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Reassessing the role of Mount Edziza obsidian in northwestern North America

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ABSTRACT

Mount Edziza is a major source of obsidian in the northwest of British Columbia, Canada. Its high quality of material, number of flows and range of use rival other large obsidian sources in North America. Previous research documented its use over an area of 1000 km^2 and earliest use over 10,000 years ago. Original XRF analysis indicated that only three out of its ten flows were used by pre-contact populations. This research confirms earlier work, but also demonstrates the use of other flows in the Mount Edziza volcanic complex and preferential exchange in and between Athapaskan speaking peoples surrounding the source and movement of material from only one flow to coastal areas.

1. Introduction

Across the northwest of North America previous archaeological research found that the use of Mount Edziza obsidian occurs over the past 10,000 years and spans an area over 1000 km^2 (Ackerman, 1968, 1996a,b; Carlson, 1994; Dixon, 2012; Fladmark, 1984, 1985, 2009; Godfrey-Smith, 1985; Lee, 2001, 2011; Reuther et al., 2011). Even in modern times, Mount Edziza is difficult to access as it is a stratovolcano that is 2787 m high and only accessible in the Summer to early Fall months, via trail from the town of Telegraph Creek or by floatplane/helicopter (Fig. 1). Previous research in the regions surrounding Mount Edziza indicate that obsidian from this and other sources played an important role in cultural interaction spheres that ran along the coast and up and down trial and river systems in interior regions (Ames and Maschner, 1999: 165–176; Carlson, 1994; James et al., 1996; Nelson et al., 1975; Fladmark, 2009). While the extensive Mount Edziza volcanic complex is known to have 10 distinctive flows of obsidian, previous sourcing studies found that only three were used (Godfrey-Smith, 1985). This limited use of Mount Edziza obsidian flows has led many researchers to presume that the artifacts they analyze, showing a Mount Edziza signature, derive from one of these three flows. Problematic to these interpretations is the lack of statistically comparative data for all the obsidian flows in the Mount Edziza volcanic complex (Fladmark, 1984, 1985; Godfrey-Smith, 1985). Additionally the number of archaeological examples from across the study region, 58 artifacts from 26 sites is equally sparse (Carlson, 1994). This results in broad-brush spatial and temporal patterns and long held assumptions. This being the long-standing case of archaeological understanding regarding this large and important source of obsidian and it demonstrates that the local Tahltan First Nation group either ignored or did not have control over who could access and use these materials. However, if it can be shown that more than three Mount Edziza obsidian flows were used, would suggest that the Talhtan knew much more about the obsidian sources and exerted some or all of the control of their use and distribution. This study uses X-ray fluorescence (pXRF) in the field and lab to characterize and reevaluate the use and extent of multiple obsidian flows from the Mount Edziza volcanic complex in northwestern British Columbia Canada (Fladmark, 1984, 1985; Souther, 1988; Souther et al., 1984). For the purposes of this analysis, the study region is defined as southern Yukon Territory, the northern sections of the provinces of Alberta and British Columbia, Canada and the coastal regions of southeastern Alaska of the United States (Fig. 1). In this analysis, it is presumed that access or exchange of Mount Edziza obsidian was for non-locally available materials. Since current archaeological method has difficultly separating the material consequences of material culture patterning on a regional scale as either being the result of mobility or exchange, consideration of these factors here is considered as mutually exclusive. In archaeological sites across northwestern North America, obsidian that is not locally available is considered an exotic material. For ancient populations obsidian represented something that originates from a distant place and combined with its physical properties brands it as a valued material. In this regard to sheer size and extent of the Mount Edziza volcanic complex, the number of obsidian flows and the role they have played in the archaeological record since the early Holocene deserve renewed attention.

2. Materials and methods

Many obsidian quarries are documented across Mount Edziza volcanic complex and are noticeable as densely concentrated carpets of

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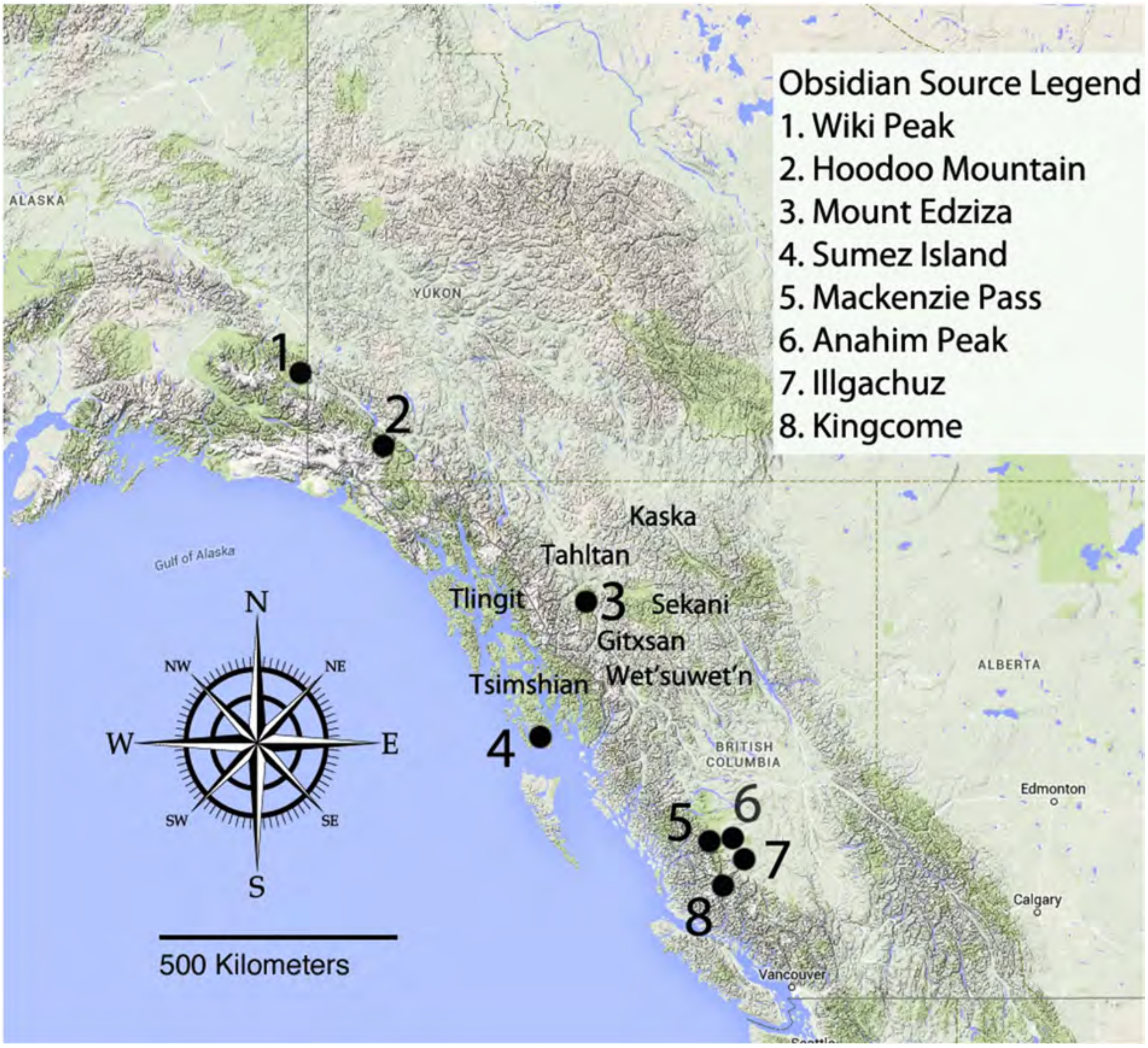

Fig. 1. Location of obsidian sources and cultural groups.

volcanic glass occurring at elevations 1800–2000 m asl where suitable knapping material directly weathers out from bedrock flows (Figs. 2 and 4). Ancient use of Mount Edziza focused on higher elevation quarries since material at these locations occurs in larger and easier to work nodules. Other sites at lower elevations contain less obsidian and extend down creek and river valleys to elevations of 1300 m asl. While widely available materials are found along creek beds at lower elevations, these nodules are quickly broken down by fluvial and alluvial action, making them less desirable for cultural use (Fladmark, 1984, 1985).

Obsidian artifacts collected during earlier fieldwork served as the basis of the earliest investigations into the elemental composition of Mount Edziza obsidians and related them to four larger geological formations (Godfrey-Smith, 1985: 52–55; Nelson et al., 1975: 85–97; Souther et al., 1984). Each flow is exposed at varying locations and elevations across the Mount Edziza volcanic complex, but all occur in the alpine zone (Fig. 2). The largest source associates with the Spectrum Formation and is centered on Goat Mountain (Fig. 2). Five flows linked to the Armadillo Formation and have a similar elemental compositions but occur in variable locations at Coffee Crater, the slopes of Cartoona Peak, Artifact Creek, Destall Pass and the confluence of Artifact and Fan Creeks (Fig. 2). Two flows linking to the Pyramid Formation occur at two outcrops on Pyramid Mountain. Lastly is the Ice Peak Formation exposed as two flows on Sorcery Ridge, near a receding alpine glacier. Earlier XRF analysis of obsidian source materials within the Mount Edziza volcanic complex only included a limited number of grab samples from each source locality (Godfrey-Smith, 1985: 56–84). This analysis also noted that sorting obsidian flows through statistical analysis of Mount Edziza obsidian is best achieved by using iron (Fe), rubidium (Rb), yttrium (Y), zirconium (Zr), and niobium (Nb) (Godfrey-Smith (1985:101).

Therefore, reevaluation of use and extent of Mount Edziza obsidian requires methodological vigor in terms of determining the nature and extent of the use of flows within the complex and sampling materials from sites across the study area. This is done through the examination of newly acquired source samples and comparing these results to previous research. These data are applied to a wide range of archaeological site samples derived from museum collections, materials from a series of Cultural Resource Management (CRM) and recent academic excavation projects. Museum and CRM samples have good spatial context but offer little in terms of temporal associations since they are surface finds or have unclear contextual information. Materials from recent excavations at two village locations of Fraser Lake (Prince, 2013) and Babine River (Rahemtulla, 2012) offer temporal resolution to the study region database. Cumulatively these results offer the most detailed assessment of the largest and most significant obsidian sources

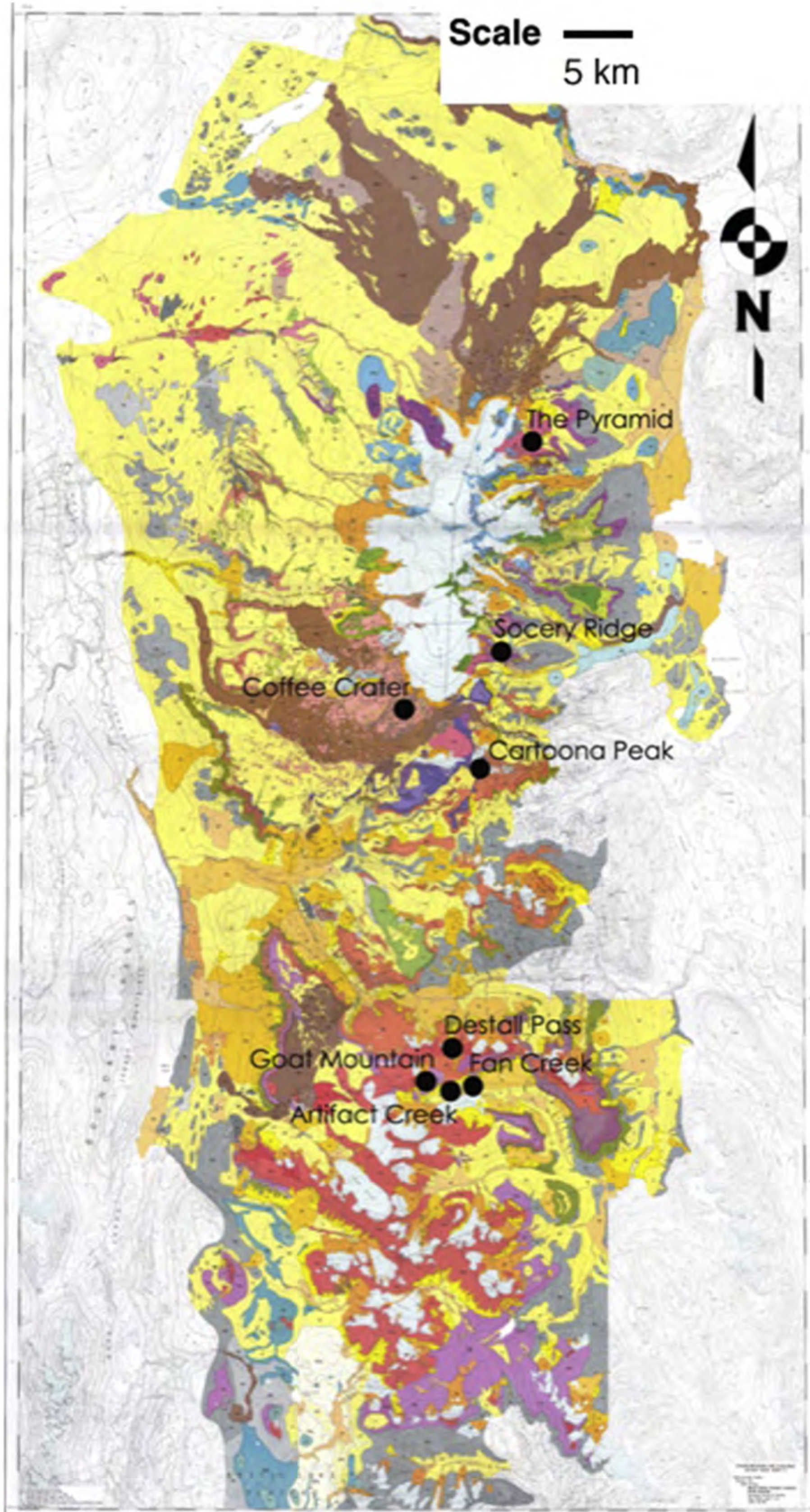

Fig. 2. Location of obsidian flows in the Mount Edziza volcanic complex (modified from Souther 1988).

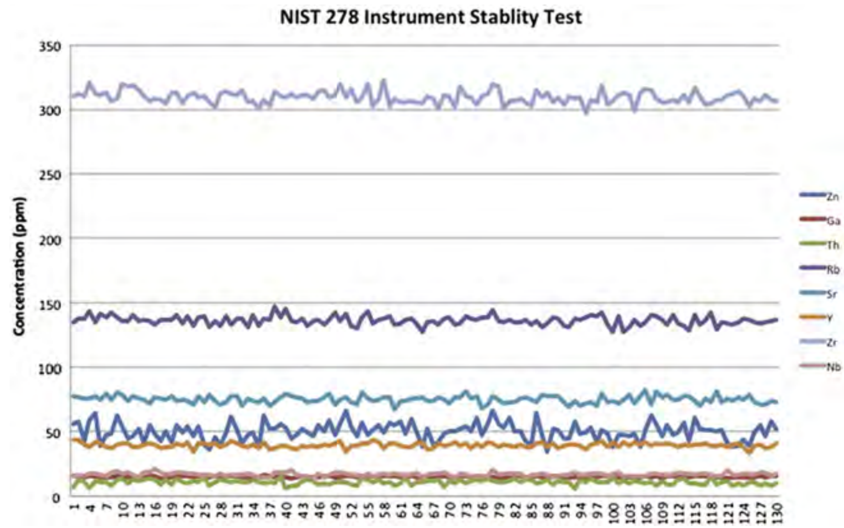

Fig. 3. 10 hour NIST 278 Instrument Stability Test variation.

in northwestern of North America since Carlson (1994). In relation to this, consideration of other obsidian source data is included to understand the distribution of these materials in the study area. In this case, materials from the Simon Fraser University reference library and or published data are used for comparative purposes (Fig. 1). Other obsidian sources in proximity to the study area include Wiki Peak, Hoodoo Mountain, Obsidian Cove, and Anahim Peak, Kingcome, and Mackenzie Pass (Arthurs 1995, 1999; Carlson, 1994; Clarke and McFadyen Clarke, 1993; Cook, 1995; Erlandson et al., 1992; Fladmark, 1984, 1985, 2009; Godfrey-Smith, 1985; James et al., 1996; Nelson and Will, 1976; Nelson et al., 1975; Reimer, 2014; Reuther et al., 2011; Stevenson, 1982; Wilmeth, 1973).

The instrument used in this analysis is a Bruker AXS Tracer III–V+ portable energy dispersive X-ray fluorescence (EDXRF) spectrometer. In the field and lab, the instrument mounted in a stable stand that allows for easy maintenance of a fixed position. It is equipped with a rhodium (Rh) tube that emits X-rays, a peltier cooled silicon PIN diode detector operating at 40 kV and 13 μA from an external power source or a battery. Samples ran for 180 live seconds with a filter comprised of 6 mm Cu (copper), 1 mm Ti (titanium), and 12 mm Al (aluminum). The live run time of analysis was restricted in two ways, first the limited time and access to each flow in the filed and second making results in the lab and museum settings comparable. This arrangement allows for the analysis of elements from manganese to molybdenum of the periodic table of elements—specifically where Fe (iron), Rb (rubidium), Sr (strontium), Y (yttrium), Zr (zirconium) and Nb (niobium) occur. This suite of elements is well suited to archaeological obsidian characterization (Ferguson, 2012). The instrument produces an X-ray beam at a 45° angle from the center of the analyzer window that measures 4 mm across. In the field or lab, no weathered artifacts were included in this analysis. In the field, samples were chosen on the basis of being freshly broken/flaked by natural means and also cleaned with fresh water and dried. In the lab or museum settings, any dirty samples were cleaned in an ultrasonic wash to remove any attached sediments. In either case, careful placement of each sample, with a clean and flat surface ensures maximum exposure to X-rays. This allows for an optimal count rate and minimizes X-ray scatter. X-ray counts processed through the S1PXRF computer program developed by Bruker allow the user to examine spectra live time during analysis or review afterwards. Results converted to parts per million (ppm) through another Bruker program S1CalProcess use the rhodium Compton backscatter and a database of forty five previously known and established values for obsidian sources around the world as determined by the University of Missouri Nuclear Reactor (Speakman, 2012). This database quantitatively calibrates the instrument by comparing expected values with those produced by the instrument for the following elements manganese (Mn), iron (Fe), zinc (Zn), gallium (Ga), thorium (Th), rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr) and niobium (Nb). This allows for the comparison of pXRF results to previous research and lab-dedicated instruments (Ferguson, 2012; Speakman, 2012). As a test of instrument stability, the NIST 278 (obsidian powder) was consecutively run for 180 s over 10 h, totaling 200 readings. Results are compared to other tests (Speakman, 2012) and shown in Fig. 3 and Table 1 and do not show noticeable differences form other similar analysis that ran materials for a 200 second live count.

3. Results

This research shows that six out of the 10 known obsidian flows in the Mount Edziza source complex played a role in the study region (Figs. 5 and 6; Table 2). It also illustrates a degree of differential access and use of the largest flow and quarry, Goat Mountain and other flows. Initial source characterization for Mount Edziza obsidian flows was limited to small sample sizes, making full statistical discrimination difficult. While 169 artifacts from three sites within the source complex were determined and results demonstrated preferential use of three out of the ten flows occurring in the source complex, they were not statistically shown in comparison to one another or to other obsidian sources in northwest North America. Earlier research matched spectra and elemental ratios from source to source and sample to sample served as a semi-quantitative means to determine a sample origin (Godfrey-Smith, 1985; Fladmark, 1984, 1985; James et al., 1996; Nelson et al., 1975; Wilmeth, 1973). Over the past 20 years the computational software and instrumental hardware developments pertaining to elemental characterization now allow for the analysis of a larger number of samples and detailed comparison of sources and flows within sources (Shackley, 1998, 2008, 2011; Speakman and Shackley, 2013). While some previous research in Alaska and for other sources in British Columbia includes Mount Edziza obsidian for comparative purposes, no summary data suitable for meaningful comparison in parts per million (ppm) is included in these studies (Arthurs 1995, 1999; Carlson, 1994; Clarke and McFadyen Clarke, 1993; Fladmark, 1984, 1985; Godfrey-Smith, 1985; James et al., 1996; Lee, 2007; Nelson and Will, 1976; Nelson et al., 1975; Reuther et al., 2011; Stevenson, 1982; Wilmeth, 1973). In this study, obsidian source data is from the broader Pacific Northwest and derives from the reference collection at SFU (Table 2). These materials are used here for comparative purposes and consider elements diagnostic for obsidian source discrimination—Fe,

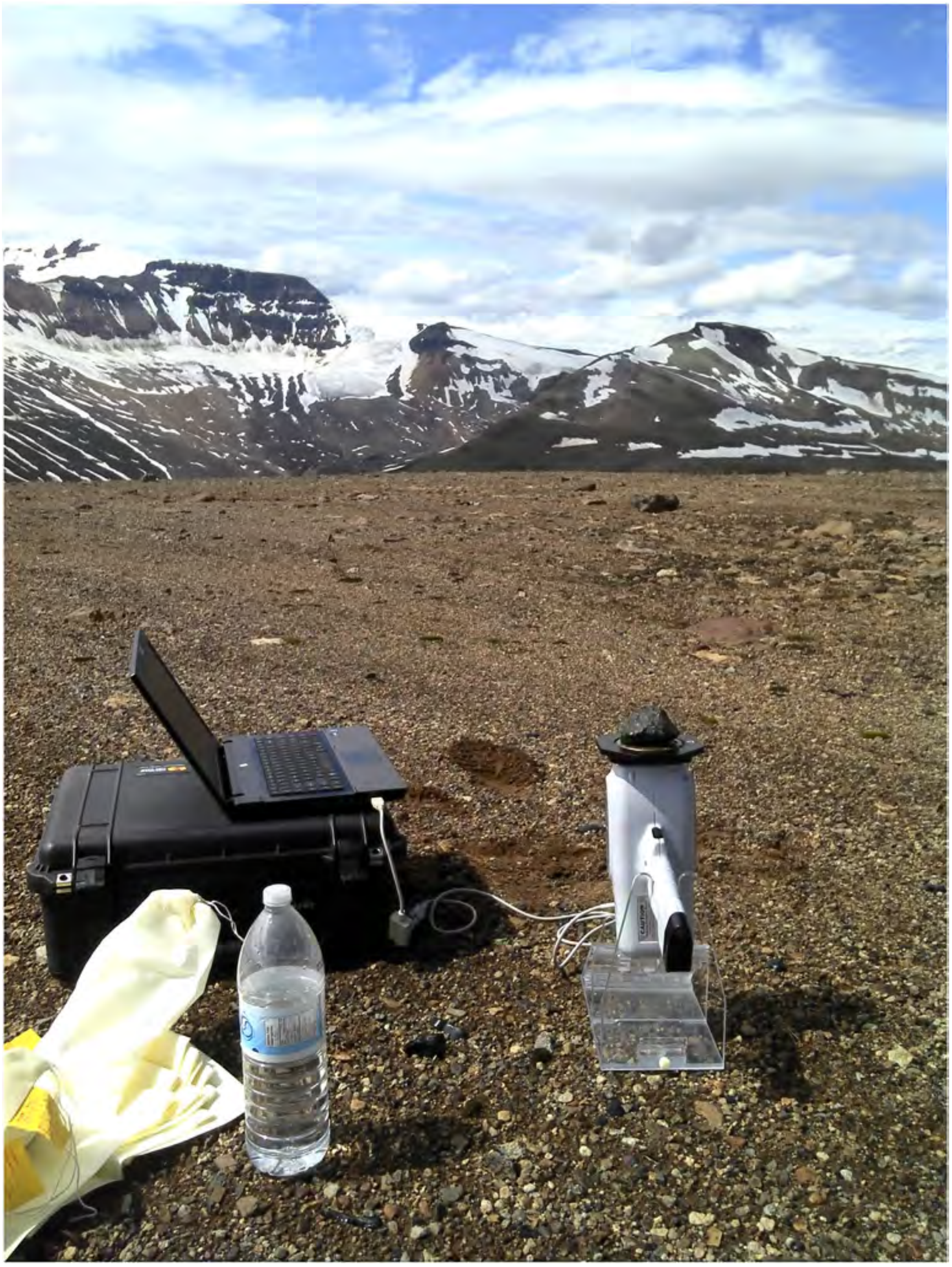

Fig. 4. pXRF analysis in the Mount Edziza volcanic complex with Goat Mountain in the distance.

Rb, Sr, Y, Zr, and Nb (Ferguson, 2012: 401–422; Godfrey-Smith, 1985; Speakman, 2012). This suite of elements was used to create a scatter plot matrixes in the statistics program JMP 11.

Fieldwork in the summer of 2013 allowed for additional source sample collection and the use of the Bruker Tracer III–V+ in the field (Fig. 4). This increased source sample data from 10 to 82, with 43 samples collected at Goat Mountain, 20 from Coffee Crater and 13 from Fan Creek (Fig. 5). Due to time, expense of helicopter access and difficulty attempting to relocate and access source flows on the Pyramid or Sorcery Ridge there are no new samples from these flows in this analysis. Future research will endeavor to obtain source materials from these flows (Table 2). This study also examined 367 artifacts from across

Table 1
NIST 278 summary statistics.

	Mn	Fe	Zn	Ga	Th	Rb	Sr	Y	Zr	Nb
This study	374 ± 67	15,821 ± 234	50 ± 7	15 ± 1	11 ± 2	136 ± 4	75 ± 4	40 ± 2	309 ± 5	17 ± 1
NIST recommended	403 ± 2	14,269 ± 140	n.r.	n.r.	12.4 ± 0.3	127.5 ± 0.3	63.5 ± 0.1	n.r.	n.r.	n.r.
Speakman (2012)	432 ± 27	14,521 ± 100	55 ± 4	n.r.	13 ± 4	133 ± 2	62 ± 1	41 ± 1	281 ± 2	18 ± 1
Glascock (2006)	397 ± 23	14,500 ± 900	53 ± 5	n.r.	12.6 ± 0.6	133 ± 6	64 ± 5	39 ± 5	290 ± 30	n.r.
Shackley (2011)	383 ± 7	14,329 ± 37	n.r.	n.r.	15 ± 5	130 ± 2	67 ± 1	40 ± 2	276 ± 2	15 ± 2

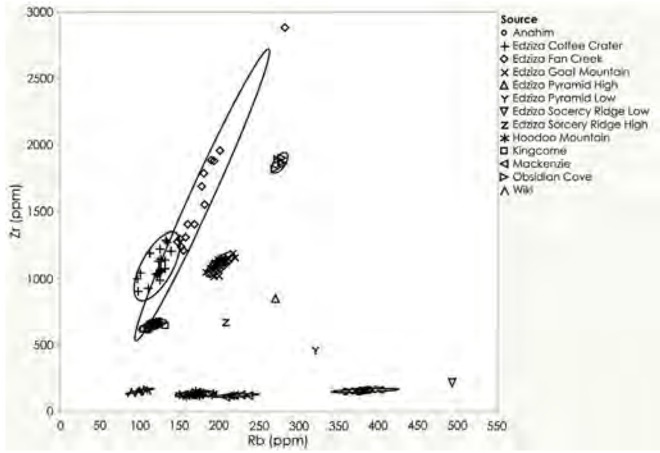

Fig. 5. Zr vs. Rb biplot for obsidian source samples across the Mount Edziza volcanic complex (including data from Godfrey-Smith, 1985).

the study region and this offers an opportunity to illustrate their stronger relationships to Mount Edziza's obsidian flows (Fig. 6). This was done through the examination of previously collected materials from Mount Edziza in the Archaeology Department Museum of Ethnology and Archaeology and the Museum of Anthropology at the University of British Columbia, academic and CRM projects from across northern British Columbia. Cumulatively these results provide new data on artifacts from 44 sites within the Mount Edziza source complex, 88 from museum collections and CRM projects and 227 from recently excavated sites. In total the number of sites from which these artifacts derive more than doubles from 26 to 55. Artifacts from these sites include a range of cores, flakes, debitage, scrapers, bifaces and projectile points. Additionally a review of archaeological reports from the past 50 years in British Columbia Archaeological Branch library accounts for over 110 references to Mount Edziza. Closer inspection of these documents narrows actual occurrence of Mount Edziza obsidian to approximately 20%. The majority of these reports document the occurrence of obsidian within Tahltan First Nation's territory. Unfortunately no elemental analysis was done for these finds and researchers rely on visual assessment or close proximity to source to make assumptions that these artifacts derive from Goat Mountain, Coffee Crater or Fan Creek. Similar attempts to access grey literature of the Yukon Territory or southeastern Alaska did not result in success of obtaining comparative data.

4. Discussion

Ethnohistorically the Tahltan First Nation occupies a territory in northwestern British Columbia (Fig. 1). It includes drainages channeling into the Pacific and Arctic oceans including the Liard, Stikine, Iskut and Nass Rivers (Emons, 1911:6; Fladmark, 2009; Teit, 1914: 484–487, 1919: 198–250, 1956: 39–54). Mount Edziza is at the center of their territory, making this material local to them but rare to surrounding groups (Fig. 1). In this cultural setting ancient obsidian movement or exchange is defined as the series of routes or paths via the North Pacific Ocean, on or along rivers, lakes, and trails by which movement of material and exchange took place. This context offered many options for material culture, in this case obsidian, to move in all four cardinal directions (Albright, 1985; Fladmark, 2009; MacLachlan, 1981: 458–460). Where these rivers cut through the Coast Mountain Range to the Northwest Coast is where cultural groups exchanged goods in an east to west direction. For example the Taku and Nass Rivers were once renown as "Grease Trails" since eulachon oil and salmon exchanged for hides and furs, copper, and other products not available on the coast (Daley, 2005: 113–114; MacLachlan, 1981: 458–460). The traditional Tahltan economy had good commercial relations with the Stikine River Tlingit to the west and the Kaska to the northeast, Sekani, Gitxsan and the Wet'suwet'n to the south and east, respectively (Tobey, 1981: 413–432; MacLachlan, 1981: 458–460). This resulted in intermarriage between these groups expanding relations on all sides and elaboration and sharing of interior and coastal traits (MacLachlan, 1981: 458–460). Contrary to these relations between Tahltan and Inland Tlingit, Coastal Tlingit, Taku River Tlingit and Tsimshian were competitive to the point of conflict at an endemic scale. These conflicts revolved around fishing locations, hunting range, trap lines and rights to exchange materials from the interior to the coast and vice versa (MacLachlan, 1981: 458–460).

In light of these know cultural relations, aspects of the occurrence, distribution and use of Mount Edziza obsidian can be contemplated.

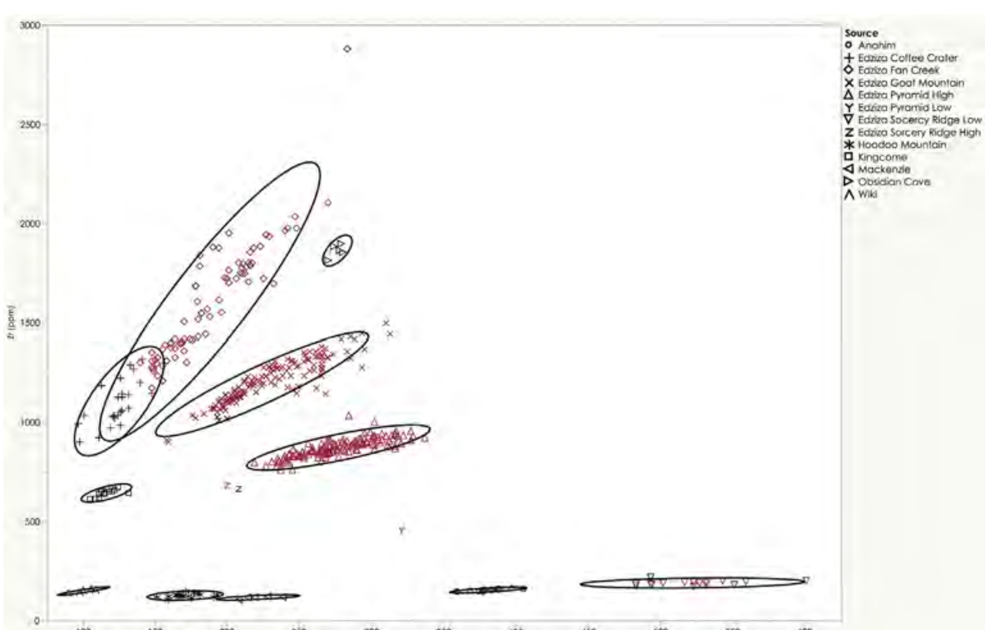

Fig. 6. Zr vs. Rb biplot for obsidian source samples and artifacts from across the study region.

Table 2
Basic statistics for Mount Edziza Obsidian flows and other sources in the study region.

Element	Goat Mountain[a]		Coffee Crater[a]		Fan Creek[a]		Pyramid Low[b]		Pyramid High[b]		Sorcery Ridge Low[b]		Sorcery Ridge High[b]	
	n = 43		n = 21		n = 14		n = 1		n = 1		n = 1		n = 1	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Mn	416	158	820	166	938	419	223	-	331	-	204	-	373	-
Fe	21,493	1535	39,959	9007	52,379	21,551	17,800	-	26,400	-	12,400	-	26,600	-
Zn	254	20	273	57	404	128	195	-	195	-	190	-	183	-
Ga	23	4	18	4	22	5		-		-		-		-
Th	24	4	13	2	20	5		-		-		-		-
Rb	201	7	122	12	179	35	321	-	271	-	493	-	208	-
Sr	4	2	4	2	6	6	10	-	12	-	10	-	18	-
Y	115	5	90	18	164	65	143	-	133	-	150	-	140	-
Zr	1103	38	1086	105	1622	448	454	-	845	-	215	-	662	-
Nb	123	4	106	14	166	49	145	-	141	-	155	-	139	-

Element	Anahim Peak		Hoodoo Mountain		Kingcome		Mackenzie Pass		Obsidian Cove[c]		Wiki Peak	
	n = 22		n = 18		n = 13		n = 6		n = 5		n = 5	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Mn	372	74	166	72	548	29	280	88	566	30	345	42
Fe	6934	825	7785	579	18,316	1187	7246	702	–	-	7714	696
Zn	216	16	27	8	128	12	51	6	309	10	28	5
Ga	22	3	15	1	19	1	17	1	38	5	16	0
Th	35	4	18	3	10	1	19	2	–	-	8	2
Rb	384	17	171	11	116	9	217	16	276	4	101	7
Sr	15	2	59	8	5	2	41	5	1	1	99	8
Y	114	4	26	2	60	3	55	3	190	5	17	2
Zr	153	6	125	10	630	15	114	6	1861	32	147	9
Nb	127	3	13	2	47	2	71	4	220	6	15	1

[a] Data from this study and Godfrey-Smith (1985).
[b] Data obtained from Godfrey-Smith (1985).
[c] Data obtained from Erlandson, Moss and Hughes (1992).

Across the study area three broad patters occur (Fig. 7). First, the highest occurrence of archaeological sites with Mount Edziza obsidian within their assemblages occurs along the eastern flanks of British Columbia's Coast Mountain range. This distribution fits well with the ethnohistorically recorded preference of Athapaskan peoples to move materials along trail systems in a north–south direction. Second, where the Skeena, Nass, Stikine, Iskut, Taku and Chilkat Rivers intersect these trial systems, access to the coast was available. The Tahltan and their close relations likely exchanged Mount Edziza obsidian at key locations along the Skeen, Nass Rivers. Elsewhere at the Taku and Chilkat Rivers, other Athapaskan groups exchanged Mount Edziza obsidian with coastal groups. However, projecting ethnohistorical relationships far back in time requires caution. How Mount Edziza obsidian arrived at early Holocene archaeological sites is currently unknown, but they could be the result of direct access of alpine quarries or gathered in secondary glacial moraine deposits. At this stage of regional archaeological understanding, the likelihood of ancient exchange between cultural groups is probable since the majority of obsidian occurring in early Holocene sites comes from Mount Edziza (Dixon, 2012; Lee, 2001, 2007). Cultural contact between the coast and interior populations is evident with the occurrence of Mount Edziza obsidian in coastal contexts and implies the use of watercraft and overland/glacier routes (Ackerman, 1996a,b; Dixon, 2012; Lee, 2001, 2007).

Third, Mount Edziza obsidian has a wide and variable distribution to the east. These broad patterns allow for additional examination of what specific flow of Mount Edziza obsidian occurs at these sites.

In regards to the distribution of variable Mount Edziza obsidian flow use, new and old patterns emerge as the result of this study. Overall, the Goat Mountain quarry holds its place as the most important and widely used flow (Figs. 5 and 6). It appears at the most number of sites and frequency of artifacts within the source complex and surrounding areas (Table 3). Outside Tahltan territory, material from Goat Mountain only occurs at five sites and is now the second most common Edziza obsidian to occur after the Pyramid High flow, which also occurs at five sites (Figs. 5 and 6). Closer examination of its distribution shows that Goat Mountain obsidian occurs in all periods across the study region and this is due to the large extent and high quality of this material (Table 3). These patterns further demonstrate Goat Mountain's importance and serves as evidence of long term control and access by the Tahltan. Previous examinations of the quarry are confirmed in this analysis by fieldwork in the summer of 2013. Survey of the area beyond the original quarry area demonstrates that the Goat Mountain quarry is more extensive than previously recorded. Closer examination of materials within this area displays evidence for expedient and formal tool manufacture, a pattern supported by previous research that Tahltan peoples used the quarry for their own use and manufacture of prepared cores and bifaces for exchange to surrounding groups. These cores and bifaces were traded to groups on the Northwest Coast, there they were used and reduced into a variety of tools and flakes, typically microblades (Ackerman, 1996a,b; Dixon, 2012; Lee, 2001, 2007).

An opposite pattern occurs with all of the other obsidian flows on Mount Edziza. The majority of materials from Fan Creek, Coffee Crater, Pyramid High, Sorcery Ridge High and Low only occur mostly in interior regions (Table 3). This general pattern may change when more comparative data is made available. The results of this analysis show that none of these materials from the Pyramid or Sorcery Ridge flows makes their way to the Northwest Coast during any time period. The only exceptions to this pattern occur within the source complex of Mount Edziza. As previously mentioned Goat Mountain is important across the entire study region. This pattern offers evidence that this source was extensively used for exchange purposes by local Tahltan peoples who had direct access to this quarry and likely restricted its use to others. Inverse to this pattern is the occurrence of all other flows toward the interior regions of the study area. This differential distribution of materials is supported by the physiographic distribution and ethnohistorical distribution of

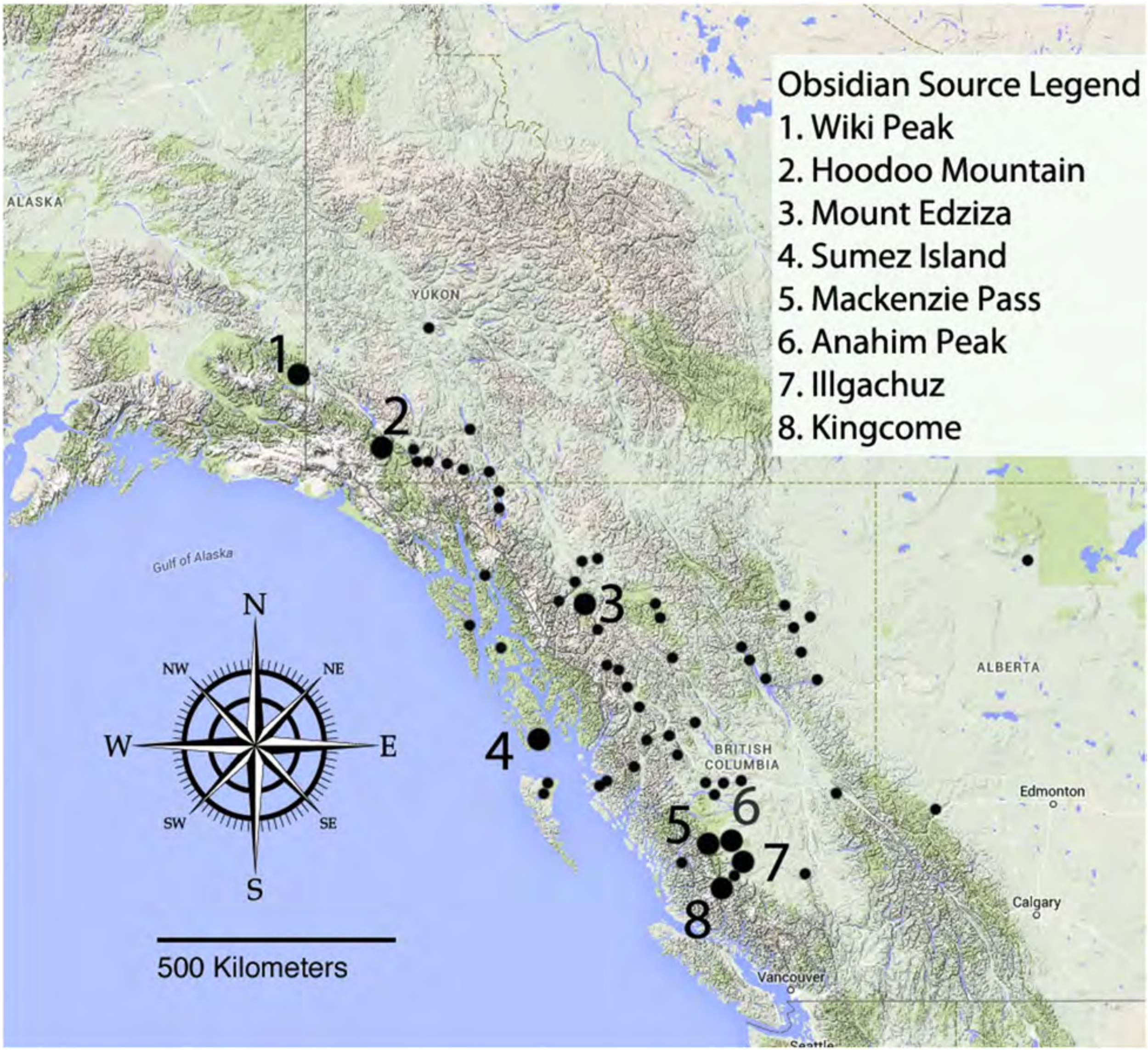

Fig. 7. Revised spatial distribution of Mount Edziza obsidians.

places and materials. Cultural groups surrounding the Tahltan had long term close relations that offered opportunities to access various flows on Mount Edziza. These social–political ties result in the distribution of Mount Edziza obsidians to the north, east and south.

5. Conclusion

While the results of this analysis maybe speculative it demonstrates that more than three obsidian flows in the Mount Edziza source complex played a significant role in regional movement or exchange of materials. This research also clarifies the relationships in and between the multiple obsidian flows of this large and important source. While obsidian from the Pyramid occurs at only one site (GiSq 4) the intensity of its use by the inhabitants of that village illustrates that they possess social links for either direct access to this flow or close personal relationships to directly exchange for this material. Though low in occurrence discovery of the use of Sorcery Ridge obsidian and a higher than expected occurrence of Fan Creek material also demonstrate new patterns worthy of additional research. Data presented here will allow other researchers to make their own comparisons. Flows that show new documented use occur in the eastern flanks of the Mount Edziza volcanic complex indicating Tahltan preferential use and exchange to near and closely related Athapaskan speaking groups. Exchange of Mount Edziza obsidian occurred at important village locations in close proximity to river systems and trail networks. Future research will examine the temporal relationships of obsidians from Mount Edziza.

Table 3
Number of sites and artifacts within and outside of Tahltan territory.

Edziza flow	Number of sites in Tahltan territory	Number of artifacts	Number of sites outside of Talhtan territory	Number of artifacts
Goat Mountain	14	26	5	107
Fan Creek	5	8	20	61
Coffee Crater	2	3	3	3
Pyramid High	0	0	5	136
Sorcery Ridge High	0	0	1	1
Sorcery Ridge Low	0	0	1	15
Total	21	32	35	323

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