# Progress Report

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A Procedural, Minimal Input, Natural Terrain Plug-in for Blender

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# 1 Previous Objectives

- Distribute water and sediment in a more random fashion so as to get more variation.

# 2 Progress

## 2.1 Lossy System

The erosion process was made lossy in terms of the water and sediment: if the grid cell being examined is on the edge of the map, dummy neighbours are added in to compensate and provide more fair erosion and consume water and sediment in the normal proportions that the erosion algorithm dictates. These dummy cells are created by duplicating other neighbouring cells that do exist, and effectively allow the transferred water and sediment to pour off the map.

## 2.2 Feature Generation: Rivers

### 2.2.1 Graph Interpolation

An attempt was made at creating initial rivers by simply interpolating the fBm terrain by a cosine value based on river width. This was then eroded and generated semi-realistic renderings. Refer to Figure 1.

### 2.2.2 Rain Tweaking

Another method of raining twice as much in the area designated was attempted and produced disappointing results. Refer to Figure 2.
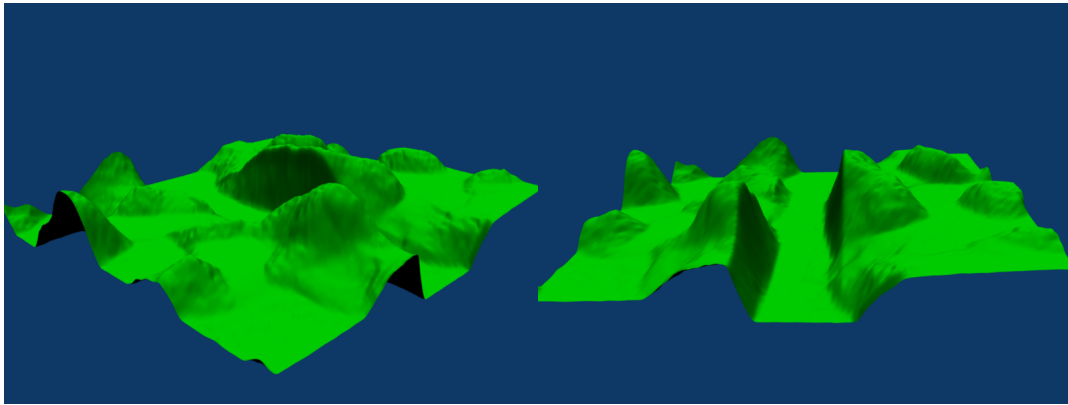
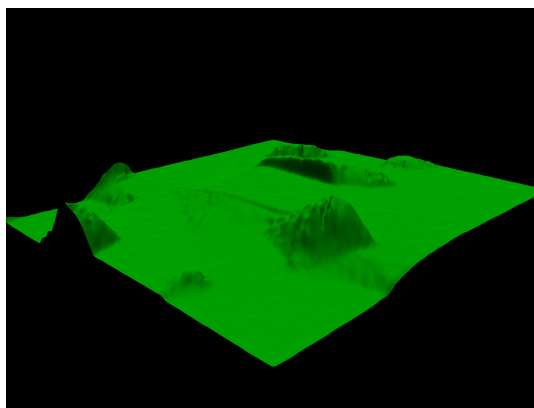Figure 1: Cosine interpolated river creation



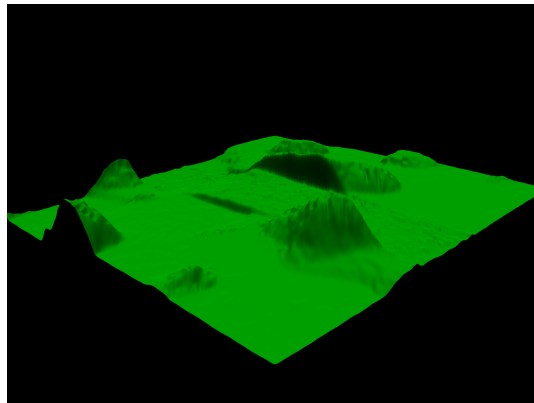Figure 2: Rain tweaking river creation

Figure 3: Erosion tweaking river creation

### 2.2.3 Erosion Tweaking

Another method was attempted by adjusting the erosion constants in the area designated to be the river: the rate at which sediment is converted to soil was halved, the max amount of sediment which can be suspended in a unit of water was doubled, and rate at which soil is converted to sediment was doubled. This too produced disappointing results, refer to Figure 3.

### 2.2.4 Conclusion

Simply using Fractional Brownian Motion as a base terrain and editing this may be insufficient, perhaps designating areas to be mountains and rivers and so forth and setting different erosion constants on a flat plane may produce more desirable results after erosion.

Perhaps the lossy system needs to be made more so: if a cell is on the edge it could possibly just lose all the water and sediment it contains. This should allow for quicker river generation and perhaps more interesting erosion patterns to develop.

## 3 Problems

The realism of the river generation approaches tried.

## 4 Objectives for Next Week

1. Make border cells completely lossy.

2. Try the flat plane approach: changing erosion constants to create mountains and rivers and then eroding (this must be done after making the border cells completely lossy otherwise the system will still be very contained).