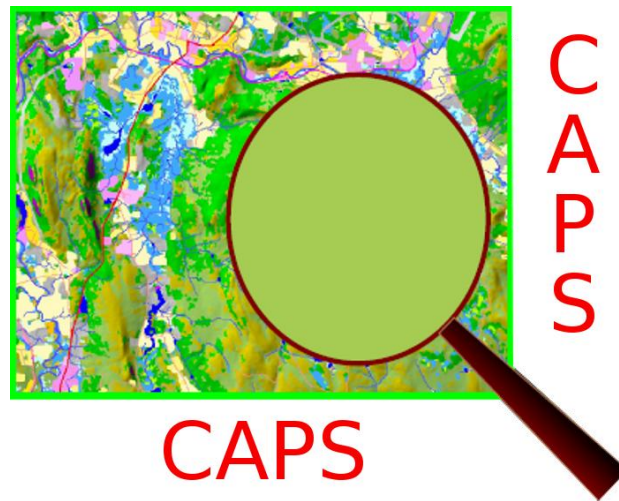


# CAPS: Conservation Assessment and Prioritization System



## CAPS Scenario Builder Users Manual

Version 0.1 – February 2012

## Preface

### Acknowledgements:

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### Links:

More information about the Conservation and Prioritization System can be found at <http://www.mass.caps.org>

The Microsoft Windows (CAPS\_Scenario\_Builder-0.8-setup.exe) and installation files for other operating systems (CAPS\_Scenario\_Builder-0.8.tar.gz) can be found at <https://github.com/EcoGIS/CAPS-Scenario-Builder/downloads>

The complete source code for CAPS Scenario Builder is available at <https://github.com/EcoGIS/CAPS-Scenario-Builder>

Information about Quantum GIS can be found at <http://www.qgis.org/>

Downloads of needed dependencies for operating systems other than Microsoft Windows (QGIS 1.71 can be found at <http://qgis.org/downloads/>

A copy of the license for this manual can be found at <http://www.gnu.org/copyleft/fdl.html>

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## Overview

### What is CAPS

The Conservation Assessment and Prioritization System (CAPS) is an ecosystem-based (coarse-filter) approach for assessing the ecological integrity of lands and waters and subsequently identifying and prioritizing land for habitat and biodiversity conservation. We define ecological integrity as the ability of an area to support biodiversity and the ecosystem processes necessary to sustain biodiversity over the long term. CAPS is a computer software program and an approach to prioritizing land for conservation based on the assessment of ecological integrity for various ecological communities (e.g., forest, shrub swamp, headwater stream) within an area.

The first step in the CAPS approach is the characterization of both the developed and undeveloped elements of the landscape. With a computer base map depicting various classes of developed and undeveloped land, we then evaluate a variety of landscape-based variables (“metrics”) for every point in the landscape. A metric may, for example, take into account the microclimatic alterations associated with “edge effects,” intensity of road traffic in the vicinity, nutrient loading in aquatic ecosystems, or the effects of human development on landscape connectivity.

Various metrics are applied to the landscape and then integrated in weighted linear combinations as models for predicting ecological integrity. This process results in a final Index of Ecological Integrity (IEI) for each point in the landscape based on models constructed separately for each ecological community. Because CAPS provides a quantitative assessment for ecological integrity (IEI) it can be used for comparing various scenarios. In essence, scenario analysis involves running CAPS separately for each scenario, and comparing results to determine the loss (or gain) in IEI units. This scenario testing capability can be used to evaluate and compare the impacts of development projects on habitat conditions as well as the potential benefits of habitat management or environmental restoration.

### What is CAPS Scenario Builder?

CAPS Scenario Builder is software that allows cooperating agencies, organizations and businesses to construct and submit “scenarios” for proposed development projects, ecological restoration projects and changes in land cover that can be evaluated using the CAPS computer model hosted on computers at the University of Massachusetts. Once created in CAPS Scenario Builder the scenarios are transmitted to UMass where they are run on University computers. Results for a particular scenario or set of scenarios are returned electronically in the form of estimated changes for each scenario in “ecological integrity” for the project area and surrounding landscape.

CAPS Scenario Builder can be used to:

- Prioritize various ecological restoration projects (e.g. dam removals, culvert replacements, removal of tidal restrictions, construction of wildlife passage structure on roads and highways) by assessing the ecological benefits for each scenario so that they can be compared;
- Assess the ecological impact (direct and indirect) of development projects for use in alternatives analysis, mitigation planning and permitting;
- Evaluate changes in land cover due to habitat management, ecological restoration (e.g. wetlands restoration), or climate change.

### How do I install CAPS Scenario Builder?

CAPS Scenario Builder currently is intended to run primarily on Microsoft Windows operating systems (XP, Vista and Windows 7), although files are available that make it possible for very experienced computer users to run the software on nearly any operating system. Hardware requirements include a minimum of 512MB of RAM and about 300MB of free disk space. Microsoft Windows users can download the standalone installer using the link found in the “Links” section above. To install, just click or double click the file to open the install wizard and then follow the instructions. We recommend installing the software using the default settings, but if you choose another installation location, you must have read/write permissions in that location. For windows users, the default installation will create a folder in the

program files list and the program can be opened just like any other Windows program. CAPS Scenario Builder is written in the Python programming language and makes use of the Quantum GIS API and the Inno Setup 5 installer program.

### Who should read this manual?

This manual assumes that users of the software will be experienced Geographic Information Systems (GIS) software users. We hope that all users of the software will read this manual carefully. The CAPS Scenario Builder software is fairly complex, and some of its workings will not be obvious—even to experienced GIS users.

### Glossary of Terms

<i>Term</i>	<i>Definition</i>
Active layer	The layer that is highlighted with a background color in the layer list panel. You make a layer “active” by clicking on the layer’s name. Note that the path to the highlighted layer is written in the status bar.
Add Attributes dialog	A dialog window with dropdown menus that allow adding or changing attribute information for new or modified features that are part of a scenario edit.
Base layer:	One of the six layers named with the prefix “base_” that contain all the CAPS data about existing infrastructure or land cover in the state of Massachusetts (MA) necessary to construct a scenario. Scenario edit types are based on data contained in the base layers. <ul style="list-style-type: none"><li>• base_culverts_bridges – data for culverts and bridges</li><li>• base_dams –data for dams</li><li>• base_terrestrial_passage –data for wildlife crossing structures on roads and highways</li><li>• base_tidal_restrictions –data for tidal restrictions</li><li>• base_traffic –data for roads and railroads</li><li>• base_land –for land cover</li></ul>
Constraints	Conditions that must be met for a scenario edit to be accepted. The program checks constraints and will prompt if constraints are not met. Currently constraints only apply to point geometry scenario edit types and are as follows: <ul style="list-style-type: none"><li>• New culverts/bridges, dams and tidal restrictions must fall on the centerline (dark blue color) of a stream in the base_streams layer.</li><li>• New terrestrial crossing structures must fall on a road in the base_traffic layer.</li></ul>
Edit mode	The application state that exists after you have chosen a scenario edit type in the Edit Scenario dialog and clicked “OK.”
Editing layers	The shapefile layers in which scenario edits are actually made and saved. No edits can be made directly to base layers or orienting base layers. The editing layers are: <ul style="list-style-type: none"><li>• edit_scenario(points)</li><li>• edit_scenario(lines)</li><li>• edit_scenario(polygons)</li></ul>
Edit Scenario dialog	A dialog window that has a dropdown menu for choosing a scenario edit type.
Exported Scenario	A Comma Separated Value format file that contains information about all edits made within a scenario. This file can be sent to the CAPS team at UMass for evaluation.
Installation directory	The folder in which you have chosen to install the CAPS Scenario Builder files. We recommend installing in the default folder “C:\Program Files\CAPS Scenario Builder” in 32 bit systems or “C:\Program Files (x86)\” in 64 bit systems.

Layer list panel	The window anchored on the left side of the main window that contains the list of layers currently open.
Main window	The window that contains the entire application consisting of the title bar, menus, toolbar, status bar and layer list panel.
Orienting base layer:	<p>One of the 5 layers mainly used to find the places where you want to make scenario edits. Note that the base_land and base_traffic layers serve both as “base layers” and “orienting base layers.” The orienting base layers include:</p> <ul style="list-style-type: none"> <li>• USGS – USGS quadrangle maps</li> <li>• base_land</li> <li>• base_streams – all the CAPS data for streams in MA</li> <li>• base_towns – town boundaries for all towns in MA</li> <li>• base traffic</li> </ul>
Personal layers	Layers that were not installed as part of CAPS Scenario Builder but that can be brought into the software to help with orientation or construction of scenarios. These might include aerial photographs, GIS data, or mapped scenario edits you would like to make.
Scenario	A collection that may include orienting base layers, base layers, editing layers, personal GIS layers and layer attributes (feature colors, projection etc.) that are saved in a file with the “.cap” extension. Scenario files can be reopened across sessions using CAPS Scenario Builder.
Scenario edit type:	<p>One of the 7 general edit types that can be made using CAPS Scenario Builder:</p> <ul style="list-style-type: none"> <li>• Culverts/bridges (points)</li> <li>• Dams (points)</li> <li>• Terrestrial Passage Structures (points)</li> <li>• Tidal restriction (points)</li> <li>• Add roads (lines)</li> <li>• Modify roads (polygons)</li> <li>• Land cover change (polygons)</li> </ul>

# How to Use CAPS Scenario Builder

## Introduction

We have worked hard to make the CAPS Scenario Builder software as easy to use as possible. For example, only buttons or menu items that can be used in the current program circumstances are enabled, while buttons that cannot be used are disabled, or “grayed out”. This behavior simplifies the interface and helps you to more easily choose the next action. In addition, the program automatically loads layers needed to edit scenarios, and highlights these layers in the layer list panel. We have included many more features to make creating scenarios as easy as possible, and we will discuss them throughout the rest of this manual.

The CAPS Scenario Builder software is currently designed to help you create scenarios only for the state of Massachusetts in the US. The main functionality of the program centers on the “Edit Scenario” toolbar button or the matching menu item on the “Edit” menu, both of which have an icon that looks like a “pencil.” The Edit Scenario button is highlighted with a rectangle in Figure 3 on page 6, and has its “tool tip” showing below and to the right of the button. Clicking that button (or clicking the “Edit Scenario” menu item from the Edit menu) opens the dialog shown in Figure 1 and allows you to choose one of the 7 general “Scenario Edit Types” listed in the dropdown menu seen in Figure 1 below:

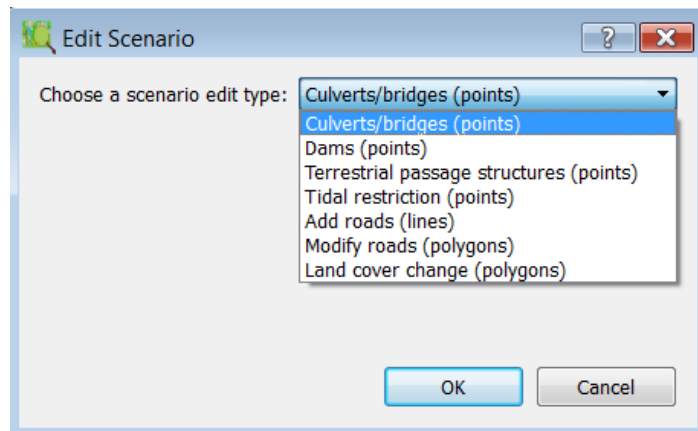


Figure 1 – The Edit Scenario Dialog

With the exception of “Terrestrial passage structures,” which refers to wildlife crossing structures on roads and highways, the edit types are fairly self-explanatory. As the list indicates, the top four edit types involve point geometries, adding roads uses line geometry, and modifying roads or changing land use involves polygon geometries.

When you select a scenario edit type, the program automatically opens the GIS layers needed to make the edits. For example, if you select “Culverts/Bridges (points)” and click “OK,” the program will open a point base layer named “base\_culverts\_bridges,” which contains all the data we have for existing culverts and bridges in MA. In addition, the program will open a layer named “edit\_scenario (points),” which we call an “editing layer.” Although you refer to a base layer to make edits, the base layers cannot be changed. Rather, any edit you make for a point geometry scenario edit type will actually be recorded on the “edit\_scenario (points) layer.” For the point geometry scenario edit types, you can add new features, modify existing features or delete existing features for each scenario edit type. You also have the option of pasting points from your own GIS layers into the “edit\_scenario (points)” layer. Line and polygon scenario edit types behave in a similar manner.

When you add a new feature, modify an existing feature, add or modify a road, or change the land use for a parcel of land, the “Add Attributes” dialog (Figure 2) will open to ask you to enter needed information about your change. In addition a second window will open providing information about the geometry and attributes of the feature as they exist prior to any modification.

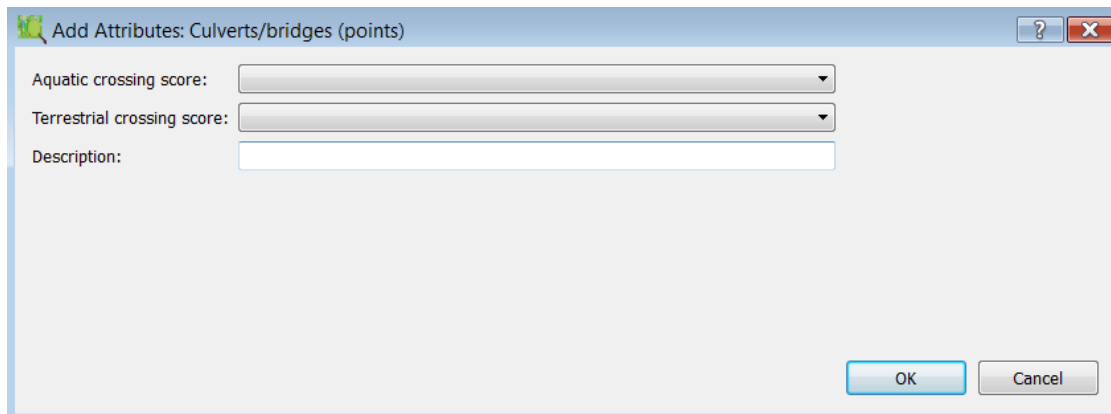


Figure 2 – The Add Attributes Dialog

The “Description” field is for your convenience and is optional, but the other combination boxes require an entry. When the arrow on the right side of the box is clicked, a drop down menu appears showing values that may be selected. The combination boxes may be different than those shown above depending on the scenario edit type you have chosen.

Finally, when you have finished making edits to a “Scenario,” you will want to export it so that it can be sent to the CAPS staff at UMass Amherst for evaluation. This function is accomplished by clicking the “Export Scenario” button on the toolbar, or by selecting “Export Scenario” from the Scenario menu. If the export is successful, a dialog will tell you where you can find the exported file.

In the rest of this manual, we will look at each function and explain how to use the program in more detail.

## Opening the Program

When you start CAPS Scenario Builder (by clicking on the program in the program files list), you will find that the program automatically opens five layers—USGS.SID, base\_land.tif, base\_streams.tif, base\_traffic.tif and base\_towns.shp (see Figure 3 on page 6). We refer to these layers as “orienting base layers,” since they are mainly used to help you navigate to the places where you want to make your scenario edits. For example, the “base\_towns” orienting base layer shows the town boundaries for all towns in MA, and you can find the name of any town by using the “Identify Features” tool. When you install CAPS Scenario Builder, the USGS layer consists of only a single USGS quadrangle as a placeholder, and we recommend replacing it with the seamless map of all quadrangles for the state of MA (a 650MB file). You can find out how to get a CD containing this seamless map by referring to the “Overview” section at [http://www.mass.gov/mgis/im\\_quad.htm](http://www.mass.gov/mgis/im_quad.htm). Note that if you replace the USGS placeholder layer you must use the same name for the new file (i.e. “USGS.SID”). You can find USGS.SID in the base\_layers folder found in the CAPS Scenario Builder directory that is located in the “All Users” directory or in your personal user’s directory (i.e the directory named with your user name). These directories normally can be found in C:\Users (Windows 7 and Windows Vista), or in C:\Documents and Settings (Windows XP). Among the remaining three orienting base layers, the base\_land layer shows “land use” for the entire state of MA. Base\_streams.tif shows all the streams in MA, and base\_traffic.tif shows all the roads and railroads in MA. These last two layers are particularly important since new bridges, culverts, dams or tidal restrictions must fall on the centerline (dark blue color) of a stream, and terrestrial passage structures must fall on a new or existing road. We refer to these rules as “constraints.”

## A Word about Projections

We have programmatically set the map canvas to render maps in the MA State Plane Coordinate System (EPSG 26986), and users do not have the option of changing that setting. All the base layers mentioned above and all editing layers installed with CAPS Scenario Builder have projection information (EPSG 26986) associated with them. Those settings result in all the base and editing layers rendering properly in relation to one another and in a geographically correct



manner. However, we have not enabled “on the fly” coordinate transformations in the current version, because we do not want to require users to have projection information associated with their GIS data files. If you open GIS files that are not in MA State Plane coordinates, they will not render in a geographically correct manner. For example, if you open a map of Vermont (VT) that is projected in the Vermont State Plane Coordinate System then VT will appear on the CAPS Scenario Builder map canvas to the south of MA, when in reality VT is located to the north of MA. Therefore, we caution readers to make certain that the coordinates in any data files they use are in MA State Plane coordinates.

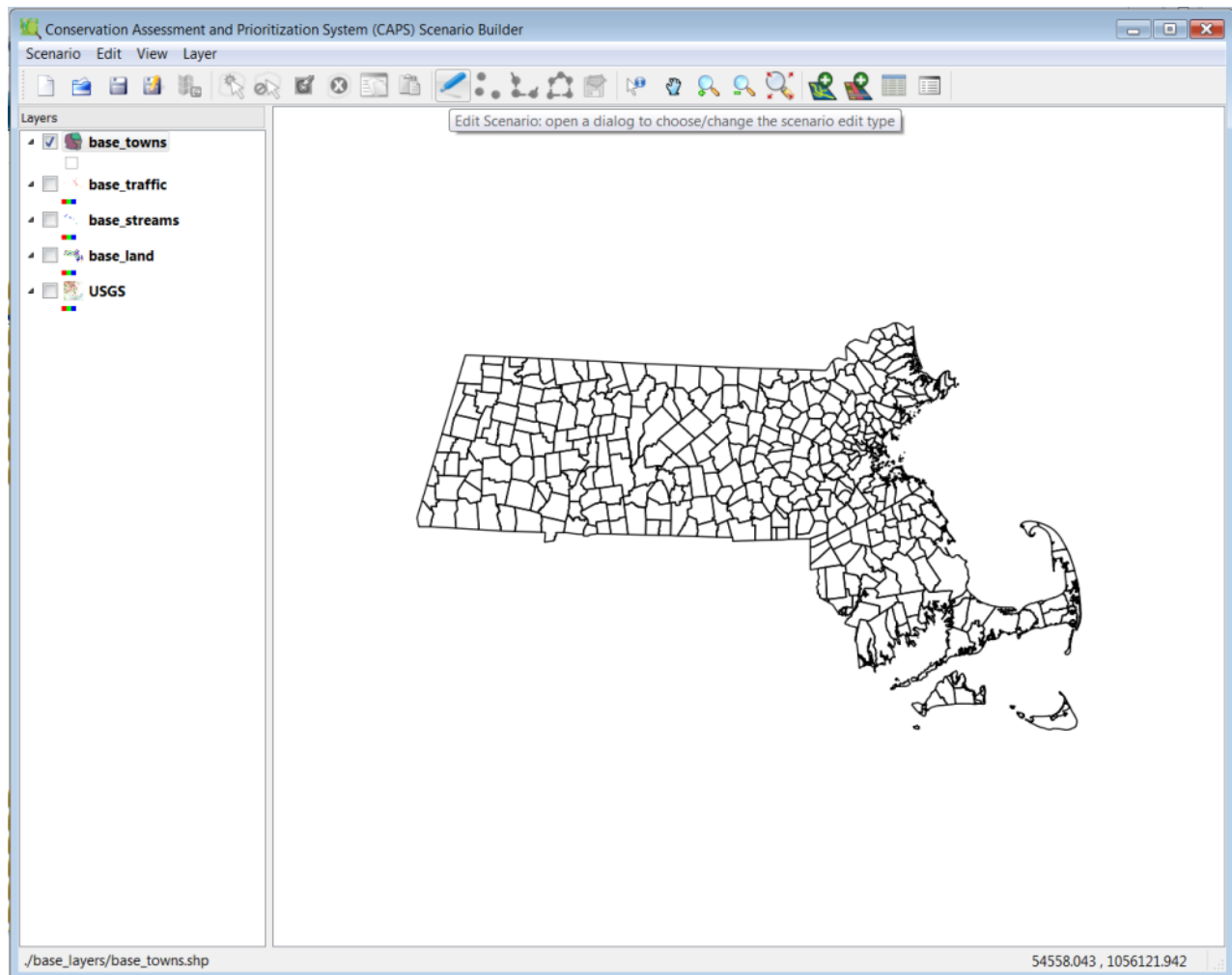


Figure 3 – The Main Window

### A Word about Menus and Toolbars

All the menu items in all four menus (Scenario, Edit, View and Layer), with the exception of Scenario>Exit, have toolbar buttons associated with them, and both the menu item and the toolbar button perform the same action. In addition, the icons next to the menu items match the icons shown on each toolbar button. Users will also notice that each button has a tool tip associated with it. For the rest of this manual, we will use the word “item,” “action,” or “button” to refer to both the menu item and its associated button.

### The Scenario Menu

When CAPS Scenario Builder opens, there is no active scenario. Before you can edit a scenario, you must create one by saving the currently displayed layers with a name of your choice. With the exception of the “Export Scenario” item, all the items on the scenario menu are always enabled. If you choose any action from any of the menus or toolbar buttons that could cause you to lose scenario changes, you will be prompted to save the scenario first. We explain the functions of each item on the Scenario Menu below:



“New Scenario”: Clicking this button returns the main window to the state it was in when you first opened the program. If you have a previously saved scenario open, you will be prompted to save your edits and any unsaved changes to the current scenario before the program returns to its original state. Once the main window returns to its original state, you create a new scenario by choosing “Save Scenario” or “Save Scenario As...,” and giving the new scenario a name.



“Open Scenario”: Choosing this item will open a file dialog that defaults to the “Scenarios” folder normally found in the CAPS Scenario Builder directory stored the “All Users” directory or your personal user’s directory. There you will find any scenarios you have saved in previous sessions. Scenario files have the “.cap” extension. Note that the file name of the scenario will appear in the title bar of the main window after you have opened it.



“Save Scenario”: This action will allow you to save the current scenario. Saving the scenario means that all the layers open in the layer list panel will be saved along with current color settings. Visibility settings for each layer are not saved in the current version of the program. If the scenario has not been previously saved, a file dialog will open to the default “Scenarios” folder to allow you to choose a name for the scenario. If you have unsaved edits, you will first be asked if you want to save them; however, if you do not have unsaved edits and the scenario has been saved previously, the scenario will simply be saved and the “Save Scenario” button will be grayed out until more changes are made to the Scenario. Please note that scenarios MUST be saved in the default “Scenarios” directory. You will be warned if you attempt to save them in any other directory.



“Save Scenario As...”: This item allows you to save a previously unsaved scenario with a name, or make a copy of an open scenario by saving it with a new name.



“Export Scenario”: Clicking this button accomplishes the main purpose of CAPS Scenario Builder by exporting a file in Comma Separated Value format. Exported scenario files are saved in the Exported Scenarios folder normally found in the CAPS Scenario Builder directory stored the “All Users” directory or your personal user’s directory.



“Exit”: This button closes the program. You will be prompted to save edits and to save the scenario before the program closes. You may also close the program by clicking the “X” in the title bar of the main window.

## The Edit Menu

The edit menu contains the core tools need to edit scenarios. Since many of these tools have very specific behavior that is often different than the normal behavior in GIS applications, we describe them carefully below:



“Select Features”: The select features button is only activated when you are in “edit mode” and the “active” layer is a vector layer. You enter edit mode when you have chosen an option in the Edit Scenario dialog and clicked OK. A layer becomes the “active layer” when you click the layer’s name in the layer list panel and the program highlights it. Since you cannot select features on a raster layer, select features becomes disabled (grayed out) when a raster layer is the active layer. Select features allows you to select multiple features of any geometry type without having to use the keyboard (i.e. hold down the ctrl key).



“Deselect Features”: The deselect features button is only enabled when you are in editing mode and have clicked the select features button, or when you make a vector layer that has selections the active layer. Clicking deselect features will remove all the selections in the active layer.



“Modify Selected”: This button becomes enabled after you have selected features on a point geometry base layer or on an editing layer. When you click this button, the Add Attributes dialog will open for each of the features you have selected and allow you to modify the attributes of that feature. Note that in the case of point base layers, the base layers are never changed. Rather the modifications are made to the edit\_scenario(points) layer. Modified points are indicated by being enclosed in a red triangle.



“Delete Selected”: Choosing this action will allow you to delete vector features on personal layers, point base layers or editing layers. In the case of personal layers, you will be prompted about deleting the features, and if you choose “Yes,” the features will be permanently deleted. In the case of point geometry “base” layers (i.e. base\_culverts\_bridges, base\_dams, base\_terrestrial\_passage or base\_tidal\_restrictions), the selected features are never actually deleted on the point base layers. Rather, they are marked with a red “X” on the edit\_scenario(points) layer, and will be recorded as deleted features in the CSV export file when you export the scenario. You may also change your mind and delete any type of change you have made to any editing layer (i.e. edit\_scenario (points), edit\_scenario (lines) or edit\_scenario(polygons)). That is you may delete new features you have added, like culverts, bridges, roads or new developments. You may also delete “modified” features that you have added to an editing layer (i.e. points surrounded with a red triangle). Finally, you may even undo deletions of dams, bridges etc. simply by deleting points with a red X from the editing layer. Once a scenario change has been “deleted” from an editing layer, the change will no longer appear in an exported scenario CSV file for that scenario.



“Copy Selected”: This button will only become enabled after features have been selected. You may only copy features from personal layers. Features may not be copied from editing layers or other base\_layers.



“Paste Features”: The Paste Features button will only become enabled after you have selected features and copied them. You can only paste features into the editing layer for the currently active scenario edit type, and applicable constraints must be met before the features can be pasted. You will be prompted to add attribute information for each feature you paste.

We understand that it may be an inconvenience to not be able to paste features into personal layers, but we have chosen to implement this behavior to prevent users for mistakenly thinking they have pasted a feature into an editing layer and thus submit a scenario that is not what was intended. If you would like to work with the editing layers outside of the CAPS Scenario Builder they may be found in the “Scenarios” folder (normally found in the CAPS Scenario Builder directory stored the “All Users” directory or your personal user’s directory) in the folder having the same name as the scenario of interest. We recommend making copies of editing files if you choose to work with them because any changes you make directly to the original editing layers in an existing scenario will be reflected in the export file if you export the scenario from CAPS Scenario Builder.



“Edit Scenario”: This button is central to using CAPS Scenario Builder. As explained above, clicking this button will open the Edit Scenario dialog and allow you to choose a scenario edit type. Note that the currently active scenario edit type is written in the status bar, and the two layers needed to make edits for the current scenario type are shown with blue text in the layer list panel. To change the scenario edit type, simply click the Edit Scenario button twice.



“Add Points”: The add points button will only become enabled when a point geometry scenario edit type has been chosen AND the edit\_scenario(points) layer is the active layer. You cannot add points to personal layers. The add points button is used to add new features for all point geometry edit types.



“Add Lines”: The add lines button will only become enabled when the “Add roads” scenario edit type has

been chosen AND the edit\_scenario(lines) layer is the active layer. You cannot add lines to personal layers.

You draw a new road by left clicking the start point on the map canvas and then left clicking as many other points as you need to define the line. You must RIGHT CLICK for the final point to end the drawing operation. The Add Attributes dialog will then appear for you to enter the necessary information about the new road. New roads must meet the constraint that they start on an existing road or on a previously saved “new road.” New roads will automatically “snap” to previously saved “new roads” when necessary.

PLEASE NOTE: If your new road crosses a stream, you should add a new culvert to the new road at the stream crossing! Also note that adding terrestrial crossing structures to new roads will meet the road constraints for that type of edit. Also, the terrestrial crossing structure will automatically “snap” to the new road.

The “Add Lines” button is ONLY meant for adding new roads. To modify existing roads, you must select the “Modify Roads (Polygons)” scenario edit type, draw a polygon around the section of road you want to change and then choose the appropriate values from the Add Attributes dialog.



“Add Polygons”: The add polygons button will only become enabled when a polygon geometry scenario edit type has been chosen AND the edit\_scenario(polygon) layer is the active layer. The add polygons button is used to add new features for the two scenario edit types, “Modify roads,” and “Land cover change”. As mentioned under “Add Lines” above, just draw a polygon around an existing road that you want to modify, or draw a polygon that defines the area of a land use change. The drawing process is the same as for Add Lines as described above. Left click for the first point and all subsequent points and then right click for the last point to end the drawing process.



“Save Edits”: This button will save any edits you have made to “edit\_scenario” layers. The button will only be enabled when there are edits to be saved, and becomes disabled immediately after you save your edits. If you take any action that could cause edits to be lost, you will be prompted to save your edits before the action takes place.

## The View Menu

All of the features on the View menu will be familiar to GIS software users, and they all behave in the usual manner. Nevertheless, we provide short descriptions of each function below:



“Zoom In”: This tool works in the normal way by selecting the tool and then clicking on the map, but you can also use the mouse wheel to zoom in and zoom out. In addition, you can hold down the left mouse button and draw a rectangle to zoom to a particular area.



“Zoom Out”: Simply choose this item and click on the map or use the mouse wheel to zoom out.



“Pan”: After clicking the Pan button, you can hold down the left mouse button and drag the map to the desired position. In addition, the left, right, up and down arrow keys will allow you to pan.



“Zoom to Map Extent”: When this button is clicked, the map extent will change to include all the layers that are currently visible. A layer is made visible by “checking” the checkbox to the left of the layer in the layer list panel. You may zoom to an individual layer’s extent by right clicking on the layer in the layer list panel to open a context menu (see “The Layer List Panel” below).



“Identify Features”: The Identify Features tool works for both raster and vector layers. To use the tool, click the tool’s button, make the layer of interest the active layer by clicking on the layer name in the layer list panel, and then click anywhere on the map for a raster layer, or click on a feature for a vector layer. This tool will show the coordinates of the clicked point and the raster value at that point for raster layers. For vector layers, the window will show the coordinates of the feature along with the values of each attribute in the attribute table.

## The Layer Menu



“Add Vector Layer”: Nearly any type of vector layer may be opened, but as we cautioned above, “on the fly” projection is disabled by default, so layers having projection information other than the MA State Plane Coordinate System will not render in a geographically correct manner. Users should make certain that layer coordinates are MA State Plane coordinates.

Also note that while most Esri grid formats may be opened, some features, such as color symbology, are not well supported. You may wish to convert some raster formats to GeoTIFF format for trouble-free viewing.



“Add Raster Layer”: Almost all types of raster layers may be opened, but the same cautions regarding projections for vector layers applies to raster layers as well.



“Open Vector Attribute Table”: This button is enabled only when a vector layer is the active layer. The table will update dynamically when layers are changed or features are added or modified. Very large vector tables (30,000 records or more) may take a few seconds to load.



“Open Raster Category Tables”: This button is always enabled and will open the tables associated with some of the base layers. These tables correlate raster values with descriptions of what the value represents.

## The Layer List Panel

The layer list panel is anchored on the left side of the main window and displays the names of all the currently open layers. The checkbox to the left of each name controls whether the layer is visible on the map canvas. You may drag layers to different positions in the layer list panel. In addition, there is a context menu that may be opened by right clicking on any layer in the panel. We describe the items in the context menu below.



“Zoom to Layer Extent”: Selecting this item from the context menu will zoom to the extent of the features included in the layer that you right clicked to open the context menu.



“Symbology...”: Choosing Symbology from the context menu will cause a “Select Color” dialog to be displayed. The color that you choose will be used to color the features on the layer that you right clicked to display the context menu. The program will save the color you have selected in the “Scenario” file, so that it will remain the same across sessions.



“Collapse all”: This item simply collapses the “child” icons for each layer. These child icons display the color of features for each layer. This menu item is only useful if your

scenario has a large number of layers.



“Expand all”: This choice simply reverses the “Collapse all” action above.



“Remove layer”: You may remove layers that are currently displayed in the layer list panel by choosing this item. We recommend that users be careful about removing orienting base layers, since they may be needed eventually; however, they may be reopened by choosing Add Vector or Add Raster from the Layer menu. The Add Vector and Add Raster dialogs will always default to the base\_layers folder where these layers are stored.

You will be warned if you attempt to remove an editing layer from the layer list panel. If you do so, the editing layer will be deleted from the file system and all edits to that layer will be lost.

### The Status Bar

You will find the status bar at the bottom of the main window. The Status bar provides several pieces of important information. First, you can view the path to the file that is active in the layer list panel on the left side of the status bar. If the path contains a “./” symbol, the file can be found in the CAPS Scenario Builder installation directory. To the right of the file path in the status bar, you will find the name of the current scenario edit type, if one is active. Finally, you can find the coordinates of the position of the cursor on the map canvas by looking at the right side of the Status Bar. The coordinates are Mass State Plane coordinates in meters.

## Quick Start Tutorial: Making Scenario Edits

1. After opening CAPS Scenario Builder, save the layers showing in the layer list panel as a Scenario by choosing “Save Scenario” or “Save Scenario As...” This creates a new scenario.
2. Click the “Edit Scenario” button, select a scenario edit type and click “OK.”
3. For point geometry scenario edit types:
  - The layers needed to make your scenario edit will open automatically and be positioned at the top of the layer list panel with **text shown in blue**. Once you have zoomed to the area of interest, you may “check” the base layer associated with the scenario edit type you have chosen to make it visible on the map canvas. You may also want to make the base\_streams or base\_traffic layers visible for reference.
  - You may add new points (i.e. culverts, bridges, dams, terrestrial passage structures or tidal restrictions) by making the edit\_scenario(points) layer active and then clicking the Add Points button. Simply click on the map canvas to add a point. Remember that added points must meet constraints by falling on the centerline of streams or on roads, depending on the scenario edit type you have chosen.
  - You may also add new points by making the edit\_scenario(points) layer active and pasting them from points copied from a personal layer. Note that ALL points that you paste from personal layers must meet constraints for that scenario edit type or the entire paste action will fail. In that case you will need to alter your points and repeat the entire paste operation.
  - You may modify the attributes of any of the points on the base layer associated with your scenario edit type by selecting the point on the base layer, and then clicking the Modify Selected button. Modified points will appear on the edit\_scenario(points) layer enclosed in a red triangle.
  - You may delete features on the base layer associated with your scenario edit type by selecting them on the base layer and clicking the “Delete Selected” button. The deleted features will appear on the edit\_scenario(points) layer with a red “X” drawn over them.

- Recall that you cannot accidentally make changes directly to a base layer, so there is no need to be concerned about this. No changes will ever be made directly to any of the base layers; the changes will be made to the edit\_scenario(points) layer instead.
4. For the line geometry scenario edit type:
    - Like the points scenario edit types described above, the needed layers will open automatically when you select this scenario edit type.
    - You may add any number of “new roads” by clicking the edit\_scenario lines layer and then clicking the “Add Lines” button to use the line drawing tool. New roads will “snap” to existing roads or previously drawn “new” roads. Refer to the “Add Lines” description under the Edit Menu section above for how to use the line drawing tool.
    - You may also create new roads by pasting lines from personal layers as described for point geometry scenario edit types.
    - You should use the base\_traffic layer for reference, but since it is a raster layer, you cannot select lines on that layer in order to delete or modify them. See the “polygons” edit types below for how to delete or modify roads.
  5. For the two polygon edit types:
    - Like the two other scenario edit types, needed layers will be opened automatically, with [text shown in blue](#) and positioned at the top of the layer list panel.
    - If you have chosen to modifying existing roads, make the base\_traffic layer visible and select the edit\_scenario(polygons) layer to enable the “Add Polygons” tool. Draw a polygon around the road, or road section, that you wish to modify (see the “Add Polygons” button under the Edit Menu section above for instructions on how to use this drawing tool). To delete a road, select the “0.0 – none(closed road; 0 cars/day) option in the Add Attributes dialog.
    - Land cover changes are made in the same way as modifying roads. Just draw a polygon around the area that you want to change. The dropdown menu in the Add Attributes dialog provides choices for the new land cover type. You may want to make the base\_land layer visible for reference.
  6. To correct or delete mistakes you have made to any editing layer, just select the feature you need to correct on the editing layer and click Modify Selected or Delete Selected.
  7. This is the easy part! When you are done editing your scenario, just save your edits, save the scenario and click Export Scenario. If all goes well, a message box will appear telling you that your scenario has been successfully sent to UMass.