

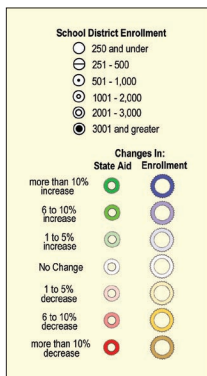
Special Symbols for Special Needs

By Jim Mossman, Data Deja View

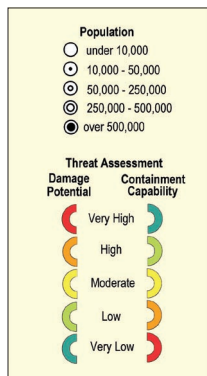
This article explores uses of several special purpose marker symbol sets and identifies techniques for visually separating symbols of primary interest from those that are less important. The referenced symbol sets—DDV's Population Plus and the DDV highway shield stylesets available for all 50 states—were created by Data Deja View (DDV) and can be downloaded at no charge from the ESRI ArcScripts Web site (www.esri.com/arcscripts).

Providing Information More Readily

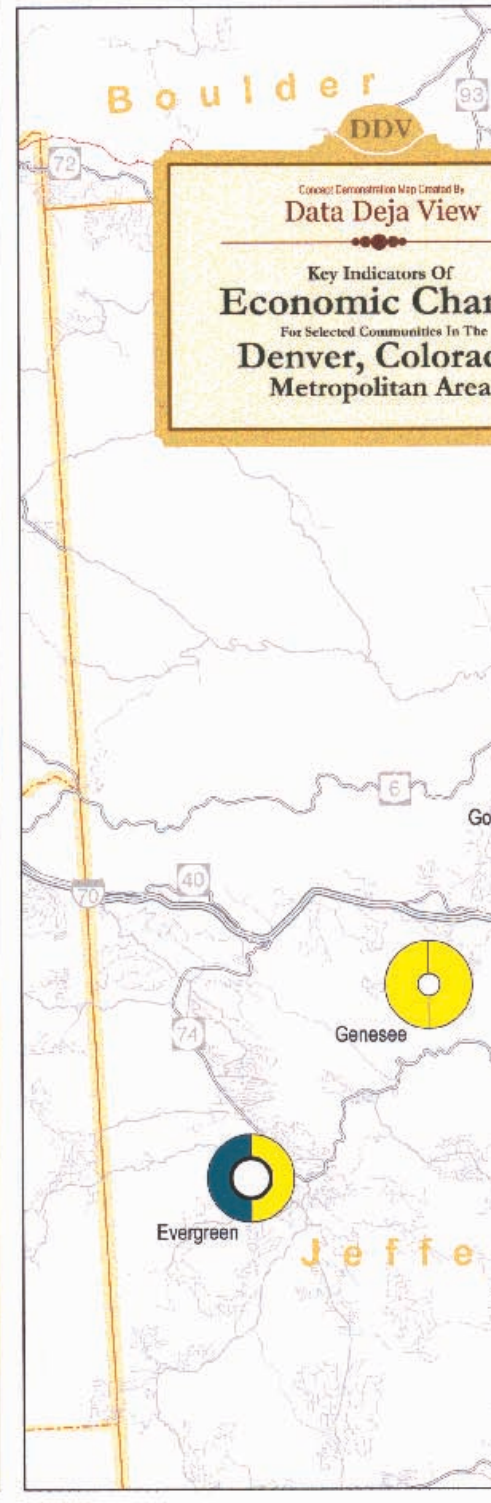
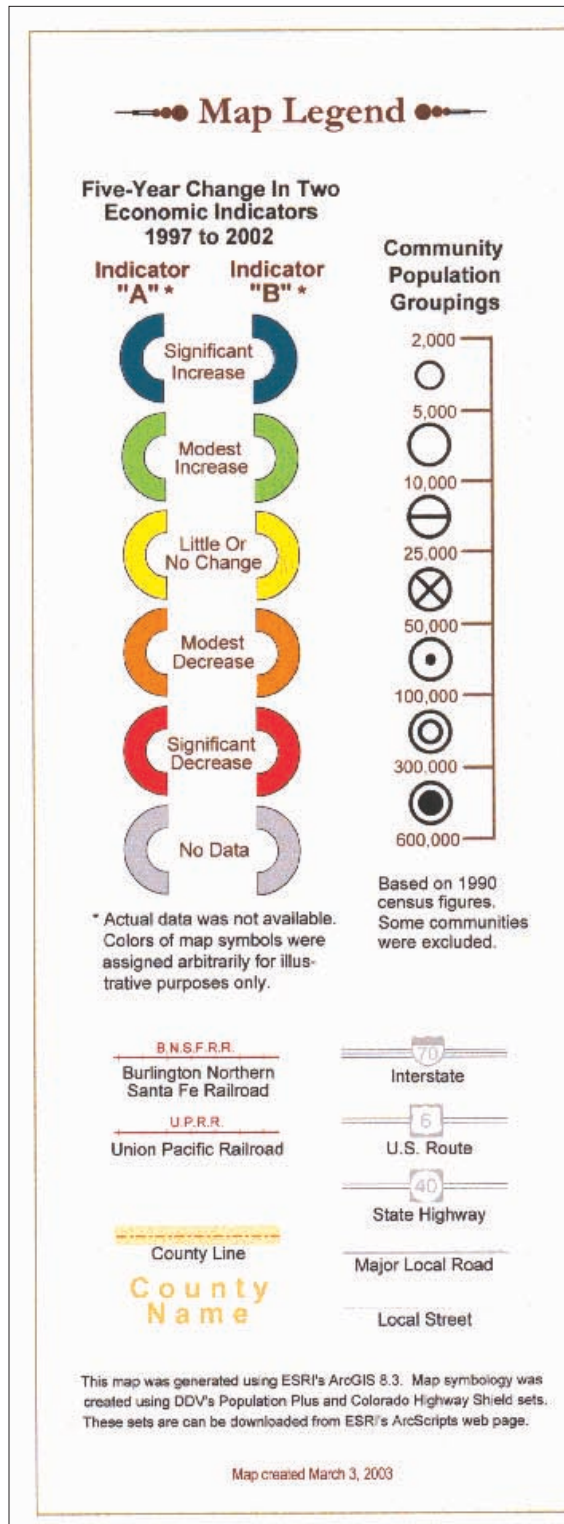
The DDV Population Plus marker set is available both for ArcView 3 and ArcGIS. The set, which evolved from a research project, was primarily designed to show things such as measures of threat level and containment capability relative to population center size classifications. The goal was to present data in a manner that would allow the viewer to quickly visually identify basic priorities for allocating federal and state funding to local communities.



This symbology conveys information about both enrollment and state aid.



This legend allows representation of threat assessment in relation to population.



In this situation, the population element is obviously important. Two communities—each with high threat levels and low containment capabilities—probably should not receive the same amount of aid for equipment and training if their populations differ significantly. However, the marker set is not limited to this use. As the map and legends that accompany this article illustrate, there are many situations that can benefit from the ability to show two additional attributes that are relative to community size.

Although this need could have been met by using three different symbols and manually placing them around each population center location, the process would be tedious. Instead, single symbols with multiple layers were created.

Building a Better Symbol Set

The font layer construction techniques for half-circle and concentric circle symbols are shown in the accompanying illustrations. Although Macromedia's Fontographer was

used to generate these fonts, FontLab 4.5 from FontLab could also have been used. Microsoft Visual Basic 6 was used to build the style sets for ArcGIS. For the ArcView 3 palettes, Avenue was employed.

To apply the symbols to a map in ArcGIS, the user changes the desired point feature's symbology to the appropriate population symbol. Then using the Symbol Property Editor, the user manually changes the colors of the attribute layers to match the data to be represented. To retain the color changes, the

Special Symbols for Special Needs

Continued from page 33

The three illustrations showing zoomed-in portions of the Economic Change map demonstrate the effect of using these design styles. The on-road style shields compete with symbology for population and economic data. When the atlas style shields are used in place of the on-road style, the highway symbols—while still noticeable—have been toned down considerably.

For the Economic Change map, highway identification plays only a minor orientation role so further toning down of the highway symbols is warranted. One way to do this is to change the color of the atlas style shields from black-on-white to gray-on-white. However, the shield outlines would become lost against the background of roads, which have also been grayed to reduce their level of importance.

The final solution involved retaining the atlas style Interstate shields and using the USDOT style shields for U.S. and state routes. The latter style employs a black rectangular background for these types of routes. All shields were changed to gray-on-white. The filled gray areas in the shields stand out sufficiently to be readily discerned

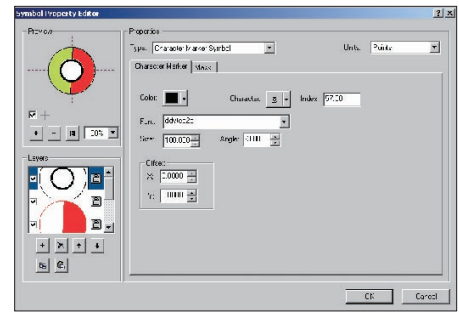
from the roads. By choosing the proper size, coloring, and style of highway shield, route identification can easily be relegated to the proper level of importance on this map.

Polygons With Numbers and Letters

Identifying point features where text labeling on the map cannot be used because there are too many features that are too closely spaced is the final mapping issue that will be addressed here. The DDV Polygon and Letters (PAL) and DDV Polygon and Numbers (PAN) marker sets, only available for ArcGIS, were designed to handle this situation.

For the tourist map of downtown Denver, Colorado, that accompanies this article, sites were symbolized by category using four of the 11 different designs available in the PAN set. For ease of location, sites were numbered from left to right on the map. In the legend, these symbols were placed in numeric order within category.

The PAL set contains letters from A to Z in serif and sans serif styles, and the PAN set contains numerals from 1 to 99. These symbols are useful against a wide variety of

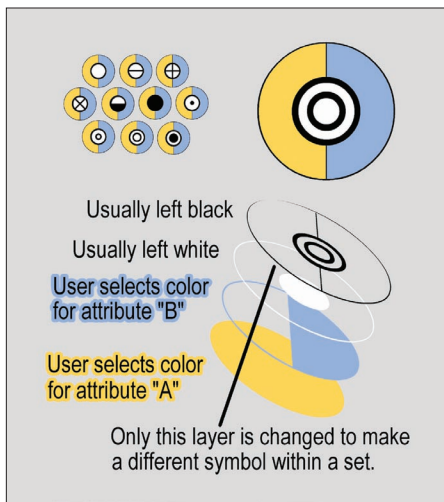


To access the Symbol Property Editor, right-click on the layer to symbolize and choose Properties from the context menu. In the Layer Properties dialog box, click on the Symbology tab. In the Symbol Selector dialog box, click on the Properties button.

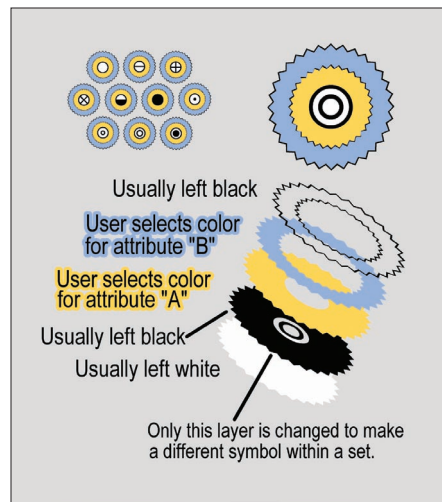
backgrounds. Both sets were constructed with variations in shape and borders.

Small Changes, Big Improvements

Several minor changes were made to the tourist map that resulted in significant improvements. Aerial photos of downtown Denver, obtained from the terraserver (www.terraserver.com),



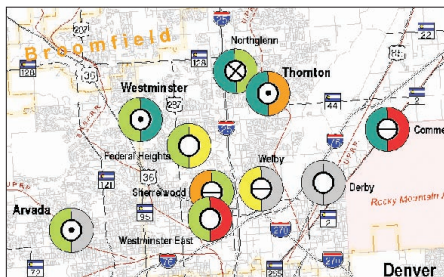
Layer construction for half-circle symbol



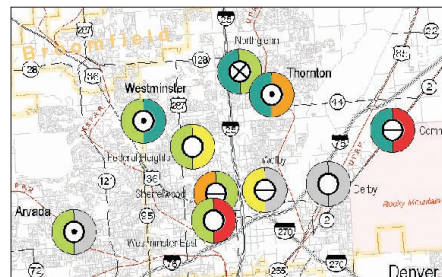
Layer construction for concentric circle symbols



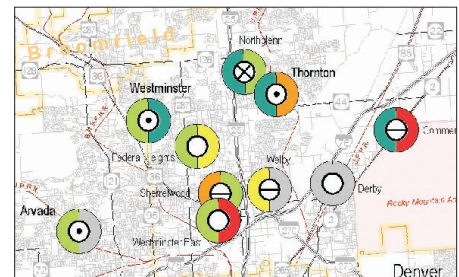
Developing a variety of symbol styles gives the mapmaker more control over the level of emphasis placed on symbol types. The DDV highway shields are available in on-road, atlas, and USDOT styles.



The on-road style shields place too much emphasis on the highways.



Atlas style highway symbols are far less arresting.



The final solution was to retain the atlas style shield for interstate highways and use USDOT style symbols for U.S. and state routes.



Cody, Wyoming - City Center

Attractions

Buffalo Bill Historical Center

- 02 Cody Firearms Museum
- 03 Whitney Gallery of Fine Art
- 04 Main Entrance and Gift Shop
- 05 Plains Indian Museum
- 06 Buffalo Bill Western Museum
- 07 Draper Museum of Natural History

Other

- 08 Cody Country Art League
- 09 Cody Stage
- 10 Cody Gun Fighters (seasonal)
- 11 Red Canyon River Trips & Bike Rental
- 12 River Runners Boat Trips

Hotels and Motels

- 13 Econo Lodge
- 21 Irma Hotel
- 25 Pawnee Hotel
- 42 Cody Motor Lodge
- 46 Up Town Motel
- 47 Comfort Inn
- 48 Holiday Inn
- 52 Rainbow Park Motel
- 54 Burl Inn

Aerial photos downloaded from www.terra-server.com. These were flown in 1994. Notable changes since then include an addition to the Buffalo Bill Historical Center. Facility locations were field checked in January 2003. It was observed that one former restaurant was no longer signed and it was not included (it may be undergoing a change in ownership or renovations). Some symbol locations were adjusted to avoid overlapping.

Public Service Facilities

- | | |
|-------------------------|------------------------|
| 01 West Park Hospital | 09 Tourist Information |
| 10 Cody H.S. Auditorium | 12 City Park |
| 11 Cody High School | 18 Fire Department |
| 15 Government Offices | 19 Police Department |
| 15 County Court | 29 Auditorium |
| 17 Public Library | 34 Government Offices |
| 19 Sheriff's Office | 35 Public Rest Rooms |

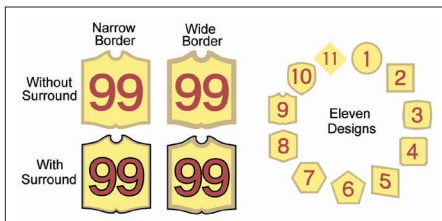


Map Prepared By
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February 1, 2003

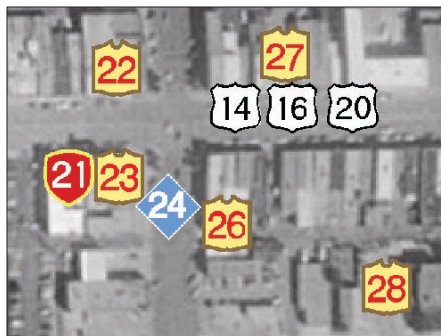
Restaurants

- | | |
|------------------------------------|----------------------------------|
| Fine and Ethnic Dining | Coffee and Sandwich Shops |
| 13 Maxwell's Fine Food and Spirits | 22 Peter's Cafe Bakery |
| 28 Irma Grill | 26 Beta Coffee House |
| 27 Proud Cut Saloon & Restaurant | 28 Patsy Ann's Bakery |
| 32 Tommy Jack's Cajun Restaurant | 40 Daylight Donuts |
| 36 Zapata's Mexican Food | 58 Cody Coffee & Restaurant |
| 37 Stefan's Restaurant | Fast Food and Pizza |
| 39 La Comida Mexican American | 14 Taco John's |
| 49 QT's Restaurant | 31 Pizza on the Run |
| 50 Hong Kong Chinese Restaurant | 41 Domino's Pizza |
| Family Style | 48 Wendy's |
| 49 Granny's Family Restaurant | Dessert Shops |
| | 33 Main Street Ice Cream |

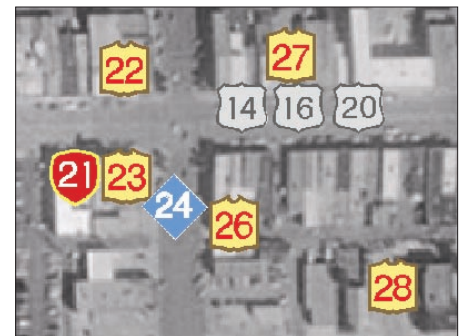
This map of Cody, Wyoming, is designed to identify points of interest for tourists.



The DDV Polygon and Letters (PAL) and DDV Polygon and Numbers (PAN) marker sets, available only for ArcGIS, were designed to identify point features where text labeling on the map cannot be used because there are too many features that are too closely spaced.



The highway shields overwhelm the aerial photo.



Lowering the contrast allows the text and symbols to stand out more.

were fairly high in contrast. Lowering the contrast a bit allowed the text and symbols to stand out more. In addition, text lettering on the photos was given a gray mask so that all text would have a uniform background.

Another small touch—the use of the narrow, pale yellow band behind the title, between the map and its legend—made a surprising improvement to the appearance of the map. Final adjustments were made to the highway symbols because they still stood out too much. Both layers of the symbols were grayed down. This reduced the contrast to the extent that the symbols almost appear to be part of the photo, yet were still visible and readable.

Conclusion

These symbol sets provide an opportunity to more effectively handle a number of mapping challenges and should have a wide range of applications. The techniques for visually separating point feature symbols by level of importance are not limited to highway symbols. For users designing their own symbols, the highway symbol examples point out the potential benefits of designing symbols in several styles.

About the Author

Jim Mossman, working as Data Deja View, has been supplying marker symbols and color sets to the ESRI user community for many years. He previously authored several *ArcUser* articles on cartography and has recently made presentations at GIS conferences on techniques for making better maps. He has also developed a workshop on marker symbol design and creation. He may be contacted at ddvgis@attbi.com. Data Deja View is now an ESRI business partner.