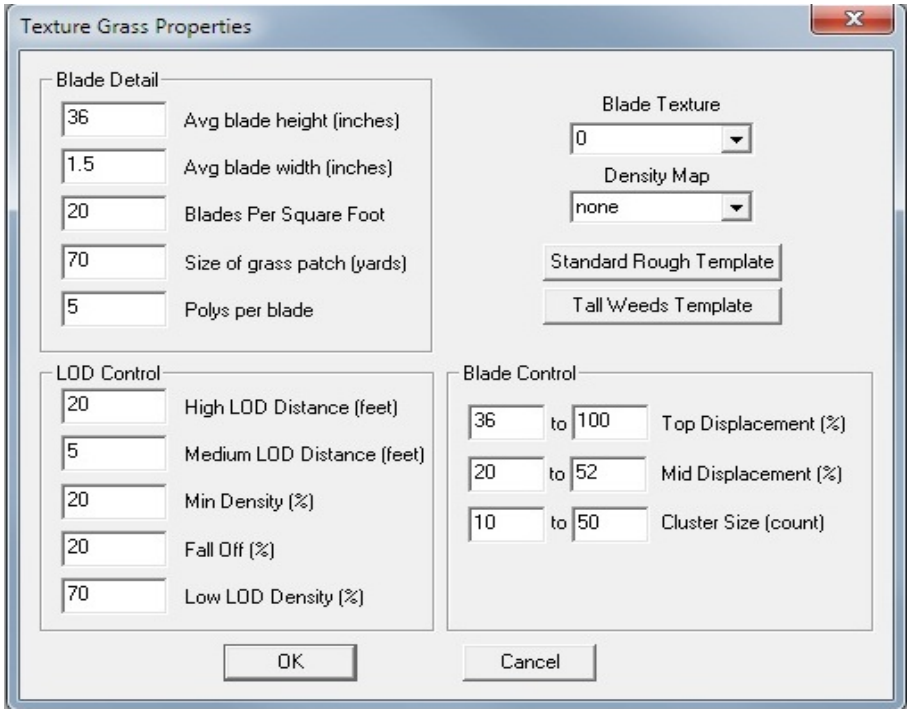
The TEXTURE GRASS PROPERTIES Parameters
in the Library Creator 06:
Their Effect on Grass Appearance

INTRODUCTION

There is not a lot of good information that I have found on the creation of grass textures for TW08 using the Library Creator 06 (LC). I recently posted a tutorial about the use of Density Mapping in the LC, and for my own information, I have recently been investigating what impact the “Grass Props” have on the appearance of grass blades in the game. Jim Meier and others are a fount of knowledge about the other aspect of playing texture creation, the “Terrain Collisions” part, but I have not found much info about the appearance affects. The information given here requires at least a basic familiarity with texture creation using the LC.

If one clicks on the Grass Props button, the following panel opens:



I will discuss below the effect that these 13 variables have on the appearance of grass in the game.

METHODOLOGY

Shown below are the values that are filled in if one clicks the “Standard Rough Template” or “Tall Weeds Template” buttons:

Tall Weeds Template			
Blade Detail			
36	Avg blade Ht (in)		
1.5	Avg Blade width		
20	Blades/sq ft		
70	size grass patch (yds)		
5	polys/blade		
Blade Control			
36	to	100	Top displacement(%)
20	to	52	Mid displacement (%)
10	to	50	Cluster size (count)
LOD Control			
20	High Lod Dist (Ft)		
5	Med LOD Dist (ft)		
20	Min Density(%)		
20	Fall Off (%)		
70	Low LOD Density(%)		
Rough Template			
Blade Detail			
6	Avg blade Ht (in)		
1.2	Avg Blade width		
200	Blades/sq ft		
13	size grass patch (yds)		
3	polys/blade		
Blade Control			
36	to	100	Top displacement(%)
20	to	52	Mid displacement (%)
0	to	0	Cluster size (count)
LOD Control			
10	High Lod Dist (Ft)		
10	Med LOD Dist (ft)		
20	Min Density(%)		
47	Fall Off (%)		
70	Low LOD Density(%)		

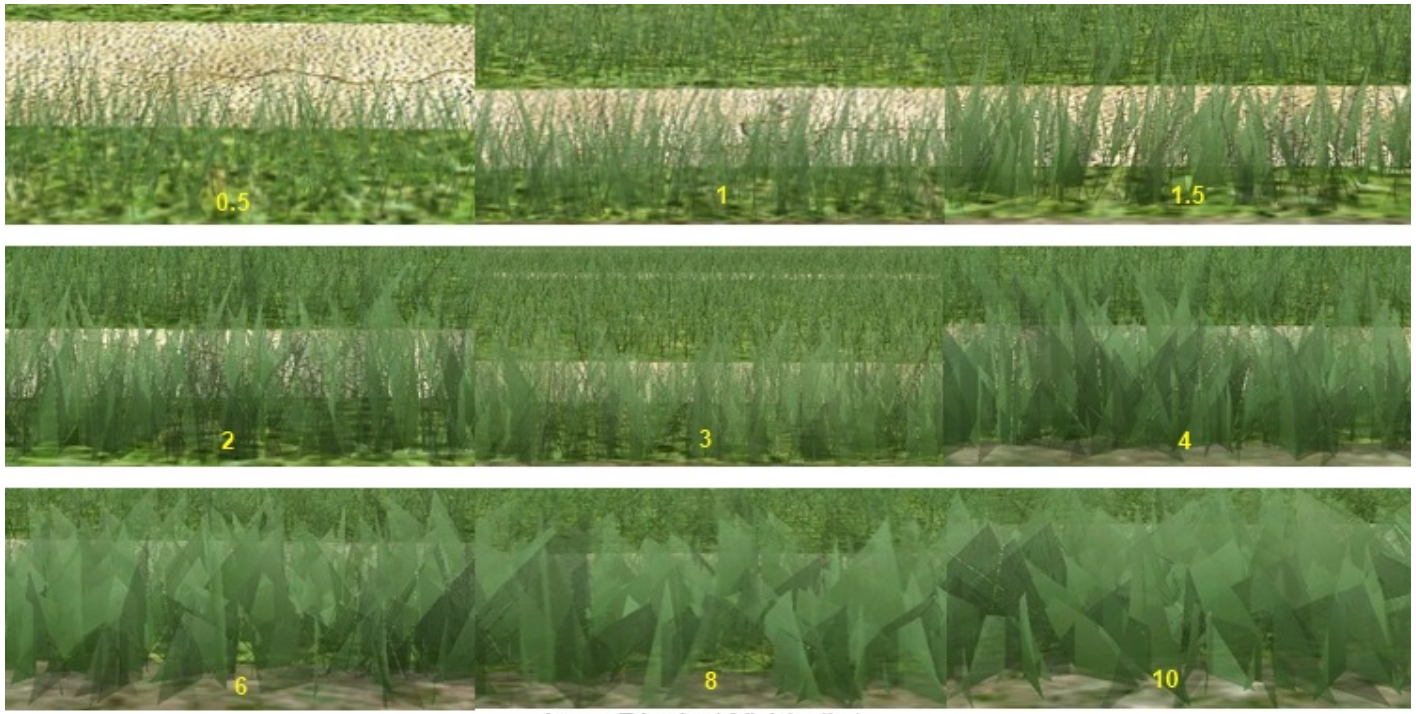
In general, as we discuss the effects of each of these individual parameters I will keep the others that are not being varied the same

as the template. In some cases that does not work well, and I will point those out as we go along.

For this work, I built a “Course” using the Course Architect (CA) that has 10 identical holes, and on each of these holes is a different Rough texture, although all 10 use the same terrain texture bitmap, and mostly the same blade texture bitmap. I mainly changed each parameter about 10 times, one for each hole, and then went into the game and took screen-shots of the results. Where appropriate I took sections out of each of the screen-shots and combined them to show side-by-side what the effects look like.

The BLADE DETAIL Parameters

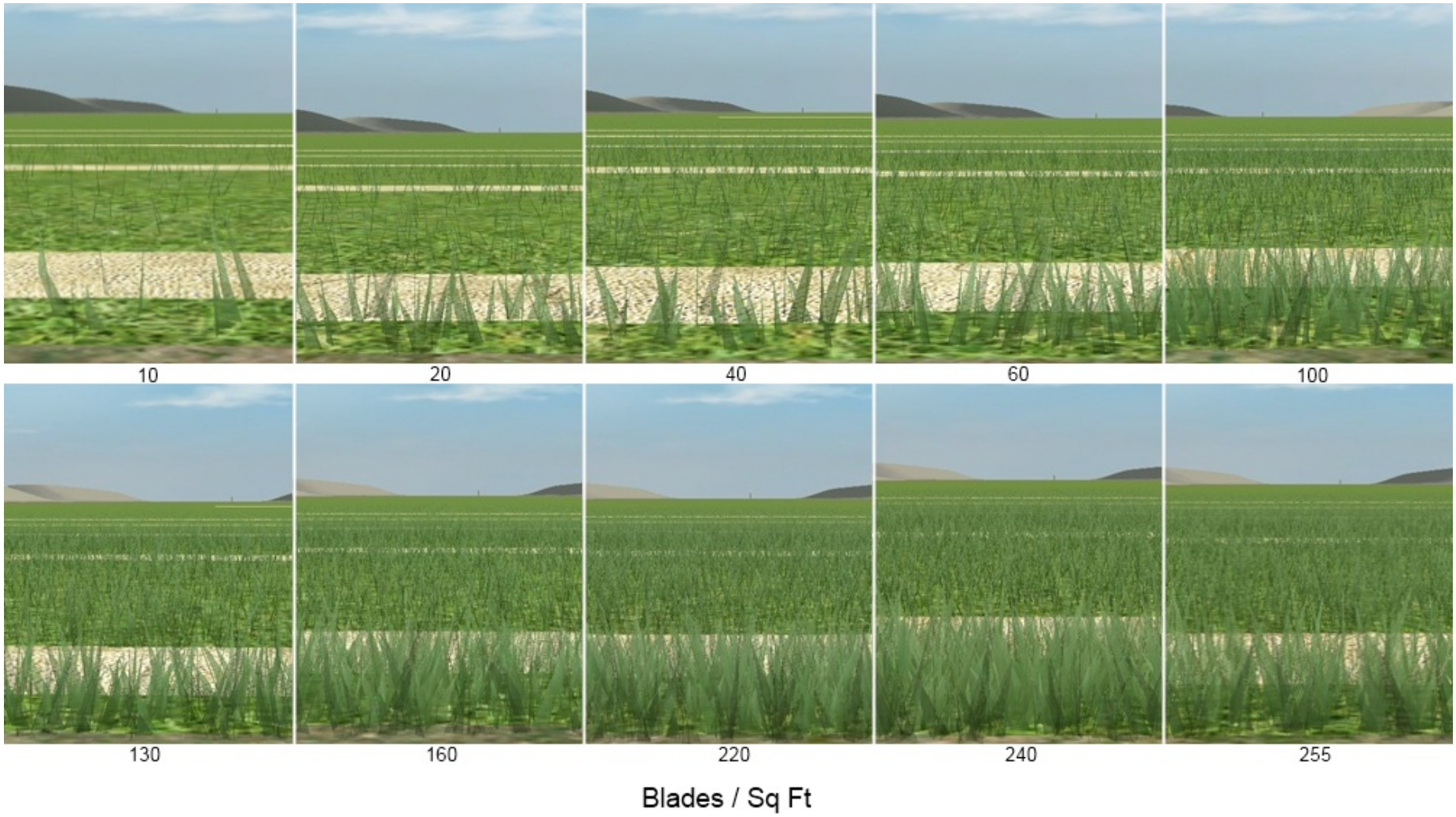
There are five Blade Detail parameters, but we will not discuss Blade Height because the results of changing that are obvious. Next on the list is Average Blade Width (in). Below is a composite of nine different blade widths, with all the other parameters kept the same as the default Rough settings.



Avg. Blade Width (in)

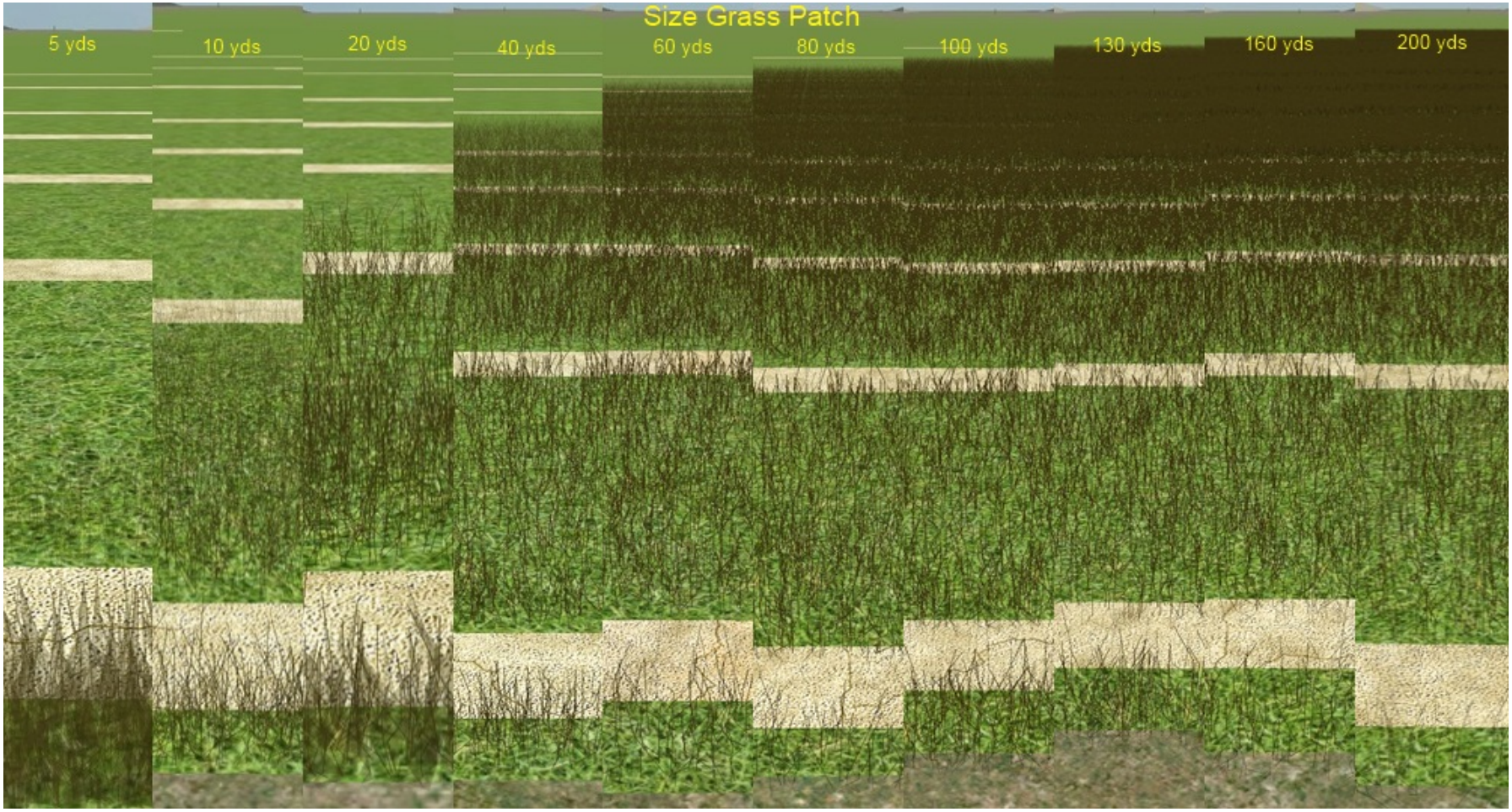
From this one can see that anything over 2 – 3 inches for 6” high rough looks pretty unrealistic, although you could use the 10” setting if you wanted to model a flower bed, patch of ivy, or a soy bean field.

The next property is Blades per square foot. This obviously impacts the look of the denseness of the grass. The maximum that can be set is 255/sq ft. The composite picture below shows 10 different setting for this parameter.



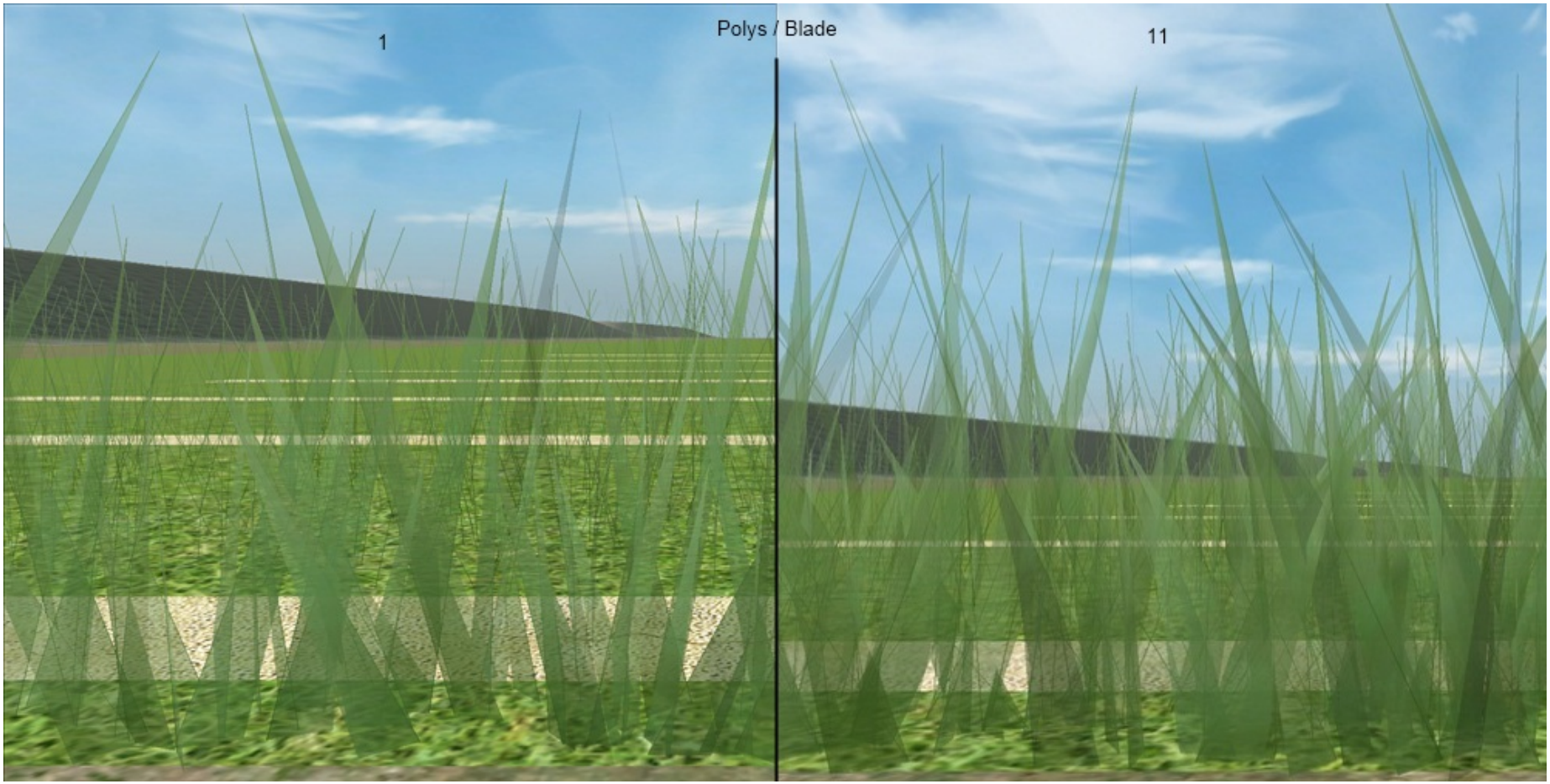
From the picture one can tell that anything below 100 for this value, at least for normal rough, leaves a pretty sparse looking patch. The default of 70 is probably barely adequate for tall weeds, especially at the higher blade widths. I will not discuss it much in this document, but I suspect that the really high setting here can have some effect on Frame-rate and lag in the game. I plan on doing a separate study on that issue later.

The “size of grass patch (yards)” is the next parameter. This is I think a measure of a radius around the point of view of the camera. This parameter is very strongly effected by the LOD values below, but here I show an example using set LOD values from the “Rough” defaults



In order to make the differences more visible for the picture, I changed some of the numbers to make the grass blades very dark and taller. As one can see, from ground level, a patch of more than 80 yards is kind of a waste of computing power, but (not shown here) from elevation, or during a fly-by, the larger patches do provide a more realistic view. This parameter also has a max of 255. I suspect it may also have an affect on frame-rate at the higher values.

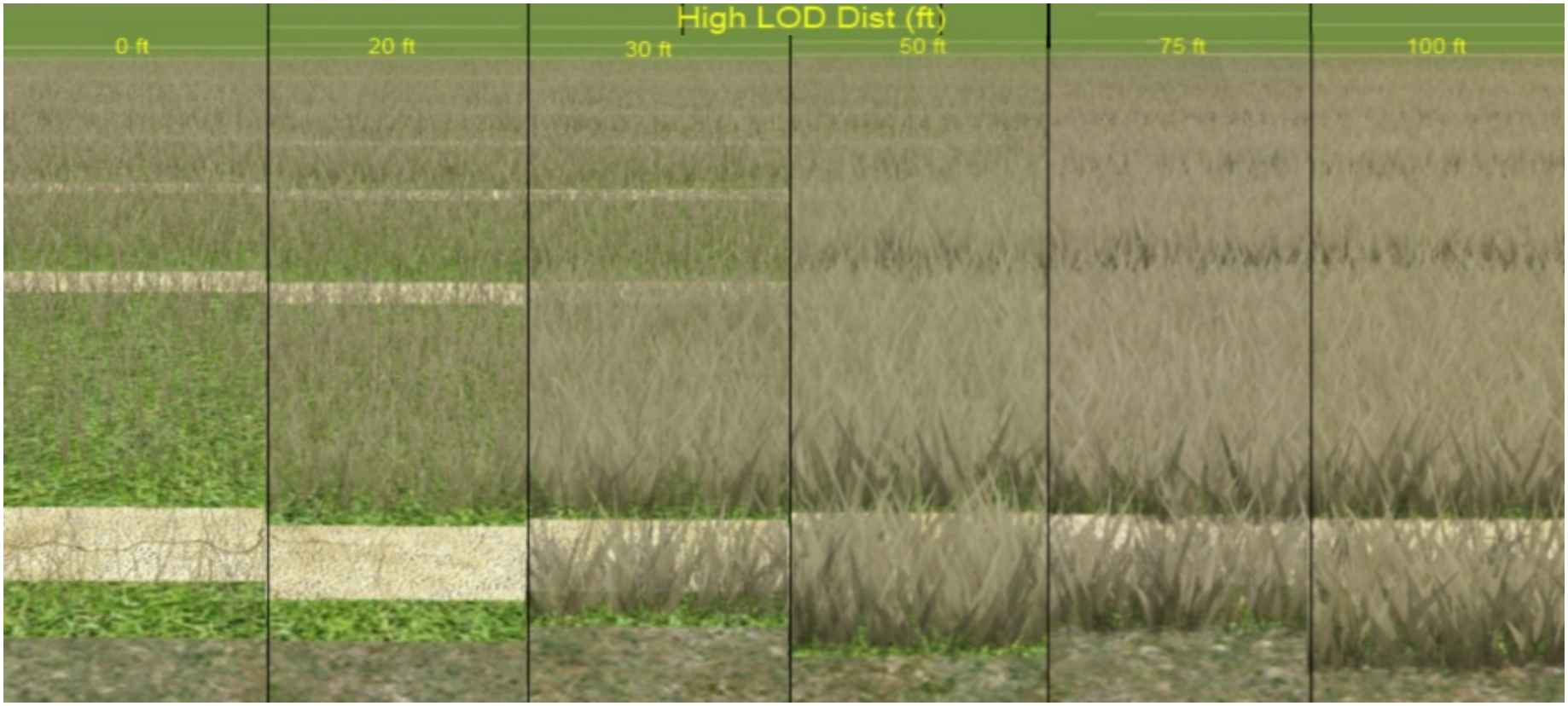
The final adjustment that can be made in this section if Polys per blade. One thing to note is that if you use an even number for this parameter, the blades will have square tops and not come to a point. I show below only two odd numbers because as you see, it does not seem to make a lot of difference in appearance. This appears to be true when there is no wind, but under windy conditions the blades with low polys move more stiffly, and the higher polys bend more in sections rather than as a unit. I probably would stick to the defaults. I used taller blades here to see if it made more difference, but it did not seem to.



A cursory look did not show that this had much effect on performance, which surprised me.

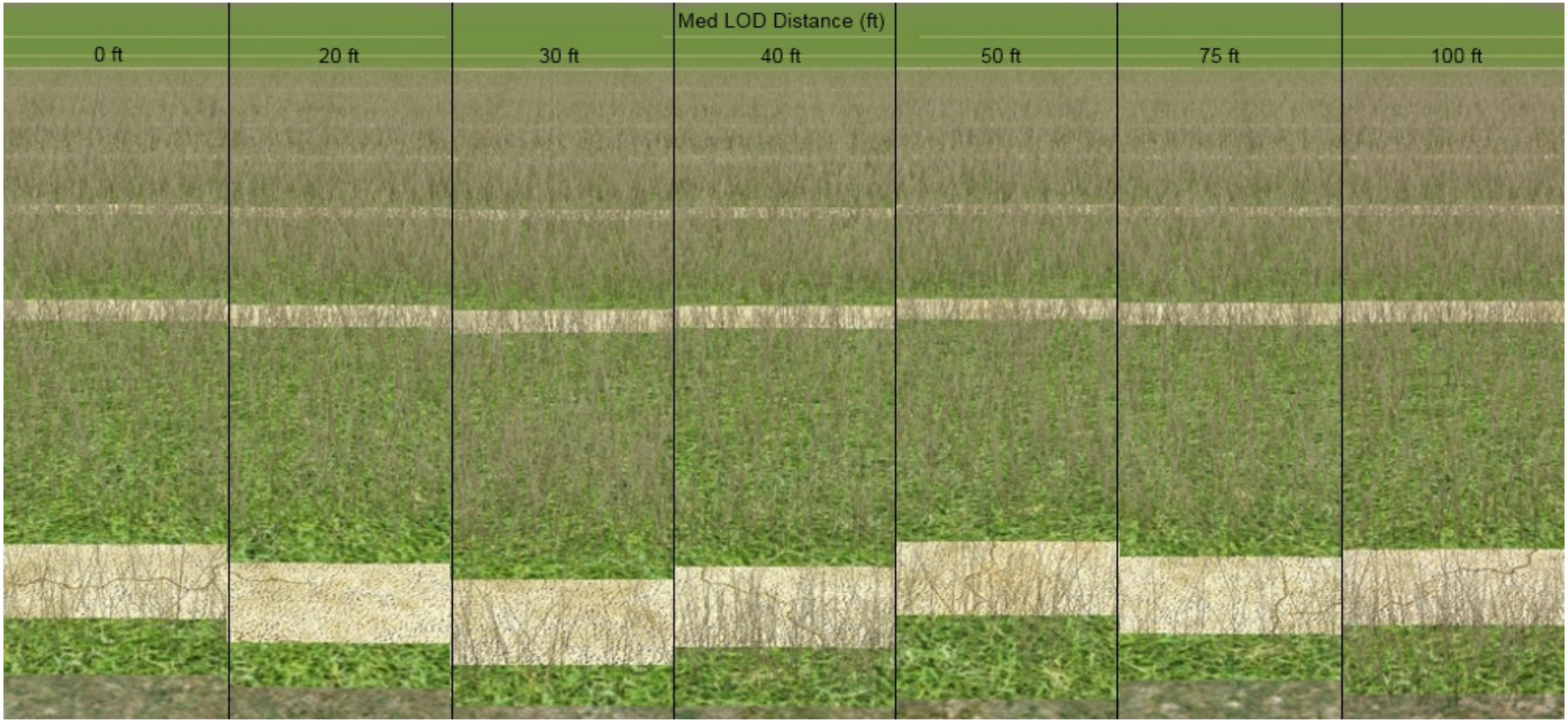
The LOD CONTROL Parameters

In the common jargon of computer graphics, LOD stands for “Level of Detail”.
I show a composite of the first LOD parameter, “High LOD Distance (feet)” below. The High LOD ft sets the distance in which the blades are displayed at full rendering power, which obviously takes a lot of computer power. I changed the “Grass patch” parameter to 200 yds, and made the grass brown on a green terrain to better show the effects.



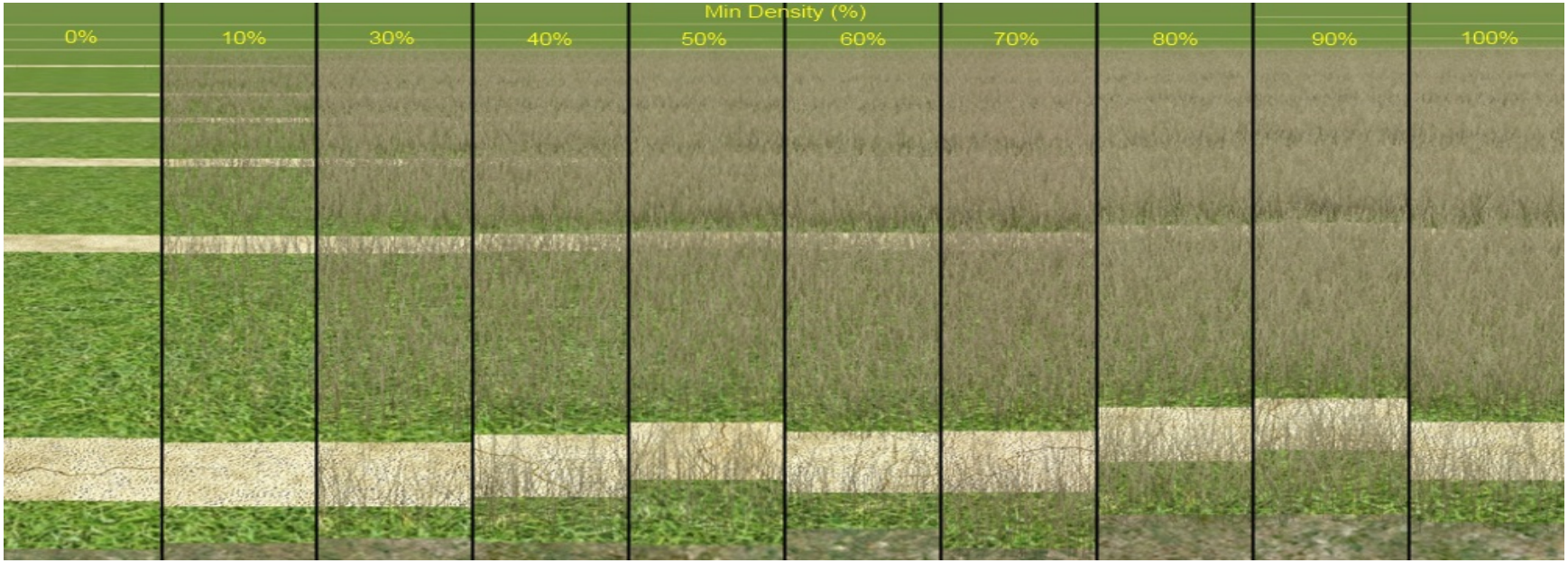
It looks to me that after maybe a setting of 50 ft (maybe 75), it makes very little difference what the setting is. The default of 10 for rough and 20 for weeds may be OK – but somewhat higher looks better. This does seem to adversely affect frame-rate, however.

Medium LOD Distance (feet) is the next variable, which is where the blades are not as intensively modeled and the distance starts where the High LOD ends.

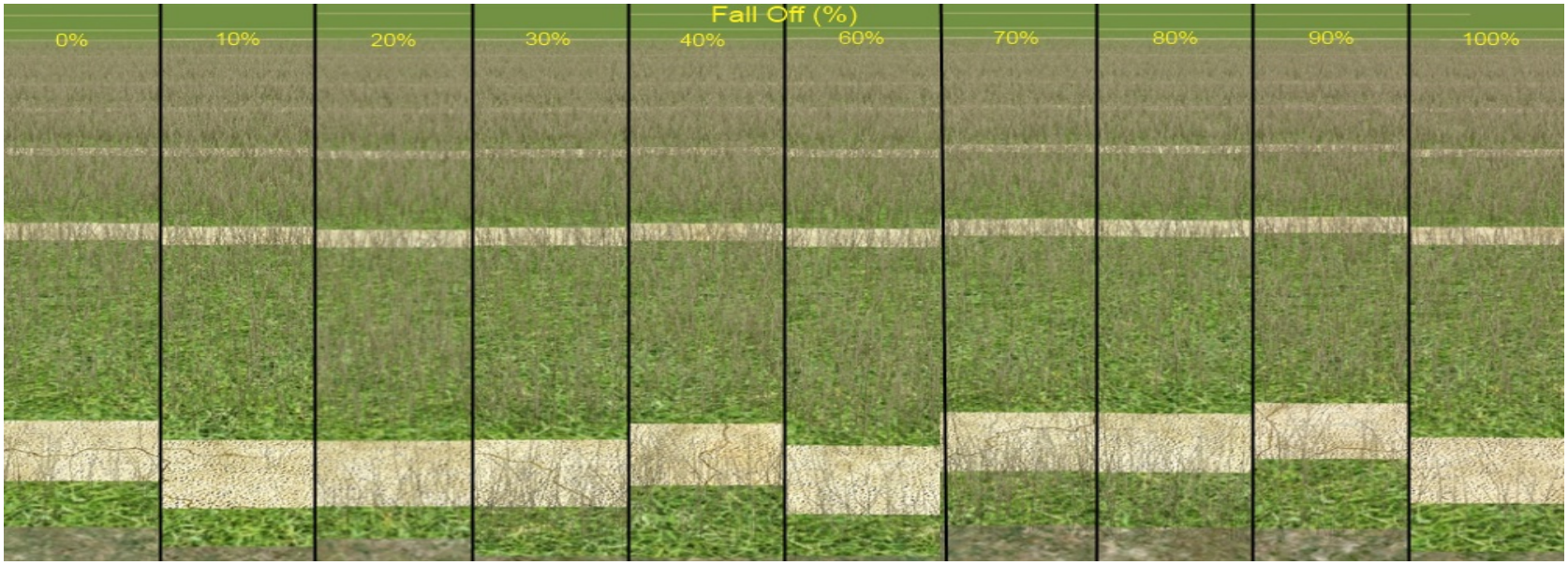


The picture does not really show much difference, and that is because the High and Med interact. Jim Meier indicates it is best if these two parameters are pretty similar in size so one does not get clear “edges” where they transition from High to Med. I did not play around with changing both High and Med numbers at the same time, and that would show more effect. It would have taken too much time to do here, and hard to take enough example pictures. I encourage designers to play extensively in this section and observe the results.

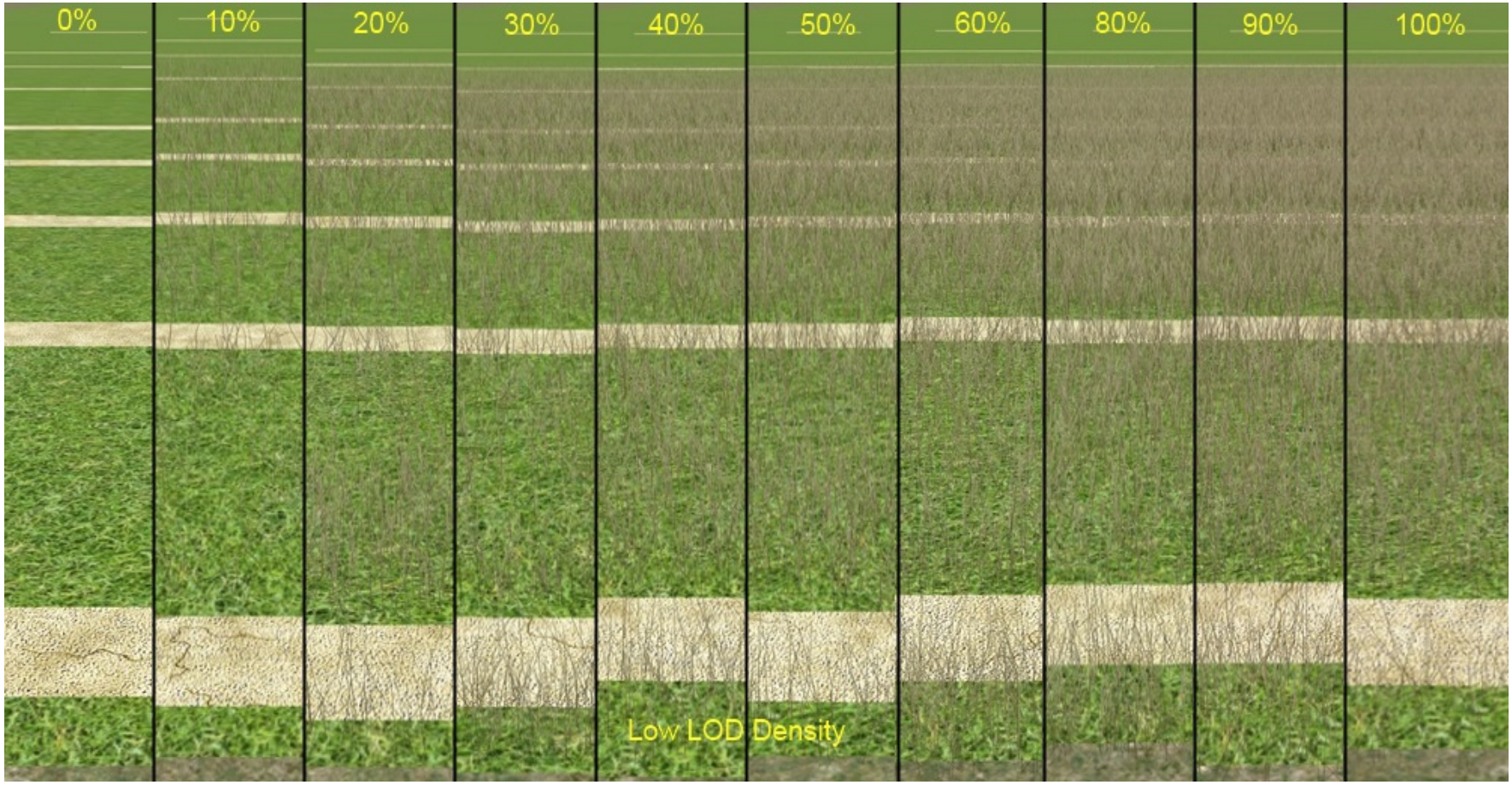
Next on the list, Min Density does make a more visible and seemingly linear difference in appearance. This also does seem to have some effect on frame-rate at the higher numbers, but not dramatic.



Fall Off (%) seems to be one of those setting that have very little visible impact on the appearance of the patch. Again, it may have to be adjusted with some of the other LOD values to show what it really does.



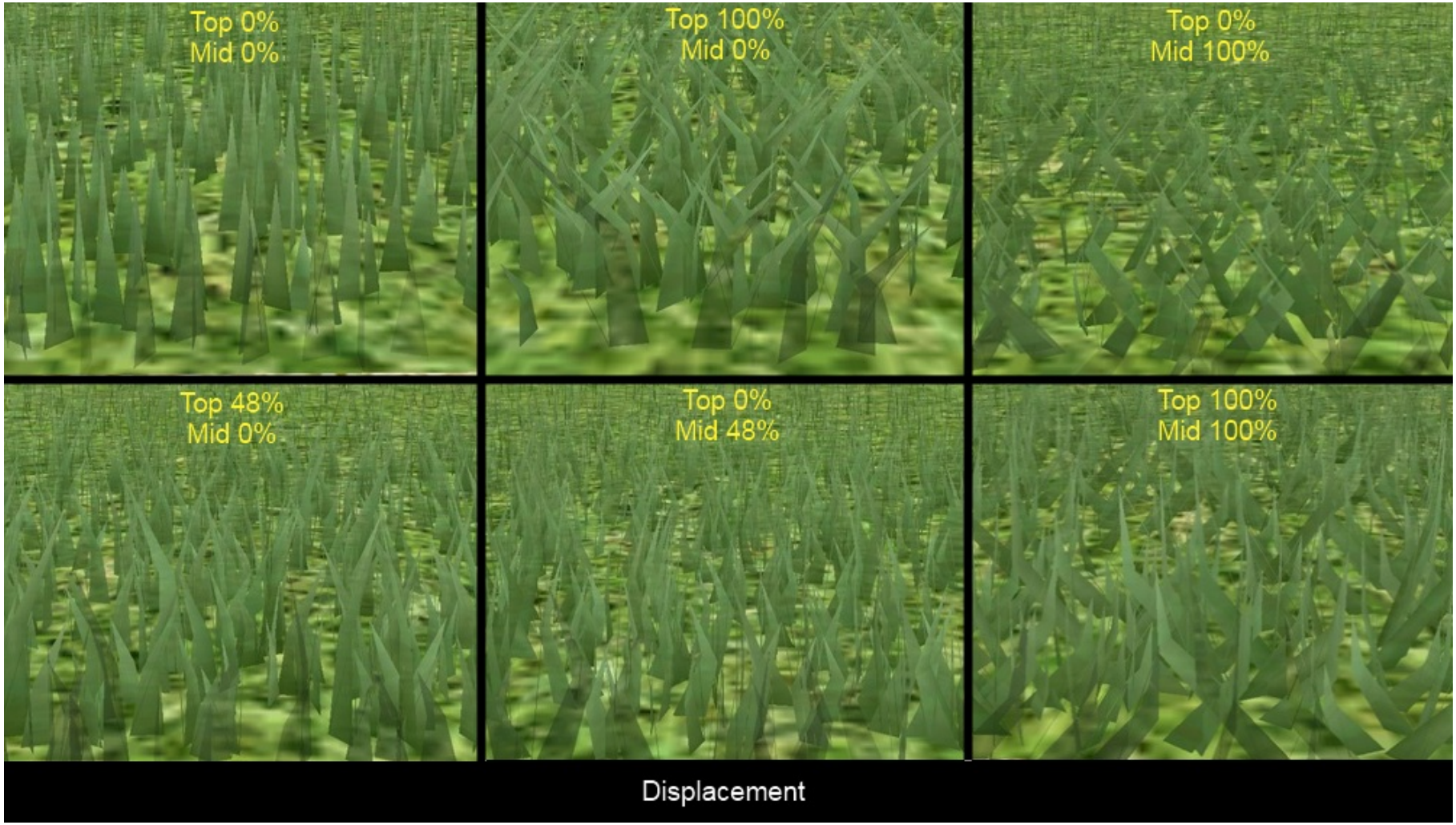
And finally, in this section, “Low LOD Density (%)” is the last parameter to look at.



It has an obvious effect, as it controls the amount of grass shown in low detail out past the High and Mid distances. Again, interaction with the other settings is key here.

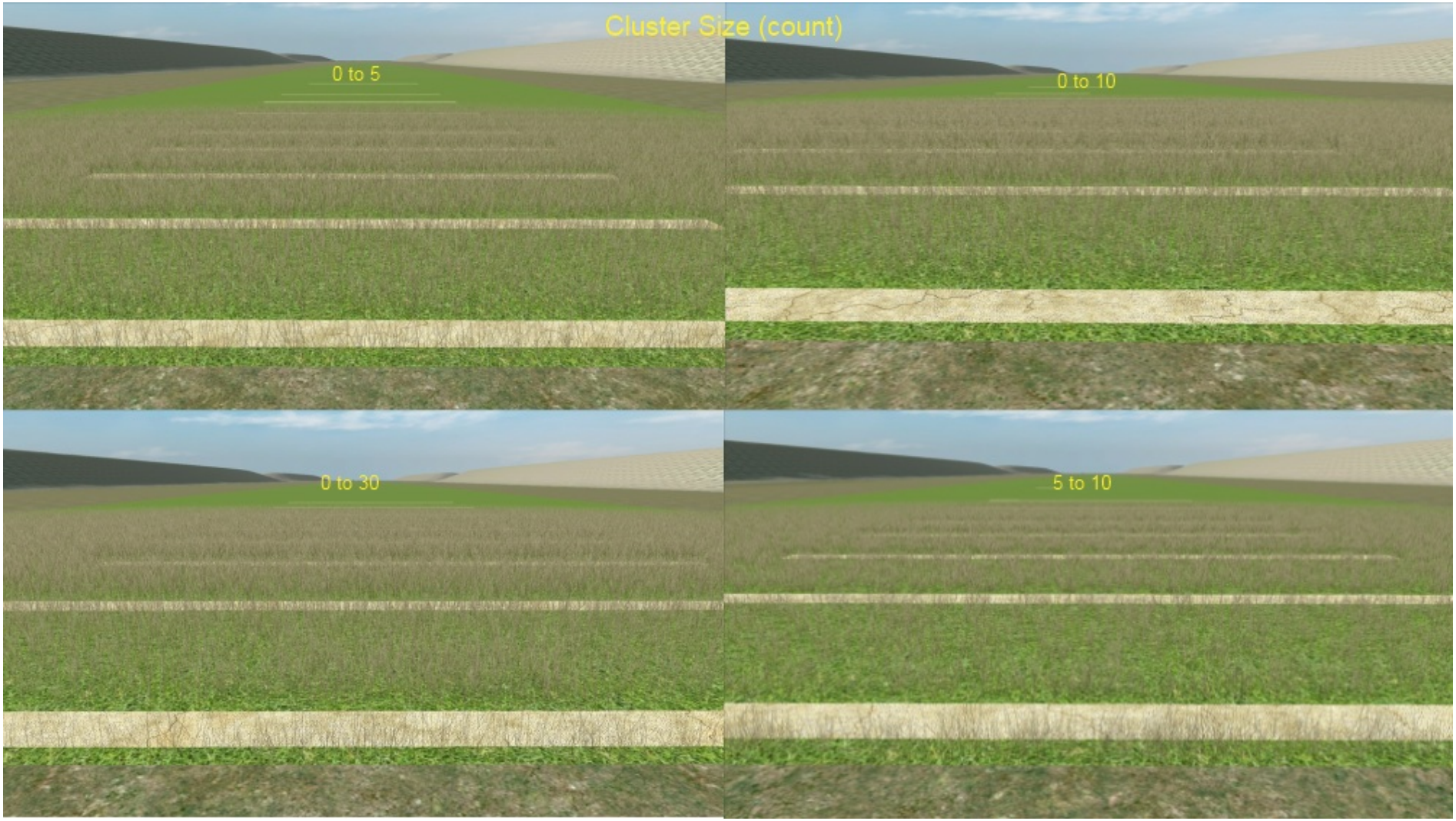
The BLADE CONTROL Parameters

These three variables were somewhat hard to figure when I first started the research, but now I think I have a handle on them. The first two of the three, Top Displacement (%) and Mid Displacement (%) needed to be looked at and changed at the same time to make it more obvious what they were doing. The composite below shows what is going on.

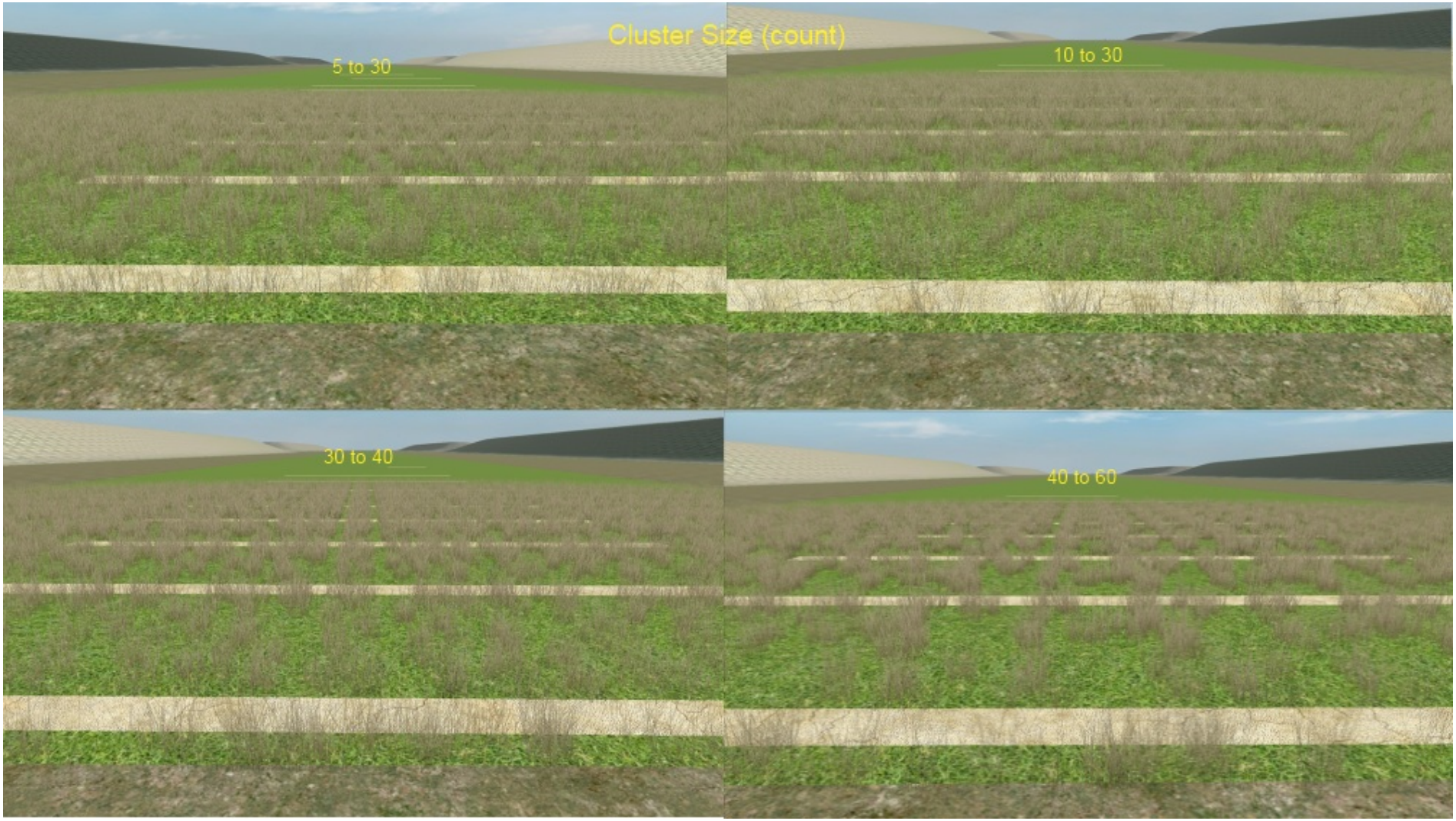


As shown, the “Top” and “Mid” refer to the top and middle of the individual grass blades, and displacement is movement from the vertical. Both numbers set to 0% gives straight un-bent blades, both to 100% gives blades bent dramatically at middle and top. This parameter is variable within Top and Mid, i.e. a setting might be “36 to 100” or “20 to 48”. I think that just allows for more variability in the total grass patch, but I did not play extensively with this. You can also set the percentage to numbers greater than 100, but I did not look at the result – presumably they blades would be very bent over.

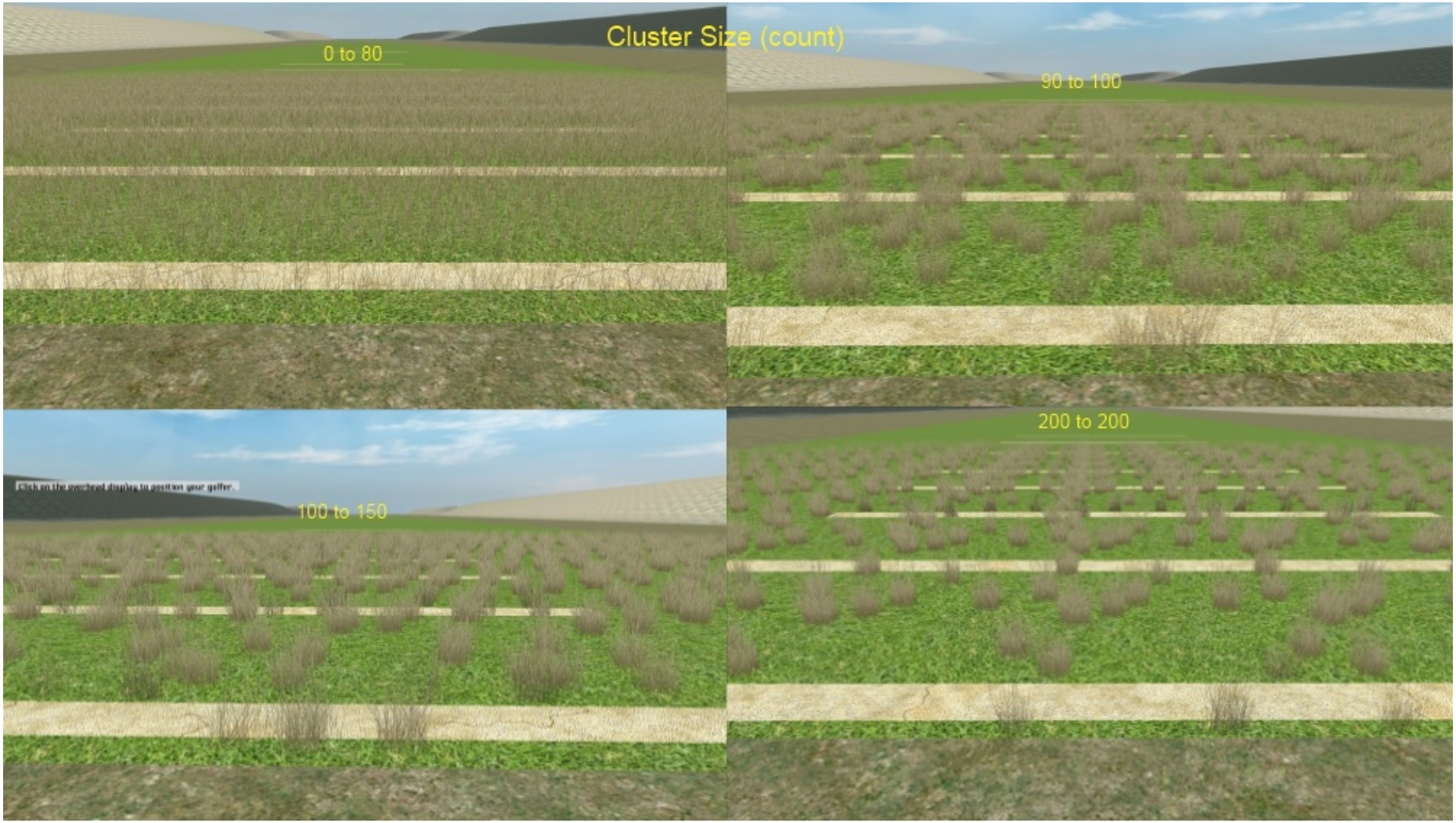
Our final value in this section, “Cluster Size” has a dramatic effect on what the patch looks like, and is very useful for weed roughs. Because I couldn't get a good view of the effects in just one composite, I show three of them



The first two show very little “clustering” of the weeds. The default setting for regular roughs is 0 to 0, which would imply totally even distribution – which is what most grass is. As the numbers start to increase, one sees a little more clumping of the blades,



which becomes ever more pronounced as the numbers get higher and closer together. One of the strange things is that the effect of a low number in the first position (see the 0 to 80 picture below), seems to negate most of the clustering. The final three pictures show how tight the clusters can be if you put in high numbers that are close together.



This was the last parameter to be looked at. I hope that this information proves useful to the TW08 community of Texture creators. As I mentioned above, my plan is to next look at these parameters and try to quantify their effect on Frame-rates and Lag during game-play, so that texture creators and designers can be aware of the least impactful approaches to making textures that look realistic but aren't detrimental to game play, especially for those who have less computing or graphic power.