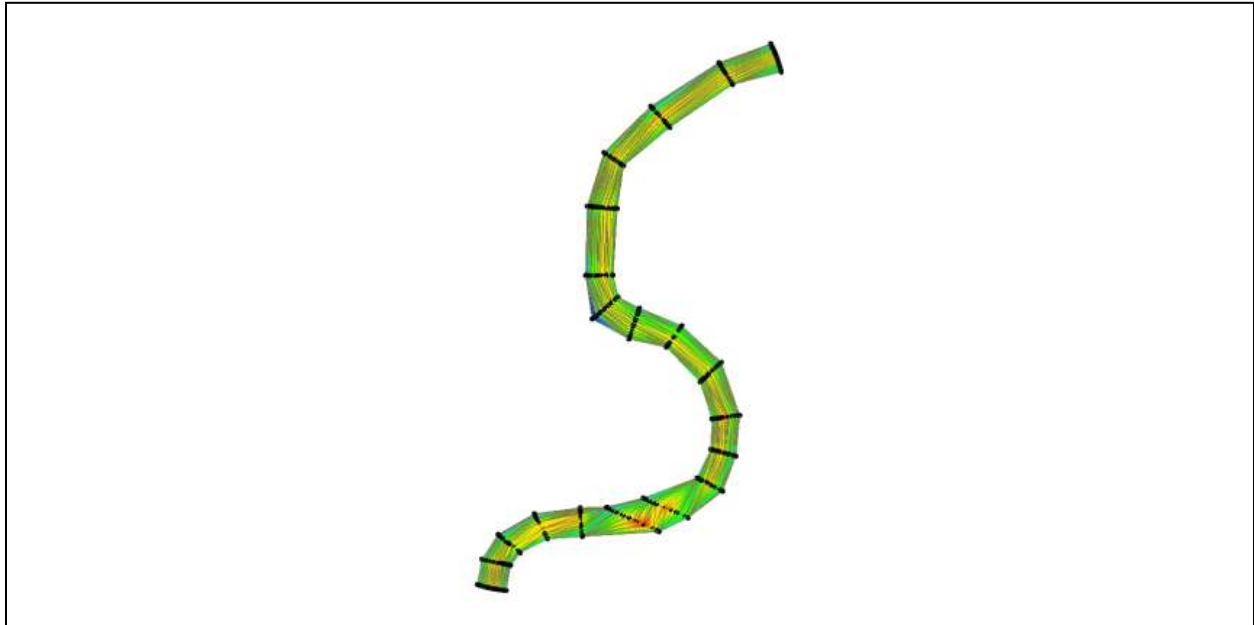*SMS 13.1 Tutorial*
Scatter Data – Define Scatter Extents

Objectives

This tutorial demonstrates how to define the area of impact or extent of a scattered data set or TIN (triangulated irregular networks) in the scatter module of SMS.

Prerequisites
- Scatter Data Import

Requirements
- Scatter Module
- Map Module

Time
- 10–15 minutes

1   Introduction

After scatter data has been imported and triangualted into SMS, the triangulation process may cause the extents, or boundaries, of the scatter data to be inaccurately defined. This tutorial will demonstrate how to define the extents of a scatter set after triangulation.

2   Load starting project

A set of scatter data consisting of cross sections across a river provides the basis for this tutorial. Open the SMS project which includes the data by doing the following:

1.   Launch the SMS application

2.   Select *File* | **Open…** to bring up the *Open* dialog.

3.   Browse to the *data files* folder for this tutorial.

4.   Select "DefineScatterExtents.sms" and click **Open**.

This opens the project which should appear similar to Figure 1. The project includes the scatter set named " xs". This scatter set originally consisted of river cross sections. The points in the cross section were previously triangulated to define a TIN.

Notice that the colored contours not only cover the meandering channel defined by the cross section points, but also the interior of the meander bends. SMS contours wherever triangles exist in the scatter set. The triangulation process creates triangles from all the points in the set using a boundary called a convex hull.
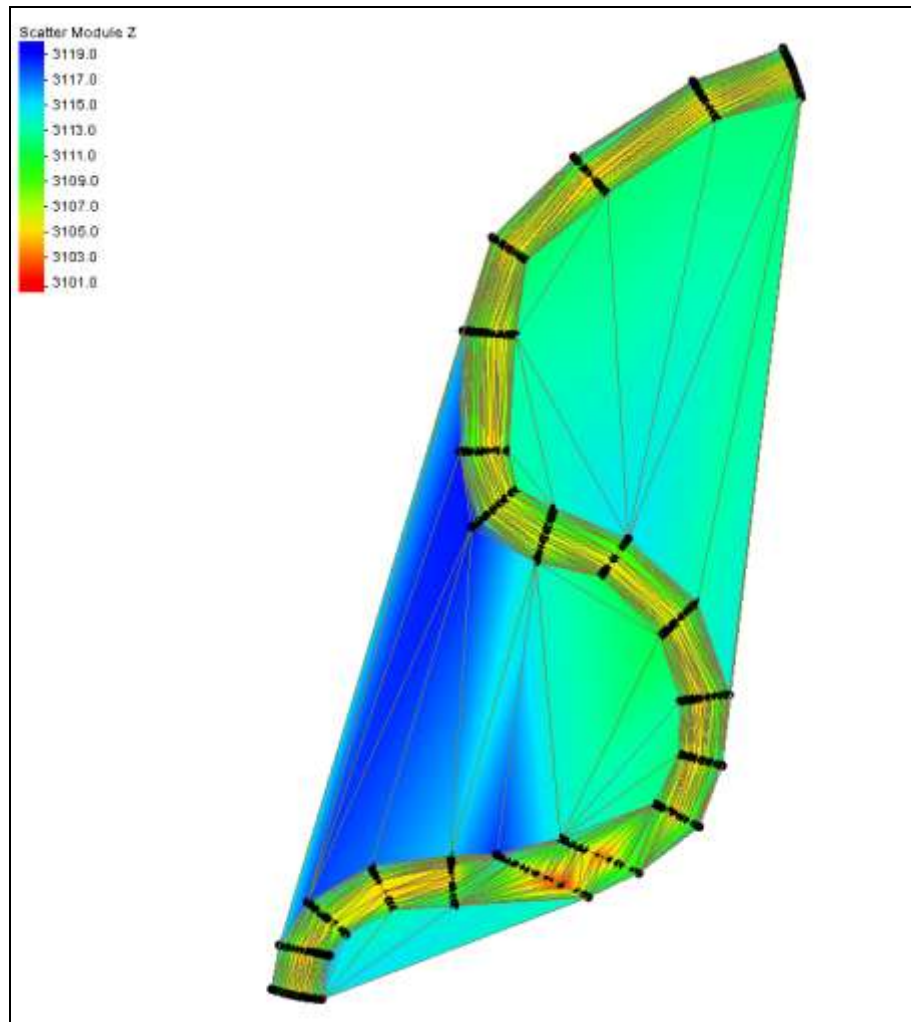
Figure 1   Imported scatter set

3   Removing Triangles to Reduce Scatter Extents

In SMS, the triangles define the area of impact (extents or domain) of the scattered set. In this case, since there are no data points in the interior of the meander bends, there should be no triangles in this area either.

To limit the area of impact for the TIN, the extra triangles should be deleted.

3.1 Selecting Single Triangles

A common method is to select a triangle and then delete it. To do this:

1. Select the **Select Triangle** 🔼 tool to activate it.

2. Click one of the big triangles in the meander bend as shown in left side of Figure 2.

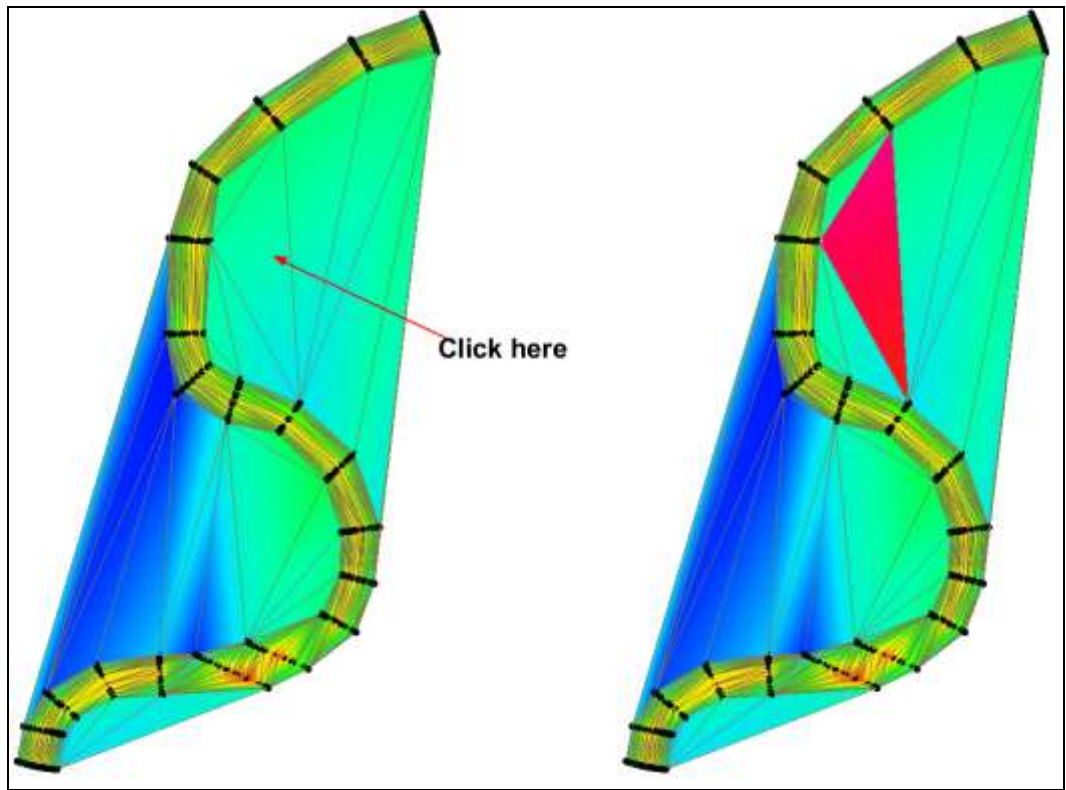The result should appear as shown on the right side of Figure 2.

Figure 2   TIN selection point and display after selection

3. While holding down the *Shift*, key, click in another triangle as shown in the left side of Figure 3. The result should appear as shown on the right side of Figure 3.
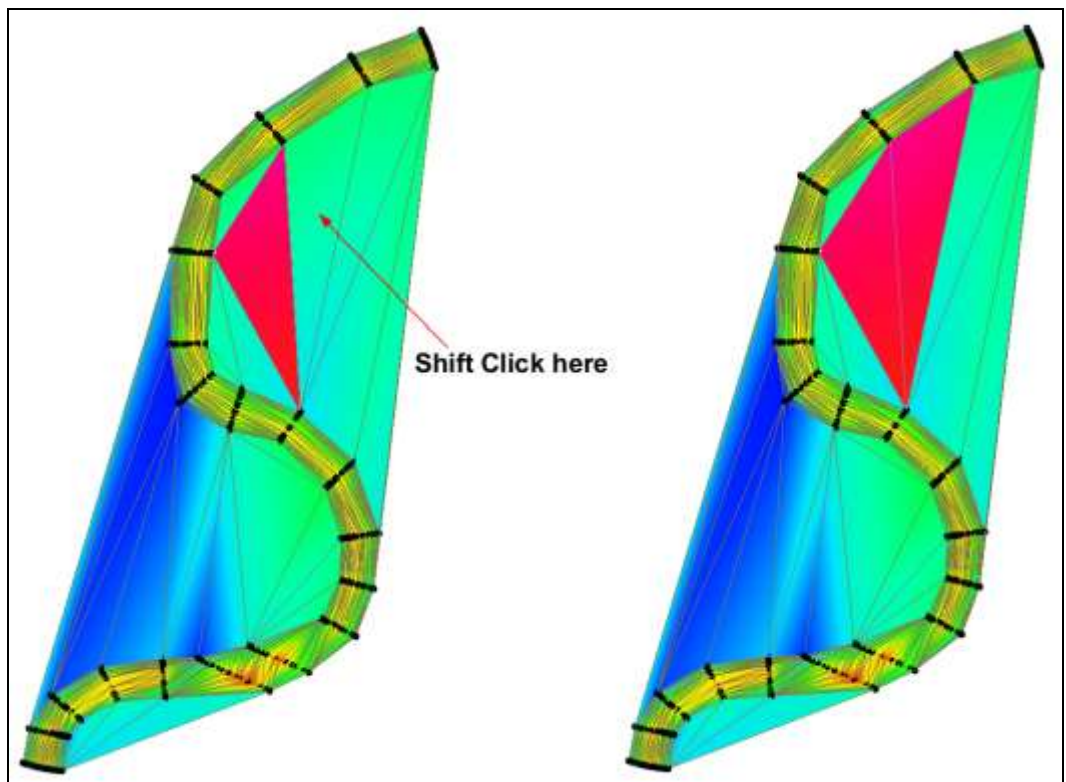

Figure 3   Selection of second triangle.

4. Click the *Delete* key or click on the **Delete** 🗑 macro to remove these two selected triangles.

This process could be repeated for the remaining triangles. However, it can become tedious if many triangles are to be deleted.

3.2 Selecting Multiple Triangles

A more efficient method of selecting triangles is to hold down the *Control* key and drag an arrow. Any triangle intersected by the arrow is selected. To illustrate this:

1. Make sure the **Select Triangle** ⬆ tool is still active.

2. With the *Control* key held down, click-and-drag across the remaining triangles as shown in left of Figure 4. The result should appear as shown on the right side of Figure 4.
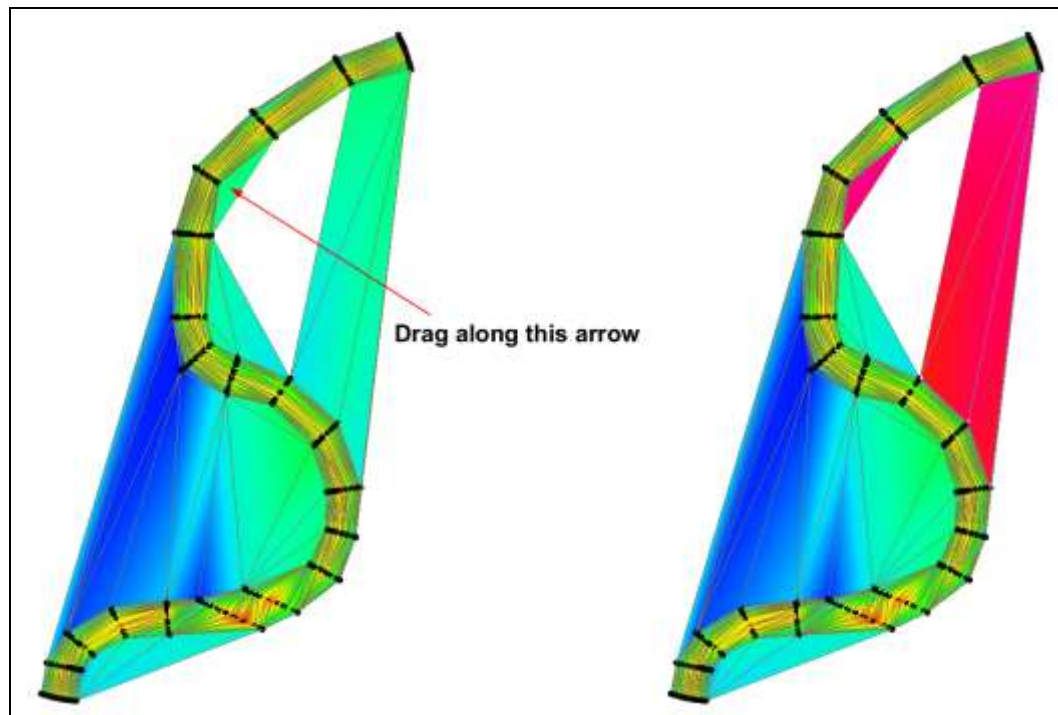

Figure 4   Selection arrow and selected result

3. Continue selecting and deleting triangles until the scatter set looks like that shown in Figure 5.
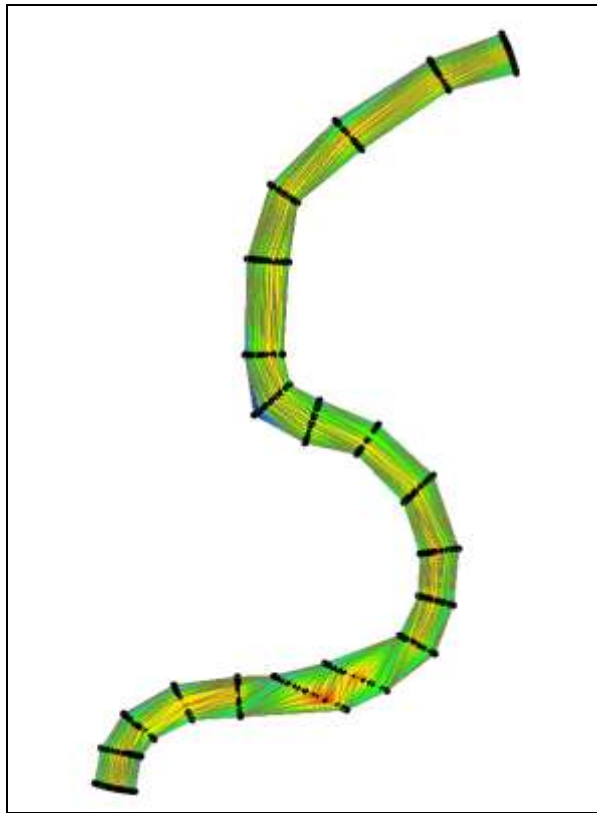
Figure 5   Final Scatter Set

Note that SMS provides several modifier keys that can be used in connection with the graphical selection tools to make it easy to perform a number of selection related tasks.

- If the *Shift* key held down with the *Control* key, the selection status of intersected triangles toggles.

- If the *Alt* key is held down with the *Control* key, intersected triangles are added to the selection list.

- If the *Shift* key is pressed, newly selected items are added to the selection and previously selected items are removed from the selection.

- If the *Alt* key is pressed, newly selected items are selected if they were not previously selected (nothing is unselected).

- If both the *Alt* and *Shift* are pressed, newly selected items are removed from selection list (nothing is added).

SMS also includes a utility called the *Process Boundary Triangles* function. This utility can speed up the process of identifying and possibly removing unwanted boundary triangles. It selects boundary triangles that have an edge ratio higher than a user specified value. The edge ratio of a triangle is calculated by dividing the length of the triangle edge on the boundary by the length of the smallest triangle edge. This tool is applicable when the scatter points are fairly uniformly spaced. In situations like the one in this tutorial, with long spaces between cross sections, this tool is not applicable.

4 Conclusion

This concludes the "Define Scatter Extents" tutorial. The tutorial demonstrated how to define the scatter set extents after scatter data interpolation in SMS.