Crest - Shallow Water

Release 1.3.3

Wave Harmonic

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ONE

INTRODUCTION

The Shallow Water package brings a Shallow Water Simulation to Crest 5. It can be used to achieve next-generation visuals by simulating shorelines and streams.

When simulating shorelines, the simulation can follow the camera. When simulating streams, the final output can be baked to a texture for fantastic performance.

As a fair warning: simulations are not one-click instant shorelines/streams. Results are determined by various factors especially the shape of the terrain.

1.1 Features

- Simulate shallow areas of shorelines
- Simulate streams with an option to baked the final output to a texture
- Simulate shallow water generally

CHAPTER

TWO

RELEASE NOTES

1.3.3

Bump version number for compatibility.

1.3.2

Changes

- Add tooltips to enum options
- Update GPU profiler / frame debugger markers naming conventions
- Validate incompatible configuration with baked DepthProbe

Fixes

- Fix simulation not running at correct rate in edit mode due to wrong delta time
- Fix triggering DepthProbe bake on first update when not needed

1.3.1

Changes

- Disable culling UI if Placement not set to Fixed

Fixes

- Fix simulation overwriting other flow inputs
- Implement better workaround to “artifacts and simulation instability when using DX12 or Vulkan” which does not reduce water level sampling quality
- Fix script warnings on build
- Disable culling if Placement not set to Fixed to prevent simulation unexpectedly not working

1.3.0

Changes

- Automatically reset simulation and populate DepthProbe on property changes
- Water level output / streams can now sample water level inputs directly via *Sample Water Level Inputs Directly*. This improves quality, removes camera position dependency, and fixes a source instability
- No longer disable Depth Probe after ShallowWaterSimulation bake
- Add "Switch to Real-Time" and "Switch to Baked" buttons
- Make properties read-only in UI when baked
- Hide irrelevant properties when using water level as the output (includes Streams preset)
- No longer allow culling option to be used with water level output (includes Streams preset), as the use case and implementation needs to be worked out still
- Visualize Padding Width with gizmos

Fixes

- Fix one frame delay for culling option
- Fix instabilities at domain edge
- Fix Blur Height option causing wrap around artifact at domain edge
- Fix streams not being at full strength due to applying *Blend Push Up Strength* which is invalid for streams
- Fix artifacts for flow and foam at domain edge when simulating streams due to using feathering instead of applying Padding Width
- Fix GC allocations when populating ground height
- Skip unnecessary mask blur when output to water level

Full version history has been omitted for brevity. It can be found at Release Notes.

CHAPTER

THREE

SHALLOW WATER SIMULATION

A Shallow Water Simulation is a versatile tool which simulates fluid dynamics in shallow water. Generally speaking it has many use cases from emergent gameplay with turbines and pumps to generating streams. At launch only the stream and shoreline use case is supported.

The simulation will inject water height, foam and flow to give convincing results.

> **Warning:** Like any simulation it can be difficult to control and thus expectations should be tempered. For example if you have a vision for what kind of shoreline waves you want, the terrain will have to be authored to produce that output with the simulation. Furthermore, depending on the riverbed, some streams will not reach the end.

Usage

To get started perform the following:

- Add the *ShallowWaterSimulation* component
- Add a *Depth Probe*
- Move the transform to where you want the simulation
- Adjust the Width property to desire size
- Optionally set the Preset
- Click “Populate Depth Probe & Reset Simulation”

After changing a property you will need to click “Reset Simulation” for them to be reflected. Changing properties when the simulation is running can cause instabilities and visual anomolies - this is expected and just click “Reset Simulation” when ready.

The above steps is for a fixed position simulation. If you want the simulation to be movable or follow the camera, then change Placement. This is only possible when injecting displacement (like for shorelines).

Stream Simulation

The Stream preset can effectively simulate a stream and the result can be baked to a texture.

This simulation is a function of water level and thus the Inject property (*Output* → *Shape* → *Inject*) needs to be set to Level. Then you will need Water Level Input"s as the input source. When you raise the Water Level Input it will expose a wall of water and this will be the source of water for the simulation. Water will flow out of this wall.

Example

See the Stream sample for an example of connecting two lakes with a stream.

Once everything is set up, let the simulation run. The simulation can be baked at any point, but the best time is when water has found its level (ie no more movement in water height - ignore flow movement). Click "Bake Output" to bake the simulation at which point the Mode will change to Baked and you will see the Baked Texture slots populated.

> **Warning:** It is possible that the stream will not reach its destination depending on the amount of obstructions and the profile of the terrain.

Shoreline Simulation

The simulation can be combined with normal waves to simulated shoreline wave behaviour.

This simulation is a function of displacement (ie Animated Waves simulation) and thus the Inject property (*Output* → *Shape* → *Inject*) needs to be set to Waves. Properties to control this simulation is found under the *General* → *Blending With Waves* heading.

This is a realtime effect and cannot be baked.

Example

See the Beach sample for an example of simulating a Swash Zone.

> **Warning:** Results will greatly depend on the profile of the terrain and the waves.