

Title:

Creating a County-Wide Zoning District Map Book

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Abstract:

The Nevada County, CA GIS Division developed a county-wide Zoning District Map (ZDM) Book using a geodatabase and the ArcGIS Map Book Developer's Sample. The original GIS version of the ZDM Book was created using AML's run within ArcInfo Workstation and the Coverage Data Model. The GIS Division streamlined the ZDM Book making process by integrating a county-wide review of its zoning data with a customized, data-driven process to generate the Book pages. The multi-step process involved verifying the accuracy of the zoning boundary and attribute data, creating a map template that was easily readable for end-users, configuring the datasets to drive the page output, creating scale-dependent feature-linked annotation, conducting quality assurance/control, and distributing both paper and digital copies to various end-users. Many of the map book options were used to customize the map template.

Paper Body:

Introduction

Good morning and welcome. This morning I will be talking about the process that our GIS Division undertook to review the county zoning information and build a new zoning map book using the Map Book Developer Sample through ESRI.

The Nevada County GIS Division like many other small GIS groups in local government have a hard time finding the time to undertake large projects. Especially when your juggling software and hardware maintenance, map and data requests, data layer maintenance and creation, Internet and other custom desktop GIS applications, among many others. In spite of this, we have the need and desire to bring our base data layers up to some type of standard. So, is there a standard when it comes to zoning designations and boundaries and if so, what is it???

Background

I would like to take a moment to briefly describe what our GIS Division started with before talking about what we have now.

The original version of the Zoning District Map Book (hereafter referred to the ZDM Book) was created and maintained by the Planning Department. In the late 90's, the GIS Division wanted to create a zoning coverage for the county so they digitized all of the zoning arcs on each individual parcel map for the entire county. The result was multiple zoning coverages that were used for each parcel map. From that point, the County of Nevada adopted the GIS version of the ZDM Book, which was created using AML scripts run within ArcInfo Workstation using the individual coverages.

Then, there was a need for a seamless parcel layer. Once the seamless parcel layer was created, so was a seamless zoning coverage for the entire county. The result was the ability for the GIS Division to assign zoning designations to individual parcels in an automated way (through intersection process) and to map zoning for the entire county.

Review of County-wide Zoning Data

More recently, our county-wide zoning review was initiated based on an inquiry into a discrepancy between zoning designations on an existing page of the ZDM Book and current knowledge of the zoning of that particular portion of the county. This minor inquiry resulted in an assessment of the scope of our problems with the GIS zoning information. Some of the major issues included ZDM Book pages not reflecting the changes instituted by County Zoning Ordinances (in other words, GIS Staff never made the amended changes to the zoning layer), GIS Division wasn't notified of all County Zoning Ordinances so the amended changes were never made, zoning boundary and designation changes made to the GIS layer with no documentation (basically, we had no way of knowing why these changes were made), incorrect or missing zoning annotation on the ZDM Book pages, discrepancies between zoning and general plan boundaries, non-coincident geometry with respect to the parcel boundaries, and so on (from a list of 20 documented problems). The majority of these problems were a result of lack of time and some oversight on the part of GIS staff.

With the help of Planning staff (one person in particular who remembered most everything about specific parcel-based zoning information for most of the county), I made multiple passes over the existing ZDM Book. The first pass required using highlighters with a lot of patience to "flag" differences between the current ZDM Book pages (showing amended changes since 1997) and the originals (adopted in 1997). After the first pass, I collected all of the County Zoning Ordinances and verified that these changes were made to GIS's master zoning layer (converted from coverage to GeoDB).

Building the ZDM Book

At this point, we had very high confidence in our master zoning layer (both geometry and attributes) and we determined that it was time to update the ZDM Book in order to do away with old AML scripts and ArcInfo plots and to make a zoning map book that used the Map Book Developer Sample to take advantage of the data-driven options and the ease of recreating map pages in hardcopy and digital forms, all built in ArcGIS 8.3.

The first step in creating the new ZDM Book was to setup a page layout. This task was a precursor to building annotation because I wanted to determine the page extent and hence fit all of the annotation on each page. The existing ZDM Book used three separate scales for the map pages because the ZDM Book index layer had variable scale polygons (i.e. in rural parts of the county there were larger index polygons compared to more populated areas with more complex zoning). We decided to continue using the original index layer (with some modifications) because it was adopted by County Zoning Ordinance and we didn't want to undertake the legal process of changing the underlying basis of the ZDM Book. However, I determined that the page scales used in the existing ZDM Book weren't appropriate for the existing index layer. For example, some of the index polygons

didn't fit on the map book page. Also, the Planning Dept. wanted to see some overlap between pages because of the common occurrence of features (esp. parcels) in question always lying on the edge of the map page. After a lot of testing, I came up with three new scales for the map pages that allowed enough space to fit each of the index polygons and to view adjacent page features. The 11x17 layout contains two sections; the main section is the map view (that contains all of the data) and the other portion of the layout contains all of the textual information about each map page. The latter portion of the layout was broken down into 4 sections from top to bottom; 1) the Planning Department title and Nevada County logo, 2) the county zoning ordinances and their operative date, which are different for each map page (both data driven using Map Series option 'Tag with Index layer field'), 3) the north arrow, scale bar and scale text, our GIS data disclaimer, and text displaying "ZDM Page Zoning Data Valid as of 'today's date'" (both scale text and date are data driven using Map Series option 'Tag as Date' and 'Tag with Index layer field', respectively), and 4) ZDM Page number and Geographic area description (both data driven using Map Series option 'Tag with Index layer field').

Since all of our data had already been converted to a GeoDB, the next step was to create annotation. I created three different types of annotation for the map book, zoning annotation (designations and notes), ZDM index or page annotation (map page numbers), and PLS (Public Land Survey) section corner annotation (section numbers). Since the map book consisted of three different scales, I created three separate GeoDB annotation feature classes for each type of feature (zoning, ZDM Index, and PLS) each reflecting a different reference scale. The result was 9 separate feature classes for the annotation. With the new functionality in Arc9.x, it may be possible to combine the three scale-dependent annotation feature classes for each type of mapped feature and use queries to mask only the annotation needed for specific scales. I built feature-linked GeoDB annotation for the zoning designations because of the utility of making future updates (i.e. when you update a zoning polygon, the annotation is automatically updated). Of course, you still have to move feature-linked annotation manually to place it appropriately on the map. This annotation was compared to the existing coverage annotation layers (of which there were several) used in the ZDM books as to not lose any information. For the ZDM index page numbers and the PLS section corners, I created standalone (or non-feature-linked) GeoDB annotation because these are static features. There is an option in the Map Book Developer Sample to auto label adjacent pages in a map book, but it had limitations and it didn't fit our needs. The ZDM index annotation contained annotation representing each page number at the corner of each index polygon, which made it very easy to identify adjacent pages.

The resulting map pages contain the following information, all of which have unique symbology to differentiate the different features:

- ZDM Book Index (Page) Boundaries and Annotation
- PLS Section Corners and Annotation
- Zoning Polygon Boundaries and Annotation
- Parcel Boundaries
- Roads with Dynamic Labels turned on

Lakes with Dynamic Labels turned on
Rivers/Streams with Dynamic Labels turned on

The first map book was built using a B&W format. This was done so that Nevada County staff and the Public can easily reprint the pages so the information on each page will be legible (esp. the symbology). I also created an index map that described all of the symbology used in for the map book. I do plan on creating a color version of the ZDM Book when time permits.

Publishing the ZDM Book

Once the ZDM Book template was established, we wanted to disseminate the information to the widest possible audience. In addition to printing pages for two copies of the ZDM Book (one for GIS and one for Planning), I exported all of the map pages to PDF's and posted them in our GIS map collection in a document management system called Docushare. This allows all county staff as well as the Public to view and print the digital versions.

We now have a process in place for receiving/updating zoning information based on new County Zoning Ordinances. Once the zoning geometry and attributes are updated within the master zoning layer, I make necessary changes to the zoning annotation and our ZDM Book index layer (i.e. update the ordinance number and dates to drive the page output), and print the new page (showing the current date) as well as export the digital version and post it to our map collection in Docushare. Because of the three scales used for the ZDM Book pages, I use the Map Book option of enabling/disabling pages when printing and exporting.

Conclusion

I worked on this project for about a year while also fulfilling my other job responsibilities. If you were to ask me if it was all worth it, I would have to say yes ...definitely. I say that because we now have a professional, easy-to-read, sound (as in the data accuracy) zoning map book that contains data-driven components and is easy to reprint and disseminate.

We received much praise for the availability of these zoning maps as well as the clarity of all of the features shown on the map.

So if anyone has any questions for me, feel free to ask them now. Thank you.

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