

Block Model Resolution

12/11/22/JPR

Low-resolution block models with large voxels (Figure 1 – upper diagram) often appear to be unpleasantly blocky or “pixelated”. This Lego-like appearance can be minimized by decreasing the voxel dimensions to create higher-resolution models (Figure 1 – lower diagram) that look much more realistic. Unfortunately, there’s a catch. High-resolution models require more time to be created.

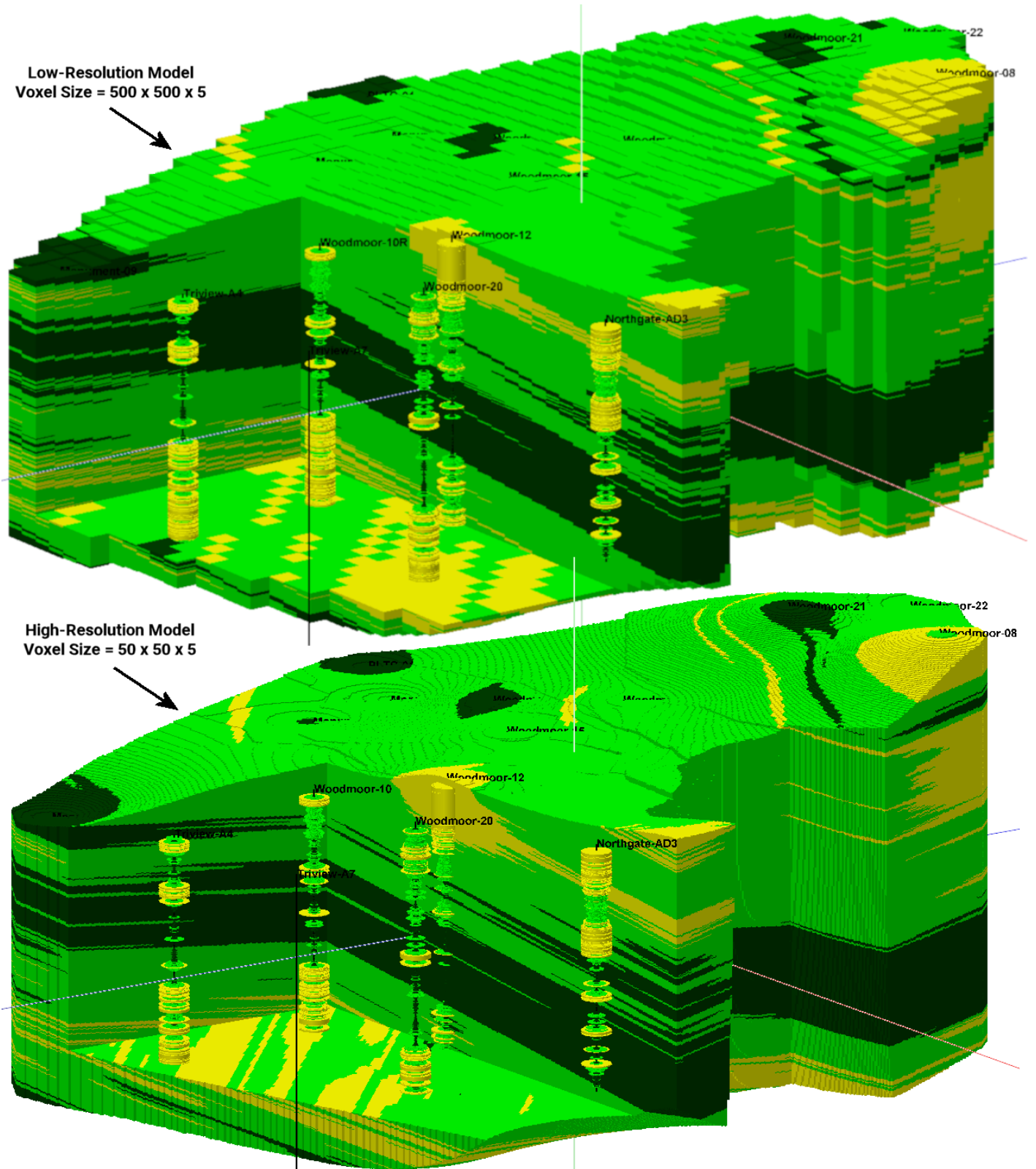


Figure 1

For example, the low-resolution model within Figure 1 required approximately three minutes to generate while the high-resolution model took over 3.5 hours. This is because the low-resolution model consists of 1,162,980 voxels while the high-resolution model has 110,549,201 voxels.

The resolution is determined by the node spacing options within the *Project Dimensions* tab (Figure 2). From a practical standpoint, the X and Y spacing should be set to $\frac{1}{2}$ of the average minimum distance between the wells while the Z spacing should be equal to the thinnest feature that will be identified (e.g., sand lenses greater than 5-meters thick).

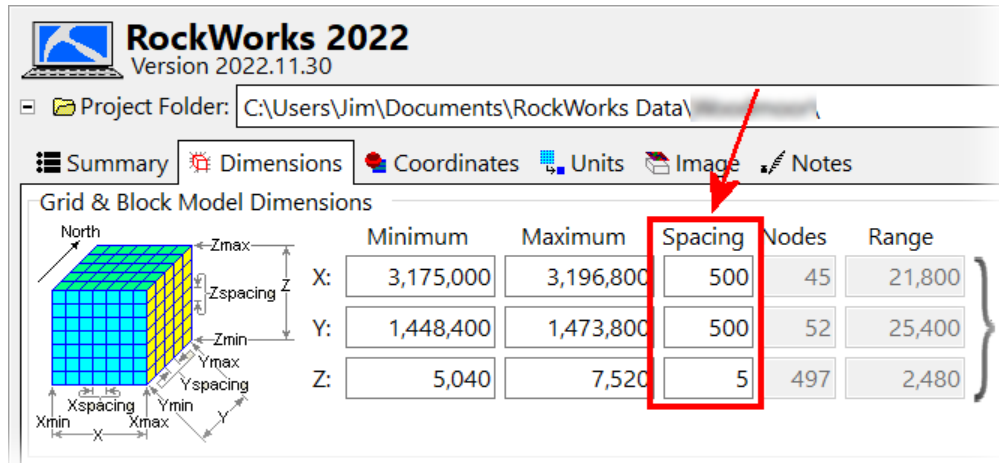


Figure 2

The problem with these practical guidelines is that the output may not be aesthetically pleasing (e.g., ugly diagrams that look like Minecraft landscapes). The solution is to model everything twice. Work with the data at a practical resolution and then re-process everything at a high resolution when the workflow has been finalized. This is best accomplished by saving the workflow within a *Playlist*, making sure that everything works correctly, refining the *Playlist* settings to obtain the desired output, and adding the *Project Dimensions* command (Figure 3) to the top of the *Playlist* (Figure 4).

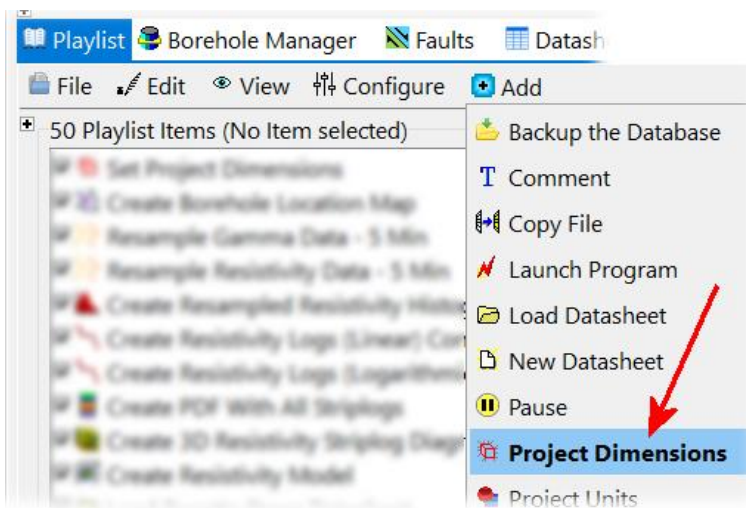


Figure 3

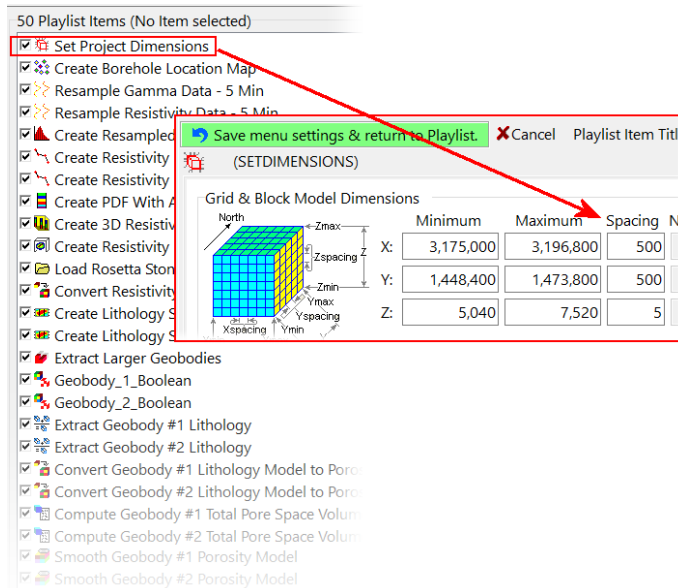


Figure 4

For additional flexibility, add a second Project Dimensions command to the Playlist. Label the first command as “Low-Resolution” and the second command as “High-Resolution” and set the associated dimensions accordingly (Figure 5).

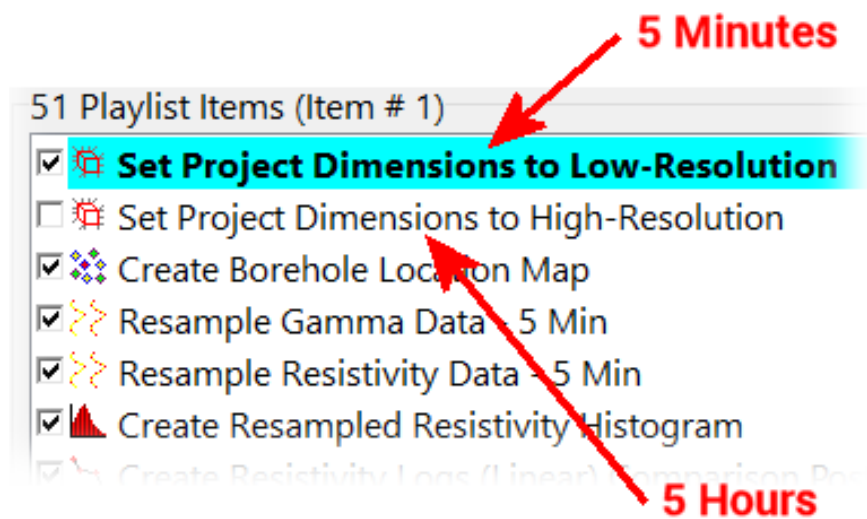


Figure 5

The utility of this approach can be illustrated with an example from a large, multi-year project involving a large amount of data and many steps to produce a variety of models, diagrams, and volumetric computations. As more data became available the entire sequence of steps was quickly re-processed at low-resolution to check for problems. Once it was established that everything was working correctly, the high-resolution option was enabled and a 12-hour run commenced. This process was repeated bi-annually as new data was provided by the client.