

HISTORICAL MAPPING OF THE COLORADO RIVER HEADWATERS GRAND COUNTY, COLORADO

PROJECT INTRODUCTION

The Colorado River is one of the most overallocated and endangered rivers in the West. In Grand County, at the source of the Colorado River, large-scale transbasin diversion projects such as the Colorado-Big Thompson (C-BT), Grand Ditch, and Moffat Tunnel transfer water out of the Colorado River watershed to the growing Front Range across the Continental Divide. Several reservoirs were constructed to store water for Grand County and to facilitate transbasin diversions. Historian Philip L. Fradkin refers to the headwaters diversion complex as “the most complicated pumping system in the world” (Figure 1). These dams and water diversions have significantly altered Grand County’s hydrology by diverting 300,000-acre feet of water to the Front Range annually. As historian Patricia Limerick argues, the Front Range had land, and the West Slope had water. Thus, the Front Range looked to the mountains to supplement the region’s urbanization and growing agricultural lands.

The objective of my project is to place Grand County within larger landscape changes on the Front Range over a 50-year period. I have created a series of land cover maps of Grand County and the Front Range from 1983 to 2020 using Landsat 1-8 satellite images (Figure 2). These maps show significant urbanization and agricultural growth on the Front Range. In comparison, Grand County witnessed decreases in wetlands, surface water, and forest composition, as well as burn scars. The de-watering of Grand County to water the Front Range’s cities and crops has shaped northern Colorado’s landscapes.

INTERNSHIP GOALS

1. Juxtapose changes in urbanization and agricultural growth, as well as forest composition, surface water availability, and wetlands between Grand County and the Front Range over a 50-year period.
2. Better understand landscape changes wrought by transbasin diversions.
3. How to use digital tools to do historical research.

HOW DOES THIS APPLY TO YOUR EDUCATION

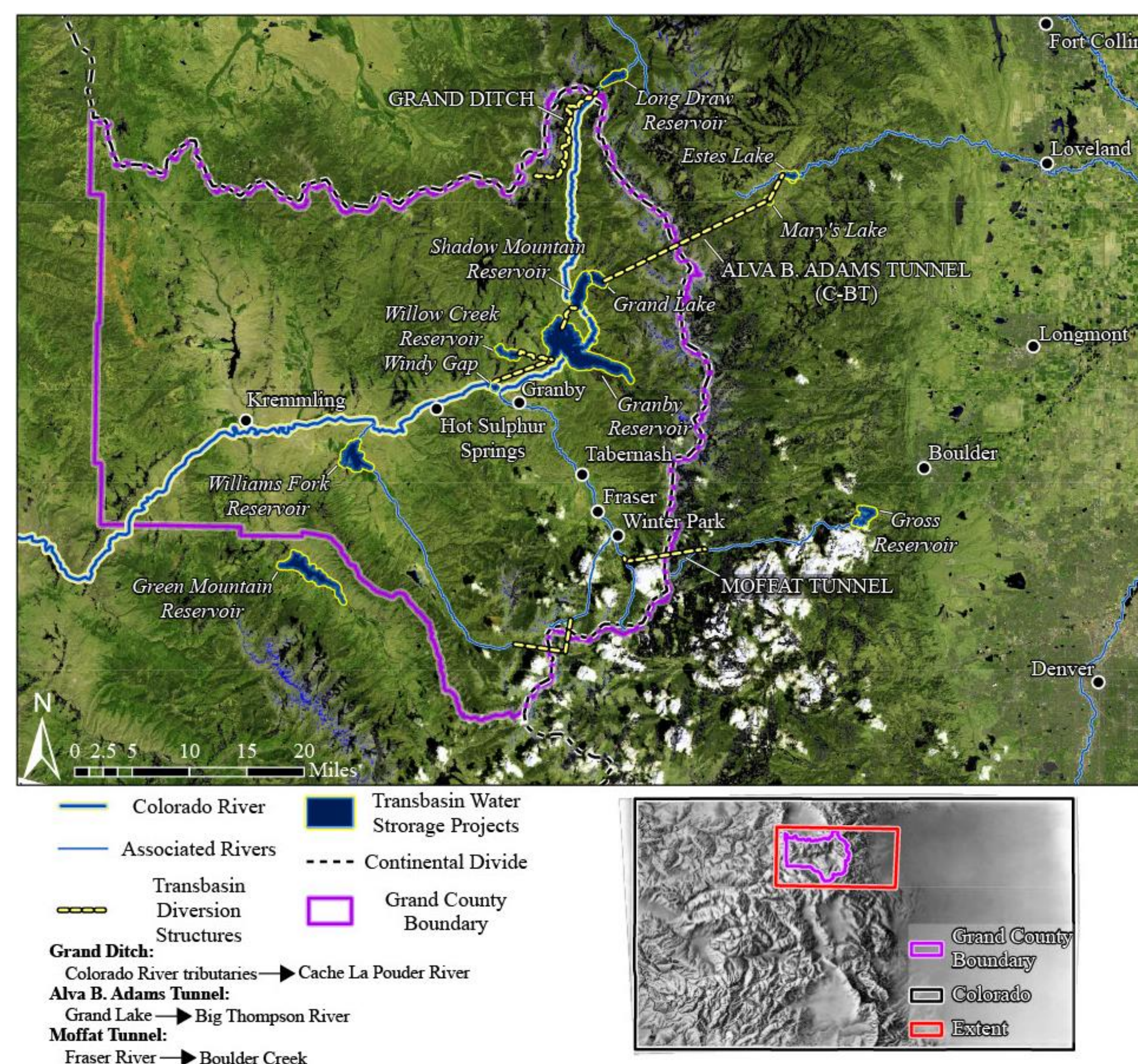
My career aspirations are to work with natural resources management agencies as a public historian. This internship has improved my understanding of the usefulness of historical research in natural resource management. I have also improved my skills in digital history and how to present data for a public audience.

WHAT YOU DID

I used ArcGIS Pro 3.1.2 to process Landsat 1-8 satellite images of northern Colorado from 1983 to 2020 to create a series of land cover maps to show landscape changes over time. All satellite images were captured in July for consistency and have less than 5% cloud coverage.

After I processed the 2020 image, I conducted a field survey in Grand County in July for ground truthing references. I took pictures of these points to verify the land cover classifications (i.e. wetland, evergreen forests, barren, etc.) I had categorized pixels as within the 2020 map were valid. I based the classifications for the 1983, 1989, 2000, and 2014 maps off the ground truthing points for 2020.

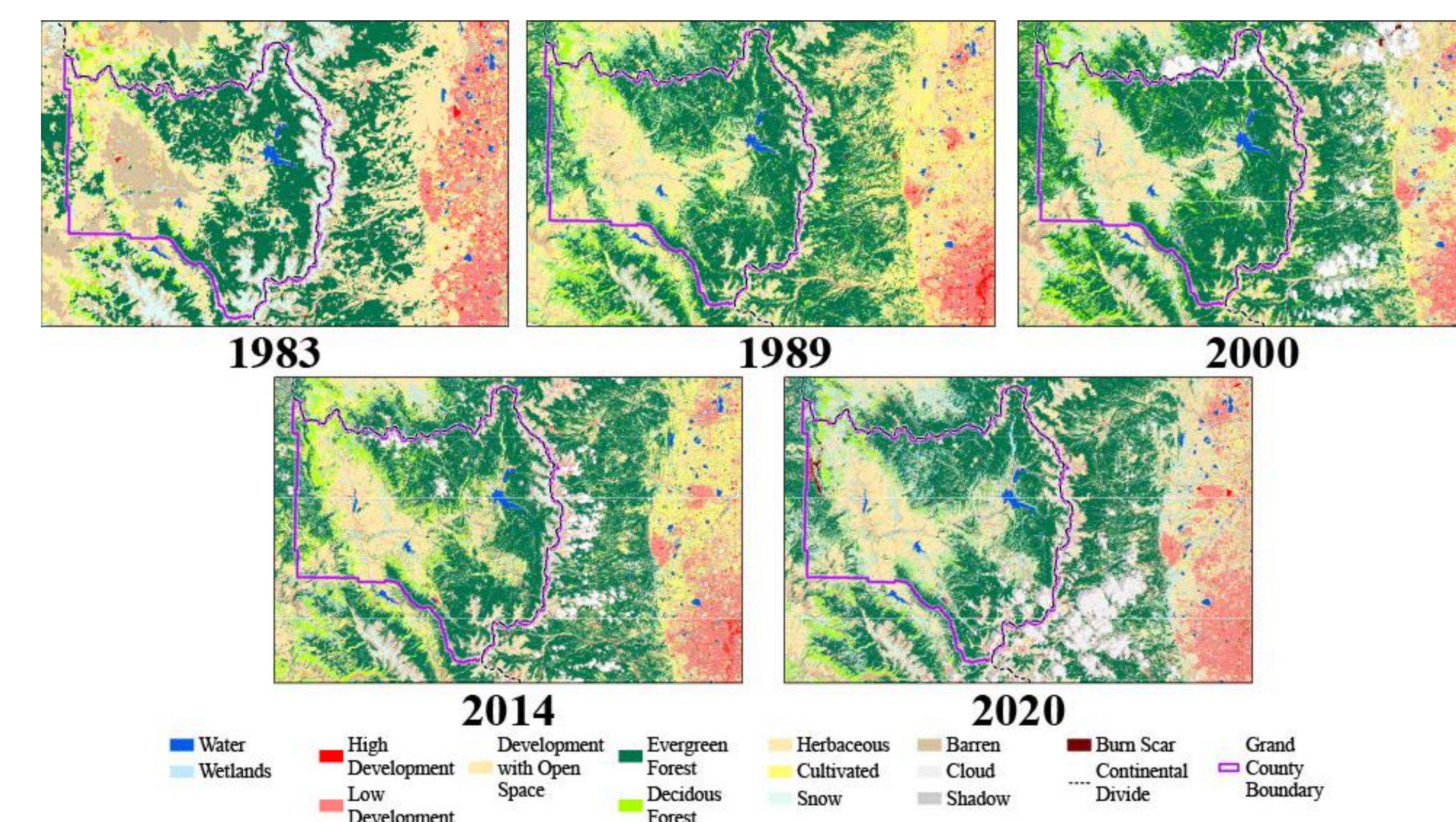
Figure 1.



WHAT YOU LEARNED

This project significantly increased my understanding of digital tools to do historical research. I also strengthened valuable skills in field surveying, interviewing, and archival research. After seeing the hydrological bowl that is Grand County and walking along the rivers, conversing with fishermen and locals, I have learned the importance of understanding place – in the physical and cultural sense – when researching environmental history.

Figure 2.



NEXT STEPS

The next step is to emplace these maps within a historical context. I have done preliminary archival research and collected interviews from Grand County residence and relevant water officials. I have received a water research from the USGS to continue archival research and interviews with an emphasis on the impact of transbasin diversions on local communities and fisheries.