Geospatial Data Development for Trails (2011)

West Virginia GIS Technical Center
April 2011

Introduction

As a follow up to the 2010 trails project between the West Virginia GIS Technical Center (WVGISTC) and the West Virginia State Trails Coordinator (WVSTC) wherein WVGISTC compiled a statewide geospatial dataset of trails and developed a data model to store and maintain that data, the WVGISTC engaged in a project of targeted data collection and integration for Monongalia County, WV. This report details that effort.

Objectives and Deliverables

The objectives and deliverables of this project are as follows:

- Utilize a combination of heads up digitizing, field collection, and integration of existing data, to create a complete set of geospatial data for the trails of Monongalia County, WV.
- Integrate that dataset into the statewide trails dataset.
- Integrate datasets for other areas of the state into the statewide trails dataset as they become available.
- Document and report the source of each feature (or set of features) within the dataset and within this report.
- State update status map.
- Sample map of Monongalia County data at local scale.

Methods and Data Collection

First, we compared the existing statewide trails dataset with the tabular record of WV's trails created by the WVSTC. This provided us with a list of trails and trail areas that we knew were either incomplete or completely lacked data. Table 1 contains that list.

Missing Trails, WVSTC Identified
Chestnut Ridge Regional Park
Coopers Rock State Forest
Mason Dixon Line
Upper Monongahela Water Trail
Krepps Park (BOPARC)
White Park (BOPARC)
Whitemoore Park (BOPARC)
Pompano Run
West Virginia Botanical Garden Inc.
West Virginia University - Core Arboretum

Missing Trails, WVSTC Identified
West Virginia University Forest

Table 1. WVSTC identified areas of missing or incomplete data

Following that, we used our own knowledge along with ancillary datasets (eg, public lands) to compile a list of areas not documented by the WVSTC that needed trail data collected. Additionally, we examined the existing data for Monongalia County and identified several features of unacceptable spatial resolution. This provided us with a list of several other trails and areas that required work. This list can be seen in Table 2.

Missing/Incomplete, WVGISTC Identified
Pedlar WMA
Little Indian Creek WMA
Snake Hill WMA
Dorsey's Knob Park (BOPARC)
Caperton Rail Trail
Deckers Creek Rail Trail
Mon River Rail Trail North
Mon River Rail Trail South
Cheat Lake Rail Trail

Table 2. WVGISTC identified areas of missing, incomplete or poor data.

Using these lists as guides, we quickly determined which areas we could collect/improve from existing data, be it actual line features or high resolution aerial photography. For example, using published trail maps along with Monongalia County's 6 inch resolution aerial photography, we were able to create detailed geospatial data for several city parks. While very little pre-existing GIS data was available for Monongalia County, we did work closely with the West Virginia Division of Forestry (WVDOF) to obtain new data for Cooper's Rock.

Several areas and trails required field work and GPS units for proper collection. We developed pre-staged datasets with domains as well as a manual of best practices for collection. We used Magellan Mobile Mapper 6 GPS units for field collection. These units are capable of approximately ½ meter accuracy.

In addition to collection of trail lines, we also collected point features for several entities. Those entities include: bridges, steps, bathrooms, parking areas, picnic tables/benches, overlooks and tunnels. We are storing that data internally at this time as no database schema has been developed for those futures. We look forward to discussing rules with our partners for storing and publishing a dataset for recreational point features in the future.

Database Integration

In addition to the WVDOF's dataset for Cooper's Rock, we also received data for other areas from two parties – the WVSTC's office and the Jefferson County Office of GIS. We developed an attribute crosswalk for each of these datasets and ultimately integrated them into the master dataset.

Source Dataset Name	Creator
Trails of Coopers Rock State Forest	WVDOF
Hydrographic Feature Lines (1: 4,800)	WVGISTC/SAMB
Jefferson County Trails	JC Office of GIS
Rail Trails of West Virginia (In Development)	WVDOT
Monongalia County 6 inch Imagery - 2010	Monongalia County Commission

Table 3. External datasets utilized in this project.

Results

Using a combination of sources, we were able to compile data for all but one of the identified areas as outlined in tables 1 and 2. The lone exception was Chestnut Ridge Park which was not open during the period of this project. We fully intend to follow up on that area in the near future. We also integrated several hundred miles of trails outside of the original focus area using the datasets listed in table 3. Tables 4a and 4b contain statistics describing the new/revised (N/R) data integrated into the dataset.

Updated Geometry from Existing Data	361 mi
New Geometry from GPS	26 mi
New Geometry from Digitizing	6 mi

Total N/R Data; Monongalia County	144 mi
Total N/R Data; Jefferson County	33 mi
N/R Data; Other Areas	216 mi

Table 4a (top). Total length of new geometry by source type;
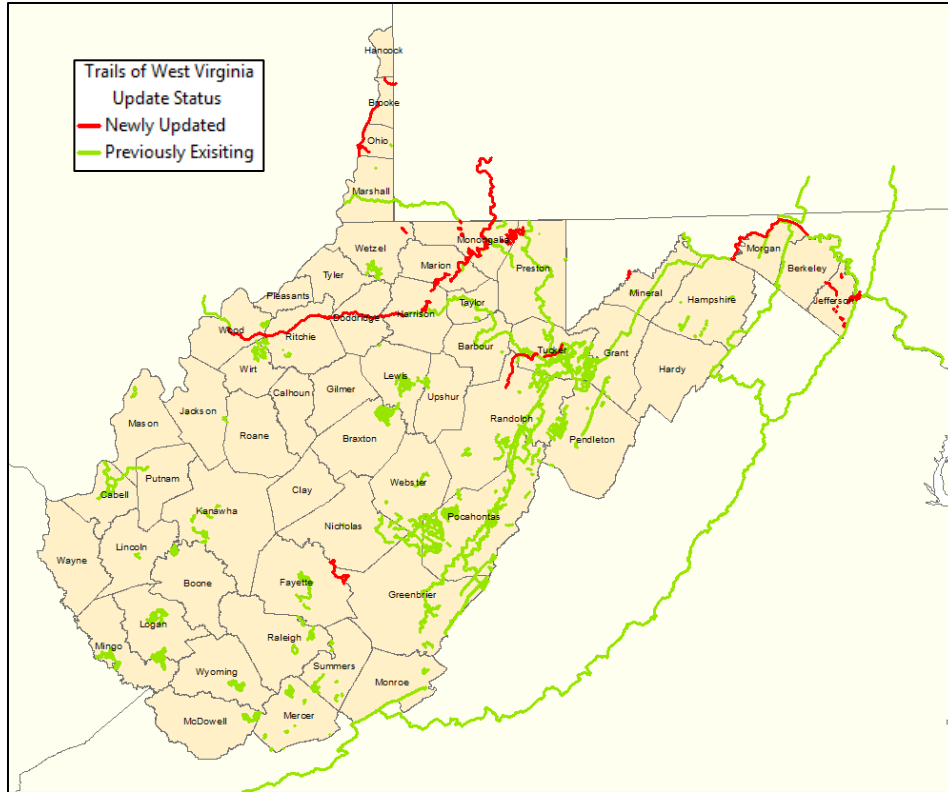Table 4b (bottom). Total length of new geometry by area

Figure 1. Update status of WV Trails Data.

As can be seen from Table 4b and Figure 1, this project's reach ultimately extended well beyond the borders of Monongalia County. The WVSTC's compilation of new geometry for WV rail trails contributed a large number features and miles to the new version of the state trails dataset and allowed us to replace a great deal of the coarsest data within the dataset.

We collected ~26 miles of new data using GPS units. All lines (but GPS lines in particular) were reviewed for connectivity and accuracy. Attributes collected in the field (eg, name, number, allowable uses) were verified and checked for spelling. GPS collection allowed us to fill in detailed trail maps for several small areas, such as Dorsey's Knob Park, depicted below in Figure 2. A more detailed version of this map, intended to demonstrate what is possible with the dataset, is attached to this report as an Appendix.

Figure 2. Dorsey's Knob Park

Thirty two (32) new miles of trails were integrated into the statewide database and geometry was dramatically improved for 361 miles of trails. In total, nearly 400 miles of data over 13 counties was updated as part of this project.

Conclusions

The methods utilized in this project proved effective and we look forward to continuing their use in the future. The WVGISTC is very comfortable with it's role as part time collector and full time integrator of new data into the state trails database and the partnership we have built with the WVSTC and other's continues to result in progress.

Future Tasks

In the future, the WVGISTC intends to continue integrating new data as it is provided to us by stakeholders. We also intend to co-author (along with the Rahall Transportation Institute) a simple guide to collecting and submitting trail data to the statewide database for distribution to people and groups who would like to put their GPS units to work. Lastly, in conjunction with interested partners, we will develop a plan to integrate point feature data into the trails dataset.

APPENDIX 1

This is a sample map, intended to demonstrate some of the capabilities of the data. The map includes point features collected by the WVGISTC but not included in the published database at this time.

APPENDIX 2

This appendix contains some relevant web links.

Trails of West Virginia: http://www.wvgis.wvu.edu/data/dataset.php?ID=413
Final Report on 2010 Trails Project (contains information about data model):
http://www.wvgis.wvu.edu/data/otherdocs/trails/finalReport12July2010.pdf
WV State Trails Program:
http://www.transportation.wv.gov/highways/programplanning/grant_administration/wvtrails/Pages/default.aspx
Morgantown BOPARC: http://www.boparc.org/
WV Botanic Garden: http://www.wvbg.org/
Chestnut Ridge Park and Campground: http://www.chestnutridgepark.com/
WV Division of Forestry: http://www.wvforestry.com/
Upper Monongahela River Water Trail: http://www.monriversummit.org/UMWT/