



# Obsidian Journeys: Prehistoric Travel and Trade Trails through the Preserve



National Park Service archeologists conducting field surveys near the Charley River headwaters

Archaeologists from Yukon-Charley Rivers National Preserve have begun an effort to geochemically analyze obsidian artifacts from the preserve. Obsidian is a volcanic glass that was used in the past to manufacture stone tools like projectile points and scrapers. Chemical signatures from obsidian artifacts are matched with source signatures to pinpoint the origin of the raw material used for the tool.

So far, approximately 100 obsidian artifacts from Yukon-Charley have been analyzed.



An obsidian hide scraper from an archaeological site in the Yukon-Charley National Preserve

Most derive from the Batza Tena source on the Koyukuk River, 500 km (310 mi) away, and the Wiki Peaks source in the Wrangell Mountains, 320 km (200 mi) away. These data have potential to reveal changing trade and travel patterns through time and shed light on prehistoric territoriality.

### Formation of Obsidian

Obsidian is a volcanic glass that lacks a crystal lattice structure because it formed from a magma or lava which cooled extremely rapidly. This geological characteristic makes obsidian a perfect raw material for stone tool manufacture because it flakes easily and predictably. When this liquid rock cools, it traps the elements present in the molten liquid. These trace elements occur in volcanic glass in variable amounts, thereby creating a unique chemical signature for any particular volcanic flow.

### Obsidian Sourcing

Determining this unique chemical signature lets scientists know where the raw material for the stone tool was obtained.

While some obsidian can be distinguished visually, the most reliable method of obsidian sourcing involves using X-ray fluorescence (XRF) or Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) to detect the combination and proportions of trace elements. Alaskan sources can be differentiated from one another using such elements as iron, rubidium, strontium, zirconium and yttrium. With the XRF and ICP-MS technology on hand, researchers have developed databases that keep records of all sourced obsidian. In all of Alaska, five obsidian sources are known and more than 20 sources are represented by archaeological samples from unknown geological sources. By finding more samples from unknown sources archaeologists hope to determine an area where the source is likely to be located. As in other parts of the state, obsidian from Batza Tena and Wiki Peak sources is most commonly encountered at archaeological sites in the park, although a few unknown sources were also discovered.

## Batza Tena

The Batza Tena source is in north-central interior Alaska along the Koyukuk River. Though reports of this source were made by the U.S. Geological Survey as early as 1900, it was not until 1967 that W.W. Patton definitively established its true location. Artifacts from this source are found across the state (excluding the Aleutian Islands and Southeast Alaska) due to its excellent quality and central location.

## Wiki Peak

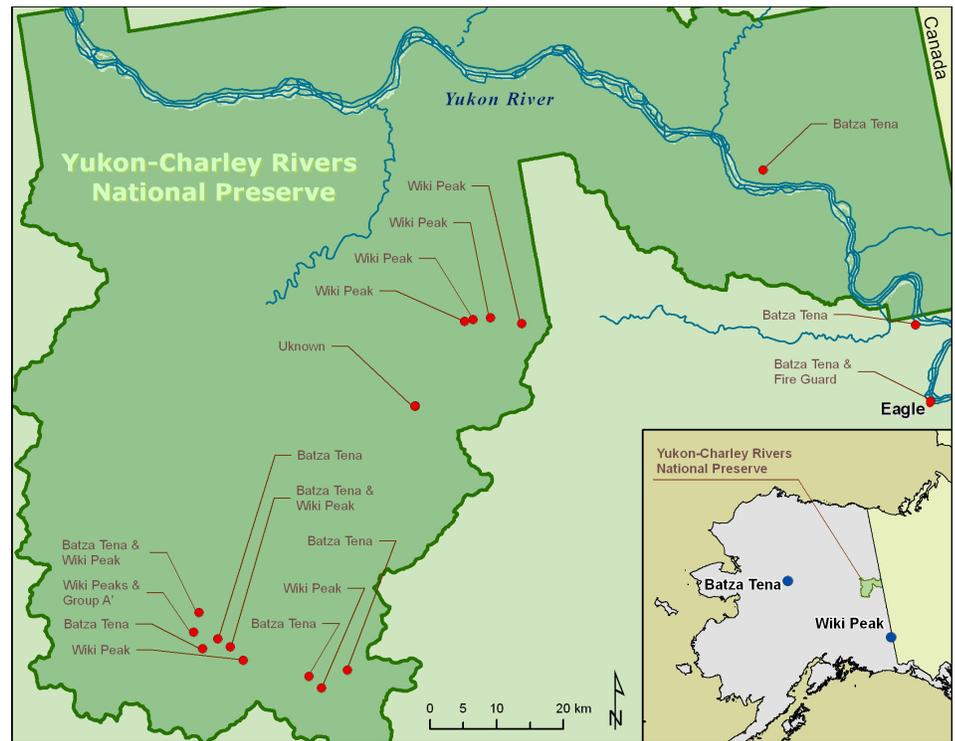
The Wiki Peak obsidian source is in the Nutzotin Mountains (Wrangell-St Elias National Park). An investigation of the Wiki Peak obsidian source was conducted in the past decade, and over 65 archaeological sites were recorded in a survey of the immediate area. The high concentration of sites is typical for other obsidian source areas in Alaska and northwest Canada, with few exceptions.

## Unknown Sources

Prehistoric people who lived or traveled in the Yukon-Charley National Preserve knew of at least three more obsidian sources that we have yet to find. One piece of obsidian from around the Seventymile River was attributed to Group A', a source with an as-yet undiscovered location. Flakes from this source were previously encountered in great quantity at the Ringling archaeological site 280 km (174 mi) south of the park. Also surprising, ten flakes from an unknown obsidian source referred to as "Fire Guard Station" were found at an archaeological site right near the National Park Service Headquarters in Eagle. Finally, one piece of obsidian found on the Dimond Fork of the Seventymile was attributed to an unknown and unnamed obsidian source.



A small obsidian flake can be evidence of large social networks



Map showing the distribution of archaeological sites with obsidian and the location of the two largest interior Alaskan obsidian sources. Site locations are approximate

## Results of Obsidian Sourcing in the Yukon-Charley National Preserve

Practically all of the sites containing obsidian in the park were found on elevated ridges ideal for hunting purposes. While most sites had obsidian from one of the two main sources, several sites contained obsidian that came from two different directions, as shown on the map. This might indicate sites that were incorporated into a larger network and served as places where people from different regions came together. Chemical sourcing has also shown that people living along, or traveling through, the Yukon-Charley Rivers region obtained more obsidian from Batza Tena than from Wiki Peak. This is interesting, because the Wiki Peak source is closer to the park and one would expect less obsidian from a more distant source. Perhaps the Yukon River was a more convenient route for trading purposes (by boat, dog sled or by foot). Travel from Wiki Peak would have been somewhat more challenging due to the rugged terrain. Alternatively, Batza Tena obsidian could be prevalent due to the presence of more established trade relationships with people to the west than with people to the south. Presence of obsidian from unknown obsidian sources shows that people were exceptionally familiar

with the land and the resources available to them.

Unfortunately, the ages of the sites which contributed the obsidian samples remain unknown. This is due to the fact that most obsidian so far has been found in high lookout, surface sites where preservation of organic materials that could be dated (by radiocarbon methods, for example) is practically non-existent. However, archaeologists speculate that some sites were occupied perhaps as early as 8,000 years ago based on characteristic stone tool forms.

This study is but a small component of a much larger research project that is underway. Collaboration between the National Park Service, University of Alaska Museum and the Smithsonian Institution constantly produces new analyses to be added to the database of sourced archaeological obsidian in Alaska. As research continues, obsidian density maps will show how widespread the obsidian is and along which routes the raw material traveled. Despite the small number of samples, this preliminary investigation already hints at a much broader exchange network and/or raw material procurement range than previously realized.