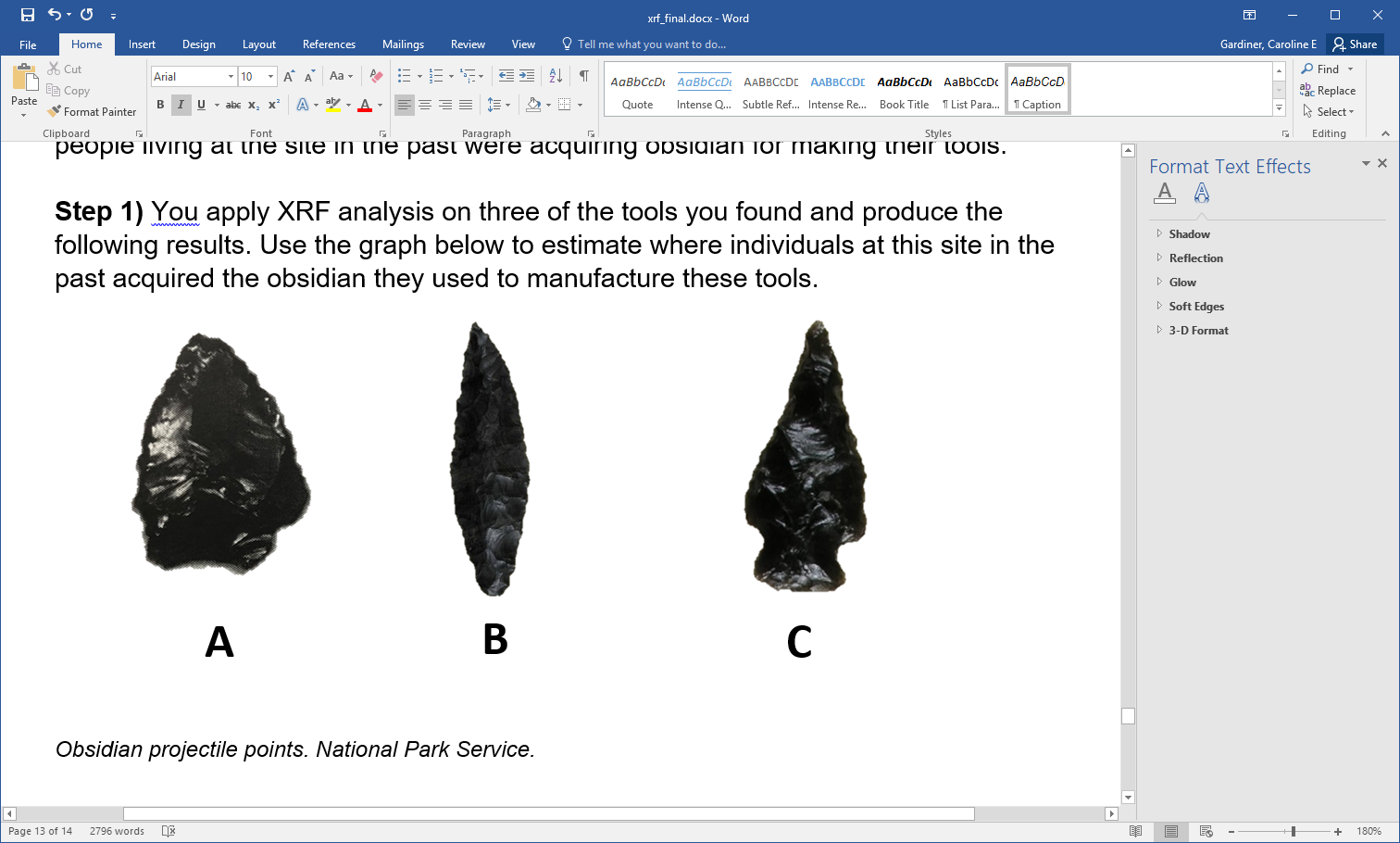
# Activity: XRF Analysis

You are an archeologist working at Osprey Beach in Yellowstone National Park. You find multiple obsidian stone tools during your excavation. You wish to determine how people living at the site in the past were acquiring obsidian for making their tools.

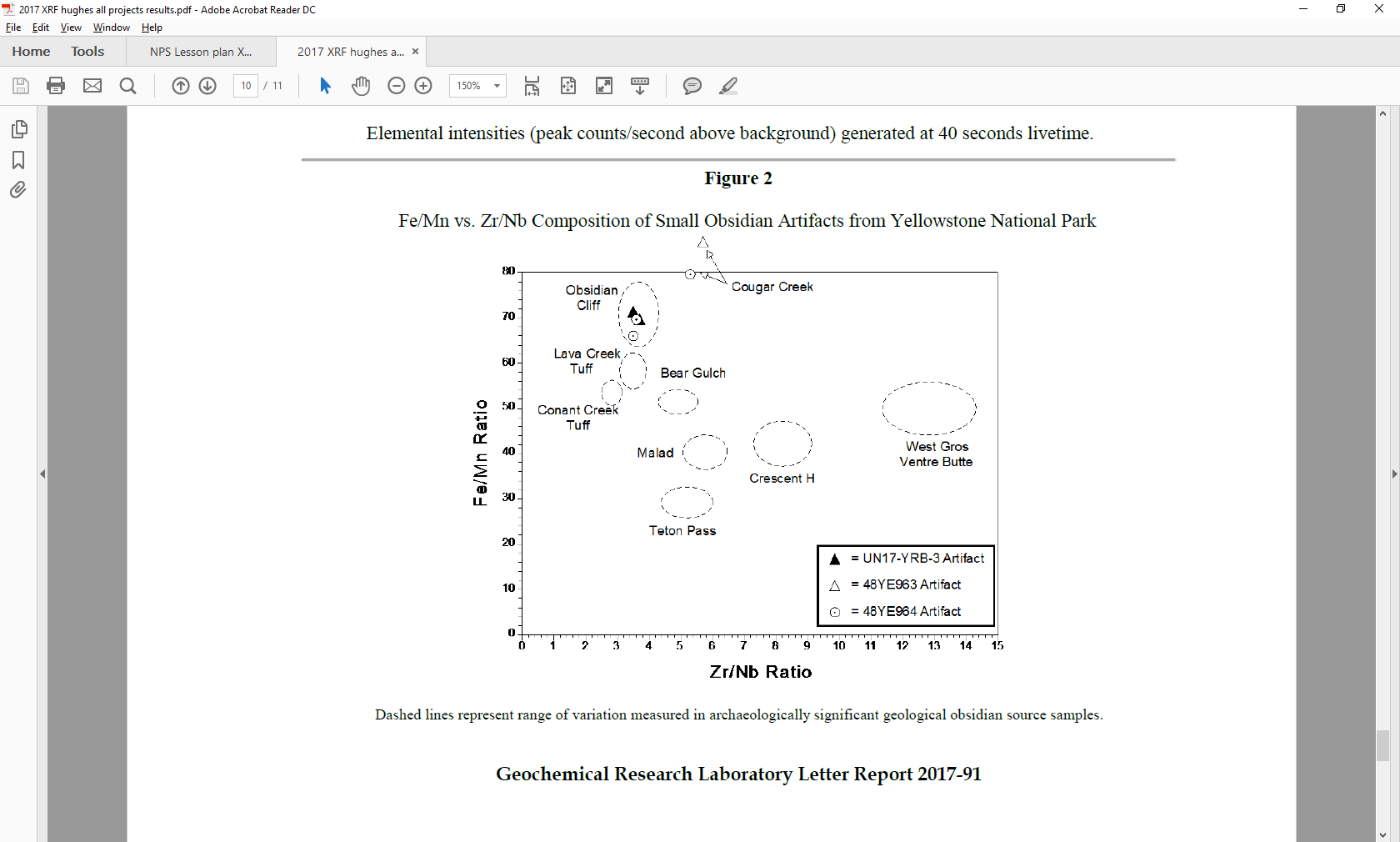
**Step 1)** You apply XRF analysis on three of the tools you found and produce the following results. Use the graph below to estimate where individuals at this site in the past acquired the obsidian they used to manufacture these tools.



Obsidian projectile points. National Park Service.

| **Tool** | **Fe/Mn Ratio** | **Zr/Nb Ratio** |
| --- | --- | --- |
| A | 26 | 4.3 |
| B | 51 | 5 |
| C | 2.9 | 68 |

Table 1: Elemental Compositions of Tools A, B, and C.



*Elemental compositions and sources of obsidian artifacts from Yellowstone National Park.*

**Step 2)** Return to the map of Yellowstone obsidian sources. Use the map scale to estimate how many miles these people covered from their settlement to the obsidian sources (1 km = 0.62 miles). How would individuals have traveled to these areas from the Osprey Beach site?

Archeologists found that although tools are manufactured from a distant source that does not always mean that they were necessarily a result of trade. Instead, individuals made a conscious effort to travel to these sources themselves. Why might this be?

**Step 3)** Archeologists found tools such as these in Hopewell burial sites in Ohio, over 1,000 miles away from Yellowstone National Park. What does this tell you about the significance of these obsidian tools to ancient cultures? Hypothesize how this trade occurred. Did the two cultures directly interact? What other information might an archeologist use to answer these questions?