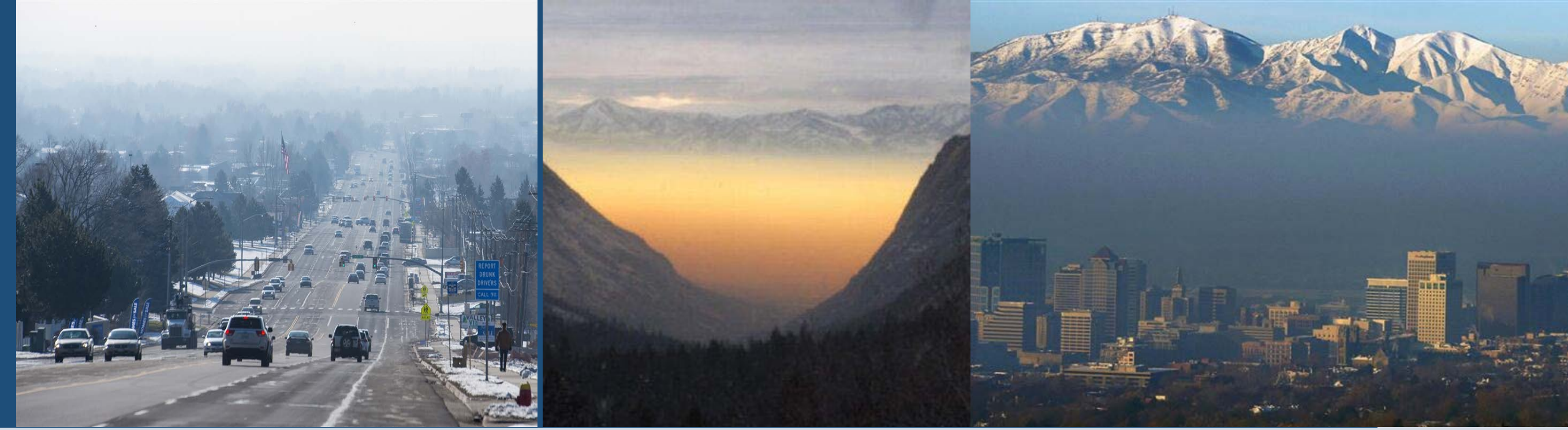


Particulates Matter: Assessing Needs for Air Quality Visualization



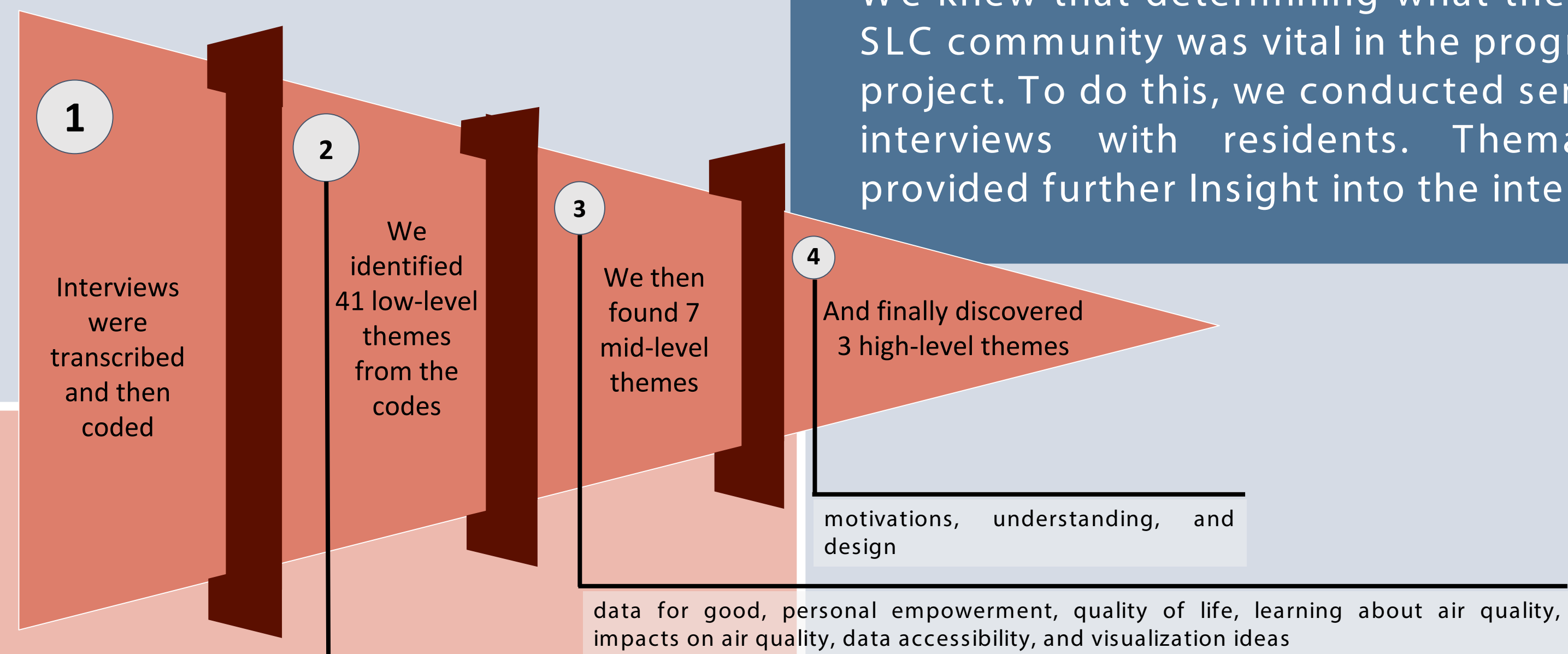
Air Quality in Salt Lake City

Salt Lake City has some of the worst air in the nation [1]. Little is known about the behavior of ambient air pollution and public access to this information is further limited.

Currently, government and grassroots websites provide only coarse data[2,3]. At the University of Utah, we've started a project to 1) explore & model air quality and 2) make it available to the public.

Thematic Analysis

We knew that determining what the needs of the SLC community was vital in the progression of the project. To do this, we conducted semi-structured interviews with residents. Thematic analysis provided further insight into the interviews.

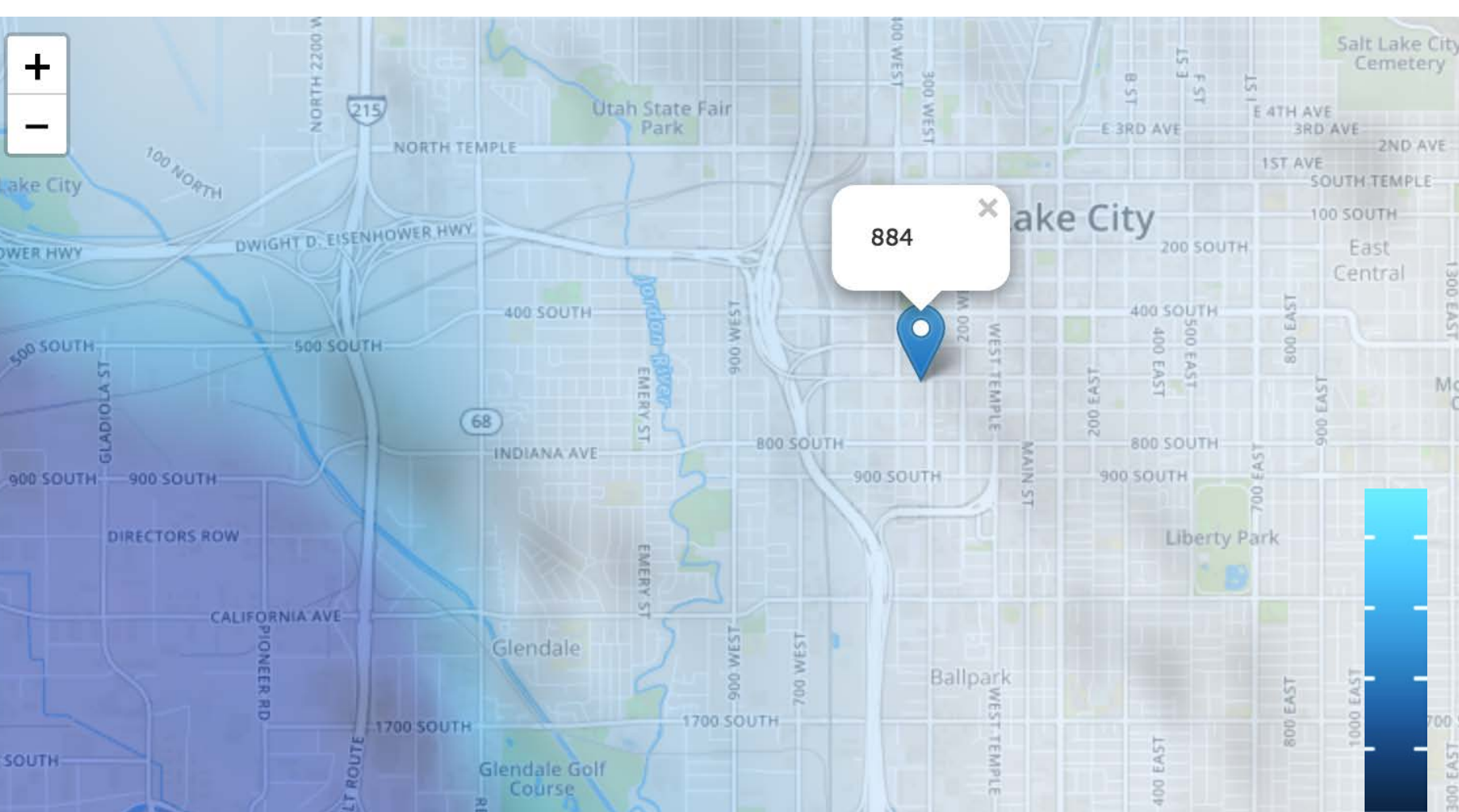


activism, acute health impact, assumption, barrier to entry, behavioral change, composition of particulates, construction/development, convenience, data check-in, data literacy, data quality, data resolution, data transparency, demarcation, development/construction, DIY, economics, elevation, environmental impact, EPA, Classification, health, impact factors, interface personalization, kids health, microclimates, mode, monitoring, open data, open resource, path of interest, personal heuristics, planning, points of interest, points of pollution, policy, population density, quality of life, region of interest, relationship to weather, response, seasonal, topography, transportation, trends, understanding personal impact, understanding sources, usage, user group, vegetation, visual check, weather

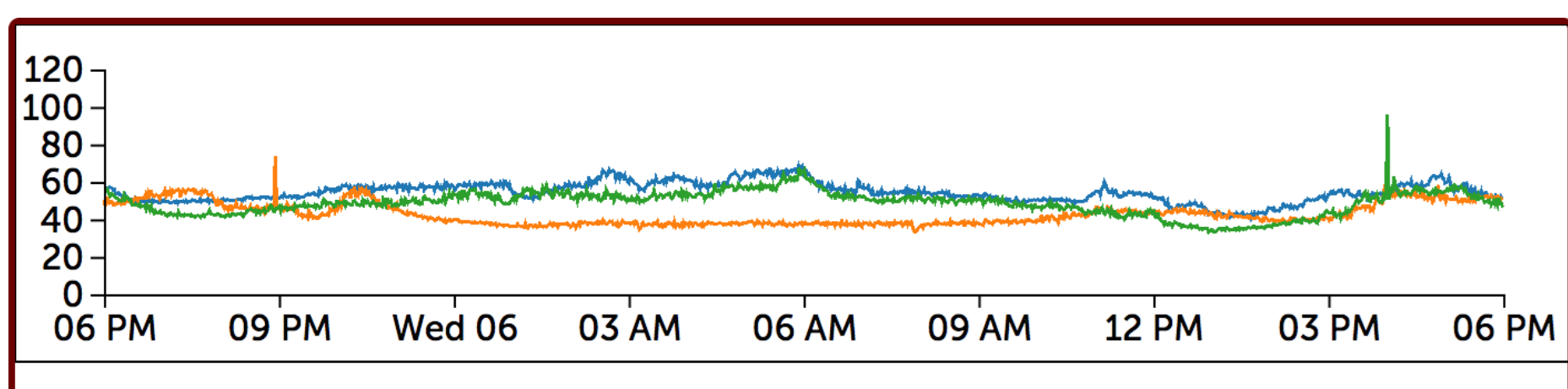
Design Choices

During the interviews, potential users stated specific desires regarding design and functionality of the interface. We examined these desires through the lens of our mid- and high-level themes and found that several aligned with the community's collective needs and produced interesting research questions for us to pursue.

This led us to develop conceptual frameworks for desires to be represented in the interface. We chose three common topics to focus on: Elevation, Historical Comparisons, and EPA Air Quality Index.



- 1 HISTORICAL COMPARISON
- 2 EPA
- 3 ELEVATION



Cohesive Views

A map is an easily recognized format for air quality data to be visualized. We chose to use a map throughout the interface to provide reference and cohesion for users as they explore other facets of the data.

1 Historical Comparisons

Users regularly stated a desire to learn more about historic trends of air quality in order to inform opinions and changes in behavior. We decided an exploratory view was needed. Users could select locations of interest and pick from a set of poor air quality days. A map of differences allows users further insight into the how the air quality is different.

2 EPA

Frequency of EPA Air Quality Index use has led to strong mental models in the SLC community of how to interpret air quality values. We cannot use the EPA Air Quality Index to represent real time data in many parts of our interface, as the index is based on 24-hour epidemiological studies. The issue of how to best express our data has led to an ongoing discussion of the merits of the index. This view is one option for users to access what is most comfortable, while still being transparent in the data.

3 Elevation

Throughout the interviews, there was consensus that elevation has a relationship to air quality. Interviewees emphasized an interest in seeing changes in elevation in conjunction with changing PM2.5 values. The research questions presented by this concept of altitude + air quality were engaging on a multidisciplinary level and created unique design challenges related to the usage and design of such a visualization. This is one solution being discussed.



- [1] M. Shenefelt. Standard Examiner: Northern Utah cities have nation's worst air pollution for second straight day, Feb 2016.
- [2] Office of Air Quality Planning and Standards (U.S. EPA). AirNow, Last read: June 2017.
- [3] Purple Air. PurpleAir Air Quality Map, Last read: June 2017.

