Teaching Map Design using Mapping Center

Aileen Buckley
Cartographic Researcher
ESRI, Redlands
Abstract / agenda

- **Mapping Center Web site**
  - help people use ArcGIS software to make maps

- **Mission**
  - teach users the cartographic principles that underlie the decisions they make about map design -- help people to understand how to make smart design decisions based on these principles

- **Challenge**
  - help a general audience learn how professional cartographers approach design challenges without diverting them from their primary mission -- various map making tasks
Abstract / agenda

• **Audience**
  – Professionals looking for help for requirements related to their job
  – College professors/other teachers looking for resources for teaching
  – Students looking for help with assignments/to understand class content

• **Success ?**
• Based on our need to disseminate content in a variety of formats for a variety of needs
• Based on our successes/failures in teaching map making with ArcGIS
• Based in part on some previously developed Web sites for cartography
Welcome to Mapping Center

Mapping Center is about the use of ArcGIS in the graphic delivery of geographic information. Its goal is to help you make great looking maps by using the same cartographic concepts and techniques that professional cartographers use.

Current News Feeds

Dot maps vs. choropleth maps with random dot area symbols

**Question:** What is the difference between filling a polygon with randomly placed dots and creating a dot density map for the polygon?

Filling a polygon with a certain number of randomly placed dots is a form of choropleth mapping where random dots are the area symbol for a quantity that is assumed to be of uniform density throughout the polygon. The choropleth map seen below of San Bernardino county population density uses random dots in this manner. *(read more)*

Getting better vectors from your rasters with ArcScan

I’ve often had the situation where I wanted to use a raster data source as a single-color map background layer, but the cell size or other data processing output resulted in a ‘blocky’ or ‘pixelated’ appearance to the data at the map scale I need. A simple raster-to-vector data conversion served only to recreate the boxes or ‘saw-tooth’ or ‘stair-step’ lines from the original raster. The ArcScan extension has tools that reduce or remove this problem, and create an output vector data layer with smooth polygon boundaries or more naturally sinuous lines. *(read more)*

Can you read me now?

**Normal** I don’t care. **Bold:** Can you read me now? **Italic:** Text and imagery have had an uneasy relationship since the day they met. Satellite imagery and aerial photographs are the ultimate cartographic background, which makes any text drawn on...
Tip for creating annotation for complex maps

Complex maps such as topographic maps present several significant challenges for setting up labeling rules and creating annotation. The first challenge is that these maps typically have many layers and types of features, requiring map authors to create and manage numerous label classes. Second, these layers may have a high density of features, which means that automated labeling for these maps requires loading all the data into the labeling engine and making your computer to work fairly hard. Third, some labels on the map are very important and should be placed optimally (e.g., labels for cities or very important landmarks); some labels can be placed with some flexibility (e.g., placing river or stream names along lines; there are many candidate positions along a given line); and some labels are just less important (e.g., labels for contours, which must yield to the other information on the map).

Producing annotation is a requirement for most complex maps because some labels (especially contours) need to be masked, and the masking tools require annotation as the input. Also, you can perhaps see better performance by producing annotation for complex maps, as waiting over 10 seconds to a minute or so for each label redraw quickly gets tedious. However, there is a trade-off, as we learned that it wasn't worth the effort to fine-tune label weights and priorities for complex maps (the user interface works well for less complex maps, but is very hard to work with for complex maps).

So, we were stuck until we realized that we could produce annotation in batches, and then we could focus our efforts for setting weights and priorities more efficiently. Specifically, we found it was much easier to produce annotation for our maps in three batches:

1. **The most important features** These features need to have consistent and prominent placement for their labels. Further, we didn't want to risk accidentally not placing labels for these features. So, we set up label classes in our layers just for these features. Sometimes it was easy to set up SQL Queries on our layer classes for these features using existing attributes, sometimes we needed to add a new attribute specifically...
Charlie, your post comes in a timely manner as I just posted a question last week on the user forums regarding creating annotation layers. I created labels classes in my FC and set the Maplex rules for those labels and the other FC’s they interact with. Once I had everything at about 95%, I converted to annotation in a file geodatabase. The rules did not hold as they converted. I am dealing with a complex map and the labels have become a bit frustrating. Any thoughts on this situation?

To be clear, it sounds like you are converting labels to annotation and appending that new annotation into existing annotation feature classes. That means the rules would have to exactly match. If you don’t already have annotation in your anno feature classes, it’s probably easier to just create new feature classes when converting your labels. Then you are assured of a 100% match if you use that map to append additional annotation (from another geographic area).

Did you save the rules in your layers to a style and then use those rules when creating the annotation feature class’s rules?

These are the steps I followed for creating my annotation layer. First, I created a file GDB in my project directory. Second, I set up my label classes in the layer’s properties, Labels section. Next, for each class, I defined the placement properties using Maplex Label Engine. Once I had all classes defined, I selected ‘convert labels to annotation’ in a database. I selected the file GDB created earlier and went with the default layer naming convention. ‘All features’ was selected and the ‘Append’ was not selected.

I did not save rules to a style. The main issue I am experiencing is the placement of the annotation after conversion. Do you think creating a style would help hold the placement rules?

By the way, I enjoy Mapping Center a lot. The art of cartography seems to be lost on the minds of many.
Ask a Cartographer provides solutions to your particular mapping challenges. Send us your questions, and we'll send you our answers. **As always, if you need immediate help, please follow your normal procedures for Technical Support.**

These are some of the questions we have received on **Ask a Cartographer** and our answers. Feel free to comment on our answers, or [send us your own question](#)! Please remember to be considerate when posting comments.

**Archived Questions**

- Link to another document preserved in exported file
- Automatic Display And Update Of Projection Datum Used In Data Frame
- Previous articles

**Featured Cartographer**

Eduard Imhof

(1895-1986) was a Swiss cartographer who is widely known for the relief shading maps he produced for school maps and atlases. He founded the Institute of Cartography at the Swiss Federal Institute of Technology in Zurich (ETH Zurich), Switzerland and was its first professor. In 1927, he first revised the atlas used in Swiss high schools, and he then directed all published editions from 1932 until 1976. Between 1934 and 1975, all editions of the Swiss primary school atlas were also produced under his direction. He ultimately retired from teaching at ETH Zurich in 1965 but...
Ask A Cartographer

Horizontal Legend for hypsometrically tinted shaded relief

April 02 2008 | 1 comment
Categories: ArcGIS Methods, Map Elements

On Charlie Frye's blog entry on creating a hypsometrically tinted shaded relief legend, he gave an example on how to make a vertical legend. I was wondering if there were any tips on labeling a horizontal legend. I had made a vertical legend along with labels, and thought that a horizontal one might be better for the map layout given the main map data frame's size. So I just rotated the data frame (using data frame tools) for the legend to make it horizontal but am looking for advice on how to effectively label it.

Mapping Center Answer:

I like using the rotated labels, I don't quite rotate all the way to 45 degrees, so the text is still more horizontal than vertical. See the attachment as an example

Attachment: Example of horizontal legend labels

Alternatives to labeling posted by Aileen Buckley on Apr 2 2008 4:13PM

We recently presented some information on terrain representation legends in a workshop we did – there are two PowerPoint files (PPTs) you can download with some examples that are horizontally aligned but do not use angled text. They are located on the Mapping Center Other Resources page in the abstract for the Terrain Representation Workshop. Take a look at the "Hillshading and Layer Tinting" and "Terrain Representation Legends" presentations to see these examples.
Ask A Cartographer Administration

Ask a Cartographer Archives  Ask Your Question

Use the following to customize your search:
- All Categories
- (Optional) Enter Keyword or Author:

25 Results per page

Search Archives

Administrative Tasks
- Add a New Question
- Manage Categories
- Manage Deleted Questions

231 questions found
Page: 1 2 3 4 5 6 7 8 9 10

Pending Questions  BLUE = Public, RED = Private
- Add Pictures To Layout Via Raster Field Type (Pending Response)

Completed  BLUE = Public, RED = Private
- Link to another document preserved in exported file (Edit)
- Automatic Display And Update Of Projection Datum Used In Data Frame (Edit)
- Previous articles (Edit)
- Auto tagging in legend (Edit)
- Importing data (Edit)
- Zoom-In selected raster layer(s) (Edit)
- How to make faded line symbols? (Edit)
- Generation a relief map (Edit)

1 question found

230 questions found
Maps

Click on a map to find instructions for achieving a variety of cartographic effects with ArcGIS software. Each effect is categorized for you using icons. For many of the maps, downloadable resources allow you to try out the cartographic techniques on your own. Be sure to look for ratings on the effects—and add your own!
ESRI Lunch Specials: Introduction

Map Details

Title: ESRI Lunch Specials
Map Extent: Downtown San Diego, California, near the Convention Center
Map Scale: 1:6,600
Media: Print
Page Size (w x h): 8 1/2 x 11 inches (~22 x 28 centimeters)
Download: All, Data, Style, Expressions, Models & Scripts, .MXD
Map Category: Special Use
About Special Use Maps

Cartographic Effects

Key to Icons Opens in new window

- Inserting formatted text from another document into the page layout
- Superimposing graphics to change the shape of a data frame
- Scale bars for people who will use the map while walking
- Inserting special characters into text elements
- Designing distinctive ground cover for large-scale maps
- Symbolizing to highlight a single specific building
- Adding locales and Points of Interest
- Designing restaurant symbols and labels

Click on the map to view a PDF [223 Kb].
Crater Lake National Park: Introduction

Map Details

**Title:** Crater Lake National Park

**Map Extent:** Crater Lake National Park and immediate vicinity

**Map Scale:** 1:63,360

**Media:** Print

**Page Size (w x h):** 18 x 24 inches (~46 x 61 centimeters)

**Map Category:** Thematic Map

About Reference Maps

Click on the map to view a PDF [6 MB].

Cartographic Effects

**Key to Icons** Opens in new window

- 🍃 Adding whitewash to promote figure-ground
- 🌈 Creating a graded color boundary
- 🌱 Flattening Overlaid Images

About this map

Purpose and Audience

Design Considerations
Crater Lake National Park: Adding whitewash to promote figure-ground

On this map, the extent of the park is primarily shown with the line symbolizing the boundary.

Using a whitewash effect, the extent of the park is shown more clearly.

What: Sometimes you need to distinguish the area that is of primary interest from the rest of the area shown on your map. Using a whitewash effect, you can emphasize what cartographers call the figure-ground relationship.

Why: Figure-ground organizes the display into two contrasting visual images: the figure, on which your eye settles, and the amorphous background around or behind it. Cartographers have figured out many ways to enhance this effect - the one we want to show you here mimics the work of Tom Patterson, a cartographer for the National Park Service, but it is modified to be used in ArcGIS. What this effect does is to “whitewash” the area that is the background so that the area that is the figure stands out more.

How: To do this, you need to create a polygon for the area outside your area of interest, and then symbolize it with a white fill and specify a transparency. We created an additional polygon layer for the area outside the park called "Notpark". Then we symbolized it so that it had the whitewash effect. Here’s how we did it:
How did you create the 3D 'tree' effect for the Fo posted by Alex Zendel on Jun 7 2007 1:15PM

The map is beautifully designed and the discussion of the whitewash and image flattening are very informative, but the most compelling feature of this map, in my opinion, is the 3D tree effect! How did you create that?

Whitewash effect for ArcView posted by Ryan Dalton on Jun 11 2007 1:58PM

If you don't have ArcInfo (and therefore the erase tool), you can accomplish the task another way... Select the feature you want to display as the "area of interest", r-click the layer and choose "Selection->switch selection, r-click the layer again and choose "Selection->Create Layer from Selected Features", set the color and transparency of the newly created selection layer. You can even re-create this process as a geoprocessing model, making this a nearly one-click operation.

3d effect posted by Ben Wieseman on Jun 27 2007 1:52PM

I agree, the 3d tree effects really pop the map, when it is laid over the tin/ and that color ramp. How did you do the 3d tree effect?

Using the Clip tool to Erase, nice gradient posted by Sean Hedgath on Jul 9 2007 4:18PM

My work doesn't have an ArcInfo license, so instead of Erase make a rectangle outside your extent like you were going to erase, then select your your study area polygon (line to poly if you don't have one) go to the editor toolbar dropdown and select clip. Make sure you dont have other layers turned on in the editing workspace, they might get chopped off too! Also I wanted to know how the pretty gradient over the lake got made, is it custom?

esri downloads posted by Lynn Gionette on Sep 4 2007 1:25PM

You guys should check out the support are for the script downloads. You'll find all sorts of tools that are found in ArcInfo only but recreated by other to be used with Arcview licence.

The erase tool is: http://arcscripts.esri.com/details.asp?dbid=14625

3D Texture Rendering (for trees and such) posted by Dwight Lanier on Oct 14 2007 1:01PM

I was pretty surprised to see ESRI featuring this map on their cartographic site and claiming that they could recreate it using only ArcGIS.

I have noticed, above, several readers asking the painfully obvious question that drives at the heart of what makes this map so great: "How did you create the stippled, textured, patterns on the hillshade?"

As I suspected, there is no info provided on this by ESRI. It would be great to see, it, but I'm not surprised that it isn't here.

This technique was created by expert NPS cartographer Tom Patterson on his website www.shadedrelief.com. To summarize, Tom brings the hillshade layer into Adobe Photoshop and uses a layer (like MODIS satellite imagery, or such) to keep him in to where he needs to textureize the existing surface with artificial "tree humps". He also adds other great details like rock strike, water glint, etc.
You can use these downloads to create your own cartographic effects. Some were used for the Maps we made. If they were, you can click on the Map it was used on to find out we achieved a particular cartographic effect with it. Note that clicking on any heading will sort the table contents.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Map it was used on</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
<td>Basic 3D symbols.</td>
<td>---</td>
</tr>
<tr>
<td>Demining</td>
<td>Symbols for status of demining operations.</td>
<td>---</td>
</tr>
<tr>
<td>Color Deficiency</td>
<td>Symbols for maps for the color deficient.</td>
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</tr>
<tr>
<td>Color Ramps</td>
<td>Color ramps for terrain, water and miscellaneous features.</td>
<td>---</td>
</tr>
<tr>
<td>Gray Shades</td>
<td>Gray Shades.</td>
<td>---</td>
</tr>
<tr>
<td>Hawaii Nei</td>
<td>Symbols for the Hawaiian Islands.</td>
<td>---</td>
</tr>
<tr>
<td>Historical</td>
<td>Symbols for historical looking maps.</td>
<td>---</td>
</tr>
<tr>
<td>Pastels</td>
<td>Pastel colors.</td>
<td>---</td>
</tr>
<tr>
<td>Elevation</td>
<td>European elevation color ramp.</td>
<td>---</td>
</tr>
<tr>
<td>ShadeMax</td>
<td>Elevation color ramps for different biomes.</td>
<td>---</td>
</tr>
<tr>
<td>Subtle Artist Light Colors</td>
<td>Light shades of a variety of hues.</td>
<td>---</td>
</tr>
<tr>
<td>Bathymetry and Elevation Color Ramps</td>
<td>Color ramps useful for symbolizing the land-water interface.</td>
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ArcGIS Resources

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<table>
<thead>
<tr>
<th>Name</th>
<th>Format</th>
<th>Description</th>
<th>Software requirements</th>
<th>Map it was used on</th>
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</thead>
<tbody>
<tr>
<td>Hillshade_tbx</td>
<td>ArcGIS Toolbox</td>
<td>Tools to create the Swiss Hillshade Effect and the Multidirectional Oblique Weighting (MDOW) hillshades.</td>
<td>ArcGIS 9.2 and Spatial Analyst</td>
<td>Crater Lake</td>
</tr>
<tr>
<td>Four Color Map</td>
<td>ArcObjects</td>
<td>Geoprocessing tool and a COM component that implement an algorithm to assign a number from 1 to 4 to a Field in a polygon FeatureClass. A Unique Value Renderer using the Field will color the map so no neighbors have the same color. Details are provided in a readme file and in the help for the Geoprocessing Tool.</td>
<td>ArcGIS 9.2</td>
<td>N/A</td>
</tr>
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ArcGIS Resources

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<tbody>
<tr>
<td>ProperCase.cal</td>
<td>Field Calculator Calculate Statement</td>
<td>Populates a field in an attribute table with the proper case instance of a text string field.</td>
<td>---</td>
</tr>
<tr>
<td>HighwayNumbers.cal</td>
<td>Field Calculator Calculate Statement</td>
<td>Populates a field in an attribute table with the numbers used in highway shield labels.</td>
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</tr>
<tr>
<td>IndexContour200FtInt.cal</td>
<td>Field Calculator Calculate Statement</td>
<td>Populates a field in an attribute table with &quot;1&quot; if the line is an index contour at 200 ft intervals.</td>
<td>Crater Lake</td>
</tr>
<tr>
<td>IndexYN.cal</td>
<td>Field Calculator Calculate Statement</td>
<td>Populates a field in an attribute table with &quot;1&quot; if the line is an index contour at 50 ft intervals.</td>
<td>---</td>
</tr>
<tr>
<td>Xpar_values.cal</td>
<td>Field Calculator Calculate Statement</td>
<td>Calculates the transparency values so a buffered vignette fades out to a white background.</td>
<td>---</td>
</tr>
</tbody>
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<tr>
<td>Crater Lake Elevation Data 36.7MB</td>
<td>Raster</td>
<td>Crater Lake elevation data for hillshading and layer tinting.</td>
<td>Crater Lake</td>
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<tr>
<td>Crater Lake Bump Map Data 9.6MB</td>
<td>Raster</td>
<td>Crater Lake data for bump mapping.</td>
<td>Crater Lake</td>
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<tr>
<td>Crater Lake Final Bump Map 13.7MB</td>
<td>Raster</td>
<td>Crater Lake final bump map data.</td>
<td>Crater Lake</td>
</tr>
<tr>
<td>Named Marine Water Bodies 3.7MB</td>
<td>Geodatabase</td>
<td>Marine water body features for the world - does not include interior water body features.</td>
<td>European Energy</td>
</tr>
<tr>
<td>Physiographic Features 2.3MB</td>
<td>Geodatabase</td>
<td>Physiographic features that can be used for labeling the map.</td>
<td>Crater Lake</td>
</tr>
</tbody>
</table>
Other Resources

Find out about ESRI [presentations] and [publications], links to additional mapping resources on the ESRI Web site, and a special collection of [Cartographers' Favorites]. Note that you can sort by any of the headings.

<table>
<thead>
<tr>
<th>Date</th>
<th>Venue</th>
<th>Title</th>
<th>Presenters</th>
<th>Link to presentation</th>
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<tbody>
<tr>
<td>2008 Mar. 29</td>
<td>UR Workshop 2008 - Redlands</td>
<td>Terrain Representation Workshop <a href="#">abstract...</a></td>
<td>Kimerling, A.J.</td>
<td>more...</td>
</tr>
<tr>
<td>2008 Mar. 26</td>
<td>UR Colloquium 2008 - Redlands</td>
<td>Dotting the Dot Map, Revisited <a href="#">abstract...</a></td>
<td>Kimerling, A.J.</td>
<td>more...</td>
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<tr>
<td>2008 Mar. 4-9</td>
<td>ACSM/LSAW 2008</td>
<td>Map Making with ArcGIS <a href="#">abstract...</a></td>
<td>Buckley, A.R.</td>
<td>more...</td>
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<tr>
<td>2008 Feb. 27-28</td>
<td>OSU-UO Recruiting 2008</td>
<td>Introduction to ESRI <a href="#">abstract...</a></td>
<td>Buckley, A.R.</td>
<td>more...</td>
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<tr>
<td>2008 Feb. 27</td>
<td>OSU GIS in Action 2008</td>
<td>GIS in Action: ESRI <a href="#">abstract...</a></td>
<td>Buckley, A.R.</td>
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<td>2008 Jan. 16</td>
<td>UR Colloquium 2008 - Redlands</td>
<td>Evolution or Devolution of Cartographic Education? Transformations in Teaching Cartographic Concepts and Techniques <a href="#">abstract...</a></td>
<td>Buckley, A.R.</td>
<td>more...</td>
</tr>
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*Note: [abstract...](#) links to the abstract for the presentation.*
Other Resources

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Journal articles, technical papers and white papers we have written that describe various mapping techniques and concepts.

**Year Citation**


Done
Find out about ESRI presentations and publications, links to additional mapping resources on the ESRI Web site, and a special collection of Cartographers’ Favorites. Note that you can sort by any of the headings.

Mapping-related resources available through other ESRI websites.

ESRI Forums  learn more...

- ESRI Cartography Industry Discussion Conference
- ESRI Maplex Product Discussion Conference
- ESRI Data Models Discussion Conference

ESRI Industries

- GIS for Map, Chart, and Data Production

ESRI Support Site

- Knowledge Base
- Data Models
- Basemap Data Model
- Geoprocessing
- ESRI Developer Network (EDN)

ESRI Training & Education

- Free training seminars
  - An Introduction to Cartographic Representations at ArcGIS 9.2
Other Resources

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<th>Other ESRI Resources</th>
<th>Cartographers’ Favorites</th>
</tr>
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</table>

Personal favorites of cartographers and resources used regularly by professional map makers.

Web Sites

- ColorBrewer
- TypeBrewer
- MapShaper
- Shaded Relief
- Relief Shading
- David Rumsey Map Collection
- Historical Map & Chart Project
- Carlos A. Furuti’s Map Projection Pages
- Gallery of Map Projections
- A Periodic Table of Visualization Methods

Cartography Forums and Blogs

- CartoTalk
- CartoBlog

Professional Organizations

- International Cartographic Association (ICA)
Mission

- Teach users the cartographic principles that underlie the decisions they make about map design
- Help people to understand how to make smart design decisions based on these principles
The workshop is structured around short lectures followed by laboratory exercises using ArcGIS. Following the workshop, we would like you to create a final project map that combines what you learned in the workshop with a topic of special interest to you. The agenda is as follows:

- Lecture - Introduction [PPT](0.4MB)
  - Exercise - Enabling the Spatial Analyst Extension [DOC](0.4MB)
- Lecture - DEM Data Sources [PPT](6.6MB)
  - Exercise - Working with Etope2 Data [DOC](0.4MB)
- Lecture - Datum Transformations [PPT](6.5MB)
- Lecture - Raster Resampling [PPT](0.3MB)
  - Exercise - Projecting the Etope2 Data [DOC](0.8MB)
- Lecture - Hillshading and Layer Tinting [PPT](4.7MB)
  - Exercise - Creating a Hillshade [DOC](1.8MB)
  - Exercise - Contrast Stretching a Hillshade [DOC](1.8MB)
  - Exercise - Setting the Display Resampling Method [DOC](1.6MB)
  - Exercise - Layer Tinting the Hillshade Using Classified Values [DOC](1.6MB)
  - Exercise - Displaying the Layer Tint Over the Hillshade [DOC](1.6MB)
- Lecture - Advanced Hillshading Techniques [PPT](1.7MB)
  - Exercise - Creating a Swiss Hillshade [DOC](0.9MB)
  - Exercise - Displaying a Swiss Hillshade [DOC](0.9MB)
  - Exercise - Modifying the Color Ramps [DOC](0.9MB)
  - Exercise - Creating an MDOW Hillshade [DOC](0.9MB)
  - Exercise - Combining the Swiss & MDOW Hillshades [DOC](0.9MB)
  - Exercise - Symbolizing the Crater Lake Bathymetry [DOC](0.9MB)
  - Exercise - Creating a Blue-Yellow Hillshade [DOC](0.9MB)
- Lecture - Terrain Representation Legends [PPT](1.6MB)
  - Exercise - Create a Terrain Representation Legend [DOC](1.1MB)
- Lecture - Bump Mapping [PPT](6.6MB)
  - Exercise - Create a Bump Map [DOC](2.9MB)
- Lecture - Printing and Outputting [PPT](1.5MB)
  - Exercise - Flattening the Rasters [DOC](1.3MB)
  - Exercise - Finishing Your Map [DOC](0.6MB)
- Lecture - Conclusion [ZIP](15.8MB)
- Lecture - Final Project [PPT](0.3MB)
Default hillshade
Raster calculator grid
Median filter grid
Layer-tinted DEM
Combined rasters
With bathymetry
Challenge

- Help a general audience learn how professional cartographers approach design challenges...
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Cartographic Effects

- [Key to Icons](#) Opens in new window
  - Adding whitewash to promote figure-ground
  - Creating a graded color boundary
  - Flattening Overlaid Images

About this map

- Purpose and Audience
- Design Considerations
Click on the map to view a PDF [6 MB].
Purpose & Audience

The Crater Lake National Park map is a replica of a map of the same name published by the U.S. National Park Service. The purpose of making a replica map was to demonstrate that ArcGIS could be used to make the same map that required multiple other specialized software applications. The audience for this map is the general public.

Design Considerations

Our main guiding principle was to come as close as we could to exactly replicating the original map produced by the National Park Service. We worked with the cartographer of the original map to learn his intentions and insights about what was important on this map.
Crater Lake National Park: Introduction

**Map Details**

- **Title:** Crater Lake National Park
- **Map Extent:** Crater Lake National Park and immediate vicinity
- **Map Scale:** 1:63,360
- **Media:** Print
- **Page Size (w x h):** 18 x 24 inches (~46 x 61 centimeters)

- **Map Category:** Thematic Map
  - **About Reference Maps**

**Cartographic Effects**

- **Key to Icons** Opens in new window
  - ![Adding whitewash to promote figure-ground](image1)
  - ![Creating a graded color boundary](image2)
  - ![Flattening Overlaid Images](image3)

**About this map**

- **Purpose and Audience**
- **Design Considerations**
About reference maps

A reference map is a map that emphasizes the geographic location of features. These are some characteristics of reference maps:

- They display a variety of information.
- The primary aims are legibility and graphic contrast.
- No graphics marks (that is, symbolized points, lines, or polygons; text; or raster pixels) should be given visual emphasis over others.

For these maps, the goal is to display a lot of different kinds of information without drawing the reader’s attention to any one theme of information more than any other theme. The reader can therefore direct their attention to the theme or themes of interest. For example, if the reader is using the reference map for navigation, they will direct their attention to roads and landmarks. If the reader is using the map for recreational purposes like hiking, then features on the map, such as contour lines and trails, will hold more interest for them.

For reference maps, the challenge is to figure out which classes of features are of greatest interest and use to a wide range of users (that is, what to include on the map.) In contrast, for thematic maps the emphasis is on the geographic pattern of the feature attributes. The challenge in making this types of map is figuring out which features to include as the minimal required locational reference information (that is, what to exclude from the map.)
Crater Lake National Park: Introduction

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About Reference Maps

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**Cartographic Effects**

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About this map

- Purpose and Audience
- Design Considerations
What...  

Why...  

How...  

On this map, the extent of the park is primarily shown with the line symbolizing the boundary. Using a whitewash effect, the extent of the park is shown more clearly.

**What:** Sometimes you need to distinguish the area that is of primary interest from the rest of the area shown on your map. Using a whitewash effect, you can emphasize what cartographers call the figure-ground relationship.

**Why:** Figure-ground organizes the display into two contrasting visual images: the figure, on which your eye settles, and the amorphous background around or behind it. Cartographers have figured out many ways to enhance this effect - the one we want to show you here mimics the work of Tom Patterson, a cartographer for the National Park Service, but it is modified to be used in ArcGIS. What this effect does is to "whitewash" the area that is the background so that the area that is the figure stands out more.

**How:** To do this, you need to create a polygon for the area outside your area of interest, and then symbolize it with a white fill and specify a transparency. We created an additional polygon layer for the area outside the park called "Notpark". Then we symbolized it so that it had the whitewash effect. Here's how we did it:

To create the whitewash polygon:

1. [Create a polygon feature class](#) in the feature dataset where your area of interest's boundary is located.
2. Add the new feature class you just created to your map.
3. [Start Editing](#).
Audience

- Professionals looking for help for requirements related to their job
- College professors/other teachers looking for resources for teaching
- Students looking for: help with assignments/to understand class content
Evidence

- Ask a Cartographer
- eCAS login
  - Web browser-based call accounting software
  - "collects call detail records from switches, processes and stores the records, and provides management reports/analytics, alerts and dashboards" ([http://www.veramark.com/Solutions/eCAS/](http://www.veramark.com/Solutions/eCAS/))
- Other communication
Mapping Center

Publish + Advertise. Put your content in front of more eyeballs with Headline Animator.

Feed Stats Dashboard

Feed Stats

- Subscribers
- Live Hits
- Item Use
- Uncommon Uses

Site Stats

- Site stats are not active for your feed. Dare to be different?

Headline Animator Stats

Services

FeedBurner Stats PRO

Wednesday, April 18, 2007 – Thursday, April 10, 2008

- 287 subscribers (on average)
- 57 reach (on average)

See more about your subscribers »

Popular Feed Items

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See more about your feed items »

Top Uncommon Uses

- http://arczone.esri.com/arczone/Tec...
48,897 visits came from 169 countries/territories
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Work week
Xmas
Weekend
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191,619 Pageviews
3.92 Pages/Visit
48.53% Bounce Rate
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35.49% % New Visits
Visitors Overview
18,032
Map Overlay world
Content by Title Detail:
ESRI Mapping Center - Ask a Cartographer

Sep 11, 2007 - Apr 11, 2008
Comparing to: Site

This page was visited 18,815 times via 1,052 URLs

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Search added to Ask a Cartographer
This page was viewed 12,057 times

12,057 Pageviews

6,631 Unique Views

00:00:53 Time on Page

30.68% Bounce Rate

15.81% % Exit

$0.00 $ Index
Evidence

- Ask a Cartographer
- eCAS login
- Other communication
Success

- How do you evaluate it?
ESRI MAPPING CENTER ROCKS!
Success

- Web site statistics
- User comments
- Course evaluations
Student comments – Mapping Center

• I like the ease of use of Mapping Center.
• I did not know that Mapping Center existed. Now that I know, I think it will be useful.
• I really appreciate info on Mapping Center. It was very logical in the steps for the practical exercises. I look forward to spending more time on the site.
The lectures were very informative, not only on course materials, but also on general ArcMap tips & tricks.

The lectures were very useful and helpful to understand the course material being taught.

Lectures were a bit too long.

Love the lectures!
The labs were a little too long in terms of verbiage.

It would be easier to have a second screen or print out for the exercises.

The lab instructions we hard to follow.

The advanced instructions need to be reworked so they are more clear... It might be best to walk through an example and then give the assignment to help go through the steps yourself.
Student comments - labs

- The labs could have been better organized (combined) for a clearer picture of what was being done and why.
- Please modify the titles of the exercises to include a number for the correct order. Some of the exercises you could easily combine.
- Some of the exercises were hard to follow and were confusing to do.
- The advanced hillshading technique labs were a bit confusing.
• Some of the instructions for the later exercises were not complete or didn’t highlight specifics, i.e., which layer we were supposed to be using.
• Some labs did not work on the computer very well, but this was software error.
• More screenshots of tools in help.
• Make steps easier to follow in the exercises (formatting).
Basic Cartographic Design

• After Andrew Mundi’s Graphic Design

Principles of Graphic Design

1. Perspective
2. 3D illusion
3. 1 point perspective
4. 2 point perspective
5. 3 point perspective

Andrew Mundi
So...

- We still have a way to go
  - Improve teaching materials
  - Improve site navigation
  - Add new content
  - Add new types of content
  - Respond to requests from users...YOU!
Mapping Centre

mappingcentre.esri.com