



# **User's Guide for the Decision Support System for Map Projections of Small Scale Data, Version 2.0**

By Michael P. Finn and Laura N. Woodard

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## **Preface**

The primary change in this report is the addition of a tutorial for the user to follow along with when making their decisions.

A copy of version 1.0 user's guide is included (Finn and Posch, 2003).

## **Background**

Research geographers and applications programmers at the National Geospatial Technical Operations Center developed this Decision Support System (DSS) for selecting an optimum projection considering various factors, such as pixel sizes, areal extent, number of categories, spatial pattern of categories, re-sampling methods, and error correction methods. The design and implementation is a web-based DSS for map projection selection and is designed for map projections of small-scale datasets (Finn and others, 2004).

The design includes an interface to solicit input information from the user, and guide the user to the selection of an appropriate projection based on the input. The DSS poses questions interactively, and the user determines the path from a decision tree to arrive at a solution. The initial choice is among global, continental, or regional area coverage. The second choice is among the preservation of shape or area, or simply a compromise, such as the Robinson projection, which is neither conformal nor equal-area (Usery and others, 2002; Finn and Posch, 2003). The design for version 2.0 also includes a tutorial that graphically displays the decision path. In addition, this version of the DSS provides access to additional information about the last decision the user made.

## **Acknowledgement**

The Authors are grateful to Mr. Jason Trent and Mr. James Nelson, two former USGS Computer Scientist Trainees, for their work on this version of the DSS. In particular, we are most grateful to James Nelson for his outstanding efforts on the tutorial and the corresponding Java development.

## Executing the Decision Support System

- To use the DSS, please make sure that the Java Run-Time Environment Version 1.4.03 or later is running.
- Go to the web-based application located at:  
<http://mcmcweb.er.usgs.gov/research/DSSMain/DSSAppletwbutton.html>

## The Main Page

When the Decision Support System is opened (by opening the DSSAppletwbutton.html page), a page with the USGS logo, four down selection combo boxes, or combo boxes (technically referred to as combo boxes in computer science literature), a submit button, a button to show the tutorial, two links to other pages (one to the Java site to download the Java runtime environment, and the other to the main USGS Cartographic Research web page), and the USGS standard footer is seen (figure 1).

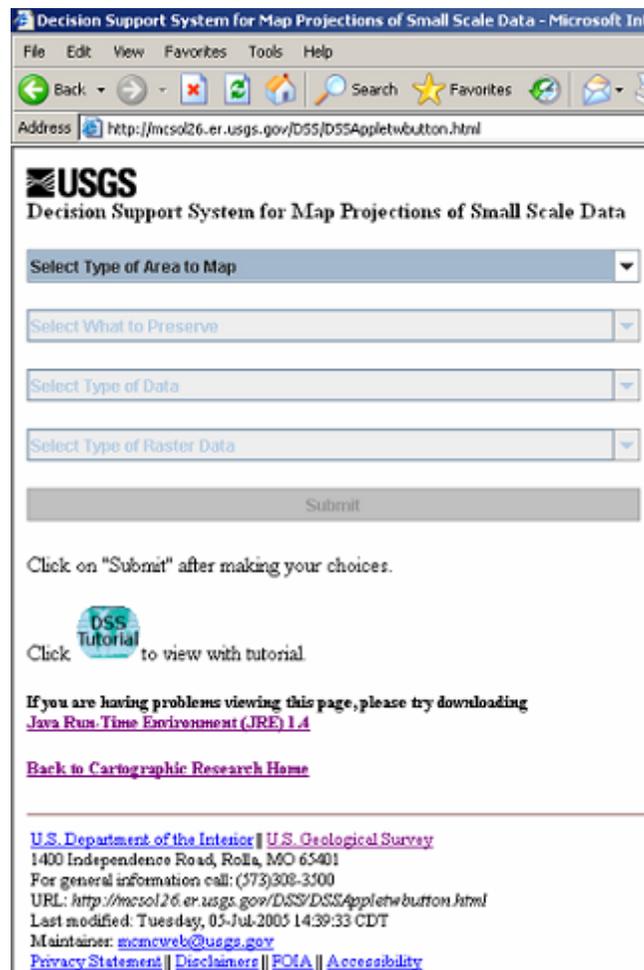
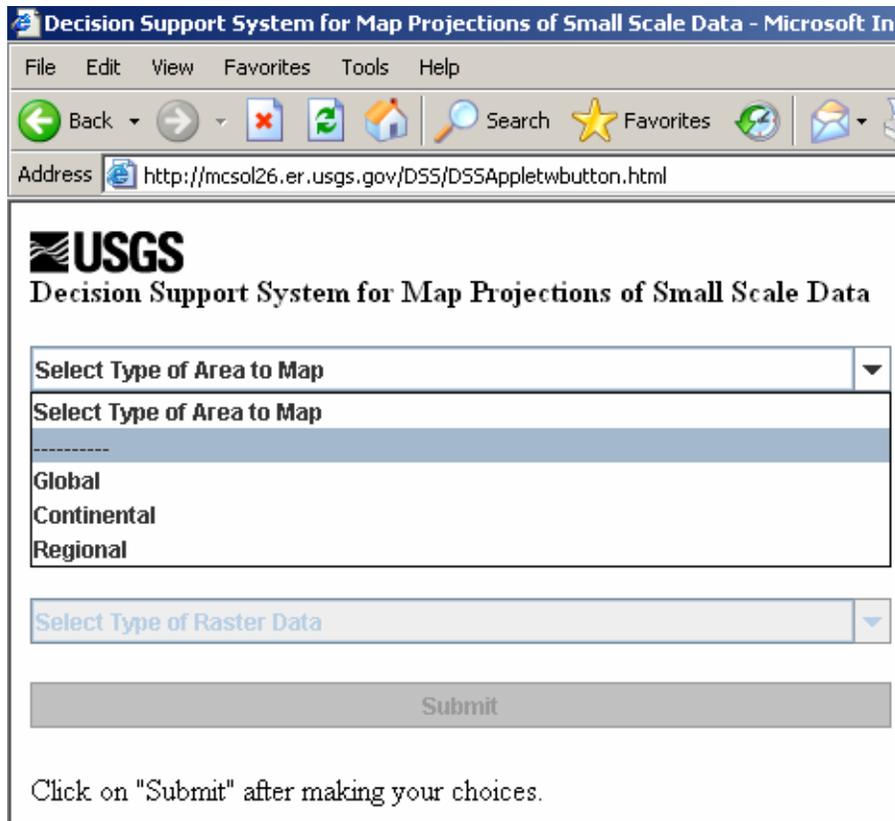


Figure 1. Startup Screen

Of the four combo boxes and submit button, the first combo box (Select Type of Area to Map) should be the only one that is active, the others (Select What to Preserve, Select Type of Data, Select Type of Raster Data, and Submit button) should be inactive.

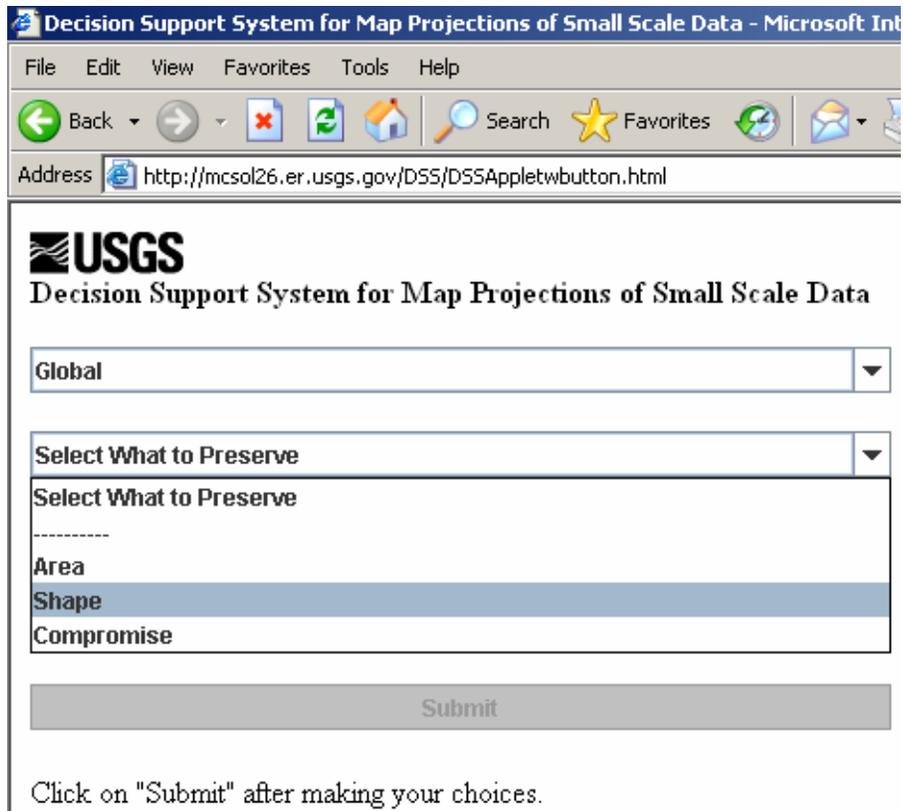
To make the first selection, click on any area of the “Select Type of Area to Map” combo box (figure 2).



**Figure 2. Type Down Selection Menu**

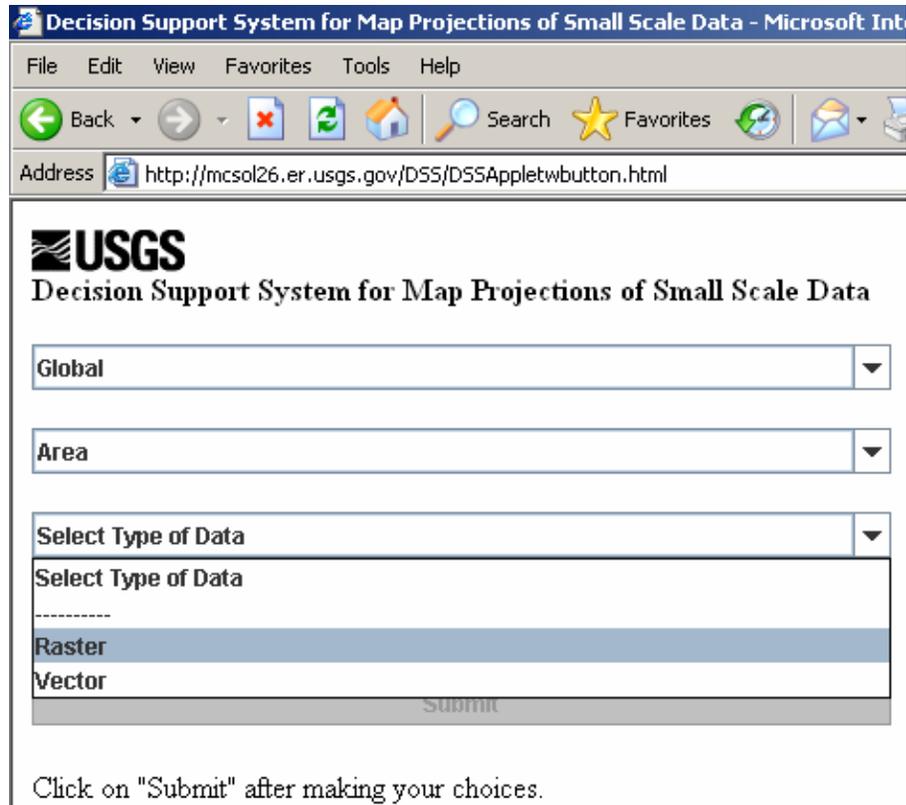
The choices of “Global”, “Continental”, and “Regional” are displayed. Choose one by clicking on it. If “Global” is chosen, the next combo box (Select What to Preserve) becomes editable; if “Continental” is chosen, the “Continental” page is displayed; and if “Regional” is chosen, the “Regional” page is displayed.

If “Global” is chosen, the “Select What to Preserve” combo box becomes editable; click on any area of that box to see the options. The selections now offered are “Area”, “Shape”, and “Compromise” (figure 3). Choose one of the options by clicking on it.



**Figure 3. Preservation Down Selection Menu**

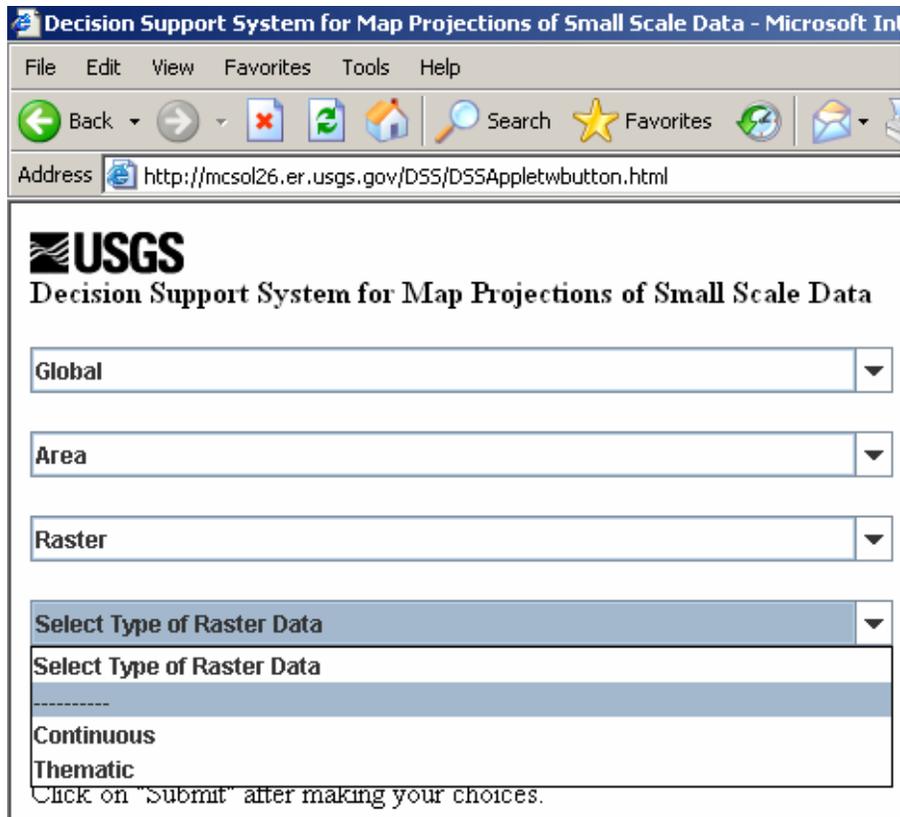
When an option has been selected on the “Select What to Preserve” combo box, the next combo box, “Select Type of Data”, will become editable. Click anywhere on that combo box to see the “Raster” and “Vector” options (figure 4).



**Figure 4. Data Down Selection Menu**

If “Raster” is chosen, the next combo box, “Select Type of Raster Data”, becomes editable, but if “Vector” is chosen, the “Submit” button becomes active.

If “Raster” data is chosen, the “Select Type of Raster Data” combo box becomes active. Click anywhere on that combo box to display the “Continuous” and “Thematic” options (figure 5). Once this is chosen, the “Submit” button becomes active.

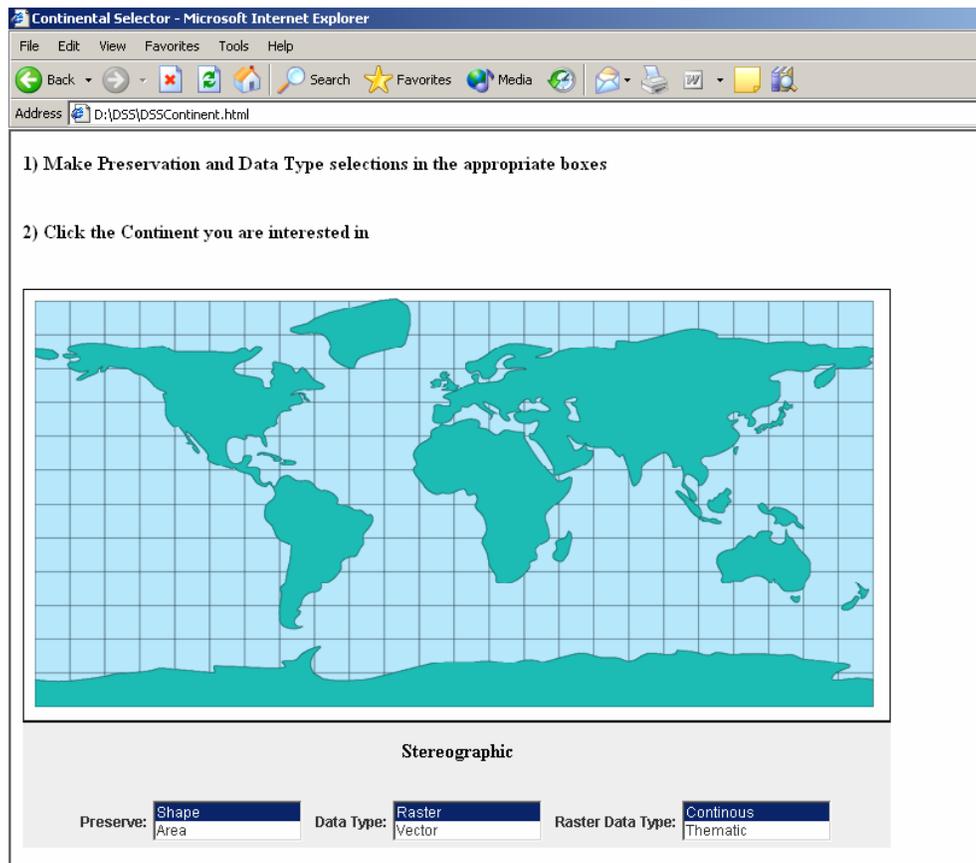


**Figure 5. Raster Data Type Down Selection Menu**

When the “Submit” button becomes active, the user should check to make sure the parameters are correct. When the decisions have been verified, click on the “Submit” button. A new window will become active and display the suggested projection type based on the choices.

## The Continental Page

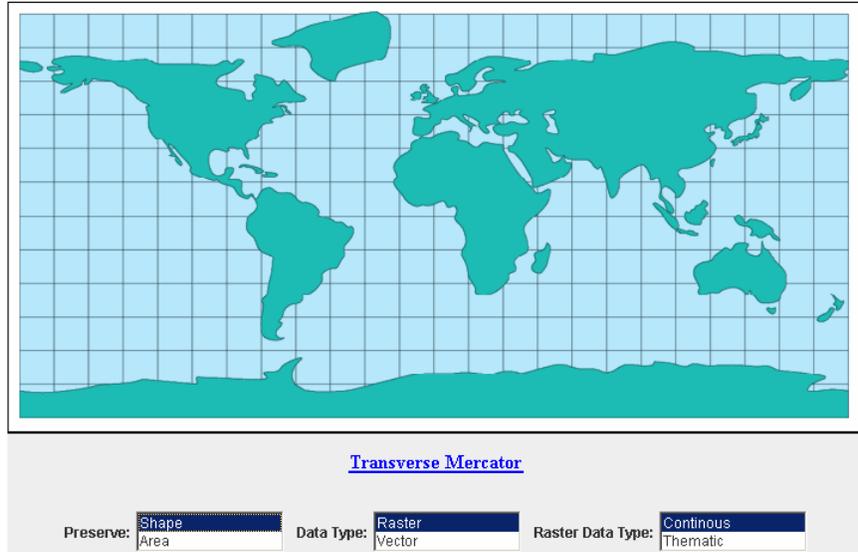
If “Continental” was selected from the “Select Type of Area to Map” combo box on the opening page (DSSApplet.html), the “Continental page” will start up in the same window. It should prompt the user to make “Preservation and Data Type” selections in the appropriate boxes, and to click on the Continent of interest. It also should be displaying a map and three selection boxes beneath it (Preserve, Data Type, and Raster Data Type) (figure 6).



**Figure 6. Continental Selector Page**

The decisions in each box should be set by default to “Shape”, “Raster”, and “Continuous”. Default settings can be changed by clicking on alternative selections. If “Vector” over “Raster” was chosen in the “Data Type” box, the “Raster Data Type” label and options (Continuous and Thematic) should become inactive.

Once the selections have been made, position your cursor over the continent of interest. The suggested projection is shown in real-time on the page. When the continent of interest has been selected, the suggested projection that is displayed will turn blue and become underlined (figure 7).

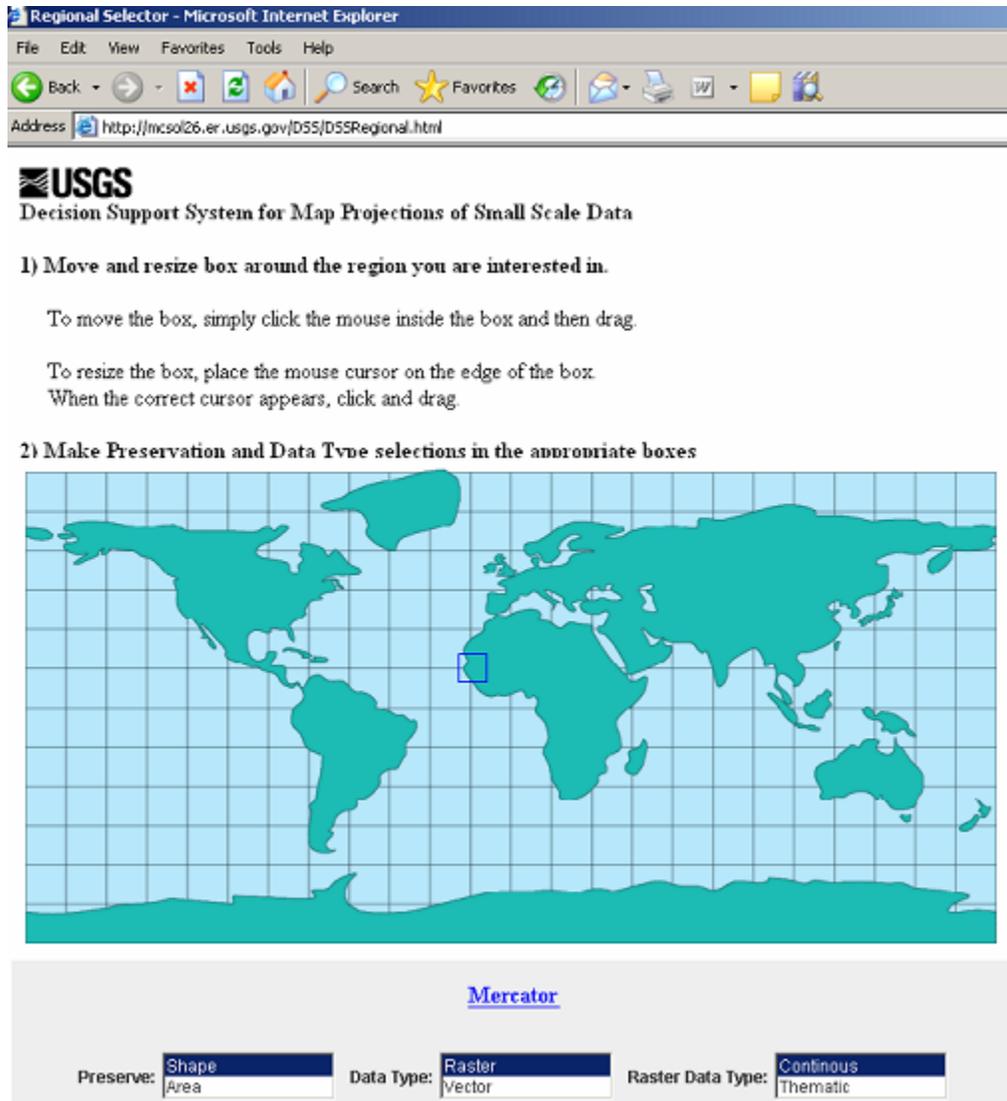


**Figure 7. Projection Name Clickable**

Once the suggested projection has turned blue the cursor can be positioned over the projection name and clicked on. In response, a new window will activate and show the suggested projection. If there is more than one suggested projection, it will show the image of the first suggested projection and provide links for all the projections where more information will be displayed about that particular projection. Otherwise, it will display the projection and additional information on the projection type that was chosen.

## The Regional Page

If “Regional” was selected from the “Select Type of Area to Map” combo box on the opening page (DSSAppletwbutton.html), the “Regional” page will start up in the same window. It should prompt the user to move and resize the box around the region of interest, and make “Preservation” and “Data Type” selections in the appropriate boxes. It also should be displaying a map and three selection boxes beneath it (Preserve, Data Type, and Raster Data Type) (figure 8).



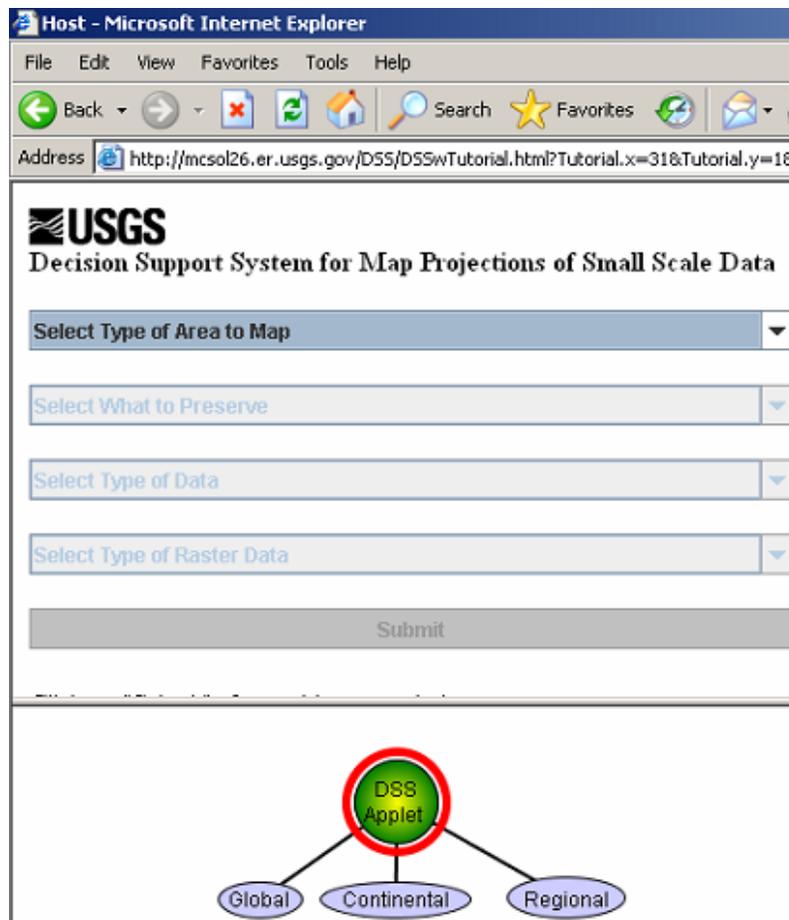
**Figure 8. Regional Selector Page**

The decisions in each box should be set by default to “Shape”, “Raster”, and “Continuous”. Default settings can be changed by clicking on alternative selections. If “Vector” is chosen over “Raster” in the “Data Type” box, the “Raster Data Type” label and choices (Continuous and Thematic) should become inactive.

Once the selections have been made, position and resize the box around the region of interest. The projection suggested is shown in real-time and should automatically be blue and underlined, allowing the suggested projection name to be chosen. When the suggested projection is chosen, a new window will activate showing more details about that particular projection.

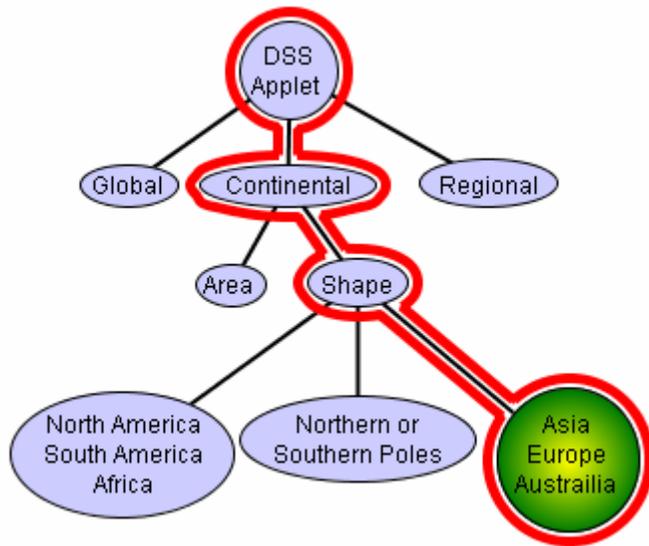
## The Tutorial

The tutorial will activate only when you click on the globe image that is labeled “DSS Tutorial” on the opening page. Once that globe image has been selected, the window will split showing the DSS on the top and the tutorial on the bottom. Initially, there should be four nodes showing; DSS Applet, Global, Continental, and Regional. The DSS Applet node should be green and circled in red, whereas the other nodes (Global, Continental, and Regional) are light blue (figure 9). Only the most recent choice should be green; the rest should be light blue. The red outline will show the path that has been chosen.



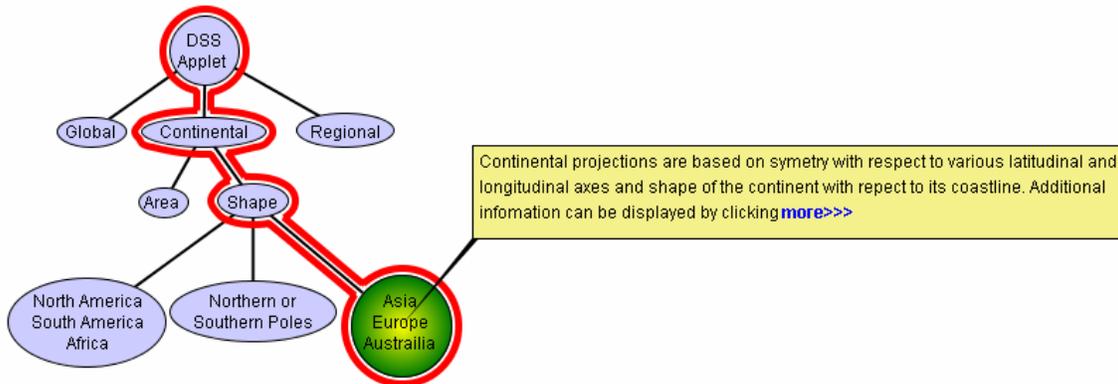
**Figure 9. Opening Page with Tutorial**

Decisions can be made the same as described above in The Main Page, The Continental Page, and The Regional Page descriptions. When a decision has been made, it should be reflected in the graph shown in the tutorial (figure 10).



**Figure 10. Tutorial Graph**

At any time, the cursor can be placed over a green node in the tutorial. A message bubble will display a small explanation of why that element is used (figure 11). In each message box more information about projections is available by clicking “more”. A new window will activate and take the user to a website with more information.



**Figure 11. Tutorial Graph with More Information Popup**

## References

Finn, M.P., Posch, S.T., 2003 User's Guide to the Decision Support System for Map Projections. U.S. Geological Survey Mid-Continent Mapping Center, Rolla, Missouri. Internet:  
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