Chittenden County
Decision Support System

USER MANUAL

October 2003

Prepared for the
CHITTENDEN COUNTY METROPOLITAN PLANNING ORGANIZATION
and
CHITTENDEN COUNTY REGIONAL PLANNING COMMISSION
by

CRITERION
PLANNERS
ENGINEERS

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INTRODUCTION

This manual provides user information for installing and operating the Chittenden County land-use and transportation decision support system (DSS). The DSS is a planning sketch tool for simulating alternative land-use and transportation scenarios and evaluating their outcomes using indicators. DSS sketches are scored with indicators to quantify and map land-use, transportation, and environmental results. The tool is designed to support the work of planning staff, citizens, and local officials engaged in typical community planning processes.

The DSS performs sketch analysis in two modes of operation: 1) "snapshots" of community conditions at a single point in time; and 2) spatial "forecasts" of community growth over time. The user manual is organized into two major parts for each of these modes of operation, with each mode described according to the following sections:

- *Getting Started Guide.* This instructs new users on installing the software and creating initial sketches.

- *UDP Defaults.* This is a listing of defaults that are provided for user-defined parameters.

- *Indicator Dictionary.* This defines each indicator according to units of measurement, applicable mathematical formula, required shapefiles and attributes, applicable user-defined parameters, and illustrative scores.

- *Community Process Guide.* This explains how the tool can be applied in typical planning processes, including guidance on creating sketches and interpreting results.

In addition to this manual, users should consult other documentation under separate cover for the EPA SGWATER model that DSS uses for stormwater evaluation; and the CCMPO integrated travel model (ITM) that is an option for calculating forecast sketch transportation estimates.

GETTING STARTED GUIDE

Snapshot Module

CONTENTS

1. Install DSS

Prepare for Installation

To install DSS, you must be running Microsoft Windows 95, Microsoft Windows 98, Microsoft Windows NT (4.0 SP3 or higher) or Windows 2000. Minimum screen resolution is 1024x768.

1.Close all running programs.

2.Close or disable virus-protection software, to prevent installation conflicts.

3.To install DSS on Microsoft Windows NT or 2000, you must have administrator rights.

Install from CD

On most Windows systems, installation starts automatically when you insert the DSS CD into your CD-ROM drive. If installation does not start automatically when you insert the DSS CD, you can install DSS using the following steps:

1.Insert the DSS CD into your CD-ROM drive.

2.From the **Start** menu, choose **Run**.

3.Type ***d:\setup***, where *d* is the letter assigned to your CD-ROM drive.

4.Click **OK**.

Once the setup program begins it will guide you through the installation process. When prompted, be sure to choose **Typical** installation (not Compact or Custom) so that you install the DSS program files and sample data necessary for using this *Getting Started Guide*.

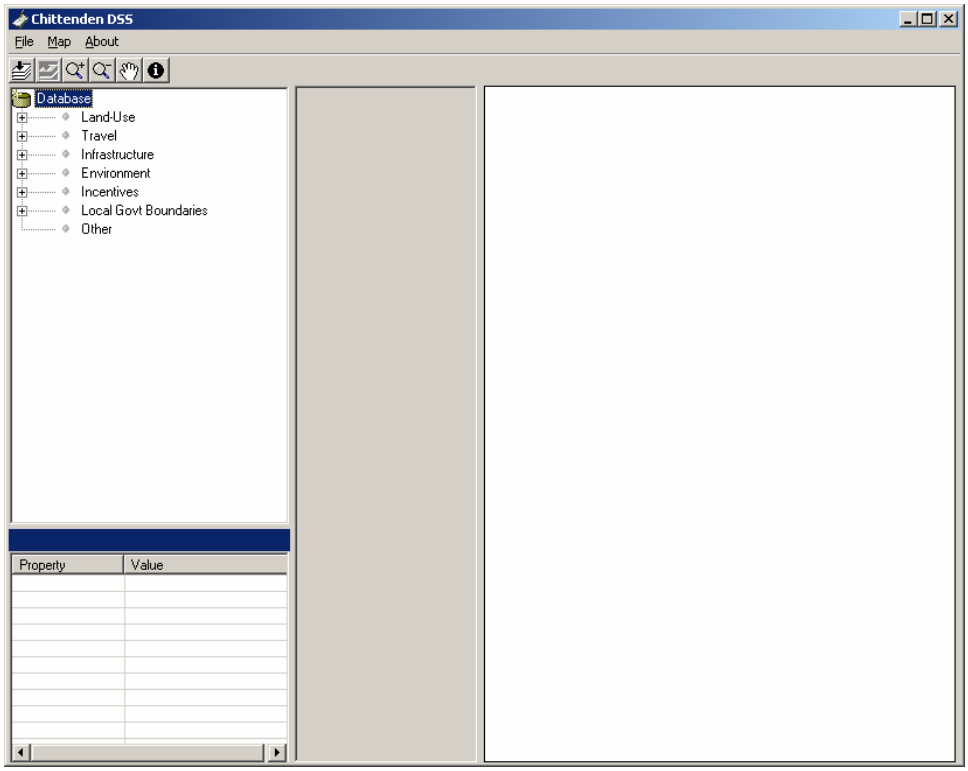
2. Prepare the Database

The DSS comes pre-loaded with county wide data. You only need to use the database if you require entirely new shapefiles to be used in new sketches you are creating. To add shapefiles to the database, follow the instructions in this section.

Open the Database

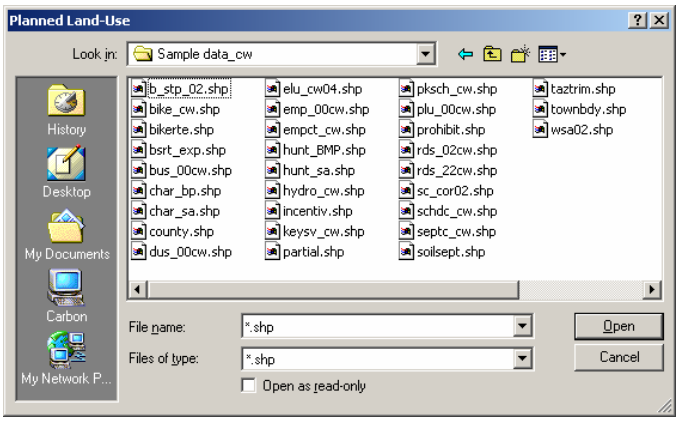
1.Start DSS. The DSS startup screen will appear:

2. Click the **Database** icon. The Database module will open:



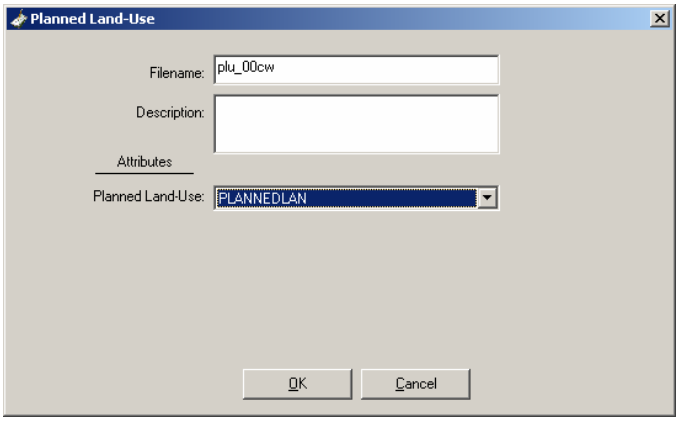
Adding Shapefiles to the Database

- Expand the Land-Use node, double-click the sub-node Planned Land-Use and a Windows file dialog appears. Within the dialog, navigate to the DSS application folder (by default, "C:\Program Files\Criterion\ChittendenDSS"), open the "Sample data_cw" folder, and the dialog changes to appear as follows:

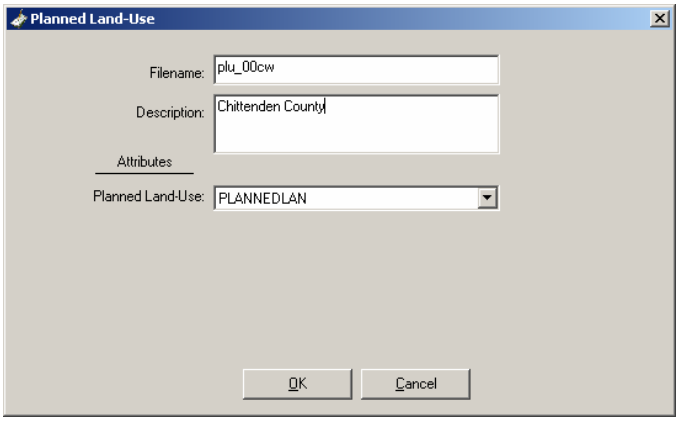


- Select the shapefile called “PLU_00.shp”, click Open, and the following dialog appears:

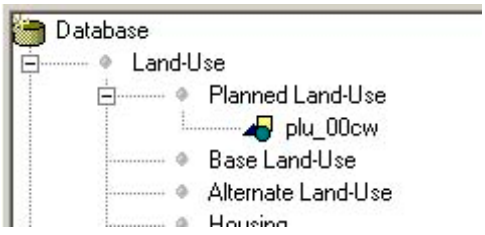
Note that the Filename text box contains the name of the file you just selected, without the extension “.shp”. This will be the case with every shapefile you add.



- Enter a file description. Then select the local attribute name PLANNEDLAN in the combo box to the right of SGI’s Planned Land-Use field. This will assign the local attribute PLANNEDLAN to SGI’s Planned Land-Use field:



- Click OK to save your entry. The Database treeview now shows the shapefile under the Planned Land-Use node:

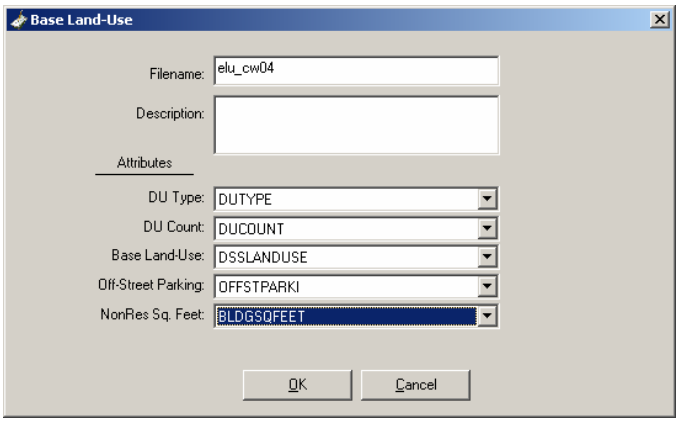


Shapefiles may be added, deleted, or viewed using either the File menu or by right-clicking the mouse to access a similar menu. If you make a mistake while choosing attributes for the fields of a shapefile, you may double-click the shapefile in the Database treeview to edit shapefile properties. If you do not discover a shapefile mistake until you are creating a sketch, you must return to the Database to correct the mistake.

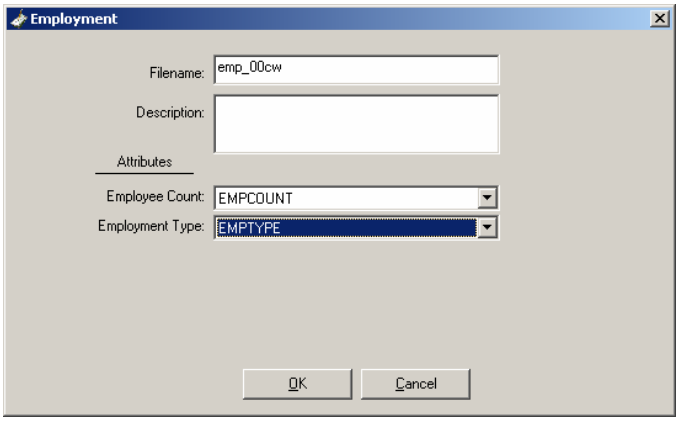
Adding Remaining Shapefiles to Database

The balance of this section contains dialogs for adding remaining shapefiles in the Sample Data folder to the Database. When making entries in the following dialogs, no nulls are allowed in any attribute field. The attribute "Year" is the four-digit year that a feature became or will become operable. This allows users to have certain planned future features recognized if a future year is being simulated; setting the field to NONE will result in a feature always being recognized regardless of the sketch year.

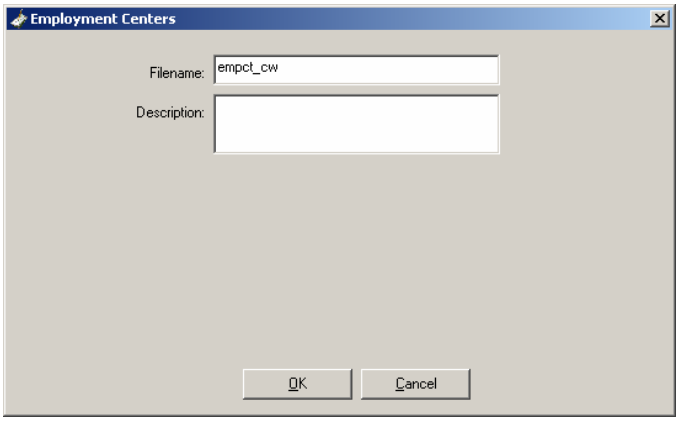
Base Land-Use



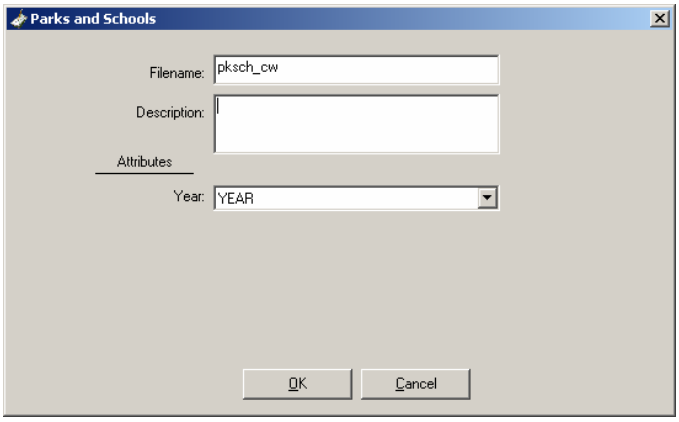
Employment



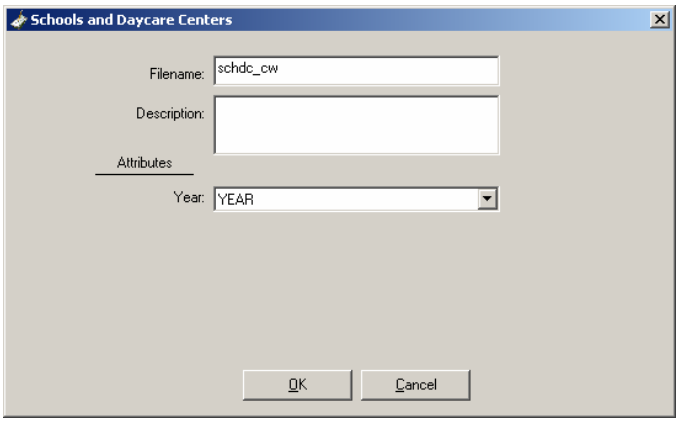
Employment Centers



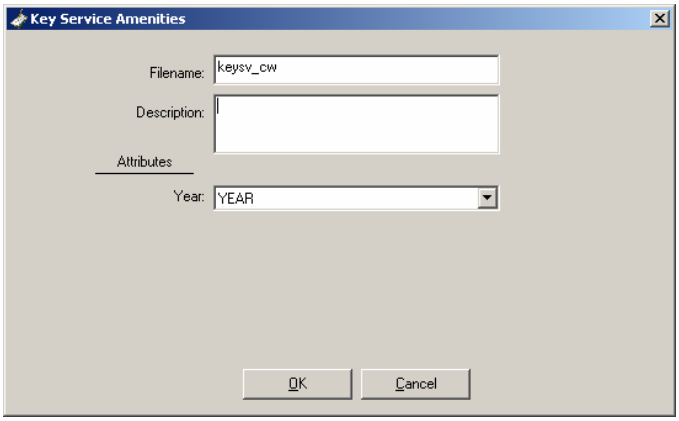
Parks and Schools



Schools and Daycare Centers

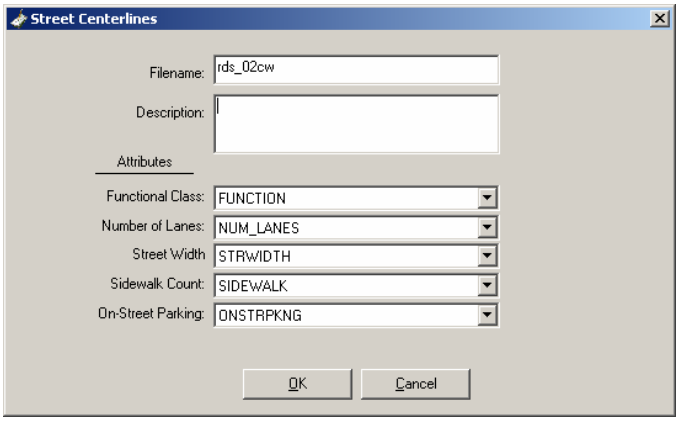


Key Services and Amenities

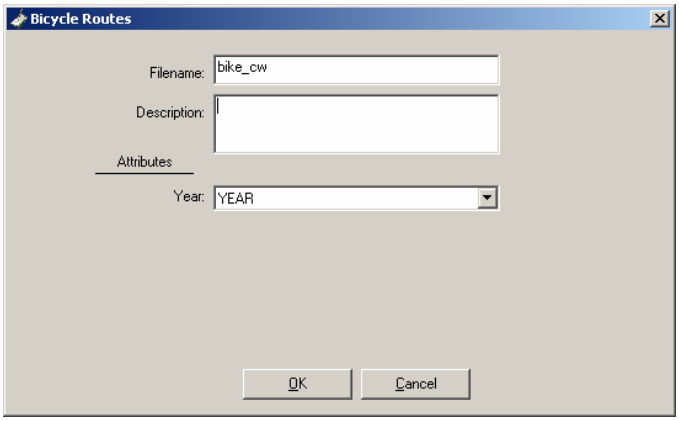


Street Centerlines

Street centerlines must have perfect connectivity to support indicator calculations.

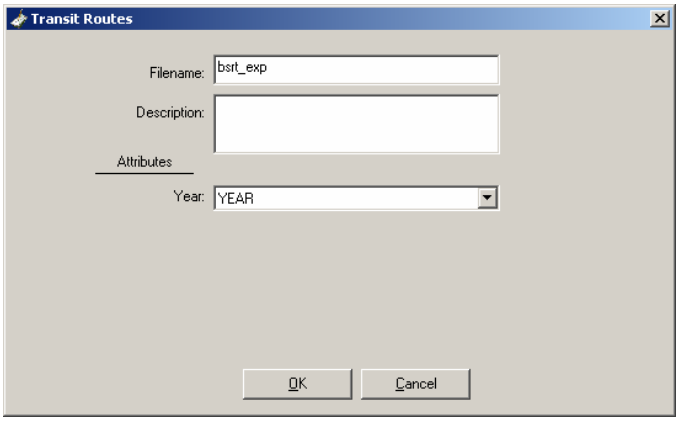


Bicycle Routes



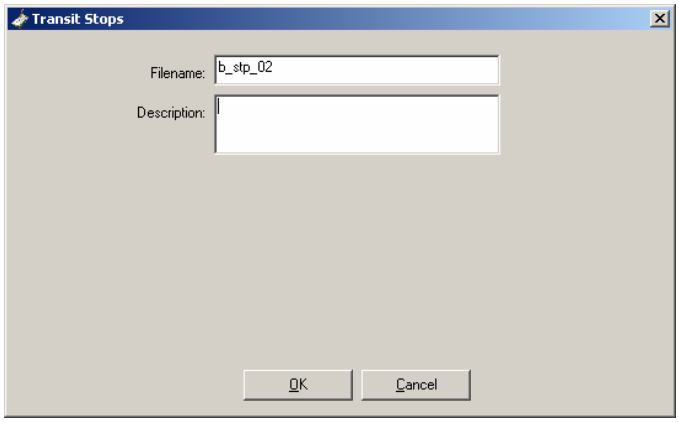
Transit routes

Transit Routes should include bus and rail transit routes.

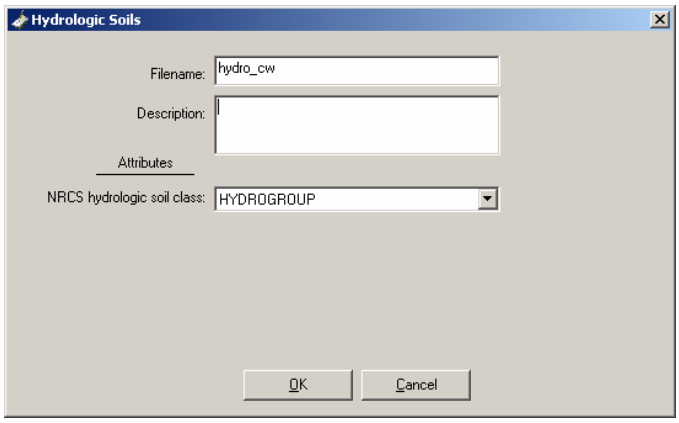


Transit Stops

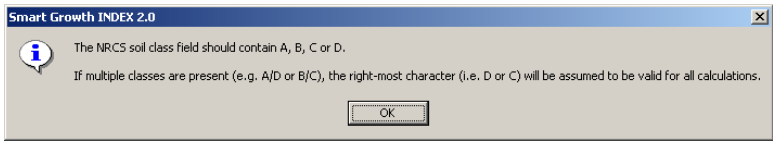
Transit Stops should include bus and rail transit stops.



Hydrologic Soils



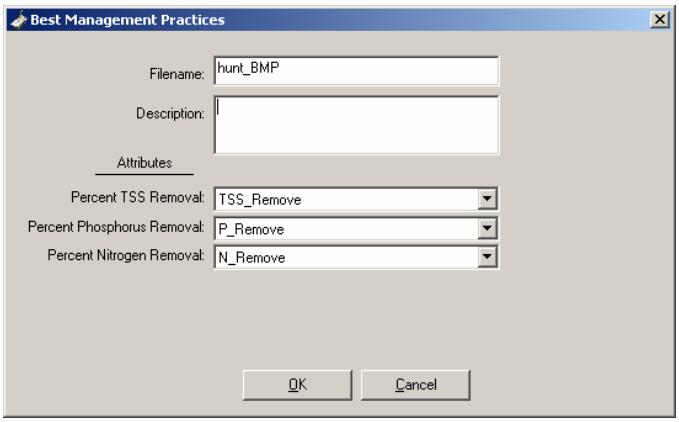
When you first double-click the Hydrologic Soils node, the following information dialog appears advising you that the NRCS group type must be entered as A, B, C, or D:



Click OK and complete the soil file description and attribute dialog.

Stormwater Best Mgmt. Practices

Stormwater best management practices (BMPs) are user-created features defined in three ways: 1) BMP type, e.g. grass swales, constructed wetlands, porous pavement; 2) spatial extent of the BMP in polygon form; and pollutant removal efficiency (%) of the BMP for each of three pollutants. The tutorial BMPs include infiltration trenches, constructed wetlands, and water quality inlets at the removal efficiencies listed in Table 4.2.



The Local Government node is not used in the tutorial. It is used when sketches are large enough to encompass multiple jurisdictions and users want to report results by jurisdiction. It is also possible to use a local government boundary as a sketch area boundary if the local government boundary coincides with the purpose of the sketch.

Table 4.2

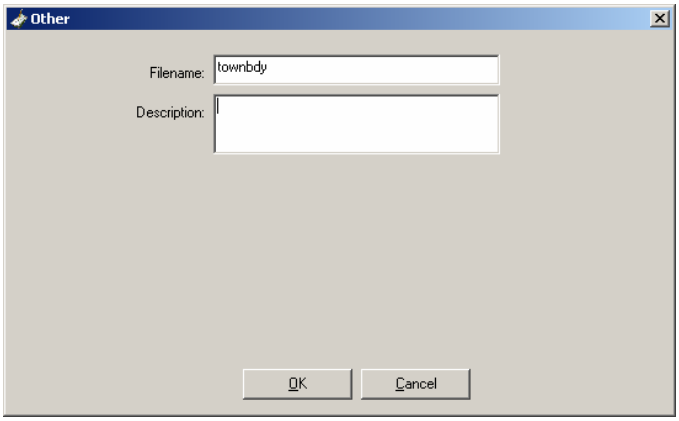
STORMWATER BEST MANAGEMENT PRACTICE GUIDANCE

(BMP types and % pollutant removal)

BMP Type	Total Suspended Solids	Total Phosphorus	Total Nitrogen
Wet Ponds	90	65	48
Extended Detention Ponds	80	45	35
Grassed Swales	70	30	25
Filter Strips	70	40	30
Infiltration Trenches	85	65	60
Infiltration Basins	85	65	60
Sand Filters	80	60	40
Constructed Wetlands	90	65	48
Water Quality Inlets	30	5	5
Porous Pavement	90	65	85

Source: EPA/GKY

The Other node in the Database is a location for shapefiles that may be used to supplement SGI-required shapefiles. For example, SGI does not require a “rivers and streams” shapefile, but you may wish to add such a feature to enhance SGI maps. Another use for the Other folder is storing shapefiles that coincidentally represent desired sketch area boundaries, e.g. traffic analysis zones or census tracts. For purposes of the tutorial, traffic analysis zones will be used to assemble a sketch boundary.



With the Database now prepared, close the Database window and return to the startup screen.

3. Create and Use Maps

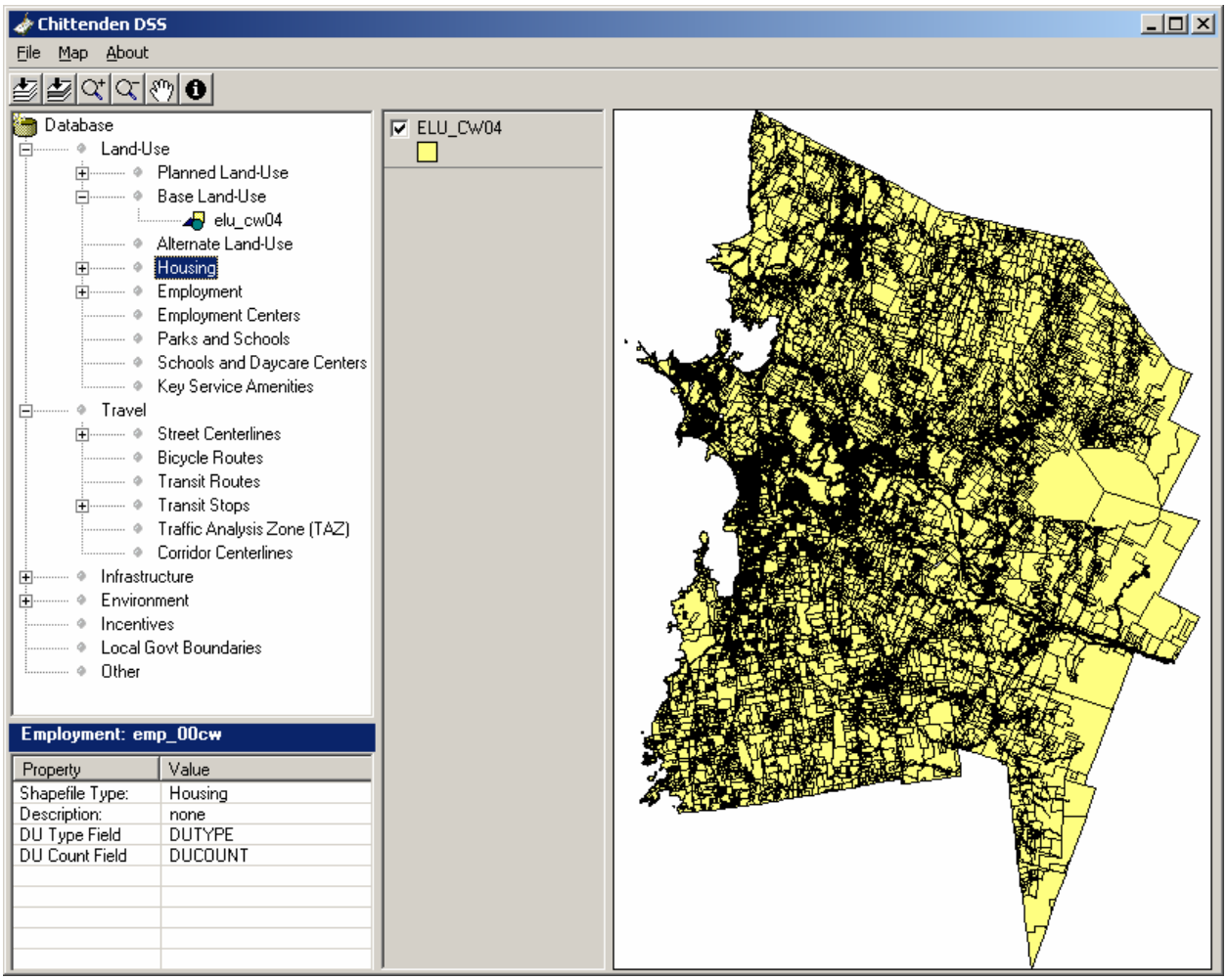
Now that you have added shapefiles to the database, the next step is to apply those shapefiles to maps as map layers.

Add a Layer to a Map

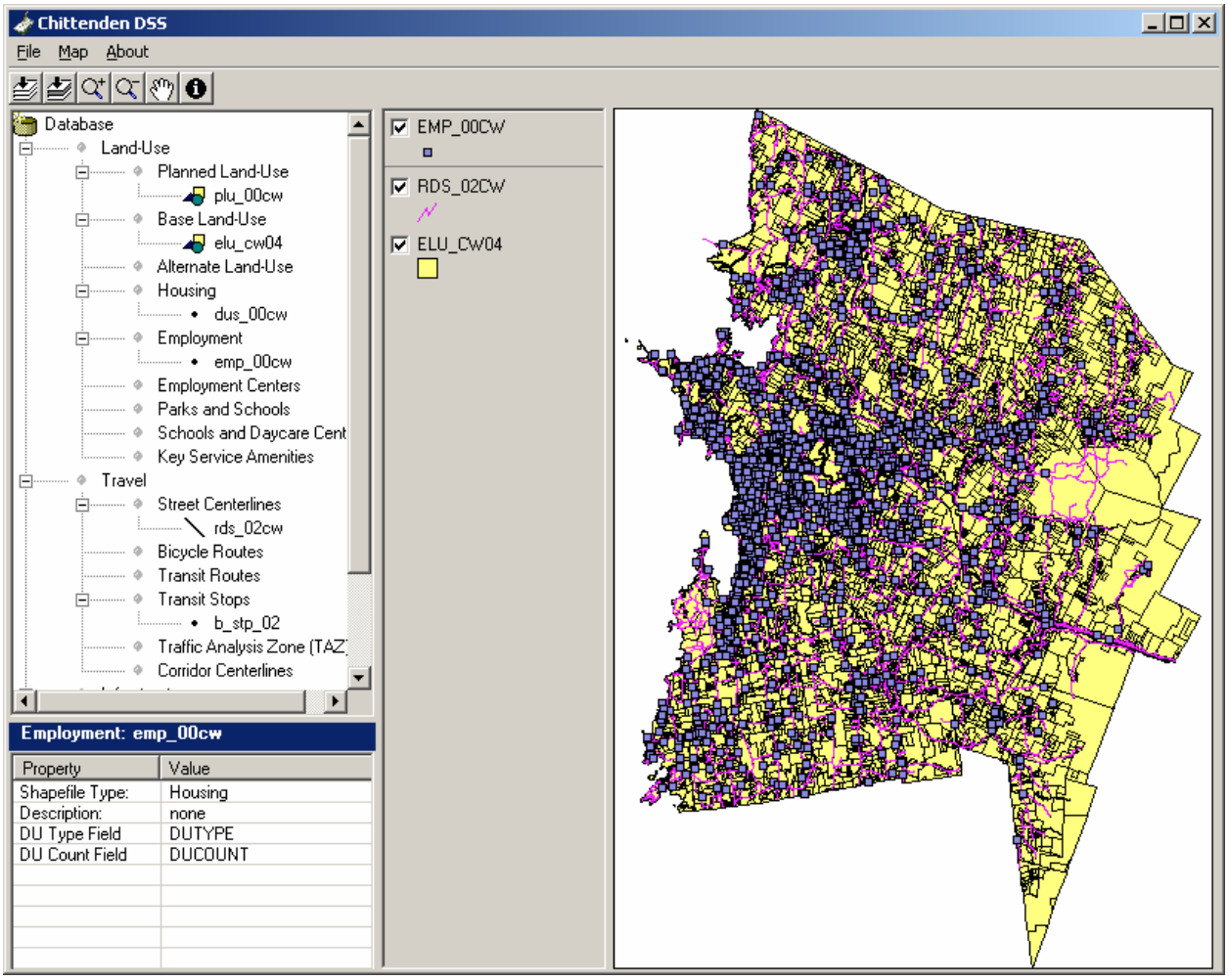
1. Single-click the **elu_cw04** shapefile, located under the **Land-Use\Base Land-Use** node.

2. Hold the mouse button down, and drag it over the legend pane.

3. Release the mouse button. Click the check box for the **elu_cw04** shapefile, on the legend pane. The **elu_cw04** layer should now appear on the legend pane and the map pane:



4. Drag other shapefiles (**Land-Use\Planned Land-Use, Land-Use\Housing, Land-Use\Employment**, and **Travel\Street Centerlines**) onto the legend pane to see them represented as layers. The exact order of the layers on the legend pane is not important.



5. You may want to change the order of layers on the legend pane. A layer can be invisible on the map because it is beneath another layer.

6. Click on whichever layer is at the bottom of the legend pane, drag it to the top, and release the mouse button. You will see the map change. This will be explained in more detail later, in the Define Sketch Boundary section.

Later in the *Getting Started Guide* you will save default legends for each shapefile, as well as maps composed of a collection of legends.

Close the Database

1. From the **File** menu choose **Exit**. This returns you to the DSS startup screen.

The next step is to create a snapshot sketch, using the data you have added to the database.

4. Snapshot Sketches

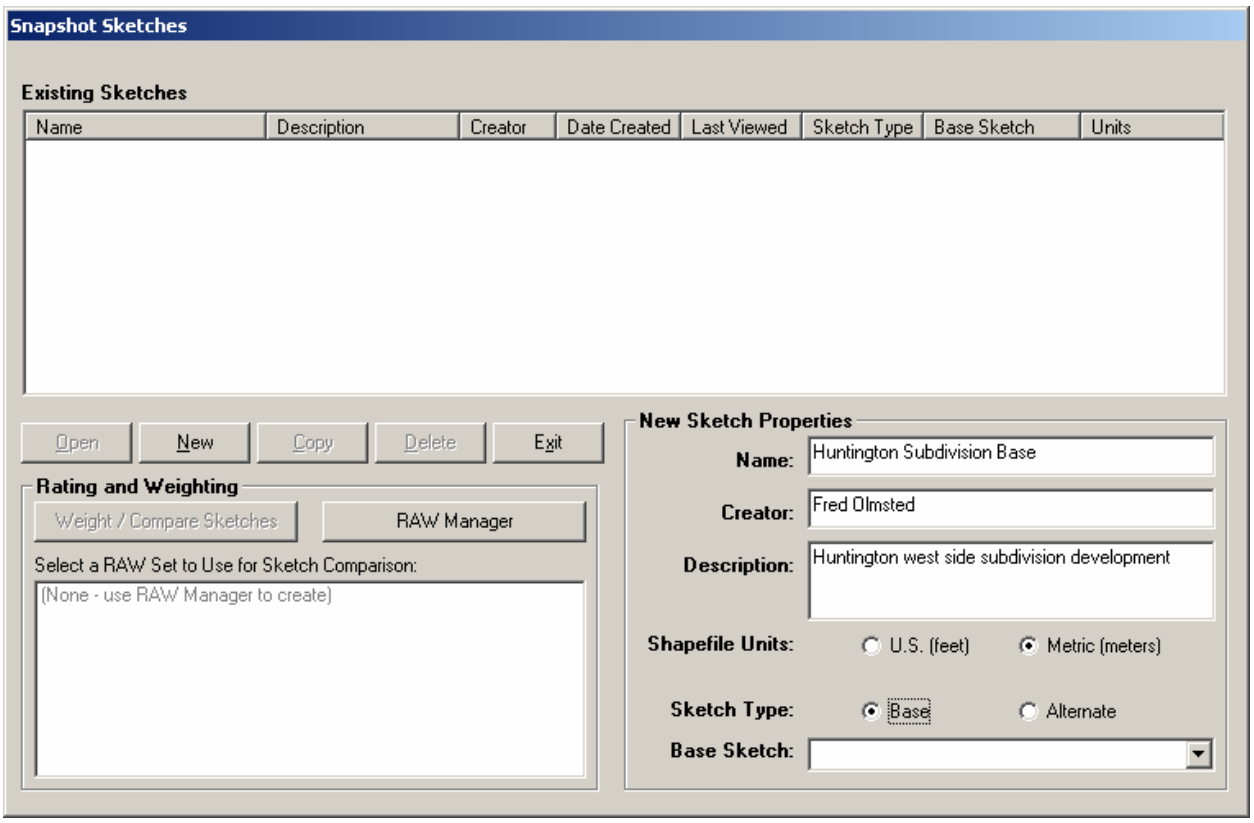
The DSS can create two types of sketches: snapshots and forecasts. This guide describes snapshot sketches. Since you have just exited the database you should now be back at the DSS startup screen, which displays the **Database**, **Forecast** and **Snapshot** icons. If this is not open, start DSS and this screen will appear.

Create a Snapshot Sketch

1. Click the **Snapshot** icon. The Snapshot Sketch Management dialog box will appear.

2. You are going to create a test sketch, so enter data in the **Name, Creator and Description** boxes as shown below. For **Shapefile Units**, choose **Metric** (which applies to all Chittenden countywide data). Choose **Base Case** as your sketch type (after creating a base case, you are able to create alternate cases associated with each base case listed in the base sketch list box).

3. The **New** button will become active, after you choose your sketch type. Click it.

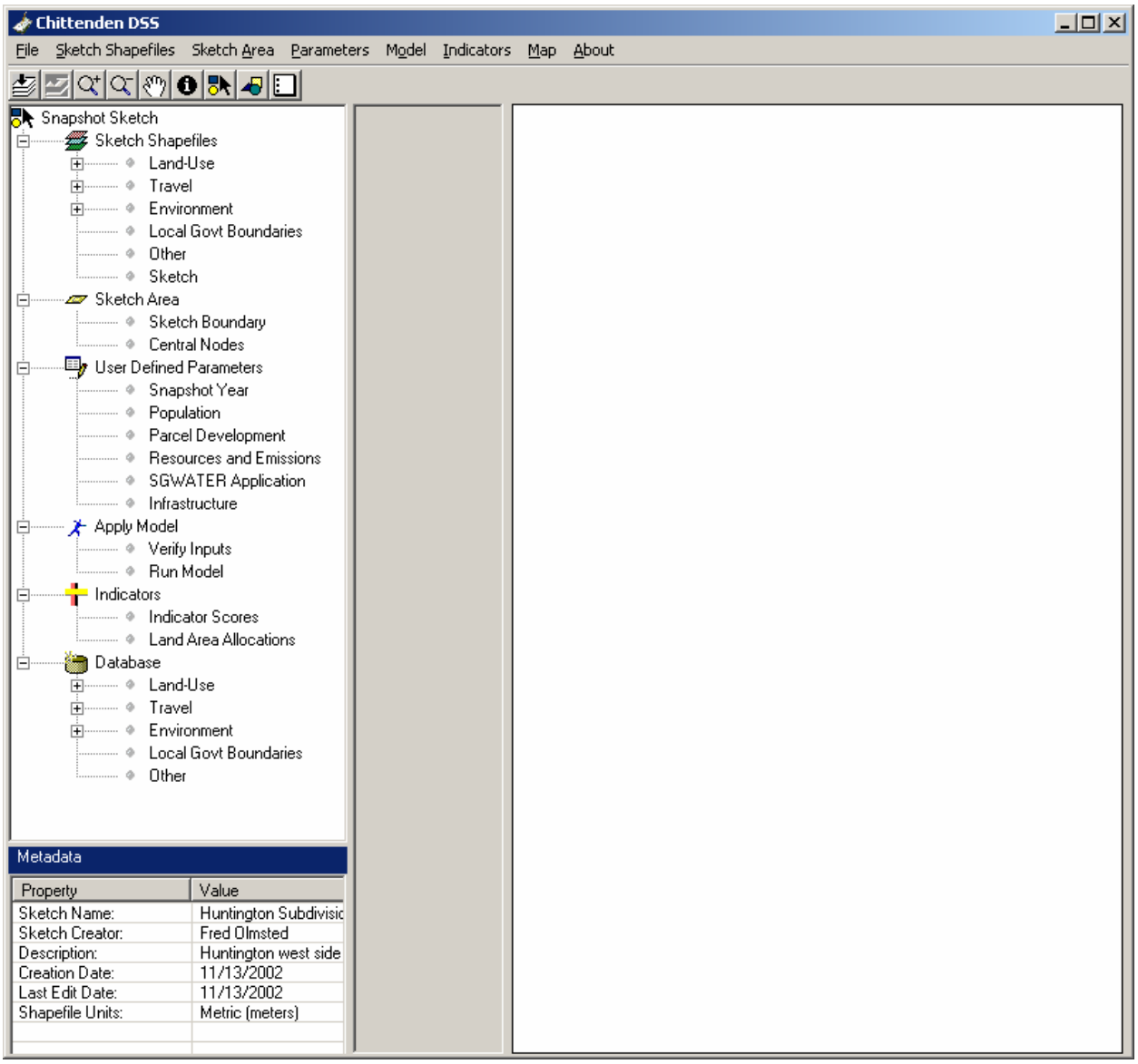


4. Click **Open** to open the new sketch.

5. Develop a Sketch

You should now be in the snapshot sketch you created. The "sketch tree" of a snapshot sketch contains nodes for the **Sketch Shapefiles**, **Sketch Area**, **User Defined Parameters**, **Apply Model**, **Indicators**, and **Database of Shapefiles**. If this is not open, go to the Sketch Management window for snapshot sketches and open your sketch.

The DSS sketch tree is designed to organize your data and create a logical workflow. The intent is to start at the top of the tree and work down, from Sketch Shapefiles to Indicators. At the bottom of the tree is the **Database** node. It contains all the shapefiles added to DSS during the database setup:



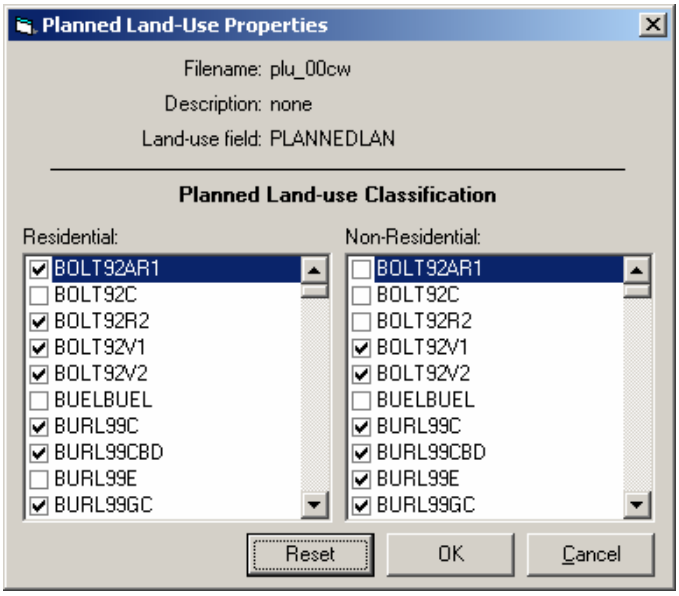
The **Database** node displays the same information you saw when you first populated the database with shapefiles. If you expand the **Database** node you will see that the Land-Use, Travel, and Environment nodes contain sub-nodes. Expand these and leave them expanded so that you can access the shapefiles listed under them.

Adding Shapefiles to the Snapshot Sketch

1. Collapse the **Sketch Area**, **User-Defined Parameters**, **Apply Model** and **Indicators** nodes. Expand the **Sketch Shapefiles** and **Database** nodes. (Clicking the plus sign (+) will expand a node, and clicking the minus sign (-) will collapse a node.)

2. With the **Sketch Shapefiles** node and **Database** nodes expanded you can now add shapefiles from the database to this sketch. Under the **Database\Land-Use\Planned Land-Use** node, double-click the **plu_00cw** shapefile.

3. While the file is being copied to the sketch folder and its contents analyzed, the Planned Land-Use Properties dialog box will appear. At this point, DSS prompts you to classify the fields in the shapefile for use in this sketch. In this case you do not need to make any changes to classifications. It will appear like this:

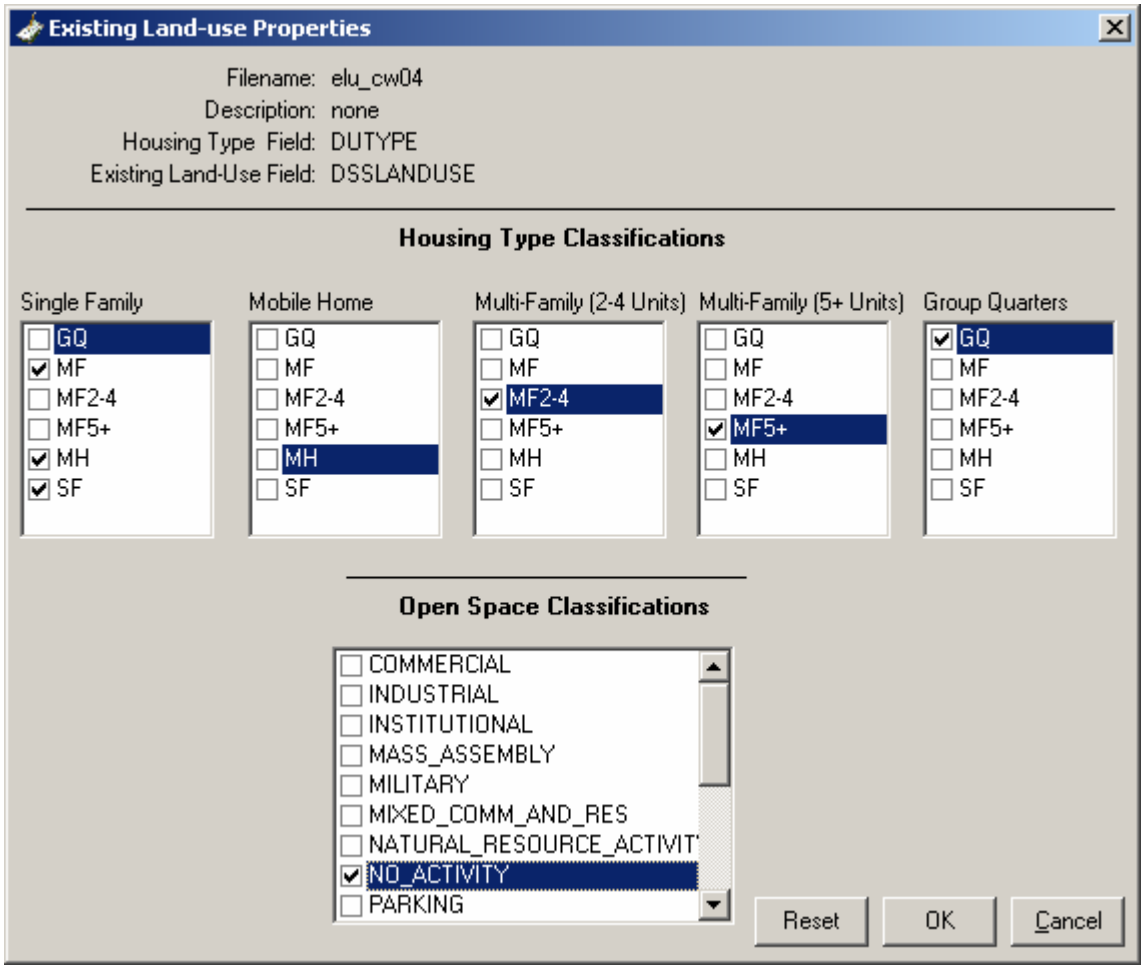


4. Click **OK**. The Land-Use Properties dialog box will disappear, and the shapefile is now in this sketch. Click the **plu_00cw** shapefile under the **Sketch Shapefiles\Land-Use\Planned Land-Use** node and drag it onto the legend pane.

Note that the residential and non-residential classifications currently default according to Chittenden County zoning specifications that existed in mid-2002; it is important to review these settings to insure that they are accurate for the sketch area in question. The procedure for changing these settings is described in the Steward Guide.

Add a Shapefile to the Base Land-Use Node

1. Double-click the **elu_cw04** shapefile in **Database\Land-Use\Base Land-Use** node. After a short time, the following dialog appears:



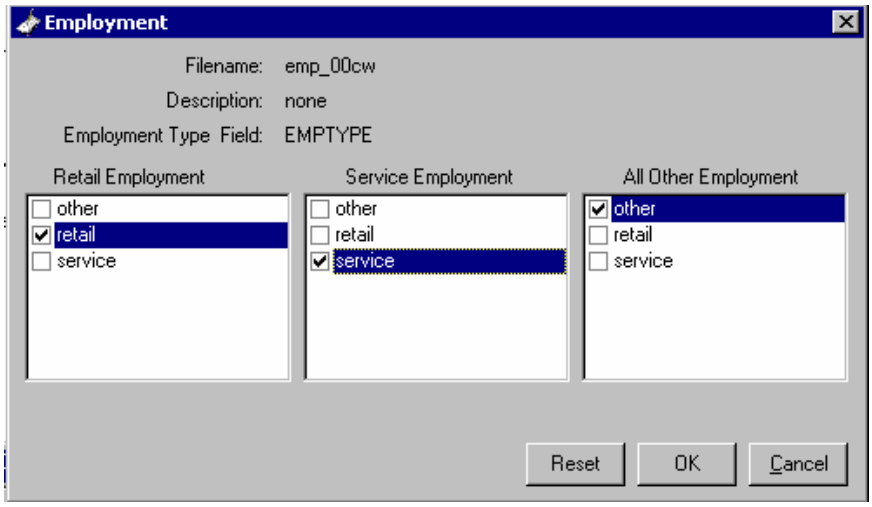
2. It will prompt you to classify the fields. Place the DUType fields in the appropriate designations, as shown above. Under Open Space, choose the appropriate land-use classes that constitute open space in the sketch area being examined. Click **OK** to close this dialog.

3. Click the **elu_cw04** shapefile under the Sketch Shapefiles\Land-Use\Base Land-Use node and drag it onto the legend pane.

Add the Employment Shapefile.

1. Double-click the **emp_00cw** shapefile under **Database\Employment**.

2. It will prompt you to classify the fields. Under Retail Employment check **Retail**, under Service Employment check **Service**, and under Other Employment check **Other**. Click **OK**.



3. Click the **emp_00cw** shapefile under the **Sketch Shapefiles\Employment** node and drag it onto the legend pane.

Add the Street Centerlines Shapefile.

1. Double-click the **rds_02cw** shapefile under **Database\Travel\Street Centerlines**. The following dialog will appear.

2. Drag the shapefile to the legend pane.

Like many shapefiles, this shapefile does not prompt you for information when added to a snapshot sketch.

Add the Hydrologic Soils Shapefile.

1. Double-click the hydro_cw shapefile under Database\Environment\Hydrologic Soils. The following dialog will appear.

2. Drag the shapefile to the legend pane.

6. Save and Load Maps and Legends

Now that you have added layers to the map you will save it, then reload it. This feature is very useful as you use DSS on a day-to-day basis. You will want to view maps with certain layers repeatedly, view the layers in a particular way, or save particular changes you have made to the way the data is symbolized.

Save a Map

1. From the **Map** menu choose **Save Map**.
2. Enter the name "**Test Map**" in the **New Map** text box.
3. Click **Save**.

Load a Map

1. From the **Map** menu choose **Remove All Layers**. All layers will be removed from the legend pane and map pane.
2. From the **Map** menu choose **Load Map**.
3. Click the **Test Map** file you created.
4. Click **Load**. (Leave the map with all these layers displayed, so that you can use it as you work through the *Getting Started Guide*.)

Saving Default Shapefile Legends

Another useful feature is the ability to change how a shapefile is displayed as a map layer, and then save this as the default.

When you previously added shapefiles to the map, DSS used only one, randomly chosen color to symbolize the data of that shapefile as a map layer. However, you can configure a shapefile so that it is always displayed the same way on the map.

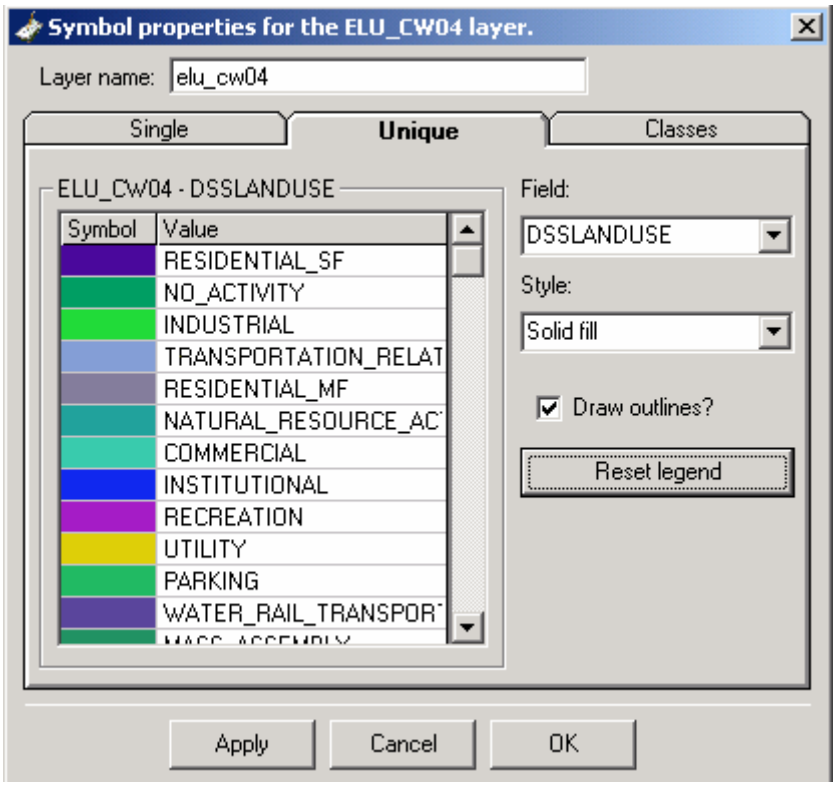
For example, many jurisdictions customarily use yellow to symbolize single-family parcels and brown to symbolize multi-family parcels. If you save these settings as the defaults, whenever you add the shapefile to a map DSS will automatically symbolize the data of the layer in this way.

It is important to note that when you add a shapefile DSS will use your default settings only if you drag the shapefile onto the legend pane. If you drag a shapefile onto the map pane the shapefile's values will be displayed in a single, randomly chosen color.

Creating Unique Values for Symbolizing Data

The Symbol Properties dialog box allows you to configure how you symbolize a shapefile's color and style.

1. Double-click the **elu_cw04** layer on the legend pane.
2. The Symbol Properties dialog box will appear. Click the **Unique** tab.
3. In the Field box choose DSS**LANDUSE**.
4. Click **Reset legend**. The legend will update:



5. Click **Reset legend** a few more times.
6. Click **Apply** for the changes to be reflected on the map pane and the legend pane. Do *not* click OK yet.

Change Colors for Each Value

Here you choose the exact colors and styles you want.

1. With the values still displayed on the legend of the Unique tab, click any of the colors in the Symbol column.

2. The Color dialog box will appear. Choose a new color and click **OK**.

3. Click **Apply** to see the changes reflected on the legend pane and map pane.

4. Repeat for other values.

5. Click **OK** to close the dialog box.

Save Default Shapefile Legend.

Now that you have made these changes you can save them as defaults, to be used whenever you add this shapefile to a map.

1. On the legend pane, the elu_cw04 layer should be the active layer. The active layer is indicated by its raised edges. If it is not the active layer, single-click the shapefile on the legend pane. (If you double-click a shapefile the Symbol Properties dialog box will open.)

2. From the **Map** menu, choose **Save Default Shapefile Legend**. This will save the settings you just made, setting them as defaults.

3. From the **Map** menu choose **Remove Layer**. The **elu_cw04** layer will disappear from the legend pane.

4. Click the **elu_cw04** shapefile, located under **Sketch Shapefiles\Planned Land-Use** on the Sketch tree. Drag it over the **map** pane, then release the mouse button. Notice that it has been added to the map pane and the legend pane, but *without* the default settings you just created.

5. From the **Map** menu choose **Remove Layer**. The elu_cw04 layer will disappear from the legend pane.

6. Drag the **elu_cw04** shapefile over the **legend** pane, then release the mouse button. Notice that it has been added to the map pane and the legend pane, this time *with* the default settings you just created.

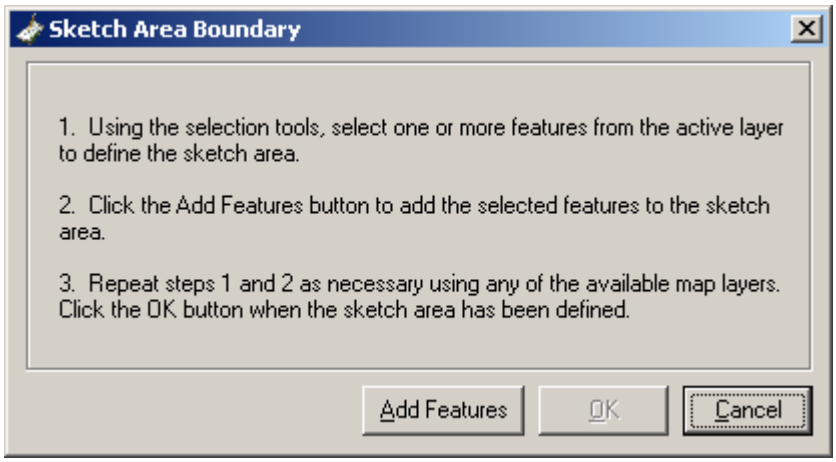
7. Define Sketch Boundary

The next step is to create a sketch boundary. All indicators use the sketch boundary as the outer limit for calculations. Sketch area boundaries can significantly influence indicator scores, and care should be exercised when selecting a boundary. Users should refer to the Snapshot Process Guide for key considerations in selecting boundaries.

For purposes of getting started, you will use the **townbdy** shapefile to define the sketch boundary. Drag the **townbdy** shapefile onto the legend pane from the **Database/Local Gout Boundaries** node.

Define a Sketch Area Boundary

1. Expand the **Sketch Area** node and double-click the **Sketch Boundary** sub-node. The Sketch Area Boundary dialog box will open. This allows you to add features incrementally to the sketch area boundary.

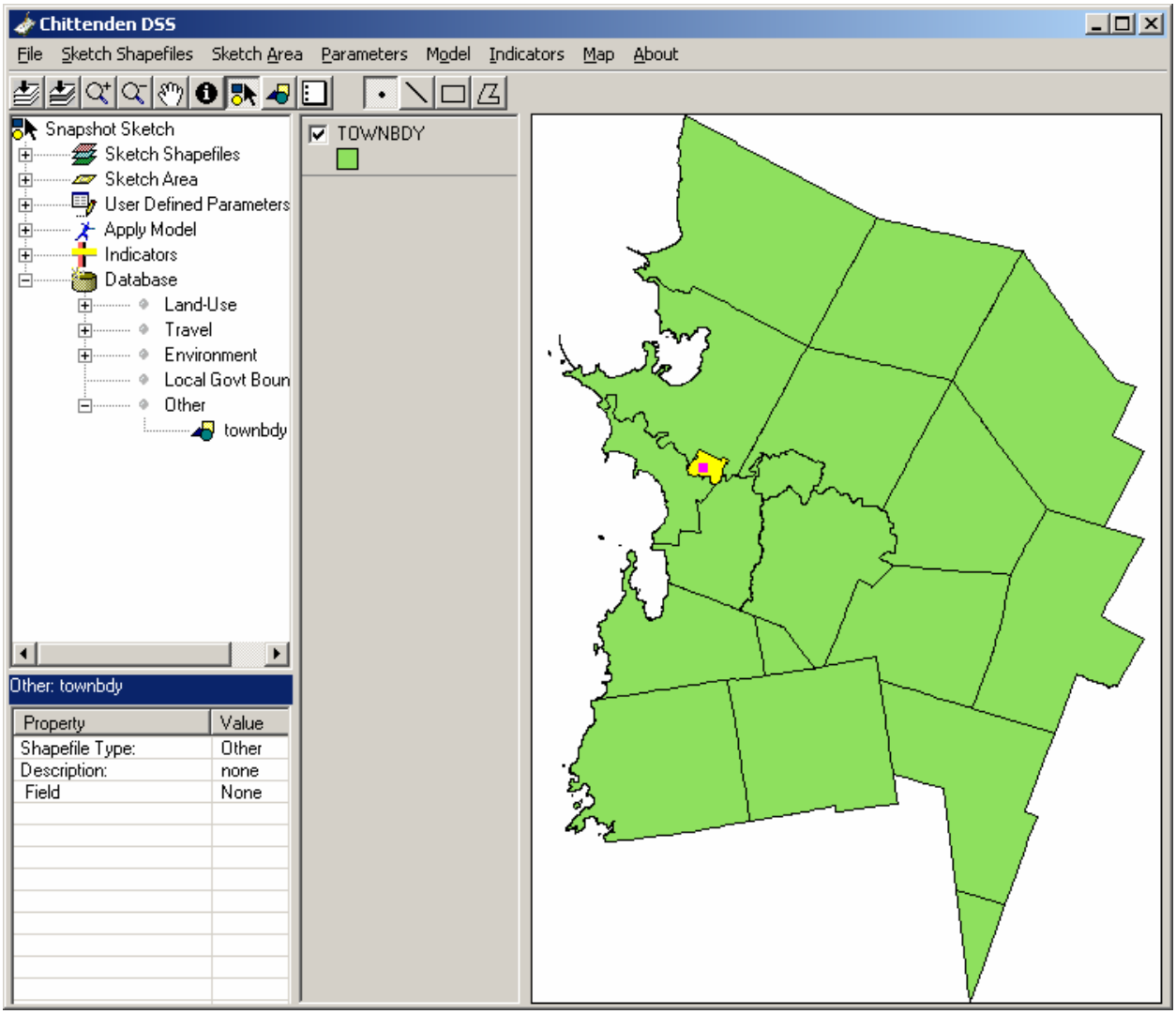


2. **Note:** When you define a sketch area boundary and then run indicators based on that boundary, DSS will use all attributes from all layers in the sketch that fall within that boundary. In other words, the layers don't have to be on your map at the time that you define the boundary for DSS to use their attributes to calculate indicators; they just have to be part of your sketch. This is why you are able to use only the **townbdy** layer (or a study area polygon added to the Other node) to define the sketch area boundary, not the base land-use shapefile.

3. Select your study area using the selection tools. Click the feature Select Tool button:

4. Click the selection tool that will enable you to select the desired features. The tools include a point, a line, a rectangle and a polygon:

5. Using these tools, select a feature or features on the map:



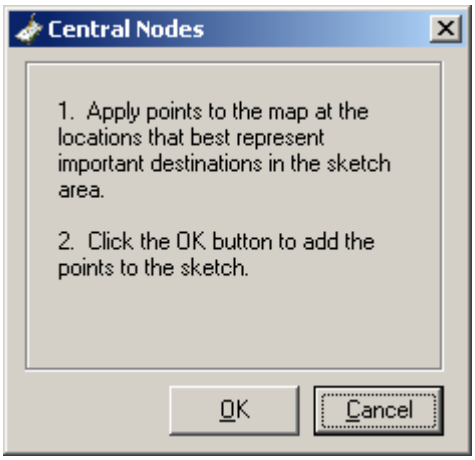
6. Click the **Add Feature** button on the Sketch Boundary Area dialog. You can repeat steps five and six as many times as you require, to identify the study area you desire. DSS will continue to add more features to the shapefile it creates. The snapshot module is a detailed parcel level model intended for studying specific development areas. Because of the level of detail, the time to calculate the indicators will increase greatly as the study area size is increased. For this sample sketch we will choose the town of Winooski as shown above.

7. Click **OK** when you have finished selecting features.

Adding Neighborhood Centers to the Sketch

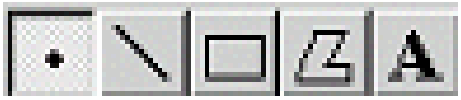
If the Base Land-Use shapefile is not on the map, drag it to the map now. The shapefile will have been trimmed to the boundaries of the sketch defined during the previous step.

1. Double-click the **Sketch Area\Central Nodes** node. The Central Nodes dialog appears:



2. When the Central Nodes dialog box appears, click the **Graphic Tool** icon, located to the right of the Feature Selection Tool icon.

3. Click the **Point Graphic Tool** icon. (The other tools are used to draw and write on the map.)



4. With the Point Graphics tool, click near the center of the map. A small triangle will appear where you click. Place the central node at a strategic destination in the sketch area.

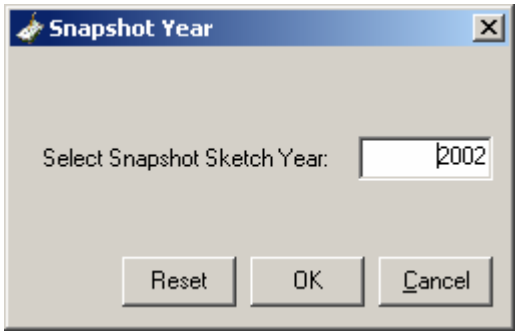
5. Click the **OK** button when finished.

8. Configure User-Defined Parameters

The next step is setting user-defined parameters (UDPs) that are acquired for a variety of indicators. Users may enter their own unique or local values, or they may use the defaults already provided in DSS. Users should refer to the Snapshot UDP Default Table elsewhere in the user manual for information about UDP defaults and sources.

Snapshot Year

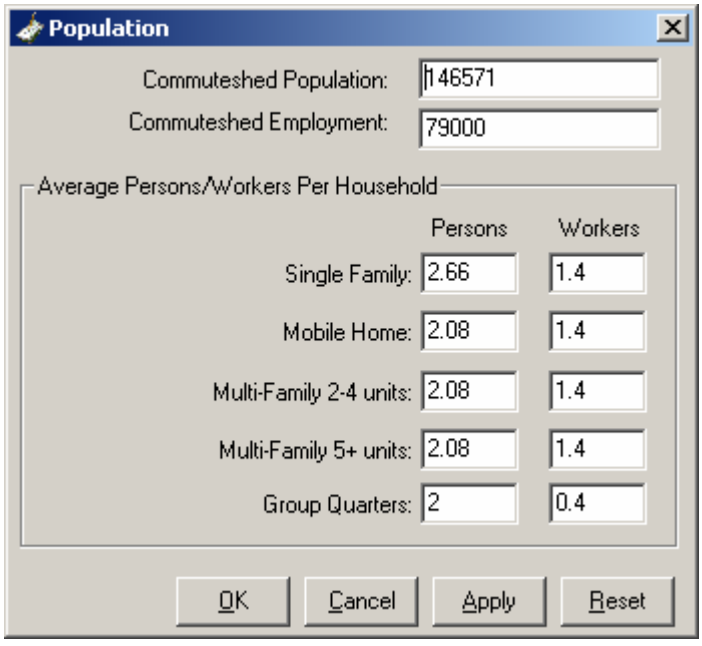
1. Expand the **User Defined Parameters** node and double-click the **Snapshot Year** node. The following dialog appears:



2. Click **OK** to accept the default.

Population

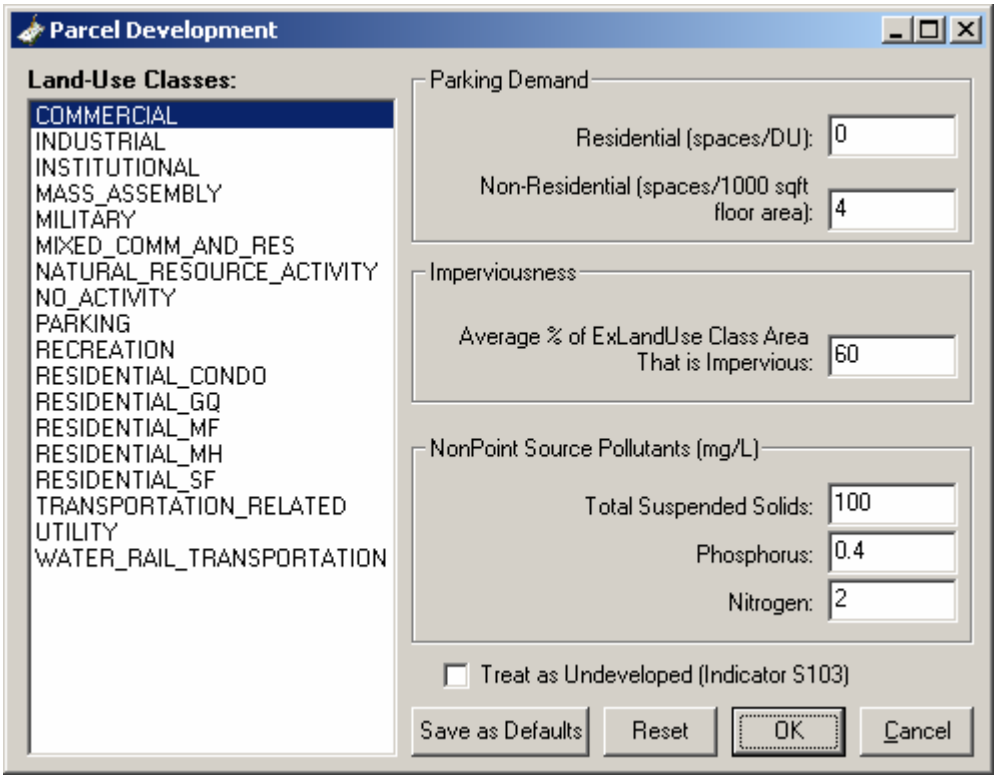
1. Double-click the **Population** node. The following dialog appears:



2. Adjust any parameter and click the **OK** button to proceed.

Parcels Development

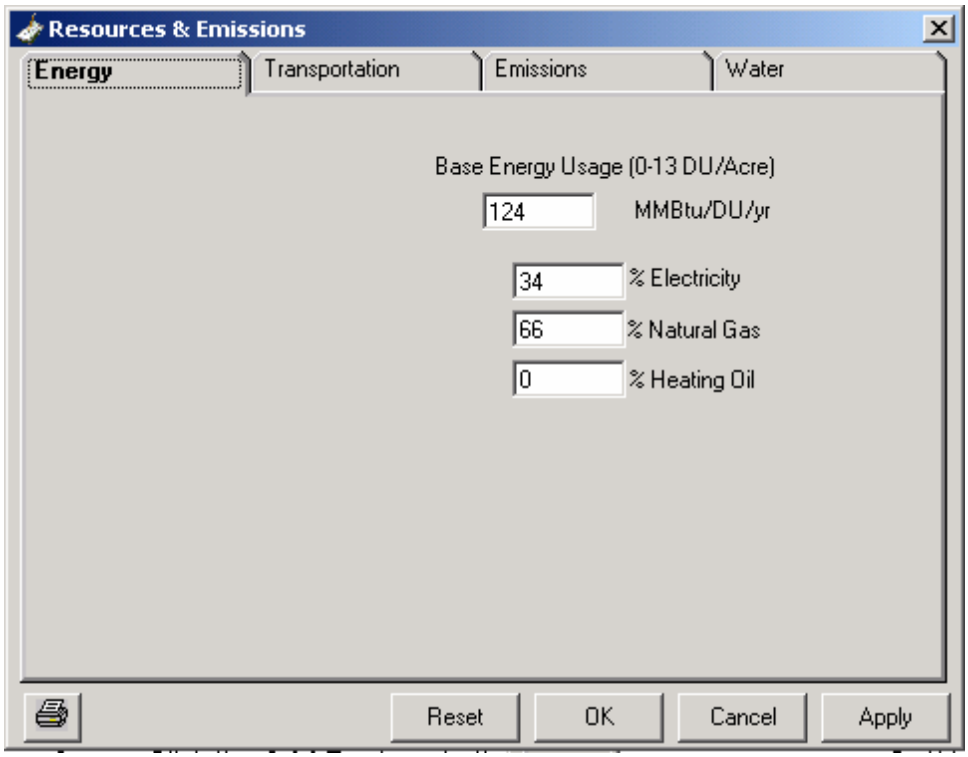
1. Double-click the **Parcels Development** node. The following dialog appears:



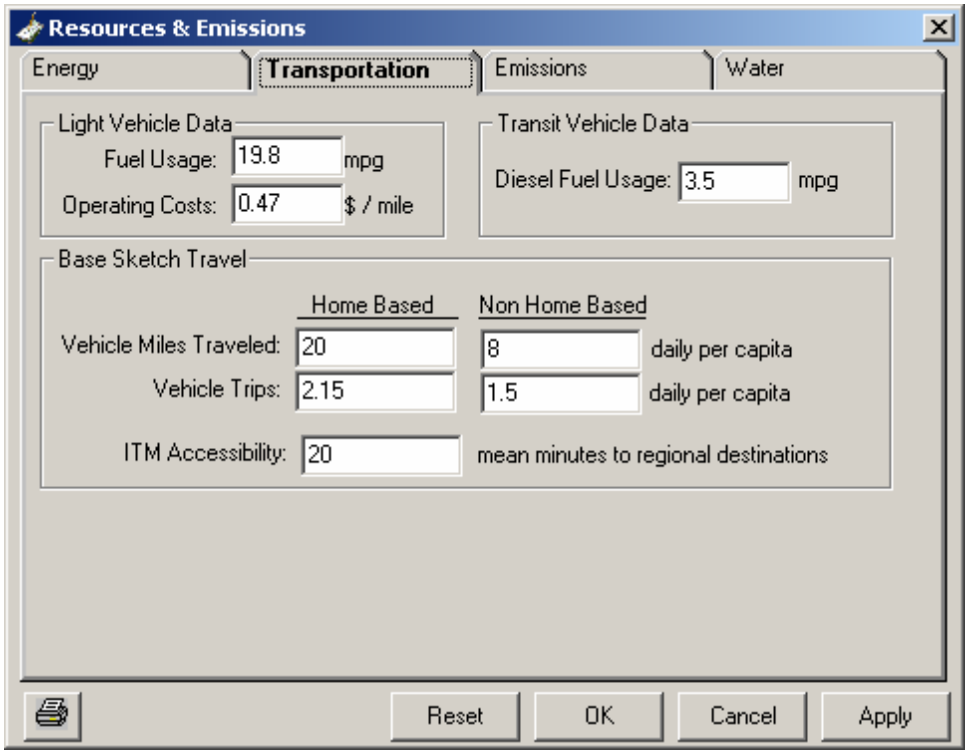
2. Click on any of the classes under Existing Land-Use Classes, to see the defaults provided. Click **OK** to accept the defaults.

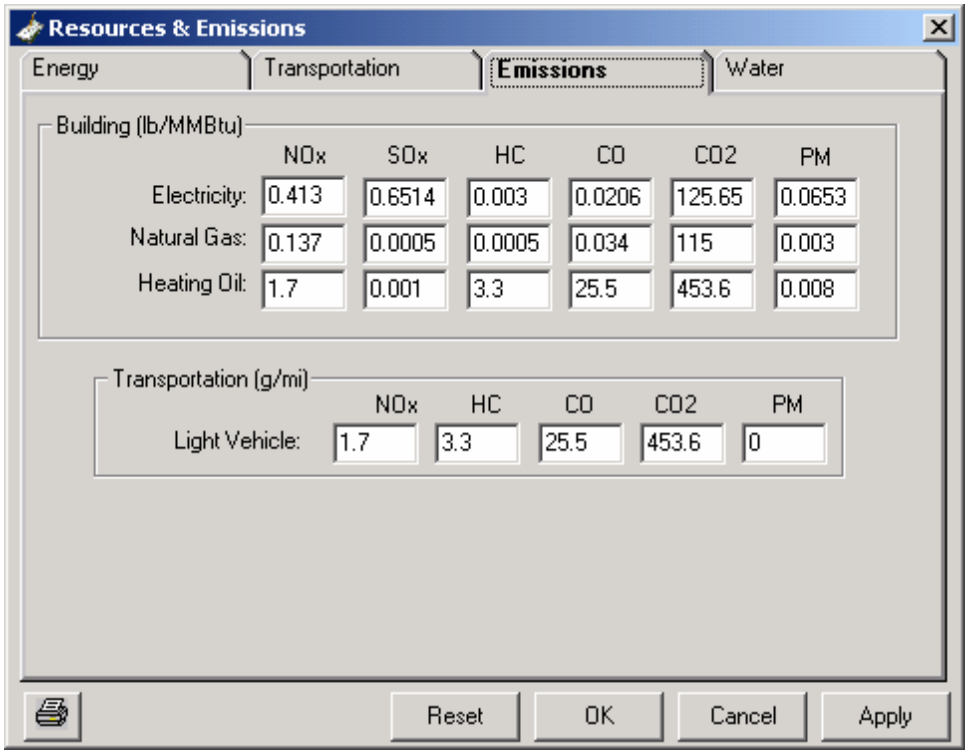
Resources and Emissions

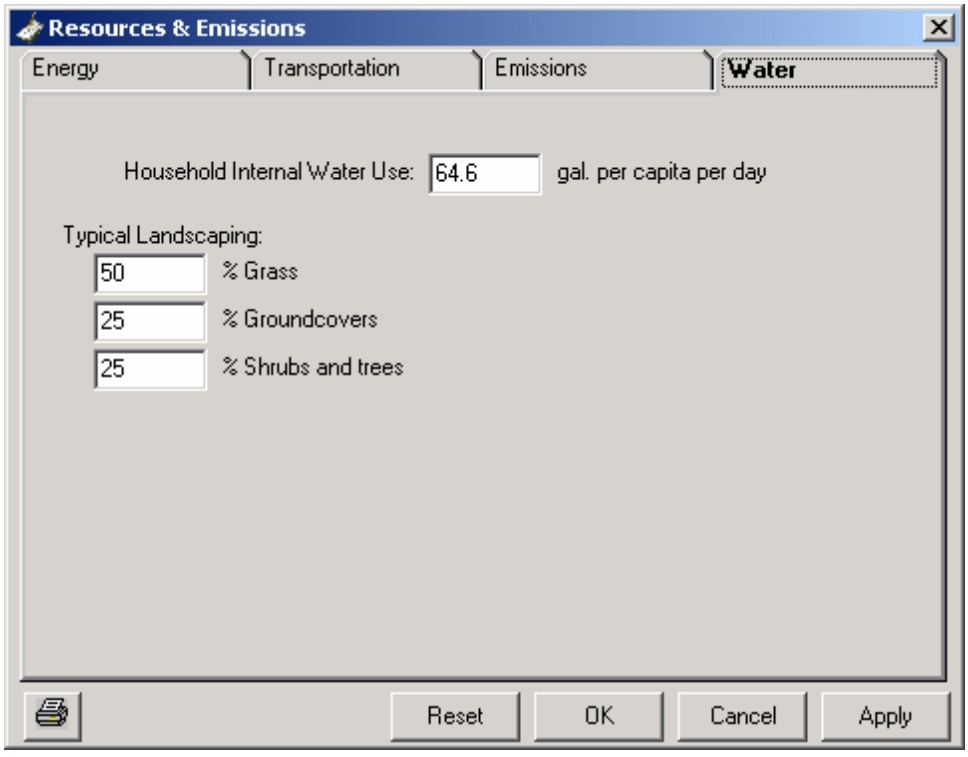
1. Double-click the **Resources & Emissions** node. The following dialog appears:



Visit the various tabs to observe the default settings:





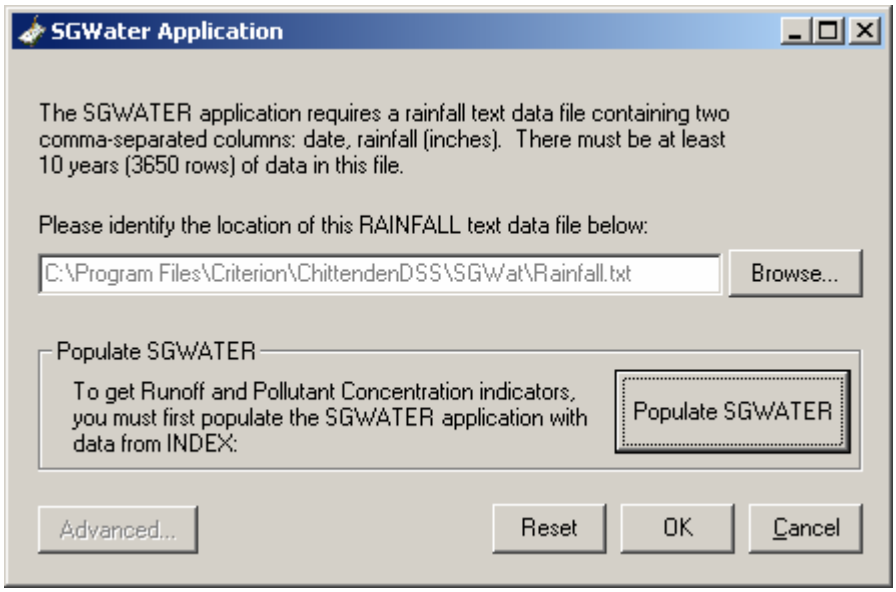


2. Click **OK** to accept the defaults.

SGWATER Stormwater Methodology

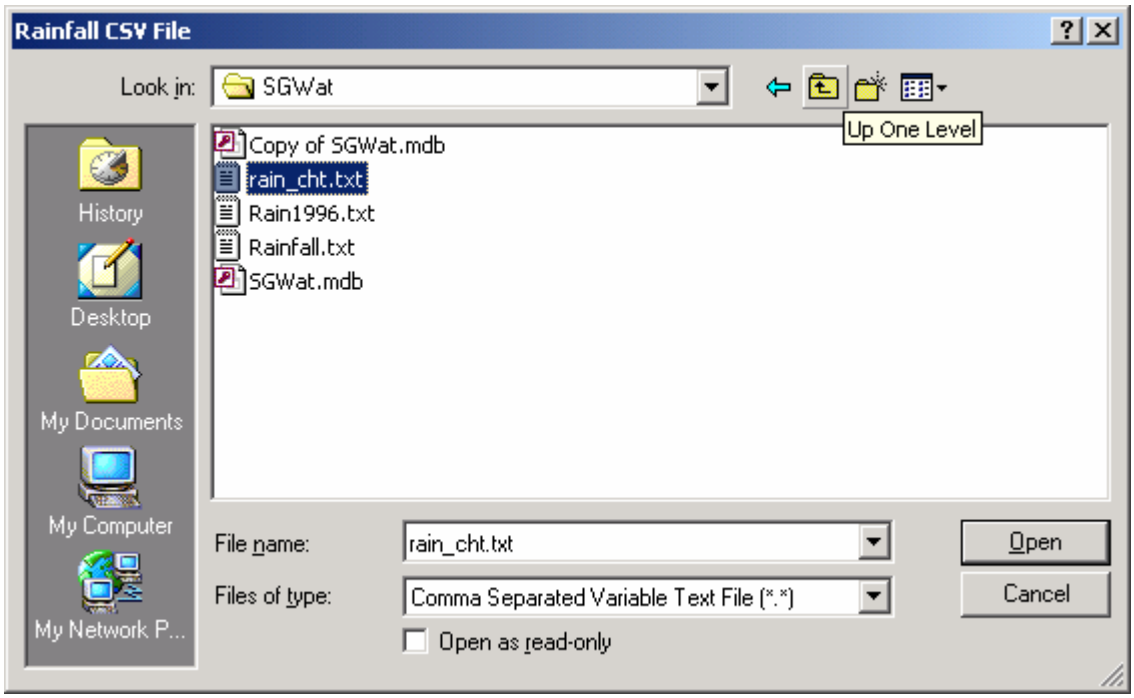
DSS employs a U.S. EPA methodology called SGWATER to calculate imperviousness, stormwater runoff, and non-point source pollutants. To run these indicators, you must first populate the SGWATER database with rainfall data.

1. Double-click the **User Defined Parameter\SGWATER Application** node. The following dialog appears:



2. Click the **Browse** button next to the rainfall text data file area. The following dialog appears

3. Click **OK** and then locate the **rainfall.txt** file in your SGWat folder:

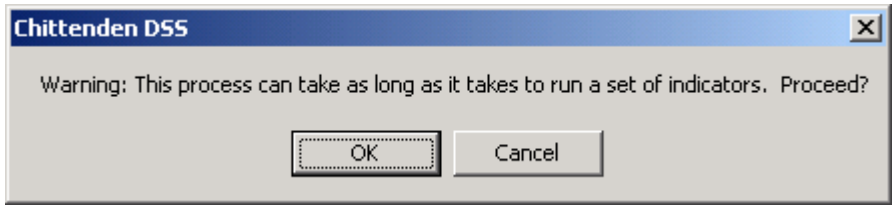


4. Click **Open** and the following dialog appears:

You only need to run this process once, and the same rainfall data will be used for all sketches until you decide to change the rainfall data.

5. Click **OK** to return to the SGWATER UDP.

6. Click the **Populate SGWat** button, the following warning appears:

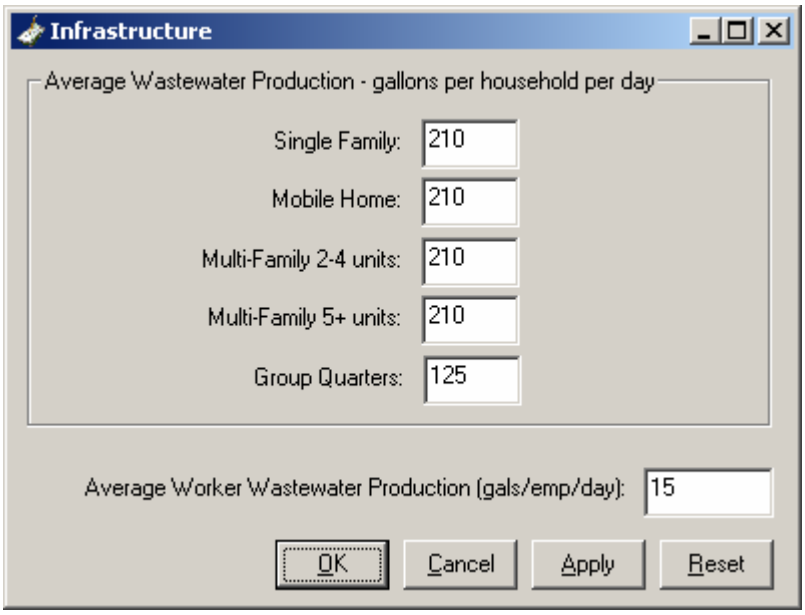


7. Click **OK** to proceed, or **Cancel** to abort the population process. **NOTE**: Populating SGWATER involves reading the Parcels Development UDP, and overlaying the Grid shapefile with the Hydrological Soils shapefile for each Growth Allocation. Therefore, whenever you change any of these components, you must return to this UDP and re-populate SGWATER.

8. When finished, click the **OK** button to return to the forecast sketch module.

Infrastructure UDP

1. Double-click the **Infrastructure** UDP node. The following dialog appears:



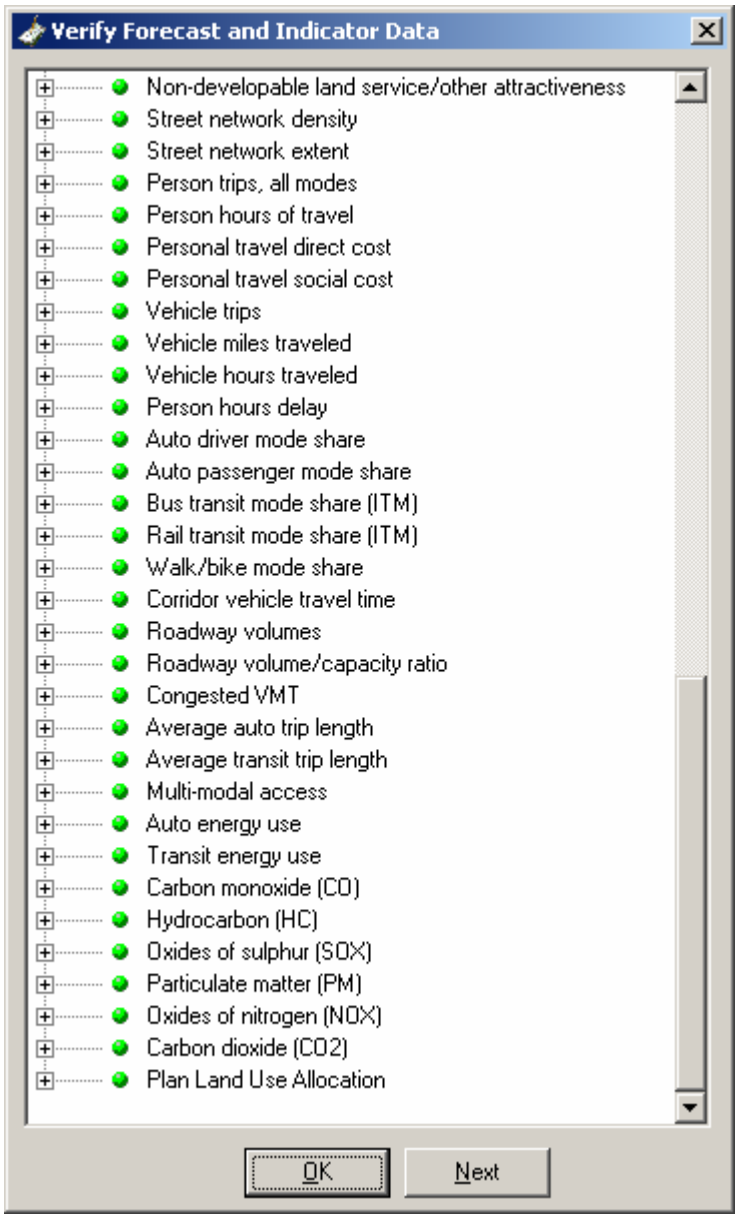
Click **OK** to accept the defaults.

9. Run The Model

Verifying Inputs

DSS indicators rely on certain shapefiles and attributes, as well as UDPs. You can use **Verify Inputs** to determine which indicators are ready to calculate.

1. Expand the **Run Model** node and double-click the **Verify Inputs** node. After completing its check, the following dialog appears:

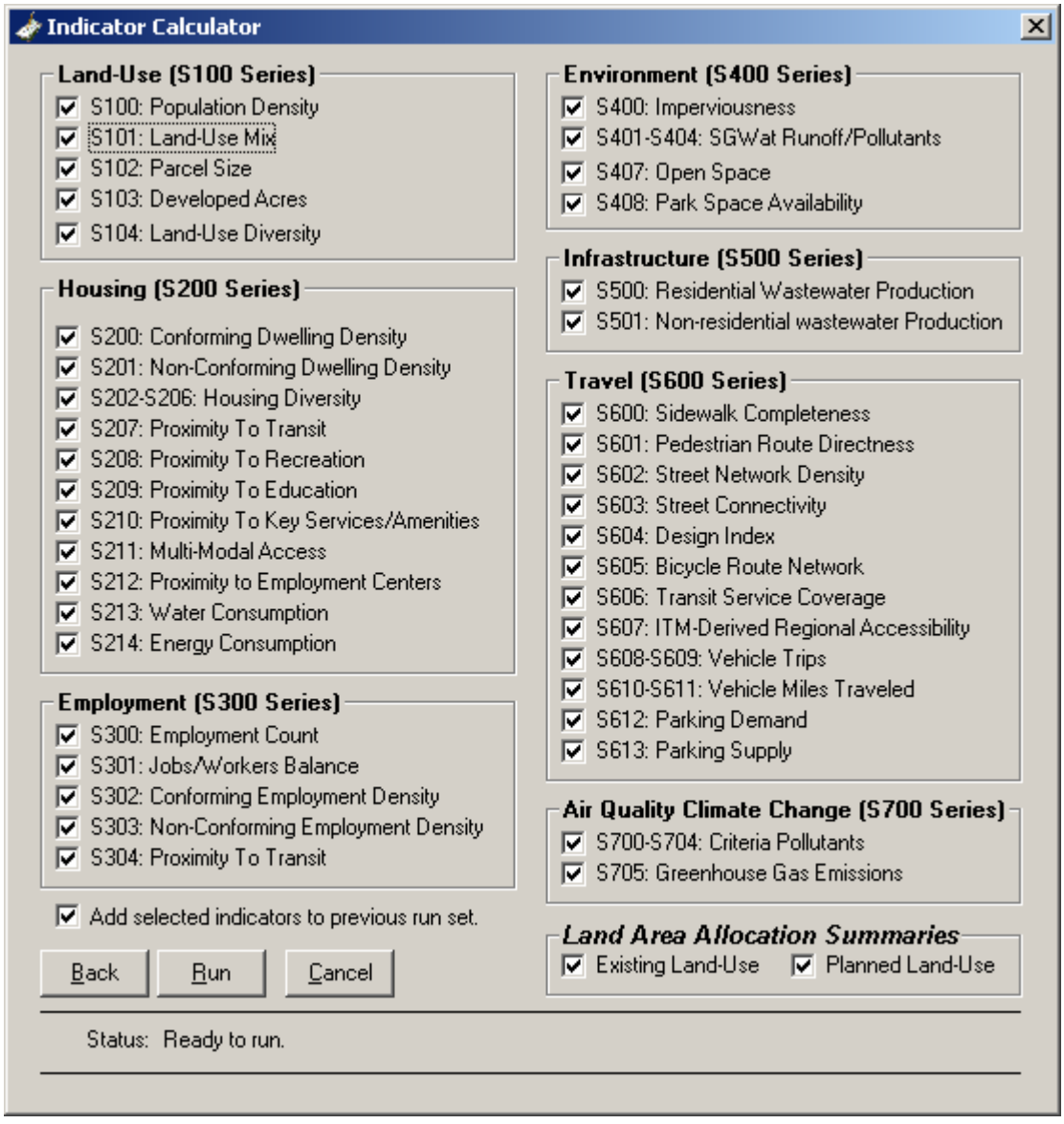


2. Indicators with green lights next to them are ready to run. Expand nodes with red lights next to them to see which shapefiles, attributes, and/or UDPs are missing or configured improperly.

3. You may want to go back and make the required corrections to your sketch, then repeat Verify Inputs until all the desired indicators have green lights. Or, go to the next step as is. Click the **Next** button when ready.

Running the Model

1. Upon clicking the **Next** button, the Indicator Calculator dialog appears:



Unavailable indicators are disabled and will remain so until all the required data is supplied. You may also unselect any indicators which you do not wish to include in a run.

If you have already completed one successful run and are returning to run additional indicators for the same sketch, you can select the **"Add selected indicators to last run's set"** checkbox to preserve previous indicator results and add scores for the newly selected indicators. The previous run's scores and newly calculated scores will appear together in a consolidated list in the Indicator Scores table described below. Users should exercise caution when making changes to sketches between runs if this feature is used because results are presented in a consolidated list that does not differentiate scores according to which run produced them. Changes in a sketch between runs are not advisable when using this feature because of the mixed and possibly misleading results in the consolidated indicator scores. Sketch area boundaries should never be changed between runs for these reasons.

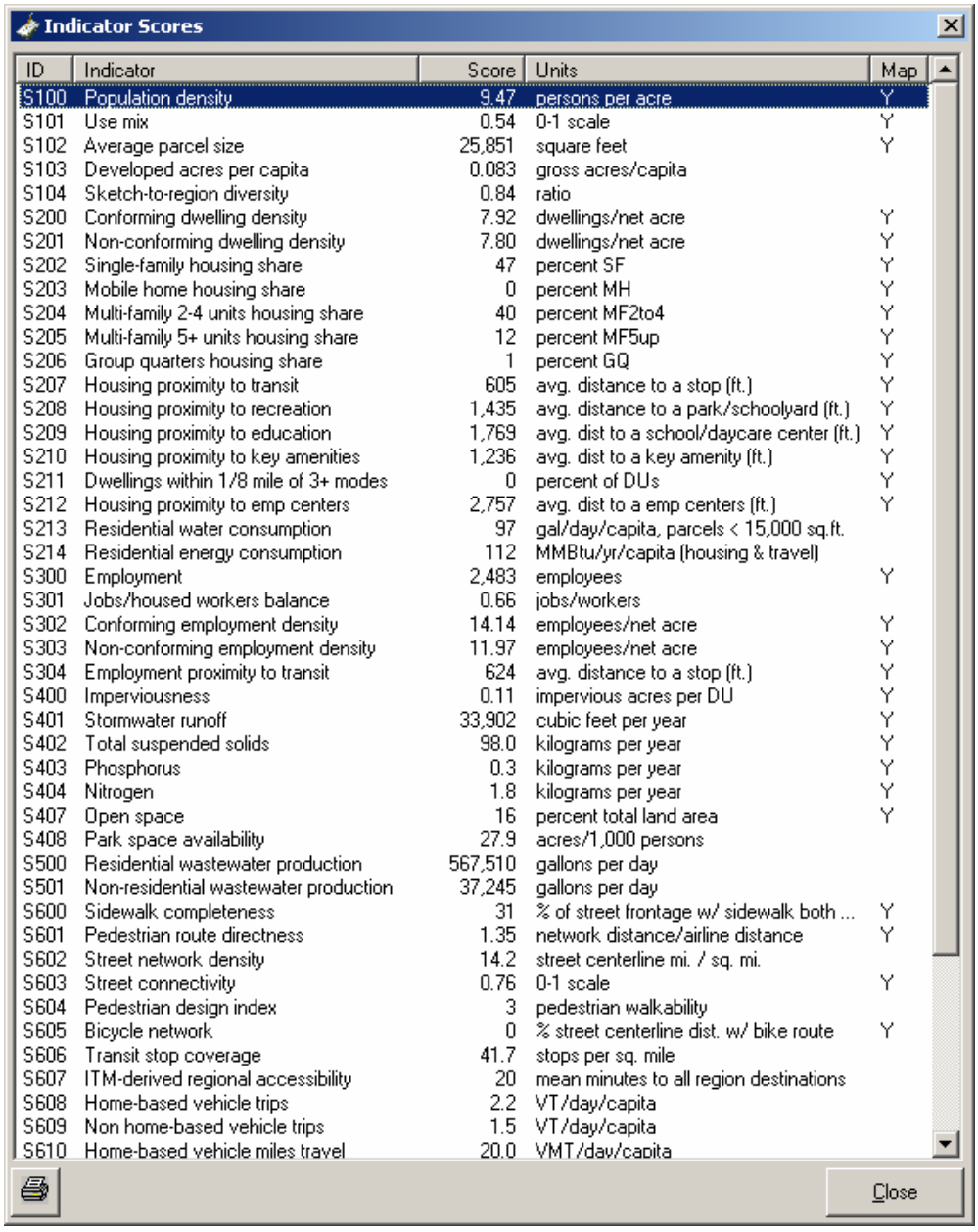
2. When ready, click the **Run** button to run the model. As the run proceeds, you can refer to the status bar at the bottom of the dialog to see how much of the run has been completed.

10. View Results

Once a run is complete, you may view the results under the Indicators treeview node. Users should refer to the Snapshot Process Guide for advice on interpreting indicator scores.

Viewing Indicator Scores

1. Expand the Indicators node, and double-click the **Indicator Scores** node. The following window appears:

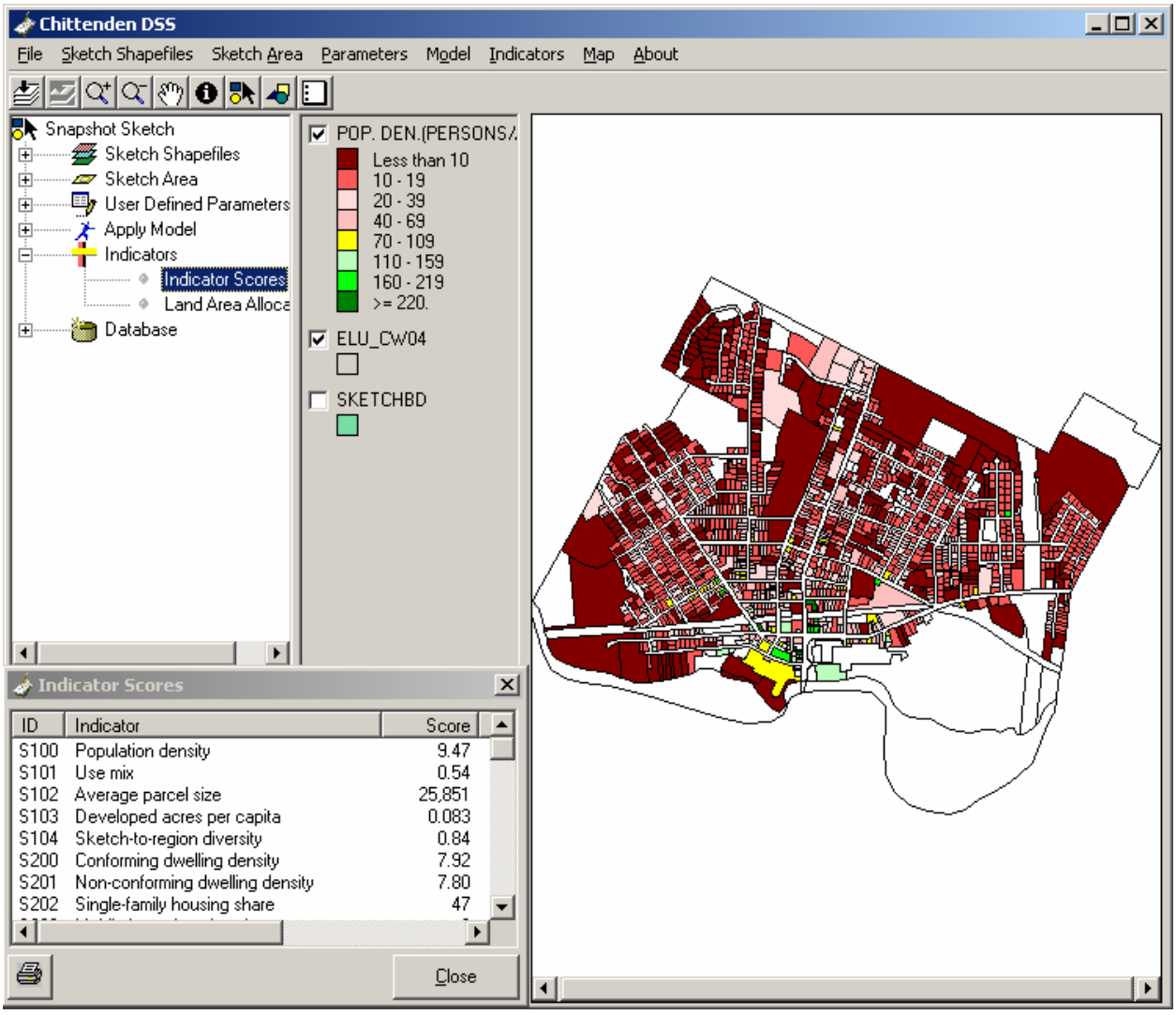


ID	Indicator	Score	Units	Map
S100	Population density	9.47	persons per acre	Y
S101	Use mix	0.54	0-1 scale	Y
S102	Average parcel size	25,851	square feet	Y
S103	Developed acres per capita	0.083	gross acres/capita	
S104	Sketch-to-region diversity	0.84	ratio	
S200	Conforming dwelling density	7.92	dwellings/net acre	Y
S201	Non-conforming dwelling density	7.80	dwellings/net acre	Y
S202	Single-family housing share	47	percent SF	Y
S203	Mobile home housing share	0	percent MH	Y
S204	Multi-family 2-4 units housing share	40	percent MF2to4	Y
S205	Multi-family 5+ units housing share	12	percent MF5up	Y
S206	Group quarters housing share	1	percent GQ	Y
S207	Housing proximity to transit	605	avg. distance to a stop (ft.)	Y
S208	Housing proximity to recreation	1,435	avg. distance to a park/schoolyard (ft.)	Y
S209	Housing proximity to education	1,769	avg. dist to a school/daycare center (ft.)	Y
S210	Housing proximity to key amenities	1,236	avg. dist to a key amenity (ft.)	Y
S211	Dwellings within 1/8 mile of 3+ modes	0	percent of DUs	Y
S212	Housing proximity to emp centers	2,757	avg. dist to a emp centers (ft.)	Y
S213	Residential water consumption	97	gal/day/capita, parcels < 15,000 sq.ft.	
S214	Residential energy consumption	112	MMBtu/yr/capita (housing & travel)	
S300	Employment	2,483	employees	Y
S301	Jobs/housed workers balance	0.66	jobs/workers	
S302	Conforming employment density	14.14	employees/net acre	Y
S303	Non-conforming employment density	11.97	employees/net acre	Y
S304	Employment proximity to transit	624	avg. distance to a stop (ft.)	Y
S400	Imperviousness	0.11	impervious acres per DU	Y
S401	Stormwater runoff	33,902	cubic feet per year	Y
S402	Total suspended solids	98.0	kilograms per year	Y
S403	Phosphorus	0.3	kilograms per year	Y
S404	Nitrogen	1.8	kilograms per year	Y
S407	Open space	16	percent total land area	Y
S408	Park space availability	27.9	acres/1,000 persons	
S500	Residential wastewater production	567,510	gallons per day	
S501	Non-residential wastewater production	37,245	gallons per day	
S600	Sidewalk completeness	31	% of street frontage w/ sidewalk both ...	Y
S601	Pedestrian route directness	1.35	network distance/airline distance	Y
S602	Street network density	14.2	street centerline mi. / sq. mi.	
S603	Street connectivity	0.76	0-1 scale	Y
S604	Pedestrian design index	3	pedestrian walkability	
S605	Bicycle network	0	% street centerline dist. w/ bike route	Y
S606	Transit stop coverage	41.7	stops per sq. mile	
S607	ITM-derived regional accessibility	20	mean minutes to all region destinations	
S608	Home-based vehicle trips	2.2	VT/day/capita	
S609	Non home-based vehicle trips	1.5	VT/day/capita	
S610	Home-based vehicle miles travel	20.0	VMT/day/capita	

Viewing Indicator Maps

In some cases, further Indicator results are available in map form. Such indicators display a "Y" under the Map column in Indicator Results.

1. Double-click the **Population Density** indicator. The Sketch Module form automatically loads a map of Population Density detail:



Printing Maps

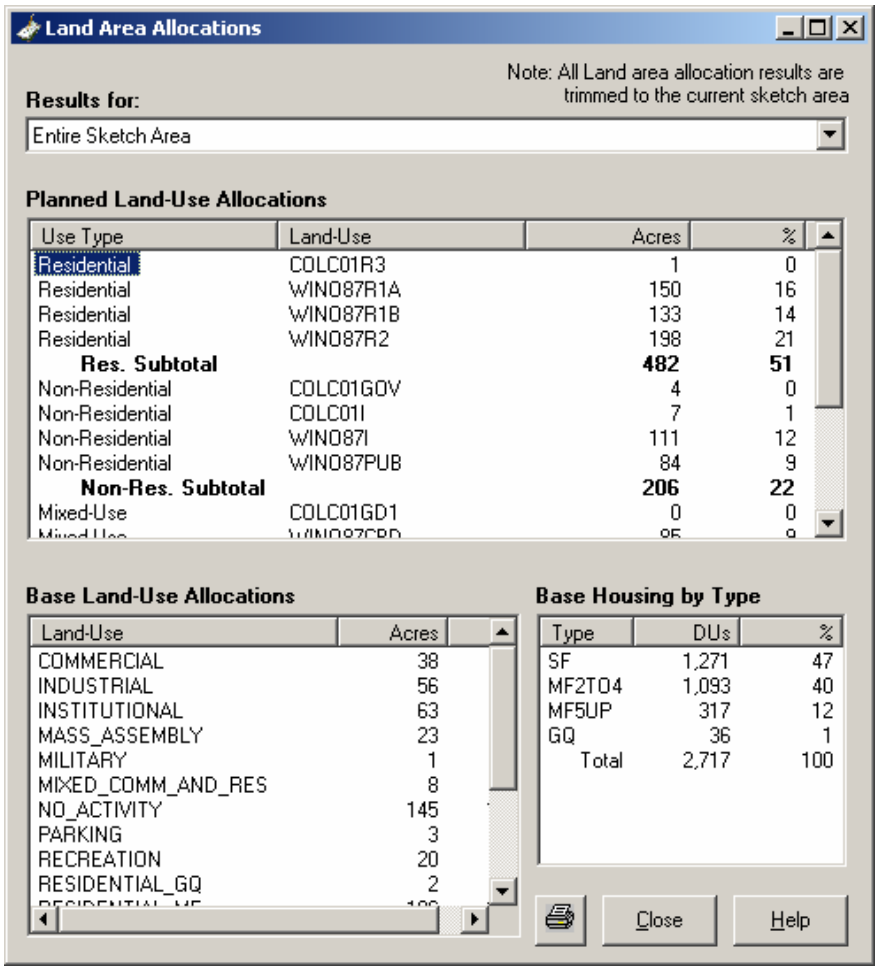
1. To print a map, select the **Print Map** option under the Map menu.

Viewing Land Allocation Results

In addition to indicator scores and maps, DSS produces a tabulation of land allocations in a sketch.

1. To view Land Allocation results, click the **Return** button on the Indicator Scores window to return to the sketch module window.

2. Double-click the **Land Allocations** node. The following form appears:



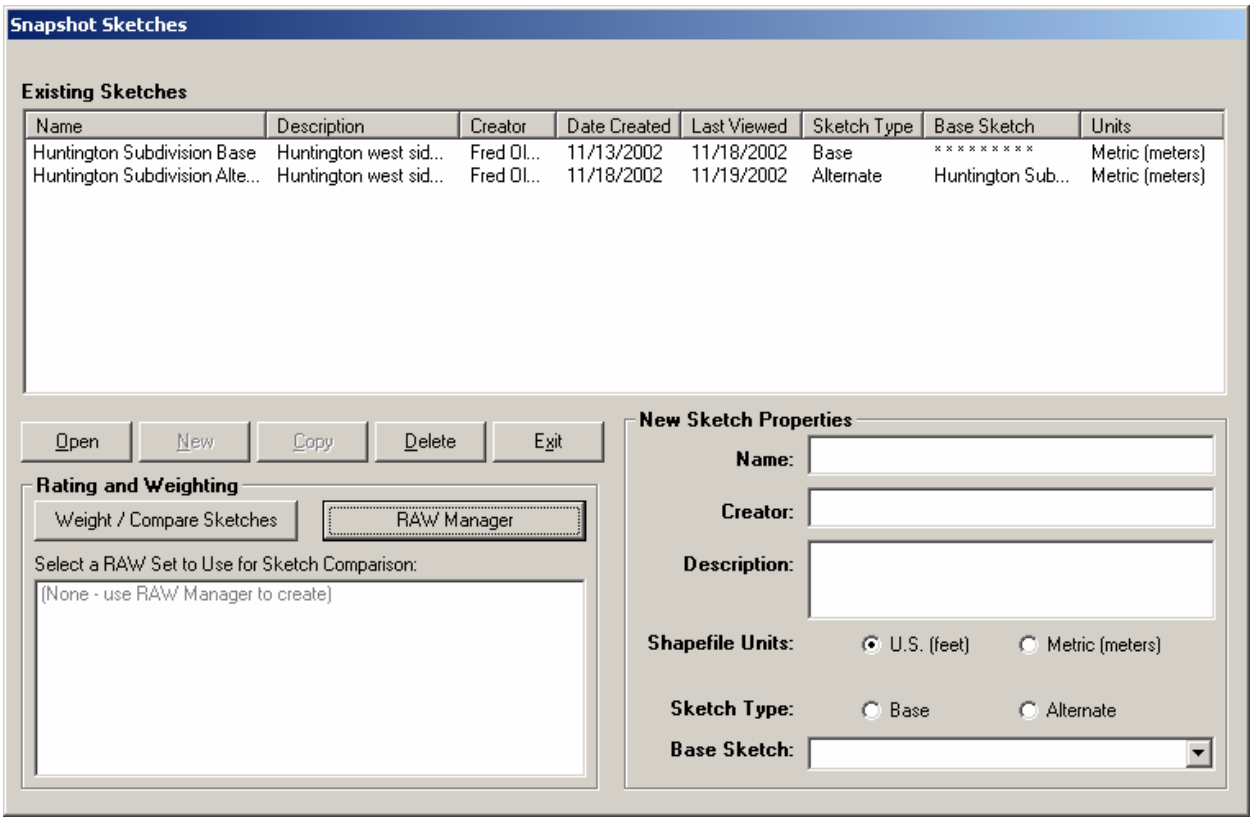
Note that the planned land-use allocation subcategory “non-buildable subtotal” is not used in snapshot sketches.

11. Compare Sketches

Once you have created several alternative sketches of a given situation, you may compare them with or without weighted scoring. Unweighted comparison is done simply by comparing original indicator scores for each sketch. Alternatively, the DSS has a rating and weighting (RAW) function that allows users to compare sketches based on ratings of score acceptability and weightings of indicator importance. Additional information on the RAW function is provided in the Snapshot Process Guide.

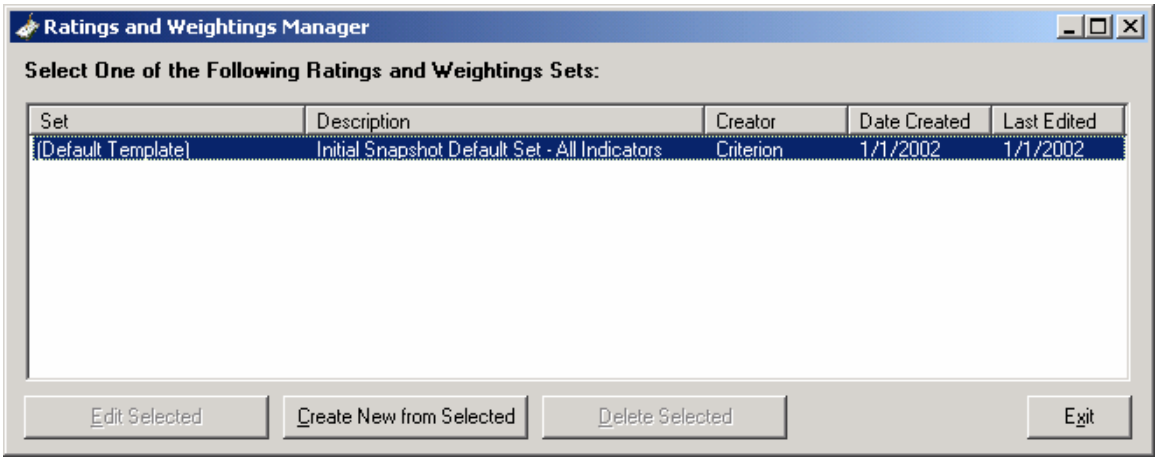
Accessing RAW

1. From the DSS Main Menu, click the **Snapshot** button. The Project Manager window appears:



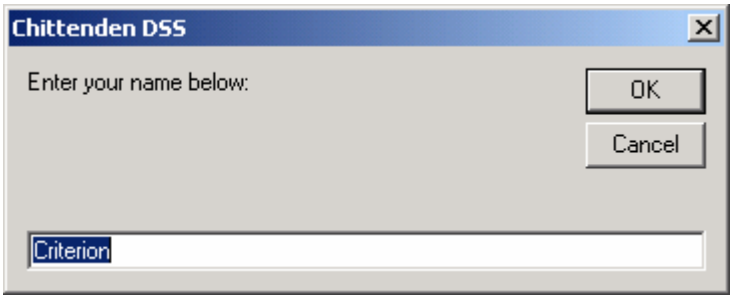
The second sketch listed is an alternate of the base sketch that was created for demonstrating the compare functionality of the model. Before proceeding you will need to create an alternate sketch. It is recommended that you add a new alternate land-use shapefile to the database then create a new sketch as outlined in Sections 5 of this guide. When defining the sketch, select “alternate” as the Sketch Type, and choose “existing base sketch” in the Base Sketch drop-down combo box.

2. Click the **RAW Manager** button. The following window appears:

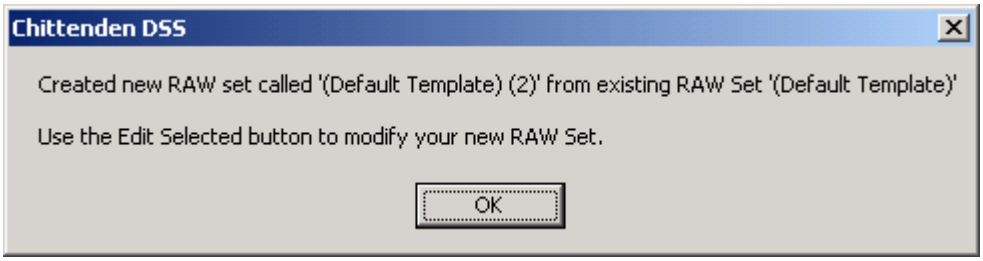


Creating a RAW Set from the DSS Default

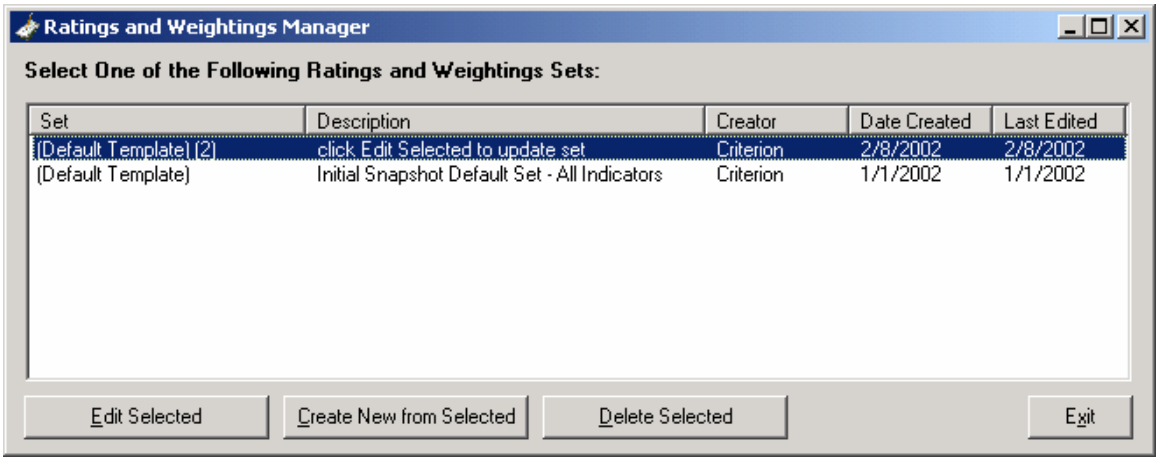
1. DSS is supplied with a default RAW set to act as a template for custom comparisons. Select the default and click the **Create New From Selected** button. The following dialog appears:



2. Enter the name that will appear in the Creator field of this new RAW Set. Click **OK**, and the following message appears:

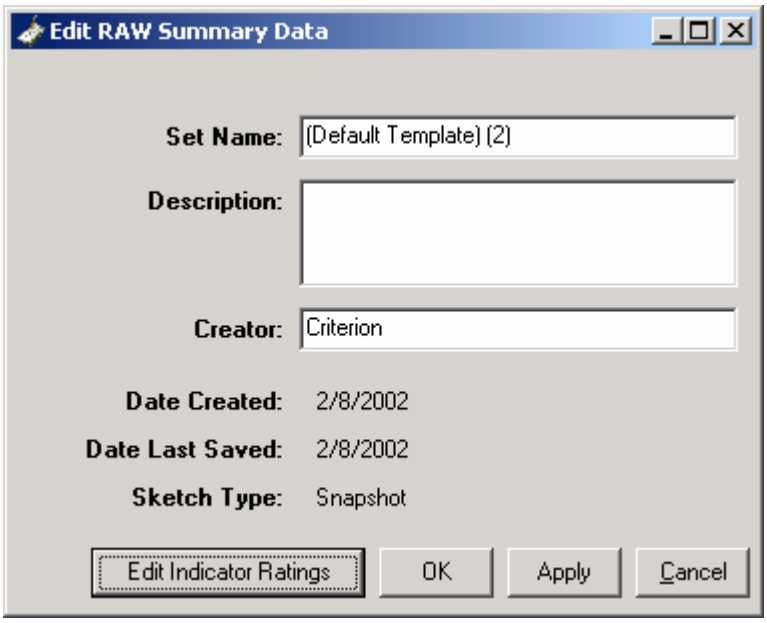


3. Click **OK**, and the newly-created RAW Set is listed in the RAW manager window:



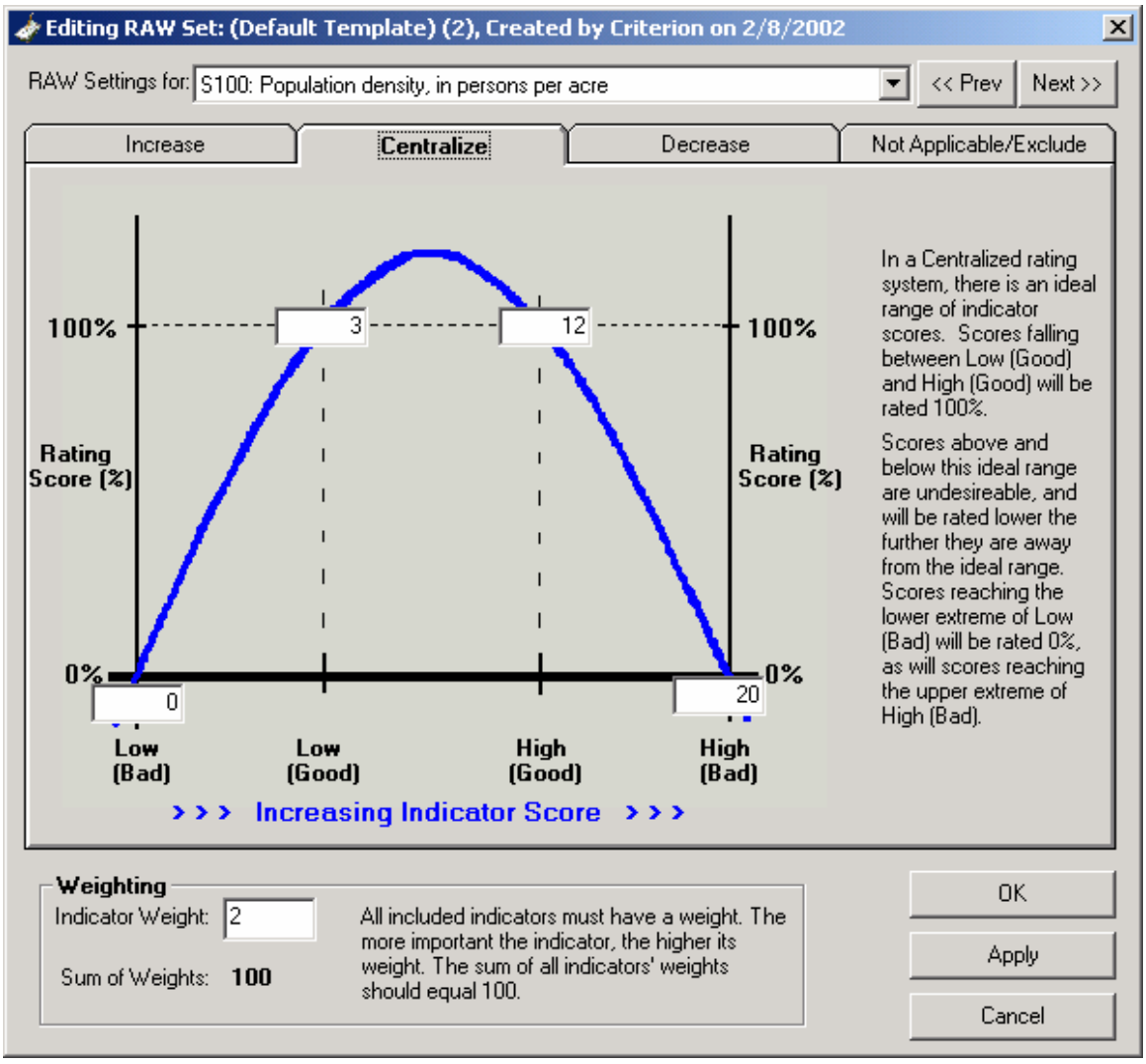
Editing a RAW Set

1. Select the RAW Set to edit and click the **Edit Selected** button. The following dialog appears:

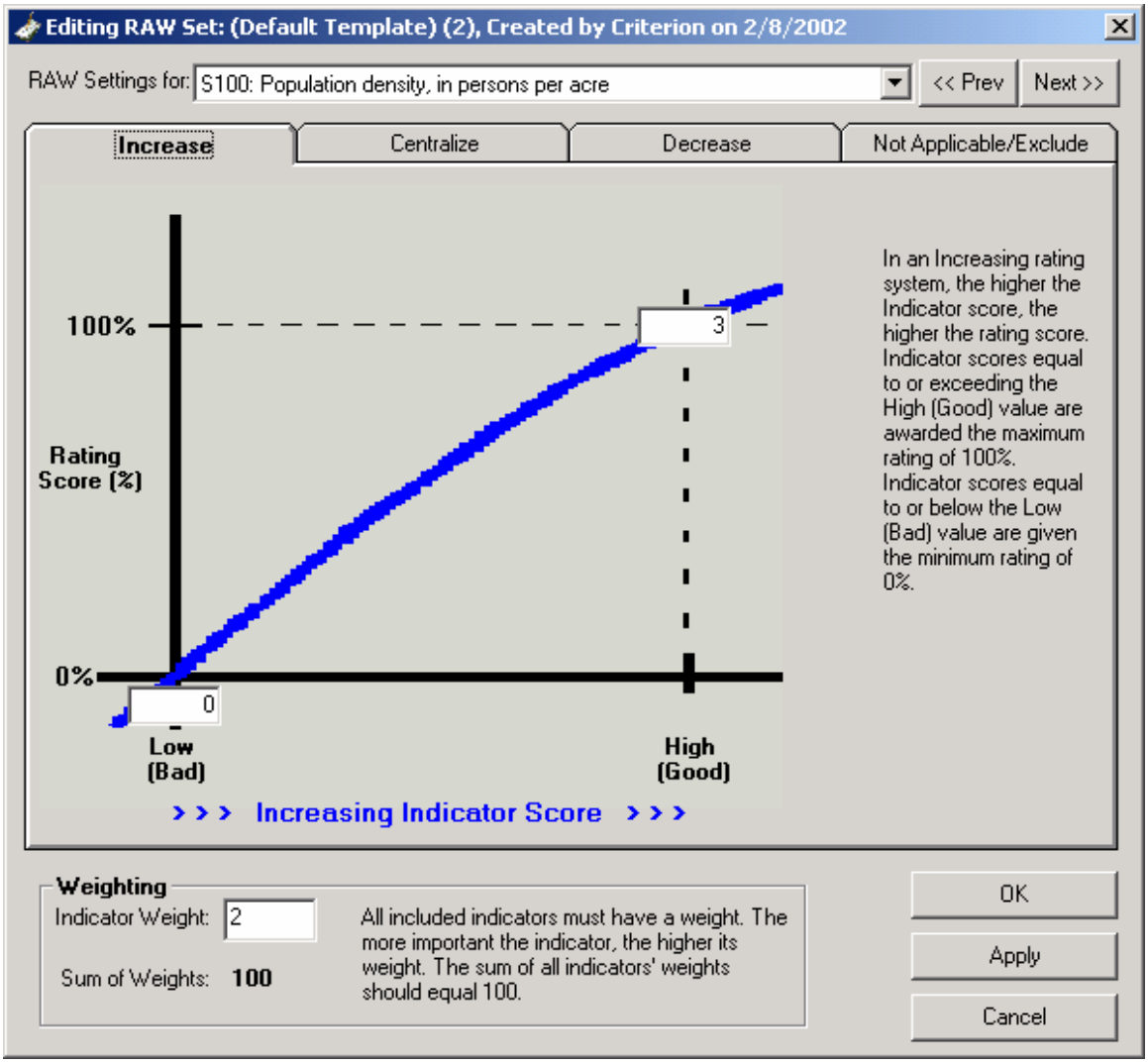


2. Fill in the **Set Name**, **Description**, and **Creator** fields as appropriate. To edit the actual criteria for rating and weighting multiple sketches, click the **Edit Indicator Ratings** button.

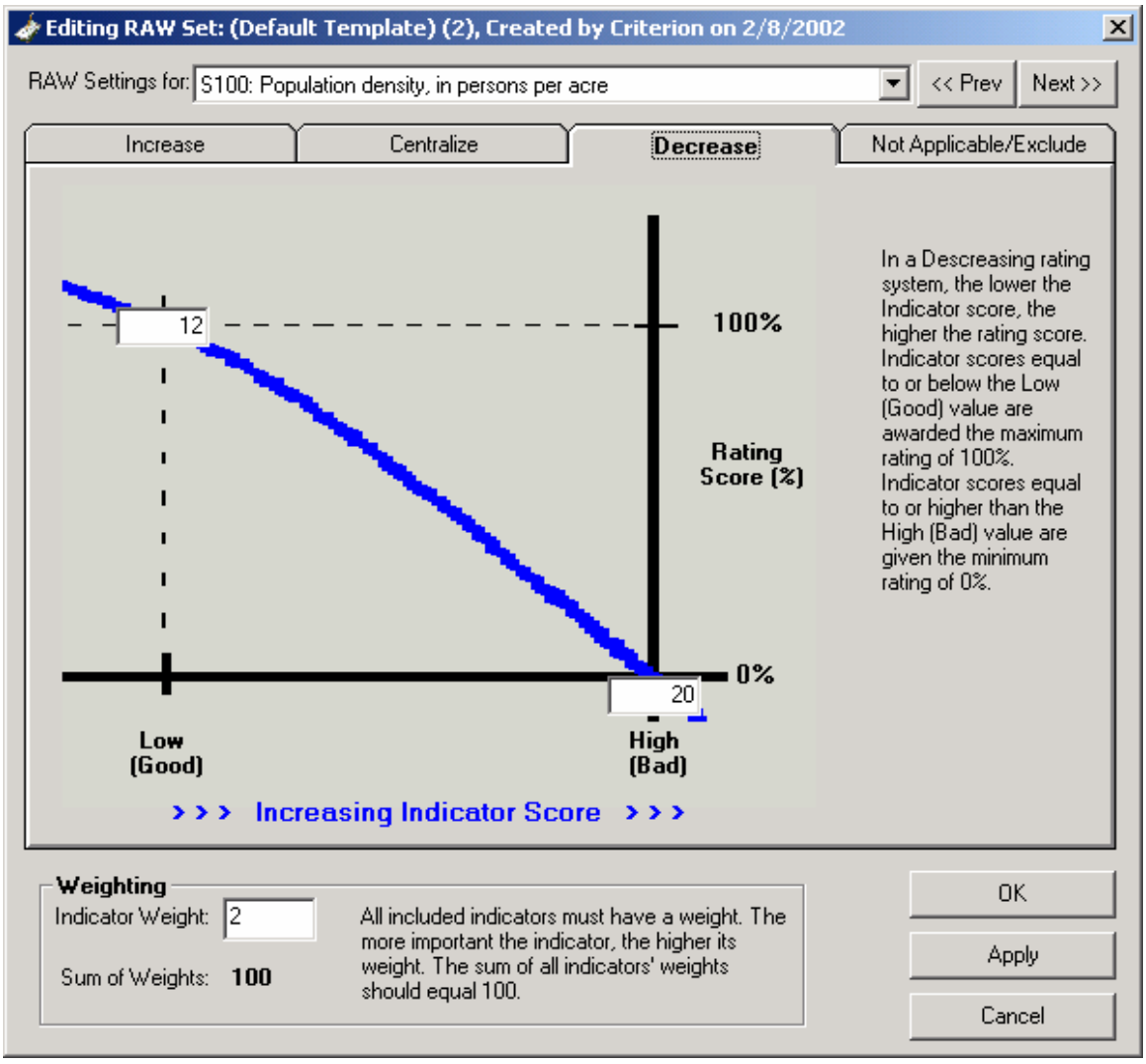
You are presented with the following form showing the first indicator (Population Density) and its default settings, inherited from the template on which you created this RAW Set.



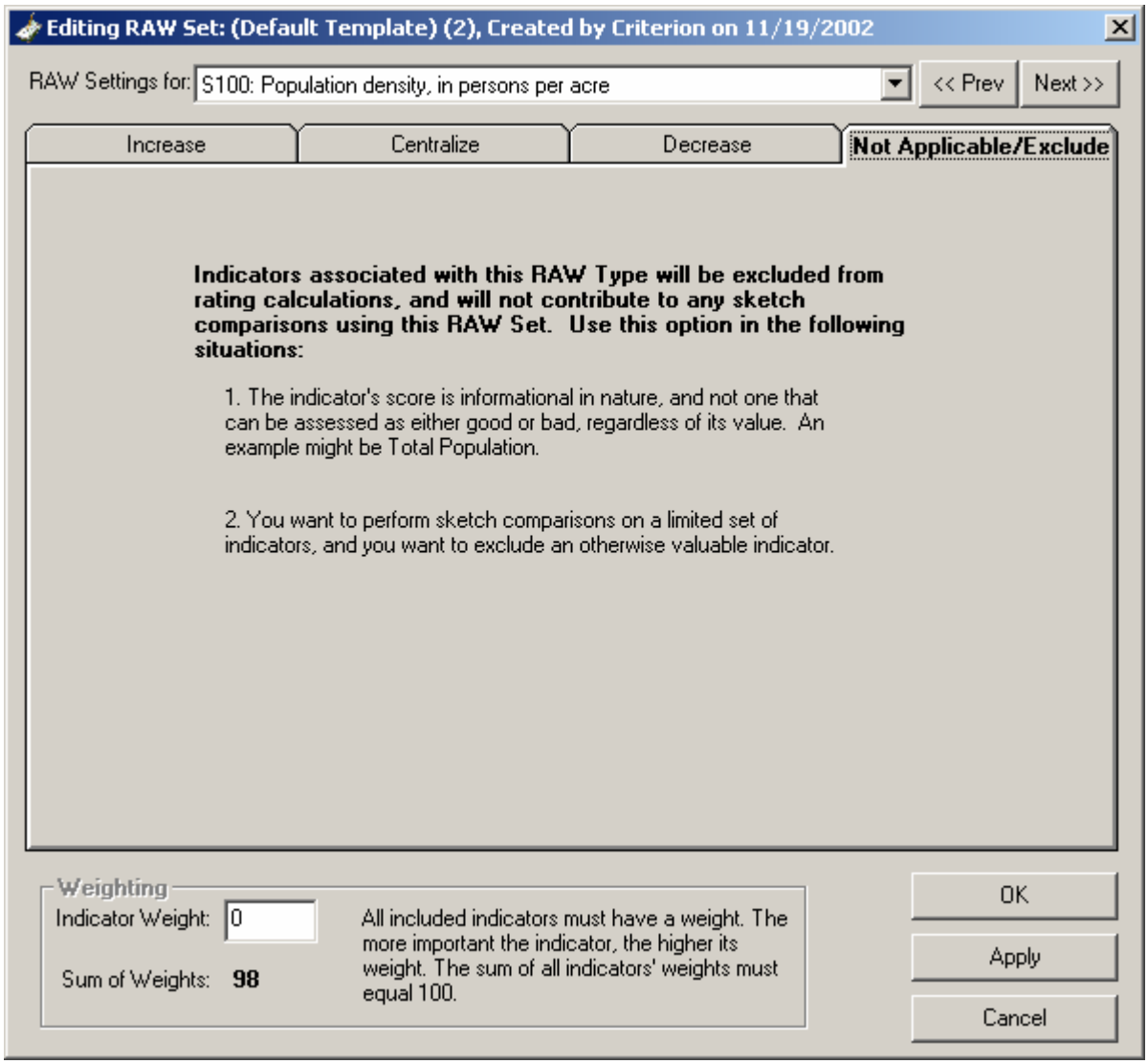
3. Review the description of a Centralize rating system as applied to an indicator. Click the **Increase** tab. The dialog changes to show an Increase system:



4. Review the description of an Increase rating system as applied to an indicator. Click the **Decrease** tab. The dialog changes to show a Decrease system:



5. Review the description of a Decrease rating system as applied to an indicator. Click the **Not Applicable/Exclude** tab. The dialog changes to show reasons why you would exclude an indicator from a RAW Set:

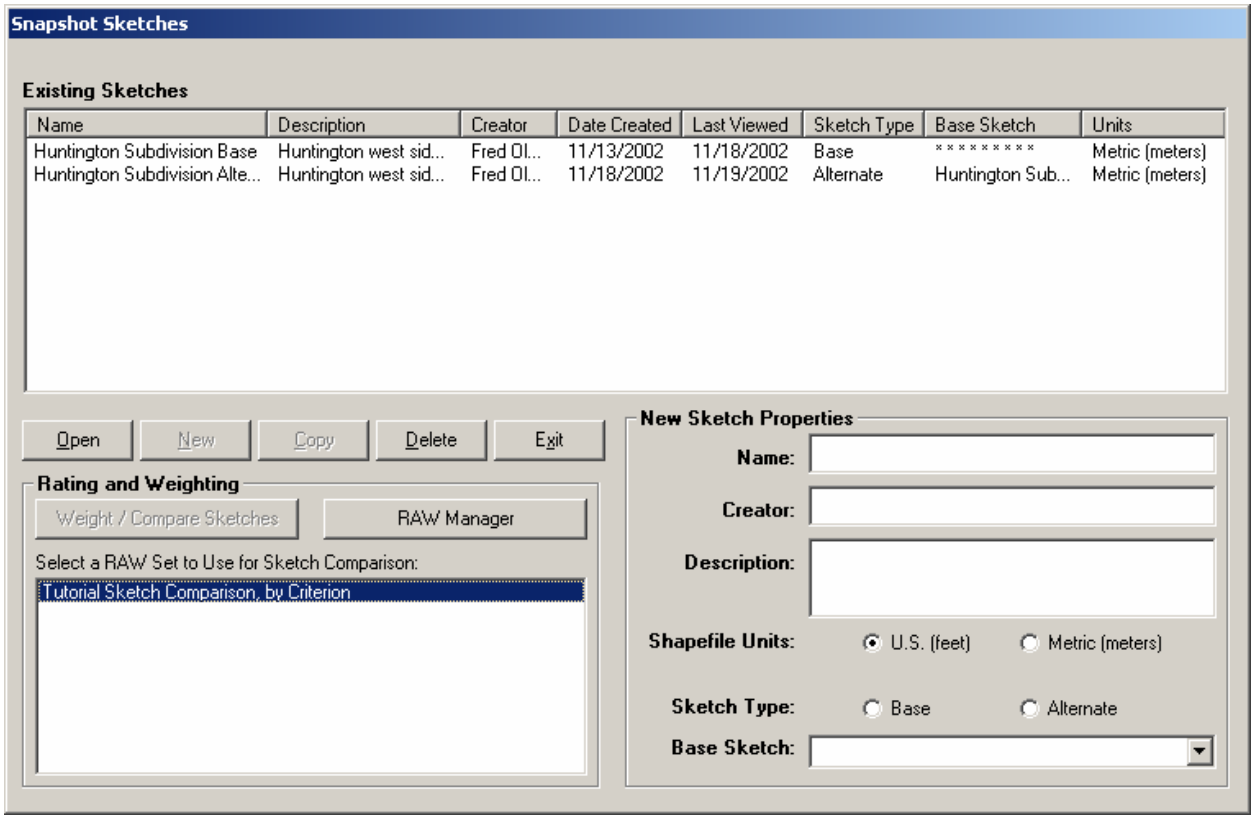


6. Note that as you click the **Next** and **Previous** buttons, the selected tab will change to reflect if the current indicator is considered an Increase, Decrease or Centralized (or Exclude) rating system.

7. Note that each indicator has an associated weight, whereby you can make a certain indicator count for more in the course of a comparison between sketches.

8. Click the **Cancel** button to leave the RAW Set unchanged and return to the RAW Manager.

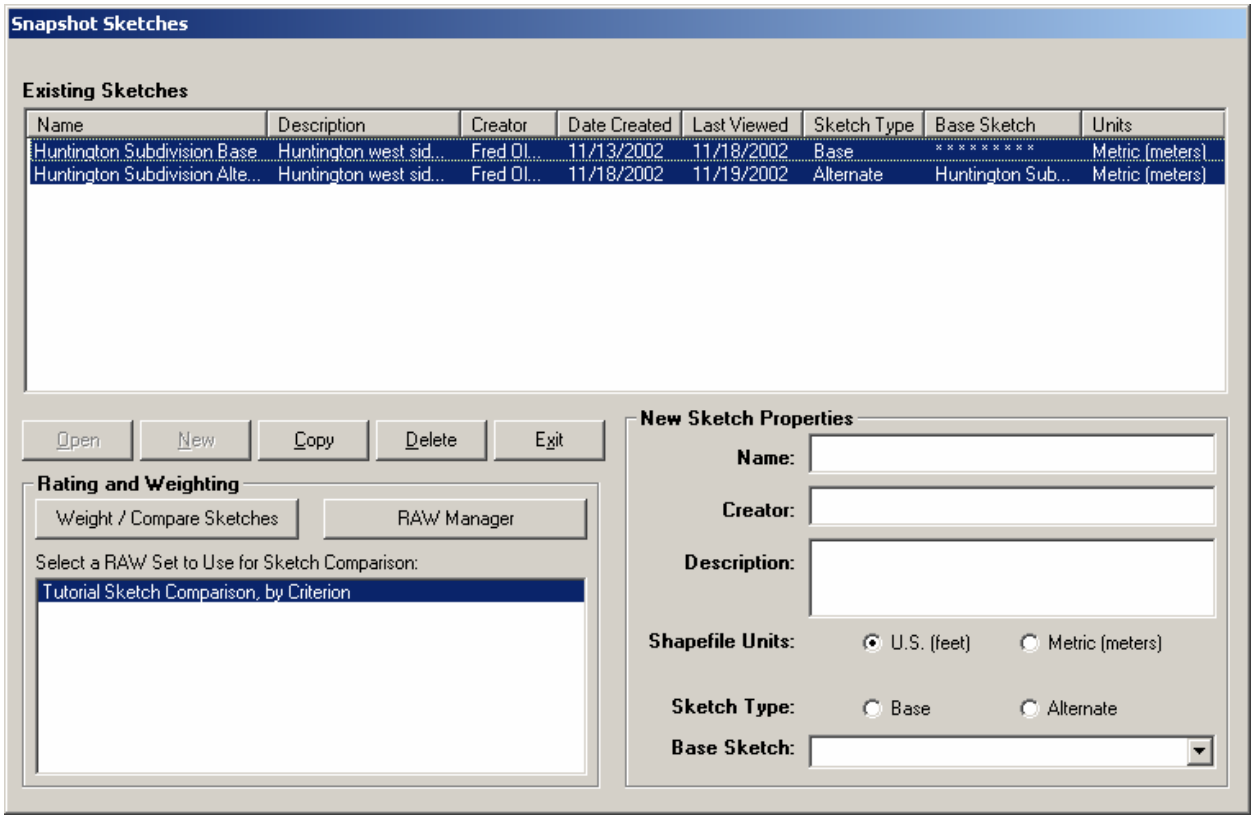
9. Click the **Exit** button to return to the Project Manager window. The newly-created RAW set is displayed, in the lower-left of the window:



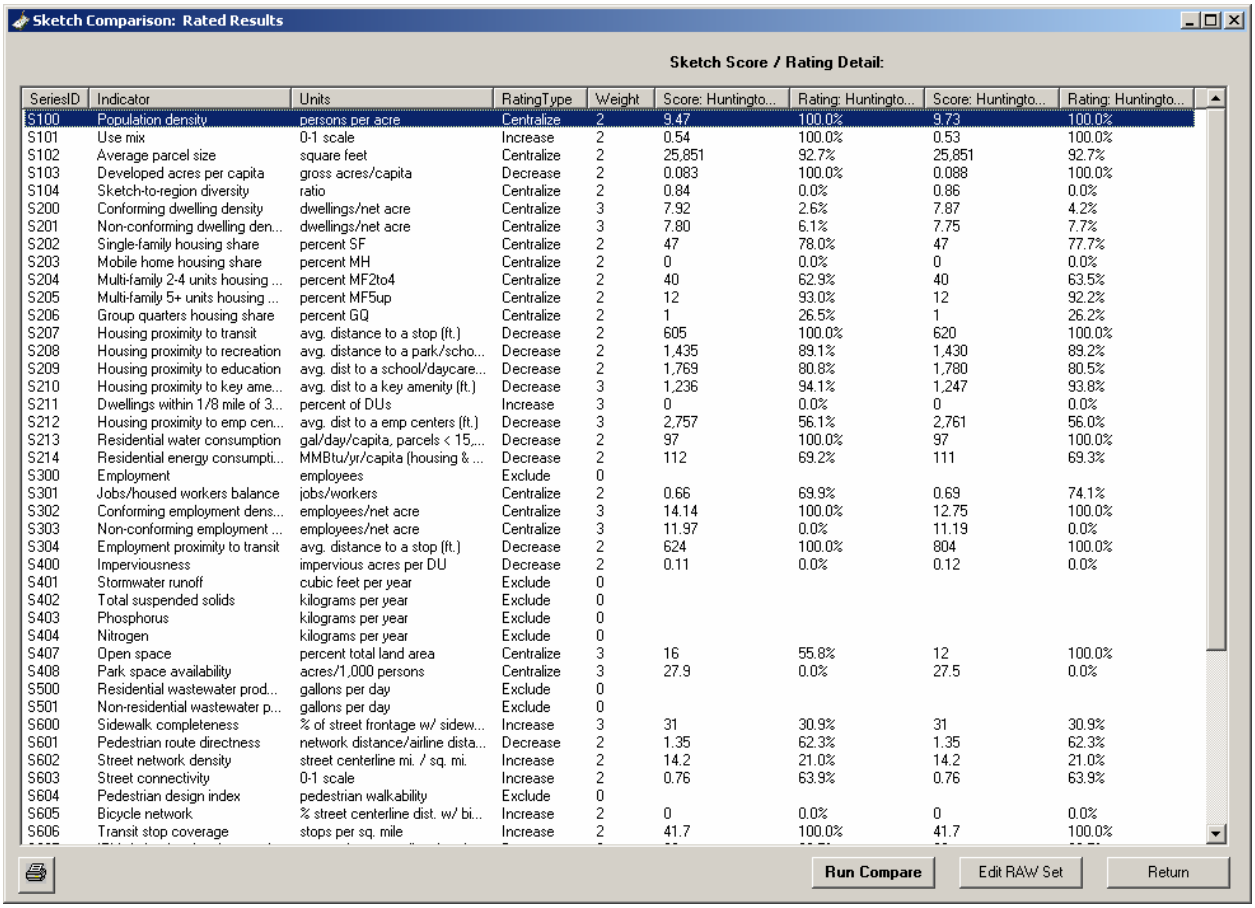
Rating Multiple Sketches

1. Select your newly created **RAW Set** from the Project Manager window.

2. Using the Ctrl or Shift keys, select multiple sketches from the Existing Sketches list. The Weight / Compare Sketches button becomes enabled only when you have selected both a RAW Set and more than one sketch:



3. Click the **Weight/Compare Sketches** button. The following window appears:

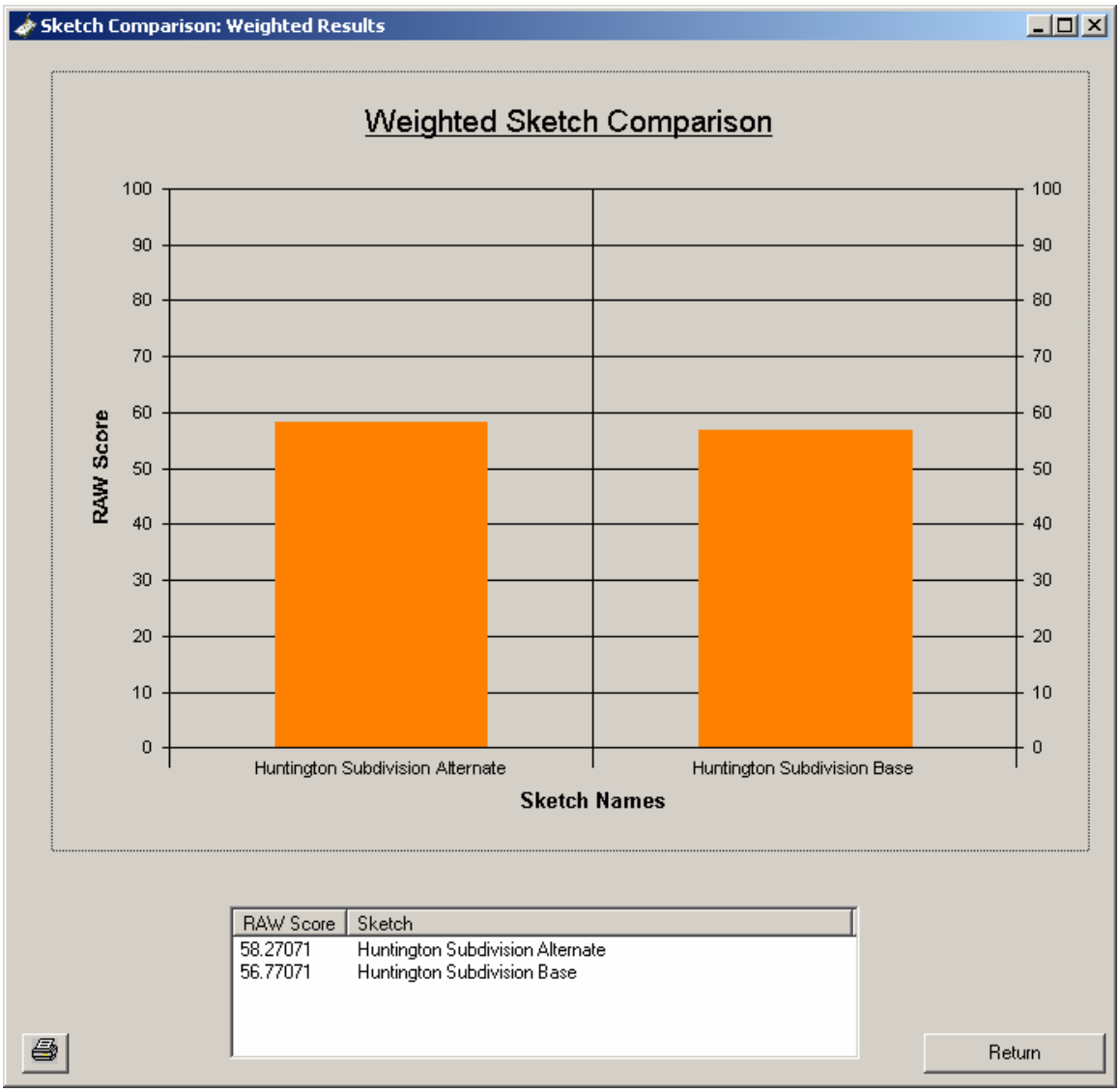


SeriesID	Indicator	Units	RatingType	Weight	Score: Huntingto...	Rating: Huntingto...	Score: Huntingto...	Rating: Huntingto...
S100	Population density	persons per acre	Centralize	2	9.47	100.0%	9.73	100.0%
S101	Use mix	0-1 scale	Increase	2	0.54	100.0%	0.53	100.0%
S102	Average parcel size	square feet	Centralize	2	25,851	92.7%	25,851	92.7%
S103	Developed acres per capita	gross acres/capita	Decrease	2	0.083	100.0%	0.088	100.0%
S104	Sketch-to-region diversity	ratio	Centralize	2	0.84	0.0%	0.86	0.0%
S200	Conforming dwelling density	dwellings/net acre	Centralize	3	7.92	2.6%	7.87	4.2%
S201	Non-conforming dwelling den...	dwellings/net acre	Centralize	3	7.80	6.1%	7.75	7.7%
S202	Single-family housing share	percent SF	Centralize	2	47	78.0%	47	77.7%
S203	Mobile home housing share	percent MH	Centralize	2	0	0.0%	0	0.0%
S204	Multi-family 2-4 units housing ...	percent MF2to4	Centralize	2	40	62.9%	40	63.5%
S205	Multi-family 5+ units housing ...	percent MF5up	Centralize	2	12	93.0%	12	92.2%
S206	Group quarters housing share	percent GQ	Centralize	2	1	26.5%	1	26.2%
S207	Housing proximity to transit	avg. distance to a stop (ft.)	Decrease	2	605	100.0%	620	100.0%
S208	Housing proximity to recreation	avg. distance to a park/scho...	Decrease	2	1,435	89.1%	1,430	89.2%
S209	Housing proximity to education	avg. dist to a school/daycare...	Decrease	2	1,769	80.8%	1,780	80.5%
S210	Housing proximity to key ame...	avg. dist to a key amenity (ft.)	Decrease	3	1,236	94.1%	1,247	93.8%
S211	Dwellings within 1/8 mile of 3...	percent of DUs	Increase	3	0	0.0%	0	0.0%
S212	Housing proximity to emp cen...	avg. dist to a emp centers (ft.)	Decrease	3	2,757	56.1%	2,761	56.0%
S213	Residential water consumption	gal/day/capita, parcels < 15,...	Decrease	2	97	100.0%	97	100.0%
S214	Residential energy consumpti...	MMBtu/yr/capita (housing & ...	Decrease	2	112	69.2%	111	69.3%
S300	Employment	employees	Exclude	0				
S301	Jobs/housed workers balance	jobs/workers	Centralize	2	0.66	69.9%	0.69	74.1%
S302	Conforming employment dens...	employees/net acre	Centralize	3	14.14	100.0%	12.75	100.0%
S303	Non-conforming employment ...	employees/net acre	Centralize	3	11.97	0.0%	11.19	0.0%
S304	Employment proximity to transit	avg. distance to a stop (ft.)	Decrease	2	624	100.0%	804	100.0%
S400	Imperviousness	impervious acres per DU	Decrease	2	0.11	0.0%	0.12	0.0%
S401	Stormwater runoff	cubic feet per year	Exclude	0				
S402	Total suspended solids	kilograms per year	Exclude	0				
S403	Phosphorus	kilograms per year	Exclude	0				
S404	Nitrogen	kilograms per year	Exclude	0				
S407	Open space	percent total land area	Centralize	3	16	55.8%	12	100.0%
S408	Park space availability	acres/1,000 persons	Centralize	3	27.9	0.0%	27.5	0.0%
S500	Residential wastewater prod...	gallons per day	Exclude	0				
S501	Non-residential wastewater p...	gallons per day	Exclude	0				
S600	Sidewalk completeness	% of street frontage w/ sidew...	Increase	3	31	30.9%	31	30.9%
S601	Pedestrian route directness	network distance/airline dista...	Decrease	2	1.35	62.3%	1.35	62.3%
S602	Street network density	street centerline mi. / sq. mi.	Increase	2	14.2	21.0%	14.2	21.0%
S603	Street connectivity	0-1 scale	Increase	2	0.76	63.9%	0.76	63.9%
S604	Pedestrian design index	pedestrian walkability	Exclude	0				
S605	Bicycle network	% street centerline dist. w/ bi...	Increase	2	0	0.0%	0	0.0%
S606	Transit stop coverage	stops per sq. mile	Increase	2	41.7	100.0%	41.7	100.0%

Scroll to the right to see the rated results for all the selected sketches.

Weighting and Comparing Multiple Sketches

1. From the Rated Results window, click the **Run Compare** button. The Weighted Comparison window appears:



UDP DEFAULTS

Snapshot Module

UDP DEFAULTS

DSS snapshots utilize several user-defined parameters (UDPs) that characterize the nature and content of sketches. UDP topics include population, property development standards, energy and water usage, air pollution emission rates, and similar factors used in calculating indicator scores.

Table 1 lists the default values and their sources that are available for snapshots. Users may accept these defaults or replace them with other values as appropriate.

An equally important set of defaults are those available for Parcel Development characteristics. These have been initially set in the DSS according to zoning specifications current as of mid-2002, including consideration of minimum lot size, maximum lot coverage, maximum building coverage, and height limits. As of September 2002, CCRPC is developing additional considerations for parking/loading requirements. For purposes of these settings, FAR equals gross floor area divided by minimum lot size (or one acre if this is not specified in the applicable local ordinance); and gross floor area equals maximum building coverage (or maximum lot coverage if this is not specified in the ordinance) multiplied by the applicable height limit.

Table 1
User-Defined Parameter Defaults for Snapshots

Snapshot UDPs	Default Value	Units	Source	Comments
Sketch Year	2002	N/A	N/A	
Population				
Regional population	146,571	persons	2000 census	
Regional employment	79,000	employees	CCMPO	
Single-family persons/household	2.66	persons	2000 census	
Single-family workers/household	1.4	workers	2000 census	
Mobile home persons/household	2.08	persons	2000 census	
Mobile home workers/household	1.4	workers	2000 census	
Multi-family 2-4 units persons/household	2.08	persons	2000 census	
Multi-family 2-4 units workers/household	1.4	workers	2000 census	
Multi-family 5+ units persons/household	2.08	persons	2000 census	
Multi-family 5+ units workers/household	1.4	workers	2000 census	
Group quarters persons/household	2.0	persons	2000 census	
Group quarters workers/household	0.4	workers	2000 census	
Parcels Development				
Residential parking demand	varies by land-use class	spaces/DU	Local zoning ord.	
Non-residential parking demand	varies by land-use class	spaces/1000 sq.ft.	Local zoning ord.	

Snapshot UDPs	Default Value	Units	Source	Comments
Imperviousness	varies by land-use class	average % of area	Center for Watershed Prot.	Based upon data for Potash Brook published in "Watershed Hydrology Protection and Flood Mitigation Project Phase II – Technical Analysis," Sept. 1999, p. B-4.
Non-point source pollutants	varies by land-use class	grams/liter	Center for Watershed Prot.	EMCs are derived from the Center for Watershed Protection work in Englesby Brook for the VT Agency of Natural Resources; EMCs are based upon national monitoring studies.
Resources/Emissions				
Building energy use	124	MMBtu/DU/yr	USDOE	
Electricity market share	34	%	USDOE	
Natural gas market share	66	%	USDOE	
Heating oil market share	0	%	USDOE	
Vehicle fuel usage	19.8	mpg	USDOE	
Vehicle operating expense	47	¢/mile	AAA	
Vehicle miles traveled	20 home based 8 non-home based	VMT/day/capita	CCMPO	Requires ITM estimate.
Vehicle trips	(VT) 2.15 home based 1.5 non-home based	VMT/day/capita	CCMPO	Requires ITM estimate.
ITM accessibility	20	min.	CCMPO	Requires ITM estimate.

Snapshot UDPs	Default Value	Units	Source	Comments
Air pollutant/greenhouse gas emissions				
Building emissions	Multiple	lbs/MMBtu	USEPA	
Transportation emissions	Multiple	grams/mile	USEPA	
Water use				
Household internal use	64.6	gal/day/capita	Handbook of Water Use, WaterPlow Press, 2001.	
Typical landscaping shares	50/25/25	% type	N/A	Rule of thumb estimate.
Rainfall	Multiple	inches/day		
Wastewater production				
Residential	125-210	gal/day/household	Vermont DEC	Wastewater rules, July 2002.
Non-residential	15	gal/day/employee	Vermont DEC	Wastewater rules, July 2002.