



Sediment Budget Analysis System (SBAS) for ArcGIS 10.1/10.2

User's Guide



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Introduction

The Sediment Budget Analysis System (SBAS) for ArcGIS 10.1/10.2 provides a framework for formulating, documenting, and calculating sediment budgets, including estimation of uncertainty. This ArcGIS toolbox allows users to define a conceptual budget visually by creating a series of cells and arrows that represent sources, sinks, and flux rates. It then calculates quantitative “micro” (local) and “macro” (regional) sediment budgets, using a pre-defined sediment-budget equation.

Sediment Budget—A measure of sediment (usually sand) “sources” (inputs), “sinks” (outputs), and net change within a specified “control volume” (a cell or series of connecting cells) over a given period of time. It is a fundamental planning and design tool for projects concerned with sediment transport, deposition, and erosion.

About SBAS for ArcGIS 10.1/10.2

SBAS for ArcGIS 10.1/10.2 is designed for users who have access to existing geospatial datasets to assist them in building sediment budgets. These datasets include such items as georeferenced aerial photography, beach profile surveys, shoreline position data, dredging history, coastal process, and bathymetry surveys. Provided that they are in a format ArcMap can translate (for example, *.TIF, *.SID, *.SHP, or *.LYR), all pertinent information can be added to the data frame for analysis. The data can be viewed spatially in an ArcMap 10.1/10.2 data frame, and its attributes can be viewed in the associated database file.

Flux Rate—The volume of sediment that moved into or out of a cell.

Sink—The destination of sediment that is moved from its original location.

Source—The point of origin of sediment that is moved to a different location.

Note: Sediment budgets created in earlier versions of SBAS—SBAS for ArcGIS 10, SBAS-A, or SBAS Standalone—are not currently compatible with SBAS for ArcGIS 10.1/10.2. However, such compatibility may be available in the future.

Requirements

- **ArcGIS/ArcMap 10.1 SP1 or 10.2**—SBAS for ArcGIS 10.1/10.2 is designed to run with Esri’s ArcGIS/ArcMap 10.1 SP1 and 10.2 (including 10.2.1 and 10.2.2).
- **Python comtypes module 0.6.2** (included with the SBAS installation file)—A Python module that allows the use of custom Component Object Model (COM) interfaces
- **snippets.py** (included with the SBAS installation file)—Used to access ArcObjects via Python

Note: ArcGIS must be installed by ACE-IT. The SBAS Toolbox and the Python comtypes model, however, are both user-installable—they do not require administrator privileges or ACE-IT involvement; snippets.py does not require installation.

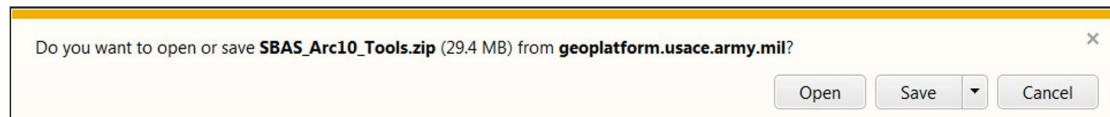
Installing the SBAS Toolbox

Use the following procedure to download and install the SBAS Toolbox in ArcMap.

Toolbox—A collection of geoprocessing tools in ArcMap.

Note: You need to perform this procedure only once.

1. Download the SBAS Toolbox files.
 - a. Go to <http://geoplatform.usace.army.mil/home/item.html?id=012c821cf7a84af8ae313d7fe4ac71f2>.
 - b. Click Open.
 - c. From the pop-up menu select Download.
 - d. When prompted to open or save SBAS_Arc10_Tools.zip, click the arrow to the right of the Save button.



- e. From the pop-up menu select Save As.
 - f. In the Save As dialog box, locate the appropriate folder on your workstation, and then click Save.

Note: No specific location is required for the SBAS folder; you can place it anywhere you want and name it anything you would like.

2. Unzip the file you downloaded in the previous step.
3. In the new SBAS_Arc10_Tools>SBAS>comtypes-0.6.2 folder, double-click install_comtypes.bat.

A window opens, and the comtypes files are installed.


4. When you're prompted "Press any key to continue..." press any key.

The window closes.

5. Open ArcMap.

6. From the Windows menu, select Catalog.

The Catalog panel displays.

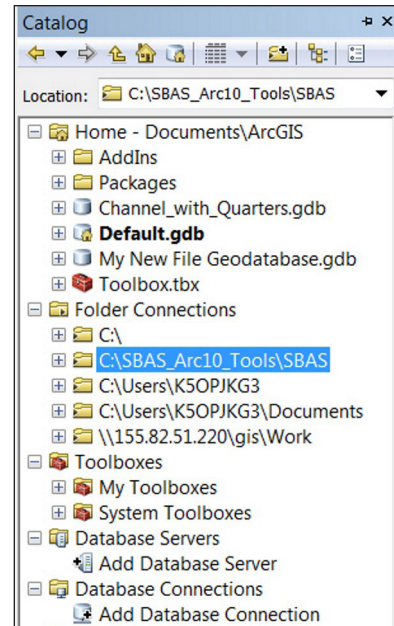
7. Click the  (Connect to Folder) icon.

A Connect to Folder dialog displays.

8. Browse to and select the SBAS folder.

9. Click OK.

The new SBAS folder (in this case, C:\SBAS_Arc10_Tools\SBAS) is added to the list of Folder Connections in the Catalog. The SBAS Toolbox is now installed and ready to use with ArcMap.




Opening the SBAS Toolbox

The SBAS Toolbox is located in ArcMap's Catalog panel. Use the following procedure to display it.

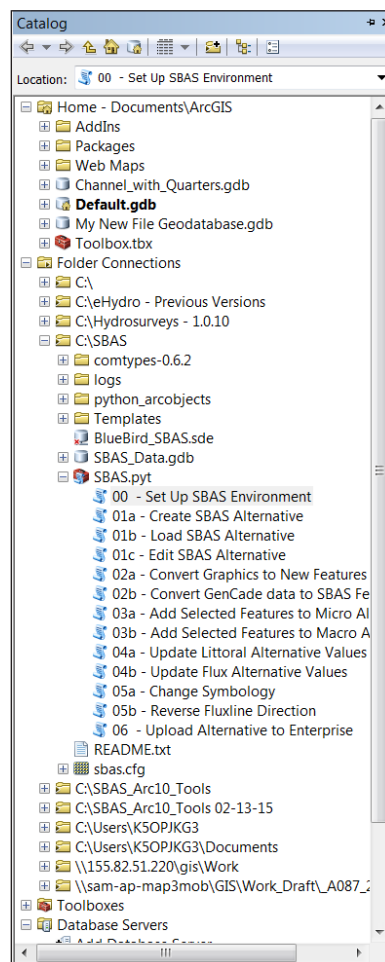
1. With ArcMap open and the Catalog panel displayed, click the  to the left of the SBAS folder connection.

The folder expands.

2. Click the  to the left of SBAS.pyt.

The SBAS Toolbox expands. It contains the following tools:

- **00 - Set up SBAS Environment**—Loads the appropriate tables and a basemap for the SBAS data frame and specifies a default workspace
- **01a - Create SBAS Alternative**—Creates a new SBAS alternative
- **01b - Load SBAS Alternative**—Loads an existing SBAS alternative (including all associated littoral cells and fluxes)
- **01c - Edit SBAS Alternative**—Allow you to edit an existing SBAS alternative
- **02a - Convert Graphics to New Features**—Converts shapes and lines into littoral cells and fluxes, adds them to an alternative, and calculates residual volumes
- **02b - Convert GenCade Data to SBAS Features**—Converts GenCade data into littoral cells and fluxes, adds them to an alternative, and calculates the residual volumes
- **03a - Add Selected Features to Micro Alternative**—Adds unassigned littoral cells and fluxes to a micro alternative
- **03b - Add Selected Features to Macro Alternative**—Adds unassigned littoral cells and fluxes to a macro alternative
- **04a - Update Littoral Alternative Values**—Adds delta, placement, and removal volumes as well as a confidence level to littoral cells
- **04b - Update Flux Alternative Values**—Adds a Q value (the import volume into [source] or export volume from [sink] a littoral cell) as well as a confidence level to fluxes



- **05a - Change Symbology**—Reclassifies the alternative by delta volume, removal volume, placement volume, residual volume (default), or confidence level
- **05b - Reverse Fluxline Direction**—Reverses the direction of the selected flux lines and then recalculates the residual volumes of any intersecting littoral cells.
- **06 - Upload Alternative to Enterprise**—Uploads the alternative to the enterprise geodatabase.

Setting up the SBAS Environment and ArcMap Data Frame

Use the following procedure to set up the SBAS environment and ArcMap data frame each time you start a new alternative.


Note: It is not necessary to set up the SBAS environment again when reloading an alternative.

1. In the SBAS Toolbox, double-click 00 - Set Up SBAS Environment.

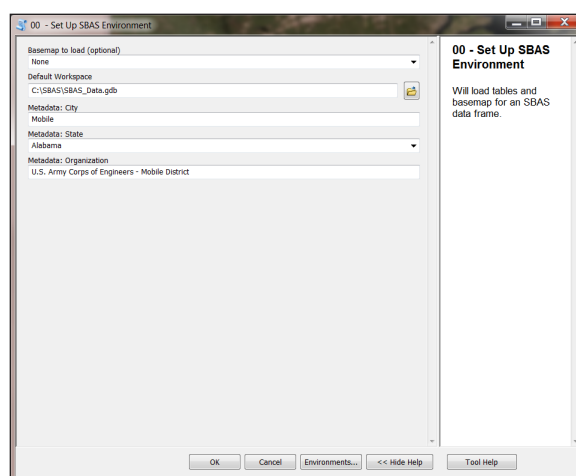
Data Frame—A map element that defines a geographic extent (bounding rectangle), a page extent, a coordinate system, and other display properties for one or more layers in ArcMap—in other words, the ArcMap work area where you create the sediment budget.

This tool loads the appropriate tables and a basemap for the SBAS data frame and specifies a default workspace.

A 00 - Set Up SBAS Environment dialog displays.

2. From the Basemap to Load drop-down, select the appropriate basemap—Counties, Shoreline, or None (default).
3. If necessary, click the  to the right of the Default Workspace field and then browse for and select the location of the SBAS_Data.gdb geodatabase.

Note: The directory in which you installed the SBAS Toolbox is displayed by default.



4. In the Metadata: City text box, type the name of your city.
5. From the Metadata: State text box, select the your state.
6. In the Metadata: Organization text box, type the name of your organization.

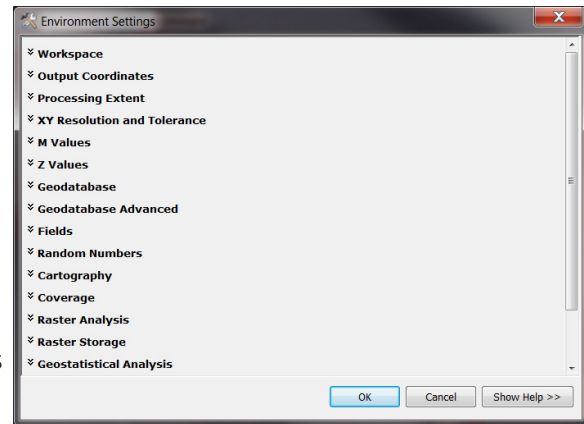
7. If you do not need to change of the ArcMap environment settings, proceed to step 5.

If you need to change any of the environment settings, do the following:

- a. Click Environments.

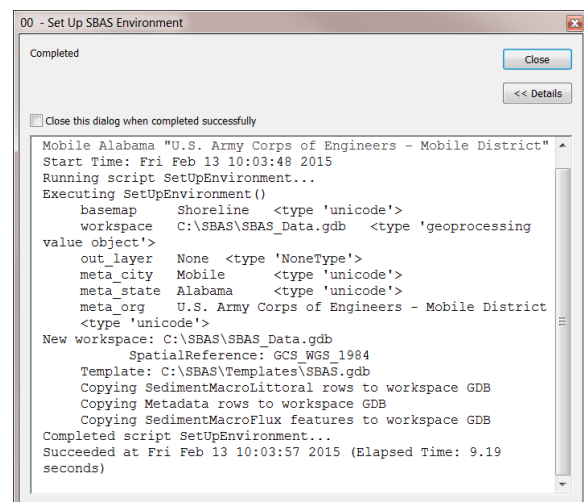
An Environment Setting dialog displays. Environment settings are system-wide default settings used by all of the tools. See the ArcMap online help for more details.

- b. Make the necessary changes.
- c. Click OK to close the Environment Settings dialog.



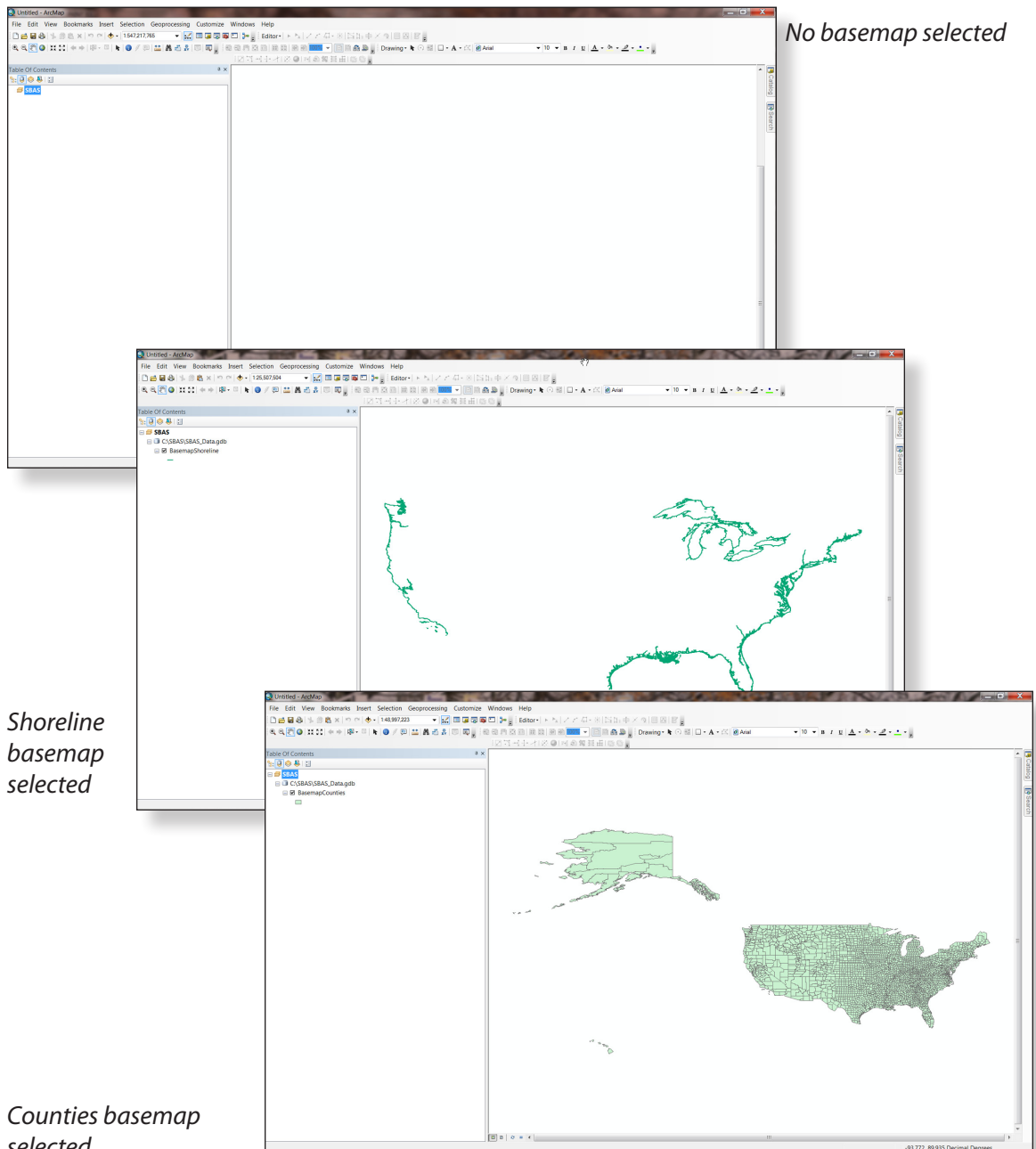
8. Click OK to complete the setup of the SBAS environment and close the 00 - Set Up SBAS Environment dialog.

Another 00 - Set Up SBAS Environment dialog displays as the tool executes.



- When a "Completed" message displays, click Close.

What displays in the ArcMap data frame depends on the basemap selected during the SBAS environment setup.



Creating Sediment Budgets—Overview

The basic procedure for creating micro and macro sediment budgets consists of the following steps. Each is described in detail in the following sections.

Micro Sediment Budgets

1. Set up the SBAS data frame.
2. Create an SBAS micro alternative.
3. Load the SBAS micro alternative.
4. Create the littoral cells and add them to the alternative.
5. Create the flux lines and add them to the alternative.
6. Enter the littoral cell and flux line values and confidence levels.

Sediment Budget—A measure of sediment (usually sand) “sources” (inputs), “sinks” (outputs), and net change within a specified “control volume” (a cell or series of connecting cells) over a given period of time.

Micro Sediment Budget—A sediment budget for a specific local area.

Confidence—The certainty level that the values assigned to littoral cells and fluxes are correct.


Macro Sediment Budgets

1. Create an SBAS macro alternative.
2. Load the SBAS macro alternative.
3. Add littoral cells and fluxes to the macro alternative.

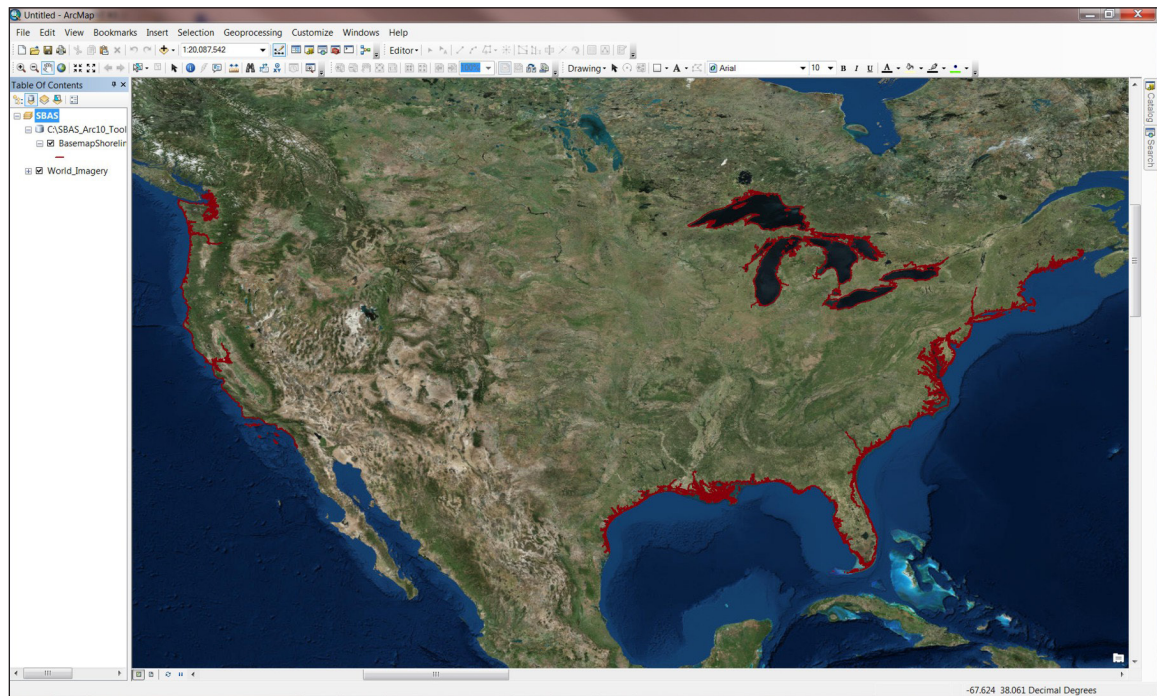
Macro Sediment Budget—A sediment budget for a region; it may consist of multiple micro sediment budgets.

Adding Data to the Data Frame

Use the following procedure if you need to add data to the data frame before using the SBAS Toolbox to develop a sediment budget. You can add vector, raster, and tabular data.

1. With the ArcMap data frame displayed, in the ArcMap Standard toolbar use the  (Add Data) tool to add the appropriate datasets and/or basemap to assist you in the design and analysis of the sediment budget.

In this case, the World_Imagery basemap was added to the data frame, which already included the BasemapShoreline basemap (the red lines) added by the 00 - Set Up SBAS Environment tool.



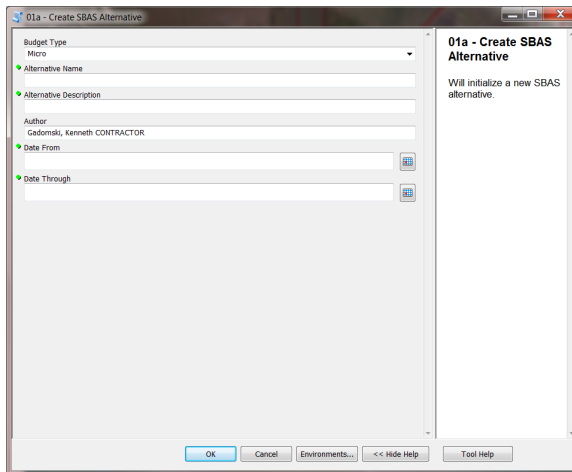
Creating an SBAS Alternative

Use the following procedure to create a new SBAS alternative.

1. With the ArcMap data frame displayed, in the SBAS Toolbox double-click 01a - Create SBAS Alternative.

A 01a - Create SBAS Alternative dialog displays. By default, the Budget Type is "Micro."

Note: All text fields are required because they are used as metadata for the alternative.



Alternative—A representation of one set of assumed conditions for a sediment budget. Each alternative has its own set of littoral cells (with delta, placement [input], and removal [output] volumes) and fluxes.



Alternatives may be created to reflect different assumptions about sediment-transport paths/rates and engineering activities, or they may reflect different time periods.

At least one alternative must be created in an SBAS session. Alternatives save all values applied to littoral cells and fluxes.

Metadata—A set of data that describes and give basic information (for example, source, creation date, and contacts) about other data.

2. In the Alternative Name text box, enter a name for the alternative.

Note: Alternative filenames are limited to 50 characters. You can use letters, numbers, and most common special characters. However, non-ASCII characters—such as ñ and both single and double quotation marks (' and ") are not accepted.

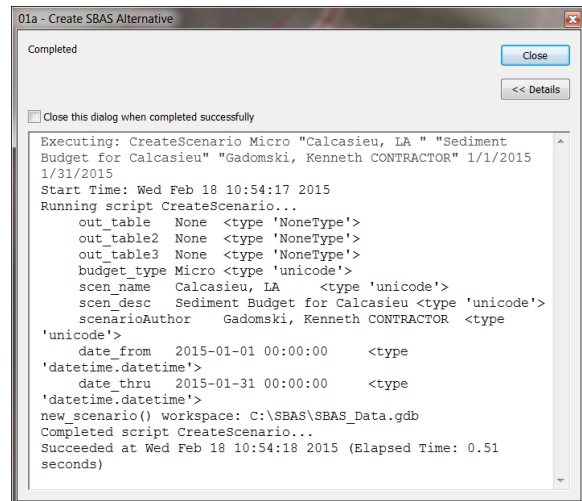
3. In the Alternative Description text box, enter a short description of the alternative.
4. In the Author text box, either leave your name (default) or enter another name.
5. Click the  to the right of the Date From text box; select the beginning date and time, date only, or time only; and click OK.
6. Click the  to the right of the Date Through text box; select the beginning date and time, date only, or time only; and click OK.

7. Click OK.

A 01a - Create SBAS Alternative dialog displays as the tool executes.

8. When the “Completed” message displays in the dialog, click Close.

The data frame redisplay.



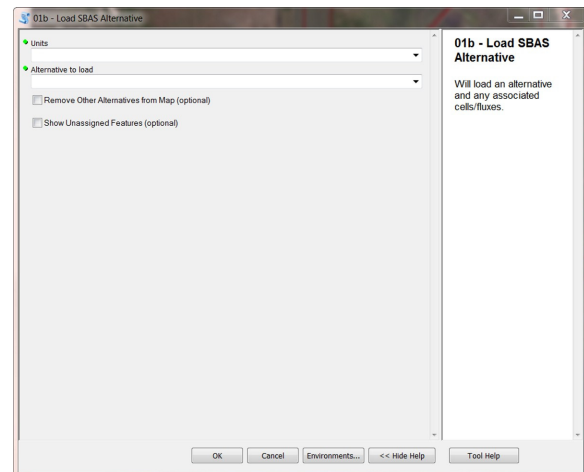
Loading an SBAS Alternative

Use the following procedure to load an existing SBAS alternative.

1. With the ArcMap data frame displayed, in the SBAS Toolbox double-click 01b - Load SBAS Alternative.

A 01b - Load SBAS Alternative dialog displays.

2. From the Units drop-down, select Cubic Yards, Cubic Yards/Year, Cubic Meters, or Cubic Meters/Year.
3. In the Alternative to Load drop-down, select the appropriate alternative.
4. (Optional) If you want to work on only this alternative, select (check) the Remove Other Alternatives from Map check box.
5. (Optional) If you want to display all features on the map that are not part of the alternative, select (check) the Show Unassigned Features check box.



Note: You must select this option if you want to add littoral cells to the “Unassigned Cells” layer or fluxes to the “Unassigned Fluxes” layer. This allows you to create cells and fluxes but not immediately assign them to an alternative. (See “Add Littoral Cells to an “Unassigned Cells” Layer” on page 23 and “Add Flux Lines to an “Unassigned Fluxes” Layer” on page 35.)

6. Click OK.

A 01b - Load SBAS Alternative dialog displays as the tool executes.

7. When the “Completed” message displays in the dialog, click Close.

The data frame redisplay.

Editing an SBAS Alternative

When you create an alternative, you give it a name, description, author (optional), date from, and date to. Use the following procedure to edit these details for an existing alternative.

1. With the alternative loaded in the ArcMap data frame, in the SBAS Toolbox double-click 01c - Edit SBAS Alternative.

A 01c - Edit SBAS Alternative dialog displays.

2. From the Edit Alternative drop-down, select the alternative whose details you want to edit.

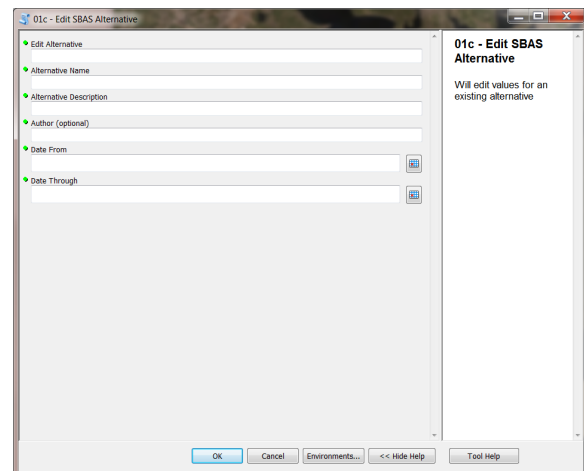
The current Alternative Name, Alternative Description, Author, Date From, and Date To display in the appropriate text fields.

3. Change any or all of the alternative's identifying information.
4. Click OK.

A 01c - Edit SBAS Alternative dialog displays as the tool executes.

5. When the "Completed" message displays in the dialog, click Close.

The data frame redisplay.







Removing an SBAS Alternative


It is not currently possible to delete an alternative from within SBAS. However, an alternative may be deleted in ArcMap by editing the SedimentManagementScenario table. Refer to the ArcMap documentation for details on editing tables.



Drawing Littoral Cells

Use the following procedures to draw one or more littoral cells in the ArcMap data frame and then convert them to features in an SBAS alternative.

Note: While these examples use the  (Rectangle) and  (Polygon) tools to create littoral cells, you can also use the circle  and ellipse  tools.

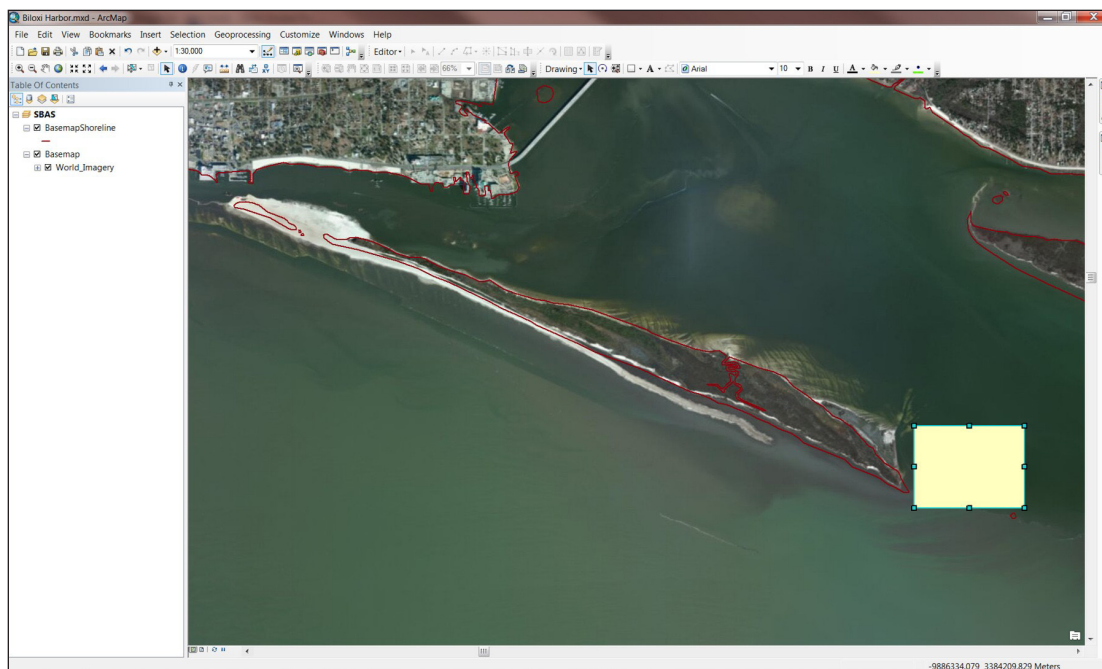
Draw a Rectangular Littoral Cell

1. In the ArcMap Draw toolbar, click the  (Rectangle) tool.

Note: If the Draw toolbar isn't displayed, from the Customize menu select Toolbars>Draw. If the  (Rectangle) tool isn't displayed, click the ▼ button to the right of the currently displayed shape tool and then, from the pop-up menu, select  (Rectangle).

2. In the data frame, position the cursor in the upper-left corner of the new cell, press and hold down the mouse button, and drag the rectangle to the lower-right corner.
3. Release the mouse button.

A rectangular cell displays in the data frame.






4. Click anywhere in the data frame to unselect the graphic.

Littoral Cell—A collection of information describing similar physical, biological, and cultural characteristics within a particular area along a river, lake, sea, or ocean. Littoral cell data can be in the form of a map, database, or text. The boundaries of the littoral cells can be defined either by morphological features (such as ebb and flood shoals, an inlet throat, and adjacent beaches) or by political features (such as nautical charts and municipal boundaries).

Feature—A point, line, or polygon that represents an object on a map.

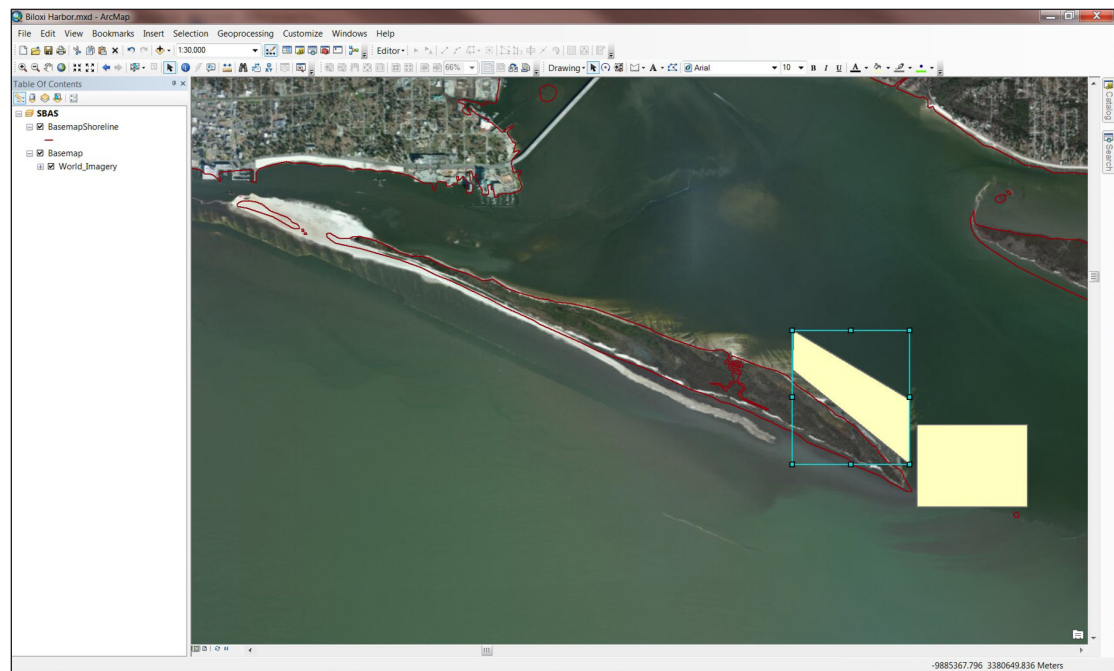
Draw a Polygonal Littoral Cell

1. In the ArcMap Draw toolbar, click the  (Polygon) tool.

Note: If the Draw toolbar isn't displayed, from the Customize menu select Toolbars>Draw. If the  (Polygon) tool isn't displayed, click the ▼ button to the right of the currently displayed shape tool and then, from the pop-up menu, click  Polygon.

2. In the data frame, click each of the new cell's vertices (corners) except the last one.
3. Double-click the new cell's last vertex (corner).

A polygon displays in the data frame.




4. Click anywhere in the data frame to unselect the graphic.

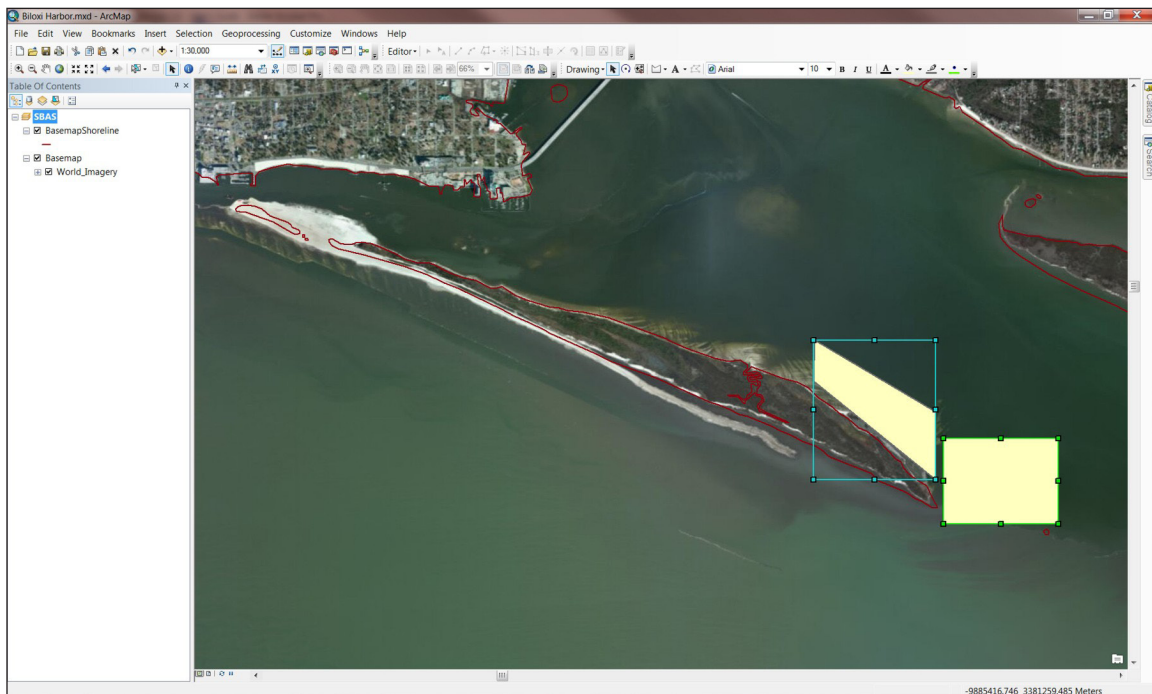
Add Littoral Cells to an Alternative

Use the following procedure to create a littoral cell layer by adding littoral cells to an alternative.

Note: If you want to create a littoral cell but not yet include it in an alternative, refer to “Add Littoral Cells to an “Unassigned Cells” Layer” on page 23.

1. In the ArcMap Tools toolbar, click the  (Select Elements) tool.
2. Select the graphic(s) you just created.

Layer—A collection of similar geographic features (such as rivers, lakes, littoral cells, and fluxes) in a particular area referenced together for display on a map. A layer references the geographic data stored in a data source, such as a shapefile, and defines how to display it.



3. In the SBAS Toolbox, double-click 02a - Convert Graphics to New Features.

A 02a - Convert Graphics to New Features dialog displays.

4. (Optional) In the Feature Name field, enter a name for the new features.

Note: If you enter a feature name but have multiple cells selected, the first cell is given the specified name and subsequent cells are named *FeatureName_n*, where “n” is the next consecutive integer, beginning with 2 (for example, “Cell,” “Cell_2,” “Cell_3 . . .”).

If you do not enter a feature name, SBAS automatically assigns one (for example, “Littoralb8fd”).

5. From the Add Features to Alternative drop-down, select the appropriate alternative.

Note: If you select “(None),” the graphic is converted to a littoral cell, but it is added to an “Unassigned Cells” layer. (See “Add Littoral Cells to an “Unassigned Cells” Layer” on page 23.)

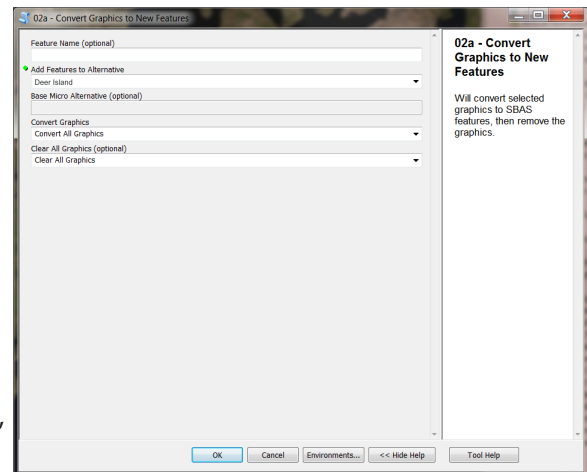
6. From the Convert Graphics drop-down, select either Convert All Graphics (default) or Convert Only Selected Graphics.
7. (Optional) From the Clear All Graphics drop-down, select Clear All Graphics (default), Clear Only Selected Graphics, or Do Not Clear Graphics.

Note: When you convert graphics to new features, it is not necessary to retain the original graphics. Therefore, it is recommended that you select either Clear All Graphics or Clear Only Selected Graphics. The difference between the two options is that Clear All Graphics deletes *all graphics* not in layers/shapefiles (for example, arrows, labels, and other text), *not only* the graphics you just created and selected. Selecting Do Not Clear Graphics leaves both the graphics and the new features.

8. Click OK.

A 02a - Convert Graphics to New Features dialog displays as the tool executes.

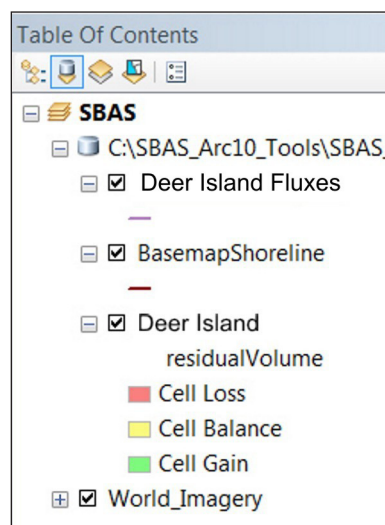
Note: This process may take a few minutes, especially if a large number of graphics are being converted to new features.



9. When the “Completed” message displays, click Close.

The selected graphic(s) are converted to features and added to the specified alternative, the graphics are deleted (if you selected either Clear All Graphics or Clear Only Selected Graphics), littoral cell and flux layers are added to the ArcMap Table of Contents, and the data frame redisplay.

Note: Residual amounts also display in the littoral cells. However, they will remain “0 YD3” or “0 M3” until you add littoral cell values. (See “Entering Littoral Cell and Flux Line Values” on page 41 for details.)



The screenshot shows the 'Table Of Contents' window in ArcMap. It lists the following layers:

- SBAS
 - C:\SBAS_Arc10_Tools\SBAS_
 - ☒ Deer Island Fluxes
 - ☒ BasemapShoreline
 - ☒ Deer Island residualVolume
 - Cell Loss
 - Cell Balance
 - Cell Gain
 - ☒ World_Imagery



Add Littoral Cells to an “Unassigned Cells” Layer

At times, you may want to display one or more littoral cells in the data frame but not yet include them in an alternative. Use the following procedure to add a littoral cell to an “Unassigned Cells” layer.

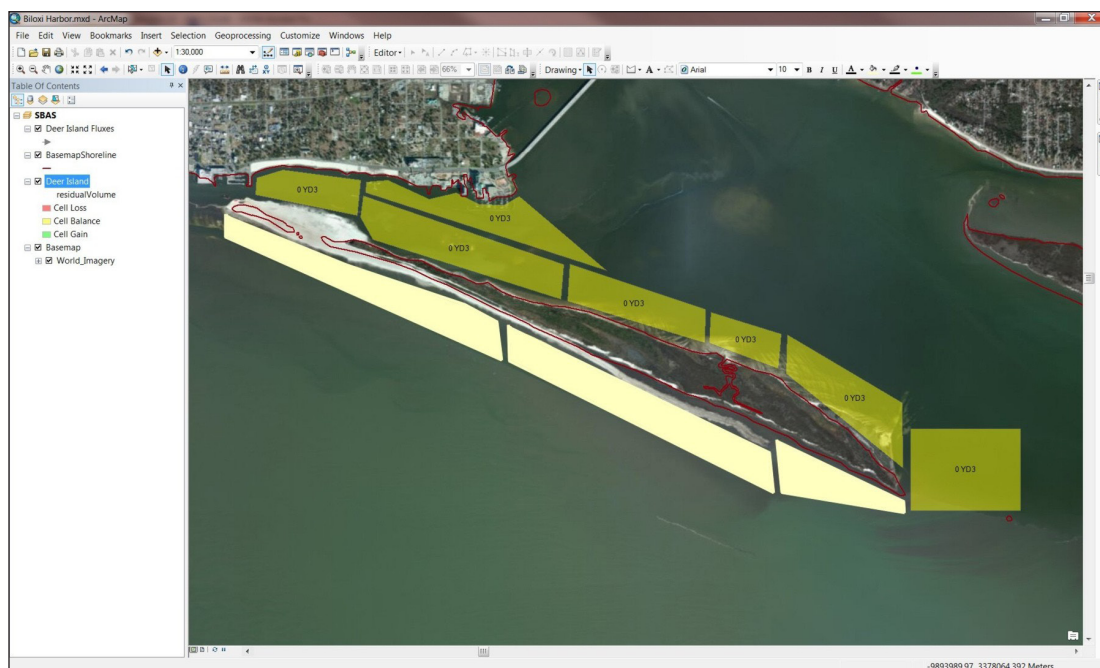
Unassigned Littoral Cell—A littoral cell that displays on the map but does not belong to any alternative.


Use the following procedure to add one or more littoral cell layer to an “Unassigned Cells” layer.

Note: Before beginning this procedure, you must have already loaded an alternative *and* have selected the Show Unassigned Features option when doing so (see “Loading an SBAS Alternative” on page 17 for details). If you have not done so, you will receive an error message when trying to convert the graphics to new features in step 3.

1. In the ArcMap Draw toolbar, use the  (Rectangle) and/or  (Polygon) tool to add one or more littoral cells in the ArcMap data frame.

Note: Refer to “Drawing Littoral Cells” on page 19 for more information.

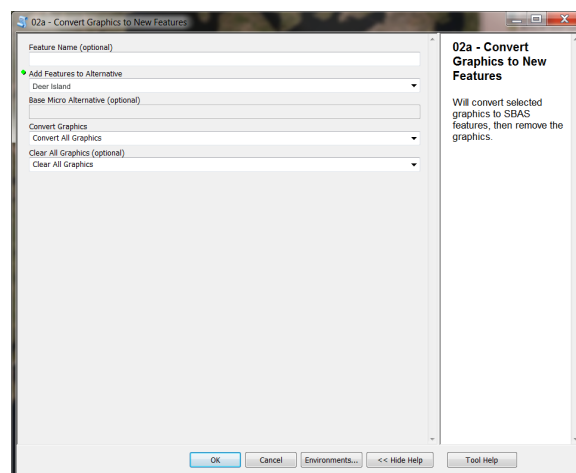


2. In the ArcMap Tools toolbar, use the  (Select Elements) tool to select the graphic(s) you just created.

3. In the SBAS Toolbox, double-click 02a - Convert Graphics to New Features.

A 02a - Convert Graphics to New Features dialog displays.

4. (Optional) In the Feature Name field, enter a name for the new features.
5. From the Add Features to Alternative drop-down, select (None).
6. From the Convert Graphics drop-down, select either Convert All Graphics (default) or Convert Only Selected Graphics.



7. (Optional) From the Clear All Graphics drop-down, select Clear All Graphics (default), Clear Only Selected Graphics, or Do Not Clear Graphics.

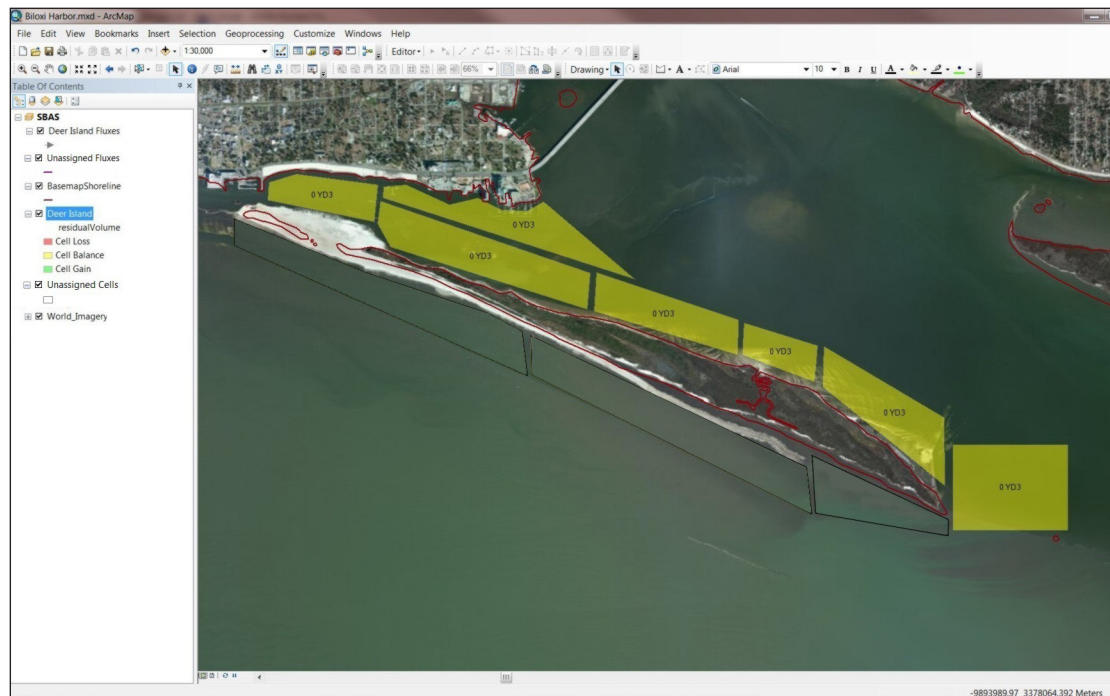
Note: When you convert graphics to new features, it is not necessary to retain the original graphics. Therefore, it is recommended that you select either Clear All Graphics or Clear Only Selected Graphics. The difference between the two options is that Clear All Graphics deletes *all graphics* not in layers/shapefiles (for example, arrows, labels, and other text), *not only* the graphics you just created and selected. Selecting Do Not Clear Graphics leaves both the graphics and the new features.

8. Click OK.

A 02a - Convert Graphics to New Features dialog displays as the tool executes.

9. When the “Completed” message displays, click Close.

The selected graphic(s) are converted to features, Unassigned Cells and Unassigned Fluxes layers are added to the ArcMap Table of Contents (if they are not already listed), and the data frame redisplay. The new unassigned littoral cells are indicated by a black border, and no residual amounts display in the cells.




Editing Littoral Cells

Resize, Reshape, and Move a Littoral Cell

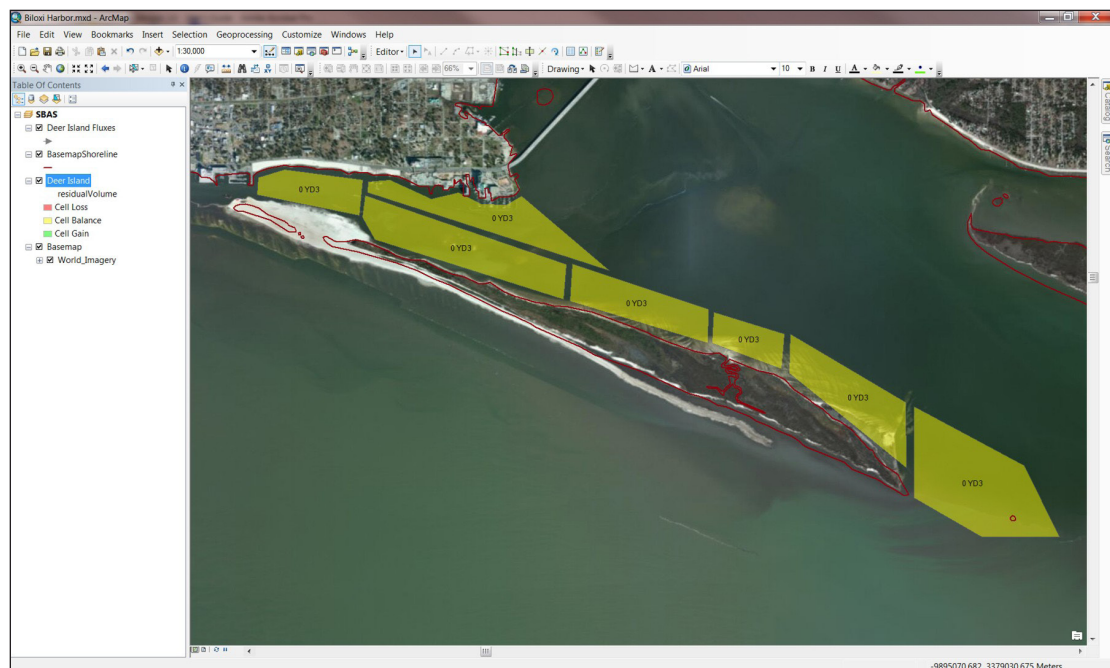
Use the following procedure to resize, reshape, or move a cell in a littoral cell layer.

Note: When a littoral cell is resized or reshaped, its values are not automatically updated. You must update these values manually. Refer to “Enter Littoral Cell Values” on page 41.

1. From the ArcMap Editor toolbar, select Editor>Start Editing to start an editing session.
2. In the ArcMap Editor toolbar, click  (Edit Tool).
3. Select the littoral cell you want to edit.
4. Use the tools in the ArcMap Editor toolbar to resize, reshape, and/or move the cell as necessary.


Refer to the ArcMap 10 documentation for details.

5. Click anywhere in the data frame to deselect the cell and apply your changes.
6. In the ArcMap Editor toolbar, select Editor>Stop Editing to close the editing session.
7. When prompted to save your edits, click Yes.



Delete a Littoral Cell

Use the following procedure to remove one or more littoral cells from a littoral cell layer.

1. In the ArcMap Table of Contents, select the littoral cell layer.
2. From the ArcMap Editor toolbar, select Editor>Start Editing to start an editing session.
3. In the ArcMap Editor toolbar, click  (Edit Tool).
4. Select the littoral cell(s) you want to delete.

Note: To select multiple cells, click the first one and then, while holding down the Shift key, click each additional cell.

5. Right-click on one of the selected cells.
6. From the pop-up menu, select Delete.
7. In the ArcMap Editor toolbar, select Editor>Stop Editing to close the editing session.
8. When prompted to save your edits, click Yes.

Set the Littoral Cell Layer's Cell Color and Label Options

By default, all littoral cells assigned to are 50% transparent, so any data beneath them can be seen. However, cell transparency—as well as label font, size, and color—can be changed by editing the littoral cell layer's properties.

Note: Cells that are set to 100% transparent still exist and can be selected during an editing session; they just don't display (except for the cell label and border, if there is one) in the data frame.

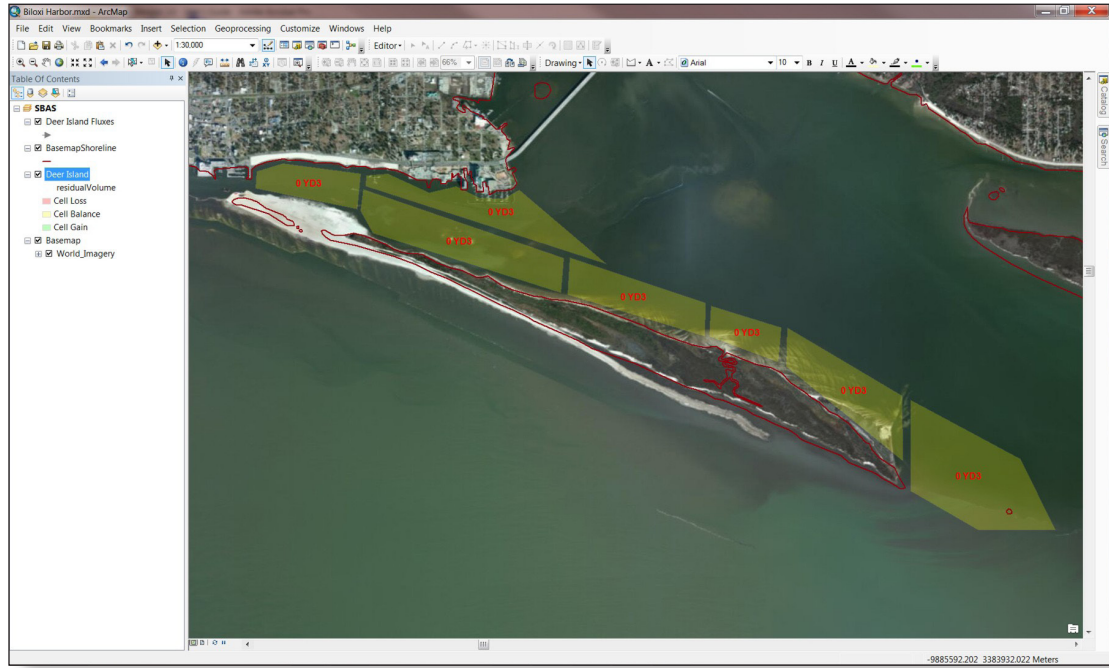
1. In the ArcMap Table of Contents, right-click the layer name and, from the pop-up menu, select Properties.

A Layer Properties dialog displays.

2. Click the Display tab.
3. In the Transparent text box, type a number indicating the transparency percentage.
4. Click the Labels tab.
5. If it isn't already selected, select (check) the Label Features in this Layer check box.
6. In the Text Symbol section, select the label font, size, and color.


7. Click OK.

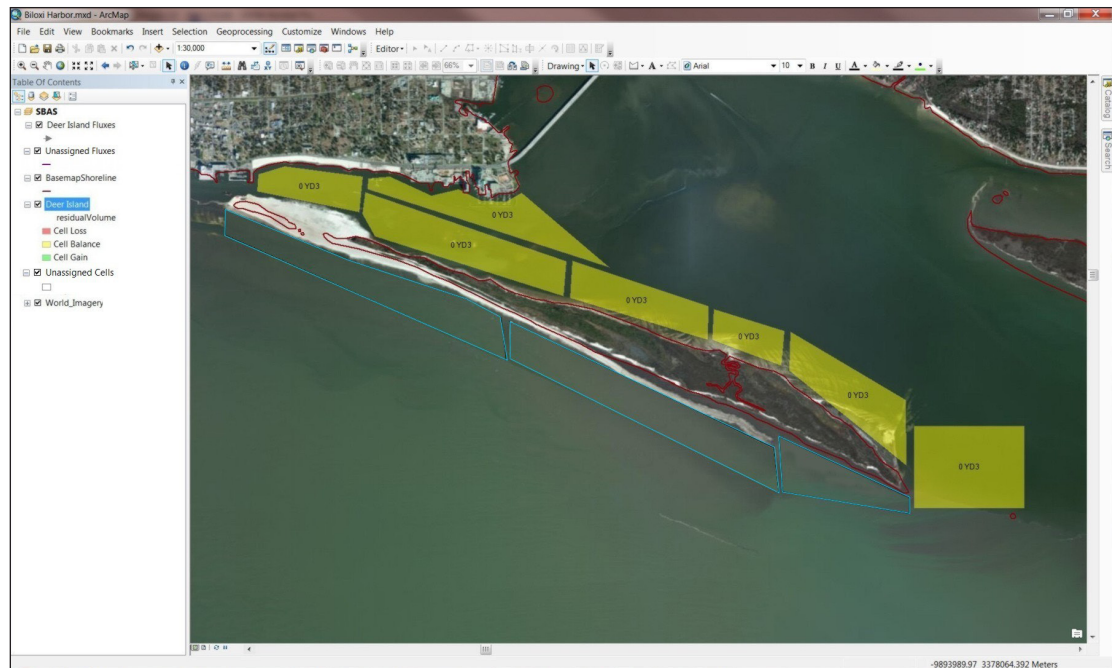
The map redisplay with your new cell color and label choices in the data frame and the Table of Contents. The following illustration shows cell transparency set to 75% and label properties set to Arial bold, 10 pt, red.



Adding Unassigned Littoral Cells to an Alternative

Use the following procedure to add unassigned littoral cells to a micro or macro alternative.

1. With the appropriate SBAS alternative already loaded, using one of the ArcMap Select Features tools () , select the littoral cells you want to add to the alternative.



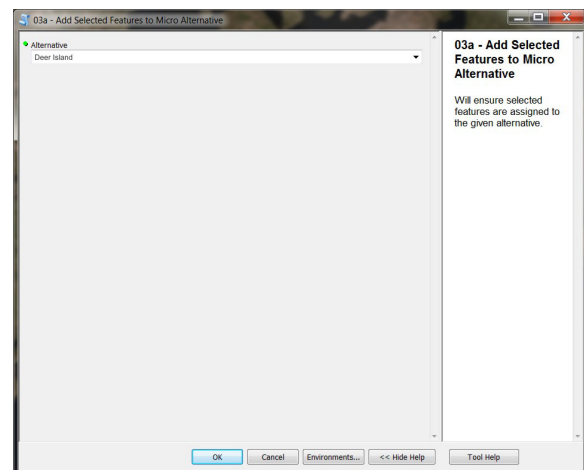
2. In the SBAS Toolbox, double-click either 03a - Add Selected Features to Micro Alternative or 03b - Add Selected Features to Macro Alternative.

A 03a - Add Selected Features to Micro Alternative or 03b - Add Selected Features to Macro Alternative dialog displays.

3. From the Alternative drop-down, select the appropriate alternative.
4. Click OK.

A 03a - Add Selected Features to Micro Alternative or 03b - Add Selected Features to Macro Alternative dialog displays as the tool executes.




5. When the "Completed" message displays, click Close.



The selected graphic(s) are converted to features and added to the alternative's littoral cell layer, residual values are recalculated, and the data frame redisplay.

Drawing Flux Lines

Use the following procedures to draw one or more flux lines in the ArcMap data frame and then convert them to features in an SBAS alternative.



Note: While these examples use the  (Line) tool to create straight and “curved” (polyline) flux lines, you can also use the curve  and freehand  tools to create flux lines.

Flux Line—A representation of the flow of sediment into and out of a littoral cell. Each cell requires both eastward and westward transport rates.

Feature—A point or polygon that represents an object on a map.

Draw Straight Flux Lines

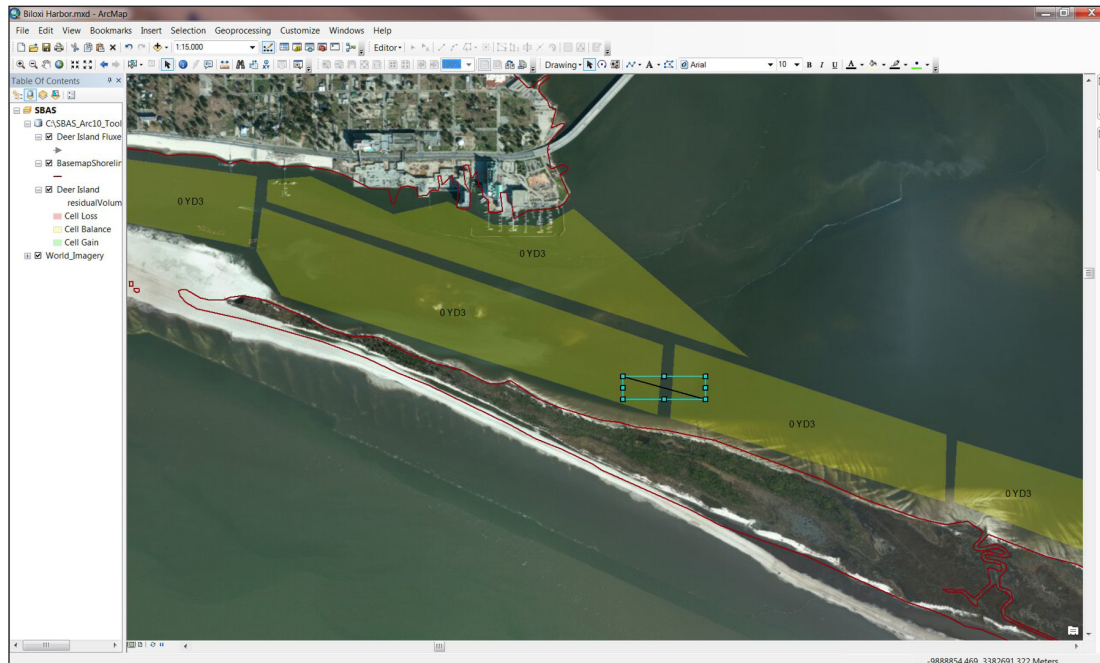
1. In the ArcMap Draw toolbar, click the  (Line) tool.

Note: If the Draw toolbar isn’t displayed, from the Customize menu select Toolbars>Draw. If the  (Line) tool isn’t displayed, click the ▼ button to the right of the selected shape tool and then, from the pop-up menu, click  Line .

2. In the data frame, click the source cell.
3. Double-click the sink cell.

The two cells are connected by the line.

Note: The arrowheads of the flux lines are not symbolized until the line graphics are converted into a flux layer.







4. Click anywhere in the data frame to unselect the line.

Draw Flux Polylines

Polylines have multiple vertices, so they can to “curve” around structures if necessary.

Note: While each cell requires both eastward and westward transport rates, this example demonstrates drawing only a single polyline.

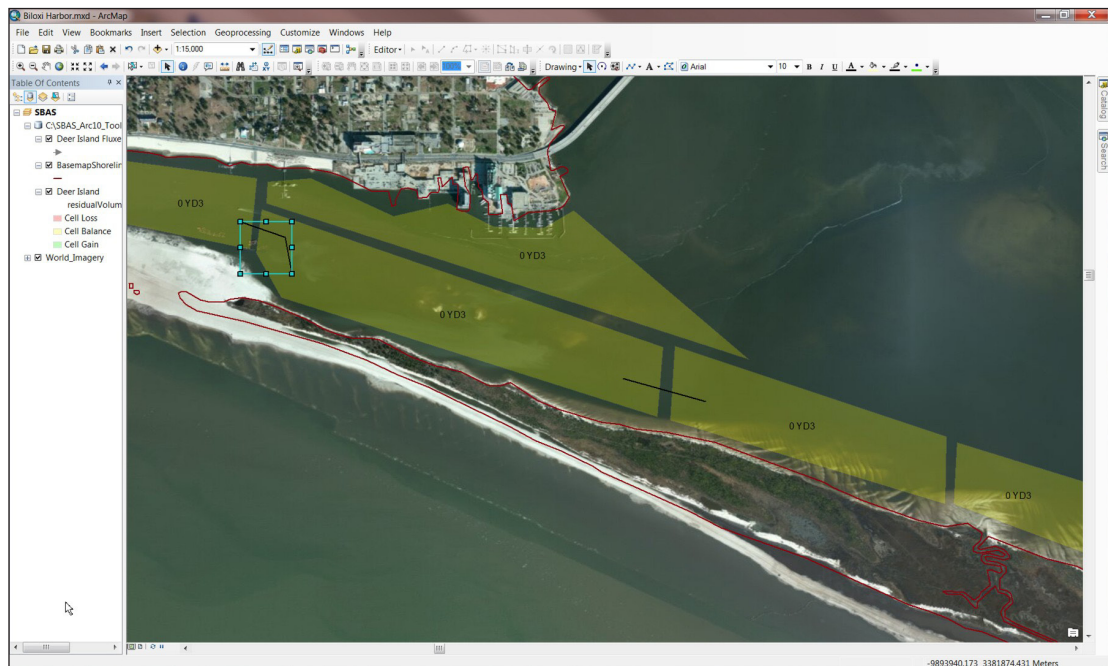
1. In the ArcMap Draw toolbar, click the  (Line) tool.

Note: If the Draw toolbar isn’t displayed, from the Customize menu select Toolbars>Draw. If the  (Line) tool isn’t displayed, click the  button to the right of the selected shape tool and then, from the pop-up menu, click  (Line) .

2. In the data frame, click the source cell.
3. In the data frame, click each of the polyline’s vertices except the last one.
4. Double-click the polyline’s last vertex on the sink cell.

The two cells are connected by the polyline.

Note: The arrowheads of the flux polylines do not display. They are not symbolized until the polyline graphics are converted into a flux layer.




5. Click anywhere in the data frame to unselect the line.

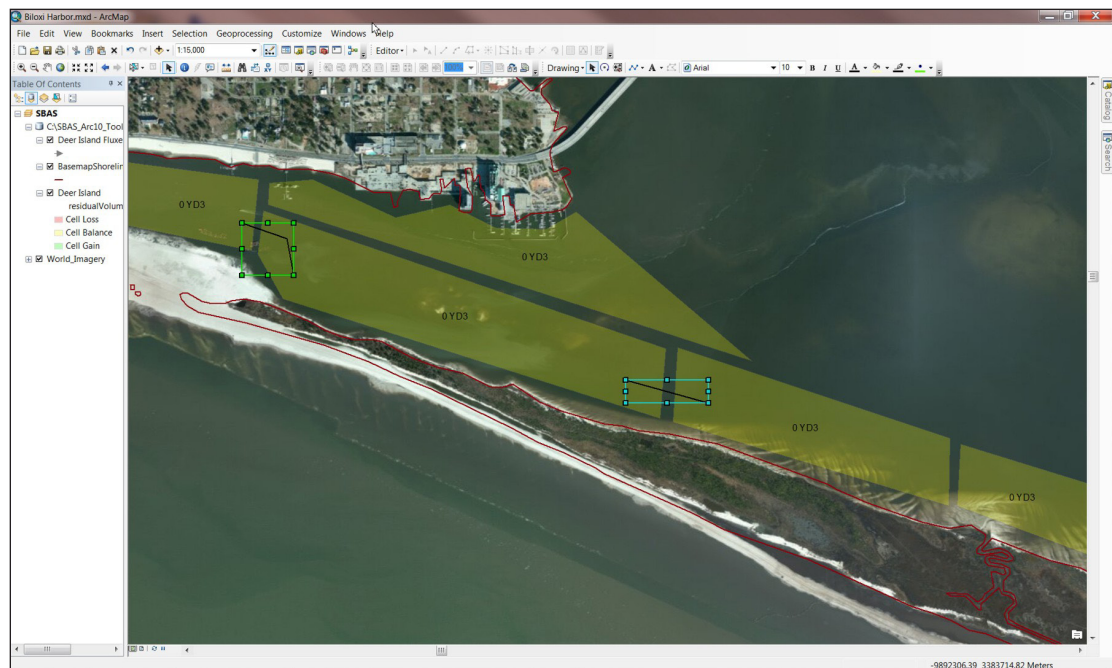
Add Flux Lines to an Alternative

Use the following procedure to create a flux layer by adding flux lines to an alternative.

Note: If you want to create a flux line but not yet include it in an alternative, refer to “Adding Unassigned Littoral Cells to an Alternative” on page 29.

1. In the ArcMap Tools toolbar, click the  (Select Elements) tool.
2. Select the line(s) you just created.

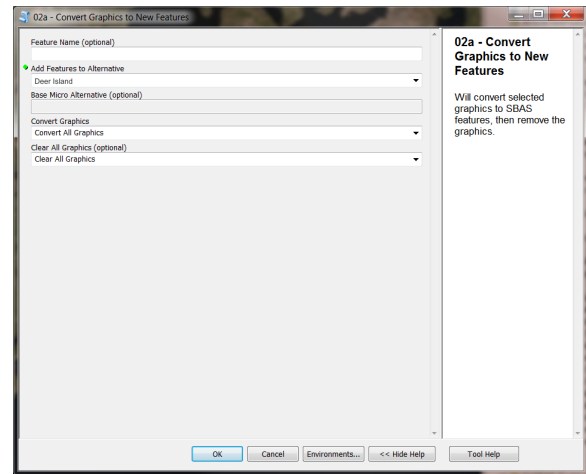
Layer—A collection of similar geographic features (such as rivers, lakes, littoral cells, and fluxes) in a particular area referenced together for display on a map. A layer references the geographic data stored in a data source, such as a shapefile, and defines how to display it.



3. In the SBAS Toolbox, double-click 02a - Convert Graphics to New Features.

A 02a - Convert Graphics to New Features dialog displays.

4. (Optional) In the Feature Name field, enter a name for the new features.
5. From the Add Features to Alternative drop-down, select the appropriate alternative.
6. From the Convert Graphics drop-down, select either Convert All Graphics (default) or Convert Only Selected Graphics.
7. (Optional) From the Clear All Graphics drop-down, select Clear All Graphics (default), Clear Only Selected Graphics, or Do Not Clear Graphics.



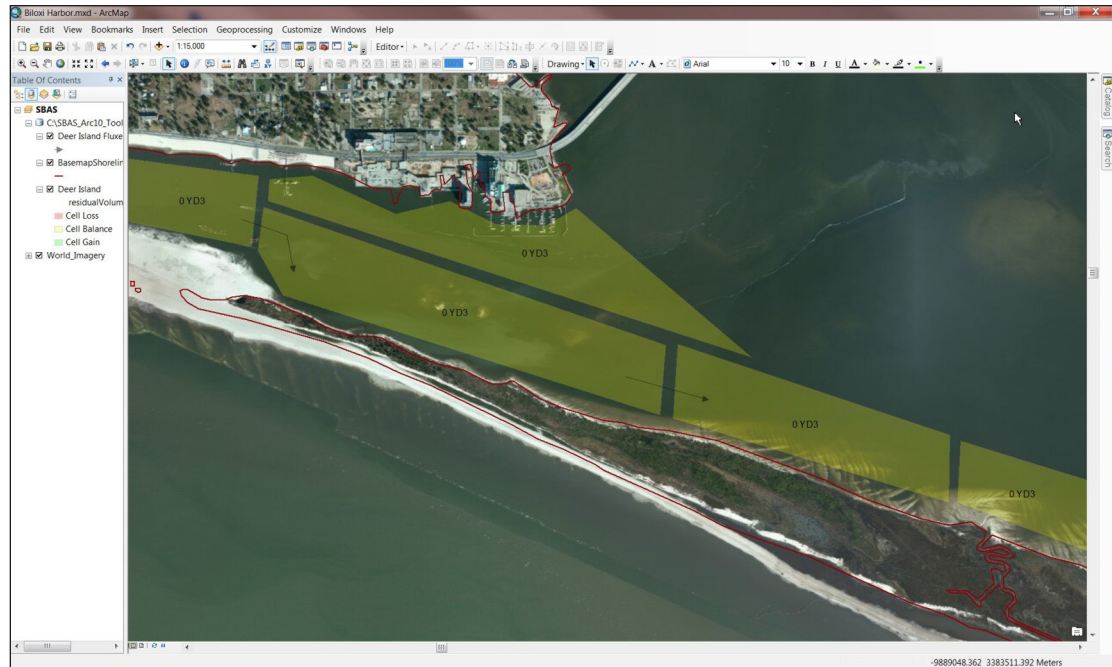
Note: When you convert graphics to new features, it is not necessary to retain the original graphics. Therefore, it is recommended that you select either Clear All Graphics or Clear Only Selected Graphics. The difference between the two options is that Clear All Graphics deletes *all graphics* not in layers/shapefiles (for example, arrows, labels, and other text), *not only* the graphics you just created and selected. Selecting Do Not Clear Graphics leaves both the graphics and the new features.

8. Click OK.

A 02a - Convert Graphics to New Features dialog displays as the tool executes.

9. When the “Completed” message displays, click Close.

The selected graphic(s) are converted to features and added to the specified alternative, the graphics are deleted (if you selected either Clear All Graphics or Clear Only Selected Graphics), the lines are transformed into arrows (with the arrow tail indicating the source cell and the arrow head indicating the sink cell), and the data frame redisplay.




Add Flux Lines to an “Unassigned Fluxes” Layer

At times, you may want to display one or more flux lines in the data frame but not yet include them in an alternative. Use the following procedure to add a flux line to an “Unassigned Fluxes” layer.

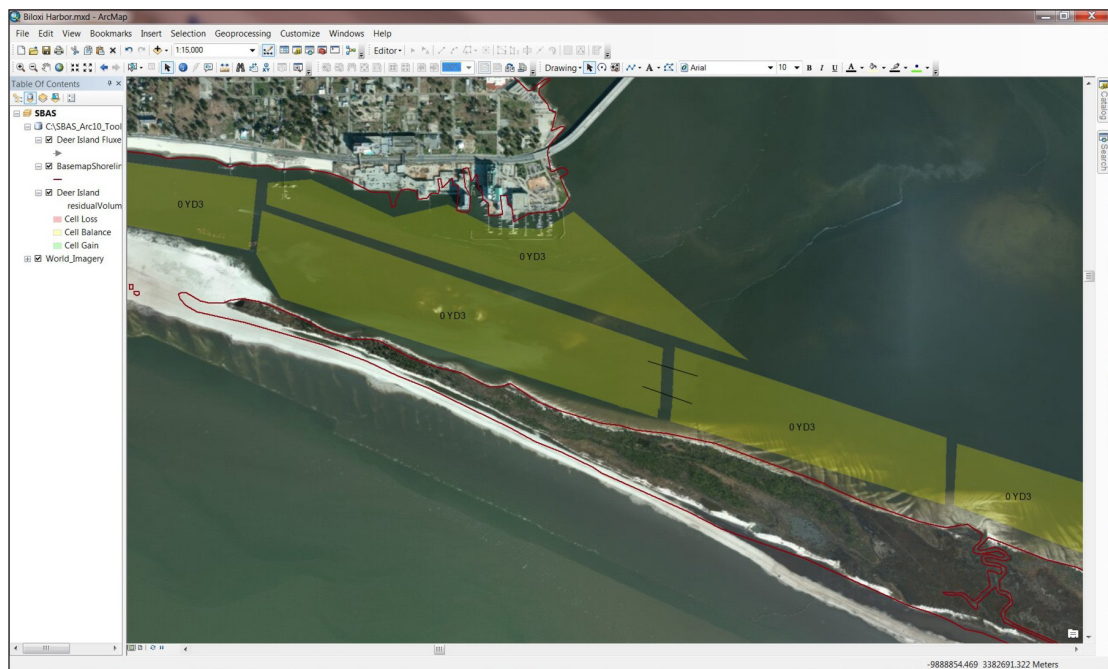
Unassigned Flux Line—A flux line that displays on the map but does not belong to any alternative.

Use the following procedure to add one or more unassigned fluxes to an “Unassigned Fluxes” layer.

Note: Before beginning this procedure, you must have already loaded an alternative *and* have selected the Show Unassigned Features option when doing so (see “Loading an SBAS Alternative” on page 17 for details). If you have not done so, you will receive an error message when trying to convert the graphics to new features in step 3.

1. In the ArcMap Draw toolbar, use the  (Line) tool to add one or more flux lines in the ArcMap data frame.

Note: Refer to “Creating Flux Lines” on page 24 for more information.

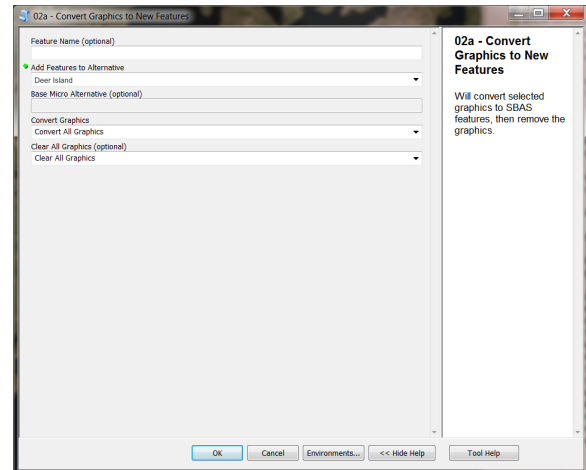


2. Select the graphic(s) you just created.

3. In the SBAS Toolbox, double-click 02a - Convert Graphics to New Features.

A 02a - Convert Graphics to New Features dialog displays.

4. (Optional) In the Feature Name field, enter a name for the new features.
5. From the Add Features to Alternative drop-down, select (None).
6. From the Convert Graphics drop-down, select either Convert All Graphics (default) or Convert Only Selected Graphics.
7. (Optional) From the Clear All Graphics drop-down, select Clear All Graphics (default), Clear Only Selected Graphics, or Do Not Clear Graphics.



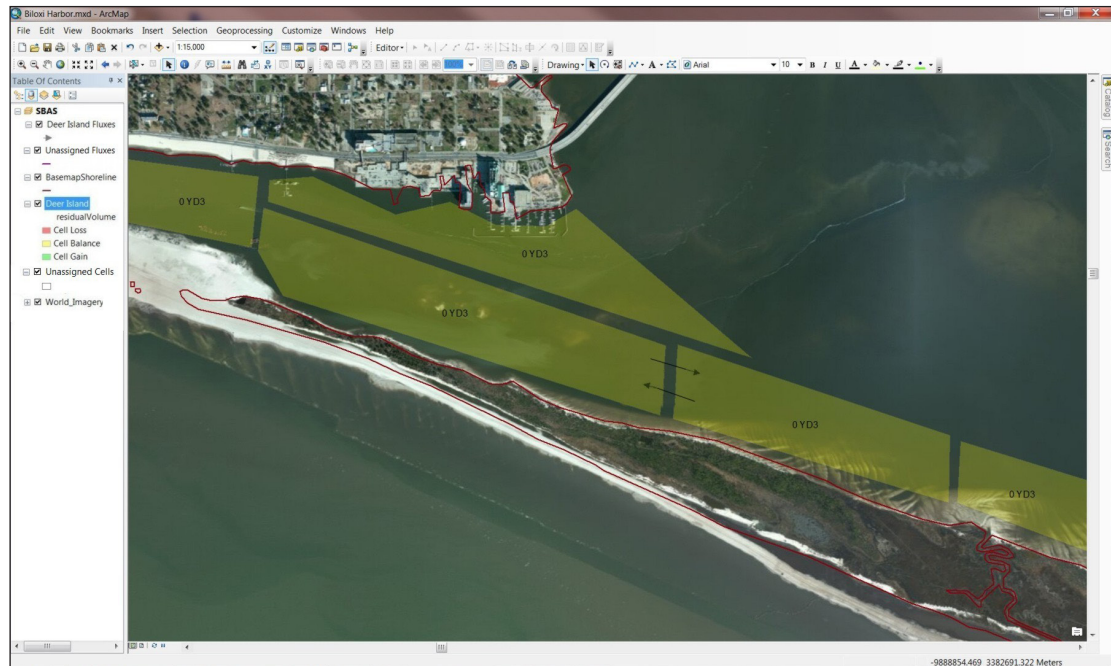
Note: When you convert graphics to new features, it is not necessary to retain the original graphics. Therefore, it is recommended that you select either Clear All Graphics or Clear Only Selected Graphics. The difference between the two options is that Clear All Graphics deletes *all graphics* not in layers/shapefiles (for example, arrows, labels, and other text), *not only* the graphics you just created and selected. Selecting Do Not Clear Graphics leaves both the graphics and the new features.

8. Click OK.

A 02a - Convert Graphics to New Features dialog displays as the tool executes.

9. When the “Completed” message displays, click Close.

The selected graphic(s) are converted to features, Unassigned Cells and Unassigned Fluxes layers are added to the Table of Contents (if they are not already listed), and the data frame redisplay.



Editing Flux Lines


Resize, Reshape, and Move a Flux Line

Use the following procedure to resize, reshape, or move a flux line in a flux layer.

Note: When a flux line is resized or reshaped, its values are not automatically updated. You must update these values manually. Refer to “Enter Flux Line Values” on page 43.

1. From the ArcMap Editor toolbar, select Editor>Start Editing to start an editing session.

A Start Editing dialog displays.


2. In the ArcMap Editor toolbar, click  (Edit Tool).
3. Select the flux line you want to edit.
4. Use the tools in the ArcMap Editor toolbar to resize, reshape, and/or move the flux line as necessary.

Refer to the ArcMap 10 documentation for details.

5. From the ArcMap Editor toolbar, select Editor>Stop Editing.
6. When prompted to save your changes, click Yes.

Reversing the Direction of a Flux Line

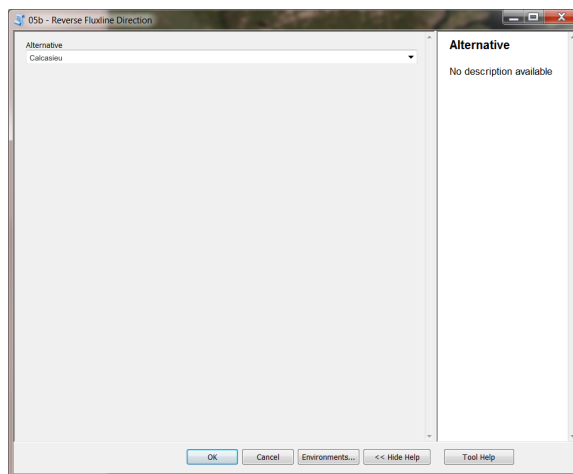
Use the following procedure to reverse the direction of one or more flux lines and recalculate the residual volumes of any intersecting littoral cells.

1. Using one of the ArcMap Select Features tools () , select the flux line(s) whose direction you want to reverse.
2. In the SBAS Toolbox, double-click 05b - Reverse Fluxline Direction.

A 05b - Reverse Fluxline Direction dialog displays.

3. From the Alternative drop-down, select the appropriate alternative.
4. Click OK.

A 05b - Reverse Fluxline Direction dialog displays as the tool executes.



5. When the “Completed” message displays, click Close.

The direction of the selected flux lines is reversed.

Delete a Flux Line

Use the following procedure to remove one or more flux lines from a flux layer.

1. From the ArcMap Editor toolbar, select Editor>Start Editing to start an editing session.
2. Select the flux line(s) you want to delete.

Note: To select multiple flux lines, click the first one and then, while holding down the Shift key, click each additional flux line.

3. Right-click one of the flux lines.
4. From the pop-up menu, select Delete.
5. From the ArcMap Editor toolbar, select Editor>Stop Editing.
6. When prompted to save your edits, click Yes.

Set the Fluxes Layer’s Color and Width Options

Flux line color and width can be changed by editing the flux layer’s properties.

1. In the ArcMap Table of Contents, right-click the layer name and, from the pop-up menu, select Properties.

A Layer Properties dialog displays.

2. Click the Symbology tab.
3. In the Symbol pane, click the graphic.

A Symbol Selector dialog displays.

4. In the Current Symbol pane, select a new color and/or width.
5. Click OK.

The Symbol Selector dialog closes.


6. Click OK.

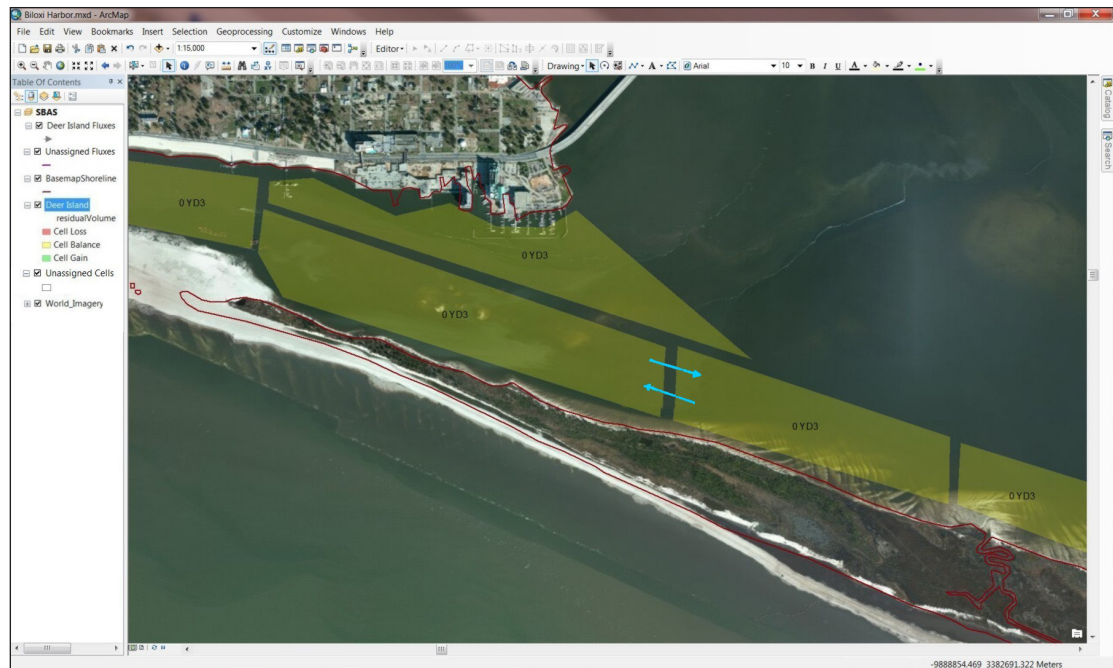
The Layer Properties dialog closes and map redisplay with your new color and/or width choices the data frame and the Table of Contents.



Add Unassigned Flux Lines to an Alternative

Use the following procedure to add unassigned flux lines to an alternative.

1. With the appropriate alternative already loaded, using one of the ArcMap Select Features tools () , select the flux lines you want to add to the alternative.



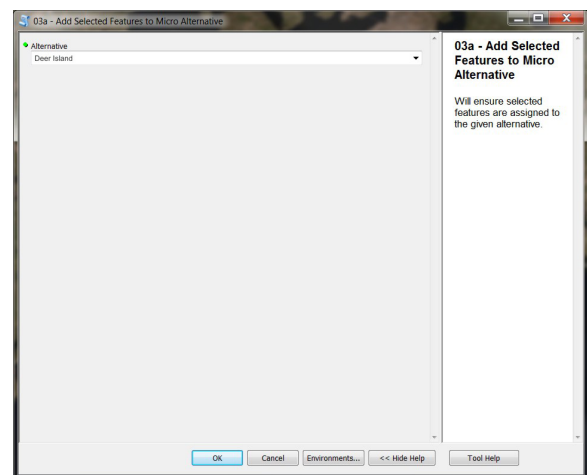
2. In the SBAS Toolbox, double-click 03a - Add Selected Features to Micro Alternative.

A 03a - Add Selected Features to Micro Alternative dialog displays.

3. From the Alternative drop-down, select the appropriate alternative.
4. Click OK.

A 03a - Add Selected Features to Micro Alternative dialog displays as the tool executes.


5. When the “Completed” message displays, click Close.



The selected graphic(s) are converted to features and added to the alternative’s fluxes layer, residual values are recalculated, and the data frame redisplay.

Entering Littoral Cell and Flux Line Values

Enter Littoral Cell Values

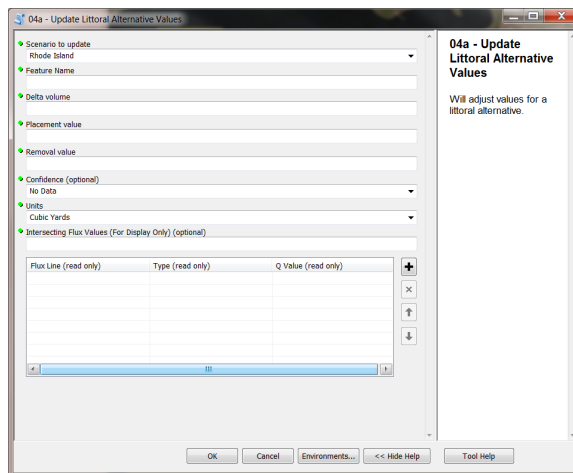
1. In the ArcMap Tools toolbar, use one of the Select Features tools () to select the littoral cell you want to edit.
2. In the SBAS Toolbox, double-click 04a - Update Littoral Alternative Values.





A 04a - Update Littoral Alternative Values dialog displays.

3. Enter the appropriate details.

- **Scenario to Update**—The name of the alternative; the current alternative is selected by default
- **Feature Name**—The name of the cell as assigned by the user or SBAS
- **Delta Volume**—Volume change of sediment within the cell (in the units specified in the Units drop-down)
- **Placement Value**—Amount of sediment placed in the cell (in the units specified in the Units drop-down)
- **Removal Value**—Amount of sediment removed from the cell (in the units specified in the Units drop-down), typically through dredging
- **Confidence**—Your certainty level that the values assigned to the littoral cell in this dialog are accurate—No Data (default), High, Medium, or Low
- **Units**—Units in which the delta, placement, and removal volumes are recorded—Cubic Yards (default) or Cubic Meters
- **(Optional) Intersecting Flux Values (For Display Only)**—Visual identification of specific flux lines that affect the sediment budget calculation

Note: These values are for display only; changes to these values are not saved. For details on changing flux line values, refer to “Enter Flux Line Values” on page 43.



- **(Read Only) Flux Line, Type, and Q Value**—Name, type (source or sink), and flux rate of all fluxes intersecting the littoral cell
 - Select a flux line and click the  button to add it to the Intersecting Flux Values list
 - Select a flux line and click the  button to remove it from the Intersecting Flux Values list
 - Select a flux value and click  or  to change its order in this list

4. Click OK.

A 04a - Update Littoral Alternative Values dialog displays as the tool executes.

5. When the “Completed” message displays, click Close.

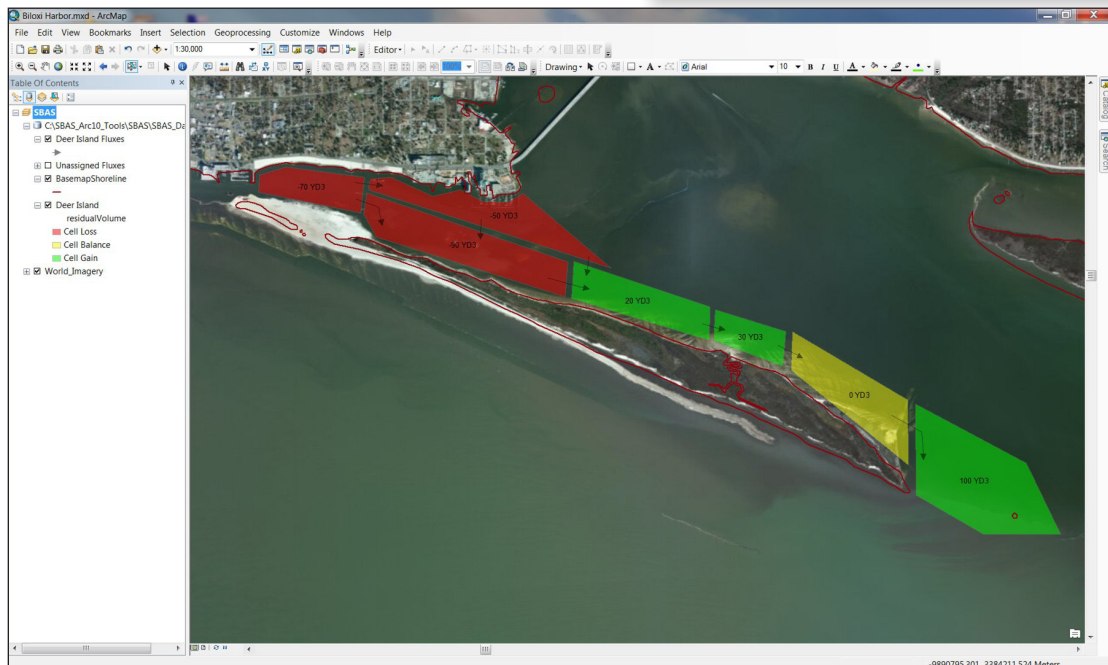
The dialog closes, the residual value is automatically recalculated, displayed, and posted in the Residual field of the layer’s attribute table; and the littoral cell’s color changes according to the layer symbology in the ArcMap Table of Contents.

Attribute—Nonspatial information about a geographic feature in a geographic information system (GIS). Littoral cell, flux, micro sediment budget, and macro sediment budget attributes are listed in Appendix B.


Attribute Table—An ArcMap table used to store attribute information for a specific feature class (for example, littoral cell or flux layer). Each row represents a feature, and each column denotes a field.

6. Click anywhere in the data frame to unselect the littoral cell.

7. Repeat steps 1-6 for all other littoral cells.



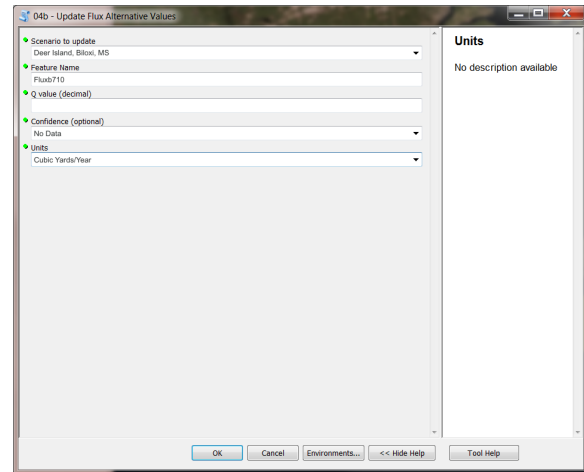
Enter Flux Line Values

1. In the ArcMap Tools toolbar, use one of the ArcMap Select Features tools () to select the flux line you want to edit.
2. In the SBAS Toolbox, double-click 04b - Update Flux Alternative Values.

A 04b - Update Flux Alternative Values dialog displays.

3. Enter the appropriate details.

- **Scenario to Update**—The name of the alternative; the current alternative is selected by default
- **Feature Name**—The name of the flux as assigned by the user or SBAS
- **Q Value**—The volume of sediment moved into or out of a littoral cell
- **Confidence**—Your certainty level that the values assigned to the flux line in this dialog are accurate—No Data (default), High, Medium, or Low
- **Units**—Units in which the delta, placement, and removal volumes of the littoral cell are recorded—Cubic Yards, Cubic Yards/Year, Cubic Meters, or Cubic Meters/Year



4. Click OK.

A 04b - Update Flux Alternative Values dialog displays as the tool executes.

5. When the “Completed” message displays, click Close.

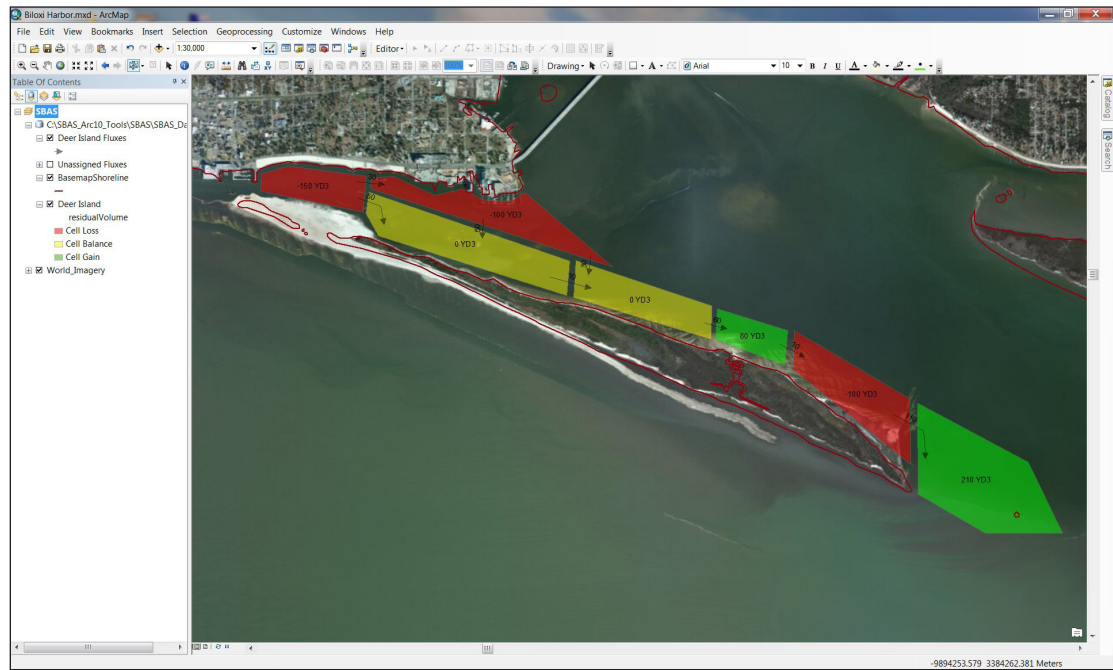
The dialog closes, the residual value is automatically calculated, displayed, and posted in the Residual field of the layer’s attribute table; and the littoral cell’s color changes according to the layer symbology in the ArcMap Table of Contents.

6. Click anywhere in the data frame to unselect the flux line.

Attribute—Nonspatial information about a geographic feature in a geographic information system (GIS). Littoral cell, flux, micro sediment budget, and macro sediment budget attributes are listed in Appendix B.

Attribute Table—An ArcMap table used to store attribute information for a specific feature class (for example, littoral cell or flux layer). Each row represents a feature, and each column denotes a field.

7. Repeat steps 1-6 for all other flux lines.



Importing GenCade Data


If you have GenCade data, use the 02b - Convert GenCade Data to SBAS Features tool to convert the data to SBAS features, import the delta volume from GenCade, and then calculate the residual volume.

Note: For details on generating the appropriate type of GenCade data required for import into SBAS, refer to the GenCade documentation.


Note: Before performing this procedure, an alternative must already have been created and loaded. (See "Creating an SBAS Alternative" on page 15 and "Loading an SBAS Alternative" on page 17.)

1. In the SBAS Toolbox, double-click 02b - Convert GenCade Data to SBAS Features.


A 02b - Convert GenCade Data to SBAS Features dialog displays.

2. From the Add Features to Alternative drop-down, select the appropriate alternative.
3. Click the  to the right of the GenCade Shapefile field, and then browse to and select the appropriate .SHP file.

The shapefile (*.SHP) spatially describes the GenCade polygons and lines.

4. Click the  to the right of the GenCade GEN File field, and then browse to and select the appropriate .GEN file.

The control file (*.GEN) lists all information related to the GenCade simulation. It records the details for structures, inlets, dredging events, beach fills, boundary conditions, wave gauges, and the model setup. It also defines the paths for each of the input and one of the output files, the *.PRT file.

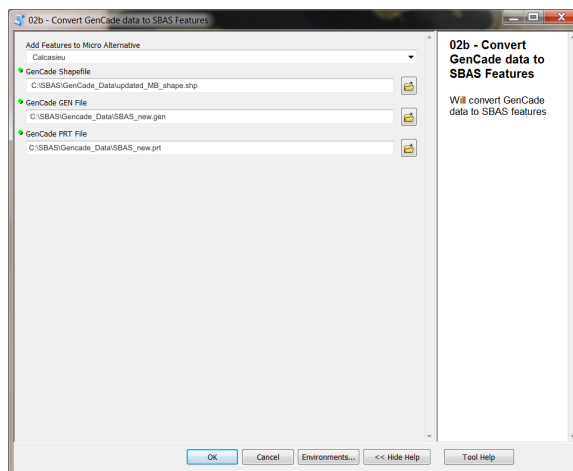
5. Click the  to the right of the GenCade PRT File field, and then browse to and select the appropriate .PRT file.

The print file (*.PRT) includes all of the information related to the simulation, including wave heights, shorelines, and transport rates.

6. Click OK.

A 02b - Convert GenCade Data to SBAS Features dialog displays as the tool executes.

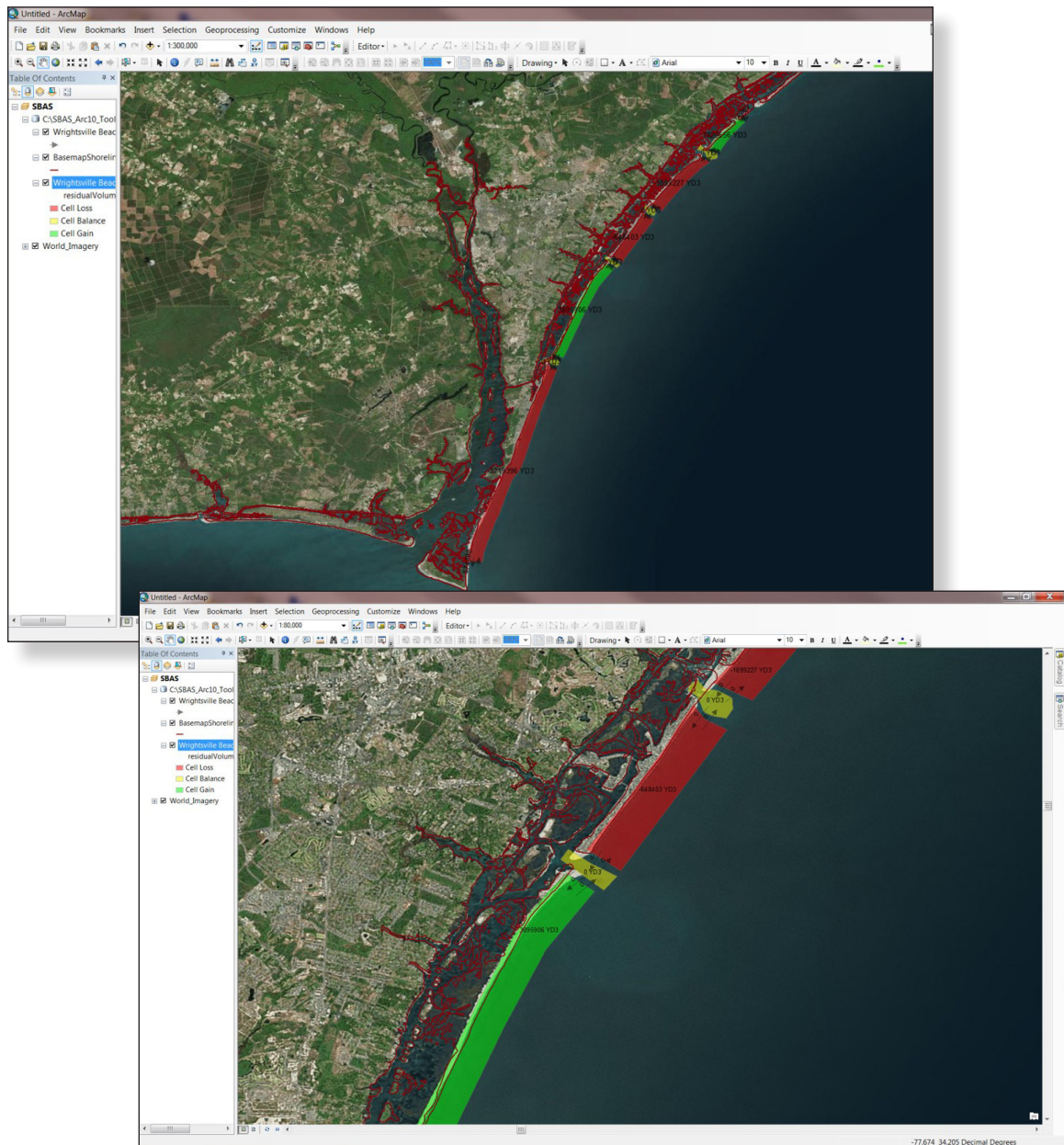
GenCade—A regional model for calculating coast sediment transport, morphology change, and sand bypassing at inlets and engineered structures. It was jointly developed by the USACE Coastal Inlets Research Program (CIRP) and the USACE Regional Sediment Management Program (RSM). It is a next-generation combination of the GENESIS (GENeralized model for Simulating Shoreline change) and Cascade beach models.



7. When the “Completed” message displays, click Close.

The GenCade data is imported into the specified alternative, littoral cell and flux layers are added to the Table of Contents, residual volumes are calculated, and the data frame redisplay.

At this point, you can work with these cells and fluxes exactly as if you had created them directly in ArcMap. Refer to “Entering Littoral Cell and Flux Line Values” on page 41 for details on adding littoral cell placement and removal values as well as littoral cell and flux line confidence levels.



Changing Layer Symbology

The 05a - Change Symbology tool allows you to reclassify an alternative by delta volume, removal volume, placement volume, residual volume (default), or confidence level. Your selection determines the type of values that display as text on the littoral cells in the data frame.

Symbology—The characteristics that define how geographic features are represented by symbols on a map.

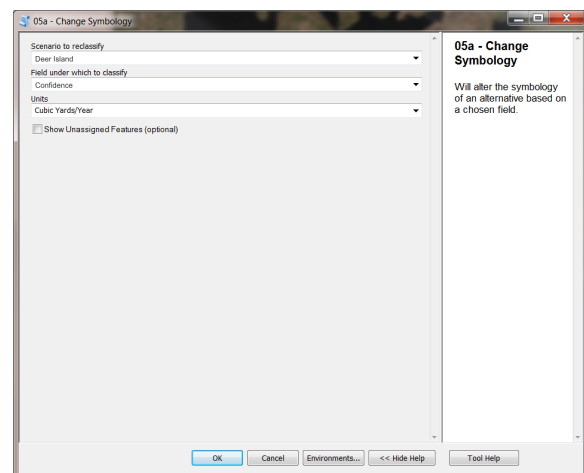
Note: For all selections *except* Confidence, the Table of Contents also updates. If you select Confidence, only the cell labels change; the Table of Contents continues to identify cells by your previous selection (delta, removal, placement, or residual volume).

1. In the SBAS Toolbox, double-click 05a - Change Symbology.

A 05a - Change Symbology dialog displays.

2. Make the appropriate selections.

- **Scenario to Reclassify**—The name of the alternative; the current alternative is selected by default
- **Field Under Which to Classify**—Delta Volume, Removal Volume, Residual Volume, Placement Volume, Confidence
- **Units**—Units in which the delta, placement, and removal volumes of the littoral cell are recorded—Cubic Yards, Cubic Yards/Year, Cubic Meters, or Cubic Meters/Year
- **(Optional) Show Unassigned Features**—Display all features on the map that are not assigned to an alternative

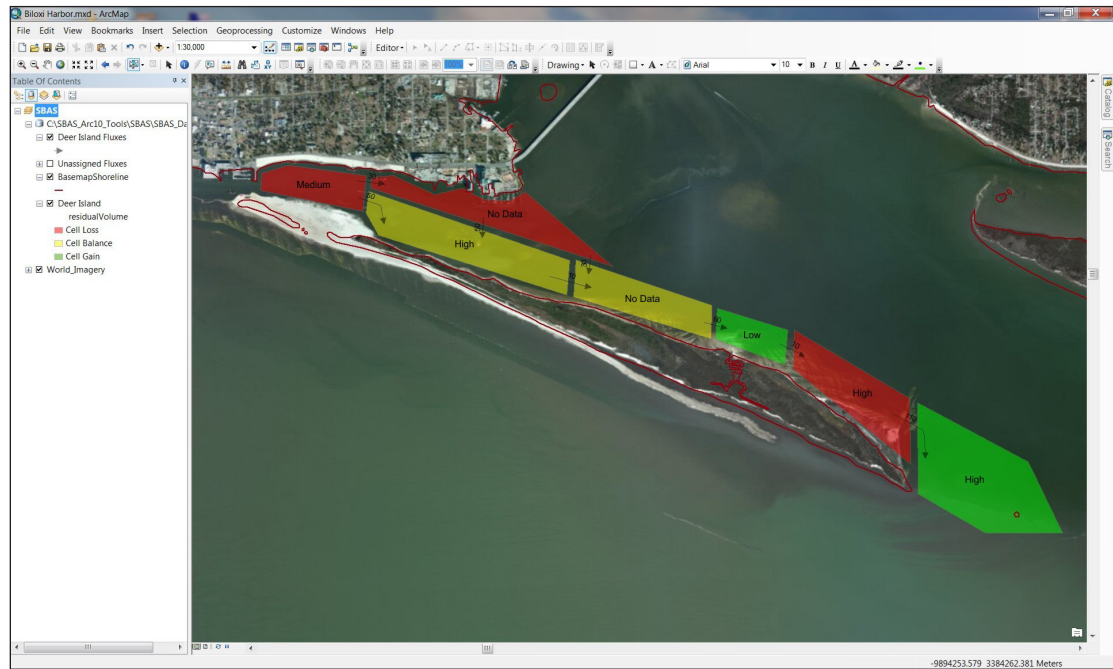


3. Click OK.

The values are saved.

4. When the “Completed” message displays, click Close.

The dialog closes, and the map is updated in the data frame. In this case, the alternative was reclassified by confidence level.



Working with Macro Sediment Budgets


After a micro sediment budget has been developed using littoral cells and fluxes, a macro sediment budget can be created to represent it on a larger (regional) scale. The macro budget validates assumed quantities at the boundaries of a specified group of sediment budget cells.



Macro Sediment Budget—A sediment budget for a region; it may consist of multiple micro sediment budgets.

Create a Macro Sediment Budget

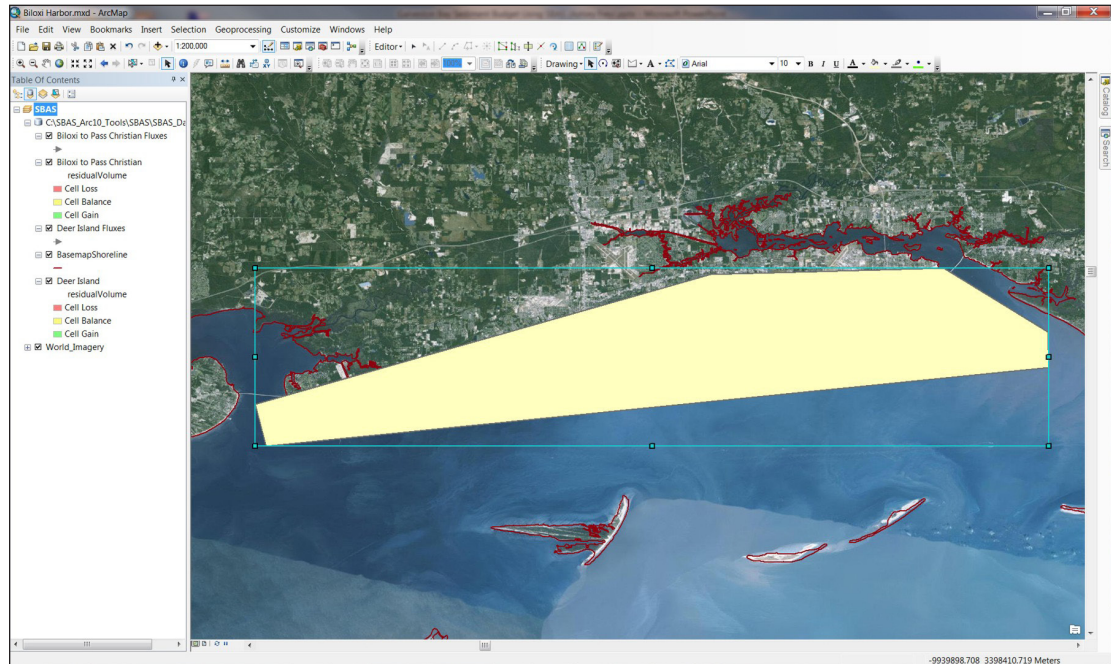
To construct a macro budget, define the budget for all cells that are bounded by assumed quantities. The resulting macro budget should balance (that is, Residual=0). If it does not (Residual = non-zero), one or more of the assumed values must be revised.



Note: Once the macro budget has been created, the individual littoral cells and fluxes can no longer be edited unless you first delete the macro budget cell (using the same procedure as for deleting a littoral cell). After making any necessary changes to the individual littoral cells and/or fluxes, you must then create a new macro budget cell.

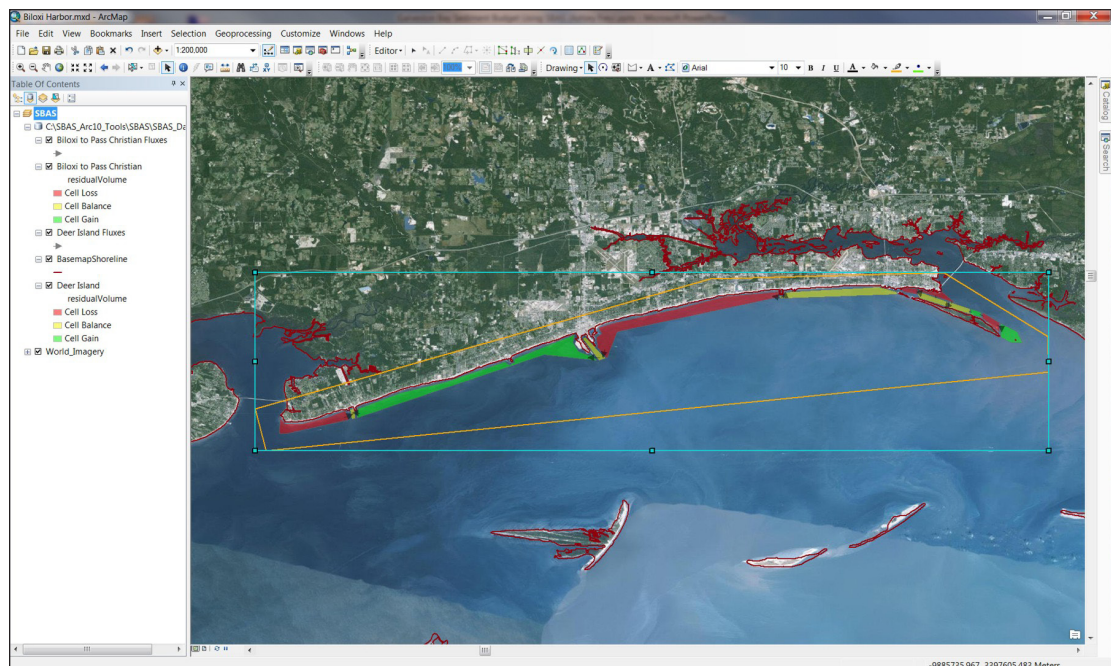
1. In the ArcMap Draw toolbar, click  (Polygon) tool.

Note: If the Draw toolbar isn't displayed, from the Customize menu select Toolbars>Draw. If the  (Polygon) tool isn't displayed, click the ▼ button to the right of the selected shape tool and then, from the pop-up menu, click  Polygon.

2. In the data frame, draw a polygon around the sediment budget area to be included in the macro budget.





Note: To make it easier to view the littoral cells and flow arrows inside the polygon, you can change the polygon fill and border color using the  (Fill) and  (Line) tools. In the following illustration, the polygon fill is set to No Color and the line to orange.

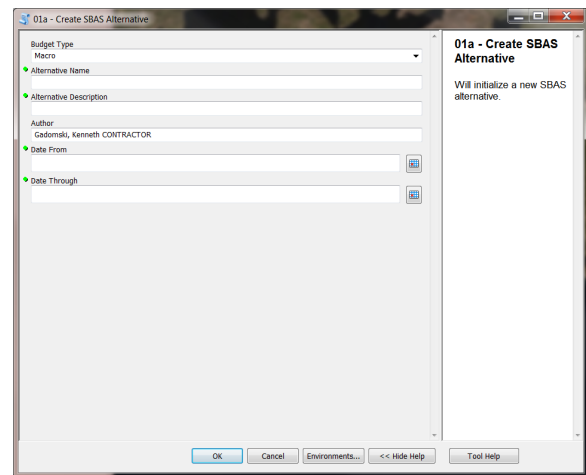


3. In the SBAS Toolbox, double-click 01a - Create SBAS Alternative.

A 01a - Create SBAS Alternative dialog displays.

4. From the Budget Type drop-down, select Macro.
5. In the Alternative Name text box, enter a name for the alternative.
6. If appropriate, in the Alternative Description text box, enter details about the alternative.
7. In the Author text box, either leave your name (default) or enter another name.
8. Click the  to the right of the Date From text box; select the beginning date and time, date only, or time only; and click OK.
9. Click the  to the right of the Date Through text box; select the beginning date and time, date only, or time only; and click OK.
10. Click OK.

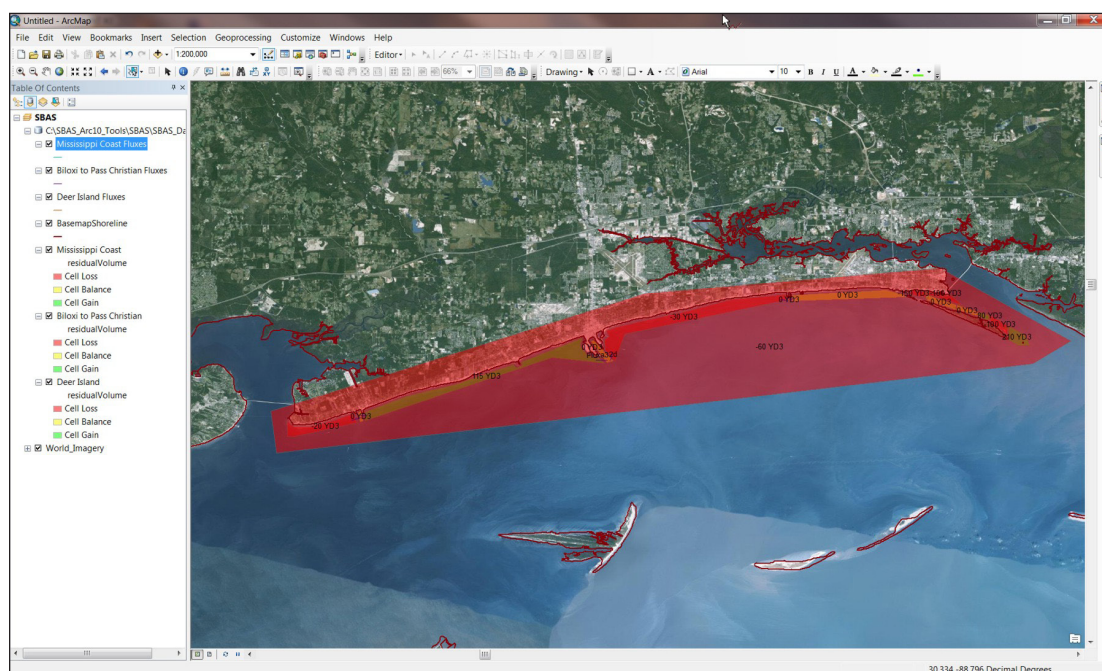
A 01a - Create SBAS Alternative dialog displays as the alternative is processed.



11. When the Completed message displays, click Close.

The data frame redisplay with the macro budget residual volume identified. All graphics were converted into a macro budget layer, the new layer was added to the ArcMap Table of Contents, symbology was applied to the layer, and the layer was stored in the SBAS working directory.


Working Directory—The default location where all files created during an SBAS session are stored.



Delete a Macro Sediment Budget

If the macro budget does not balance (that is, $\text{Residual} \neq 0$), as in the illustration above, one or more of the assumed values of the individual littoral cells and/or fluxes must be revised.

Use the following procedure to revise the values of the individual littoral cells and/or fluxes after you have created a macro budget.

1. Using one of the ArcMap Select Features tools () , select the macro cell.
2. Press Del.
3. The macro budget is deleted.

Uploading an Alternative to the Enterprise Geodatabase

You can share an alternative with others by uploading it to the enterprise geodatabase. The following procedure demonstrates how to upload all of the alternative's features and data.

1. With the appropriate alternative loaded in the ArcMap data frame, in the SBAS Toolbox double-click 06 - Upload Alternative to Enterprise.

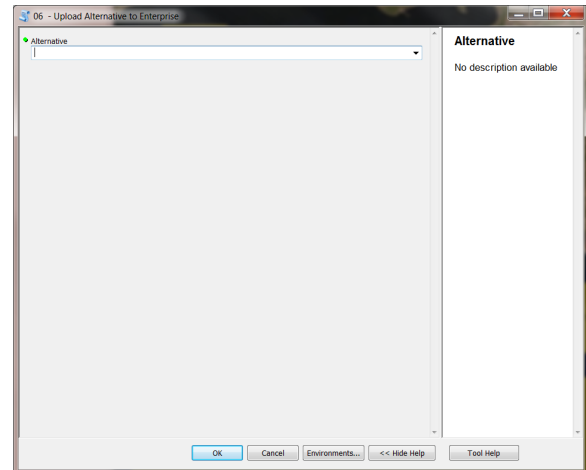
A 06 - Upload Alternative to Enterprise dialog displays.

2. From the Alternative drop-down, select the alternative you want to upload.
3. Click OK.

A 06 - Upload Alternative to Enterprise dialog displays as the tool executes.

4. When the "Completed" message displays in the dialog, click Close.

The data frame redisplays.



Appendix A—Glossary

- **Alternative**—A representation of one set of assumed conditions for a sediment budget. Each alternative has its own set of littoral cells (with delta, placement [input], and removal [output] volumes) and fluxes. Alternatives may be created to reflect different assumptions about sediment-transport paths/rates and engineering activities, or they may reflect different time periods. At least one alternative must be created in an SBAS session. Alternatives save all values applied to littoral cells and fluxes.
- **Attribute**—Nonspatial information about a geographic feature in a geographic information system (GIS). Littoral cell, flux, micro sediment budget, and macro sediment budget attributes are listed in Appendix B.
- **Attribute Table**—A table used in ArcMap to store attribute information for a specific feature class (for example, littoral cell or flux). Each row represents a feature, and each column denotes a field. To view a layer's attribute table, in the ArcMap Table of Contents right-click the layer and, from the pop-up menu, select Open Attribute Table.
- **Confidence**—The certainty level that the values assigned to littoral cells and fluxes are accurate.
- **Data Frame**—A map element that defines a geographic extent (bounding rectangle), a page extent, a coordinate system, and other display properties for one or more layers in ArcMap—in other words, the ArcMap work area where you create the sediment budget.
- **Feature**—A point, line, or polygon that represents an object on a map.
- **Flux**—A line representing the flow of sediment into and out of a littoral cell. Each cell requires both eastward and westward transport rates.
- **Flux Rate**—The volume of sediment moved into or out of a cell.
- **GenCade**—A regional model for calculating coast sediment transport, morphology change, and sand bypassing at inlets and engineered structures. It was jointly developed by the USACE Coastal Inlets Research Program (CIRP) and the USACE Regional Sediment Management Program (RSM). It is a next-generation combination of the GENESIS (GENERALized model for SImulating Shoreline change) and Cascade beach models.
- **Layer**—A collection of similar geographic features (such as rivers, lakes, littoral cells, and fluxes) in a particular area or place referenced together for display on a map. A layer references the geographic data stored in a data source, such as a shapefile, and defines how to display it.
- **Littoral Cell**—A collection of information describing similar physical, biological, and cultural characteristics within a particular area along a river, lake, sea, or ocean. Littoral cell data can be in the form of a map, database, or text. The boundaries of the littoral cells can be defined either by morphological features (such as ebb and flood shoals, an inlet throat, and adjacent beaches) or by political features (such as nautical charts and municipal boundaries).
- **Macro Sediment Budget**—A sediment budget for a region; it may consist of multiple micro budgets.
- **Micro Sediment Budget**—A sediment budget for a specific local area.

- **Sediment Budget**—A measure of sediment (usually sand) “sources” (inputs), “sinks” (outputs), and net change within a specified “control volume” (a cell or series of connecting cells) over a given period of time. It is a fundamental design tool for projects concerned with sediment transport, deposition, and erosion.
- **Shapefile**—A vector data storage format for storing the shape, location, and attributes of geographic features. A shapefile is stored in a set of related files and contains one feature class.
- **Sink**—The destination of sediment that is moved from its original location.
- **Source**—The point of origin of sediment that is moved to a different location.
- **Symbology**—The characteristics that define how geographic features are represented by symbols on a map.
- **Table of Contents**—In ArcMap, a list of all the data frames and layers on the map, showing what features the symbols in each layer represent.
- **Toolbox**—A collection of geoprocessing tools in ArcMap.
- **Unassigned Flux**—A flux line that displays on the map but does not belong to any alternative.
- **Unassigned Littoral Cell**—A littoral cell that displays on the map but does not belong to any alternative.
- **Working Directory**— The default location where all files created during an SBAS session are stored.

Appendix B—SBAS Attributes

For each littoral cell, flux line, micro sediment budget, and macro sediment budget, SBAS produces a shapefile with the following field attributes.

Attribute	Applicable to				Type	Length	Null Allowed	Description
	Cell	Flux	Micro Budget	Macro Budget				
deltaVolume	✓		✓	✓	Double	—	✓	Net change in volume within the littoral cell or sediment budget
littoralCellIDPK	✓		✓		Text	50	✓	Unique identifier of the littoral cell
macroCellIDPK				✓	Text	50	✓	Unique identifier of the macro sediment budget
mediaIDFK	✓	✓	✓	✓	Text	50	✓	Not used; reserved for future functionality
OBJECTID	✓	✓	✓	✓	Object ID	—		ID assigned to the feature
placementVolume	✓		✓	✓	Double	—	✓	Volume of sediment placed into the littoral cell
projectID	✓	✓	✓	✓	Text	50	✓	Not used; reserved for future functionality
qValue		✓			Double	—	✓	Flux rate
removalVolume	✓		✓	✓	Double	—	✓	Volume of sediment removed from the littoral cell
repTransportType		✓			Text	100	✓	Not used; reserved for future functionality
rePurpose		✓			Text	100	✓	Not used; reserved for future functionality
residualVolume	✓		✓	✓	Double	—	✓	Representation of the degree to which the cell is balanced
scenarioIDFK	✓		✓	✓	Text	255	✓	Unique identifier of the alternative
sdsFeatureDescription	✓	✓	✓	✓	Text	50	✓	Description of the feature
sdsFeatureName	✓	✓	✓	✓	Text	80	✓	Name of the feature

Attribute	Applicable to				Type	Length	Null Allowed	Description
	Cell	Flux	Micro Budget	Macro Budget				
sdsID	✓	✓	✓	✓	GUID	32	✓	Not used; reserved for future functionality
sdsMetadataID	✓	✓	✓	✓	Text	255	✓	Not used; reserved for future functionality
sedimentTransport-DirectionIPDK		✓			Text	50	✓	Unique identifier of the flux direction
SHAPE	✓	✓	✓	✓	Geometry	—	✓	Shape of the feature
SHAPE_Area	✓		✓	✓	Double	—	✓	Area of the feature
SHAPE_Length	✓	✓	✓	✓	Double	—	✓	Length of the feature
valConfidence	✓		✓	✓	Text	255	✓	Certainty level (High, Medium, Low, No Data) assigned to the data

Appendix C—Environment Settings

The parameters you set in each SBAS tool's dialog apply only to that specific tool. However, within each dialog, you also have the option of clicking the Environments button and configuring environment settings, values that are applied to all SBAS tools.

The following environment settings may be configured.

Environment/Options	Default	Description
Workspace		
Current Workspace	C:\Users\userid\Documents\ArcGIS\Default.gdb	The default location for tool input and output.
Scratch Workspace	C:\Users\userid\Documents\ArcGIS\Default.gdb	The default location for tool output that is not maintained.
Output Coordinates		
Output Coordinate System	Same as Input	The coordinate system with which the output geodatasets are created.
Geographic Transformations	[None]	Transformation methods to be used when projecting data.
Processing Extent		
Extent	Default	Area within which features or rasters will be processed.
Snap Raster	[None]	Raster to whose cell alignment the extent of the output rasters is adjusted. s Adjustment to the extent of the output rasters, so they match the cell alignment of the specified snap raster.
XY Resolution and Tolerance		
XY Resolution	[None]	The number of significant digits used to store X,Y coordinate values in output geodatasets.
XY Tolerance	[None]	The minimum distance between coordinates before they are considered equal.
M Values		
Output has M Values	Same as Input	Identification of whether the output geodataset will store M values.
M Resolution	[None]	The number of significant digits used to store M values in output geodatasets.
M Tolerance	[None]	The minimum M distance between equivalent X,Y coordinates before they are considered equal (clustered).
Z Values		
Default Output Z Value	[None]	The Z coordinate set on feature vertices written to the output feature that do not already have a Z coordinate.
Output has Z Values	Same as Input	Identification of whether the output geodataset will store Z values.

Environment/Options		Default	Description
	Z Resolution	[None]	The number of significant digits used to store Z coordinate values in output geodatasets.
	Z Tolerance	[None]	The minimum Z distance between equivalent X,Y coordinates before they are considered equal (clustered).
Geodatabase			
	Output CONFIG Keyword	[None]	The keyword that tells the geodatabase where or in what format to store new data.
	Auto Commit	1000	Number of changes made within an ArcSDE transaction before they are automatically committed.
Geodatabase Advanced			
	Output Spatial Grid 1	0	Spatial grid index used to create feature classes (if those feature classes support spatial index grids).
	Output Spatial Grid 2	0	
	Output Spatial Grid 3	0	
	Output XY Domain	Same as Input	X,Y domain used to generate output geodatasets.
	Output M Domain	Same as Input	M (measure) domain used to generate output datasets.
	Output Z Domain	Same as Input	Z domain used to generate output datasets.
	Maintain Spatial Index	Unselected	Indication whether the spatial index of an ArcSDE feature class should be deleted and recreated or retained and updated.
Fields			
	Maintain Fully Qualified Field Names	Selected	Indication whether fully qualified field names should be maintained to distinguish between qualified and unqualified field names.
	Transfer Field Domain Descriptions	Unselected	Indication whether output shapefiles and dBASE (.ddf) tables should have fields added containing domain and subtype descriptions in addition to fields containing domain and subtype codes.
Random Numbers			
	Random Number Generator	N/A	Tool used to produces sequences of random numbers.
	Seed	0	The random number generator's initial value.
	Random Generator Type	ACM599	The algorithm used by the random number generator.
Cartography			
	Cartographic Partitions	[none]	Partition polygon features used to subdivide input features for sequential processing to avoid memory limitations that might otherwise be encountered with large datasets.
	Cartographic Coordinate System	Same as Input	Cartographic Coordinate System used to determine the size, extent, and spatial relationships of features when making calculations.

Environment/Options		Default	Description
	Reference Scale	[none]	The denominator of the scale fraction corresponding to the intended the display scale of input data.
Coverage			
	Precision for Derived Coverages	HIGHEST	Amount of precision used when creating derived output coverages.
	Precision for New Coverages	SINGLE	Amount of precision used when creating new coverages.
	Level of Comparison Between Projection Files	NONE	Degree to which input projections must match before the geoprocessing tools execute.
Raster Analysis			
	Cell Size	Maximum of Inputs	Raster cell size (resolution) for the operation; the default output resolution is determined by the coarsest of the input raster datasets
	Mask	[None]	A raster or feature dataset that identifies the cells that should be processed; all location outside of this area are assigned to NoData in the output
Raster Storage			
Pyramid			
	Build Pyramids	Selected	Indication of whether pyramids (reduced-resolution representations of the dataset used to improve performance) should be built for the raster
	Pyramid Levels	[None]	Number of pyramid levels
	Skip First	Unselected	Indication whether the first pyramid level for the raster should be skipped
	Pyramid Resampling Technique	NEAREST	Resampling technique used to build the pyramids
	Pyramid Compression Type	DEFAULT	Compression type to be used when building pyramids
	Compression Quality	75	Compression quality to be used when building pyramids with the JPEG compression method
Raster Statistics			
	Calculate Statistics	Selected	Specification of whether statistics should be calculated
	Statistics Skip Factor—X Skip Factor	1	The number of horizontal pixels between samples
	Statistics Skip Factor—Y Skip Factor	1	The number of vertical pixels between samples
	Statistics Ignore Value	[None]	Value(s) to be ignored in the statistics calculation; separate multiple values by a colon
Compression			
	Compression	LZ77	The compression type used for storing output raster datasets

Environment/Options		Default	Description
	Compression Quality	75	The amount of compression; the lower the compression quality, the higher the compression ratio
	Tile Size		
	Tile Size for Blocks—Width	128	The width of the tile size for rasters that are stored in blocks of data
	Tile Size for Blocks—Height	128	The height of the tile size for rasters that are stored in blocks of data
	Resampling Method	NEAREST	Resampling method used to interpolate pixel values while transforming the raster dataset.
	NoData	NONE	Mapping method used to designate as the NoData value in the output; indication of whether the NoData value from the input needs to be transferred to the output raster
Geostatistical Analysis			
	Coincident Points	MEAN	Indication how coincident data is treated
Parallel Processing			
	Parallel Processing Factor		Specification of whether tools can divide and perform operations across multiple processes
Terrain Dataset			
	Minimize Memory Use During Analysis on Terrains	Unselected	Specification of whether memory usage is minimized (that is, the terrain block size forced to be equal to the terrain tile size) during terrain analysis
TIN			
	Default TIN Storage Version	CURRENT	The ArcGIS version in which TIN surfaces are output

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