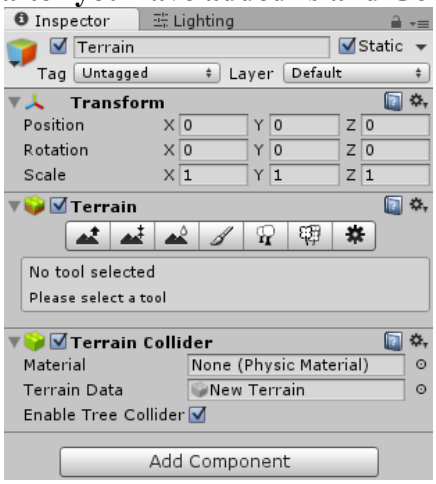
# Procedural Island Basis Generator Manual

The package includes three files: **IslandGenerator.cs**, **IslandGeneratorEditor.cs** and **IslandGeneratorIcon.png**. First script is the main script of the asset, containing the algorithms. Second one is used to create custom Inspector Layout (this needs to be in the *Editor* folder). Last one is the icon for the component.

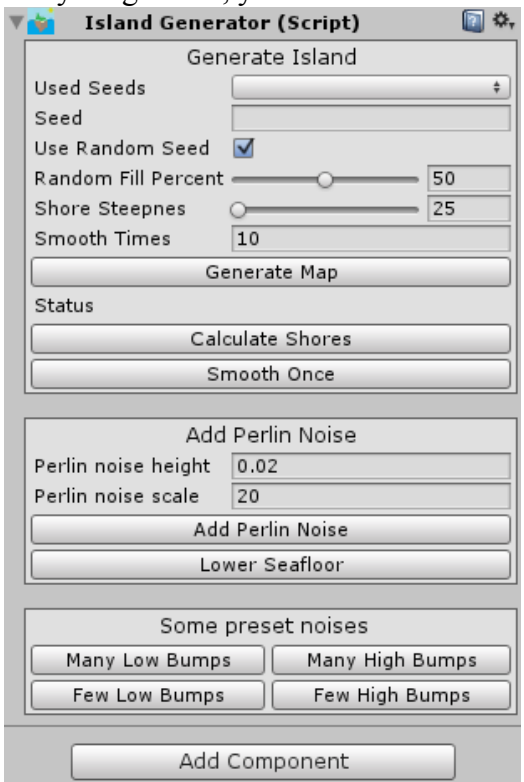
## How to start

To start using this asset, you will need to have a **3D Object: Terrain** with **Terrain Component** and **Terrain Data** added in the scene. Without these, Island Generator won't work. *Island Generator* supports different Terrain Widths, Lengths and Heights. Different resolutions are almost fully supported, although I suggest you don't go under 129 or over 2049. (Low resolutions makes poor looking islands and High resolution can increase calculation time drastically)
**IMPORTANT: Do not remove Terrain Component or Terrain Data from the GameObject after you have added Island Generator Component to it!**



*Default Terrain Gameobject that is ready to use Island Generator.*

Next, you can add the Island Generator to your GameObject by clicking the *Add Component*-button and selecting *Island Generator-Island Generator*, or from the top toolbar *Component-Island Generator-Island Generator*, or simply dragging the **IslandGenerator.cs** to the inspector. If everything is OK, you should see this:



Now you are ready to use the Island Generator! Let's focus a little more in depth to all the values, sliders and buttons on the Inspector, starting from the “Generate Island”-section. Inspector layout is designed to be worked from top to bottom:

- ***Used Seeds*** stores 10 last used Seeds in a dropdown-menu. Selecting a Seed from here applies it automatically to the Seed's input field (Don't forget to un-check “Use Random Seed” checkbox!)
- ***Seed*** is the base of randomization. Seed can be any typed string of numbers, letters or special characters. If you have same Seed, the algorithms will always return the same result. This way you can write down good or otherwise interesting Seeds and use them again later.
- ***Use Random Seed*** if this is ticked on, algorithm will generate a random Seed every time. If the checkbox is un-checked, algorithm will use the seed typed into the *Seed* field.
- ***Random Fill Percent*** determines how much of the surface area is used for the islands and how much is going to be water. Lower values uses more land and creates larger islands, and higher values create smaller, more scattered islands. Recommended values for best looking results are between 50-60.
- ***Shore Steepness*** determines how curved the shores are starting from the land to the ocean floor. Lower values makes shores really steep curve and higher values makes the shores more smoother and even. Bigger values also results in a longer calculation time. Recommended values for best looking results are between 50-100.(**NOTE:** Shore steepness also depends on how far the shore is from the edge of the terrain; if an island is really close to the edge, it's shores are going to be steep, so it won't go over the edge of the terrain. On the other hand, if the island is more center of the terrain, the shores are going to be more smoother).
- ***Smooth Times*** is the value how many times a “Smooth” function is applied to the terrain. This function is just a basic blur-type algorithm that uses the mean of pixels around a one pixel to determine the new value of that pixel. This is used to smooth out some jagged edges of the terrain.
- ***Generate Map*** pressing this will generate the first iteration of the Island Generation using the values defined above. This is a crude layout of the island(s) with very jagged edges that gives you and overall picture of the shape of the island(s). This algorithm is relatively quick, so that's why it is separate from the rest of the generation. (**NOTE:** this needs to be pressed every time you want to create a new island with new parameters!)
- ***Status*** percentage of the shore calculation status (Next button).
- ***Calculate Shores*** this generates the smooth shores around the island layout generated before. It uses the *Shore Steepness* to determine how smooth the shores are and applies it to the terrain. Lastly it uses the *Smooth Times* to smooth the Terrain given times.
- ***Smooth Once*** runs the “Smooth” function just once on the terrain. Can be used to fine-tune the overall look on the terrain any given time.

That concludes the main part of the *Procedural Island Basis Generator* and with the tools and attributes explained above can be used to create a basic layout of islands into the Terrain-object.

**NOTE:** Undo works after every terrain change, so if you accidentally generate a new Map over an old one, you can Undo it. Also if you add undesired-looking *Perlin Noise* (*Perlin Noise* is explained below) you can Undo it and try again with different values!

## Perlin Noise

Next part of the Component is the *Perlin Noise* Generator. *Perlin Noise* is a continuous and smooth noise, that can be applied to a Terrain to give realistic-looking land. *Perlin Noise* is added on top of the current TerrainData, so you can use this to add some noise even after you have sculpted your island with other Terrain tools. It can also be used on a whole different Terrain that didn't even use the Island Generator, but you just want to add some noise to some other Terrain! *Perlin Noise* has:

- ***Perlin Noise Height*** is the height of the *Perlin Noise* “bumps”. Higher values means more difference between the lowpoints and the highpoints of the noise. Think of this as the Amplitude on a Sine-wave.
- ***Perlin Noise Scale*** is the scale of the noisemap. This means that higher values has more smaller “bumps” and lower values less larger, smoother “bumps”. Think of this as the frequency of a Sine-wave.
- ***Add Perlin Noise*** adds the *Perlin Noise* to the map with the parameters given above.
- ***Lower Seafloor*** adding *Perlin noise* multiple time raises the overall height of the terrain. So over time, the bottom of the Terrain (seafloor) raises and can even go higher than the sea itself. This button lowers every point on the heightmap until at least one point is at 0 height again. Using this button multiple times can also be used to lower the islands incrementally lower, even if the seafloor is at zero.

Lastly there are four *Perlin Noise* presets you can use to quickly add some basic *Perlin Noise* with a press of a button.