For describing the terrain encountered during this inaugural survey, the geologic zones of the Teton Range were categorized into two generalized groups: sedimentary and granitic. The sedimentary category includes (but is not limited to) Paleozoic Madison Limestone and Bighorn Dolomite and is found primarily in the northern and southern portions of the Tetons. The granitic category is composed of Precambrian Granite, Gneiss, and Monzonites and occurs primarily in the central to north-central portions of the Tetons (Love, Reed, and Pierce 2003). In some circumstances Precambrian layers are topped with Flathead Sandstone — it is at this contact that steatite (a.k.a. soapstone), an important resource for prehistoric peoples, occurs and was routinely quarried for late-prehistoric bowl, pipe, and bead production (Adams 2003, 2004, 2006, 2010). Other prominent lithic resources in the Tetons include several obsidian sources, ignimbrite, high quality chert, and occasional sources of Flathead sandstone and quartzites.

Previous research in the Tetons

Research focusing on the prehistoric utilization of the high Teton Range has occurred sporadically over the past 40 years. Due to the format of this research report we will not go into much detail regarding past work in the Tetons, although this work played a crucial role in conceptualizing alpine archaeology on a global scale. In the 1970s, several high-altitude surveys and some excavations were conducted in the northwest Tetons by Love (1972), Wright (1977, 1978, 1984, Wright, Bender, and Reeve 1980), Bender (1978), and Marceau (1978) to determine a basic chronology of alpine occupation and to develop a broad-spectrum subsistence model for the range (Bender and Wright 1988, Wright 1980, Cannon, Bringelson, and Cannon 2004, Connor 1989). This initial work was the first in the Tetons and Wyoming to suggest that entire families resided seasonally in the alpine zone and that extreme vertical topography was not a hindrance to prehistoric mobility (Bender and Wright 1988, Wright 1984). This work, in particular Bender (1981), was also instrumental in identifying a dense plant-based resource pool in alpine basins that were previously thought to be low in subsistence opportunities.

After the work of Bender and Wright, only a few projects in Teton County have focused on high-altitude occupations. Some Section 106 compliance surveys were carried out by Connor (1991a, 1991b) and Reher (2000) which focused on the impact of alpine archaeological sites by modern hiking trails and campsites. Additionally, several of Bender and Wright's sites have occasionally been monitored and revisited by Midwest Archaeological Center, Grand Teton National Park, and Caribou-Targhee National Forest archaeologists. In recent years, only a few question-oriented projects have been conducted in the high Tetons which include studies on prehistoric steatite usage (Adams 2003, 2004) and site patterning on the Eastern slope of the range (M. Peterson, personal communication). As with the early work, the more recent projects have similarly concentrated on the northern portions of the range.

Altogether, the previous alpine archaeological research conducted in the Teton Range has demonstrated that family groups frequented the alpine ecotone for at least 10,000 years and utilized a wide range of lithic and subsistence resources. This research offers a detailed framework for understanding Teton prehistory and solid foundation for future research. However, given that only a small sample (approximately less than 30%) of the range has currently been surveyed, our knowledge and interpretations of past Teton usage remains in its infancy.

✦ TETON ARCHAEOLOGICAL PROJECT 2014 SEASON

In the summer of 2014, project directors from the Jackson Hole Historical Society and Museum along with five student volunteers from the University of Wyoming and University of Montana conducted two high-elevation surveys in the Teton Range. Unlike traditional archaeological projects, the remote nature of this wilderness survey necessitated small amounts of equipment and technology that are suitable for camping (see Adams et al. 2014, Morgan 2014, Stirn 2014a). With the aid of horses and professional outfitters the team was able to travel efficiently and investigate a variety of alpine basins, passes, and ice-patches in the southern and central Tetons. In total the team covered 1,923 acres, recorded 28 new archaeological sites, reevaluated five previously recorded sites, and investigated 7 ice-patches for organic material culture. The results of this project will be presented chronologically by time period.

✦ SURVEY RESULTS AND INTERPRETATIONS

Paleoindian Period

During the 2014 survey, the team recorded two Paleoindian sites, 48TE1926 and 48TE1934.

TE1926 is multicomponent site (see Late Prehistoric section) located just above tree line amongst alpine tundra, ample Whitebark Pine, and a series of alpine lakes. At this site the team collected the base of a James Allen type projectile point (c. 8,000 BP: Drager and Ireland 1986:587) and the midsection of a non-diagnostic obsidian point with ground margins and parallel oblique flake patterning. Site TE1934 is located on the southern slope of an exposed peak near 10,000 feet and here the team collected a single Alberta style Cody Complex projectile point (c. 9,000BP: Drager and Ireland 1986:586; Figure 1).

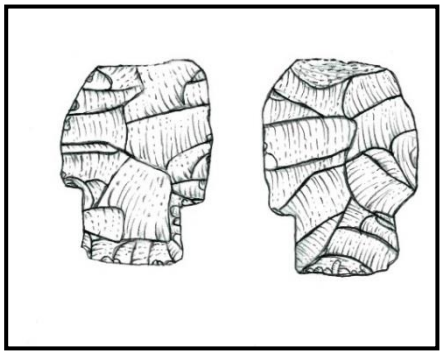

Figure 1. Paleoindian Alberta Projectile Point From TE1934.

The three Paleoindian era projectile points recorded this season do not lend themselves to detailed interpretation. The Alberta point is among the earliest artifacts found in the high Tetons but is not particularly surprising given the abundance of Cody complex sites in Jackson Hole, Wyoming (Connor 1988, Page and Peterson 2015) and Teton Valley, Idaho (Sgouros and Stirn 2015). According to Whitlock (1993:191) the period between 10,500 − 9,000 BP in the Teton region is characterized by the onset of warm-dry conditions and the generalized establishment of sub-alpine forests. It is likely that during this time, due to reduced snowpack, the Teton Range became more accessible and could have offered several routes between Wyoming and Idaho with a higher abundance of alpine plant and animal resources than was found in the Late Pleistocene. At this point in our research, however, not enough data on the Paleoindian use of the Tetons has been acquired to move beyond basic speculation.

Archaic Period

In total, three Archaic era sites were recorded with projectile points dating from the Early Archaic (c. 7,500 − 5,000) and Late Archaic Periods (c. 3,000 − 1,400 BP). Site TE1928 contained one white chert Early Archaic Elko Corner Notch projectile point (Drager and Ireland 1986:591) located near 9,000 feet in a large, marshy alpine meadow on the Western slope of the Tetons. Site TE 1937 contained several pieces of groundstone, end scrapers, a quartzite Northern Side Notched style and quartzite Elko Corner Notch projectile point (Drager and Ireland 1986:587,591) located on a pass near 10,000 feet. Site TE1923 is located next to a large sub-alpine lake and contained several hundred non-diagnostic artifacts, two biface fragments, one obsidian Late-Archaic Pelican Lake style point (Drager and Ireland 1986:589) and Late-Prehistoric period artifacts (see below).

Bender (1983) and Wright (1984) recollect that the majority of sites they recorded in the northern Tetons were from the Archaic period. While the results of the 2014 Teton Archaeological Project do not display a higher number of Archaic sites, the preliminary data does suggest a broader utilization of the mountains during this time. Whereas every Paleoindian site recorded in the Teton high country thus far is characterized by isolated projectile points, many Archaic sites display superficial evidence of a longer-term occupation and wider activity range through the occurrence of fire-hearths, a variety of formal tools, groundstone, and denser lithic scatters (see also Bender and Wright 1988, c.f. K. Cannon, Bringelson, and Cannon 2004). In the nearby Wind River Range, the occurrence of groundstone at Archaic and Late-Prehistoric sites have been associated with the processing of Whitebark Pine nuts and as evidence of longer-term seasonal occupations (Adams 2010, Stirn 2011, 2014b). Whitlock (1993) notes that the period in the Tetons between 9,000 − 5,000 BP was characterized by drier conditions and a rise in the elevation of tree line (corroborated by our icepatch study results, see below). Given these climatic trends it is not surprising that the mountains experienced a more sustained utilization by humans during the Archaic period. The economic intensity and activities related to the Archaic period, however, remain uncertain and will require question-based testing and additional research.

Late Prehistoric Period

During the 2014 season the TAP team recorded eight new Late-Prehistoric sites (c. 1,400 − 250 BP) and re-evaluated one that was recorded previously by Marceau (1978). Of the newly recorded sites, TE1927 is located near an alpine lake at 9,000 feet and consists of a dense lithic scatter and single obsidian Late-Prehistoric side-notched projectile point. TE1923 (see previous section for environmental description) contains primarily Archaic artifacts with the exception of one Late-Prehistoric era soapstone

bowl preform (Figure 2). Sites TE1935 and TE1940 are located on an exposed alpine shelf at near 9,200 feet and consist of dense obsidian lithic scatters with one late-prehistoric side notched projectile point at each site.

Site TE1925 is located in an alpine basin just above treeline. This site covers over 500 square meters and consists of a dense lithic scatter of obsidian, chert, Wiggins Fork petrified wood, basalt, and quartzite. Several formal artifacts were recorded at this site including a late-prehistoric obsidian projectile point and pieces of at least three broken soapstone vessels. Additionally, two possible residential structures (a.k.a. lodge pads -- Adams 2010, Stirn 2014b) were recorded at the site.

Figure 2. Soapstone Bowl Preform from TE1923.

Site TE1926 is located 1 km South of TE1925 and is located just above treeline near several springs and streams. This site provided evidence of several occupations including Paleoindian (see above section) and Late-Prehistoric. This large site covers approximately 6,000 square meters and consists of a dense lithic scatter of obsidian, chert, Wiggins Fork petrified wood, ignimbrite, basalt, and quartzite. Several formal obsidian tools were recorded including two bifaces and a Cottonwood Triangular projectile point. Additionally, the team recorded several pieces of soapstone debitage, one soapstone bowl fragment, and a complete soapstone vessel that was cached between two large granite boulders (See Figure 3). One possible residential structure was also recorded.

Site TE1942 is located in the central Tetons in a sub-alpine pine forest above 9,000 feet and covers 3.2 square kilometers along a mountain stream. This site consists of an extremely dense lithic scatter of various materials including obsidian, ignimbrite, quartz crystal, petrified wood, chert, quartzite, and basalt. The team recorded several formal tools including quartzite end-scrapers, quartzite and chert bifaces, basalt and granite groundstone, and two obsidian late-prehistoric side notched projectile points. The team also recorded two abraded soapstone pebbles and one nodule of red ochre.

Site TE 1943 is located just upstream from TE1942 and consists of a small soapstone workshop located above 9,000 feet in a small alpine cirque. The team recorded fragments of four separate soapstone vessels including one with a repair hole (see Adams 2006, 2010), and, a preform of an unfinished soapstone vessel.

Figure 3. Cached Soapstone Bowl from TE1926.

In addition to recording new Late-Prehistoric sites, the TAP team reevaluated TE 557 and TE 654 which had previously been recorded by Marceau (1978). Upon examination it was determined that both sites are not unique and are instead part of one large archaeological site located on an alpine shelf near 10,000 feet. Here, the team recorded a dense lithic scatter of obsidian, chert, quartzite, and basalt, and, an obsidian Archaic Pinto Basin style and obsidian Late Prehistoric side-notched projectile point. The team also recorded four pieces of burned non-diagnostic long bone and a ceramic scatter consisting of 18 pieces (representing at least three separate vessels) of Intermountain Style pottery (Finley and Boyle 2014, Mulloy 1958). This marks the first known example of pottery in the high Tetons (Figure 4).

Figure 4. Ceramic Fragment from TE 557/654

The Late Prehistoric period at high-elevations in the Rocky Mountains and Great Basin is typified by the occurrence of residential structures and alpine villages (Adams 2010, Bettinger 1991, Morgan, Losey, and Adams 2012, Stirn 2014b, Thomas 2013). These features have been interpreted as evidence towards an intensification of mountain resources (Morgan, Losey, and Adams 2012) and in the Wind River Range display a site patterning likely related to the optimal procurement of Whitebark Pine nuts (Stirn 2014b). At several alpine villages the co-occurrence of residential architecture, Intermountain style pottery and soapstone artifacts have been interpreted as culturally affiliated to the Mountain Shoshone (Adams 2010, Stirn 2015tb, c.f. Larson and Kornfeld 1994). Because only two possible village sites were recorded in the Tetons, there is not enough data to approach questions related to site patterning or cultural affiliation. The discovery of several new Late Prehistoric sites, possible residential structures, soapstone workshops, and pottery does, however, provide a fresh perspective of Teton occupation between 2,000 BP and modern day. While the Tetons have long been considered important to Late Prehistoric cultures for soapstone acquisition (Adams 2003, 2004, Marceau 1978), the extent of occupation and resource acquisition during this period has remained unclear. Because of the lack of Late-Prehistoric sites he identified, Wright (1984), for example, suggested that Jackson Hole and the Teton Range experienced a hiatus in utilization during this time. The discoveries made during the 2014 season offer a more detailed glimpse into the Late Prehistoric period and suggest that in a similar fashion to the nearby Absaroka and Wind River Ranges, the Tetons were used intensively throughout the past 2,000 years. To more fully understand the economies underlying late prehistoric sites in the Tetons it will be necessary to conduct further question-based research such as site location modeling (see Stirn 2014b) and dietary analysis from lipid residue and archaeobotanical analyses.

✦ ICE PATCH SURVEYS AND RESULTS

Throughout the past decade warming temperatures in the Rocky Mountains have led to the discovery of several preserved-organic artifacts (e.g. Andrews, Mackay, and Andrew 2012, Lee 2012, Lee et al. 2014, Reckin 2013) and paleobiological specimens (e.g. Benedict et al. 2008) thawing from permanent snow and ice patches. Whereas the majority of the prehistoric archaeological record in North America is represented by lithic artifacts, the rare occurrence of organic (wood, cloth, twine, etc.) provides a unique glimpse into obscure aspects of ancient life. Additionally, non-archaeological specimens (e.g. wood, trees, plants) offer valuable information regarding past environmental and ecological changes such as temperature, precipitation, and species development. Given the increase in seasonal temperatures worldwide during the past several decades, ice patches are melting at an unprecedented rate (Lee 2012, Lee et al. 2014). When organic artifacts or paleobiological specimens are exposed, they quickly begin to decompose due to increased oxidization and desiccation. As organic material is being exposed at an increasing rate, it is important that ice patches and permanent snowfields are continuously investigated for archaeological and paleobiological remains.

Following several years of productive research in Yellowstone and Glacier National Parks, Lee (2014) developed a predictive model for the Greater Yellowstone Ecosystem of ice-patches that are quickly thawing and are likely to contain cultural and/or paleobiological material. This model targeted areas that receive little solar radiation and are situated in areas likely to have been frequented by past humans (Lee et al. 2014). While this model has previously been tested and proven successful in the Absaroka and Wind River Ranges (R. Kelly - Personal Communication), its applicability for the Tetons has remained unexplored. During the 2014 season, the TAP team investigated five ice patches and snowfields identified by Lee's model, two of which contained organic specimens. Ice patch PL4 is located at 10,000 feet near an alpine pass and contained one non-diagnostic large mammal long bone. This specimen was photographed and recorded but was not collected for species identification or radiocarbon dating. Ice patch PL1 is located at 10,200 feet in Caribou-Targhee National Forest on an exposed alpine slope. Two pieces of wood were collected from the fore field of PL1 and were AMS dated to 6040+/-127 BP (D-AMS 008937) and 2749+/-25 BP (D-AMS 008938) (Figure 5). The Early Archaic specimen is non-cultural and is likely the bark of a high-altitude pine. The Late Archaic specimen appears to be modified (cut) but is not an obvious tool or artifact. Both specimens are currently being submitted for species identification and the results will be presented in a future publication.

The results of this study are significant as they show that ice patches have remained preserved in the Tetons for at least 6,000 years and, that Lee's (2014) predictive model is successful in the Teton Range. The occurrence of pine *(Pinus sp.)* at 10,300

feet (above modern tree line) during the Early Archaic period coincides with Whitlock's (1993; c.f. Mensing et al. 2012) palynological data which suggests that tree line rose substantially during this period. This data helps to place Archaic era sites in the high Tetons within a more accurate ecological context. As more organic cultural and paleobiological specimens are discovered in future seasons, the Tetons could become an important contributor to regional ice patch archaeological studies.

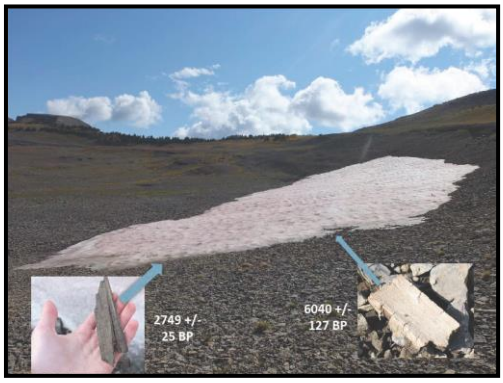

Figure 5. Icepatch PL_1 and Recovered Wood Specimens

Lipid residue analyses

A high resolution of data regarding diet and paleoeconomics in the Tetons is important to our interpretations and understanding regarding past life at high elevations. While there currently exist numerous hypothesis based upon theoretical patterns (e.g. Losey 2013, Morgan, Losey, and Adams 2012) and spatial modeling (e.g. Benedict 1992, Stirn 2014b), most interpretations of prehistoric alpine economies are preliminary and require additional scientific evidence. Lipid residues (fatty acid chains) offer an excellent marker for reconstructing past diets as they are species specific, can be analyzed as compounds, and often survive better than other biomolecules such as proteins or starches (see Regert et al. 2003). Moreover, recent developments in lipid residue analyses are non-destructive and can be accomplished through a solution bath and ultrasonic vibrations (M. Malainey — Personal Communication).

During the 2014 season, the TAP team collected eleven samples from Caribou Targhee National Forest consisting of groundstone, quartzite projectile points, and soapstone to be submitted for non-destructive lipid analysis at Brandon University. The goals of this study are to determine the survivability of absorbed lipid residues within surface artifacts and to test their effectiveness in identifying prehistoric food sources to the species level. The results from this testing remain incomplete and will be presented in a future publication. If successful it is believed that absorbed lipid residues will provide a detailed dietary record for the prehistoric occupants of the Teton Range.

✦ CONCLUSIONS

During the 2014 field season the Teton Archaeological Project recorded 28 archaeological sites along the Teton Crest in Caribou-Targhee National Forest and Grand Teton National Park. The data acquired from these preliminary surveys provide congruent evidence towards previous research in the Teton Mountains and suggest that the alpine zone in this region was utilized extensively and consistently from at least 9,000 BP. The identification of several new Late Prehistoric sites, soapstone workshops, and Intermountain-style ceramics offer new information regarding recent occupations of the Tetons and suggest that they were utilized to a similar extent as other mountain ranges in Northwestern Wyoming. The recovery of two pieces of Archaic era wood from a high-elevation ice patch demonstrate that snow fields and ice patches in the Tetons have remained intact for at least 6,000 years. The data acquired from these specimens also support existing paleoenvironmental models of the Tetons suggesting that tree line rose substantially during the Archaic period and few sites at this time would have been located in the true alpine zone. In total the archaeological and paleobiological information acquired during the 2014 season offers a fresh glimpse into the Tetons' past and provide a foundation for future work. The TAP team looks forward to continuing work in the summer of 2015 with expanded objectives and hopes to further unravel the story of the Tetons.

✦ ACKNOWLEDGEMENTS

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