be similar. Given the extensive excavations that took place during the Tellico project and the accessibility of the Little Tennessee River from the Ridge and Valley, it is difficult to understand how prehistoric peoples in Tuckaleechee Cove could have had access to a wider variety of non-local lithic materials than groups in the Little Tennessee River drainage. While non-local chert was noted during the Tellico project, archaeologists at Tellico did not identify anything near the diversity of chert that was recovered during the Townsend excavations. With regard to the Early Archaic materials recovered from the Tellico project, Kimball (1996:185) states that the excavations at Tellico recovered, "...few, if any, examples of tools of non-local raw materials from as far away as the Cumberland Plateau, northeastern Tennessee, extreme southeastern Tennessee, or southwestern Virginia." The only non-local chert that received any mention in Kimball's (1985) lithic resource survey was a green variety of chert derived from Chickamauga limestone which occurs throughout much of eastern Tennessee, though did not occur in the portion of the Tellico Reservoir surveyed.

This contrasts sharply with the Townsend assemblage, which contains materials with source areas as distant as the Cumberland Plateau, Middle Tennessee, West Tennessee, West Virginia and Ohio.

Another interesting difference between the Townsend lithic assemblage and the materials recovered from the Tellico project and the Great Smoky Mountains is the presence of barbed, transitional Late Archaic-Early Woodland projectile points at

Townsend. These projectile points, such as the Wade, Delhi, Cotaco Creek and Buck Creek types, were identified during the analysis of the Townsend lithic assemblage. No barbed transitional Late Archaic-Early Woodland projectile points were recovered from archaeological excavations at Tellico or the Great Smoky Mountains (Bass 1977; Chapman 1979,1981,1985; Davis 1990; Kimball 1985). These artifacts were also completely absent from excavations at Phipps Bend and Watauga Reservoir in northeast Tennessee (Boyd 1985; Lafferty 1981). These barbed transitional Late Archaic-Early Woodland point types are common in areas of Middle Tennessee and northern Alabama and may suggest contact or trade between prehistoric groups in Tuckaleechee Cove with groups further west in the Tennessee River Valley. Why there would be trade or contact between groups in Tuckaleechee Cove and not in other parts of Southeast Tennessee, northeast Tennessee or western North Carolina is not clear. Since we know that steatite was transported from the east side of the Appalachian summit into Tuckaleechee Cove, it may well be the case that steatite continued to be transported downstream along the Little River corridor and into the Ridge and Valley where it could have been traded to prehistoric groups further southwest. This would explain the presence of stylistic traits from the south and west during the Late Archaic period in Tuckaleechee Cove.

Since much of the Townsend artifact assemblage is still being studied at this time, archaeologists may eventually be able to identify reasons that these differences exist. Future lithic research should focus on temporal changes in the use of lithic raw materials at Townsend. By examining the amount of particular raw materials used during different time periods, it may be possible to identify patterns that would help explain the presence of such significant amounts of non-local raw materials and the diversity of projectile

point forms at Townsend compared with other sites in the region. Information about trade or contact would greatly improve archaeologists understanding of the prehistory of Tuckaleechee Cove and the region.

Lithic resource surveys are rarely undertaken by archaeologists in eastern Tennessee. This study represents the only systematic lithic resource survey undertaken in southeastern Tennessee in the past 30 years. This study provided valuable information about sources of raw material that were used to manufacture chipped and ground stone artifacts recovered during the excavations of sites 40BT89, 40BT90, 40BT91 and 40BT94. Prior to this study, the distribution of raw materials in the Little River drainage and the variety of raw materials that were available to prehistoric groups in Tuckaleechee Cove and the surrounding region was not known. The results of this study will aid in the final interpretation of the Townsend lithic assemblage and will provide information necessary for understanding the Townsend artifact assemblage as a whole. This study also identified differences between the Townsend lithic assemblage and the surrounding region, raising interesting questions about prehistoric settlement and subsistence patterns in Tuckaleechee Cove and the potential implications that the presence of non-local raw materials has to our ability to identify long-distance trade and contact in the region. While there is much work to be done to understand the Townsend site complex and its relationship to other sites in the region, this study provides information that is essential to an understanding of the local lithic economy and raises questions about the relationship between the Townsend sites and other regions of the Mid-South.

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Vita

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