

# R.A.M -River Auto Material & L.V.E Lava & Volcano Environment Tutorial

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River Auto Material: <https://www.assetstore.unity3d.com/#!/content/101205?aid=1011IGkb>



Lava & Volcano Environment: <https://www.assetstore.unity3d.com/#!/content/112703?aid=1011IGkb>



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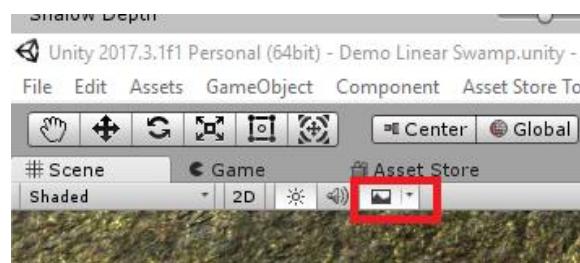
<b>FEW IMPORTANT WORDS AT START ABOUT BOTH ASSETS .....</b>	<b>2</b>
<b>DIFFERENT SRP(LW AND HD), NEW TERRAIN SUPPORT AND SETUP .....</b>	<b>3</b>
<b>RIVER SETUP.....</b>	<b>4</b>
BASIC OPTIONS: .....	4
ABOUT VERTEX COLOR:.....	10
MULTIPLE RIVER CONNECTIONS .....	11
FLOW MAP .....	12
SIMULATION.....	13
TERRAIN SHAPE .....	14
TERRAIN PAINTING .....	15
CSV FILE POINTS.....	15
VEGETATION STUDIO SUPPORT .....	16
VEGETATION STUDIO PRO SUPPORT.....	16
SMALL API.....	17
<b>VERTEX/FLOWMAP PAINTER (ALL OTHER MESHES THEN SPLINE) .....</b>	<b>18</b>
<b>AUTOMATIC ROCKS HEATING AND WETNESS.....</b>	<b>20</b>
<b>LAKE SETUP .....</b>	<b>21</b>
ADD POINTS/ REMOVE POINTS (RAYCAST FROM MOUSE).....	21
OPTIONS.....	21
FLOWMAP AND VERTEX COLOR PAINTING .....	22
LAKES & VEGETATION STUDIO AND VEGETATION STUDIO PRO .....	22
<b>RIVER AND SWAMP MATERIALS.....</b>	<b>23</b>
RIVER SHADING .....	23
SWAMP SHADING .....	25
<b>LAVA MATERIALS .....</b>	<b>25</b>
HOT LAVA SHADING .....	25
FROZEN LAVA SHADING .....	26

## Few important words at start about both assets

As we create many tools, shaders we try to share same technology between assets to avoid mess in your project. Tools and systems mentioned in this doc are shared between L.V.E and R.A.M. If you will be common with one of this pack for sure you will not have problems with other one or any other future packs. As we like to say – one spline to rule them all!

We made few demo scenes to show different setup and possibilities.

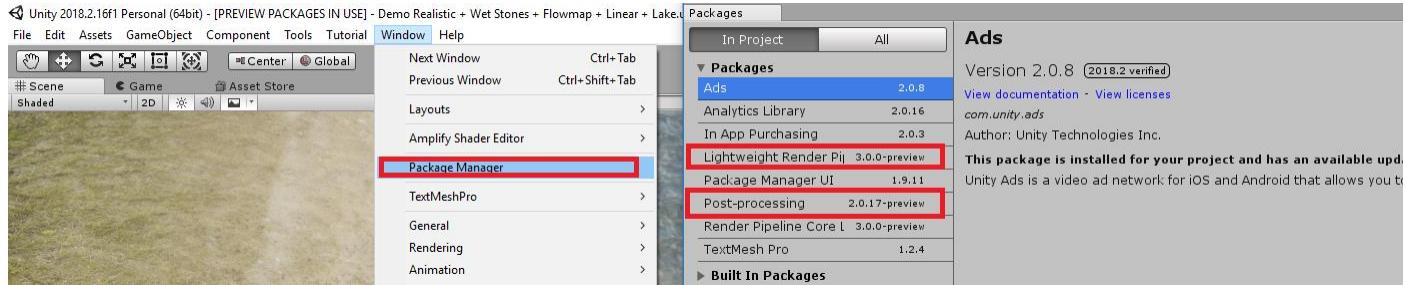
To see how surface moves and to notice emission in scene view you need to keep image effects turned on in scene window:



Lava shading need bloom image effect at the scene, emission show up and react with screen only when bloom is turned on. This is how engine works with emissive materials. Be sure then that you have bloom effect from post process stack or other source. Bloom power will also affect emission behave so you have to find balance bloom power and emission power. We suggest to setup emission on non- emissive area to reasonable values and then play with emission power at materials. We setup our materials to pretty standard values so there should be no or small adjustment in emission values.

## **Different SRP(LW and HD), new terrain support and setup**

If you use HD (in future) or LW SRP (we support it now) import latest HD/LW SRP and post process stack versions in unity package manager (unity 2018.1+). Look below:

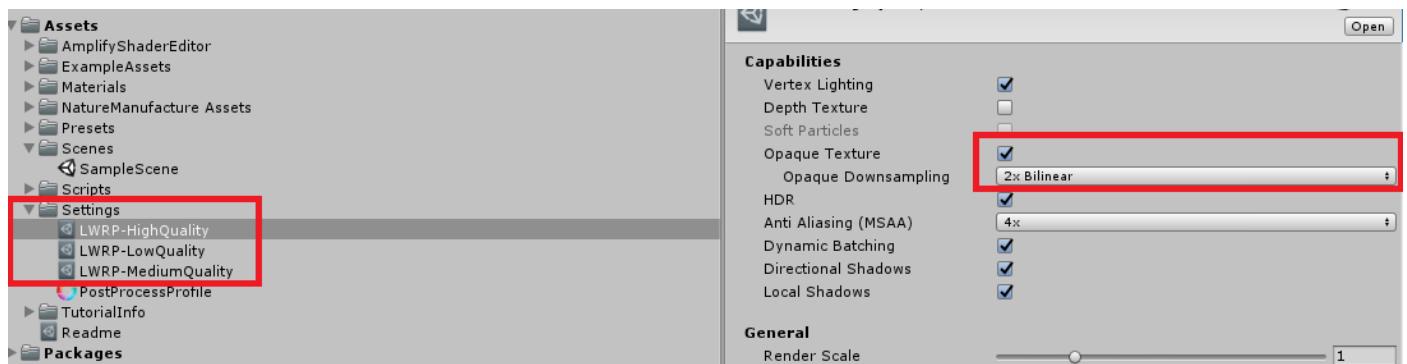


Next step is import our compatibility pack called:

"LW SRP Unity 2018 River Auto Material 3.0.0 or 4.2.0", "Unity 2018.2.7+ LW SRP 3.0.0 or 4.2.0 Lava and Volcano Environment" or HD SRP Unity versions in future. This packs will replace shaders, materials, prefabs, particles etc and force assets to work on SRP out of the box. Make note that tessellation is not supported by LW SRP.

We export LW SRP in 2018.2f16 and LW SRP 3.0.0 and 4.2.0 (different packages)

**To use distortion in LW SRP** at rivers , heated air & water particles in LW SRP please be sure that you have this option turned on:



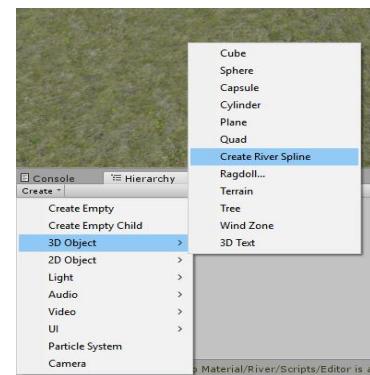
## River Setup

By our spline tool you could create very advanced mesh for your water/lava river or cliff and road. By our vertex paint you could customize meshes and spline in selected places. Here are few steps that will give ability to create simple mesh for your river:

### Basic options:

#### 1. Create river object at your scene:

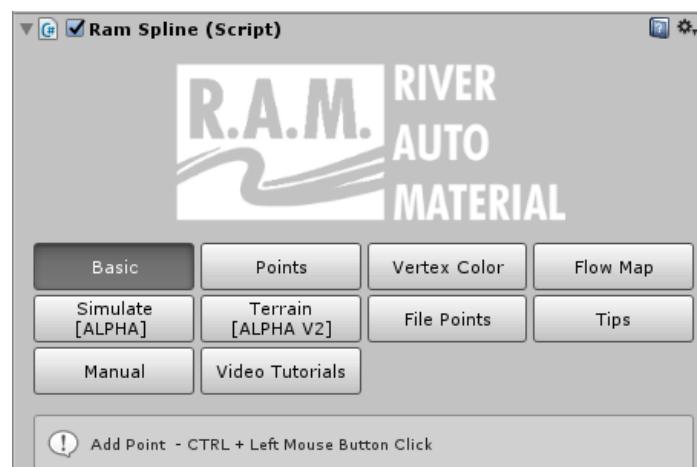
Make note that this option could not show if you got compiler errors in your project. It's because errors block editor script compilation.



#### 2. Check spline object at your scene hierarchy. You will get such view in inspector window.

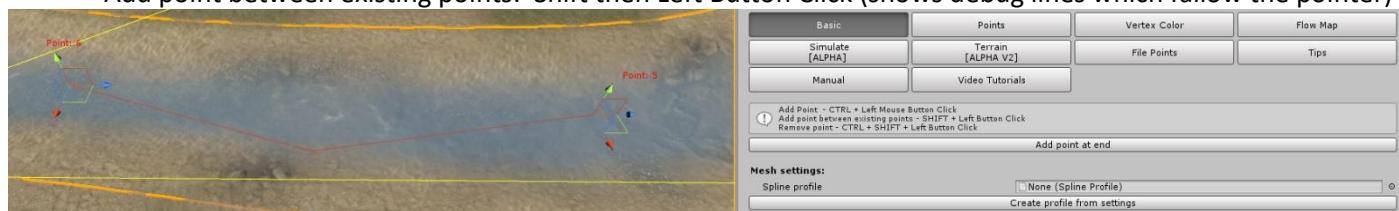
As you see there are few main pages:

- **“Basic”** - changes which are global for whole mesh or even few of them if rivers are connected.
- **“Points”** - local changes like rotation, position, scale, add, remove, select.
- **“Vertex Color”** - modify mesh and customize locally by our vertex color tool if **vertex color shader is selected**.
- **“Flow Map”** – modify flow map for shaders that support flow direction
- **“Simulate”** – this part allow you to simulate river/spline flow from specific point.
- **“Terrain Shape”** – modify terrain under the spline
- **“File Points”** – here you could import points from CSV file to create R.A.M spline.
- **“Tips”** - info about lighting and tricks.
- **“Manual”** - which drives you directly to this PDF
- **“Video Tutorials”** - which will open YT tutorials where we will explain R.A.M and L.V.E usage.



#### 3. Add points/ Remove points (raycast from mouse)

- Add new points when you hold: CTRL + Left Mouse. Setup few points like that.
- Add point between existing points: Shift then Left Button Click (shows debug lines which follow the pointer)



- Remove point: CTRL + Shift then Left Button Click to remove point. (shows debug which follow the pointer)



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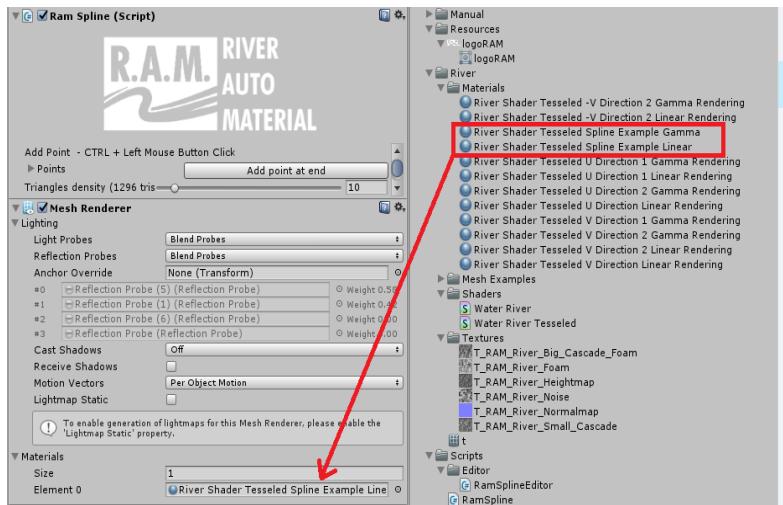
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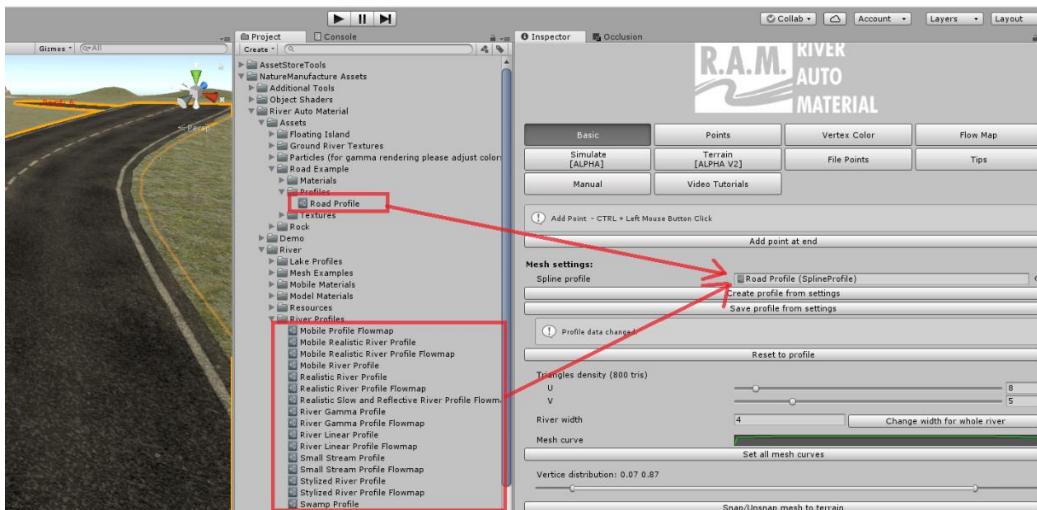


#### 4. To setup your material into river you can do this in few ways.

- You could drag and drop it from our library or create your own. Just drag and drop material from project into mesh renderer component



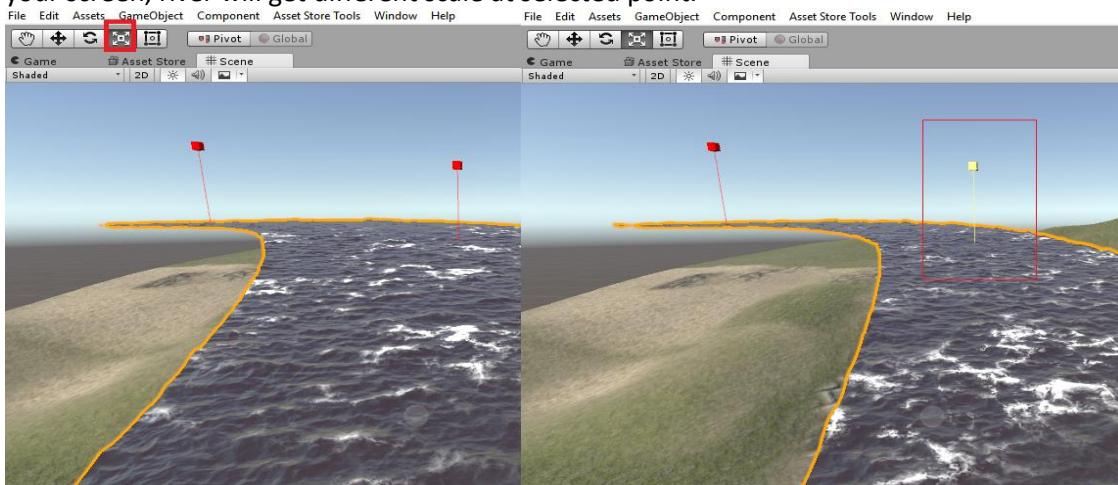
- You could drag and drop profiles which contain info about material, mesh shape, spline resolution, terrain carve and flowmap. Try our river and road profiles. It's very useful, you don't have to copy paste any values anymore to create similar effects.



In our many assets like meadow environment where we use R.A.M splines to create roads or rivers for demo scene we always include profile files so you could simply drag and drop it and use in your scenes without additional setup.

#### 5. Scale mesh.

You could start scaling your river in specific point by clicking "R" or by this marked button. During moving the box up or down at your screen, river will get different scale at selected point.



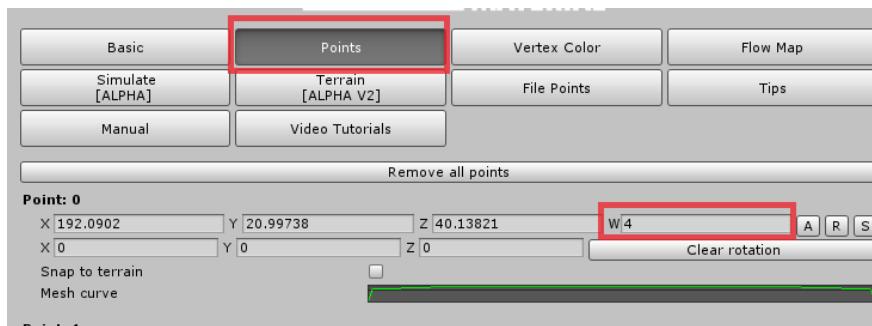
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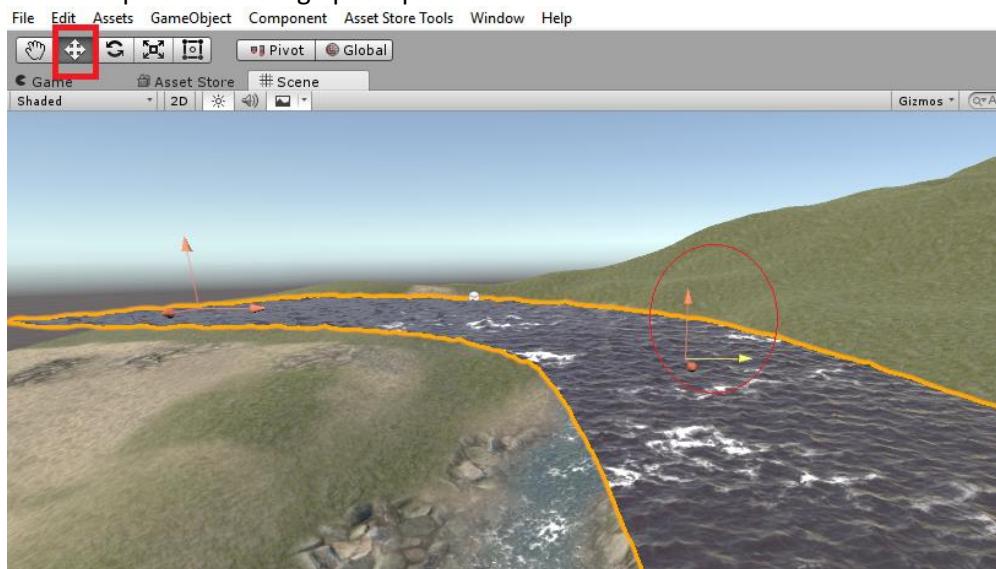


You could also scale river in specific place in Points page – “W” value



## 6. Point move.

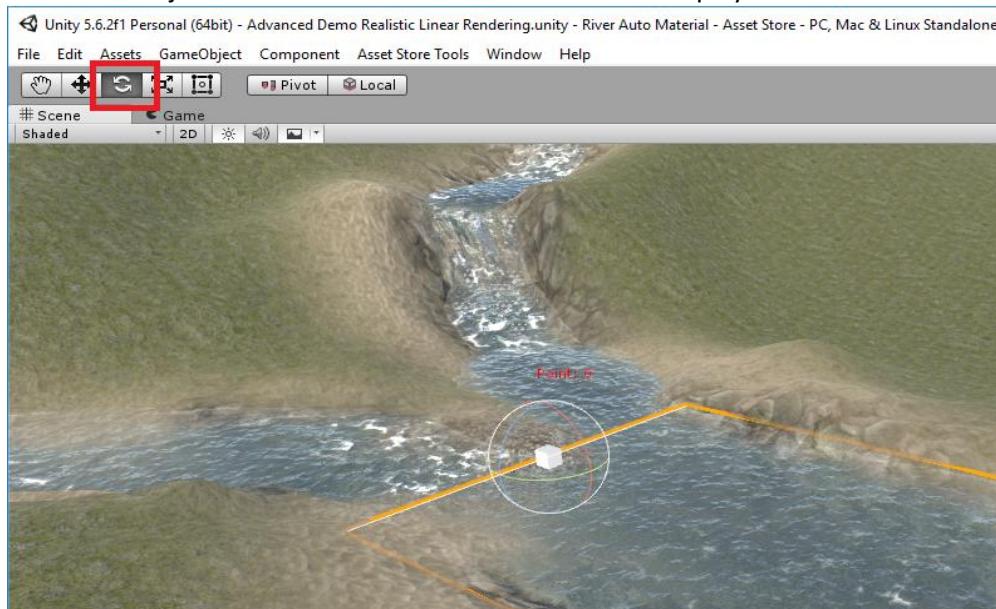
You could start to move your river specific points by clicking "W" or by this marked button. By moving selected arrow at your screen river point will change point position.



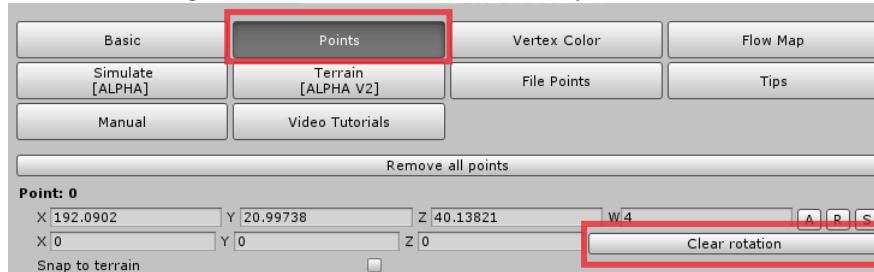
Sometimes user said that they don't see any arrows, anything. Please restart engine layout and they will show up.

## 7. Rotation

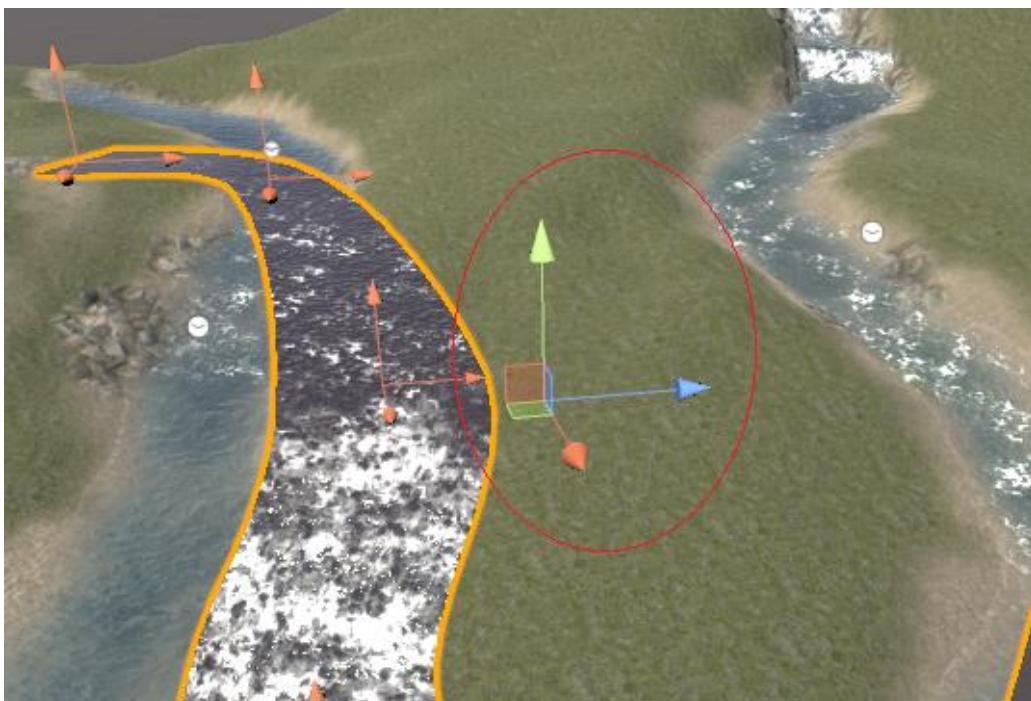
You could rotate points at river like normal objects in scene hierarchy. Click “R” or marked this button. Note that too big angle sometimes could invert normal but small changes could fix spline or add additional details. By green and blue lines you could control shape, by red mesh normal direction. Via mesh normal direction you could create cascade even at flat area or adjust it before or after cascade. We advise to play with it a bit!



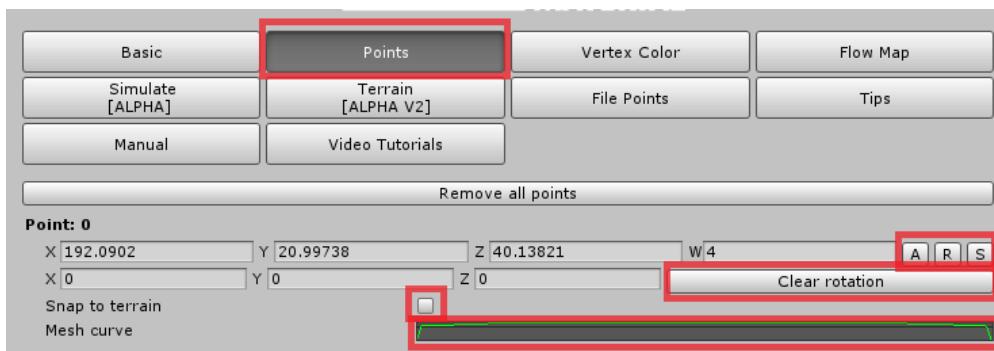
You could always clear rotation changes and reset to default values by “clear rotation button” in points page.



#### 8. You could move whole river by selecting big object arrow.

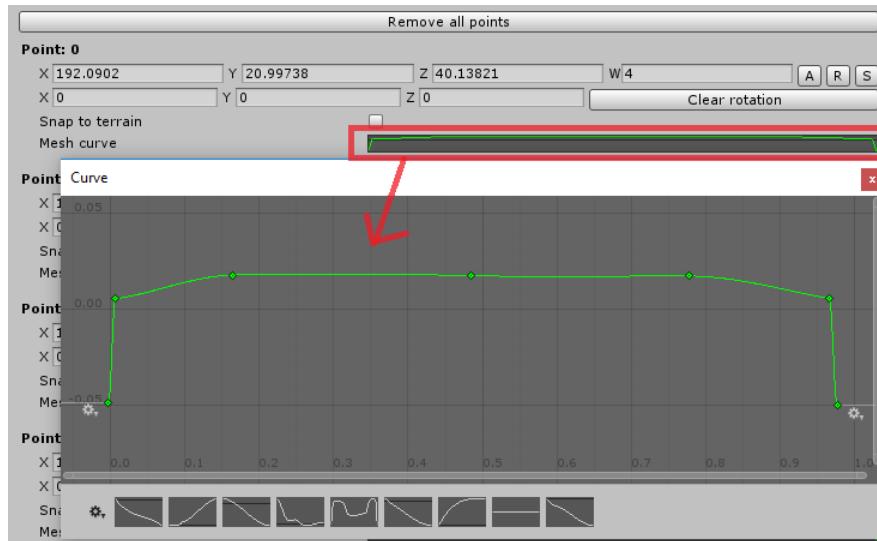


#### 9. Additional point options in points page:



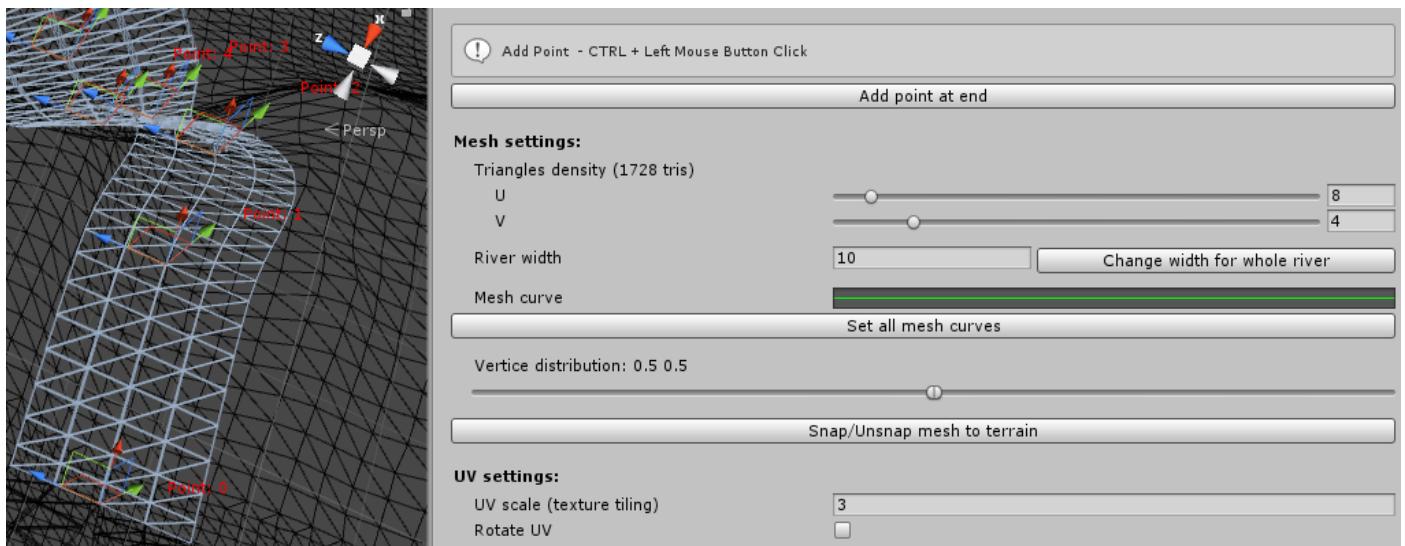
- "R" button to remove points from spline.
- "A" button to add point after this selected point.
- "S" button to select "mark" point at spline. Helpful before remove operation.
- "Clear Rotation" will reset rotation in current point to default values
- "Snap to terrain" your mesh (mesh will follow the terrain in current spline point), useful for streams and in other objects then river, our tool is universal.
- "Mesh curve" allows you to change locally mesh shape in current point. Useful rather for roads or small streams in combination with "Snap to terrain". To get more specific changes you have to change mesh distribution in "Basic" page which will move and dense verts in specific region. Useful for roads to move down road edges.





## 10. Mesh resolution.

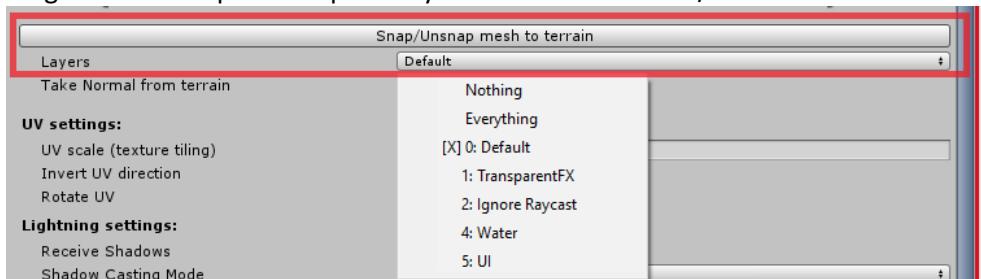
You could control it by changing triangle density number in U or V direction. From our perspective 4-8 is pretty good value. You could add more triangles in specific area by adding more control points instead of adding them globally by this slider. If you connect few rivers you also have to keep a bit more verts in V value to distribute to other rivers. Note that if you have multiple rivers connected this option will be switched off for rivers which are connected with main river. More info you will find lower. Anyway just play with it.



**Note:** For tessellated shader it's good to hold pretty square mesh because of equal triangles. Ofc do not add V density too much. Tessellation will handle non square mesh but when difference is too huge it could start to look weird. In close distance tessellation will handle and fix most mesh problems with river shape so there is no need to adding huge density in the mesh – trust tessellation 😊

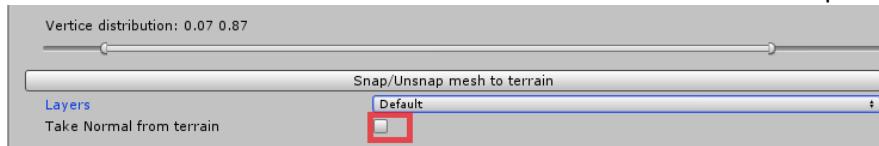
## 11. Mesh snapping to colliders/terrain.

Our spline system have ability to snap to any surface with collider. If you click this button it will snap all verts to colliders under the spline. It's global value and you could also modify it locally in point section. We also give ability to snap by layers so for example to avoid small rocks or any other objects. Make note that if you want to snap spline to very dense and unregular surface spline will probably need a bit more verts/ dense to catch all changes.



## 12. Vertex normal from terrain.

Spline have ability to take normal from surface under own mesh. It's useful for dirty roads and paths or frozen lava rivers. Probably with all surfaces which we would like to blend with terrain as much as it's possible.



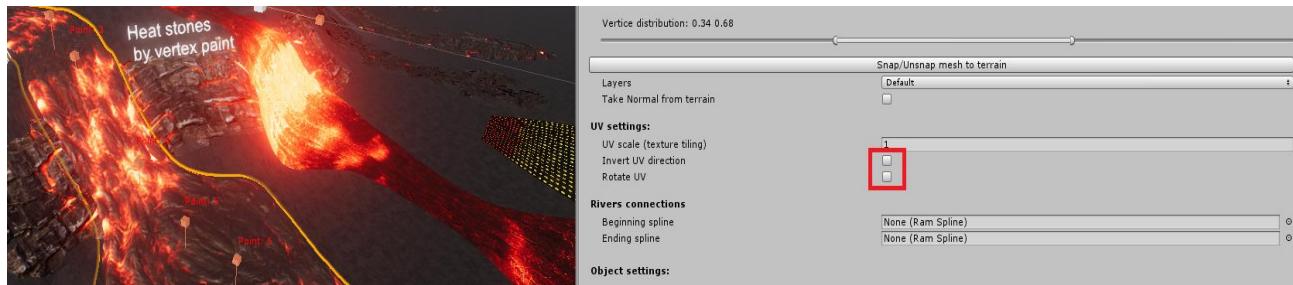
## 13. Mesh split – mesh in parts.

You could split river into many submeshes. It's useful for streaming, long rivers parts camera culling and for reflections. Simply check the box and chose how many submeshes you want to have. This option will be extended so you will be able to cut river in every specific point.



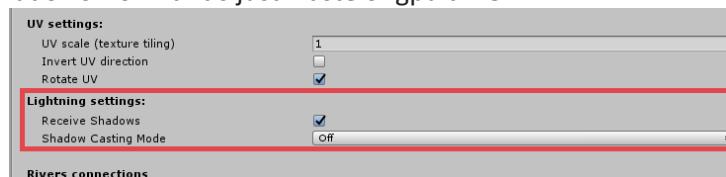
## 14. UV settings

UV control gives ability to change tiling of the river or rotate whole UV by 90 degrees. Our realistic material use non-rotated uv. This option was added to support textures with different directions. UV scale could be switched off if river depend from other rivers (multiple river connections) . You could also invert river direction.



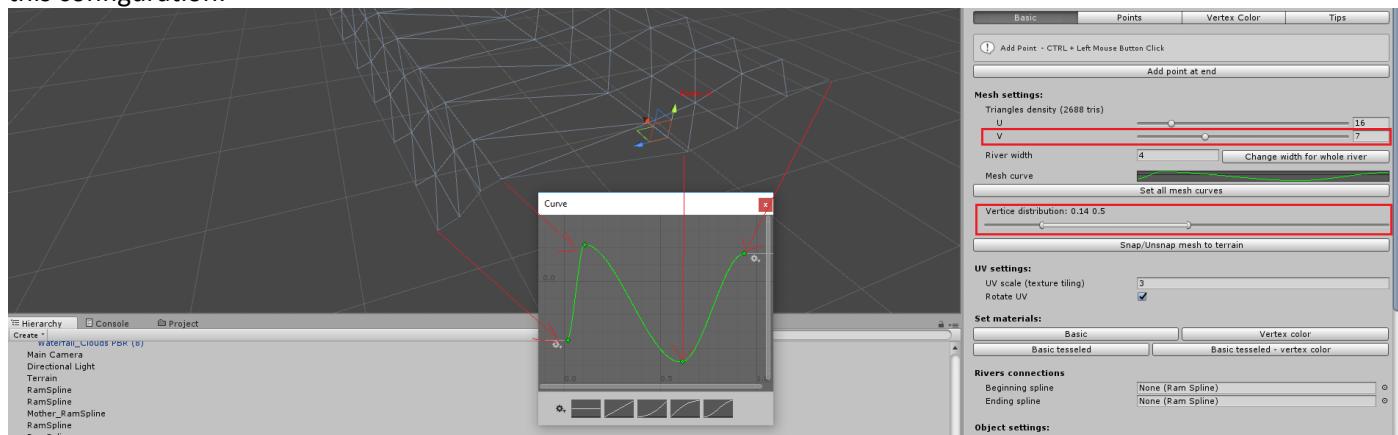
## 15. Lightning settings

This part controls shadow receive and cast. For water and dirty paths we rather don't want to cast shadows. For all kind of roads and paths we would like to receive shadows and sometimes cast too. If road or lava surface is flat we don't need to cast shadows from it. It's just waste of gpu time.



## 16. Mesh curve and vert distribution.

This options allow to change mesh shape and vertex position. Anyway this need a bit more V density. Take a look at this configuration:



We moved vertex density into left side of the mesh and we change shape globally by curve. You could change this shape also locally in "Points" setting.

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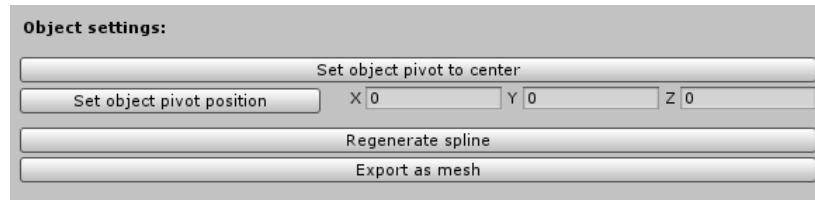
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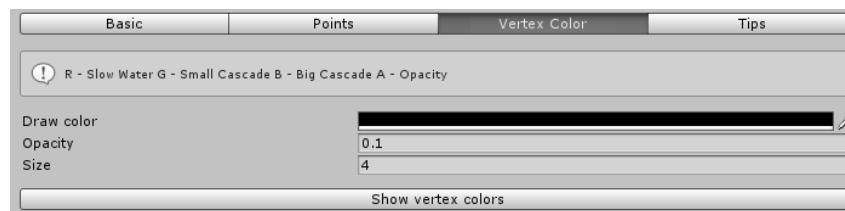


### 17. In object settings you could:

- change river object pivot position to its center or specific position.
- export it into unity asset instead of editable spline object.
- regenerate mesh object if you need. For example after copy/paste into other scene or multiple rivers changes/refreshing. It sometimes helps.



### About vertex color:



- When you start playing with vertex color you have to choose vertex color shader variant.
- Each color/mask give ability to paint by different water stage.
- Different surface react on their own way on vertex paint:

Lava:

- R - Pretty cold lava/small slope
- G - Hot lava/bigger slope
- B - Very hot/waterfall
- A - Frozen lava

Lava Frozen:

- R – Heat your lava
- G – Cover your lava by ground texture or any other
- B – maybe we will add another 2<sup>nd</sup> ground texture
- A – we will see ☺

Water:

- R – Slow water
- G – Small cascade
- B – Waterfall
- A – Alpha color It's useful to blend with other water systems or paint specific behavior in specific place.



## Multiple river connections

Best practice is to watch our video tutorial with our demo scene then try to do it yourself. Basically you have to prepare yourself for this operation. Because there is few rules which have to be hold to get good synced mesh. For non-tessaled shaders you don't have to keep them all because vertex offset will not desync and destroy mesh at connections.

- If you create 2 rivers connections and they will become 3<sup>rd</sup> you have to drag and drop 3<sup>rd</sup> river as end of 1<sup>st</sup> and 2<sup>nd</sup> and adjust how big part of new river is 1<sup>st</sup> and 2<sup>nd</sup> river by "Part parent" slider.



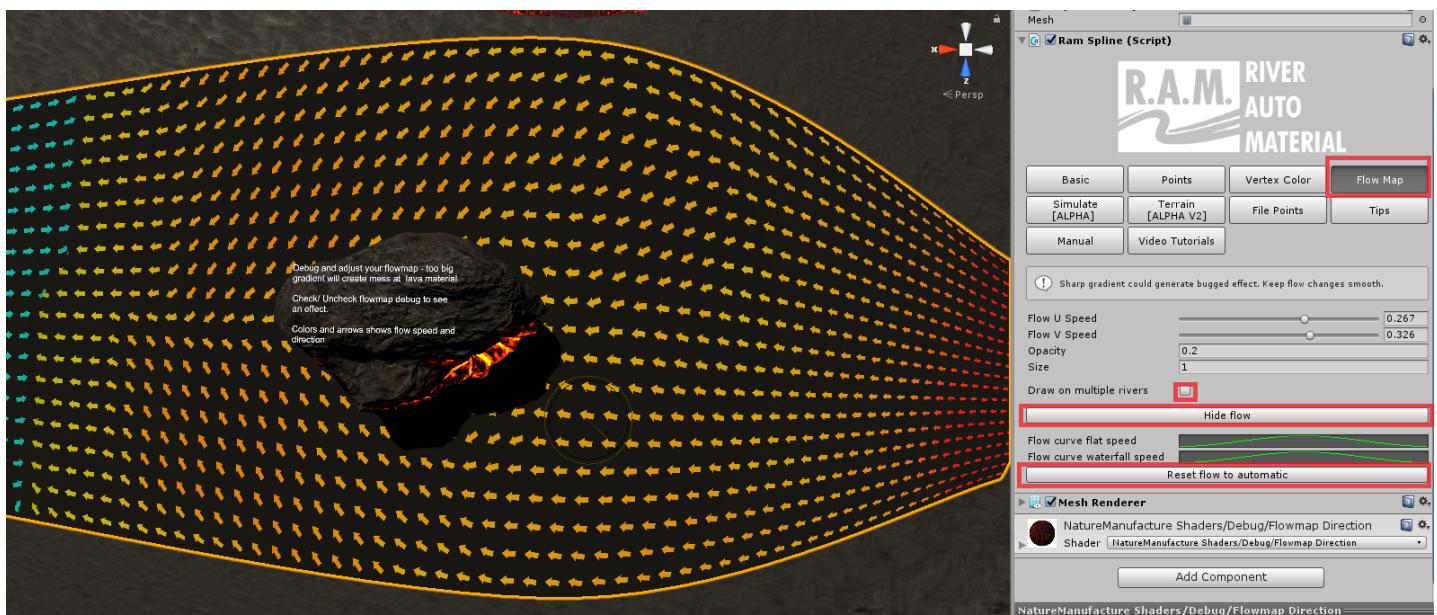
This 3<sup>rd</sup> river will now control "V" mesh density of your 1<sup>st</sup> and 2<sup>nd</sup> river and tiling. We did this to create seamless connection between rivers even with tessaled shader. Look at V and UV settings at 1<sup>st</sup> river. They were grayed.

- If 1<sup>st</sup> river become 2<sup>nd</sup> and 3<sup>rd</sup> river you have to connect 2<sup>nd</sup> and 3<sup>rd</sup> river into mother "1<sup>st</sup> river" at beginning spline window. You also have to adjust how big part of the old river is the new one. In this case mother river will also control 1<sup>st</sup> and 2<sup>nd</sup> "V" mesh density. Anyway look in our example this 2<sup>nd</sup> river is also connected to another river in ending spline window. Bigger constructions are also allowed.



In such case you could create connection of 2,3,4,5 rivers at the same place but... each river take 1 or more "V" resolution. If mother river have v resolution = 4 you could create 2 rivers with V=2 and V=2 like at the image or V=3 and V=1. Play with it and check our complicated example in our demo scenes. We will add more info about this soon and show how awesome it could be.

## Flow Map



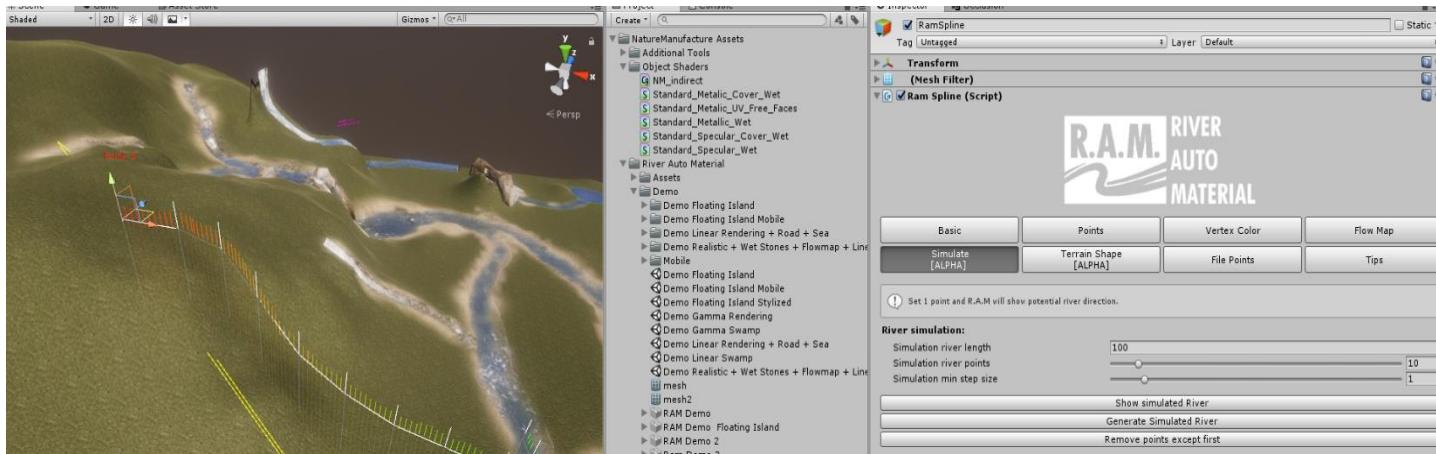
Flow mapped shaders are very sensitive. Gradient between direction must be smooth, mostly in tessellation shaders where verts must smoothly change UV and direction. We gives to debugs.

- **“Show/Hide flow directions”** – It will show/hide arrows with colors which shows direction and speed of water. Deep red or blue mean big speed. Be careful and blend speed, don’t create hard gradient.
- **“Flow U, V speeds, opacity and size”** - They are used to control direction, speed, size and hardness of brush which will paint flowmap on spline surface.
- **“Draw on multiple rivers”** – It gives ability to paint on river connections and many rivers at the same time. It help to keep proper blend and correct flowmap on river connections.
- **“Flow curve flat and waterfall speed”** – By this 2 curves you could control automatic flow speed profile on flat and high slope surfaces (waterfalls). Everything between this curves will be interpolated. They give ability to move



## Simulation

This new options is useful to simulate river behave. User **setup only one** point, chose river length, density of points. Click “Show simulated river” to check how river will behave and which direction will chose. R.A.M will analyse shapes around and show potential river position. It’s useful for natural river generation. If shape of spline and it’s position fit you, simply click generate. With our upgraded terrain shaping you will be able to setup whole river in 3 buttons click with whole bed. This kind of simulation will chose most accurate and natural river bed. If you want to repeat, operation click remove points except first to start simulation again from 0. This is our first but not last procedural option. We will extend this area a lot in upcoming updates.



- **“Simulation River Length”** – It setup how long river will be generated.
- **“Simulation River Points”** – It setup number of points that will be between start and end of the spline. Too dense point setup could generate problems at spline shape, try to keep reasonable value.
- **“Simulation min step size”** – It give you control how often spline will sample the surface . Too low sampling could create river which will ignore gravity (it will goes up) , too dense could block it in places. We will expand this idea for sure to make river as proper as it could be out of the box.

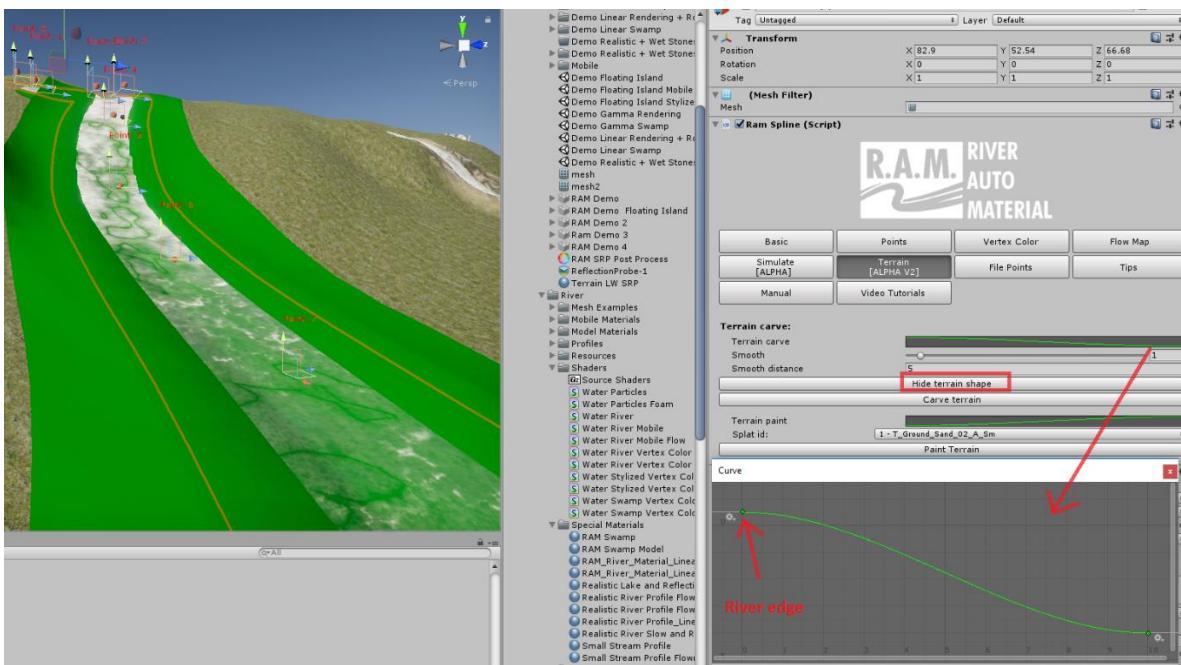


## Terrain shape

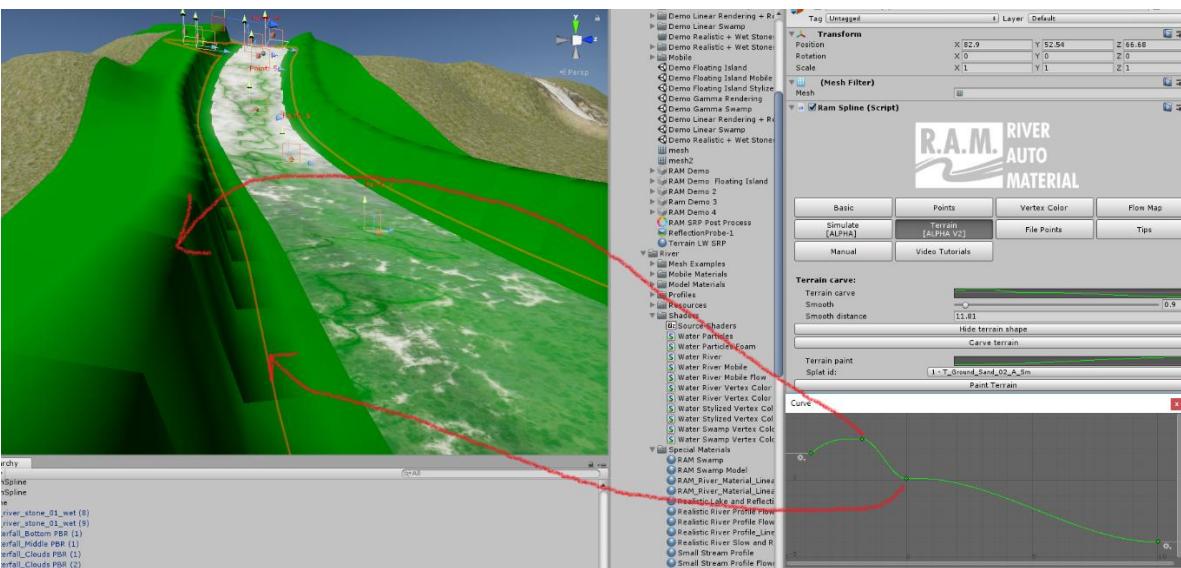
This is early tool to shaper/painter for terrain around spline. It works on multiple terrains and it could create river bed or road hill, paint terrain around the spline and much more. Debug “Show hide terrain shape” will show you future terrain shape in realtime. Anyway we will focus on this feature at next releases to add noises and much more options.

- **“Terrain Carve”** – this option open spline where you could setup how river bed surface will behave from edge to deeper river area.
- **“Smooth”** – you can adjust smooth power for terrain shaping outside the spline. It’s blending power function between terrain shape and shape which was setup by spline.
- **“Smooth distance”** – you can adjust river terrain influence distance. Higher values will modify terrain verts far from river edge.

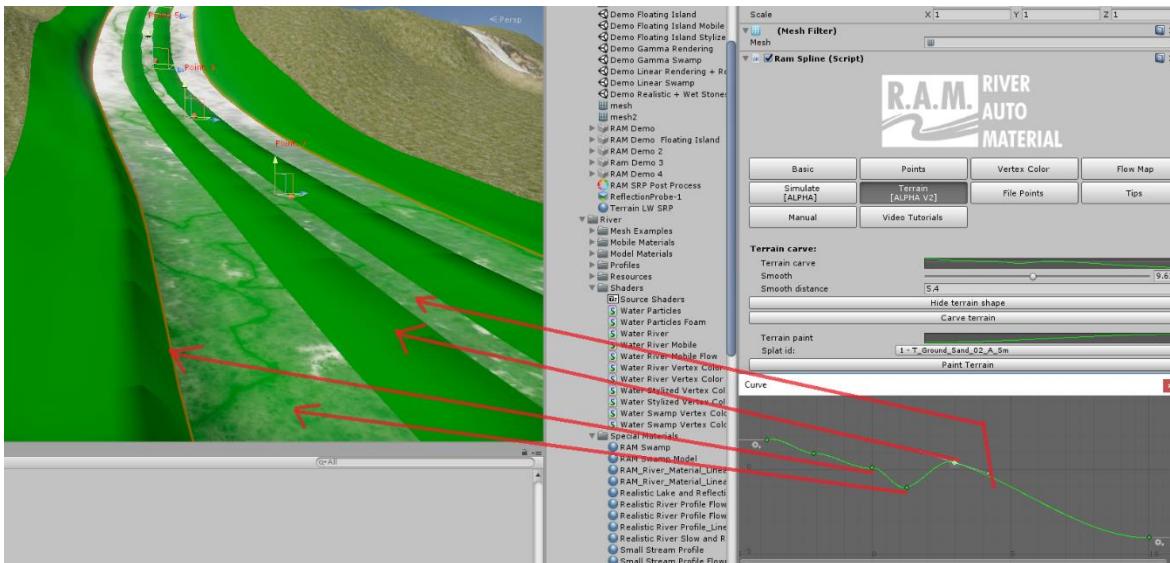
Values are refresh debug surface in realtime.



Let's show 2 different setup with different curves and values.



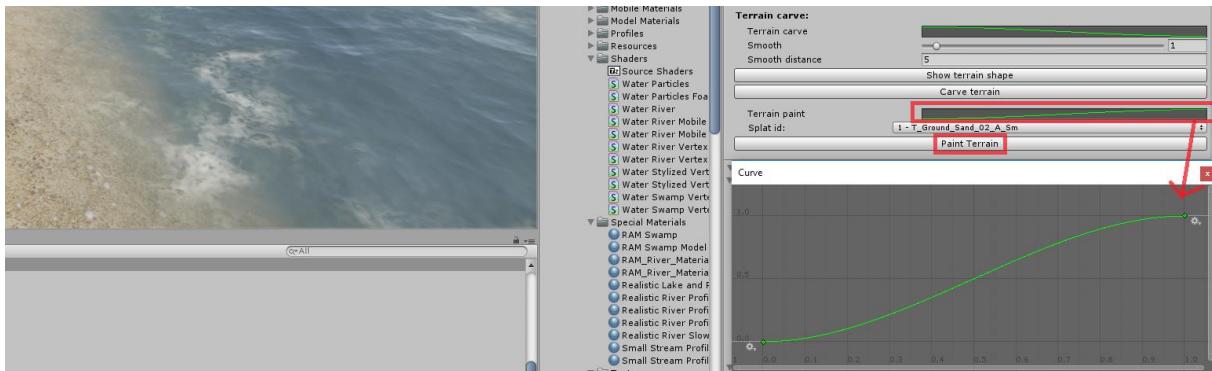
Small smooth force terrain to get shape directly from curve. Big distance means that spline affect big area. Curve outside “0” value so on “-“ strongly modify and manage shape outside the river.



As we see here we setup small hill in the middle of spline. You can see 2 hills because 2<sup>nd</sup> is mirrored and generated by spline from second edge. Give us a sign if you would like to have full control over the both spline edges. In this case if spline would be thinner there will be 1 hill or none in the middle.

## Terrain painting

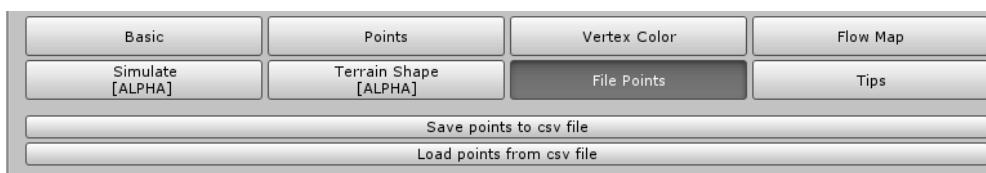
This part will paint your terrain under river bed. You simply chose texture from terrain splat ID list and setup texture power from river edge into middle at curve. Curve is very useful when you use textures heighblending and you interest in specific sand or river bed texture show/pop up.



## CSV File Points

This option allows you to import and create splines from CSV file format. Useful if you want to import data from GIS, and other 3d programs then unity. If spline is broken in anyway you always could export csv file and import it again. This should fix any issues.

You could always export spline from unity into file in CSV format.



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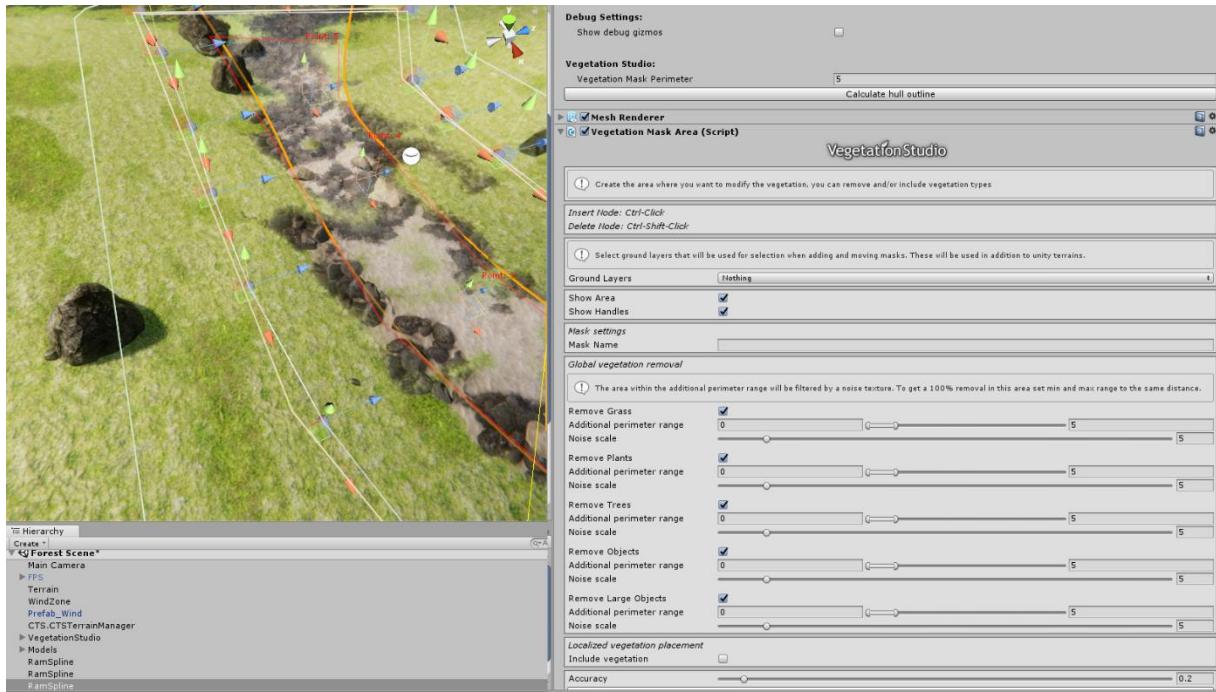
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## Vegetation Studio Support

Asset support vegetation studio and vegetation studio pro versions. R.A.M will detect VS out of the box in your project and show additional option in “Basic” page at the bottom.

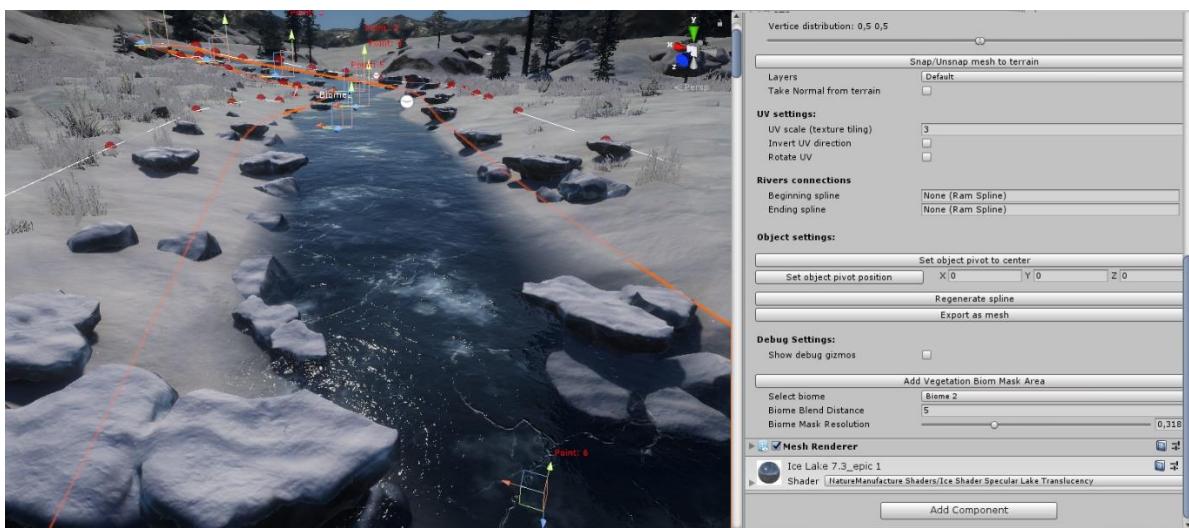
**Standard Vegetation Studio** it will cut foliage around the spline.



## Vegetation Studio Pro Support.

**Vegetation Studio Pro** it's could be biome object like in first Lennart biome video presentation. We made there: Frozen river biome, water river biome, lava river biome. In this pack you could find example biomes for VS PRO beta. We will keep this up to date as we can. In biomes we mixed our assets so to support our biome profiles you probably need most assets for best experiance. They will work even without them. We share our examples, give us feedback.

At image below we spawn ice floe around the frozen river, everything is procedural, no single object at this scene at all.



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If VS Pro is inside the project you R.A.M will detect it and at bottom of Basic section you will find button to add VS Pro mask. Make note that it refresh mask when you move river points. This could slowdown moving process sometimes, for bigger river with huge mask and many points.



## Small API

**CreateSpline(Material splineMaterial = null, List<Vector4> positions = null)** - Creates spline with points

**AddPoint(Vector4 position)** - Adds point at end of spline

**AddPointAfter(int i)** - Adds point in the middle of the spline

**ChangePointPosition(int i, Vector3 position)**

**ChangePointPosition(int i, Vector4 position)** -

Changes point position, if new position doesn't have width old width will be taken

**RemovePoint(int i)** - Removes point in spline

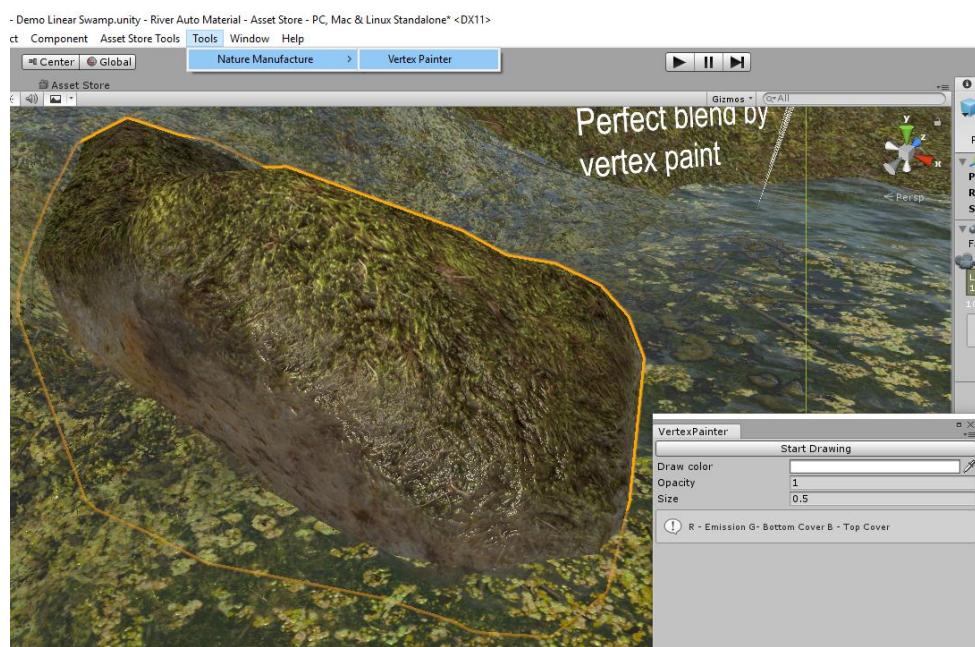
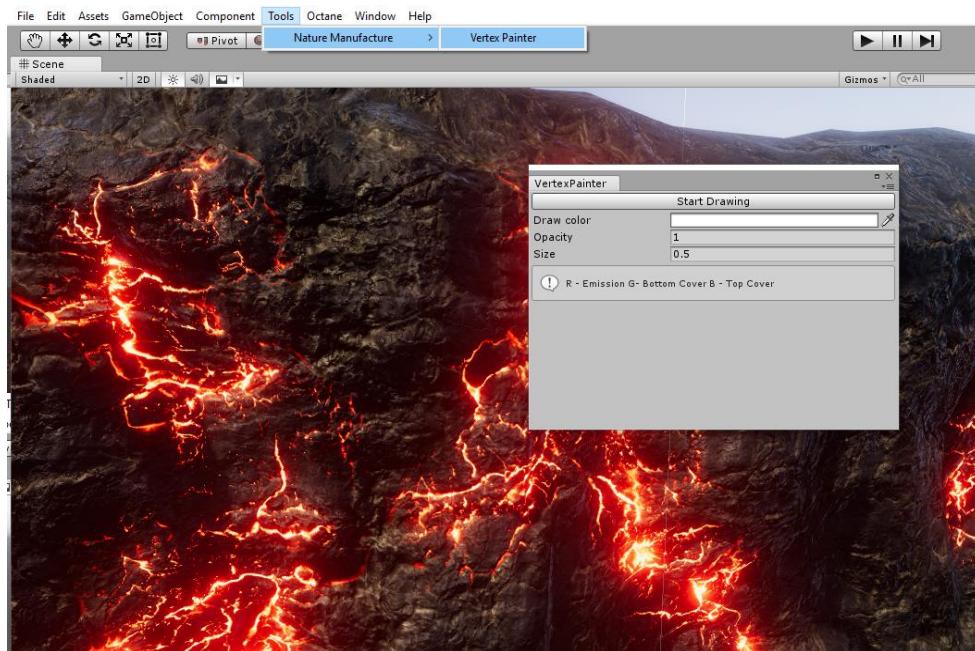
**RemovePoints(int fromID = -1)** - Removes points from point id forward



## Vertex/Flowmap Painter (all other meshes then spline)

This early version of tool give ability to paint on vertex and UV to get additional effect. In river it will make rocks wet, but in lava it will heat stone or even overlay it by chosen textures like rocks or sand. By uv painting you could paint flowmap on models. **R.A.M spline mesh should be painted via spline tools**, for all other meshes this tool will be best.

- Default color is white – no actions. By decreasing color power R,G or B it starts to shows effects in our shaders.
- We choose white because shader must work without any effects on default white meshes too.
- **Always check mother** (object with LOD group) to paint on every LOD at the same time. If you will check only LOD\_0 etc only this lod will be modified. Rest will be untouched. For small changes its pretty cool to leave last LOD untouched to save GPU and memory. You always could paint on all LOD's and at the end change/reset last LOD mesh to default.
- We added flowmap painter which works exactly the same as at spline river. Flowmap painter on meshes was used in our floating island demo.

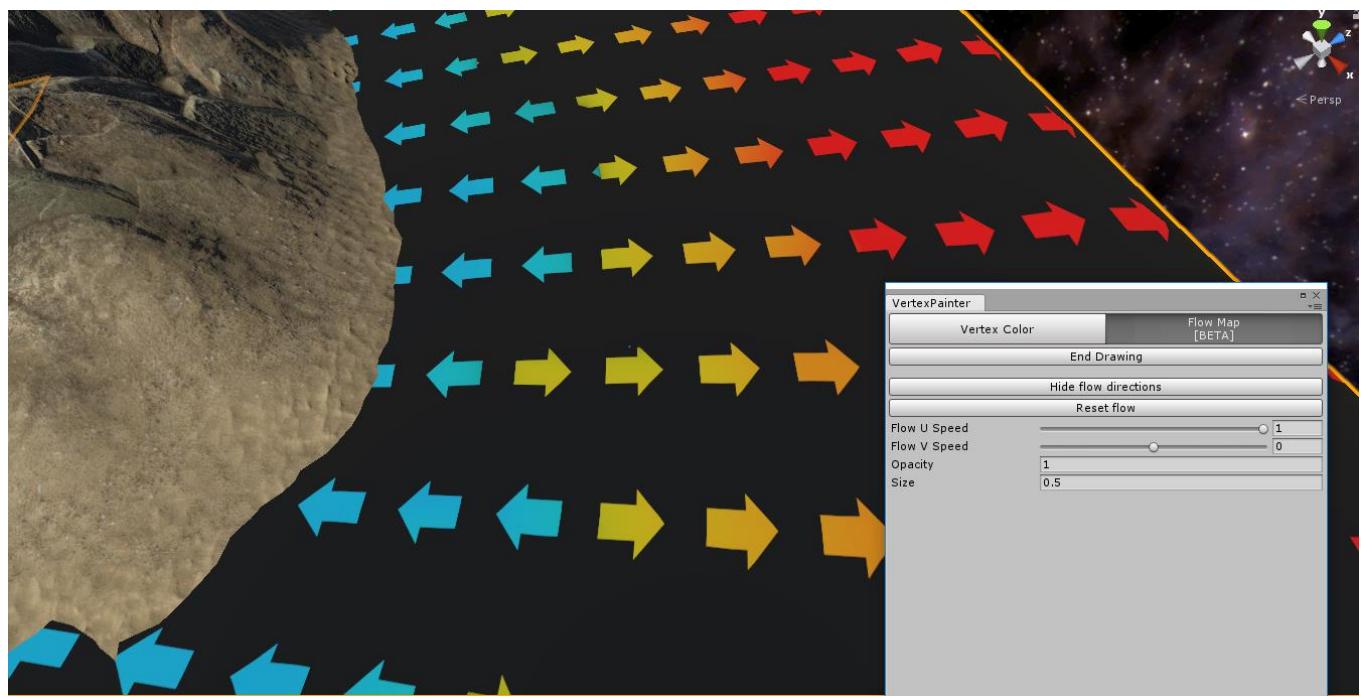


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We will improve it every update but.. you also could use own vertex paint tools to play with our shaders.

Flow mapped shaders are very sensitive. Gradient between direction must be smooth, mostly in tessellation shaders where verts must smoothly change UV and direction. We gives to debugs.

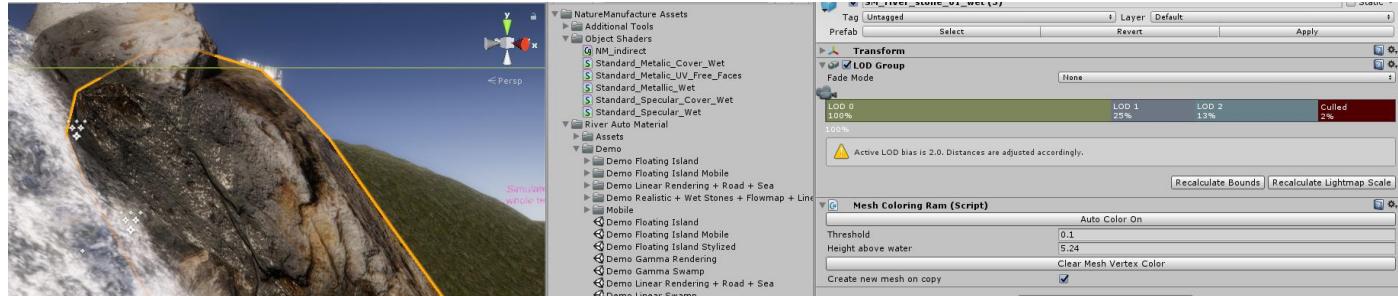
- **“Show/Hide flow directions”** – It will show/hide arrows with colors which shows direction and speed of water. Deep red or blue mean big speed. Be careful and blend speed, don’t create hard gradient.
- **“Flow U, V speeds, opacity and size”** - They are used to control direction, speed, size and hardness of brush which will paint flowmap on spline surface.

## Automatic rocks heating and wetness.

Simply drag and drop our Mesh Coloring Ram script into object, LOD parent. It will detect R.A.M and make stones wet by water or heated by lava.

**“Threshold and Height above water”** – this 2 values are used to adjust blending between wet and dry surface.

**“Create new mesh on copy”** gives ability to copy this mesh many times without overwrite the data.

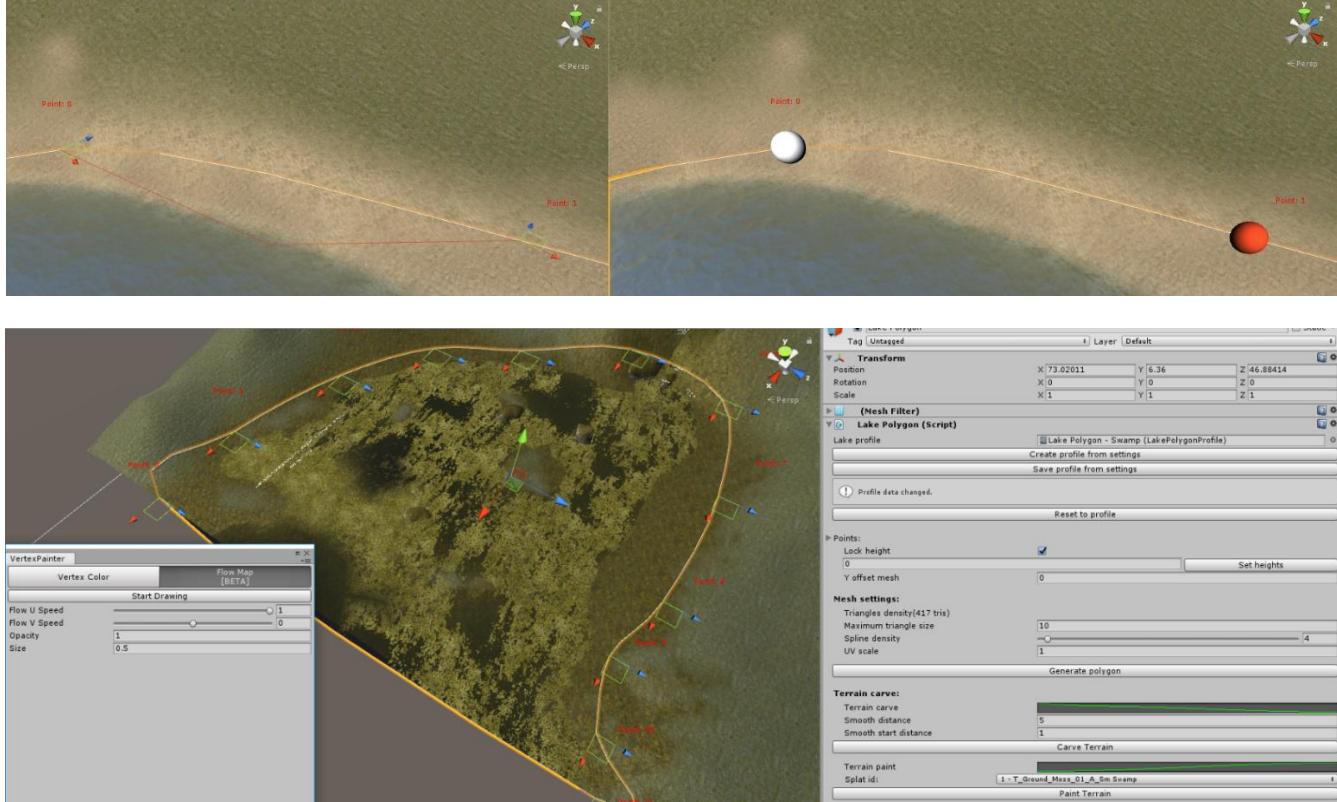


## Lake Setup

We design lake system to generate lakes, sea and other curved shapes and avoid big surfaces of water under the terrain or other models. Anyway it's always easier and better to create one surface with options to manage points and shape in one place instead of fighting with tiles.

### Add points/ Remove points (raycast from mouse)

- Add new points when you hold: CTRL + Left Mouse. Setup few points like that.
- Add point between existing points: Shift then Left Button Click (shows debug lines which follow the pointer)
- Remove point: CTRL + Shift then Left Button Click to remove point. (shows debug which follow the pointer)



## Options

System works similar to river. You could create, save, load profiles which contain information about terrain carve, paint splines etc.

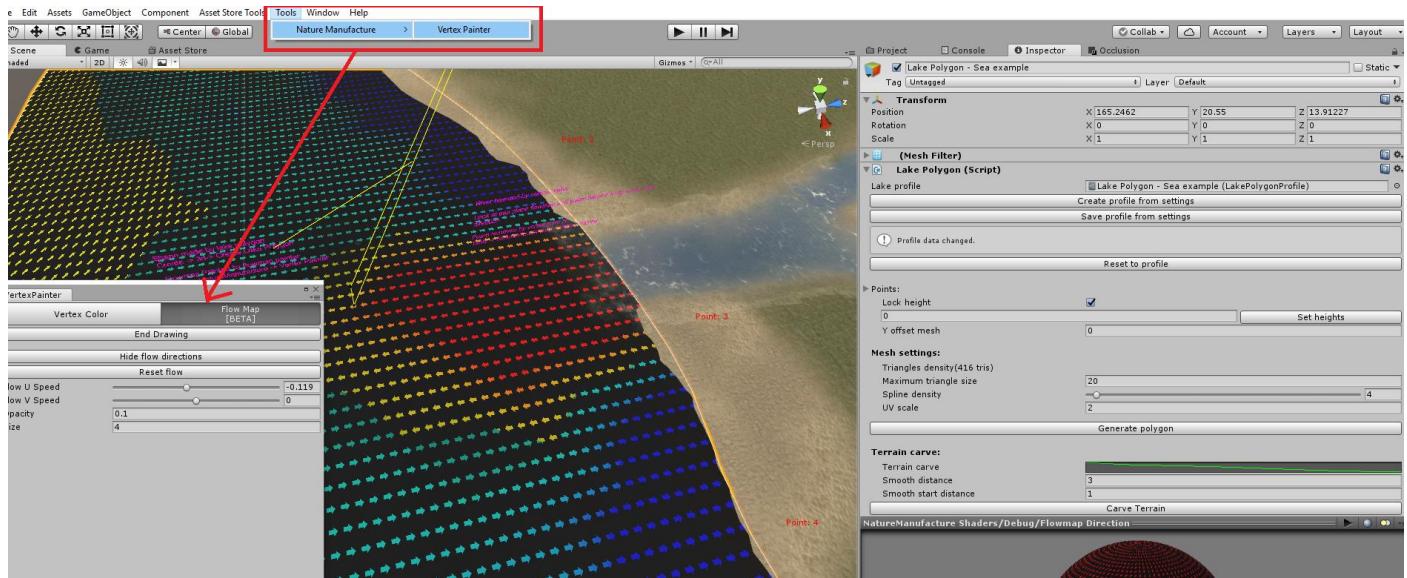
- **“Lock Height”** – It locks points position in “Y” direction. Useful when you are going to create flat water surface. Height will be taken from first point.
- **“Set height”** – it will set new height for points, useful to restart positions or just to move shape up or down.
- **“Mesh settings”** – you could change here how big vertex at lake mesh would be. Higher values are suggested for tessellated shader to get nice base for tessellation.
- **“UV Scale”** – It will change tiling at lake mesh
- **“Generate polygon”** – it refreshes mesh, useful when you copy object between scenes or you need to restart mesh informations like vertex colors or flowmap.
- **“Terrain Carve”** – this option opens spline where you could setup how river bed surface will behave from edge to deeper river area. (we will add debug in next update).



- “Smooth” – you can adjust smooth power for terrain shaping outside the lake shape. It’s blending power function between terrain shape and shape which was setup by lake.
- “Smooth distance” – you can adjust lake terrain influence distance. Higher values will modify terrain verts far from river edge.
- “Terrain paint” – It will paint terrain under the water shape. Via curve you can adjust texture intensity in relation to water edge.

## Flowmap and vertex color painting

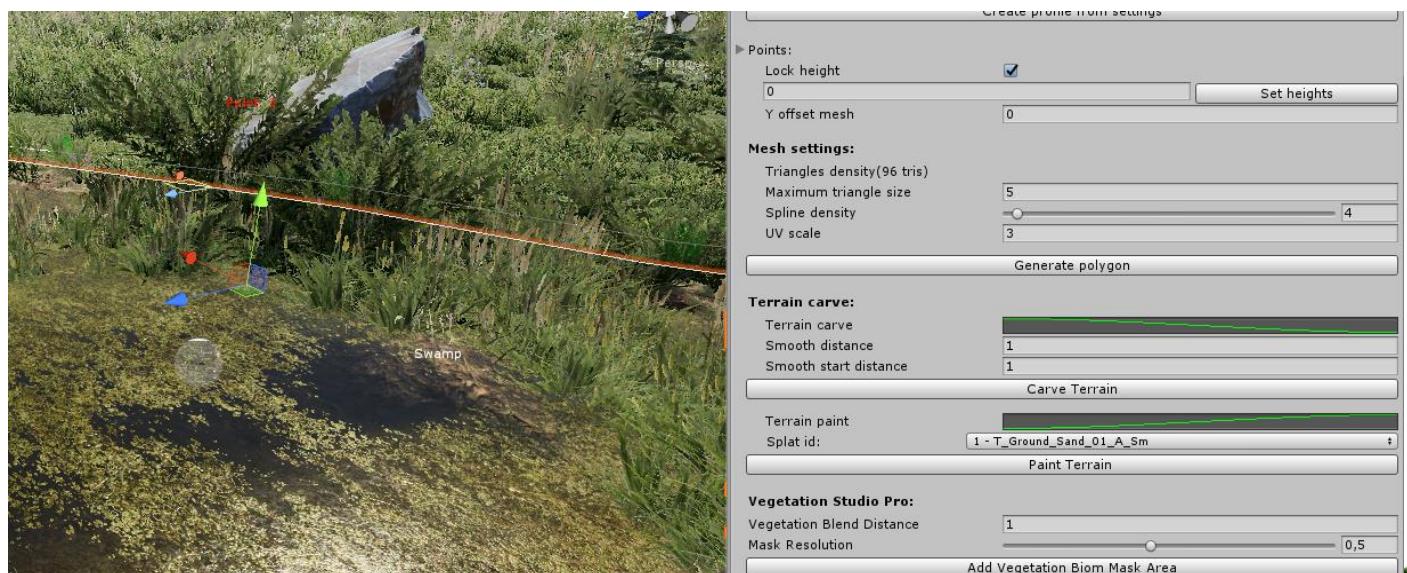
Be sure that you use material/shader which support flowmap / vertex color. To paint flowmap/vertex color on lakes. We advise to use our vertex painter tool which will give you same effect as you got on rivers and all debug features.



By this feature you could move water/surface in specific direction on our lake or paint additional effects like in swamp shading or cascades in water shader. For sure you could replace in water material cascade with bigger waves, so you will be able to paint noise with bigger waves in the middle of the lake etc.

## Lakes & Vegetation Studio and Vegetation Studio Pro

Option to add mask or biome will show up at the bottom as soon as system will detect vegetation studio.



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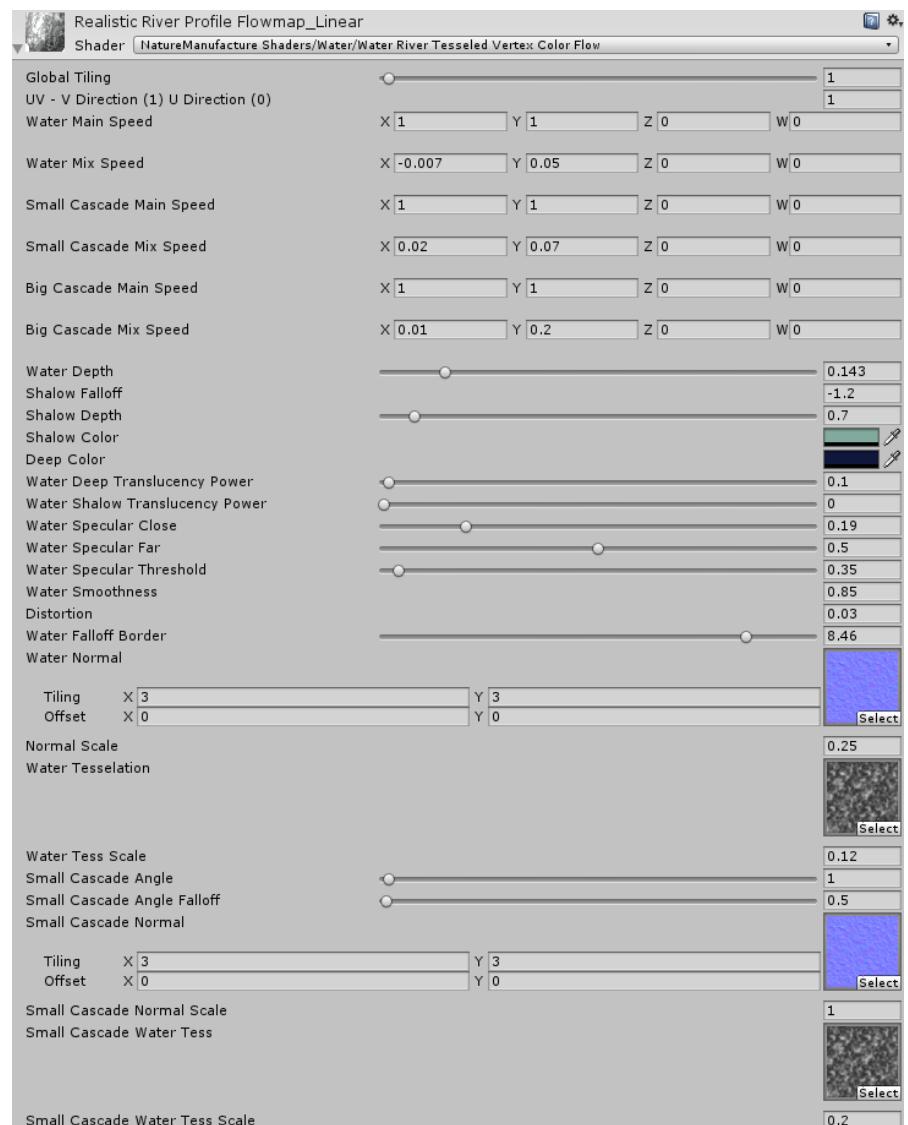


## River and Swamp Materials

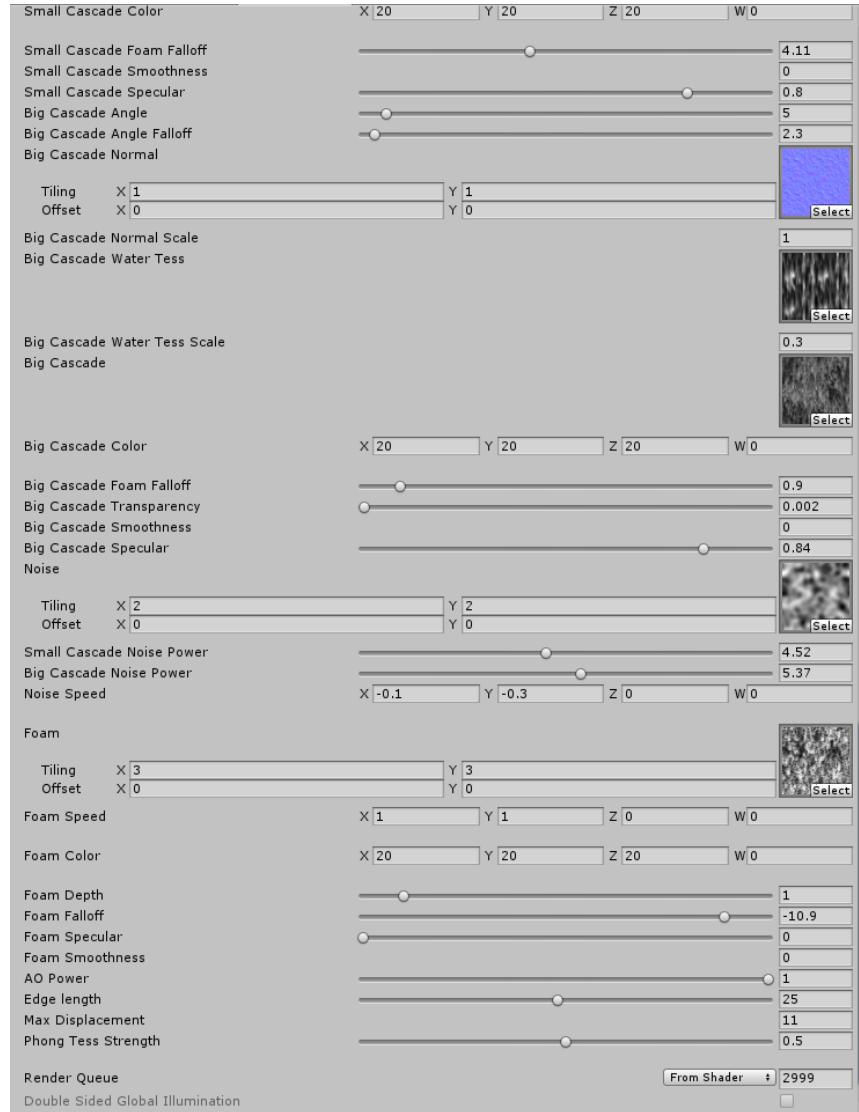
### River shading

This pack contain few shaders which have different amount of features. We will show here most advanced as rest simply have just lower amount of options but they work the same.

- **Water, small cascade, big cascade main speeds** control main speed of the water and also it's main speed for flowmap system. In flowmap shaders we rather advice to keep speed for all cascades and basic water equal.
- **Water mix speeds** are used to create wave noise on the water.
- **"Water depth"** controls blending of water with background in very shallow area"
- **"Shallow Falloff"** control blend between deep water and shallow.
- **Shallow or Deep Color** manage color of water at shallow and deep area.
- **"Water Translucency Power"** – we added small effect of overlighted waves, you could control it's intensivity by this sliders.
- **Water Specular Close and Far** – we setup different specular power close and far range to simulate natural water behave where close water surface is more transparent.
- **"Water Specular Threshold"** control blending distance between far and close specular values.
- **"Water Smoothness"** control smoothness and reflexivity of the water surface. Smoothness closer to 1 will generate more sharp and visible reflections on water surface. It also affect how light is mirrored by water surface.
- **"Distortion"** manage power of distortion at water edges mostly. It distort image under the water.
- **"Water Falloff Border"** manage mostly water line visibility when water meets background. It works similar to water depth but its focused on edge visibility.



- In next part you setup normal maps their power , height texture for tessellation and it's bumpiness.
- “**Small Cascade Color**” here you could manage power of cascade colors, make note that higher values at albedo could become emissive, so for night or dynamic light scene we advise to drop them to around 8.
- “**Small Cascade Angle**” this value setup small waterfalls on water surface when it’s stop become flat.
- “**Small Cascade Falloff**” change sharpness of the angle blending between small cascade and flat water.
- “**Small Cascade Foam Falloff**” - manage visibility/ power of small cascade texture. It works like color but it’s rather power function which eliminate or make details stronger.
- “**Big Cascade Color**” here you could manage power of cascade colors, make note that higher values at albedo could become emissive, so for night or dynamic light scene we advise to drop them to around 8.



- “**Big Cascade Angle**” this value setup big waterfalls on water surface when it’s stop become flat.
- “**Big Cascade Falloff**” change sharpness of the angle blending between big cascade and small cascade/flat water.
- “**Big Cascade Foam Falloff**” - manage visibility/ power of big cascade texture. It works like color but it’s rather power function which eliminate or make details stronger.
- **Foam Specular Smoothness, Depth, Color** -this values control foam visibility and render at edges of the water.
- **Cascades noise powers** – cascade textures use noise to break the tilling, we will probably change this in the future to stop texture usage. By this sliders you could manage noise sharpness. Too big values make waterfalls look a bit strange.
- “**AO Power**” manage how water behave with ambient light. We advise to keep this value at 1
- “**Edge length**” manage how dense tessellation mesh will be. We setup pretty standard value.
- “**Phong Tess Strength**” – its power how tessellation behave on strongly curved area. Higher value will smooth them, lower would leave them as they are.
- “**Render Queue**” – very important in blending between 2 water surface to put their correct render order. Correct values will avoid flicker on transparent water surfaces connection.

As river have queue 2999 so for example lake connected with river should have around 2998 or 2997. This means river water will be rendered at the top and.. when you will blend surface by vertex color alpha at spline, you will get VERY smooth, invisible blending.



## Swamp shading

For swamp most setup is the same, the difference is that Detail albedo 1 and 2 are non-transparent and there is noise texture to mix them each other and with clean water. Use vertex colors to get different swamp looks. Swamp demo will give you tips which colors are used and how.

## Lava Materials

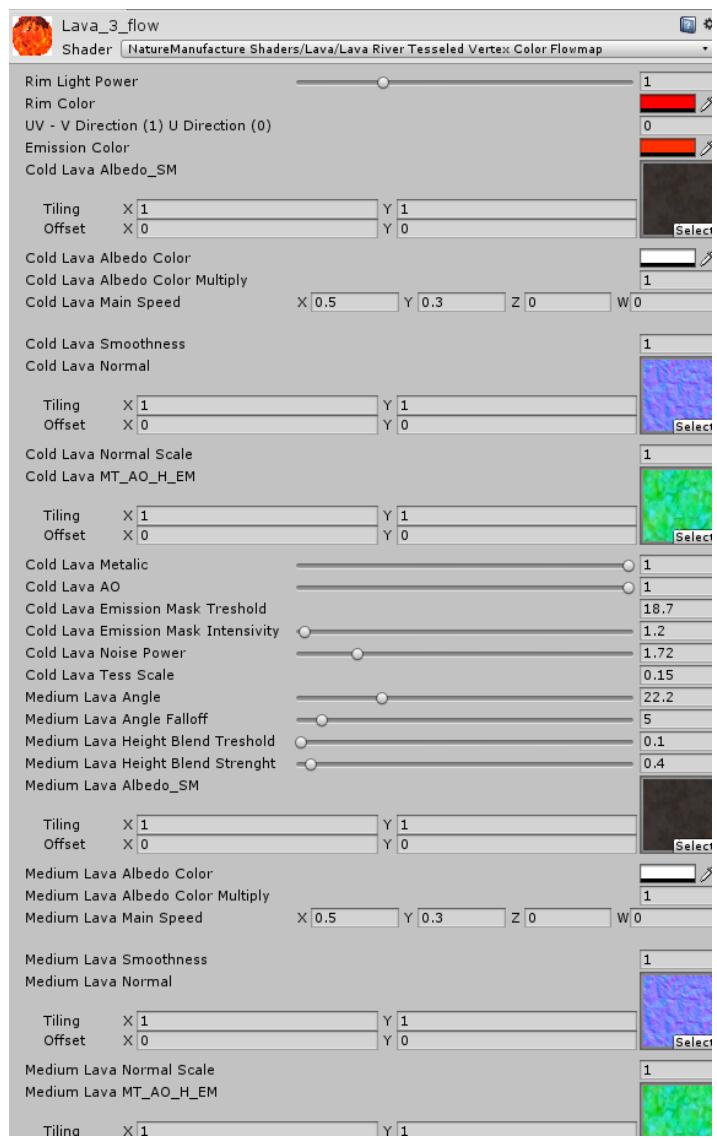
In Lava shading be sure that you have bloom turned on, its impossible to adjust emission without bloom on screen. Emission only show up when bloom effect is turned on at engine post processing stack or other post process that you use.

This pack contain few shaders which have different amount of features. We will show here most advanced as rest simply have just lower amount of options but they work the same.

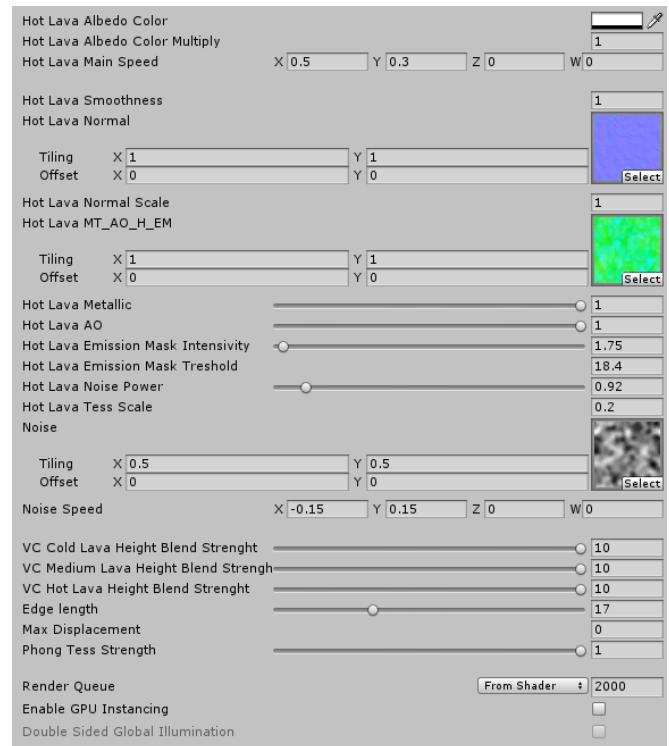
Lava contain 2 kind of materials hot and frozen.

### Hot lava shading

- **Rim Light Power and color** – this kind of emission show up only at lava borders or very high angle view. It overlight lava in such view and create nice effect on background models like they become heated.
- **“UV- V U directions”** – it manage lava moving direction. By changing it you could rotate movement by 90 degrees.
- **“Emission color”** is color that lava will use in emission.
- **Cold Lava means** – this sentence means behave on flat area
- **“Cold Lava color and it’s multiply”** – will manage albedo color.
- **“Cold Lava Main Speed”** – is used to control lava speed also on flowmap.
- **Cold Lava Metalic, AO, Smoothness** – This values manage PBR character of the cold lava surface.
- Notice that at alpha chanel lava MT\_AO\_H\_EM texture contain emissive mask. B chanell is used for heighblend and heightmap for tessellation.
- **“Cold Lava Emission Mask Threshold”** – it adjust threshold of emission mask, you could make it more or less sharp (not the same as power)
- **“Cold Lava Emission Mask Intensity”** – it manage power of emission from mask which left from threshold adjustment above. This is main value to manage emission power for each lava layer.
- **“Cold Lava Tess Scale”** – if you use tesseled shader it will pop up verts using heightmap texture.



- **Medium Lava Angle and Falloff** – this values manage angle value and blending where lava start to use second layer textures and setup
- **“Medium Lava Heightblend Threshold”** – you could adjust heightmap used height-blending at mix between cold and medium lava. Threshold value will make this blend harder, sharper. It
- **“Medium Lava Heightblend Strength”** – this value could multiply heightmap used for heigblend.
- All medium, hot lava values are working the same.
- **Hot and medium lava noise power** – Lava use noise on emission to simulate physical heat movment inside lava surface, this values are used to control it's sharpness. Too sharp noise could generate strange results.
- **VC Cold, Medium, Hot height blend strengths** – as you are able to paint on lava via vertex paint, this values help you to manage height blending between when you mix via vertex colors.
- **“Edge length”** manage how dense tessellation mesh will be. We setup pretty standard value.
- **“Phong Tess Strength”** – its power how tessellation behave on strongly curved area. Higher value will smooth them, lower would leave them as they are.



## Frozen Lava Shading

This shader is used to simulate eroded old lava rivers which could be blended via vertex colors with background textures. It basically blend 2 layers, lava and cover. Tessaled shader is designed to fill gaps in main texture by cover slowly while amount of cover is rising. Ash or background start to filling holes and move verts up and at the end it start to cover top verts. It's very realistic construction which gives a lot of fun. Shader very sensitive but you also could use it in rocky road at forest or any other case. Anyway shader works the same as this above but it's focused on different blending type between surfaces.

- **“Max Tessellation”** – desity of tessellation at lava surface
- **Tess Min and Max Distances** – manage tessellation rendering distance.
- **“Phong Tess Strength”** – its power how tessellation behave on strongly curved area. Higher value will smooth them, lower would leave them as they are.
- **“Cover Heightmap Contrast”** – This value is able to fix, manage a bit contrast of the heightmap used for heightblend
- **“Cover Heightmap Threshold”** – By this value you could adjust sharpness of heigblend between cover and bottom surface.
- All rest values work the same as in shader above. This is still lava shading so It could be emissivie etc. This mean lava could be still a bit hot like in our video

