Waterfall System Guide

Game 2D Water Kit v1.4

This is an auto-generated pdf file of the online guide

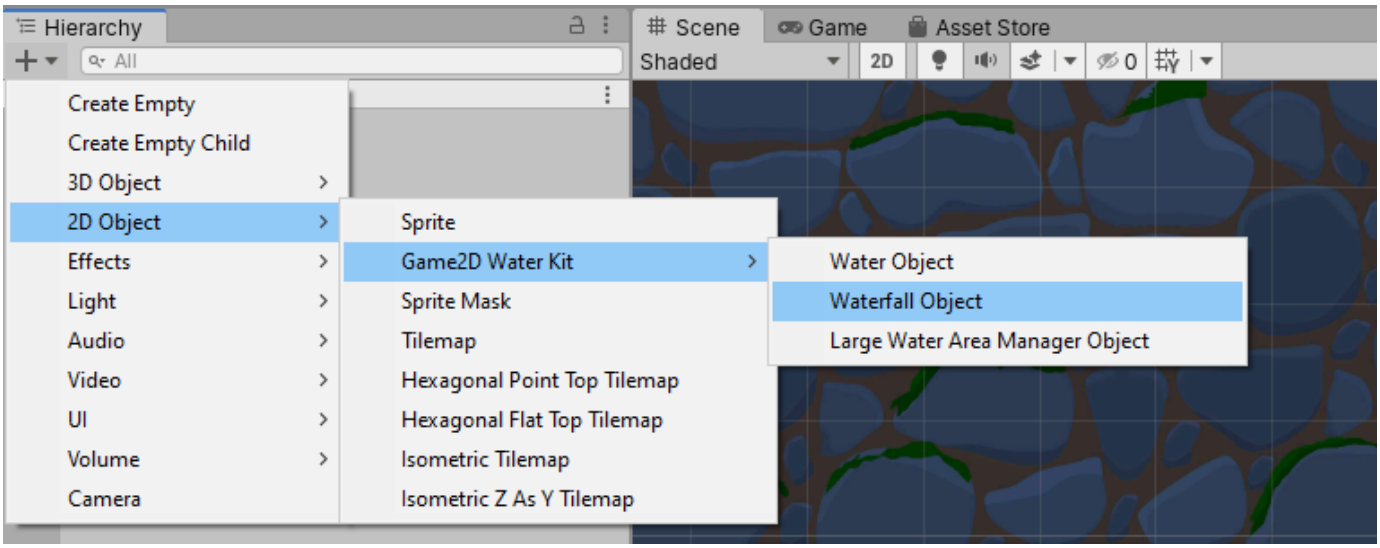
www.game2dwaterkit.com/waterfall-system

Getting Started With The Waterfall System

Creating A Waterfall Object

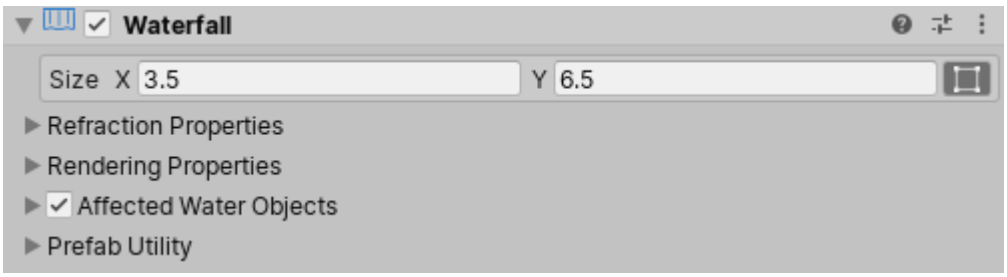
We create a waterfall object from the Hierarchy's Create menu:

> **2D Object → Game2D Water Kit → Waterfall Object**



Resizing The Waterfall Object

We resize the waterfall object right in the scene view using the Rect Tool, or we can just provide the width and the height in the waterfall component inspector.



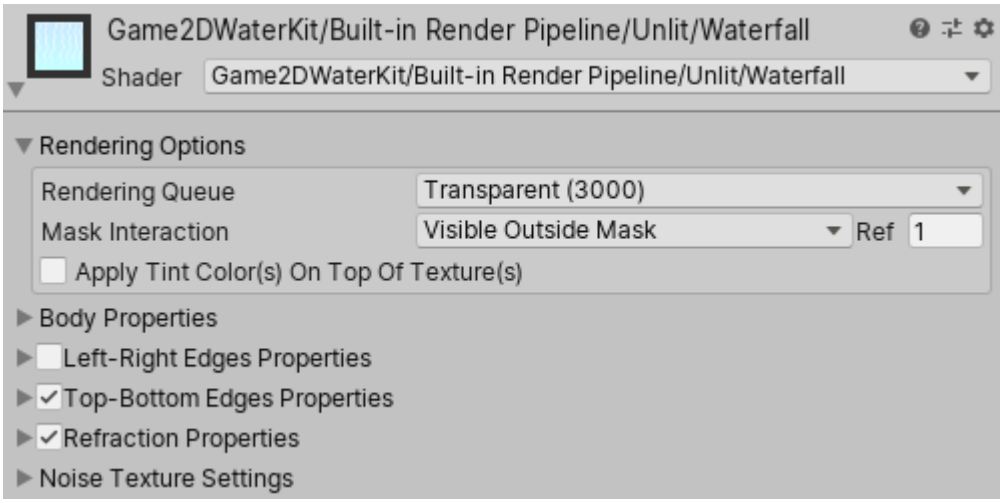
> **Script Reference**

```
waterfallObject.MainModule.SetSize(new Vector2(width, height));
```

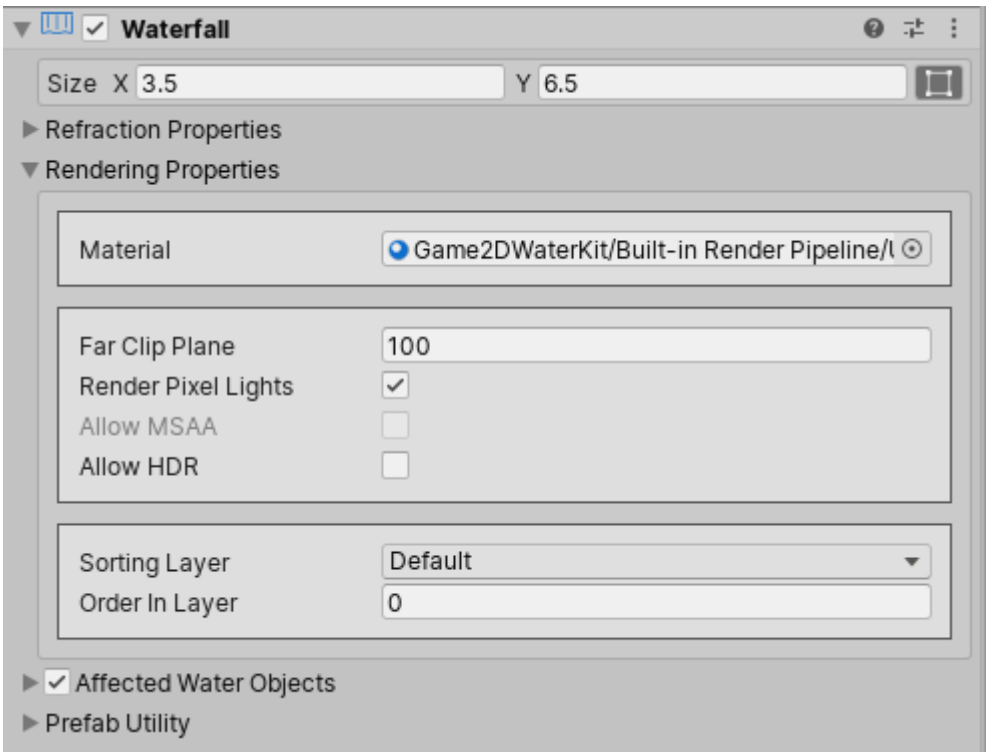
Sorting The Waterfall Object Relative To Sprites

Before trying to sort the waterfall object relative to sprites, we first need to make sure that the ***Rendering Queue*** property, under **Rendering Options** in the waterfall material inspector, is set to Transparent.

> **Note**
>
> The ***Rendering Queue*** property is set to ***Transparent*** by default.



Then, under the **Rendering Properties** in the waterfall component inspector, we specify the sorting layer as well as the order within this layer.



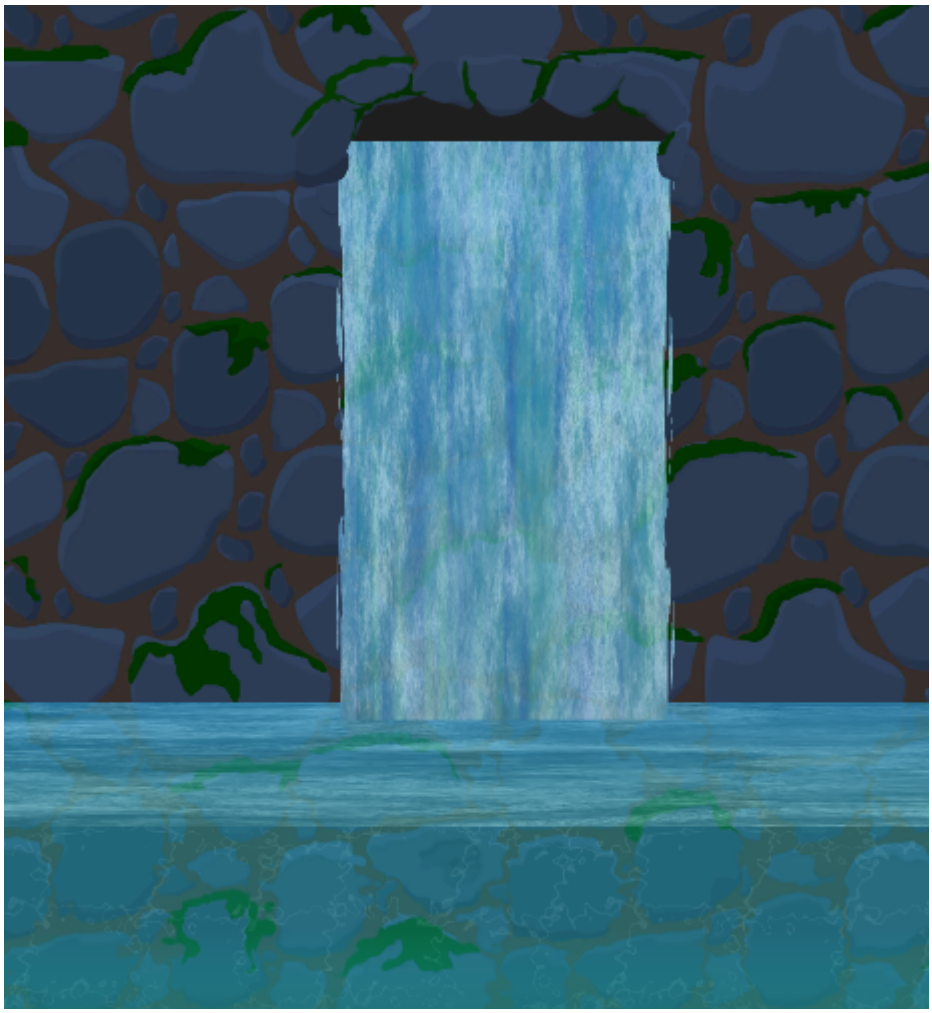
Script Reference

```
waterfallObject.RenderingModule.SortingLayerID =
SortingLayer.NameToID("Default");
waterfallObject.RenderingModule.SortingOrder = 0;
```

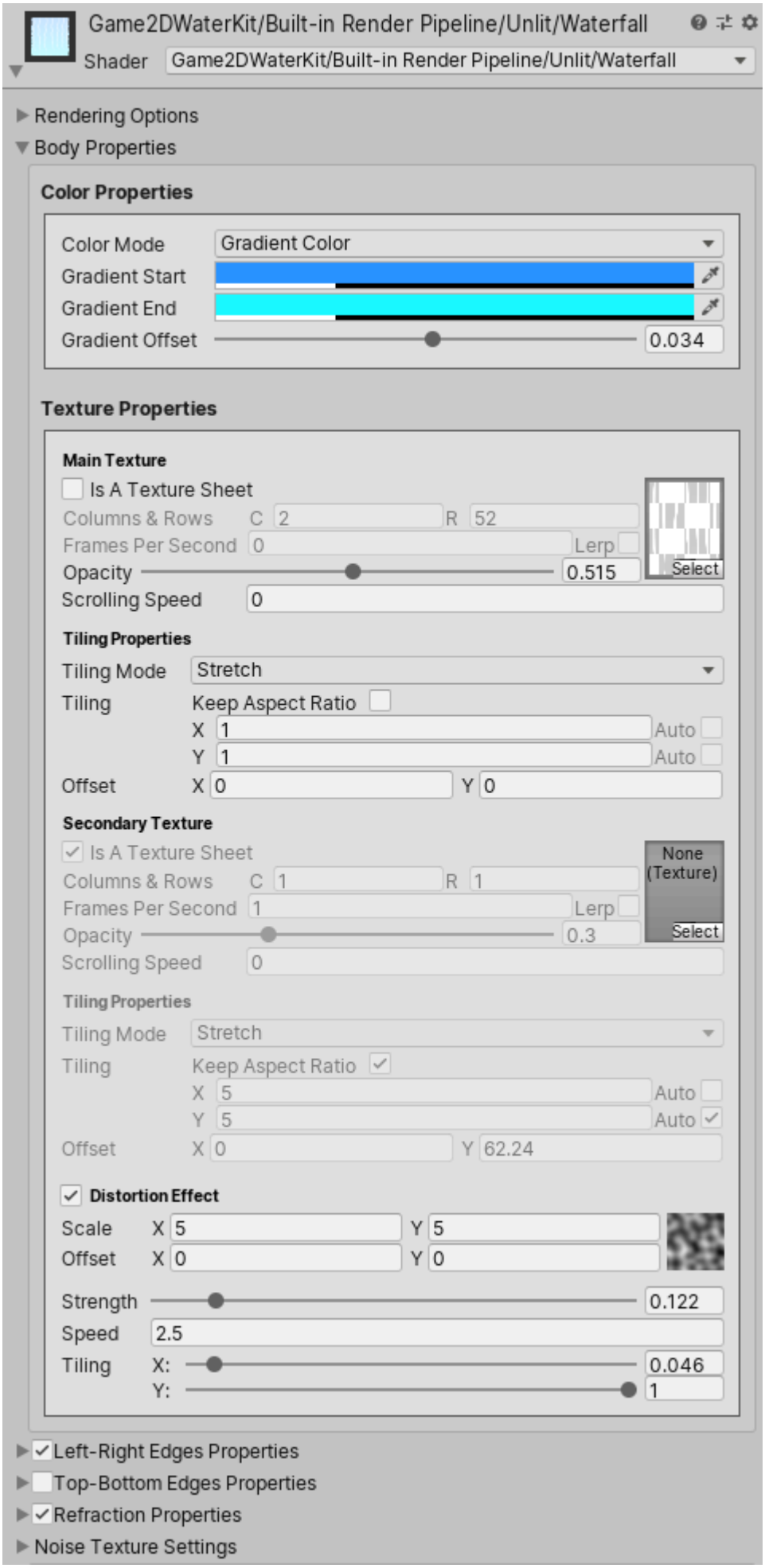
Info

We will look into the other rendering properties later in this guide.

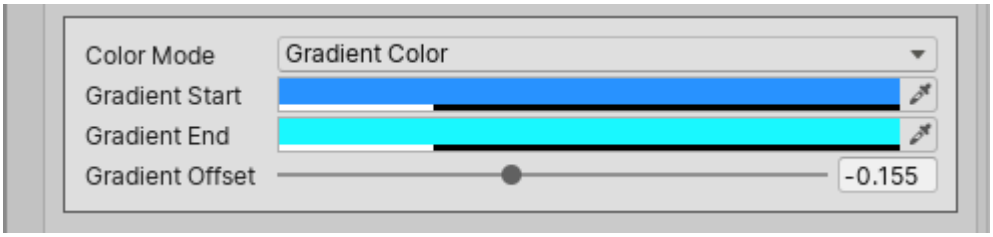
Tweaking The Waterfall Visuals



Waterfall Body Properties


Game2DWaterKit/Built-in Render Pipeline/Unlit/Waterfall
Shader
Game2DWaterKit/Built-in Render Pipeline/Unlit/Waterfall
Rendering Options
Body Properties
Color Properties
Color Mode
Gradient Color
Gradient Start
Gradient End
Gradient Offset
0.034
Texture Properties
Main Texture
Is A Texture Sheet
Columns & Rows
C 2
R 52
Frames Per Second
0
Lerp
Opacity
0.515
Select
Scrolling Speed
0
Tiling Properties
Tiling Mode
Stretch
Tiling
Keep Aspect Ratio
X 1
Auto
Y 1
Auto
Offset
X 0
Y 0
Secondary Texture
Is A Texture Sheet
Columns & Rows
C 1
R 1
Frames Per Second
1
Lerp
Opacity
0.3
None (Texture)
Select
Scrolling Speed
0
Tiling Properties
Tiling Mode
Stretch
Tiling
Keep Aspect Ratio
X 5
Auto
Y 5
Auto
Offset
X 0
Y 62.24
Distortion Effect
Scale
X 5
Y 5
Offset
X 0
Y 0
Strength
0.122
Speed
2.5
Tiling
X:
0.046
Y:
1
Left-Right Edges Properties
Top-Bottom Edges Properties
Refraction Properties
Noise Texture Settings

Body Color



We can set the waterfall body color to either a *Solid Color* or a *Gradient Color*. If we choose to use a *Gradient Color*, the ***Gradient Offset*** property controls how much to shift the gradient-line midpoint position (where the middle of the color transition should be).

> **Info**
>
> The ***Gradient Offset*** property range: **-0.5** → **0.5**

Body Textures

We could apply up to 2 textures (main and secondary) across the waterfall body.

> **Warning**
>
> The texture should have its wrap-mode set to *Repeat* or *Mirror* in the texture import settings.

Body Texture Sheet Properties

The main or the secondary texture could be a *regular* texture, or a texture-sheet (a texture consisting of many frames) by toggling the ***Is A Texture Sheet*** property on, and then specifying the number of columns and rows and also setting how many frames to play per second.

Body Texture Opacity

The ***Opacity*** property controls the visibility of the texture.

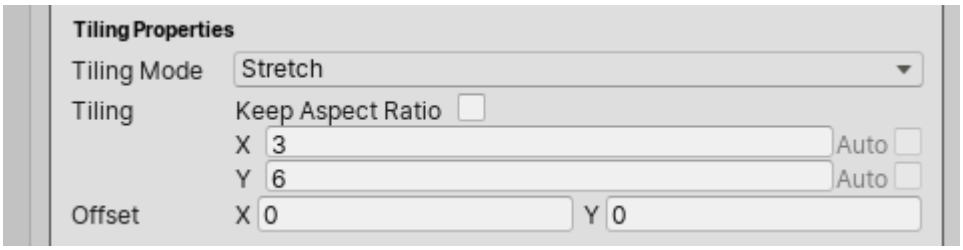
Body Texture Scrolling Speed

We can make the texture scroll vertically by tweaking the ***Scrolling Speed*** property.

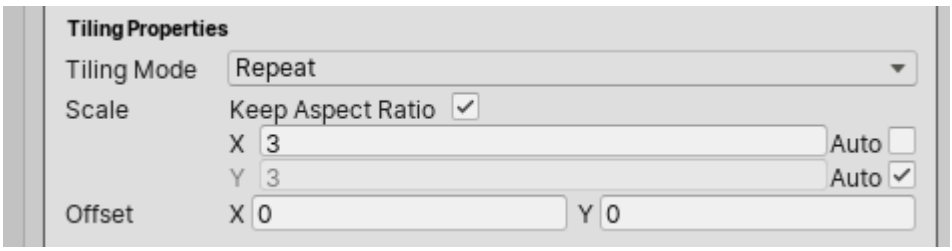
Body Texture Tiling Mode

Regarding the texture tiling properties, there are two tiling modes:

- **Stretch:** The texture stretches when the waterfall object size changes, always keeping the same number of tiles we specify for the X and Y directions.



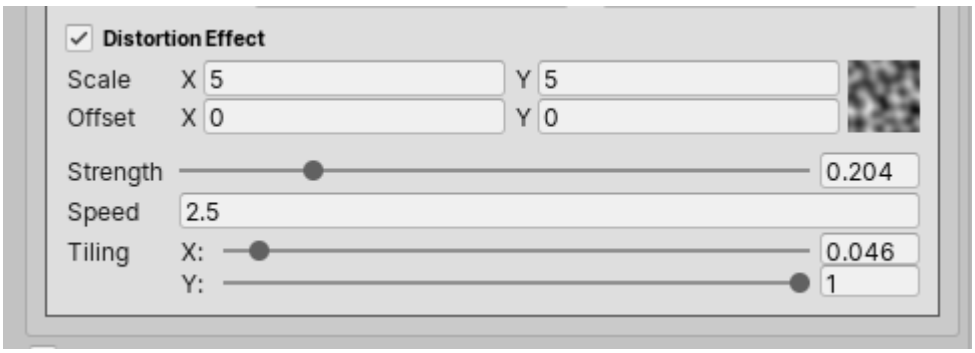
- **Repeat:** The texture repeats when the waterfall object size changes. In this mode, we specify the scale in units of a single tile.



Body Texture Offset

We can provide a texture offset regardless of the selected texture ***Tiling Mode***.

Body Texture Distortion Effect



DISTORTION SCALE - OFFSET

The Mathf.PerlinNoise(x,y) function is used to *sample* the Perlin noise texture values. The ***Scale*** and ***Offset*** properties controls the sampled area size and origin, respectively.

> **Warning**
>
> The ***Scale*** And ***Offset*** properties are used to generate the noise texture (which actually happens only in the editor), and as such they are not animatable.

DISTORTION STRENGTH

The ***Strength*** property, as the name suggests, controls how strong the distortion effect is.

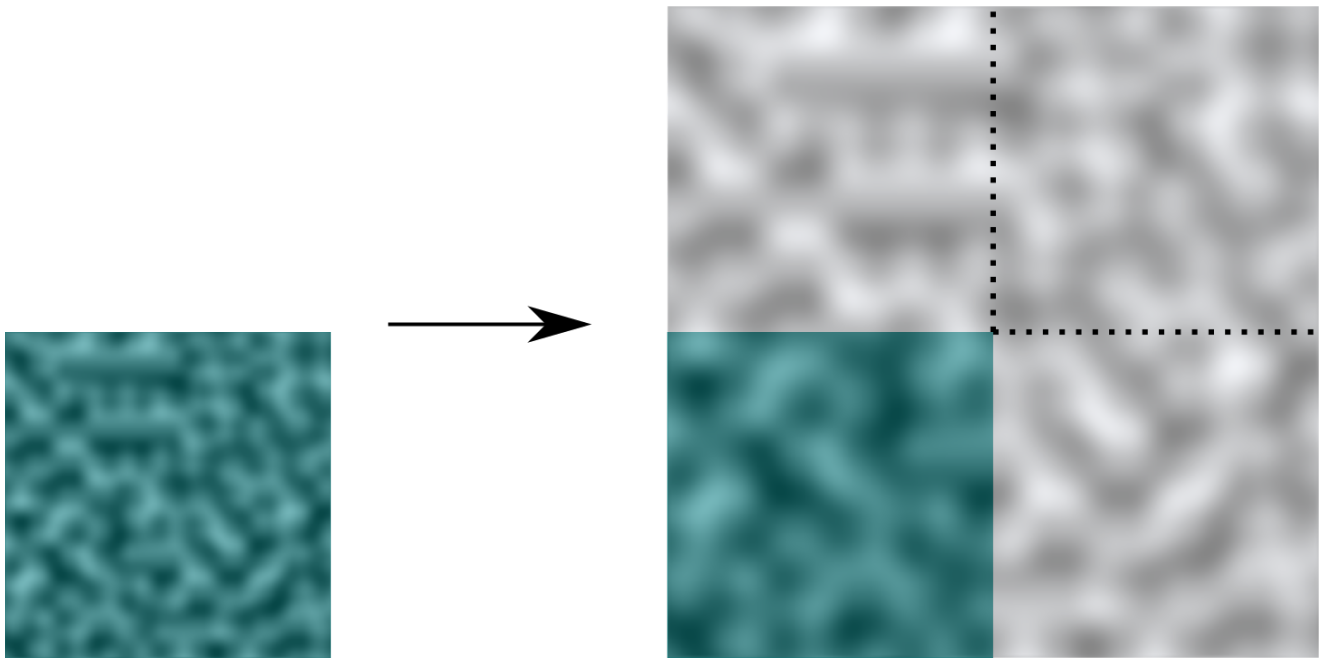
DISTORTION SPEED

The ***Speed*** property controls the noise texture scrolling speed.

DISTORTION TILING

The ***Tiling*** property controls the scale of a texture noise texture tile relative to a waterfall body texture tile.

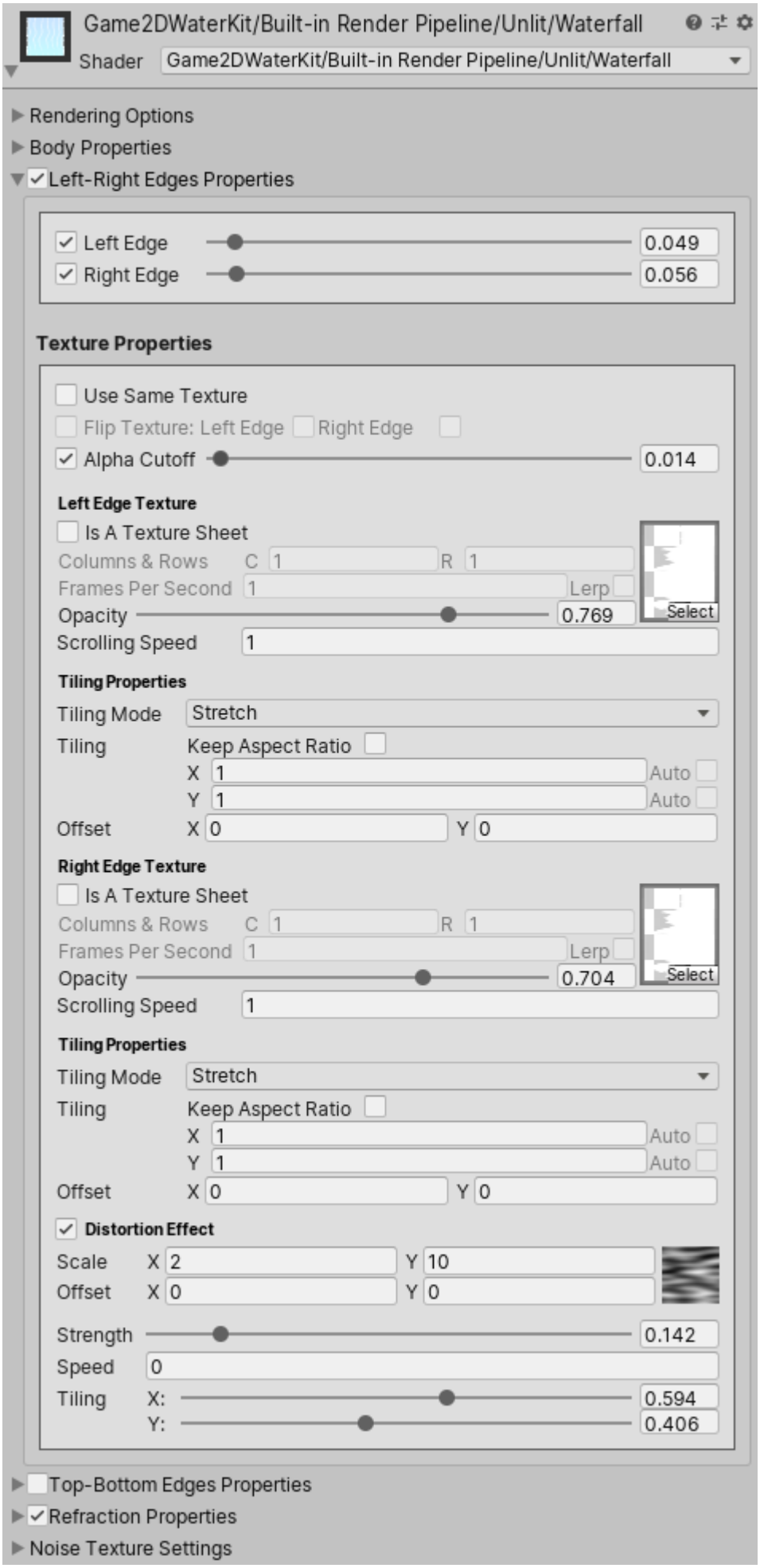
> **Example**
>
> A value of **0.5**, for both the X and Y axis, will apply the noise texture across **4** waterfall body texture tiles.



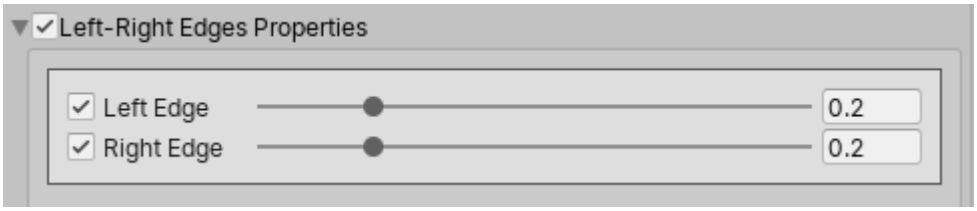
Tip

We can use the ***Tiling*** property to lower the distortion strength across one axis, and keep the full strength across the other.

Waterfall Left-Right Edges Properties

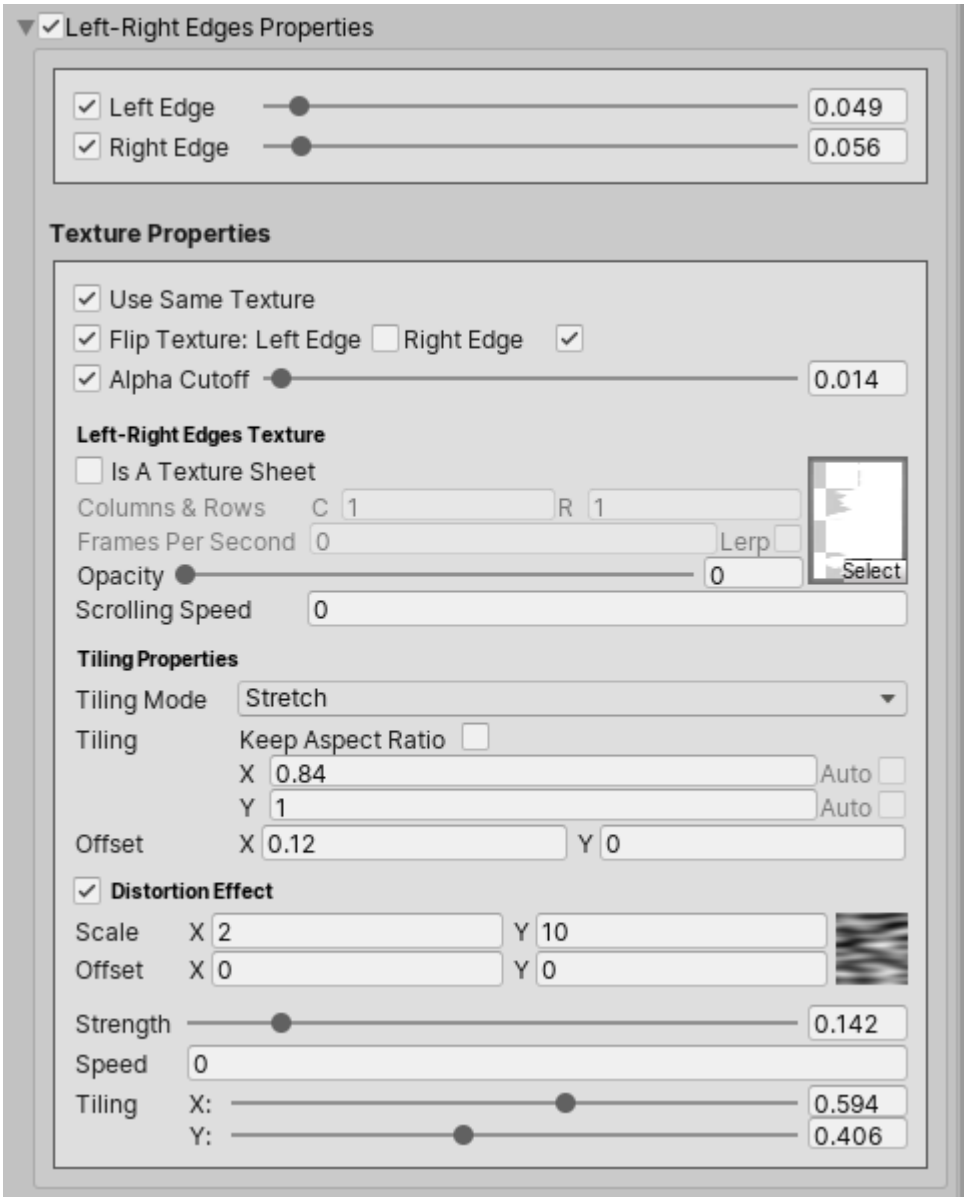

Game2DWaterKit/Built-in Render Pipeline/Unlit/Waterfall
Shader
Game2DWaterKit/Built-in Render Pipeline/Unlit/Waterfall
Rendering Options
Body Properties
Left-Right Edges Properties
Left Edge
0.049
Right Edge
0.056
Texture Properties
Use Same Texture
Flip Texture: Left Edge
Right Edge
Alpha Cutoff
0.014
Left Edge Texture
Is A Texture Sheet
Columns & Rows
C 1
R 1
Frames Per Second
1
Lerp
Opacity
0.769
Select
Scrolling Speed
1
Tiling Properties
Tiling Mode
Stretch
Tiling
Keep Aspect Ratio
X 1
Auto
Y 1
Auto
Offset
X 0
Y 0
Right Edge Texture
Is A Texture Sheet
Columns & Rows
C 1
R 1
Frames Per Second
1
Lerp
Opacity
0.704
Select
Scrolling Speed
1
Tiling Properties
Tiling Mode
Stretch
Tiling
Keep Aspect Ratio
X 1
Auto
Y 1
Auto
Offset
X 0
Y 0
Distortion Effect
Scale
X 2
Y 10
Offset
X 0
Y 0
Strength
0.142
Speed
0
Tiling
X:
0.594
Y:
0.406
Top-Bottom Edges Properties
Refraction Properties
Noise Texture Settings

Left-Right Edges Thickness



We first specify how thick the left and the right edges are.

Left-Right Edges Texture(s)

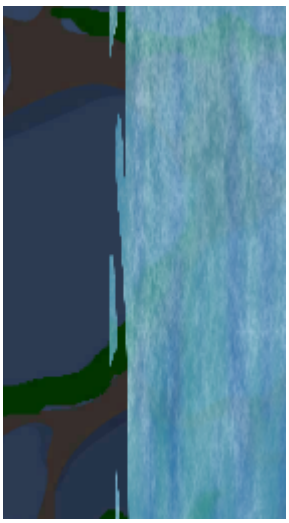


We can use two different textures for the left and right edges, or we can simply use the same texture for both edges by toggling the ***Use Same Texture*** property on.

In case we decided to use the same texture, the ***Flip Texture*** property controls whether or not we want to flip the texture when it gets applied across the specified edge horizontally.

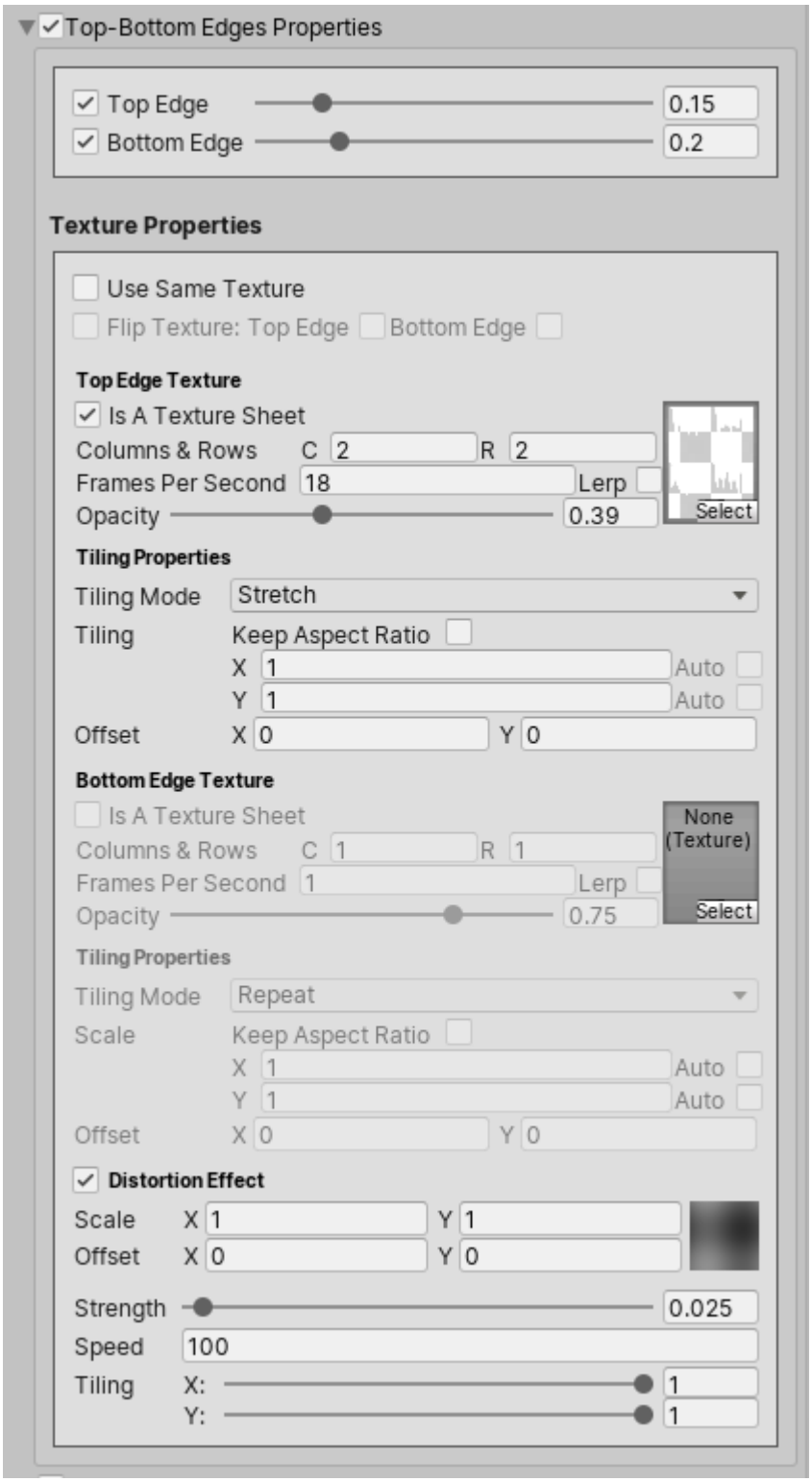
By toggling the ***Alpha Cutoff*** property on and tweaking the cutoff value, any pixels with the alpha value below the cutoff threshold will be considered invisible. This might be useful if we would like to add some *irregularities* to the left and the right edges.

Example

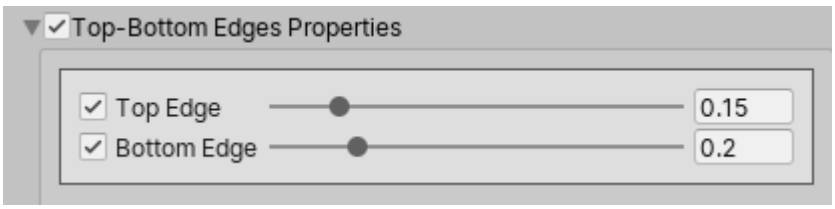


The description of the left-right edges texture(s) properties is the same as the waterfall body texture properties, as discussed here.

Waterfall Top-Bottom Edges Properties

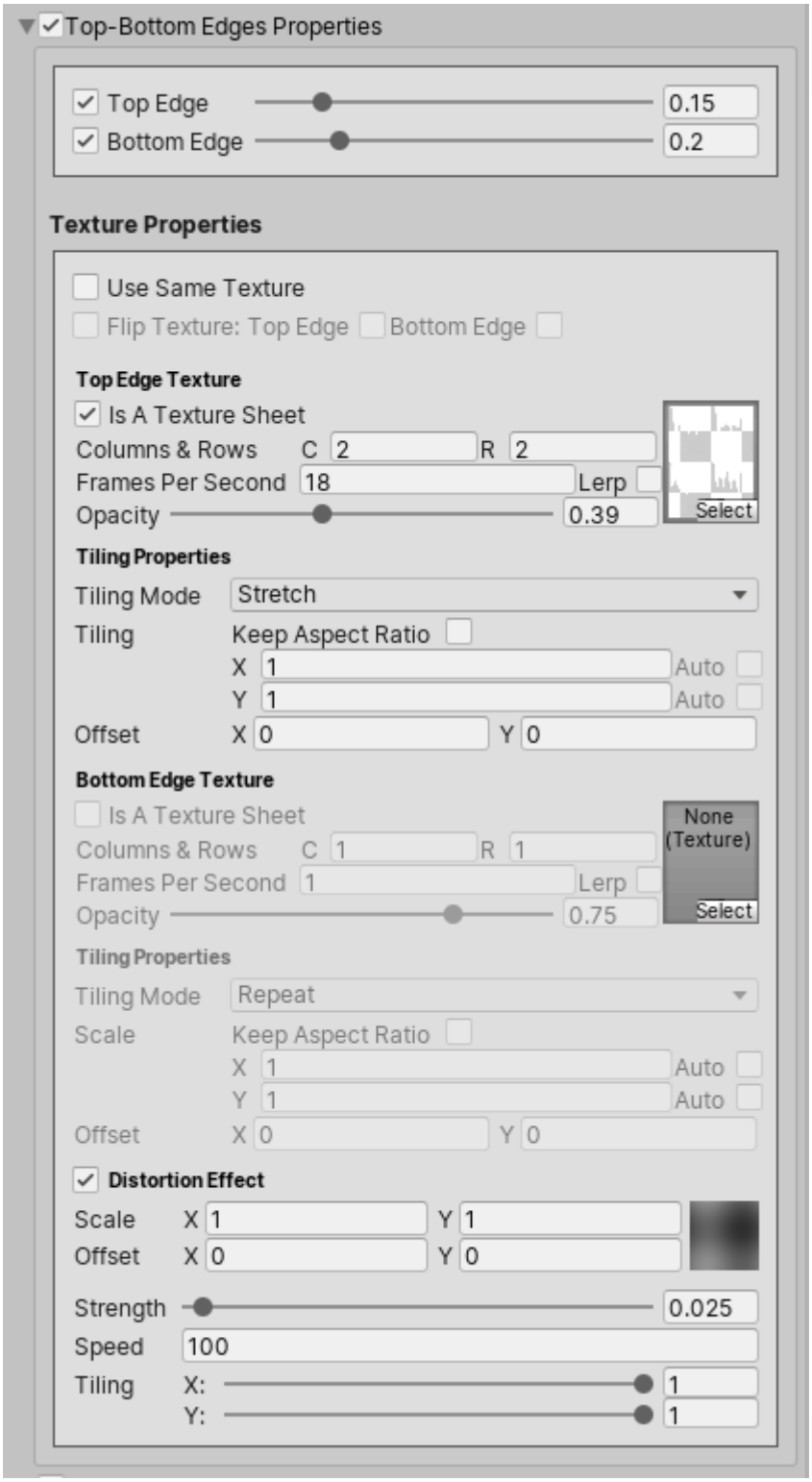


Top-Bottom Edges Thickness



We first specify how thick the top and the bottom edges are.

Top-Bottom Edges Texture(s)



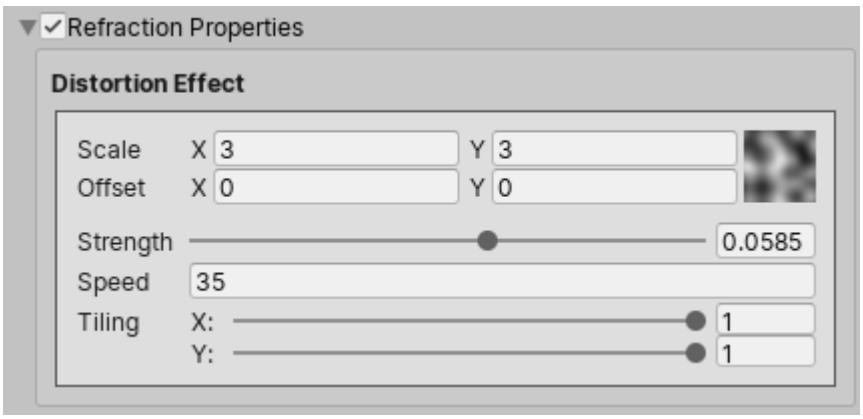
We can use two different textures for the top and bottom edges, or we can simply use the same texture for both edges by toggling the ***Use Same Texture*** property on.

In case we decided to use the same texture, the ***Flip Texture*** property controls whether or not we want to flip the texture when it gets applied across the specified edge vertically.

The description of the top-bottom edges texture(s) properties is the same as the waterfall body texture properties, as discussed here.

Waterfall Refraction Effect

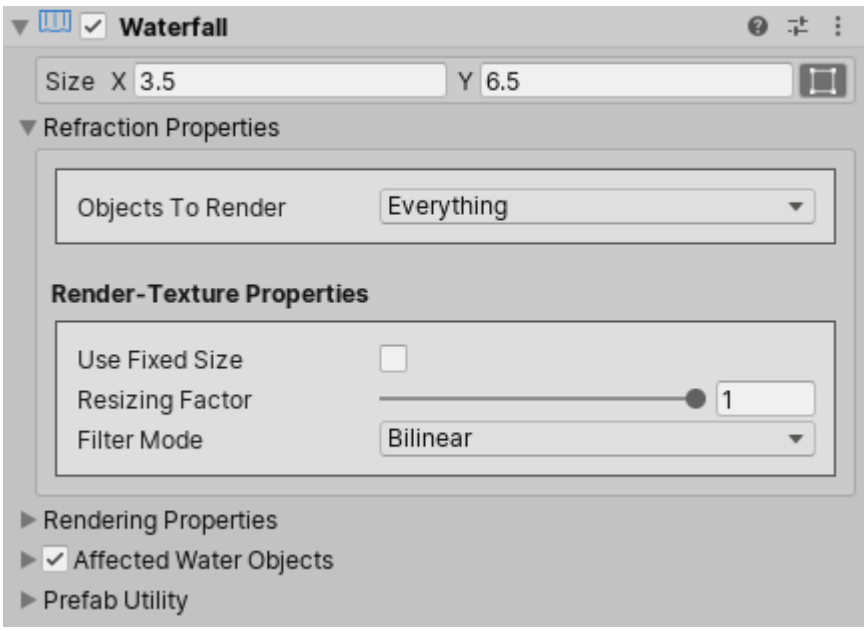
Under the **Refraction Properties** in the waterfall material inspector, we set the refraction effect distortion properties.



The refraction distortion properties description is the same as the waterfall body distortion effect properties, discussed here.

Waterfall Refraction Layers

Under the **Refraction Properties** in the waterfall component inspector, we use the ***Objects To Render*** property to select which layers to include in the refraction rendering.

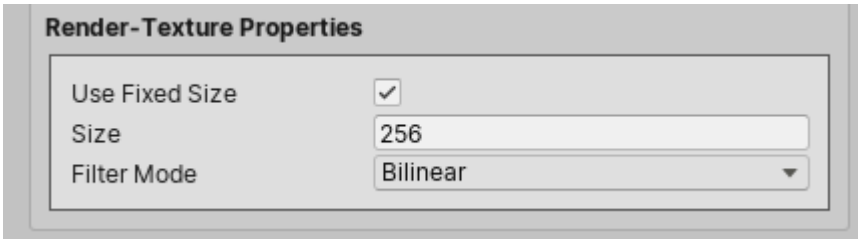


Script Reference

```
waterfallObject.RenderingModule.Refraction.CullingMask =
LayerMask.GetMask("Default", "TransparentFX");
```

Waterfall Refraction Render-Texture Properties

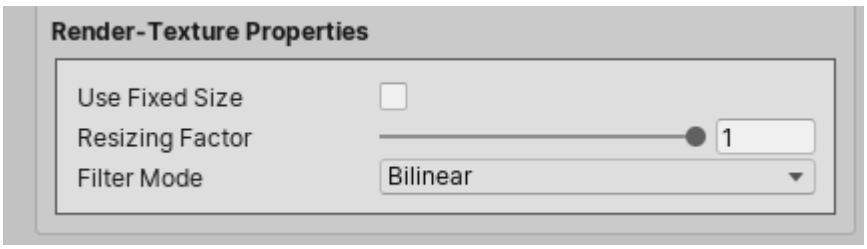
If the ***Use Fixed Size*** property is toggled on, the ***Size*** property sets the refraction render-texture width and height.



Script Reference

```
waterfallObject.RenderingModule.Refraction.RenderTextureUseFixedSize = true;
waterfallObject.RenderingModule.Refraction.RenderTextureFixedSize = 512;
```

But, if the ***Use Fixed Size*** property is toggled off, the refraction render-texture will have a dynamic size, and the render-texture width and height are in this case equal to the the waterfall object visible area on screen width and height. We can even downscale this computed size by lowering the ***Resizing Factor*** property value.



Script Reference

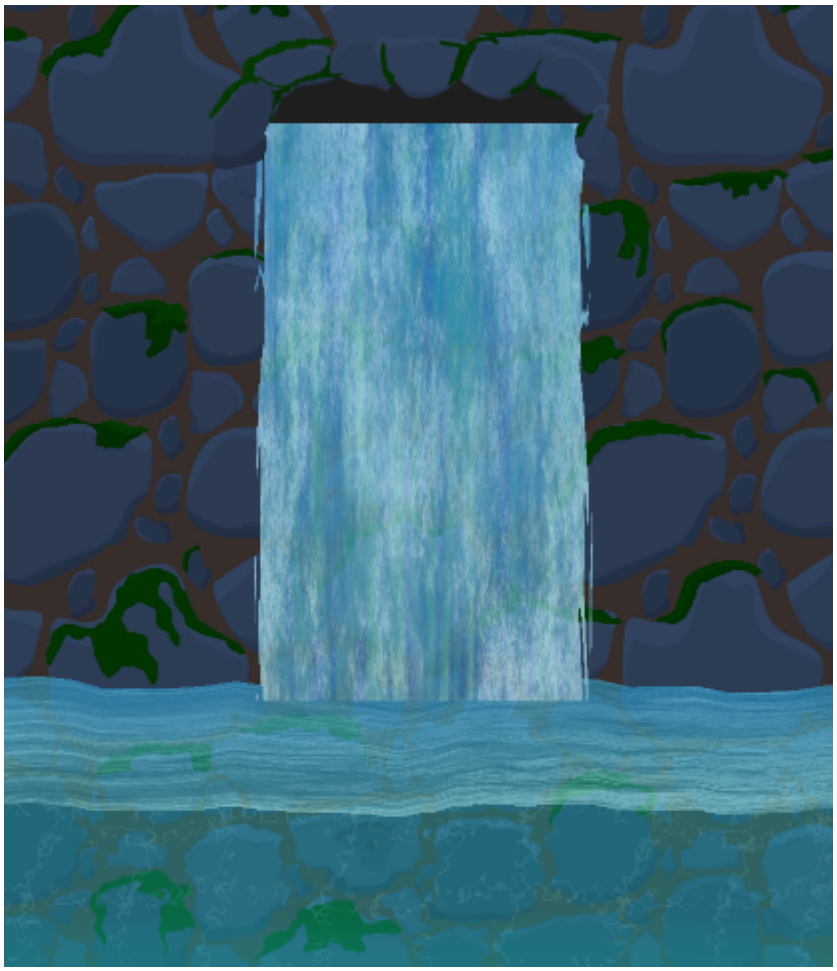
```
waterfallObject.RenderingModule.Refraction.RenderTextureUseFixedSize =
false;
waterfallObject.RenderingModule.Refraction.RenderTextureResizingFactor =
0.75f;
```

Lastly, We can set the refraction render-texture ***Filter Mode*** property to either *Bilinear* or *Point*.

Script Reference

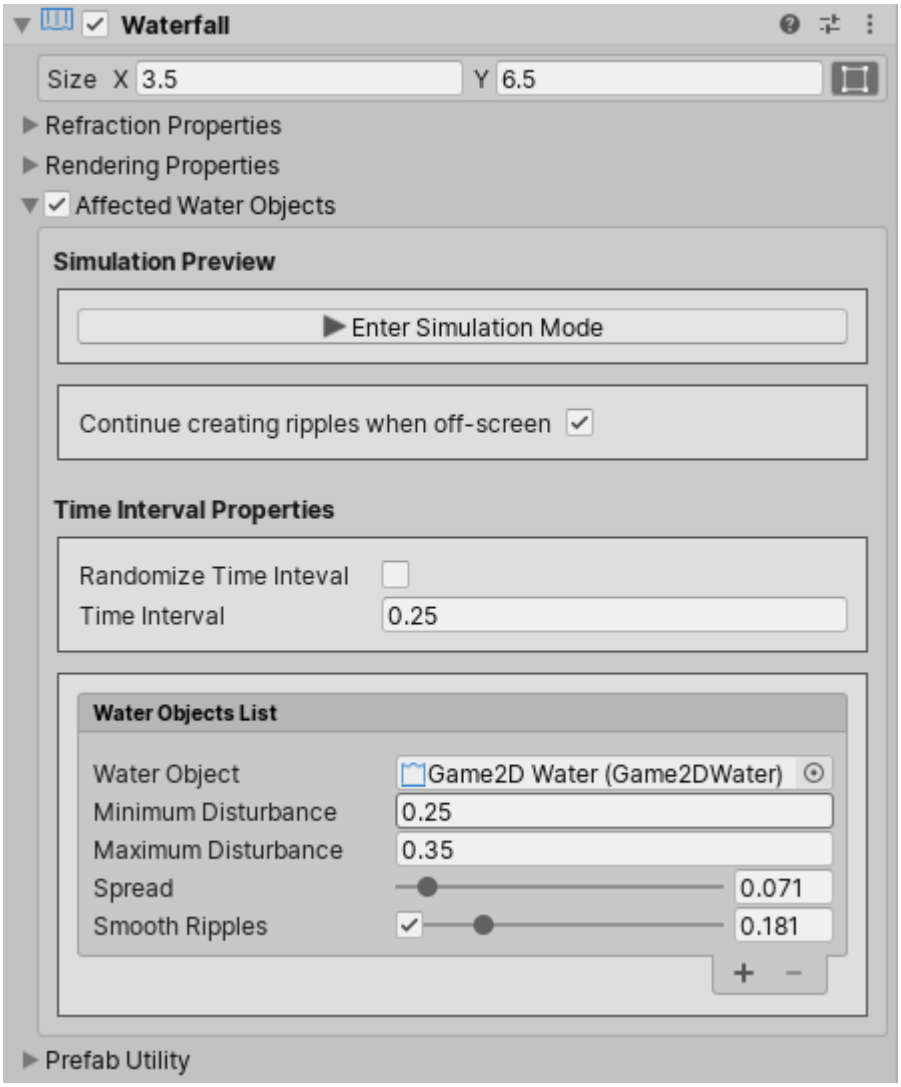
```
waterfallObject.RenderingModule.Refraction.RenderTextureFilterMode =
FilterMode.Bilinear;
```

Tweaking The Waterfall Behavior



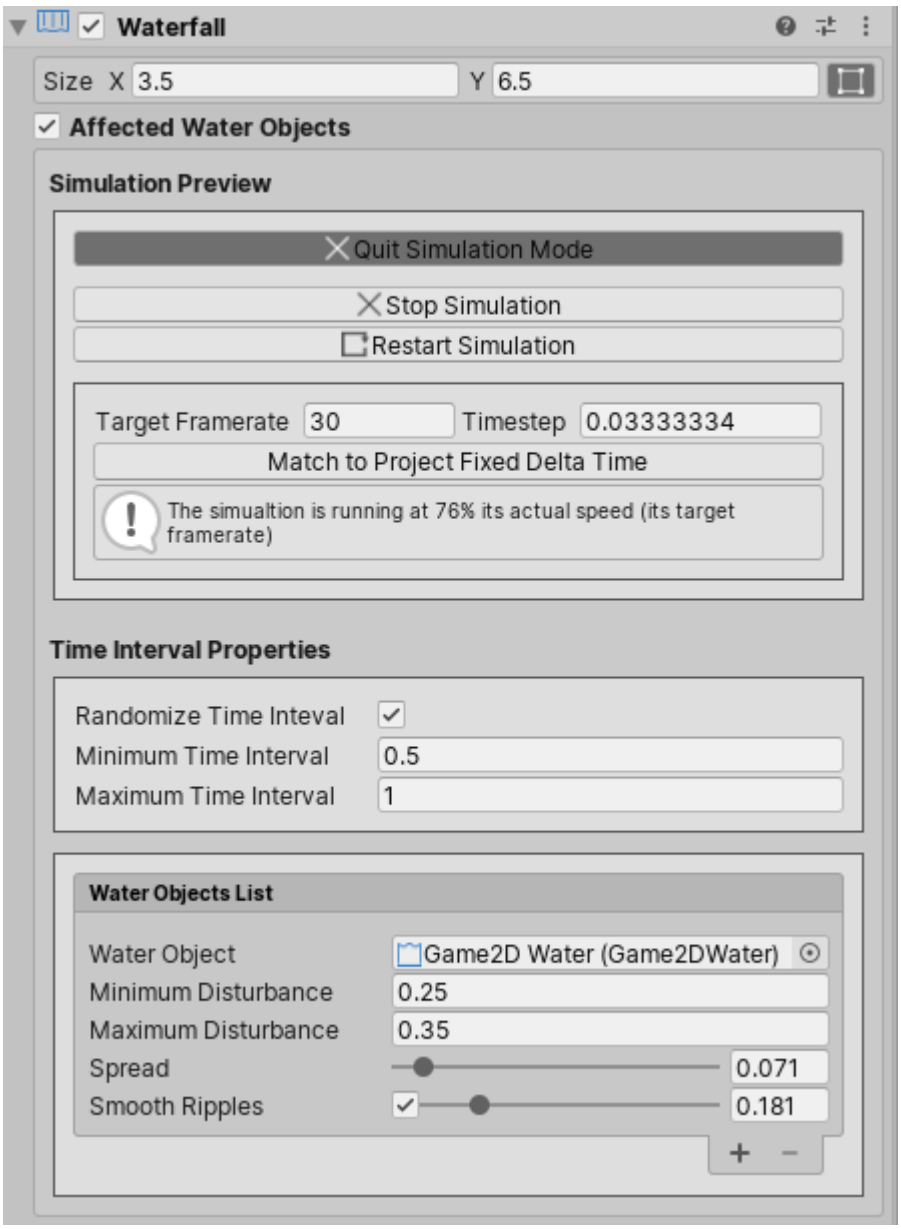
The waterfall system can interact with multiple water systems it **overlaps**, disturbing their surfaces and creating ripples.

We tweak the waterfall behavior in the waterfall component inspector.


Waterfall
Size X 3.5 Y 6.5
Refraction Properties
Rendering Properties
Affected Water Objects
Simulation Preview
Enter Simulation Mode
Continue creating ripples when off-screen
Time Interval Properties
Randomize Time Inteval
Time Interval 0.25
Water Objects List
Water Object Game2D Water (Game2DWater)
Minimum Disturbance 0.25
Maximum Disturbance 0.35
Spread 0.071
Smooth Ripples 0.181
Prefab Utility

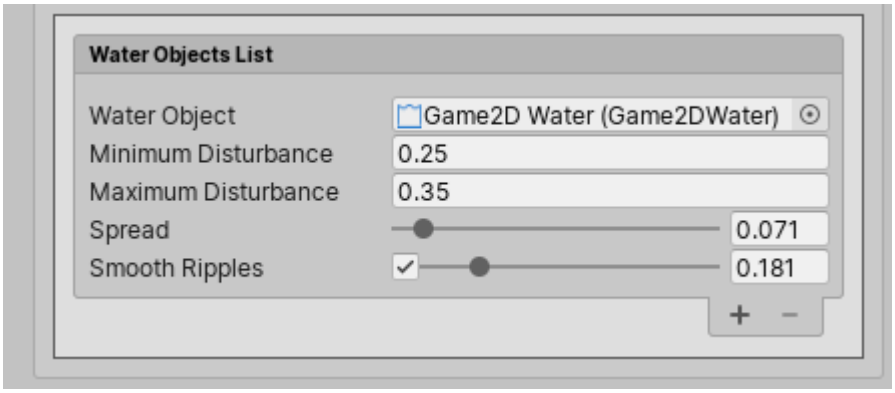
Tip

We can use the simulation mode to quickly and easily tweak and test the waterfall system simulation properties, in realtime, right in the edit mode without the need to switch to play mode. All we need to do is to press the ***Enter Simulation Mode*** button.



Affected Water Objects

We can set which water object(s) the waterfall can interact with, by tweaking the ***Water Objects List*** property.



For each water object:

We specify the minimum and the maximum disturbance the waterfall could apply to its surface.

The ***Spread*** property controls the *weight* of the disturbance. Setting this property to **1** (full weight), the waterfall disturbs **all** the water surface vertices it **overlaps**.

The ***Smooth Ripples*** controls whether or not to disturb a water surface vertex neighbors. We tweak the slider to control the amount of disturbance to apply to the neighbor vertices.

Script Reference

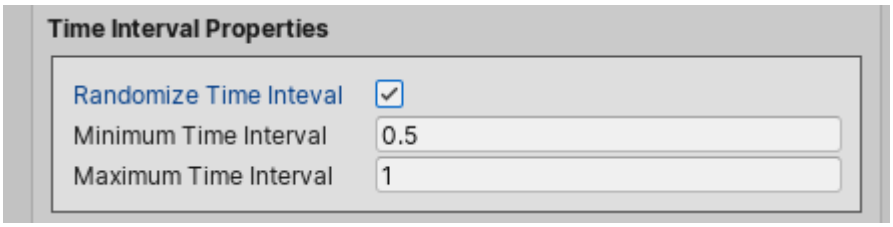
```
using Game2DWaterKit.Ripples;

....

waterfallObject.RipplesModule.IsActive = true;

var affectedWaterObject = new WaterfallAffectedWaterObjet
{
    waterObject = waterObjectInstance,
    minimumDisturbance = 0.25f,
    maximumDisturbance = 0.35f,
    spread = 0.071f,
    smoothRipples = true,
    smoothingFactor = 0.181f
};
waterfallObject.RipplesModule.AffectedWaterObjects.Add(affectedWaterObject);
```

Time Interval Properties

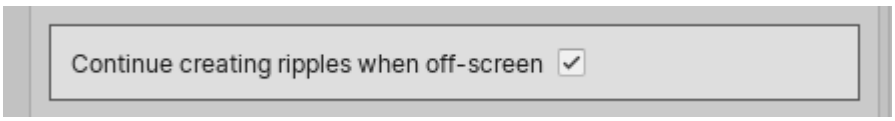


We could specify a fixed time interval, or just provide the minimum and the maximum time intervals and let the waterfall system pick a random time interval.

Script Reference

```
waterfallObject.RipplesModule.RandomizeTimeInterval = true;
//waterfallObject.RipplesModule.TimeInterval = 1f;
waterfallObject.RipplesModule.MinimumTimeInterval = 1f;
waterfallObject.RipplesModule.MaximumTimeInterval = 1f;
```

Continue Creating Ripples When Off-Screen Property



The ***Continue creating ripples when off-screen*** property controls whether or not the waterfall system keeps creating ripples even when the waterfall object is not visible to any camera.

Script Reference

```
waterfallObject.RipplesModule.UpdateWhenOffscreen = true;
```

Prefab Utility

The prefab utility serves to save the waterfall object as a prefab properly, along with its material and its generated noise texture.

We only need to choose where we would like to save the prefab, and then hit the **Create Prefab** button!