##### [00:00:02.170] - Speaker 1

Welcome to this Community Viz video tutorial on allocator concepts and terms used in both allocator wizard and allocator five. This is an advanced topic. If you're looking for step by step instructions, please refer to the scenario 360 Help or other resources. The emphasis here is on concepts and terms.

##### [00:00:25.610] - Speaker 1

The basic idea of allocation is that it models the spatial pattern of future development. Here's how it works. You start with a forecasted growth amount for your planning area and your planning horizon, so maybe 10,000 new dwelling units over the next 20 years, and you provide that as input to the allocation algorithm. You also feed in two maps. One is the plan capacity for your area, that is, the development amounts allowed by your planning policies.

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The other is a desirability surface, which represents the development where development wants to go. Based on market forces, the allocation algorithm combines those to produce a new map showing where development will likely occur over time. The idea is often illustrated like this here. The bars in the chart represent individual land areas like, say, parcels on a map. For example, the left one is the most desirable location and has a capacity of maybe two dwelling units.

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And one further over here is in a less desirable location and has a capacity of maybe five dwelling units. The new growth comes in the way water comes into an ice cube tray that you put in your freezer. It fills up the most desirable parcels first and spills over from cup to cup until all the growth has been accommodated.

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To illustrate this on a two dimensional map, here's a simplified case where the parcels are all the same shape, like rectangles, and they all have identical capacities. In this case, there is an attractor in the southwest corner that increases the desirability of parcels near to it. Allocation in its simplest form would place new growth in the most desirable areas, resulting in a cluster of new development in the southwest corner, as shown here. Now, obviously this is simplistic, and community based allocation tools allow for adding many refinements to this basic approach, as will be described in this video.

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Allocation tools always need an allocation analysis layer to work with. Usually the layer is polygons and most commonly it is parcels. But depending on the needs of your project, it could also be larger features such as taz or census blocks, or perhaps you want to use an artificial grid. The primary considerations here are the resolution of your analysis, processing time, what data are available, and probably most importantly, how you plan to use the results. In practice, the features are usually called parcels, even if technically they are some other shape.

##### [00:03:29.310] - Speaker 1

Another required input for any allocation is the development capacity of each feature, also known as the supply. This needs to exist as an attribute in your allocation layer before you start running the allocation tool. It represents the maximum net amount of development. Each partial can support per plan, which is the gross capacity minus any existing development. It's usually calculated from zoning or future land use maps, potentially including land use scenario sketches that you are doing in real time.

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One tool for calculating capacity is the Build Out Wizard, but it's not required. And if you're allocating more than one land use, you'll need to calculate capacity separately for each type.

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The Desirability score for each parcel is another required input that needs to exist as an attribute before you run the Allocator tool. Usually it's a number from zero to 100, where 100 is the most desirable location. Most often, Desirability is estimated using the Suitability Wizard and a weighted combination of factors that influence where development is most likely to occur. The factors in their ratings vary by location, and it's up to you to determine what they are. Again, if you are working with multiple land uses, you'll need to develop separate desirability services for each one.

##### [00:04:59.730] - Speaker 1

Growth amount, or demand is a single number for each land use that represents the quantity of new development you want to allocate across your entire study area. Transportation modelers often call these amounts control totals. In allocator five. You can set different amounts by land use type and by sub region, and you can divide it into several cycles if desired.

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In allocatory five, you have the option to divide your allocation into smaller periods called cycles. For example, you could split 20 years of development into four five year cycles and get reports on the progress at each stage. Also, you can update desirability scores between each cycle. There are two main reasons for doing this. One is that you expect infrastructure to change in the future.

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For example, if you know that a new rail line is going to complete five years from now, that will probably change as our ability scores. For some locations, you can run one cycle for the first five years, update scores, and then run the rest of the allocation in the second cycle. The other reason is that you can model the way in which growth tends to follow growth. For example, if there were a lot of residential development in a particular location in one cycle, it might attract retail development in the next cycle.

##### [00:06:29.930] - Speaker 1

Randomness in allocation is a way of adding variability to the strict trickle down model. It modifies the allocation results and or desirability scores to make them more scattered. In scenario 360, there are three different ways to set randomization going back to the ice cube tray model. Adding randomness is like allowing some of the water to splash out of the most desirable locations and into less desirable ones on a map. First, we call this simplistic allocation from earlier.

##### [00:07:09.250] - Speaker 1

Adding randomness sort of blurs the edges around the growth area. This example is using exponential setting in the Allocator Wizard. Here is the linear setting in the Allocator Wizard, which adds much more randomness in allocator five. You can vary randomness on a scale from zero to one to two to three, and so on, all the way up to ten.

##### [00:07:41.810] - Speaker 1

Here are some suggestions on randomness settings. Don't use any randomness when you are setting up or calibrating your desirability model. Do use a small amount to illustrate the uncertainty in your model and to promote inter mixing. When allocating more than one land use use higher settings when your focus is on allocation amounts rather than existing locations, or when your desirability scores have low statistical significance.

##### [00:08:13.290] - Speaker 1

The Allocator Wizard only does one land use at a time, but an allocator five. You can set up allocations for multiple land uses. These can be general categories, like residential and commercial, or more specific ones like single family, residential, or retail. Up to ten land uses are allowed. One reason to do this is just to save time, so you can run, say, a residential and commercial allocation simultaneously.

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Another reason is that you want to do a combined allocation in which uses compete for the same land. To illustrate this, consider a hypothetical example where commercial development is attracted to the Southwest and residential development is attracted to the Southeast. At low levels of growth, each type can grow in its own area, but as growth increases, the growth areas will overlap. When this happens, allocation algorithms usually give preference to the use with higher desirability. In this parcel, for example, commercial is slightly more desirable than residential, so it is allocated commercial growth.

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Adding some randomness allows intermixing at the boundary.

##### [00:09:31.870] - Speaker 1

Filling methods describe the way the allocation algorithm assigns growth amounts within parcels. Which one you use depends on your project. In the Allocator Wizard, features are filled one unit at a time. So, for example, if this one feature has a capacity of 168 dwelling units, the Allocator will add one dwelling unit, then another as it moves through its process across the steady area. This often results in many features being partially filled, particularly if any randomness is applied.

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In allocator five with features like standard parcels that can support only a single land use, features are filled completely whenever possible so that one feature would receive its full 168 dwelling units. In most cases, unless demand runs out partway through across the study area, almost all features are either filled or not filled, with nothing in between. In allocator five, with features like Taz's that will have many land uses within them, allocations are based on percentages of the capacity for each land use. So, for example, a feature might be allocated two thirds of its residential capacity and one third of its commercial capacity.

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Thank you for watching this community of his video tutorial. For more information, please read the extensive documentation available in the Help.