Thank you

Thank you very much for choosing *Crest Ocean System* 4.8 for URP!

When upgrading *Crest*, make a backup of your project and remove the existing Crest files before installing the new package.

Please follow *@crest_ocean* on Twitter for news and updates, and drop in to the Crest Discord server `https://discord.gg/g7GpjDC` to say hello!

Crest began life as open source software hosted here: `https://github.com/wave-harmonic/crest`. This may be a useful resource for issue searching/posting, for looking at experimental development branches, looking at commit history for files, and misc.

Note: Unity 2019.4.9 and URP 7.3.1 or later are required. The most recent version of each is recommended due to the large volume of fixes and improvements that Unity are making.

Documentation

There is a getting started video available on YouTube here: `https://www.youtube.com/watch?v=TpJf13d_-3E`. There are additional tutorial videos on this channel covering other aspects of *Crest*.

Refer to *userguide.pdf* alongside this document for full documentation, including detailed setup steps.

Support

There are a number of channels to get support. First and foremost, you can contact us directly via email: support@waveharmonic.com.

Another support channel is the *Crest* Discord: `https://discord.gg/g7GpjDC`.

Finally issues can be searched and posted on the *Crest* GitHub: `https://github.com/wave-harmonic/crest`.

Notes

- *Crest LWRP* is now deprecated as LWRP is not maintained or supported by Unity. Please upgrade to URP.

- Some of the example scenes require a new layer to be added to your project called Terrain. *Crest* is unable to add this layer to your project automatically, so it will throw an error if this layer is not found.

- Custom sky assets may require their code to be added to the ocean shader for the fogging/scattering to work. The ocean shader *Ocean.shader* has a comment pointing out where such code may need to be inserted: "If you

are using a third party sky package such as Azure, replace this with their stuff!". Please see the wiki on *Crest* GitHub for more information and examples.

Release Notes

4.8

- Change minimum Unity version to 2019.4.9

- Add new Gerstner component *ShapeGerstner* with better performance, improved foam at a distance, correct wave direction and spline support (preview). See notes in the *Wave conditions* section of the user guide.

- Add new spline tool component *Spline* which can be wave splines for new gerstner system (preview). See notes in the *Wave conditions* section of the user guide.

- Add orthographic projection support to ocean surface

- Add weight control for *Underwater Environmental Lighting* component

- Add option on *AnimWaveSimSetting* to disable ping pong for combine pass. See notes in performance section of user guide.

- Calculate sub-surface light scattering from surface pinch, to enable other fixes/improvements. May require retweaking of the scattering settings on the ocean material.

- Improve error reporting when compute shaders fail

- Change shader level target for combine shader to 3.5 which might fix some issues on Quest

- Fix dynamic wave sim stablity by reducing *Courant number* default value

- Remove warning when camera not set which was displaying even when it shouldn't

- Change ocean depth cache populate event option to Start

- Fix for multiple gaps/cracks in ocean surface bugs

- Fix *Follow Horizontal Motion* for foam override

- Fix normals not being flipped for underwater with flow enabled

- Fix ocean depth cache triggered by other cameras or probes

- Fix underwater effect flickering when other cameras are in the scene

4.7

- Add foam override shader and material to remove foam

- Add camera property to *OceanRenderer*. *ViewerHeightAboveWater* will use camera transform

- Add option to add downhill force to buoyancy for some floating objects

- Improve platform support by improving texture compatibility checks

- Minor underwater performance improvement

- Fix Unity 2020.2 / URP 10 support

- Fix shadows not following scene view camera

- Fix *Follow Horizontal Motion* not working

- Fix *Strength* on *Crest/Inputs/Foam/Add From Texture* being ignored

- Query system - fixed ring buffer exhausted error on some Linux and Android platforms

4.6

- Change minimum Unity version to 2019.4.8

- Improve foam texture

- Add height component that uses *UnityEvents* (under examples)

- Add shadow LOD data inputs

- Add support for disable scene reloading

- Disable horizontal motion correction on animated waves inputs by default

- Add more dynamic waves debug reporting options

- Improve performance by reducing work done on scripted shader parameters every frame

- Make some shader parameters globally available

- Fix precision artefacts in waves for mobile devices when far away from world centre

- Fix spectrum editor not working in play mode with time freeze

- Fix build error

- Fix *UnderwaterEnvironmentalLighting* restoring un-initialised values

- Fix precision issues causing very fine gaps in ocean surface

- Fix some memory leaks in edit mode

- Fix mesh for underwater effects casting shadow in some projects

- Fix caustics moving, rotating or warping with camera for URP 7.4+

- Fix caustics breaking for VR/XR SPI

- Fix underwater material from breaking on project load or recompile

4.5

- Add option to clip ocean surface under terrain

- Use local shader keywords

- Remove ocean depth cache updating every frame in edit mode

- Add option to ocean input to allow it to move with ocean surface horizontally (was always on in last version)

- Allow save depth cache to file in edit mode

- Validate OceanRenderer transform component

- Validate enter play mode settings

- Improve feedback in builds when spectrum is invalid

- Improve spectrum inspector

- Fix underwater effects for URP 7.4+

- Fix undo/redo for spectrum inspector

- Fix dynamic waves crashing when flow or depth sim not enabled

- Fix culling issues with turbulent waves

- Fix precision issues causing gaps in ocean surface

- Fix shadow sampling not following camera after changing viewpoint

- Fix shadow sampling not following scene camera

- Fix caustics and shadows not being correctly aligned

- Fix material being allocated every frame in edit mode

4.4

- XR: add Single Pass Instanced support

- Gerstner waves from geometry shader - allow wave scaling using vertex colour

- Performance: Fix for ocean depth cache populating every frame erroneously

- Usability: disable inactive fields on ocean components in Inspector

- Validation: improve lighting settings validation

- Fix for buffer overrun in height query system which caused crashes on Metal

- Fix for height query system breaking down at high frame rates when queries made from FixedUpdate

- Fix height queries when Scene Reload is disabled

- Fix various null reference exceptions in edit mode

- Fix for small wavelengths that could never be disabled

- Fix popping caused by shallow subsurface scattering colour

- Fix some null exceptions if OceanRenderer is not enabled in scene

- Fix mode (Global/Geometry) not applying in edit mode for ShapeGerstnerBatched component

- Clean up validation logging to console when a component is added in edit mode

- Fix underwater shader/material breaking on project load

- Fix shadow sampling running on cameras which isn't the main camera

4.3

- **Crest LWRP deprecated**. We are no longer able to support LWRP, and have removed the LWRP version of Crest in this release. Do not install this version if you need to remain on LWRP.

- Ocean now runs in edit mode

- Realtime validation in the form of inspector help boxes

- Fix *Segment registrar scratch exhausted* error that could appear in editor

- Make compatible with dynamic batching

- Add option to disable occlusion culling in planar reflections to fix flickering (disabled by default)

4.2

- Scale caustics intensity by lighting, depth fog density and depth.

- Show proxy plane in edit mode to visualise sea level.

- Fix leaked height query GUIDs which could generate 'too many GUIDs' error after some time.

- Validate ocean input shader, warn if wrong input type used.

- Fix for cracks that could appear between ocean tiles.

- Fix for null ref exception in SRP version verification.

- Warn if SampleHeightHelper reused multiple times in a frame.

- Metal - fix shader error messages in some circumstances.

- Fix for erroneous water motion if Flow option enabled on material but no Flow simulation present.

- Fix sea floor depth being in incorrect state when disabled.

- Fix caustics stereo rendering for single-pass VR

4.1

- Bump version to 4.1 to match versioning with *Crest HDRP*.

- Clip surface shader - add convex hull support

- Add support for local patch of Gerstner waves, demonstrated by GameObject *GerstnerPatch* in *boat.unity*

- Darkening of the environment lighting underwater due to out-scattering is now done with scripting. See the *UnderwaterEnvironmentalLighting* component on the camera in *main.unity*.

- Remove object-water interaction weight parameter on script. Use strength on material instead.

- Fix garbage allocations.

- Fix PS4 compile errors.

- Better retention of foam on water surface under camera motion.

- Fix NaN issues in height query code that could produce 'flat water' issues.

3.8

- Fix for missing shadergraph subgraph used in test/development shaders. This does not affect main functionality but fixes import errors.

- Refactor: Move example content into prefabs to allow sharing between multiple variants of Crest

3.7

- Clip surface shader - replaces the ocean depth mask which is now deprecated

- Removed the deprecated GPU readback system for getting wave heights on CPU

- Exposed maximum height query count in *Animated Wave Settings*

- Support disabling *Domain Reload* in 2019.3 for fast iteration

3.6

- Third party notices added to meet license requirements. See *thirdpartynotices.md* in the package root.

- VR refraction fix - ocean transparency now works in VR using *Single Pass* mode. This fix was actually in version 3.5 but we missed the release note item, so including here.

3.5

- Gizmos - color coded wireframe rendering of geometry for ocean inputs

- Object-water interaction: 'adaptor' component so that interaction can be used without a 'boat'. See *AnimatedObject* object in *boat.unity*.

- Object-water interaction: new script to generate dynamic waves from spheres, which can be composed together. See *Spinner* object in *boat.unity*.

- Fix visual pop bug at background/horizon when viewer gains altitude

- Input shader for flowmap textures

- Better validation of depth caches to catch issues

- Fix for compile errors for some ocean input shaders

- Documentation - link to new tutorial video about creating ocean inputs

3.4

- Ocean depth cache supports saving cache to texture on disk

- Ray trace helper for ray queries against water

- Fix for dynamic wave sim compute shader not compiling on iOS

- Input shader for flowmaps

- Shader code misc refactors and cleanup

3.3

- Fix for compute-based height queries which would return wrong results under some circumstances (visible when using Visualise Collision Area script)

- VR: Fix case where sea floor depth cache was not populated

- VR: Fix case where ocean planar reflections broken

3.2

- Add links to recently published videos to documentation

- Fixes for wave shape and underwater curtain on Vulkan

- Fix for user input to animated wave shape, add to shape now works correctly

- Fix for underwater appearing off-colour in standalone builds

- Fix garbage generated by planar reflections script

- Fix for invalid sampling data error for height queries

- Fix for underwater effect not working in secondary cameras

- Asmdef files added to make Crest compilation self-contained

- Fix waves not working on some GPUs and Quest VR - Issue #279

- Fix planar reflections not lining up with visuals for different aspect ratios

- Documentation - strategy for configuring dynamic wave simulation

- Documentation - dedicated, fleshed out section for shallow water and shoreline foam

- Documentation - technical information about render/draw order

3.1

- Made more robust against VR screen depth bug, resolves odd shapes appearing on surface

- Preview 1 of Crest URP - package uploaded for Unity 2019.3