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Archaeological Survey for the Snake Headwaters Project: 2013-2014 Survey and Evaluation Report

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2013-2014 UNIVERSITY OF MONTANA SNAKE AND LEWIS RIVER SURVEY AND THE SNAKE HEADWATERS PROJECT: SURVEY AND EVALUATION OF ARCHAEOLOGICAL SITES IN SOUTHERN YELLOWSTONE NATIONAL PARK

By

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2013-2014 Survey and Evaluation Report

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DRAFT FINAL REPORT

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Yellowstone National Park

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Abstract

This report presents the summary of work completed by the University of Montana in 2013 and 2014 along the Lewis and Snake Rivers of southern Yellowstone National Park. This project, known as the Snake and Lewis Survey (The Snake Headwaters Project) is ongoing and has been initiated as part of the Wild and Scenic Rivers designation. This designation would help preserve these rivers natural setting for future visitors. This project falls under the auspices of Section 110 of the NRHP, which allocates funding for federal agencies to conduct preemptive archaeological inventories No current developments are planned in these river corridors, although ongoing road, trail and campsite maintenance occurs in the area and historic impacts on the landscape are evident. This report summarizes the methodology, survey results, and proposed interpretations and hypothesis associated with historic and prehistoric human use of the southernmost sections of the park.

The two seasons of survey covered more than 60km of river shoreline and canyon rim survey, with a survey corridor of ±40m wide. Some areas allowed for much larger or multiple transects, with the University of Montana surveying around 16 sq. km., or 3954 acres. Survey identified 54 (36 in 2013 and 18 in 2014) previously undocumented historic and prehistoric archaeological sites, along with 16 isolated finds. 48YE418 (SLS-42) was previously identified, but survey in 2014 dramatically expanded the site. The University of Montana identified four sites as eligible for NRHP listing, two of which were previously identified. Most sites were very small or sparse, lacked diagnostic artifacts, or require future investigation and subsurface testing. The crew also identified two low quality obsidian outcrops that are likely to have been utilized as quarries, as well as an orthoquartzite outcrop and isolated tested cobbles of both materials. One significant historic site was documented at a previously documented lithic scatter, 48YE1268, which also contains the remains of a historic cable car. Four historic gravel pits and several artifact scatters and hearths of unknown age were also identified. Shovel test pits were also conducted in areas of high potential and very low surface visibility, which occurred in four places along the Lewis River. None were conducted along the Snake River

Six diagnostic prehistoric projectile points were identified and collected for analysis. They include two Paleoindian points, one Late Archaic point, and three Late Prehistoric arrow points. A number of other formal but not temporally diagnostic tools such as bifaces were identified as well. Total lithics were collected tallied 112 artifacts, consisting of diagnostic

artifacts and artifacts for EDXRF sourcing. In addition to artifacts for sourcing, 52 natural obsidian samples were taken from the quarries and isolated cobbles. Eighteen historic artifacts were collected for analysis as well, all of which came from 48YE1268. The vast majority of lithics identified throughout the survey are made from orthoquartzite and spherulitic obsidian, referred in this report as welded tuff obsidian, although it is referred to by many names in the literature.

Acknowledgements

Staffan Peterson, Archeologist with the Branch of Cultural Resources, is the project manager at Yellowstone National Park for the Snake and Lewis Survey, as well as the Snake Headwaters Project. Tobin Roop is Chief, Branch of Cultural Resources, and facilitated project management. During the 2013 and 2014 field season, Matthew Nelson was Field Director for the project, with University of Montana students, Justin Pfau, Michael Ciani, Stockton White, Ethan Ryan, Brandon Bachman, and Elizabeth Lynch, as field technicians. UM Department of Anthropology Professor Doug MacDonald is the project Principal Investigator, report editor, and lithic analyst. Justin Pfau wrote this report as his Thesis toward completion of his Masters of Arts degree in Anthropology from the University of Montana Department of Anthropology. With the exception of the lithic analysis and final editing, Justin wrote all of this report, including map, table, photograph, and figure preparation. Additional work was provided in the lab by University of Montana graduate students Matt Nelson (GIS mapping) and Brandon Bachman (digitization of field maps, condition assessment forms, data entry). Richard Hughes conducted EDXRF analysis of selected igneous materials from the project area.

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Chapter 1. Project Description and Undertaking

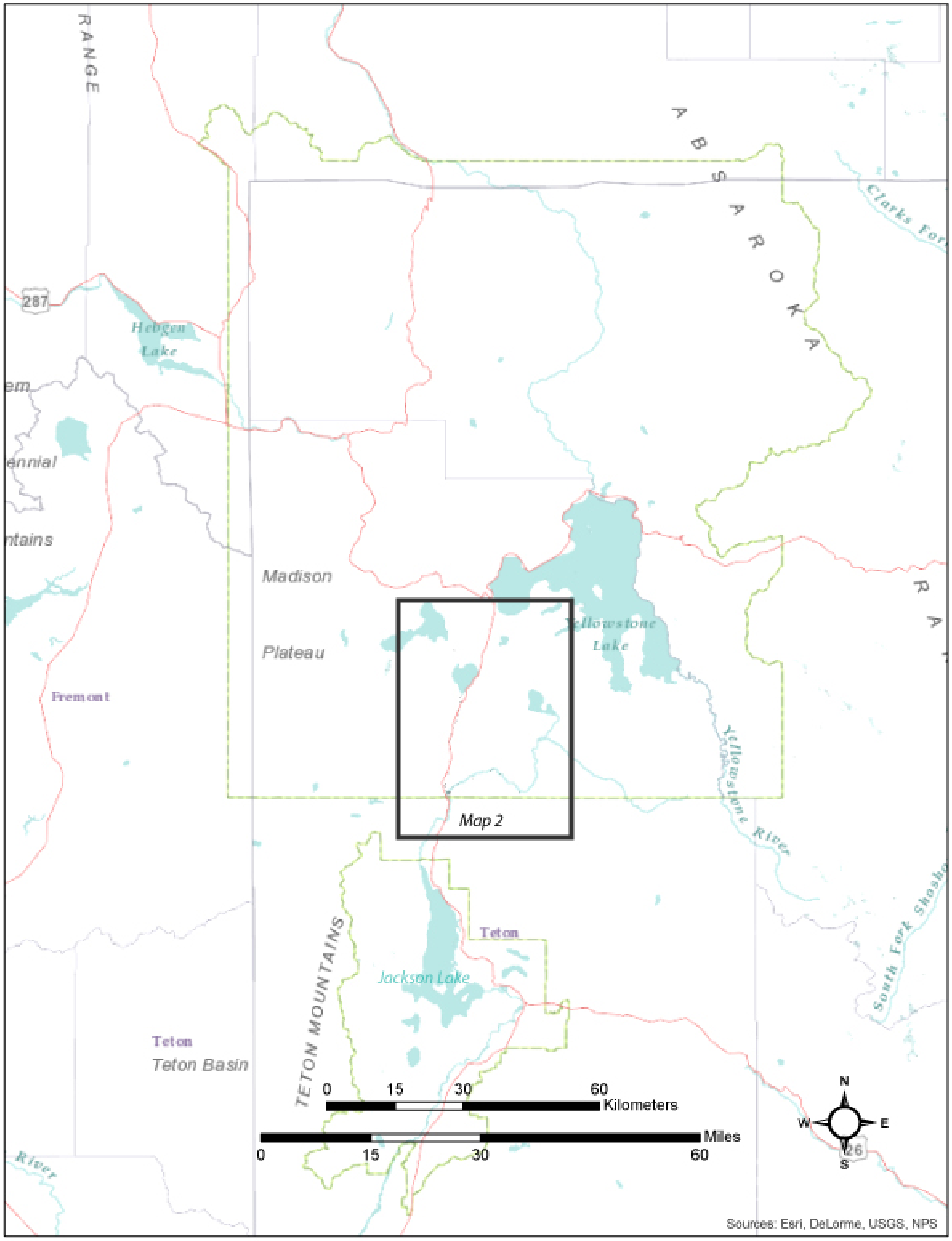
The University of Montana conducted two field seasons of archaeological survey along the Lewis and Snake Rivers in southern Yellowstone National Park in the summers of 2013 and 2014, shown in Map 1. The first season focused primarily on the Lewis River, from the South Entrance of the park to Lewis Lake, with an additional small portion of the northern bank of the Snake River. The 2014 season had a primary focus on the Snake River, and is part of the ongoing Snake River Headwaters Project. The second season completed survey of the northern bank of the Snake River up to the confluence with Coulter Creek, and on the southern bank from the South Entrance to backcountry campsite 8C6, near the Snake Hot Springs. The second season also finished the remaining Lewis River channel between Lewis Lake and Shoshone Lake. Survey identified 54 previously undocumented historic and prehistoric archaeological sites (36 in 2013 and 18 in 2014), along with 16 isolated finds. The crew also identified two low quality obsidian outcrops that are likely to have been utilized as quarries, as well as an orthoquartzite outcrop and isolated tested cobbles of both materials.

Survey and evaluation was conducted along the Snake and River shoreline where possible, and along canyon rims and high terraces when not feasible or when site potential was unlikely in shore areas such as floodplains. Approximately 41km (25.5 miles) of both sides of the Lewis River were surveyed, and about 23.5km (14.6 miles) of the Snake River, for a total of 64.5km (40 miles) for both seasons. Approximately 33km (20.5mi) of the Snake River still remain to be surveyed in the park, with proposed survey in 2015 to cover the 6.1km (3.7mi) of the Snake River's southern shore up to Coulter Creek

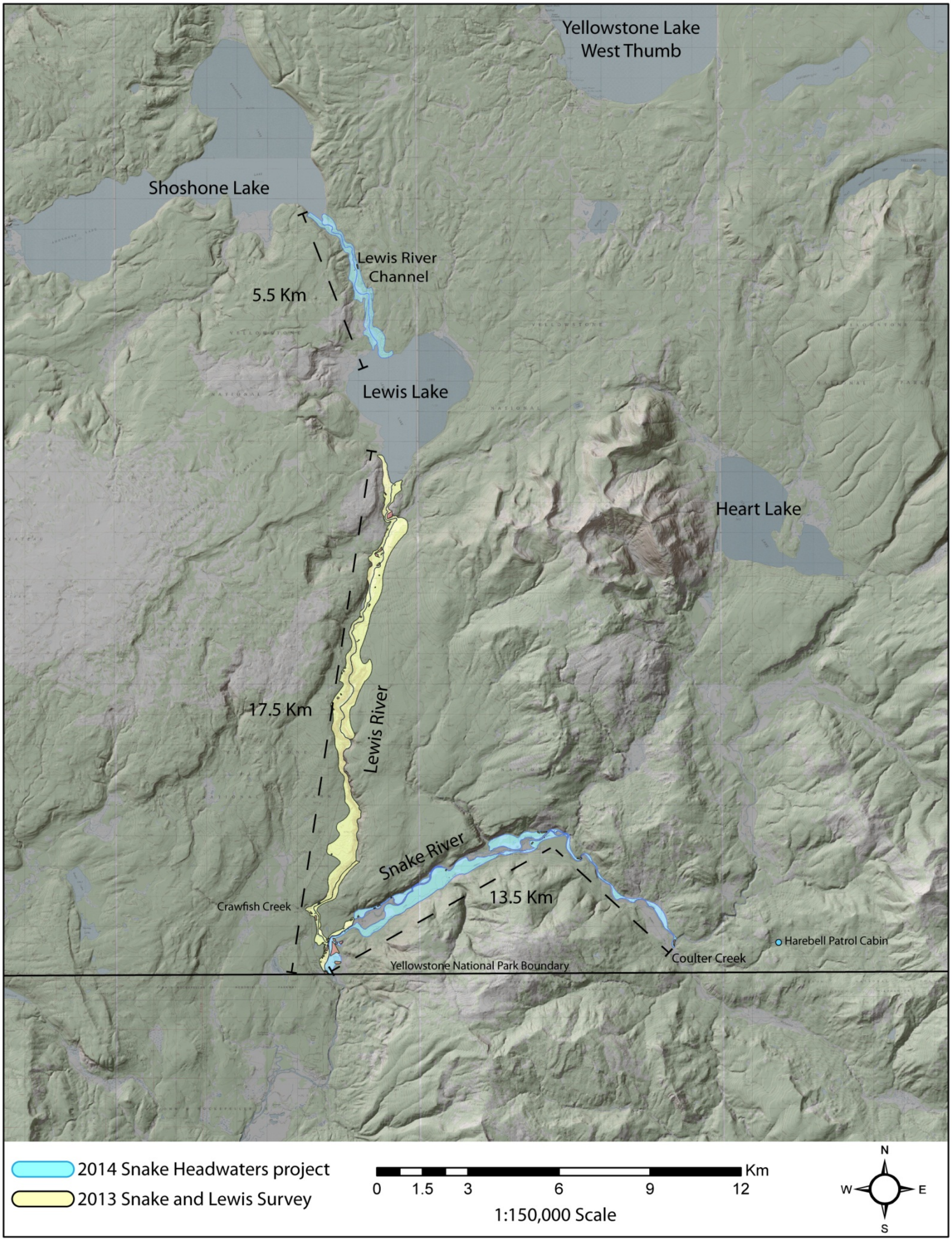
The survey corridor, with four field members, was approximately ±40m wide, depending on terrain. The University of Montana surveyed a total of around 16 sq. km., or 3954 acres. The entirety of the Lewis River was inventoried from its headwaters at Shoshone Lake to its confluence with the Snake River, with the exception of a 4km section above the eastern bank of the Lewis Canyon, where accessibility was difficult and site potential low. Along the Snake River, a 1.75km section along the northern bank, west of Forest Creek, was not surveyed due to steep canyon walls and dense willow banks. On the southern bank of the Snake River, from campsite 8C6 to Coulter Creek has yet to be surveyed to time constraints, as well as the remainder of the Snake River upstream from Coulter Creek to its headwaters in the eastern portion of the park. These areas and landscape features are visible in Map 2 below.

The field crew for both years of survey included Dr. Douglas MacDonald and student crew members Matthew Nelson, Michael Ciani, Stocky White, Brandon Bachman, Ethan Ryan, Elizabeth Lynch, and Justin Pfau. The crew at any given time consisted of only four or five of the above members. The vast majority of this survey was conducted out of a base camp located at Grant Village on the West Thumb of Yellowstone Lake, where a RV was provided, courtesy of the park and Steffan Peterson. From there, the crew commuted out to survey locations, using two vehicles to facilitate one directional pedestrian travel. The final section of survey on the Snake River was conducted out of Backcountry Campsite 8C6. Considerations for future surveys further up the Snake River may include a pack train to facilitate the ability to have excavation equipment available to investigate sites further.

During survey, the surface was inspected by walking slowly with the crew online at about 10m, for a total of 40 to 50m in width. All artifacts were marked with pin-flags upon identification. Once a site was identified, close interval survey of the surrounding area was conducted to identify site boundaries. The crew then delegates the tasks of documenting artifacts and terrain features with GPS, taking photographs, making sketch maps and conducting detailed survey. Three areas with poor surface visibility but very high site potential were shovel pit tested, although no test units or further excavations were conducted or warranted at the time. Field notes were then digitized at the University of Montana between field seasons by the projects graduate students. Artifact analysis was conducted by Dr. MacDonald, Ph.D., and Martin Lopez, with Richard Hughes conducting EDXRF geochemical sourcing.



Map 1. Project Area Overview in Yellowstone National Park



Map 2. Snake and Lewis Survey Overview

Chapter 2. Environmental Setting

This chapter provides brief overviews of regional geology, climate, flora & fauna, prehistory, and general setting for the Snake and Lewis Survey and Snake Headwaters Project. These sections provide an overall context for presenting the results of archaeological research in later chapters, and includes regional information as well details of the unique setting of the Snake and Lewis Rivers.

Geology

The 2013-2014 UM archeological studies were conducted near the Snake and Lewis Rivers in the southern portion of Yellowstone National Park, and therefore we focus on a description of the environmental conditions south of Yellowstone Lake. Located mostly in the northwestern portion of Wyoming with some parts in Montana and Idaho, the Yellowstone Plateau was formed through a series of volcanic eruptions and lava flows between approximately 2.1 million and 70,000 years ago during the Pleistocene. Elevations range dramatically within Yellowstone National Park, from lows of ca. 5,300 ft. above mean sea level (AMSL) in the far northern areas of the park near Gardiner, Montana, to highs of greater than 12,000 ft. amsl in some mountain ranges in the park. The Pinedale Glaciation was the last glacial period in Yellowstone. Although separate from the North American ice shield, the Yellowstone Plateau glacial icecap covered almost the entire Yellowstone area with a relatively flat mantle of ice that began melting as the climate warmed around 14,000 B.P. and was virtually gone by 12,000 B.P. (Hale 2003). The Lewis River is a direct result of glacial carving and the following runoff, while the Snake meanders through more ancient corridor less impacted by the ice sheet.

Lewis Falls marks the edge of the Lava Creek Caldera, to the north and west of which is overlain primarily with the Central Plateau Member of rhyolitic lava from the most recent post-caldera eruption, the Pitchstone Plateau. South of Lewis Falls the canyon moves into the Lava Creek Tuff , dropping around 105m (350ft) into the canyon (Fritz and Thomas 2011). This creates impressive canyon walls, waterfalls and rapids, shown in Photograph 1. The Lava Creek Tuff overlies the Lewis Canyon Rhyolite (Photograph 2) which lie of pre-caldera formation Mesozoic and Paleozoic sedimentary rocks (Fritz and Thomas 2011).

Photograph 1. Lewis Canyon with exposed columnar jointing of Lava Creek Tuff.

The Snake River is geologically quite different than the Lewis River. While the Lava Creek Tuff and Lewis Canyon Rhyolite form impressive canyon walls and cliffs on the northern side of the Snake River valley, the majority of the river corridor meanders through Mezozoic and Paleozoic sedimentary formations (Fritz and Thomas 2011). This is likely why there is prominence of orthoquartzite artifacts at sites on the Snake River and near its confluence with the Lewis River. Both rivers also contain scatters of thermal features, most notably east of the Snake and Lewis Confluence, and the Snake Hot Springs.

Photograph 2. Lewis Canyon Rhyolite exposed on the northern Snake River Valley

Physiography

The elevation of the Snake and Lewis River survey areas ranges between about 6,800 and 7,800 ft. AMSL. This elevation range is consistent with the majority of elevations across the Yellowstone Plateau proper, which averages 8,000 ft. AMSL (NPS 1991). The survey area encompasses three main physiographic settings: 1) river terraces and floodplains with rolling pine hills most common near the South Entrance; 2) steep sided canyons and alpine foothills associated with the caldera rim and the Lewis Rivers central section; and 3) the open riparian river braid systems with high, ancient terraces located on the Snake River, and also the southern and northern reaches of the Lewis River. The Lewis River has dramatic canyon formations which cut through many rhyolite and welded tuff formations, with little evidence of substantial channel migration at any point along its route.

The Snake River on the other hand, while still containing sections of steep canyon, has much more visible evidence of continuous modern and ancient channel migration, and even abandonment of some segments, and creations of new ones. This type of braided, meandering river channel has formed extensive terrace landforms upon most of which are the locations of prehistoric lithic scatters.

Hydrology

The Lewis and Snake Rivers are both dramatically affected by spring runoff and summer drought, which drastically affect water levels. The Lewis River obtains most of its flow from Lewis Lake, which can remain frozen as late as June, creating massive runoff episodes during the late spring and early summer. Other sources that feed the Lewis River are small ephemeral drainages which occur frequently along the canyon rims, occasionally experiencing blow-out episodes during snow melts. The only major tributary to the Lewis River is Crawfish Creek, entering from the west. Several waterfalls exist on the Lewis River; best known in the highly trafficked Lewis Falls, but there are also the equally impressive Upper and Lower Lewis Canyon Falls, which are two cascade falls with heights just under 100ft (Marcus et.al.). Visible in which are generally not easily visible or accessible for modern visitors.

The Snake River has the second highest annual total runoff of any river in the park, after the Missouri River, with the highest peak cubic feet per second (Marcus et. al. 2012). Unlike the Lewis River, the Snake River is not connected directly to a lake, and is fed primarily by small year round and ephemeral tributaries. However, Heart Lake, 4km north of the Snake River at its nearest point, provides several tributaries; Heart River, Basin Creek and Red Creek. Forest Creek also enters the Snake River from the north, but is not connected to Heart Lake, and shows evidence of massive runoff and flooding episodes. Tributaries from the south include another powerful runoff location at Mosquito Creek (termed by the University of Montana crew), and Coulter Creek, as well as some other small unnamed tributaries. Flooding and high water in the Snake River cause shore erosion and channel shifting on an annual basis, as opposed to most of the Lewis River, where high waters do occur but are generally contained by steep canyons and high terraces which maintain the channel.

Photograph 3. Upper Lewis Canyon Falls

Climate

According to Despain (1990), average precipitation on the interior ranges of Yellowstone Park falls between 30-50 inches depending on the elevation. A majority of this precipitation comes in the form of winter and spring snow accumulation (Despain 1990). However, YNP states that generally the higher elevations of the park receive much more precipitation on average around 150 inches per year just for snow. This snow fall has the ability to linger within the higher elevations into late spring at a depth of several feet as noted on visits to the park by project members in March. A couple feet of Late spring-early summer snow accumulation is also possible as late as mid-April as seen during the spring of 2010 as storms were expected to deposit several feet of snow in the Yellowstone Area.

The southwestern corner of Yellowstone National Park and into Grand Teton National Park generally receives significantly higher amounts of precipitation than elsewhere in the region (Marcus et.al. 2012). The Snake River Plain funnels moisture into the Tetons and the Yellowstone Plateau, making these areas relatively wet in the winter and spring compared to other parts of the park (Marcus et.al 2012) Historically the Snake and Lewis River areas are consistent in temperature with other regions in and around the park, with low extremes in the mid -40s and high extremes in the high 90s, but averaging around 0 degrees to 75 degrees annually. The 2013-2014 field seasons both experienced dramatic weather, with traffic-halting hail in July and sweltering 90 degree days in September.

Flora

Yellowstone National Park is home to a tremendous variety of flora, represented by more than 1,350 species of vascular plants (NPS 2010). The presence of two major parent materials for soil, rhyolite and andesite, as well as a lesser contribution from windblown glacial material, loess, provide a foundation for the spatial variance of plant life within the region. These materials yield soils with differing mineral content and water-holding capacities that cater to particular types of plants (Despain 1990:137-150). Fluctuations in elevation, precipitation, and topography also help to shape the patterns of plant life found throughout Yellowstone National Park, lending to a nearly unparalleled diversity in habitats.

The majority of the Snake and Lewis River corridors consist of mixed conifer forests. These forests are generally dominated by lodge-pole pine, but also contain varieties of spruce, fir and aspen. Some areas have been heavily burned and are marked by old growth large deadfall and short young regrowth. Other areas have not been burned, most notably on the southern bank of the Snake River, where extremely dense mixed conifer forests are choked with new growth trees and shrubs with thick deadfall.

While the Lewis River in particular generally consists of young pines and short bunch grasses on alluvial loams or rhyolitic gravel, the Snake River presents a more diverse suite of flora and vegetation zones. Floodplain zones along the Snake River are often thick riparian areas when not open beach, and contain thick tall grasses, but are sometimes choked with sandbar willows.

Photograph 4. Wildflowers and river terraces above the Snake River

Intermediate river terraces generally contain sparse pines with open grassy meadows containing impressive arrays of wildflowers, especially Castilleja, or Indian Paintbrush. Other terrace formations along the Snake River are extremely dense pine forests, as previously mentioned, which show no evidence of recent or historical burns, creating a diverse and densely populated vegetative habitat along the Snake River.

Fauna

Yellowstone has a diverse ecosystem, which is currently home to many large mammals; bison, elk, moose, big horn sheep, deer, antelope, grizzly and black bear, mountain lions, coyotes, and wolves. In addition to these varied large game species, a variety of birds and other small animals are also present in the region. A vast majority of Yellowstone's bison are seasonally migratory and move to the higher elevation during warmer weather and lower elevation during cold weather pattern as with most of the large ungulate species in the foothill-mountains. These migrations are generally from the lower wintering valleys and basins around the park to the higher elevation summer ranges within the park (Cannon 2001).

Snowfall during the fall, winter and spring months causes animal migration to lower elevations generally beginning in October to areas with less than two feet of snow accumulation (Osborn 1993). A study observed animals unable to maximize feeding potential without a significant energy loss as the cause for the move to lower wintering elevations, a model that is applicable across all upland areas of the Rocky Mountains (Osborn 1993). Heavy snow in the uplands of the Intermountain region make, "mid range latitudes uninhabitable during winter" meaning a group "must make base camp in adjacent valley foothills or mouths of canyons" (Madsen and Metcalf 2000: xi).

The portion of the park involved in the Snake and Lewis Survey is outside of the known annual range for bison, whose annual range generally only progresses as far south as Old Faithful (Marcus et.al. 2012) The terrain and accessibility of the survey area suggest that the Snake and Lewis river corridors are sub-optimal for Yellowstone's large game. Both rivers exhibit steep canyons and hills, dense forests and shrub land, unstable gravelly slopes and marshes, and a general lack of large meadows capable of supporting substantial herds.

Photograph 5. Elk skull found near SLS-45

While no elk where seen by the field crew in 2013-2014, the project area does fall within the summer migration ranges of some herds, there is strong evidence for their presence in the form of large antler sheds and skulls. Moose were observed in 2014 in the riparian zones of the Snake River. Traditionally moose populations in the park are low, with less than 200 currently, as reported by the National Park Service website (NPS 2015).

Between 1979-2009 the region of the Snake and Lewis Rivers within the park had the lowest number of female grizzly bear sightings and observed grizzly bear deaths in the park (Marcus et.al 2012). While no bears were observed there were frequently bear prints in the sandy shorelines and mud, as well as the hiking trail along the Snake River. Although wolves of the Bechler pack were reported in 2006 to have been occupying the southwest corner of the park, outside of the project area (Marcus et.al. 2012), most maps show the Snake and Lewis region as unoccupied. The University of Montana field crew and recent reports have identified some wolves occupying the Snake River Valley. During survey large and small wolf prints were identified on and near the pack trail, especially near the crossing of Mosquito Creek.

Observed smaller fauna along the Lewis and Snake River consisted primarily of small rodents, especially varieties of tree squirrels and chipmunks. At some sites populations of ground squirrels, moles and voles, such as SLS-5 or 46, expose many of the artifacts. Beaver dams and large beaver deadfall were observed along both rivers. Grouse are present in the underbrush, possibly white-tailed ptarmigan, and a variety of warblers, chickadees, nuthatches and other small birds. Waterfowl were uncommon in both river corridors, although a variety of sandpipers, sometimes known as killdeer, were frequently upset by survey of the shoreline along the Snake River. Also, sand hill cranes were observed on the eastern shore of the Lewis River. Both rivers support populations of Mountain Whitefish and Yellowstone Cutthroat, with non-native species of brook trout and brown trout (Marcus et.al. 2012). The largest observed population was that of small garter snakes which occupied much of the cobble shoreline of both rivers. Prehistoric survival in this area in its modern state does not support the traditionally viewed reliance of hunter gatherers on bison, but would require more intensive exploitation of smaller game, fishing, and patience for hunting the rare elk or moose.

Prehistory

In order to provide a context for the description of archaeological findings, we provide a brief summary of the prehistory of the area. This section is brief and we refer the reader to the University of Montana *Yellowstone Archaeology* volumes on northern Yellowstone (MacDonald and Hale 2011) and southern Yellowstone (MacDonald and Hale 2013) for in-depth summaries of the prehistoric context of the various regions of interest to the YUMAP.

Following Frison (1991), Hale (2003), and MacDonald (2012), we organize the following culture history into six chronological periods, including: Paleoindian (11,000 to 8,000 years ago); Early Plains Archaic (8,000 to 5,000 years ago); Middle Plains Archaic (5,000 to 3,000 years ago); Late Plains Archaic (3,000 to 1,500 years ago); Late Prehistoric (1,500 to 300 years ago); Contact and Historic Period (300 years ago to present).

The Upper Yellowstone River Valley was in constant use over thousands of years by hunter-gatherer populations from all over the northern Rockies and northern Plains. The Yellowstone River—both its southern and northern branches provide a natural corridor or conduit for the migration of animals and people following resources along the valley (Davis et al. 1995; Hale 2003). Native Americans traveling from the Snake River Plain to the southern Yellowstone River arrived at Yellowstone Lake's southern shore, while those traveling southward along the upper Yellowstone River from Montana arrived at its northern shore.

The continued use of similar landforms, or the same landforms, by prehistoric groups, especially in the intermountain regions around YNP is well documented in archaeological research. High altitude upland valleys and foothills in the Greater Yellowstone region show a continued occupation by hunter-gatherer populations throughout the last 10,000 years B.P. (Baumler et al. 1996; Bender and Wright 1988; Frison et al. 1976; Kornfeld et al. 2001; Meltzer 1999; Reeves 1973; Short 1999a, 1999b; Smith and McNees 1999). Sites like Osprey Beach (Shortt 2001), Fishing Bridge (Reeve 1989), and the Donner Site (Vivian et al. 2007) detail the continued use of the upland areas of the park since at least 9,000 years ago. Through absolute and relative dating techniques, these intermountain areas have proven to be habitable living locations for these groups for thousands of years. Knowledge of continued land use is important in order to understand settlement patterns of prehistoric populations in intermountain regions over time; however, understanding the use of the upland regions of the park by the same cultural groups living on the Plains come with its challenges.

A majority of the archaeology sites in the park consist of ephemeral or short-term camps used for lithic reduction activities or hunting. The remains of these open-air campsites consist mainly of lithic debitage scattered over a utilized area with possible features such as hearths or boiling pits. Archaeology surveys along the first 10 miles of the Yellowstone River north of Fishing Bridge resulted in almost 100 of these ephemeral lithic scatter sites (Reeves et al. 2006; Sanders 2013; Sanders et al. 1996; Shortt 1999c). Several dozen more lithic scatters or "chipping stations" have been documented around Yellowstone Lake with the highest concentration occurring between the Fishing Bridge peninsula heading south along the western shore to the Bridge Bay local; results of UM's prior studies at Yellowstone Lake are available in MacDonald Hale 2013. Additional lithic scatters have been identified sporadically along the East Entrance Highway and on the east shore of the Lake (Livers and MacDonald 2012). Survey along the southern shoreline of Yellowstone Lake has resulted in the identification over more than 150 prehistoric sites (Vivian et al. 2007; MacDonald 2014; MacDonald et al. 2012), adding even more evidence to support the extended use of Yellowstone Park during prehistory.

Yellowstone is a diverse landscape evident of over 10,000 years of use by prehistoric groups. From projectile point to tipi rings, the evidence for prehistoric use and occupation of this unique Intermountain area of the Rocky Mountains is everywhere.

Paleoindian (12,000 to 8,000 years ago)

The early prehistory of Yellowstone National Park is a period of human colonization of a previously uninhabited landscape. The earliest known occupation in the Yellowstone region is the Clovis culture, radiocarbon dated from 11,500 to 10,900 years ago. The Clovis people would have been the first groups to traverse Yellowstone country, hunting all available game, but especially mammoths and mastodons, until about 10,900 years ago. At this time, due to circumstances that we do not quite understand, these large game disappeared; however, the people did not go away. They simply adapted their lifeways and hunted the remaining large game, including now extinct forms of bison, *Bison antiquus* and *Bison occidentalis*. These Goshen and Folsom hunters started a subsistence practice that continued until approximately 8,000 years ago. At this time, during the Early Archaic period, the hot and dry Altithermal kicked into gear, reducing both the overall size of bison as well as the size of the bison herds. People switched to a variety of other game and plants during this period.

Only two known Clovis points have been recovered within park boundaries. The first discovery was by UM in 2007 at the Yellowstone Bank Cache Site (24YE355) along the Yellowstone River (MacDonald et al. 2010). However, the point was likely secondarily deposited at the site, either from upland slopes or by later site occupants via recycling. In 2013, UM recovered a fluted (probably Clovis) point at a site along the southernmost shores of Yellowstone Lake (MacDonald 2013). Just north of the Yellowstone park boundaries, a Clovis point recovered was from the construction of the Gardiner Post Office (Janetski 2002). Approximately 100 miles north of the project area, the Anzick Clovis Cache yielded a wealth of data regarding Clovis burial and cache behavior in the northern Plains (Lahren 2006).

As with Clovis, the Folsom and Goshen complexes rare in YNP and this portion of the Yellowstone River basin. UM recovered a Teton Pass obsidian Goshen-like point during archaeological survey just south of Lewis Falls in the southern portion of the park. The Folsom cultural complex dates to approximately 10,800 to 10,300 years before present, and the culture is characterized by a subsistence pattern oriented toward bison hunting (MacDonald 1999; Hill 2007). A Folsom point found in the Bridger-Teton National Park south of Yellowstone was sourced to Obsidian Cliff, indicating that Folsom individuals clearly entered the park to collect stone (Cannon et al. 1997) as early as 10,900 years ago (Frison 1991). An unfluted Folsom or Plainview point, geochemically similar to stone from Obsidian Cliff, was recovered during archaeological excavation on the shores of Yellowstone Lake (Cannon and Hughes 2003). The Folsom component of the Indian Creek Site also yielded obsidian sourced to Obsidian Cliff in YNP (Davis and Greiser 1992).

Folsom culture persisted in Montana and the Great Plains until approximately 10,200 years ago. At that time, archaeological data indicate that individuals ceased to use Folsom points, in favor of Agate Basin and Hell Gap stemmed lanceolate points and, subsequently, a variety of other unfluted point types. Agate Basin and Hell Gap archaeological components are mostly focused south of Montana, persisting until approximately 9,500 years ago. As of the writing of this culture history, no archaeological sites in Montana have yielded Agate Basin or Hell Gap archaeological components. Nevertheless, several Agate Basin and Hell Gap style points have been collected across the state, suggesting a sizable presence. Although the location is unknown, the oldest recognized projectile point collected from the interior of YNP was described as Agate Basin like. It has been dated in other locals outside of the park at 10,500-10,000 B.P. (Taylor et al. 1964; Cannon and Hughes 1993).

UM has recovered numerous Late Paleoindian Cody and Foothill/Mountain complex projectile points around the perimeter of Yellowstone Lake. The oldest documented site in YNP is the important Cody Complex site at Osprey Beach (48YE409/410) and although younger than Clovis, Goshen, and Folsom phases, provides overlapping data to support the change occurring at the terminal Paleoindian Period (Johnson et al. 2013).

Osprey Beach is located at the mouth of Solution Creek and extends for over a mile along the shoreline west of the creek outlet on the southern shore of West Thumb, the western most extent of Yellowstone Lake. Several Early Archaic Bitterroot Side-notched and Middle Archaic McKean projectile points were also collected, successfully filling in the occupation gap between the Paleoindian and Late Archaic Periods (Johnson et al. 2004). A radiocarbon date retrieved by Pierce (Shortt and Davis 2002) from a charcoal lense eroding from the shoreline below the cultural deposits of the site returned a date of 9,360±60 B.P. solidifying the date of the Cody Complex components.

In addition to more than 20 Late Paleoindian points recovered by UM at Yellowstone Lake, a dacite Cody knife was found inland on Stevenson Island (Sanders 2001), Yellowstone Lake's largest island, suggesting a means of transport around the lake (Johnson et al. 2013). MacDonald et al. (2012) support the hypothesis of island access over frozen ice in early spring or early winter, however.

Early Plains Archaic (8,000 to 5,000 years ago)

By the end of the Paleoindian period—approximately 8,000 years ago—Plains Native Americans embraced a diverse subsistence pattern and used the atlatl in hunting (MacDonald 2013). A variety of notched projectile points dominate lithic artifact assemblages from all three sub-divisions of the Archaic, including: Early Archaic - 8,000 to 5,000 B.P.; Middle Archaic - 5,000 to 3,000 B.P.; and the Late Archaic – 3,000 B.P.

The Archaic period is characterized by a decline in bison use during the Early Archaic, an increase by the end of the Middle portion, and a dramatic increase during the Late Archaic portion. This change over time largely is due to dramatic environmental shifts over the course of the Archaic Period. Projectile point technology changed over time, with the use of large side-notched points in the Early Archaic, bifurcated points during the Middle Archaic, and smaller side- and corner-notched points in the Late Archaic. This chapter provides a description and analysis of the archaeological record of the Early Archaic period in Montana and the northern Plains and Rocky Mountains

One of the hallmark characteristics of the Early Archaic period is a lack of well-excavated archaeological sites and an apparent decline in human population. Early Archaic sites are as rare as Paleoindian sites and are also less visible, due to a decreased reliance on bison hunting. This decreased role of bison hunting was largely due to the decreasing herd populations as a result of the emerging altithermal climatic period (Antevs 1953; Dean et al. 1996; Wolfe et al. 2006). The altithermal or hypsithermal period is characterized by comparatively hot and dry climate, resulting in decreased forage for bison. Bison teeth that date to the Early Archaic period are badly worn, suggesting more dry grass and grit in their forage. Surface water was likely reduced during this time and springs and summers were likely much warmer than during the previous Late Paleoindian period.

One Early Archaic site important to discuss is the Fishing Bridge Point Site (48YE381) located southwest of the Fishing Bridge area. This site was the first and only excavated site in Yellowstone Park to provide an Early Archaic occupation date based on a radiocarbon sample date from a buried hearth feature (MacDonald et al. 2011, 2012). Site 48YE381 was formally excavated during the summers of 2009 and 2010, providing excellent depositional stratigraphy from which to examine distinct episodes of prehistoric occupation along Yellowstone Lake from the Early Archaic through Late Prehistoric Period.

Blood residue analysis of the Early Archaic point indicated its use on both bovine and possibly capparid (identified in initial test; not in a repeated second test). The presence of capparid indicates use of the point in plant processing. In particular, the likely species of capparid is Rocky Mountain bee weed, *Cleome serrulata*. Bee weed was utilized by Native Americans, but typically in lower-elevation, hotter and dryer settings. This plant is not native to the lake area, but can be found on south-facing slopes of hotter, dryer portions of the Rocky Mountain front. Likely locations of procurement would be the lower Madison Valley to the west, the Gardiner Basin to the north, or the Shoshone Valley to the east of Yellowstone Lake (MacDonald and Livers 2012).

William Mulloy (1958) was the first to suggest that humans abandoned the hot and dry open Plains in favor of uplands and water sources such as river valleys. MacDonald (2013) summarizes data from the Early Archaic in the Yellowstone region, supporting some aspects of a human abandonment hypothesis. There is a very clear decline in archaeological sites in the Plains and Montana between 8,000 and 5,000, suggesting that Mulloy's abandonment theory may have some validity. Current research adds validity to Mulloy's (1958) idea but general trends associated with hunter-gatherer mobility and subsistence patterns do not function properly across the vast extent of the Plains due to variation in Altithermal effects (Meltzer 1999). Water would have dried up in some places and not others (Meltzer 1999; Yansa 2007) while bison populations might have varied in location and size based on available resources

(Frison et al. 1976; Reeves 1973). In the southern Great Plains, Meltzer (1999) has recorded archaeological sites with excavated wells, suggesting an extreme water shortage.

Pollen samples from the greater Yellowstone region do show a warming trend during the Altithermal period beginning around 7000 BP and becoming increasingly drier with the evidence from increased grass pollen counts while tree pollen decreased (Whitlock and Bartlein 1993: 232). Pollen samples from other locations on the Northern Plains also suggest aridity of upland regions with the retreat of tree lines around 6500 – 6000BP (Greiser et al. 1985), dates consistent with Yansa's (2007: 135) work on the Eastern Plains region showing the greatest drought period occurring on the upper Plains starting around 6000BP. Even though the Altithermal period affected the entire Plains region in some fashion, "The impact of middle Holocene climate change seems relatively inconsequential" in the Northern Plains region (Meltzer 1999: 413). Numerous sites in the region are evident of Archaic use of high altitude locations during the Altithermal showing these areas were not marginal environments, even during environmental stresses (Baumler et al. 1996; Bender and Wright 1988; Kornfeld et al. 2001; Shortt 1999a).

Although sites in the region point to area use, the archaeological evidence from the Greater Yellowstone Area and other upland areas do show general trends thought to be a result of Altithermal stresses. These trends include, increased diet breadth based on heavy processing (Greiser et al. 1985; Meltzer 1999), a move to higher elevations or resource rich areas (Bender and Wright 1988; Frison et al. 1976; Meltzer 1999; Smith and McNees 1999; Walthall 1998), and decreased mobility with the introduction of pit houses (Meltzer 1999) or other semi-permanent features like stone lined ovens (Bender and Wright 1988; Meltzer 1999; Smith and McNees 1999). Numerous sites in the region are evident of archaic use of high altitude locations during the Altithermal showing these areas were not marginal environments, even during environmental stresses.

Middle Plains Archaic (5,000 to 3,000 years ago)

The Middle Plains Archaic period in the region lasted from approximately 5,000-3,000 years ago. The Middle Plains Archaic—otherwise referred to as the MPA or Middle Archaic—is best characterized as a time of transition, from the diversified economy of the Early Plains Archaic. The Middle Archaic period is characterized by more varieties of projectile points on the Northwestern Plains, including several with bifurcated bases such as Oxbow and McKean. Variations in a number of other categories such as technology, social and economic organization, as well as settlement strategies during this period should be expected due to the nature of short term and long-term changes (Hoffman 1997).

The initial portion of the MPA is largely a continuation of trends begun during the Early Plains Archaic, including use of a diverse subsistence base, site furniture, and heightened use of foothills and mountains. At the beginning portion of the MPA—between 5,000 and 4,000 years ago approximately—Native Americans also increased their use of subterranean pit houses in eastern Montana and western Wyoming. However, by the end of the period—between approximately 4,000 and 3,000 years ago—Native Americans began to transition back to a Plains bison hunting culture.

The Airport Rings site (24YE357), along the Yellowstone River in the Boundary Land area of YNP exhibits several of the characteristics noted within the Middle Archaic Period. Even though it is difficult to accurately associate buried cultural materials with surface materials, the excavations at Airport Rings uncovered a partially slab lined, rock filled roasting pit inside one of the rings, with a date correlating to the beginning or time immediately before the Middle Archaic Period (Livers 2011; Livers and MacDonald 2010). As well as the radiocarbon C-14 date gained from the hearth sample, point chronologies consistent with the Oxbow tradition make the Airport Rings hearth, as far as the information available from stone circle literature, the earliest date for a hearth found within a stone circle by several hundred years. All three of these sites begin to substantiate claims for the use of tipis, or some sort of portable structure, aiding in the initial rise of bison hunting in the Middle Archaic Periods.

The gradual transition back to bison hunting not coincidentally coincides with the re-emergence of substantial *Bison bison* herds to the northern Plains. After 5,000 years ago until the period of contact with Europeans, Native Americans hunted bison as the staple of their diet, but continued to hunt and gather other wild resources, especially in the mountains. For example, at the Mummy Cave site near Cody, Wyoming, Big Horn sheep were the focus of hunting for all of prehistory. Blood residue on projectile points from Yellowstone Lake Area sites also reveal a wide range of blood proteins—not just bison—suggesting adaptation to the diverse ecosystem of the lake area.

Prior to the 2009 excavations at The Fishing Bridge Point Site on the west shore of Yellowstone Lake, the earliest radiocarbon dates from prehistoric occupations in the park came from the Middle Archaic Period. Middle Archaic radiocarbon dates have been recovered from the Arnica Creek Site along the West Thumb (Cannon and Hale 2013), Chittenden Bridge Site (48YE516) on the Yellowstone River approximately 12 miles northwest of Fishing Bridge (Cannon et al. 1994), the Airport Rings Site (24YE357) along the Yellowstone River in the

Gardiner Valley (Livers and MacDonald 2010), along the Gardner River (Shortt 1999a), and from the First Blood Site (48YE449/457) along the north shore of West Thumb (Cannon and Hale 2013).

Late Plains Archaic (3000 to 1500 years ago)

Native Americans across Montana, southern Alberta/Saskatchewan, the Dakotas, and Wyoming, once again focused upon bison as the focal point of their subsistence patterns. This period marks the emergence of the classic Plains Bison Hunting Culture, including the use of buffalo jumps and corrals that dominate the archaeology of the region. The Late Archaic period also witnessed the first use of pottery, the widespread use of tepees, trade of obsidian and Knife River flint across the U.S., and the last stand for atlatls as the weapon of choice for natives utilizing YNP. The Plains Bison Hunting Culture emerged as the way of life for many Montana Native Americans. This culture, or way of life, continued virtually unaltered (in basic form) until the time of European-American contact a few hundred years ago.

Late Archaic human populations in Montana and Wyoming were sustained by the intensification of bison procurement. Bison hunting on the Plains during the Late Archaic was not a passive enterprise. While introduced and used sporadically during preceding time periods, bison jumps and corrals were used all over the Northwestern Plains and Rocky Mountains with increased intensity beginning 3,000 years ago. Buffalo jumps required a complex arrangement of features, including bison aggregation areas with water, open areas conducive for driving bison, and the cliff itself. Some bison jumps also incorporated corral structures into the hunt.

As such, Native Americans actively altered their environment to facilitate their subsistence success, building drive lines—comprised of hundreds of large rocks organized into two parallel lines—for dozens of miles from the jump and occasionally building corrals to trap the animals once driven over the precipice. Montana was the center of the bison-jumping universe, with thousands of such locations spread across the Big Sky state. Park Superintendent Norris (1880) noted the presence of a wooden fence several feet high in the Swan Lake Flat area of Gardner's Hole during his tenure and described it as a probable Indian game drive system for deer or elk in the area. Norris (1880) approximated the length of the wooden fence at several hundred feet with it ending at the edge of Rustic Falls where the animals probably fell off the cliff of the falls. Also during this period, prehistory groups in the region began to utilize fire as a range management tactic for grassland rejuvenation or even to drive game (Shullery 1997). Use of fire inside the park is not evident and was not likely employed, but evidence of multiple grass fires from tree scars suggest groups in the area did practice grassland burning in the lower elevation foothills around the Yellowstone Plateau (Shullery 1997).

Bison was a commodity across the Plains and Native Americans actively traded bison meat, hides, and tools with neighboring groups that were unable to regularly hunt bison. In addition to bison products, Plains Native Americans traded a variety of other goods during the Late Archaic period. In particular, Knife River flint from North Dakota and Obsidian from Yellowstone National Park have been traced to Woodland-period archaeological sites—especially those of the Hopewell culture—in Ohio, Pennsylvania, and Michigan, among other states, during the Late Plains Archaic (Davis et al. 1995).

While most of these goods are thought to have been transported indirectly via down-the-line trade from the Plains and Rocky Mountains to the Midwest and eastern United States, DeBoer (2004) proposes that some individuals within the Scioto River Hopewell culture of Ohio actively travelled to Montana and Wyoming to obtain rare goods for use in ceremonies. Such goods include obsidian, Knife River Flint, bison, as well as Big Horn Sheep horns, among other unique Plains and Rocky Mountain items. Hundreds of archaeological sites within the Mississippi, Ohio, and Missouri River Valleys, among others, contain obsidian from Wyoming, Idaho, and Montana (DeBoer 2004; Davis et al. 1995).

Other tools were employed to facilitate the high mobility of bison hunting, as Plains Native Americans increased their use of portable hide structures for shelter during the Late Archaic. These hide structures—sometimes referred to as tepees (tipis)—can be identified by the presence of stone circles. Millions of stone circles marking the former locations of Native American lodges (living and spiritual, both) can be found in Montana. Their easy identification (most of the time!) likely also has resulted in increasing site counts dating to this time period. Stone circles were used with increasing frequency during the Late Archaic period and the subsequent Late Prehistoric but the exact period for skin-covered lodge adoption remains unknown.

In addition to the diagnostic projectile points, several other important technological innovations occurred during the Late Archaic period. Several have been discussed, including: 1) the adoption of stone circles (tipis) as the main form of shelter; 2) widespread use of buffalo jumping/corralling; and 3) widespread trade ties to areas outside of the Great Plains and Rocky Mountains and, in particular, to areas of the Midwest during the terminal portion of the Late Archaic.

Two other important innovations are recorded in Late Archaic archaeological sites as well. First, sites dating to the Late Archaic period have some of the earliest examples of well-preserved perishable goods. Sites like Spring Creek Cave, Wyoming, have yielded projectile points still hafted to wooden atlatl dart shafts. These sites allow us to interpret all Archaic notched projectile points (Early, Middle and Late Archaic varieties) as likely dart points (as opposed to spear or arrow tips). Another important technological innovation of Late Archaic tribes is the first—albeit limited—use of pottery. Besant pottery is rare in Montana, but is found on occasion dating to between 2,000 and 1,500 years ago in sites in the northern tier of the state (especially in the northeast corner). Besant pottery in Montana likely is derived via trade and cultural contact with emerging village groups in the Missouri River Valley to the south and east.

Besides pottery, many of these changes are evident from the archaeological record in the uplands of Yellowstone Park. Pelican Lake points have been recovered on the ground surface and from excavations in many areas, constituting a majority of Yellowstone's Late Archaic sites as well as artifacts (Johnson 2002, Hale 2003; MacDonald and Maas 2011; Sanders 2013).

Late Archaic sites are plentiful in the Hayden Valley north of Yellowstone Lake, as well as within the Yellowstone Lake basin. MacDonald and Hale (2013) and Sanders (2013) report on numerous Late Archaic sites in these areas.

Two burials known to exist in Yellowstone Park were associated with the Late Archaic period on the Fishing Bridge Peninsula (Wright et al. 1984). Other human remains have been recovered from Yellowstone's west lakeshore at site 48YE220, but not in a burial context. These remains were discovered eroding out of the shoreline and reported by visitors in 1996. The site is located on the sandy area of an ephemeral outwash channel on the only geographic point 4.8km southwest of Rock Point. Three diagnostic skeleton elements were collected, including one femur, part of the skullcap, and one vertebra. The Wyoming coroner's lab determined the remains to be approximately 1,000 years old.

Late Prehistoric (1500 to 300 years ago)

There are numerous archaeological sites of Native American origin in the Greater Yellowstone Area, some that have become world famous such as Mummy Cave, located just 13 miles east of the East Entrance to the Park (Husted and Edgar 2002). While the number, composition, and specifics of each site is large and varied, in general most of the more contemporary sites, dating from about A.D. 1500 onward, are of Crow, Salish, Nez Perce or

Shoshone origin. Ethnographically use of Yellowstone Lake includes several other tribes. Following Bradford et al. (2003), several native groups claim ancestral ties to Yellowstone Lake itself include the Kiowa (Gunnerson and Gunnerson 1971: 14; Mooney 1979), Shoshone (Dominick 1964; Wright 1978), and Apache (Perry 1980). The Late Prehistoric period is indicated by a fairly dramatic increase in stone circle use (Livers 2011), as well as the innovation of the bow and arrow, resulting in a decrease of projectile point size. Looking at the radiocarbon sequence of dates from YNP indicates a rapid rise and peak in the number of dates around 1200 to 1000 years ago (Frison 1991: 111).

Intermountain pottery, though not as pervasive as the new weapon technology, appears in the region and is found throughout the Canadian provinces, Wyoming, Montana, Utah, Idaho and southern Colorado (Frison et al. 1996). Various types of prehistoric pottery were utilized in Montana, with both Shoshone (Intermountain) and Crow varieties being the most common, especially in the Upper Yellowstone Valley area. Tom Jerde (1987) documented at least a dozen sites containing pottery evidence along Tom Miner Basin and Paradise Valley to the north of the park.

Many of the hallmarks of the Late Holocene, such as side-notched arrow points, pottery, and wider use of plants and animal resources are found along the Yellowstone River north of the park. However, many other hallmarks of the period, such as bison drives and jumps, sheep and pronghorn traps, aggregations of domestic stone circles, winter habitation sites, horticulture evidence by bison scapula hoes, rock art, medicine wheels, and variations in pottery styles (Frison et al. 1996) have yet to be found in YNP. As mentioned earlier when discussing fauna, little to no remains are found within the YNP proper due to the nature of the soil. Yet, one unique site does exist and is the only prehistoric sheep and elk bone bed recorded in YNP. This bone bed comes from the terminal Late Archaic-early Late Prehistoric component of the Malin Creek Site (24YE353) along the Black Canyon of the Yellowstone (Vivian et al. 2008).

While the Late Plains Archaic—3,000 to 1,500 years ago—marks the emergence of the Plains Bison Hunting Culture, the Late Prehistoric period—1,500 to 300 years ago—can be defined as its heyday, a time in which bison hunting reigned supreme all over the northern Great Plains. Bison hunting escalated in intensity, with many more locations being used for hunts, many more individuals participating in the complex organization of bison hunting, and many more bison being hunted during the Late Prehistoric compared to the Late Archaic. Instead of dozens of animals at a bison jump as during the Late Archaic, Late Prehistoric bison kills often have hundreds of animals, evidence of a heightened intensity of bison procurement during the last 1,000 years prior to European contact.

The Late Prehistoric period is best characterized as an era of increasing cultural complexity, both in the intensity and organization of the buffalo hunt and in the emergence of sedentary villages supported by the harvest of a variety of resources. The emergence of sedentism marks an important first for the Late Prehistoric period. Prior to this time, everyone in the Great Plains and Rocky Mountains were strictly mobile hunter-gatherers with a few possible semi-sedentary groups. While most Native Americans in Montana continued to hunt and gather for their subsistence throughout the Late Prehistoric period, they certainly were influenced by Native Americans to their east and west who opted for a largely sedentary lifestyle.

It is during the Late Prehistoric period that we can clearly recognize the presence of specific Native American tribes in Yellowstone, including the Salish, Kootenai, Blackfoot, Crow, and Shoshone. While many more tribes were certainly present, their archaeological signatures are not clearly visible at sites in Yellowstone. Other than excavated archaeological sites, one of the main ways archaeologists identify the presence of tribes is through rock art. A huge variety of rock art is present across Montana and surrounding states and provinces that allows for an enhanced understanding of Native American life beyond hunting and gathering. However, no prehistoric rock art has ever been identified in Yellowstone to aid in the decipherment of tribal use of the area. Suffice it to say that multiple tribes from many regions used the area that the park now resides within.

Contact and Protohistoric (300 to 150 years ago)

Native groups during the Contact period on the Northwestern Plains found themselves face to face with increasing numbers of European homesteaders, pioneers, cattlemen, miners, and others looking to claim land or adventure into unexplored territory to make a new life for themselves (Frison et al. 1996: 37-40). Horses also became common during this period with the possibility of horses introduced to interior Plains as recently as the early 1700's from southern tribes like the Comanche (Ewers 1955). If horses had not been introduced before this time they were during the Protohistoric Period from the first Spanish and French expeditions into the interior. Many ethnographic and historical accounts coming from this period note a wide variation in cultural practices between the various tribes known to live and use the GYA. These accounts detail differences in such things as horse use over foot travel, types of domestic structures, and even diversity in beliefs.

According to Crow explanations for how they became a discrete ethnic group on the Plains they have a story of how one of two brothers, No Intestines, was directed to look for seeds of the sacred tobacco during his vision quest. During his wanderings, he took his people over much of the Great Plains, specifically passing through a place "where there is fire', perhaps Yellowstone National Park or a fiery coal pit (Nabokov and Loendorf 2002 quoting Voget 1984). After settling in the Big Horn Mountains, the Crow began to separate into regional subdivisions. Of these, the largest was the Mountain Crow, who consider (and still claim) the region near present-day Yellowstone National Park as part of their aboriginal territory (Nabokov and Loendorf 2002).

In contrast, the Shoshone are often considered the only "permanent" residents of Yellowstone National Park. It is important to understand that "permanent" does not mean sedentary, but that a significant portion of their semi-nomadic lifestyle took place within Yellowstone National Park (Nabokov and Loendorf 2002). Historic evidence describing non-horse using groups in the park around the 1800's may have been referring to the Shoshone (Davis et al. 1995). This account may possibly provide the answer to the often-asked question of why more tipi rings are not found within the interior of the park and why wikiups are far more evident. Without the aid of a horse or pack animal, tipi lodge poles and hides would be much more difficult to transport, especially into the higher elevation plateaus of Yellowstone where access along water sources may have only passable by foot.

There are few historic accounts of Native American use in northern Yellowstone National Park after the parks creation in 1872. This is mainly due to efforts by the early administrators of Yellowstone National Park to downplay or eliminate Indian involvement and usage of the park, done to encourage white tourists to feel safe after the 1877 Nez Perce encounter in the park and the 1878 Bannock War (Nabokov and Loendorf 2002, Introduction, and pp. 103-112). However, there are some relevant accounts. Prior to the park's establishment, the first Euroamerican sighting of Sheepeaters in the park was from an 1835 account where a trapping party led by Osborne Russel encountered Shoshone in the Lamar Valley (Haines 1996a: 49)

In *Lifeways of Intermontane and Plains Montana Indians* (Davis 1979), Norris's 1882 superintendent's report is referenced for the information provided to him by a Shoshone informant concerning the native use of areas in the park. The Shoshone informant said the Shoshone, Bannock, and Crows visited the lake and river areas of the park often, providing a relevant historical account that at least three tribes were historically utilizing the Yellowstone area. In addition, Norris (1882) recorded that the Shoshone and Bannock probably utilized the thermal and hot springs areas in the park for healing purposes, while these area were not utilized by the Crow or other Plains tribes according to a Crow informant. The notion that native groups did not utilize the park because of the thermal features is highly incorrect as both artifacts and ethnographic accounts such as these provide direct evidence for the use of these areas.

It is obvious Yellowstone was utilized by native groups up to the late 1800s or the U.S. Army would not have had to patrol the park in the late 1800s and early 1900s. The reason for the assumed lack of Late Prehistoric materials in the archaeological record remains unknown; however, several reasons may contribute to this issue. Little work is conducted with metal detectors in the park when many Late Prehistoric sites contain metal, so the sites are possibly being overlooked or missed during survey. Another factor contributing to the lack of sites could be the 100 years of undocumented collection and looting of prehistoric artifacts from the Park interior.

Chapter 3. Background Research

Since the 1950's substantial archaeological surveys, testing and research have been conducted around the shores of Yellowstone Lake, yet relatively few projects have included work in the Lewis and Snake River Corridors and the southwest corner of Yellowstone National Park (Hale 2013). It has been proposed by investigators such as Gary Wright in 1978 that the river corridors in the southern portion of the park may have served as key travel routes between Yellowstone Lake and the Jackson Hole region as part of a 'northern adaptive territory' (Wright 1978, Hale 2013). Despite this possibility, only a handful of prehistoric sites (n=15) and historic sites (n=6) have been documented throughout this large and isolated portion of the park throughout the past 50 years. Early surveys in the region focused primarily around Heart Lake and Heart River, with a few other sites near the border of Yellowstone National Park and Bridger-Teton National Forest. Table 1 lists the previously identified sites within the region surveyed by the University of Montana 2013 Snake and Lewis River Survey, which addressed the gap in survey between the southern boundary sites and a solitary Lewis Lake site.

The first official surveys in the southwest portion of the park were conducted by Montana State University, now the University of Montana. These surveys were directed by Carling Malouf and Dee Taylor, with fieldwork conducted by crews led by J.J. Hoffman during their seminal work in the late 1950s and early 1960s. Work was inspired by park ranger Wayne Replogle's exploration of the Bannock Trail in late 1940's (Hale 2013) and many of the sites they documented were previously identified by his work (Hoffman 1961). The University of Montana's surveys were large scale and involved extensive portions of the park, and were considered a 'crash program' due to its scope and limited timeframe, as part of the Mission 66 park development program (Hoffman 1961). While many sites were found (a total of 195), especially in the northern portion of the park , there were two prehistoric sites found in the Snake and Lewis River corridors (Hoffman 1961). 48YE418, located east of the confluence of the Snake and Lewis Rivers near a thermal vent, is a sparse flake scatter of mixed stone types (Hoffman 1958a). The other site, 48YE437, was noted near a swamp on the northeast bay of Lewis Lake but was not investigated beyond Replogle's initial observation (Hoffman 1958b). This site indicates potential for future archaeological research around Lewis and Shoshone Lake.

No new sites were identified in the southwest region throughout the remainder of the 1960's, and extensive surveys didn't resume until Lloyd William's Heart Lake research in 1977. South of the park, the Huckleberry Ridge Fire Lookout was documented by the Wyoming Recreation Commission's Survey of Historic Sites, Markers and Monuments in 1967, located just outside of the park boundary in Teton National Forest. Entered into the register of historic places in 1983, this historic lookout was completed in 1938 and manned in 1939, and saw action during the Sheffield Creek Forest Fire in 1940, when it was evacuated. The lookout became abandoned after 1957, but is the sole remaining fire lookout in the northern portion of Teton National Forest (NPS 1983).

Additional archaeological surveys to the south of Yellowstone National Park were occurring in the Teton National Forest during the early 1970's as part of the John D. Rockefeller Jr. Memorial Parkway construction, with 48TE428 being documented in 1973 by Gary Wright just outside of the Yellowstone Park boundary on the east side of the Snake River. This small flake scatter contained mixed lithic types, including quartzite, obsidian, chert, and ignimbrite (Wright 1973). Ignimbrite is an ambiguous term which refers to a variety of welded volcanic tuff flows, the densely layered bottom of which is often referred to as vitrophyre. These vitreous, or glassy, ash flows may weld in beds to various degrees, sometimes creating inclusion filled welded volcanic tuff obsidian (Gemeno 2003). Past and recent surveys have found an abundance of this type of obsidian being used for tool production in the southern portion of the park. For the purposes of this research, the terminology used by the authors of a given site will be used to identify vitrophyre, ignimbrite, volcanic ash and snowflake obsidian, all of which can be assumed to refer to similar types of welded volcanic tuff obsidian common in this region.

In 1977, Lloyd Williams conducted a more extensive series of surveys in the area around Heart Lake, Heart River and Wolverine Creek under the supervision of Gary Wright, documenting eight lithic scatters. This region was chosen as it is known from historic documents to be part of a migration trail, possibly as part of the larger network of routes between southern Yellowstone and Jackson Hole (Wright 1978). 48YE490 is the largest of these sites, is located on the north bank of the Heart River and extending to the eastern shore of Heart Lake. This site has several components, which were revaluated by Kenneth Cannon in 1990 and came to include 48YE1291 and 48YE489. Both Williams and Cannon found many quartzite, chert, obsidian, ignimbrite (vitrophyre for Cannon) and petrified wood flakes. Tools found included one obsidian, one chert, one petrified wood and one vitrophyre projectile point, along with a vitrophyre scraper. These tools were suggested by Cannon to fit within the range of projectile points known as Elko Eared, dating from between 1300 B.C. to 700 AD at Gatecliff shelter in Nevada (Cannon 1990). Located just south of this site along the Heart River is 48YE491, a very small lithic scatter, which contained a worn chert biface. 48YE492, 493 and 494 are located to the southwest of 48YE491, near the confluence of the Heart and Snake Rivers. These are also very small sites, but one chert biface was found at 48YE493, and solitary utilized black ignimbrite flakes at the other two sites. Williams documented three additional sites further to the south near the confluence of the Snake River and Wolverine Creek, just inside the southern boundary and near the Harebell Snowshoe Cabin, discussed below. These sites, 48YE495, 496 and 497 are similarly very small sites with primarily quartzite flakes and one large utilized quartzite flake or biface found at 48YE495 (Williams 1977a-h).

Following Williams work, no extensive surveys occurred in the southwest corner of the park until the 1988 Post-Fire Assessment conducted by the National Park Service. This park-wide survey documented a possible logging camp and dump, 48YE25, just south of Lewis Falls. The dump consists of construction debris including concrete, brick and wood, and is nearby a foundation scar, log piles and possibly a privy pit. Tools, bottles, wire and other artifacts and debris were also found in this camp likely associated with 1940’s logging operations (Ayers 1988). In 1989 the Historic American Engineering Record (HAER) conducted a comprehensive study and historical documentation of the road system throughout Yellowstone National Park, called The Yellowstone Roads and Bridges Recording Project. This large scale study included the Crawfish Creek Bridge, 48YE811, which spans Crawfish Creek just north of the South Entrance at Moose Falls. This bridge was constructed in 1936 as part of the parks burgeoning road development program, and was constructed at the same time as the Lewis River Bridge near Lewis Falls. HAER created detailed and measured drawings, conducted formal photography as well as an in-depth historical background investigation of the bridges planning phase and construction (HAER 1989). During the University of Montana’s 2013 surveys, two sites were found which are likely associated with the bridge construction, one being a quarry and the other may have been the contractors materials plant, noted in the HAER historical research as being located just inside the park boundary, on the bank of the Snake River (UMSLS-5).

Archaeology increased after the 1988 fires, when Kenneth P. Cannon with the Midwest Archaeological Center (MWAC) conducted post fire surveys throughout the park from 1989 to 1991 as part of the road reconstruction program (Hale 2013) and as part of the Housing Unit Design Assistance Team (HUDAT) (Cannon 1991). They documented three prehistoric sites in southwest Yellowstone National Park, as well as expanding Williams's 1977 sites 48YE489 and 48YE490. Two of these sites located in 1990 are 48YE739 and 48YE740, which lay along Heart River just northeast of the confluence with the Snake River and sites 48YE495, 496 and 497. These two sites revealed one obsidian projectile point at 48YE739 and a chert biface at 48YE740 with sparse, mixed types of flakes (Cannon 1990a,b). Some confusion was caused regarding Williams 1977 site 48YE490, which was re-recorded and expanded by MWAC but misidentified as 48YE489, resulting in two components, A and B, now 48YE490 and 48YE1291, respectively, while 48YE489 remained the same (Cannon 1990c). Despite this minor discrepancy, it seems clear that the region near Heart Lake was used extensively and what is being observed may be a continuous and expansive occupation, likely as a waypoint and resource locale for users of these prehistoric highways. An additional site documented by Cannon is 48YE58 located just inside of the park boundary, south of the old ranger station and west of the highway, during the 1991 HUDAT project. Lithics consisted of four obsidian, four white chalcedony and two vitrophyre flakes (Cannon 1991).

48YE934, located just inside the park boundary to the south of Heart Lake, contains both historic and prehistoric components. The Harebell Snowshoe Patrol Cabin was documented in 1983 and further in 1997 during Yellowstone National Park historic properties inventories, with the prehistoric component being formally documented during a hazard fuel reduction project in 2003 by park Archaeologist Ann Johnson (Johnson 2003). The cabin was built in 1920 and originally used as a winter patrol base by the United States Army to patrol for poachers, and later for other uses such as wildlife research and fire patrols. It is eligible for listing on the National Register of Historic Places under criterion A and C, for association with the parks resource protection history, as well as unique park cabin construction. The lithic component at the site has likely been heavily disturbed due to construction and years of modern occupation and use. It is also possible that the site was created recently as a result of tourists and rangers moving flakes from elsewhere back to the cabin. Of significance, however, is that all of the documented lithic artifacts consist of small red "volcanic ash" flakes (Johnson 2003).

The most recent survey in the Snake and Lewis River Valleys was conducted in 2001 by the Office of the Wyoming State Archaeologist (OWSA), with surveys led by Paul Sanders and David Reiss documenting two historic and one prehistoric site. 48YE1567 consists of seven abandoned and disconnected historic road sections that constituted the original South Entrance Road. This site has been considered ineligible for listing on the National Register of Historic Places due to a lack of the rustic formal design and materials associated with the park's historic architecture (Reiss 2001). An additional 250 foot segment of the old South Entrance Road, 48YE823 was found adjacent the South Entrance kiosks, and is similarly abandoned and overgrown, and recommended to not be listed on the Register (Sanders 2001a). Cannon also documented a prehistoric lithic scatter, 48YE 1268/48TE1568, which straddles the park boundary, hence the two site names. This mixed lithic scatter is located just south of the kiosks along the Snake River, and consisted of quartzite, chert and both glassy and snowflake obsidian flakes. One projectile point base was sourced to the Teton Pass obsidian source (Sanders 2001b). Sourced flakes were found to originate from multiple sources throughout the Greater Yellowstone Region in addition to Teton Pass, including Lava Creek, Conant Creek, Bear Gulch, Obsidian Cliff and with an overall bias towards the Park Point source, located on the eastern shore of Yellowstone Lake (Sanders 2001b). This is the only site in this southwestern region within the park that has chemically sourced lithic artifacts, and also is the only site listed here that was shovel pit tested. This site is also the suggested location of a historic tram that was used to access the opposite side of the Snake River.

The past surveys mentioned here in the southwest portion of Yellowstone National Park, involving the Lewis, Heart and Snake River corridors, have indicated potentially extensive prehistoric occupations as well as park architecture and construction from its historic development. Lithics found during the University of Montana's 2013 field season followed the trend of past projects by finding a large amount of snowflake obsidian and quartzite flakes and tools as well as historic quarries, gravel pits and dumps. While the University of Montana has begun to fill some of the gaps in these past surveys, there are large tracts of land in the region that have yet to be officially surveyed and hold vast potential for future research.

Table 1. Summary of artifact types from past research

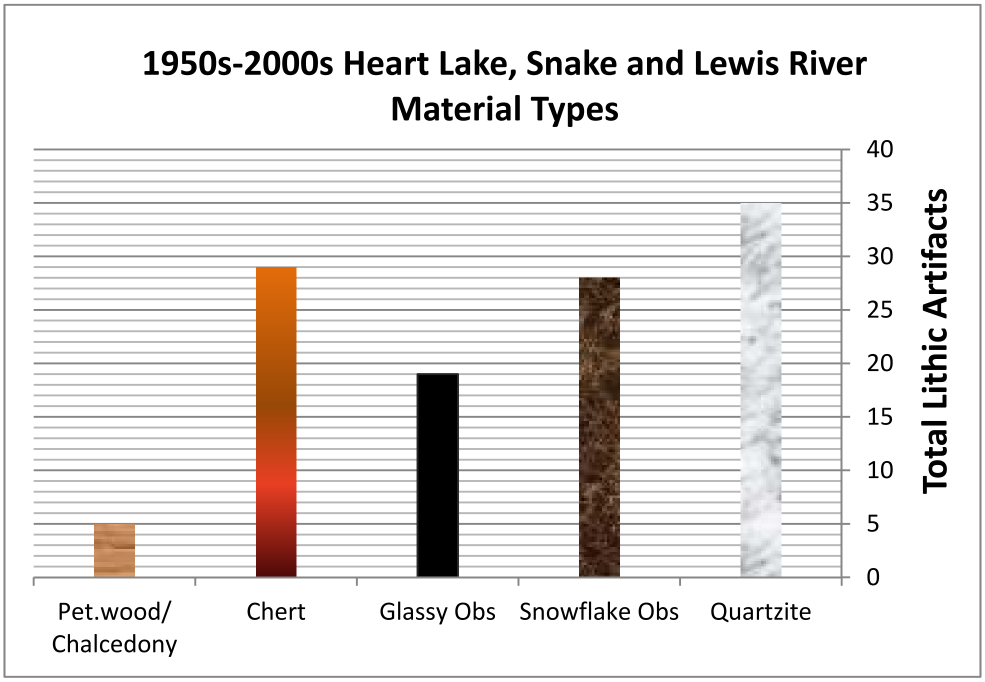


Table 2. Summary of Previously Recorded Archaeological Sites in or near the project area

Site #	P/H	Type	Eligibility	TSR	Record
48YE25	H	Historic Dump/Camp	"non-significant"	T:50N R:115W S:36	1988 J.Ayers and S. Crockett Post-Fire Assessment (NPS)
48YE58	P	Lithic Scatter	?	T:48N R:115W S:9	1991 Cannon (MWAC)
48YE418	P	Lithic Scatter	?	T:48N R:115W S:10	1958 Hoffman (Montana State University)
48YE437	P	Lithic Scatter	?	T:50N R:114W, S:9	1958 Hoffman (Montana State University)
48YE490/1291	P	Lithic Scatter	?	T:50N R:113W S:34	1977 Williams/ 1990 Cannon (MWAC)
48YE491	P	Lithic Scatter	?	T:49N R:113W S:3	1977 Williams
48YE492	P	Lithic Scatter	?	T:49N R:113W S:16	1977 Williams
48YE493	P	Lithic Scatter	?	T:49N R:113W S:16	1977 Williams
48YE494	P	Lithic Scatter	?	T:49N R:113W S:16	1977 Williams
48YE495	P	Lithic Scatter	?	T:48N R:114W S:10	1977 Williams
48YE496	P	Lithic Scatter	?	T:48N R:114W S:10	1977 Williams

48YE497	P	Lithic Scatter	?	T:48N R:114W S:10	1977 Williams
48YE739	P	Lithic Scatter	?	T:49N R:113W S:9	1990 Cannon (MWAC)
48YE740	P	Lithic Scatter	?	T:49N R:113W S:10	1990 Cannon (MWAC)
48YE811	H	Moose Falls Bridge	?	T:48N R:115W S:9	1989 (HAER)
48YE823	H	Historic Road	?	T:48N R:115W S:9/16	2001 Sanders (OWSA)
48YE934	H	Harebell Snowshoe Cabin	Eligible	T:48N R:113W S:7	1997-98 Historic Structures Inventory (NPS)
48YE1268/48TE1568	P	Lithic Scatter	Unevaluated	T:48N R:115W S:9/16	2001 Sanders (OWSA)
48YE1567	H	Multiple Road Segments	Not Eligible	T:47N R:115W S:5,8,20,29 T:48N, R:115W S:9,1,21,28,33,32	2001 Sanders (OWSA)
48TE428	P	Lithic Scatter	?	T:48 R:115 S:16	1973 Wright (J.D. Rockefeller Jr. Hwy)
48TE910	H	Huckleberry Mountain Fire Lookout	Listed in 1983	T:48N R:114W S:31	1967 (Wyoming Recreation Commission)

Chapter 4. Survey Methodology

This chapter provides an overview of the research design and archaeological methods utilized in the survey and evaluation of archaeological sites in the Snake and Lewis River surveys of 2013 and 2014. The methods of archaeological survey and excavation, as well as methods of prehistoric artifact analysis, are described below. In order to help answer the many important questions about the history of the study area, the University of Montana utilized standardized methods of site identification, excavation, and artifact analysis.

Archaeological Survey Methods

The University of Montana archaeological team conducted a systematic surface survey of the project area including all accessible areas along the Snake and Lewis Rivers, or their related canyon rims when not accessible. Groups of four individuals walked in parallel transects along the shore or terrace, extending to 20m intervals, terrain permitting. UM's typical survey width was ca. 40m (130ft). Some areas allowed for several transects to be crossed back and forth, such as open hills or meadows, where others restricted transect width due to vegetation density or terrain constriction.

When archaeological sites were identified, the survey corridor expanded to encompass site limits. When artifacts were identified the team assembled to conduct a detailed examination of the ground surface around the find spot, expanding in all directions to attempt to identify site boundaries. All prehistoric and historic artifacts were marked with pin flags. Site boundaries and artifact findspots or clusters were delineated and recorded using the GPS unit. Field personnel also recorded a field map of the site in relation to major landforms.

Subsequent to discovery, each artifact identified on the ground surface was mapped by field personnel under the direction of the Principal Investigator, Field Director, and/or the graduate student teaching assistant using forms created for the project. Each cluster of artifacts or individual artifact—depending on lithic or historic artifact density—was photographed in the field and located with the GPS unit. The artifact cluster or individual artifacts were described in field notes and on field GPS log forms to facilitate an overall count of artifacts at the site and to characterize lithic artifact types and materials. Students also recorded attributes such as artifact type, dimensions, color, and raw material for these surface identified artifacts. Diagnostic artifacts were collected for analysis and to help characterize the ages of the sites. Each diagnostic artifact collected in the field received a unique field specimen (FS) number linked to its provenience within the site. Locations of all findspots, including diagnostic and collected artifacts, were marked on field maps. If the artifact was collected, the provenience and descriptive information was recorded on an FS log and upon the plastic collection bag for each artifact. This survey was conducted as low impact, and thus subsurface testing was minimal, and collections were only made if the artifact was diagnostic, sourcable to a unique geochemical signature, or was culturally or geographically unique, such as the orthoquartzite bifaces at SLS-54.

Artifact Analysis Methods

Three main types of artifacts were observed during the Snake and Lewis surveys, including flaked stone artifacts (lithics), faunal remains, and historic artifacts. Most historic artifacts were not collected, but were photographed in the field and documented as to possible type and age, with 48YE1268 as the exception where 18 historic artifacts were collected at the cable car site. The vast majority of prehistoric lithic artifacts were also not collected in the field. Diagnostic projectile points, obsidian source and material samples, and occasional other lithic artifacts of interest were collected for analysis and sourcing. Lithic scatters were recorded in the field as to lithic raw material type and tool type. These areas of lithics were mapped onto the site planview and recorded on a GPS log.

As with many of the sites in Yellowstone, lithics dominated the artifact assemblage. As discussed above, the vast majority of artifacts observed in the field were not collected, but

Chapter 6. Conclusions and Summary

In total the University of Montana surveyed over 60 km of the Snake and Lewis River Valleys. Survey covered river shoreline and canyon rims, revealing 54 total sites and resurveying 48YE1268. 48YE418 was also previously identified, and the University of Montana expanded its site boundaries. Seventeen isolated finds were also documented, consisting of singular lithic artifacts and hearths of unknown age.

Summary of Findings and Recommendations

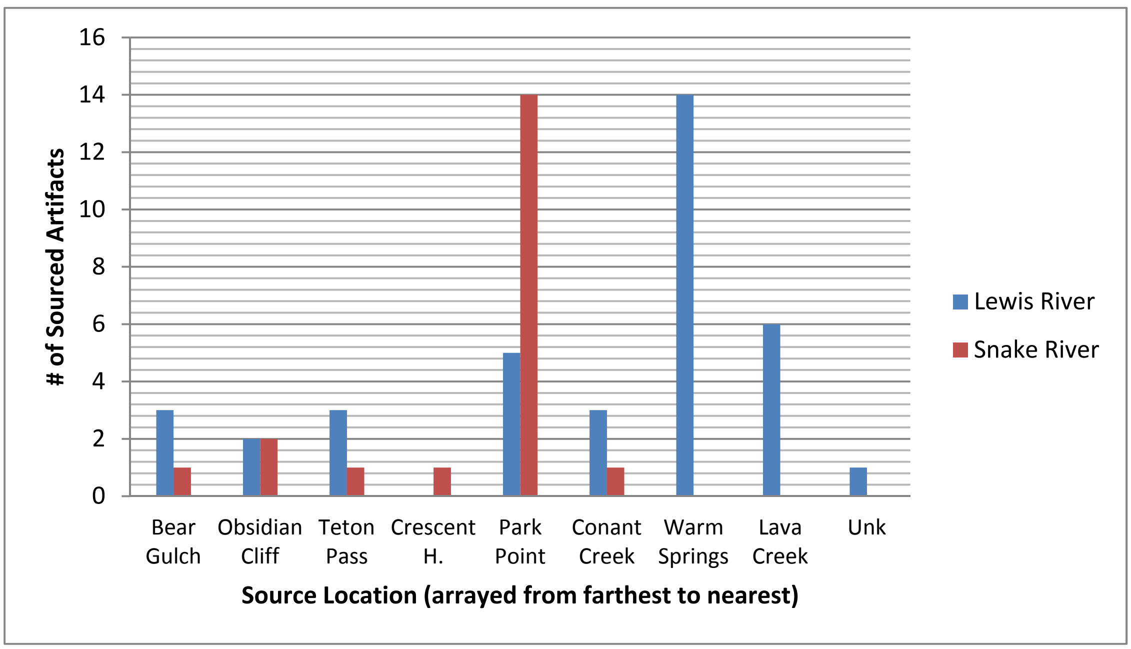
Of the total 54 sites recorded by the University of Montana in 2013 and 2014, 4 are historic sites, 45 are lithic scatters, and 5 are multicomponent sites. In addition, 3 outcroppings of obsidian (SLS-10, 13 and 21) and one of orthoquartzite (SLS-10) were identified along the Lewis River, and two natural obsidian specimens were observed on the Snake River. STP's were conducted at four locations: SLS-12 and SLS-28, as well as non-site locations in the Lewis Canyon and Lewis Falls area. Subsurface finds were insignificant or non-existent. 48YE1268, originally a lithic scatter, was reevaluated and found to contain the remains of a historic cable car. Eighteen artifacts were collected from this location, with dates dating to 1930 and earlier. Aside from this site, no other historic collections were made. Other historic sites were primarily quarries or hearths.

Site information and recommendations for the 54 sites and isolated finds are listed in Table 76. Three sites were identified as eligible for NRHP listing. In addition, 48YE1268 is also recommended eligible in light of reevaluation. SLS-42 (48YE418) was also previously recorded, and the Paleoindian point found there, the many Park Point artifacts, and the expansion of the site boundaries during the 2014 survey suggest this site has a very high potential for future research. There is also potential evidence of prehistoric habitation nearby at SLS-43. The other two sites eligible for NRHP listing under criterion D are SLS-16 and SLS-18. These two sites are less than 500m from each other, but contained all of the diagnostic artifacts found on the Lewis River, which spanned ages from around 11,000 ybp to 1500 ybp. Four sites were deemed not eligible, two historic quarries and two negatively tested sites, SLS-12 and SLS-28. No isolated finds are recommended for future research, although the biface at IF-10 was collected.

SLS-21(48YE2224)	88	Flake	1	Teton Pass
SLS-21(48YE2224)	89	Core	2	Lava Creek?
SLS-21(48YE2224)	90	Tested cobble	2	Lava Creek?
SLS-29 (48YE2231)	91	Flake	1	Warm Springs
SLS-29 (48YE2231)	92	Flake	2	Park Point
SLS-29 (48YE2231)	93	Flake	2	Park Point
SLS-29 (48YE2231)	94	Flake	3	Obsidian Cliff
SLS-29 (48YE2231)	95	Flake	3	Warm Springs
SLS-29 (48YE2231)	96	Flake	4	Conant Creek
SLS-29 (48YE2231)	97	Flake	4	Warm Springs
SLS-29 (48YE2231)	98	Flake	5	Bear Gulch
SLS-29 (48YE2231)	99	Flake	5	Bear Gulch
SLS-29 (48YE2231)	100	Flake	6	Bear Gulch
SLS-29 (48YE2231)	101	Flake	6	Park Point
SLS-29 (48YE2231)	102	Flake	6	Park Point
SLS-29 (48YE2231)	103	Tested cobble	7	Lava Creek
SLS-34 (48YE2236)	104	Flake	1	Lava Creek?
SLS-34(48YE2236)	105	Flake	2	Warm Springs
SLS-34(48YE2236)	106	Flake	3	Lava Creek
SLS-34(48YE2236)	107	Flake	4	UNK
SLS-34(48YE2236)	108	Flake	5	Park Point
SLS-34(48YE2236)	109	Flake	6	Warm Springs
SLS-34(48YE2236)	110	Flake	6	Lava Creek?
SLS-34(48YE2236)	111	Flake	7	Warm Springs
SLS -10 (48YE2213)	CC1	Nat.	5	Lava Creek
SLS -10 (48YE2213)	CC2	Nat.	4	Lava Creek
SLS -10 (48YE2213)	CC3	Nat.	11	Lava Creek
SLS -10 (48YE2213)	CC4	Nat.	13	Lava Creek
SLS -10 (48YE2213)	CC5	Nat.	13	Lava Creek
SLS -10 (48YE2213)	CC6	Nat.	18	Lava Creek
SLS -10 (48YE2213)	CC7	Nat.	19	Lava Creek
SLS -10 (48YE2213)	CC8	Nat.	22	Lava Creek
SLS -10 (48YE2213)	CC9	Nat.	23	Lava Creek
SLS -10 (48YE2213)	CC10	Nat.	24	Lava Creek
SLS-21(48YE2224)	L1	Nat.	1	Lava Creek
SLS-21(48YE2224)	L2	Nat.	2	Lava Creek
SLS-21(48YE2224)	L3	Nat.	3	Lava Creek
SLS-21(48YE2224)	L4	Nat.	1	Lava Creek
SLS-21(48YE2224)	L5	Nat.	2	Lava Creek
SLS-21(48YE2224)	L6	Nat.	2	Lava Creek
SLS-21(48YE2224)	L7	Nat.	3	Lava Creek
SLS-21(48YE2224)	L8	Nat.	3	Lava Creek
SLS-21(48YE2224)	L9	Nat.	4	Lava Creek
SLS-21(48YE2224)	L10	Nat.	4	Lava Creek
2014 Snake River				
Site#	**XRF#**	**Type**	**FS#**	**Source**
SLS-2014 Red	1	Nat.	-	Park Point
SLS-2014 Red	2	Nat.	-	Park Point
SLS-2014 Red	3	Nat.	-	Park Point
SLS-2014 Red	4	Nat.	-	Park Point
SLS-41 (48YE2248)	5	L. prehistroic Pt.	1	Obsidian Cliff
SLS-42 (48YE418)	6	Early Reduc.	1	Park Point
SLS-42 (48YE418)	7	Flake Frag.	2	Obsidian Cliff

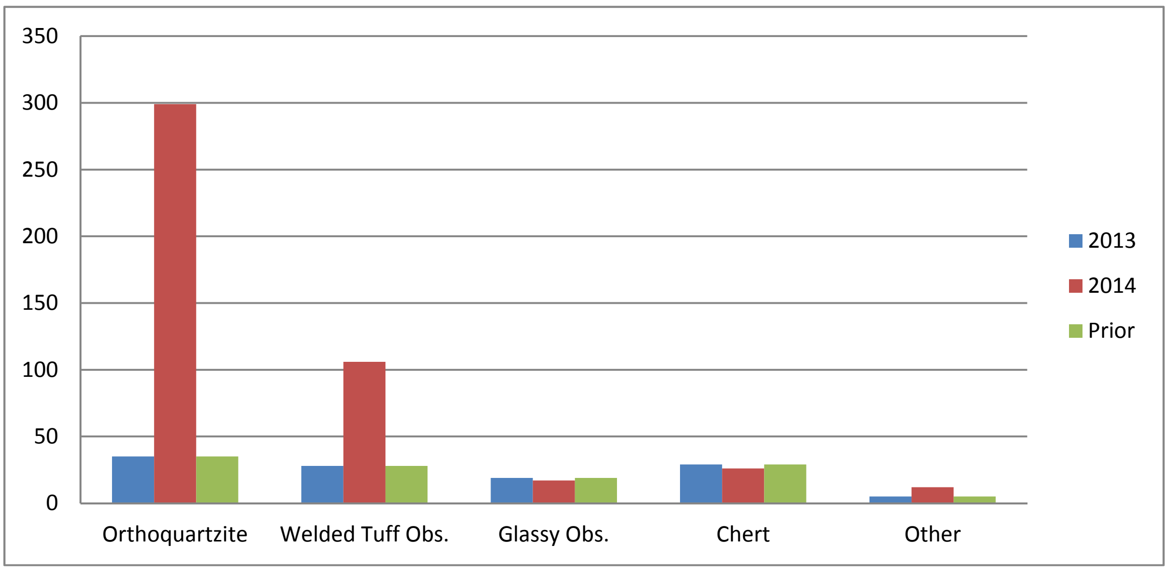
SLS-42 (48YE418)	8	Early Reduc.	3	Park Point
SLS-42 (48YE418)	9	Flake Frag.	4	Park Point
SLS-42 (48YE418)	10	Freehand Core	5	Park Point
SLS-42 (48YE418)	11	Biface Reduc.	6	Park Point
SLS-42 (48YE418)	12	Biface Reduc.	7	Park Point
SLS-42 (48YE418)	13	Decort. Flake	8	Park Point
SLS-42 (48YE418)	14	Ind. Biface	8	Crescent H.
SLS-42 (48YE418)	15	Paleo Pt.	12	Park Point
SLS-46 (48YE2252)	16	L. prehistroic Pt.	1	Teton pass
SLS-54 (48YE2260)	17	Flake Frag.	2	Park Point
SLS-54 (48YE2260)	18	Biface Reduc.	4	Conant Creek
SLS-54 (48YE2260)	19	Biface Reduc.	5	Bear Gulch
SLS-54 (48YE2260)	20	Biface Reduc.	6	Park Point
SLS-54 (48YE2260)	21	Early Reduc.	6	Park Point
SLS-54 (48YE2260)	22	Early Reduc.	7	Park Point
SLS-54 (48YE2260)	23	Ind. Flake	7	Park Point
SLS-54 (48YE2260)	24	Early Reduc.	10	Park Point

Figure 62. Summary of EDXRF Results for the Snake and Lewis Rivers (Corresponds with year)



Looking at the material types used for lithic tool production also reveals patterns in tool stone preference in the Snake and Lewis Valley's. Most regions of Yellowstone National Park show evidence of a heavy reliance on Obsidian Cliff material and chert, however this survey reveals quite the opposite. Since collections were minimal, the data summarized in Figure 63 is primarily based on photographs, site forms and GPS logs. However, the many dissimilarities between welded tuff obsidian and high quality glassy obsidian make their distinction possible. It is clear that orthoquartzite is a primary source according to current and passed research, and that low quality local obsidian is generally present where glassy obsidian is not. A further mixture of chert, petrified wood, chalcedony and moss agate are also present. Figures 64, 65 and 66 break down Figure 63 into its components to alleviate bias based on sheer artifact counts

Figure 63. Summary of Material Types for all Lithic Artifacts (including past research)



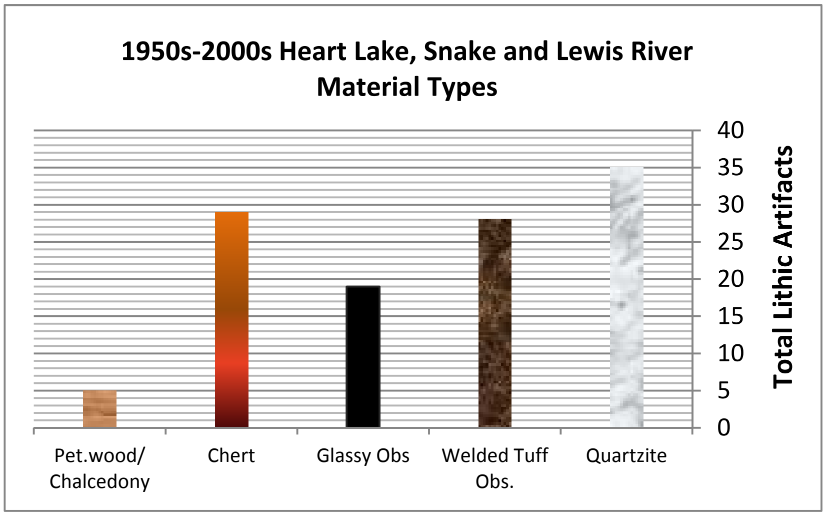


Figure 64

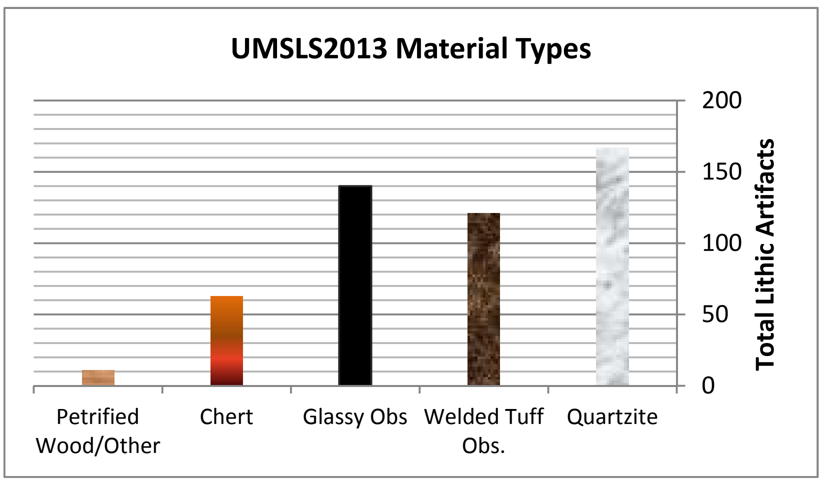


Figure 65

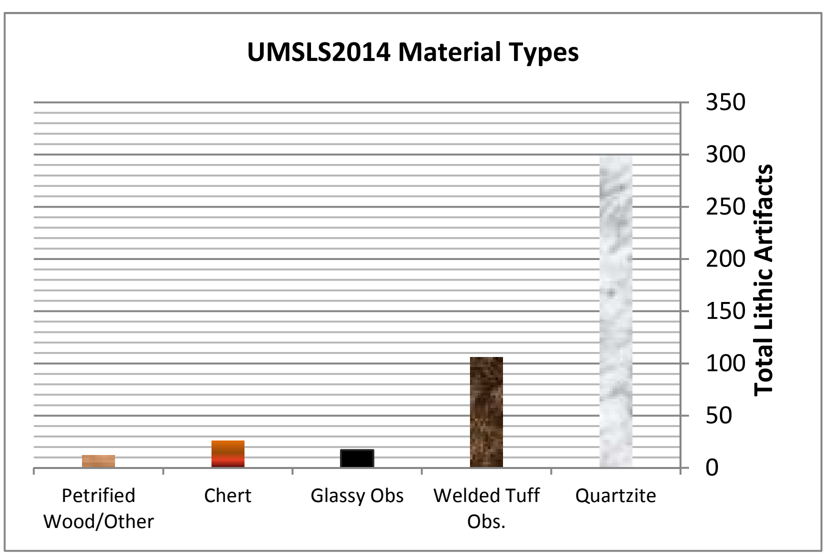


Figure 66

Conclusion

The Snake and Lewis River Survey and Snake Headwaters Project are the result of the Wild and Scenic Rivers designation and NRHP section 110 inventory. In 2013 and 204 the Montana surveyed about 64.5km (40 miles) km of the Snake and Lewis River Valleys. The 2015 field season hopes to address the remaining 6km (3.7 mi) on the southern bank of the Snake River between backcountry campsite 8C6 and Coulter Creek. With this completed, approximately 27km (17mi) of the Snake River Still remain unsurveyed within the park. These upper reaches of the Snake River continue to exhibit evidence of intermediate terraces and river meanders creating high potential site locations such as those found elsewhere in the survey area.

Survey covered river shoreline and canyon rims, revealing 54 total sites and resurveying 48YE1268. 48YE418 was also previously identified, and the University of Montana expanded its site boundaries. Seventeen isolated finds were also documented, consisting of singular lithic artifacts and hearths of unknown age. Three sites as well as 48YE1268 with the cable car are recommended eligible for NRHP listing, and four sites four sites were determined not to be eligible. Two of the four considered ineligible were tested with shovel pits, and the other two are historic gravel pits that lack integrity, craftsmanship and potential for future research.

The two field seasons conducted along the Snake and Lewis Rivers revealed several interesting prehistoric patterns, and showed many natural and cultural differences between this area and other regions of Yellowstone National Park. EDXRF sourcing by Richard Hughes revealed two outcroppings of Lava Creek Tuff obsidian, with a base source from Grassy Lake, south of the park. In addition, sourcing showed a heavy local reliance on Warm Springs, Teton Pass and Park Point obsidian. However, more traditionally thought of sources such as Bear Gulch and Obsidian Cliff were also present. Orthoquartzite was by far the most common tool stone, followed by varieties of welded tuff obsidian. However, a large variety of stone such as chalcedony, petrified wood, chert and moss agate were also employed, showing a large regional diversity not seen in the north of Yellowstone National Park.

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