Water2D Tool v1.x

GPU Based Water Guide

To create a new GPU based water object you can access the menu (*GameObject->2D Water->GPU Water*).

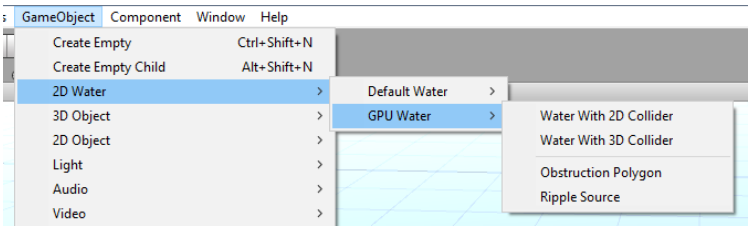

Figure 1 – Water Menu

Alternatively, you can instantiate one of the water prefabs from the *Water2D_Tool/Assets/Prefabs* folder.

All the properties of the GPU based water can be customized in the water objects Inspector, *Water2D_Ripple* script, **Figure 2**.

Figure 2 – GPU Based Water Inspector Options

As you can see from **Figure 2**, the fields **Radius** and **Strength** can be encountered multiple times.

- **Radius** – This field represents the initial radius of the ripple, or you could look at it as the radius of the object that creates that ripple
- **Strength** - Strength determines how high the ripple waves rise or go down.

To find more about the function of a particular field, you can hover the mouse over its name and a short info message will be displayed to you, Figure 3.

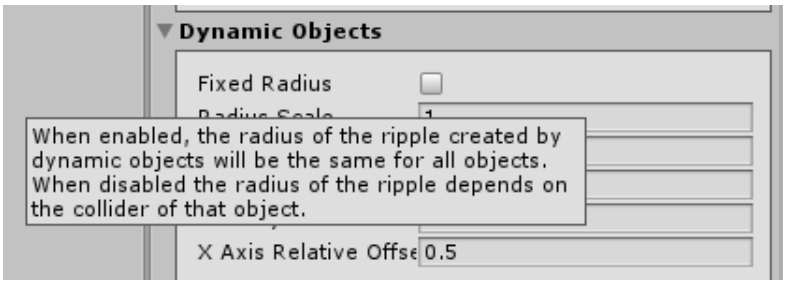

Figure 3 – Info Message.

Water Interaction

Dynamic Objects Interaction - A dynamic object that interacts with the surface of the water will generate ripples. The properties of the ripple can be customized in the *Dynamic Objects* options group, **Figure 4**.

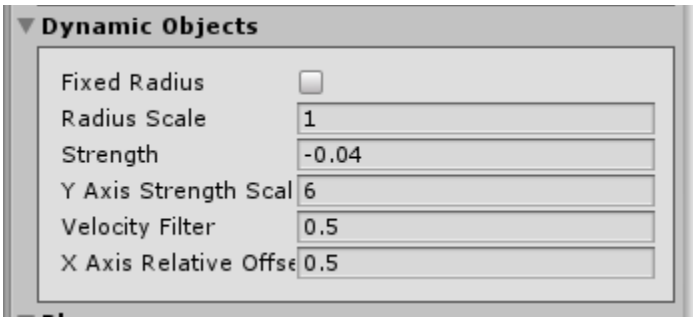

Figure 4 – Dynamic Objects Ripple Properties.

There a several conditions a dynamic object must satisfy in order to be able to generate a ripple.

- The collider of the object must intersect the surface of the water. Objects that are above or below the surface of the water will not generate ripples.
- The Abs values of the velocity on the X or Y axis must be greater than the value of the field *Velocity Filter*, **Figure 4**.

When **Fixed Radius** toggle is disabled, the radius of the ripple created by a dynamic object depends on that objects collider bounding box length on the Z axis and the value of the field **Radius Scale.** When Fixed Radius is disabled, the ripple radius is the same for all dynamic objects. If the water object uses a 2D Collider, **Fixed Radius** is enabled by default and can't be disabled.

Player Interaction – You can use a physics based character controller or a ray cast based character controller for the player. While a player that uses a ray cast based character controller will generate ripples, the buoyancy will work only with physics based character controllers. The properties of the ripples created by the player can be customized from the *Player* options group, in the *Water2D_Ripple* script, **Figure 5**.

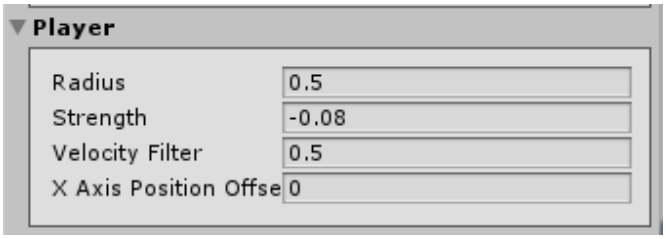

Figure 5 – Player Options.

The conditions a dynamic object must satisfy in order to generate a ripple also apply to players that use a physics based character controller. In the case of the players that use a ray cast based character controller, only the first condition must be satisfied.

Ripple Sources Interaction - To create a ripple source, you can access the menu *GameObject->2D Water->GPU Water->Ripple Source* or instantiate a ripple source prefab from *Water2D_Tool/Assets/Prefabs* folder. There are 2 ways you can use a ripple source. You can place the ripple source object in the water objects inspector, *Ripple Sources* options group, **Figure 6**.

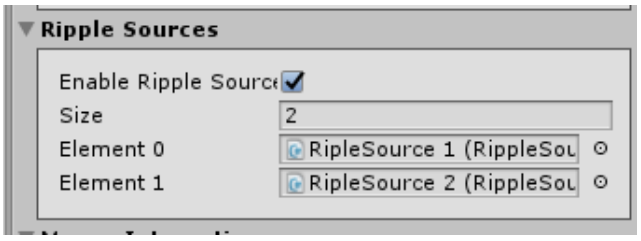

Figure 6 – Ripple Sources

Alternatively you can add the **RippleSource** script to a kinematic object. It is not recommended to add the **RippleSource** script to a dynamic object.

A ripple source has 3 main options that determine when a ripple is generated:

- **When Moving** – When this option is enabled, a ripple will be generated only when the object changes its position in world space, **Figure 7**.

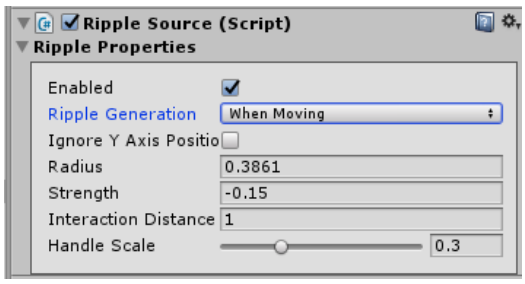

Figure 7 – When Moving.

- **Random interval** – When this option is enabled, a ripple will be generated at random intervals of time. After a ripple is generated, the ripple source will calculate a random value between the values of *min* and *max Delta Time*. This value represents the time to wait before a new ripple is generated, **Figure 8**.

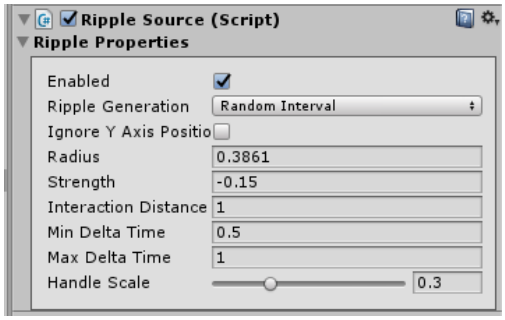

Figure 8 – Random Interval.

- **Fixed Interval** – When this option is enabled, a ripple is generated at a fixed interval of time. , **Figure 9**.

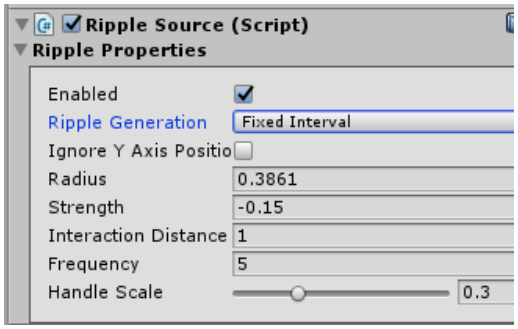

Figure 9 – Fixed Interval

When you select a ripple source in the editor, you will see a couple of handles. The Green square handles can be used to change the value of the field **Interaction Distance, Figure 10.** The current value of the field **Interaction Distance** is represented by the green line. For a ripple source to be able to generate ripples, the green line must intersect the surface of the water. This rule is ignored if the toggle **Ignore Y Axis Position** is enabled.

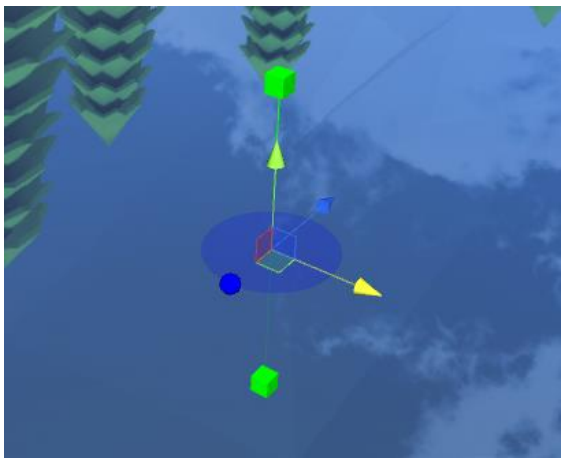

Figure 10 – Ripple Source Object in Editor

The blue sphere handle can be used to change the value of the field **Radius**.

Mouse Interaction – you can use the mouse arrow to generate ripples on the surface of the water. The radius and power of the ripples can be set in the *Mouse Interaction* options group, **Figure 11**. This option is only available if the water object uses a 3D collider.

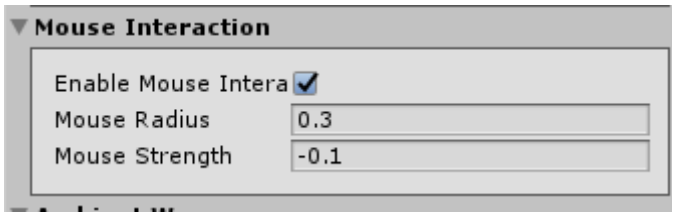

Figure 11 – Mouse Interaction

NOTE: Currently only 10 ripples can be generated per frame.

Water Obstructions

The GPU water supports 2 types of obstructions: dynamic and texture.

Dynamic Obstructions – To enable this option, in the **Obstruction Type** dropdown menu select **Dynamic Obstruction, Figure 12**.

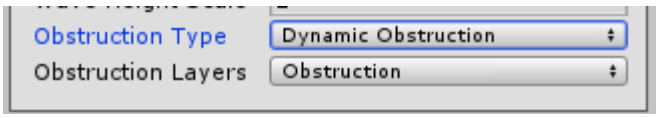

Figure 12 – Dynamic Obstruction

Objects that have a Box Collider or a Sphere Collider and are on the Obstruction Layers mask, will prevent the ripples from passing through them. These objects can be moved in the water and the

obstruction region will move with them. Currently there are some restrictions to this feature. You can use only 5 objects with Sphere colliders and 5 with Box colliders. If there are more than 5 of each type, they will be ignored. Another restriction is that the objects with box colliders should be rotated only around the Y axis and only by 0, 90, 180, 270 or 360 degrees. This is because the bounding box of the collider is used to calculate the obstruction region.

Texture Obstructions - To enable this option, in the **Obstruction Type** dropdown menu select **Texture Obstruction, Figure 13**.

Figure 13 – Texture Obstruction

In the obstruction texture white means the ripples can move freely while black means that they can't pass through that region and will be reflected back.

You could use photoshop or other tools to create the obstruction texture, but there is a much simpler and quicker way to do it. Water 2D Tool has a build in tool that allows you to create an obstruction texture right inside Unity.

To create a texture obstruction, first go to the menu (*GameObject->2D Water->GPU Water)* and create an **Obstruction Polygon** object, Figure 1, **Figure 14.**

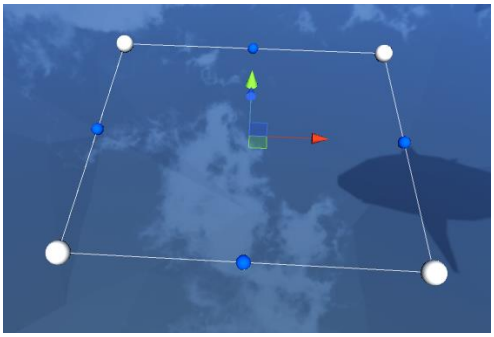

Figure 14 – Obstruction Polygon

To change the shape of the obstruction polygon click, hold and drag one of the white handles. Clicking on the one of the blue sphere will add a new polygon point at that position. To delete a polygon point hold ALT key and press on one of the red spheres, **Figure 15**.

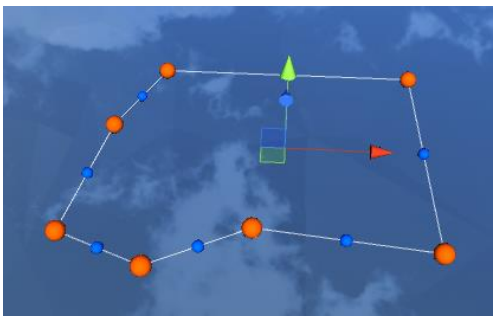

Figure 15 – Delete Polygon Point

When editing the shape of the polygon, to have a better view, it is recommended that you change the camera view to Top. You can do that by right clicking on the axis gizmo and selecting Top option, **Figure 16**.

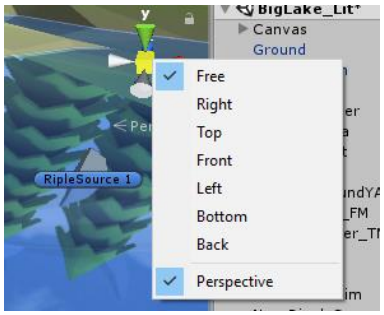

Figure 16 – Camera View

After you give the obstruction polygon the shape you need, go to Windows menu and click on **Texture Obstruction Creator**, **Figure 17**.

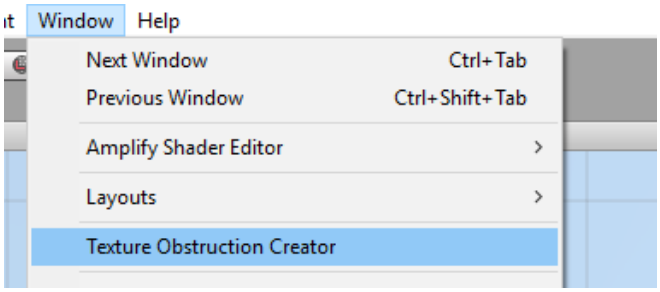

Figure 17 – Texture Obstruction Creator

This will bring up the **Texture Obstruction** window, **Figure 18**. Here you can give the texture a name, set its scale. By default the texture scale is set to 1, this means that the obstruction texture will have the same resolution as the render texture that is used to store the height map.

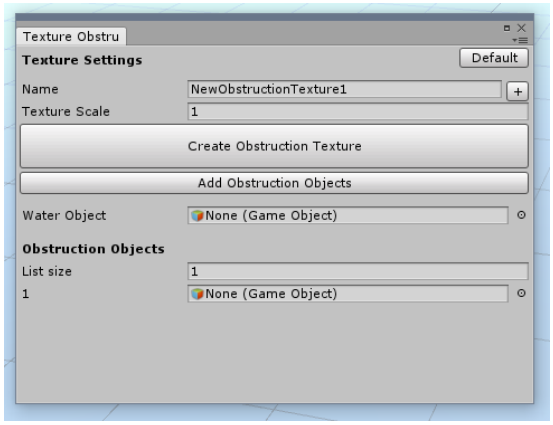

Figure 18 – Texture Obstruction Window.

The next step is to place the water object for which we want to create an obstruction texture in the **Water Object**, **Figure 19.**

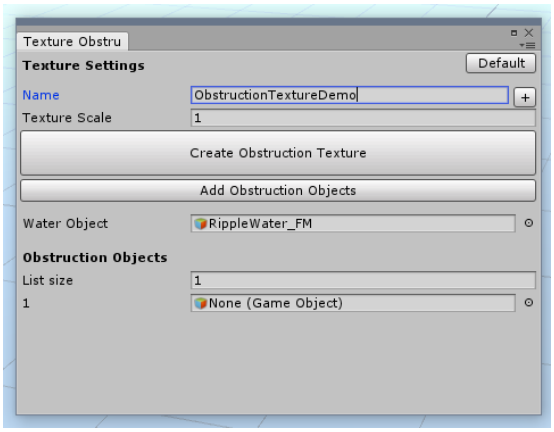

Figure 19 - Texture Obstruction Window.

We do the same for the obstruction objects. We could place them one by one manually or we can just select the obstruction objects in the hierarchy panel and just click the button **Add Obstruction Objects, Figure 20.**

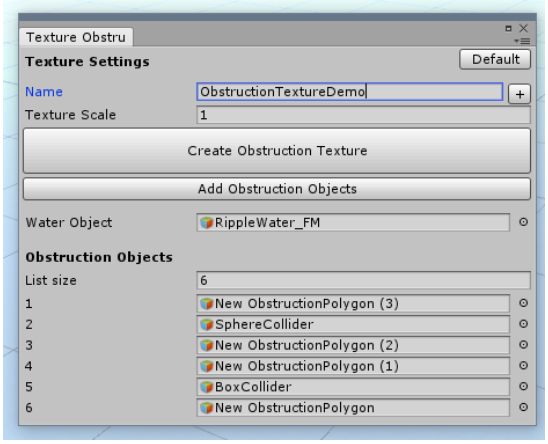

Figure 20 - Texture Obstruction Window.

You can also use as obstructions, objects with Sphere and Box Colliders. The objects that have box colliders can be rotated only around the Y axis.

Now all that's left is to Press the button **Create Obstruction Texture**. The new obstruction texture can be found in the *Water2D_Tool/Assets/Textures/Obstructions* folder, **Figure 21**.

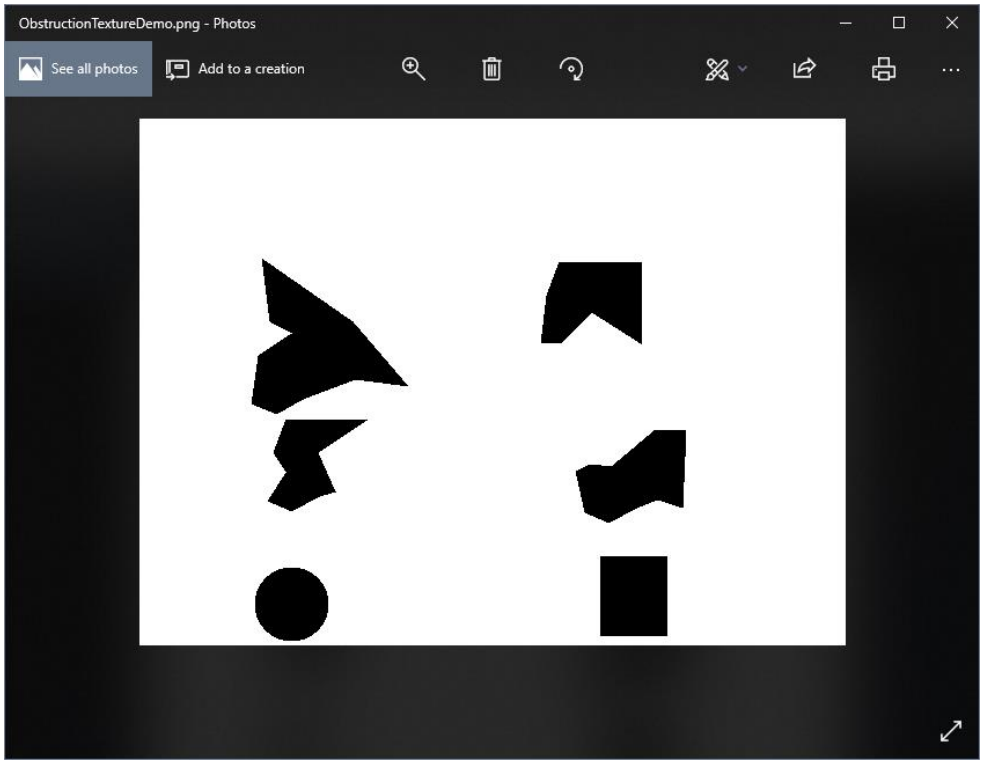

Figure 21 – Obstruction Texture.