Advancing the Spatial Data Infrastructure of Bannock County, Idaho: 2020 Final report

Project Description

The project team at Idaho State University's GIS Training and Research Center (GIS TREC) focused its efforts on four GIS data layers; sidewalks, sidewalk hazards, curb returns, and street signs. Work included a review and revision of the geodatabase schema used for each of these layers with the understanding that completed data would need to retain compatibility with the Lucity system already in use at the City of Pocatello. Working within this framework the team (PI Weber and Subigya Shah (an ISU student)) were able to improve the schema by removing unused fields, creating improved and consistent coded value attribute domains, applying an alias/improved field description to several fields, and simplifying the remaining fields as appropriate. The summer and early fall were devoted to onsite data collection using *Collector for ArcGIS* software on a mobile device. During this time, additional sidewalks, hazards, curb returns/ramps, and street signs were acquired. Following data collection, these data were reviewed and edited to improve data quality and correct errors. In addition, FGDC-compliant metadata was written for each of the layers. The following pages provide additional detail for this project and its results.

Methodologies

Following review and several monthly meetings with project partners (Mori Byington, Bannock Planning and Transportation Office (BPTO), Ryan Howerton (City of Pocatello), and Jackie Malloy (City of Chubbuck)) a field collection priority and geodatabase schema[1] was adopted. Normally, field data collection begins following the end of the spring semester at ISU, however due to COVID-19 the start date was delayed until later in the summer. Data collection progressed rapidly however and continued into the fall semester to allow for the time missed early in the summer.

An assessment of change in sidewalk hazards was also completed. This assessment sought to answer the question "how have sidewalk hazards identified during the 2006-2007 field collection changed over time?" To determine this, Subigya Shah re-visited all sidewalk hazard points along two identified hazard hot spots (S. 4th Avenue and S. 7th Avenue) and hazard cold spots (Albatross Drive, Bluebird Drive, and Chickadee drive).

Once data collection was completed, these data were downloaded from the ISU AGOL cloud and copied to a file geodatabase. These data were then shared with the project partners for initial review. Review was also undertaken at ISU's GIS TREC by PI Weber. Errors were identified that required desktop editing of these data, and second edition/revision was completed late in October. This edition contained full metadata documentation and was as error-free as possible.

Results and Discussion

The original 2006-2007 survey collected curb returns/ramps and sidewalk hazards as point features along with a sidewalk inventory as line features. At the conclusion of this work completed by Mansoor Raza (ISU GIS TREC) there were 297.1 miles of sidewalk mapped. The sidewalks layer revised by Subigya Shah (ISU GIS TREC) mapped 397.7 miles of sidewalk. The approximately 100 additional miles of sidewalk occurred primarily in Chubbuck and in various new sub-divisions and developments on the benches of Pocatello (figure 1).

[1] See the 2020 project website to download the geodatabase schema as an XML workspace document.

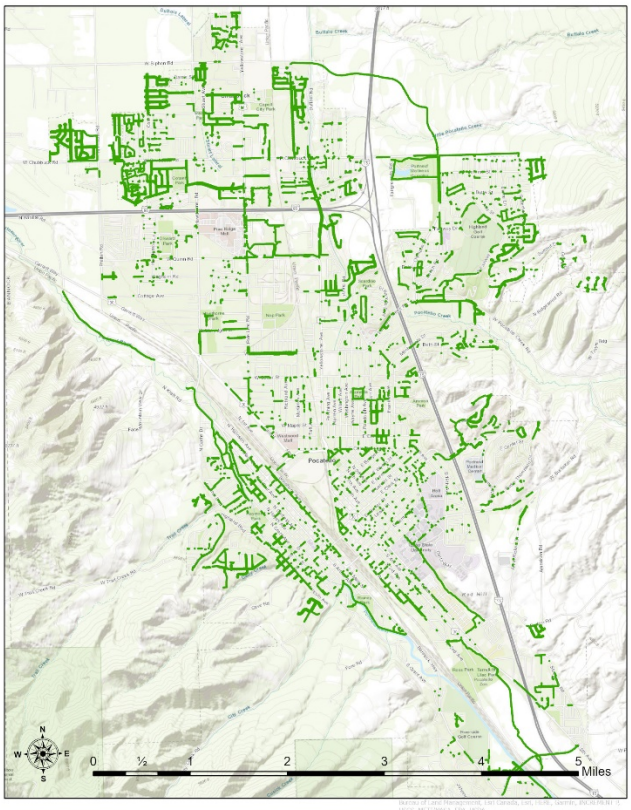

Figure 1. New sidewalks (green) mapped as a result of the 2020 field data collection campaign. While numerous sidewalk segments were added/updated throughout the project area, the majority of new sidewalks were mapped in Chubbuck and along the east and west benches of Pocatello.

Based on 2006-2007 data, 5,804 sidewalk hazards existed and were mapped. The 2020 data collection found 5,855 sidewalk hazards or approximately 50 additional hazard points. This slight difference could be misleading and thus, an explanation of the mapping process is needed. First, while approximately 50 additional hazards were mapped, hazard density appears to have decreased since 100 more miles of sidewalk were mapped. This results in a hazard density of 19.5 hazards per mile of sidewalk based on 2006-2007 data and 14.7 hazards per mile based on the current 2020 data. In all likelihood, the density of sidewalk hazards has not changed and the reader should bear in mind the fact that sidewalk hazard mapping was not a priority of the 2020 data collection. To assess the change in sidewalk hazards, Getis-Ord hot-spot analysis was used to identify those areas have a "higher than expected" density of hazards as well as a "lower than expected" density of hazards (figure 2). The results of this analysis highlighted south 4th Avenue and south 7th Avenue as hot-spots along with Albatross Drive, Bluebird Drive, and Chickadee drive as cold spots. The hazards mapped in 2007 were revisited in 2020 resulting in all hazards being re-confirmed in both sample areas, with additional hazards identified as well. This suggests that the sidewalk hazards are actually increasing and a more thorough field campaign to map these features might be necessary in the future.

A priority of the 2020 field mapping campaign was the collection of street signs in Chubbuck. While signs were not collected as part of the previous 2006-2007 project, the City of Pocatello had previously mapped street signs and shared these data with this project. The schema used for the street sign inventory followed that used by the City of Pocatello and as a result, a nearly comprehensive street sign inventory is available with 11,106 signs mapped across the project area.

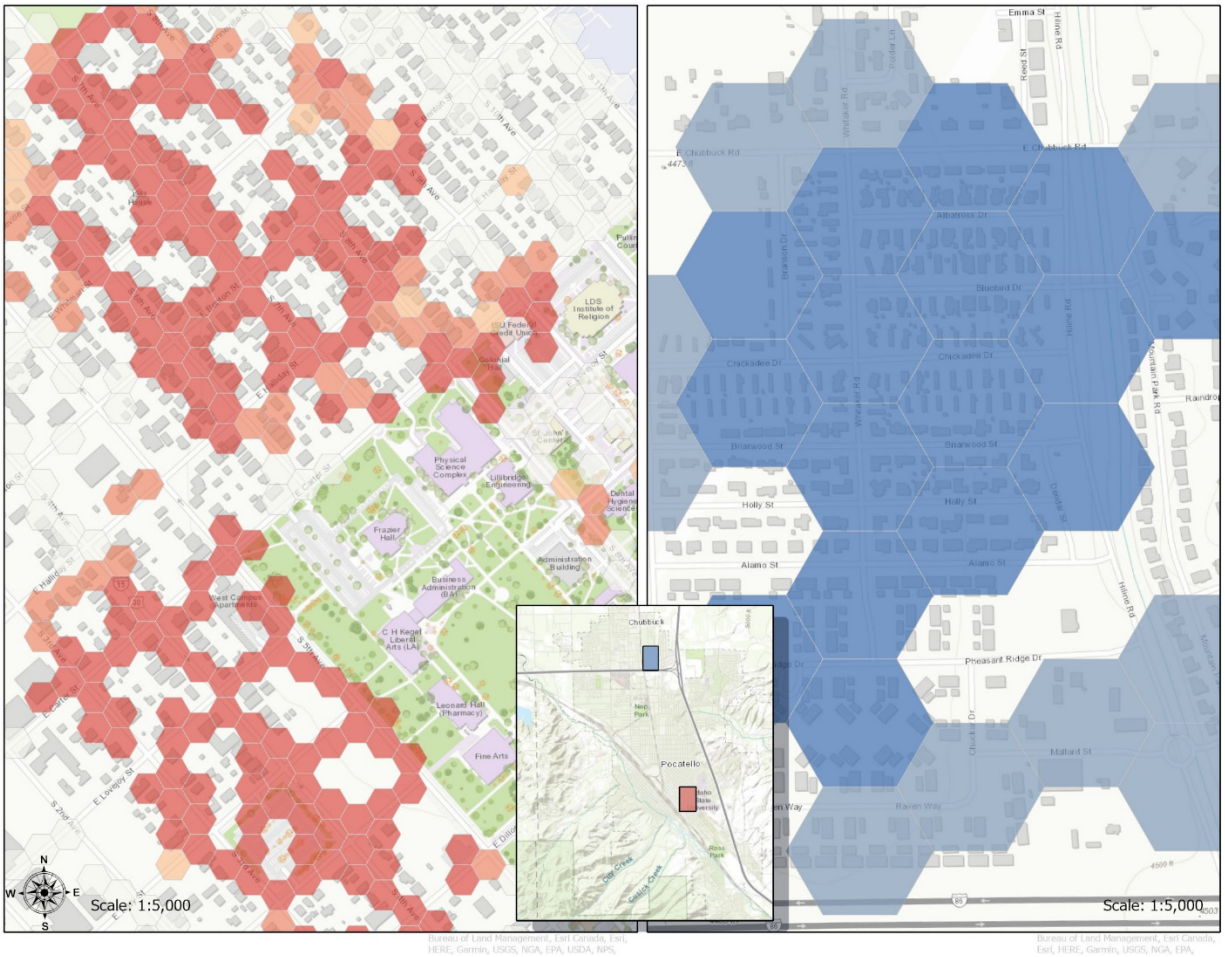

Figure 2. Result of Getis-Ord analysis to identify hot spots (left) and cold spots (right) in sidewalk hazard points. These areas were re-visited during the 2020 field campaign.

Another project priority was the mapping of curb returns or sidewalk ramps. These features represent a pedestrian's interface between the sidewalk and crosswalk. For a variety of reasons, including compliance determination for the Americans with Disabilities Act of 1990 (ADA), these features are important to map. The 2006-2007 project mapped 2,786 sidewalk ramps. Following the 2020 field collection 3,720 ramps had been mapped, or approximately 1,000 additional ramps.

Table 1. A summary of the new features mapped by this project.

Data layer	2006-2007	2020	Change
Sidewalks	297.1 miles	397.7 miles	+ 100.6 miles
Sidewalk hazards	5,804 points	5,855 points	+ 51 points
Sidewalk ramps	2,786 points	3,720 points	+ 934 points
Street signs	n/a	11,106 points	+11,106 points

Conclusions

The *Advancing the Spatial Data Infrastructure of Bannock County, Idaho* project succeeded in mapping/revising the priority feature layers identified by the project partners; a sidewalk and curb ramp inventory update, sidewalk and curb ramp survey, and street sign inventory. Following a careful review of these data and data layers there is a relatively simple step that could be taken to further improve these data. That is a consolidation of two coded value attribute domains (CVAD). The first is a "Yes/No"

domain using the short integer data type and an identical "Yes/No" domain using the long integer data type. The recommendation is to eliminate either of these domains and use the remaining CVAD throughout the project in the future. From a performance perspective it would be advantageous to retain the short integer CVAD, however that may yield errors with the Lucity system already in use at the City of Pocatello. The second CVAD that should be examined more closely is the use of various *condition* domains. Each describes a features *condition* using very similar categories (e.g., poor, fair, good, and excellent), yet several domains have been created and specifically applied to sidewalks, signs, curb returns, etc. In practice, only a single *condition* domain is required and could be applied to all fields where condition is assessed. We will discuss both of these recommendations at the next monthly project meeting.

We look forward to continuing this project and suggest planning to accommodate a comprehensive revision of the sidewalk hazards in the future. A higher priority however, is the development of an improved methodology to update and maintain the sidewalk ramp inventory. Progress is already being made toward this end with current discussions on a consistent evaluation process (protocol) along with development of an easy to use, field data collection app based on *Collector for ArcGIS* or Esri's new *Field Maps* app.