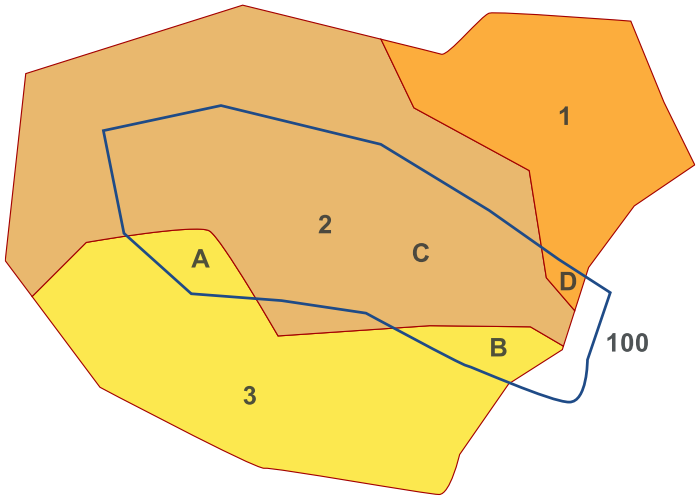
Area Weighting: estimating attribute values in overlapping polygons.

Transferring stress or other attribute measures between features.



The old features, 1, 2, and 3 would be in one layer, and the new features in another layer (only one feature from the other layer is shown here, feature 100).

The three old features, with IDs of 1, 2, and 3, have associated stress measures s1, s2, and s3.

We want to transfer the stress measure to the new feature, with ID 100, proportional to the areas of each of the old features occuring within feature 100.

A spatial intersection procedure, POSTGIS's ST_Intersection(), or the Identity tool in ArcMap, will isolate the intersecting are for the two layers.

There are four pieces of the old features in the new feature, A, B, C, and D. If their respective areas are aA, aB, aC, and aD, then the contribution of stress from A is:

$$s3 \times \frac{aA}{aA + aB + aC + aD}$$

For C it is:

$$s2 \times \frac{aC}{aA + aB + aC + aD}$$

If parts of the new features are not covered, they are assumed to have the same value as the part that is covered.

The contribution of stress from each old feature piece for each new feature is:

$$stress \times \frac{piece\ area}{total\ area}$$

You can check the results by applying a graduated color to the old shapes, and them importing that symbology as the symbology for the new shapes. New shapes touching only one old shape should be the same color, and new shapes touching multiple old shapes should be a shade intermediate amongst the old shapes colors, allows for greater influence from larger pieces.