ESPA Aquifer Volume Change Calculation

Aquifer volume changes are calculated using available water levels. Water levels from the two years of interest are differenced to determine the water-level change at each well. This requires that the well be measured in the two years of interest which results in slightly different data sets for comparisons of different years. The water-level changes are then interpolated across the most recent Easter Snake Plain Aquifer Model (ESPAM) domain.

The interpolation is done using the Ordinary Kriging interpolation method. The IDWR kriging process is accomplished using Surfer® software (Golden Software, LLC). The same method can be accomplished with ArcGIS® ArcMap™ software using the Kriging Tool within the Interpolation Toolbox under the Spatial Analyst extension. However, the contours generated will look slightly different using ArcMap™ than when using Surfer®.

The contours are used to calculate a total volume change by subtracting the total volume of negative-change contours (area of each contour multiplied by the change represented in the contour) from the total volume of positive-change contours. IDWR computes the total volume using a utility found in Surfer®. Total volume can be computed with ArcGIS® ArcMap™ software using the tools within the Zonal Toolbox under the Spatial Analyst extension – there are multiple tools that can be used based on user preference; however, this is a much more complicated process. The resulting volume is then multiplied by the average calibrated Specific Yield from the most recent ESPAM version to obtain the volume of water gained or lost.