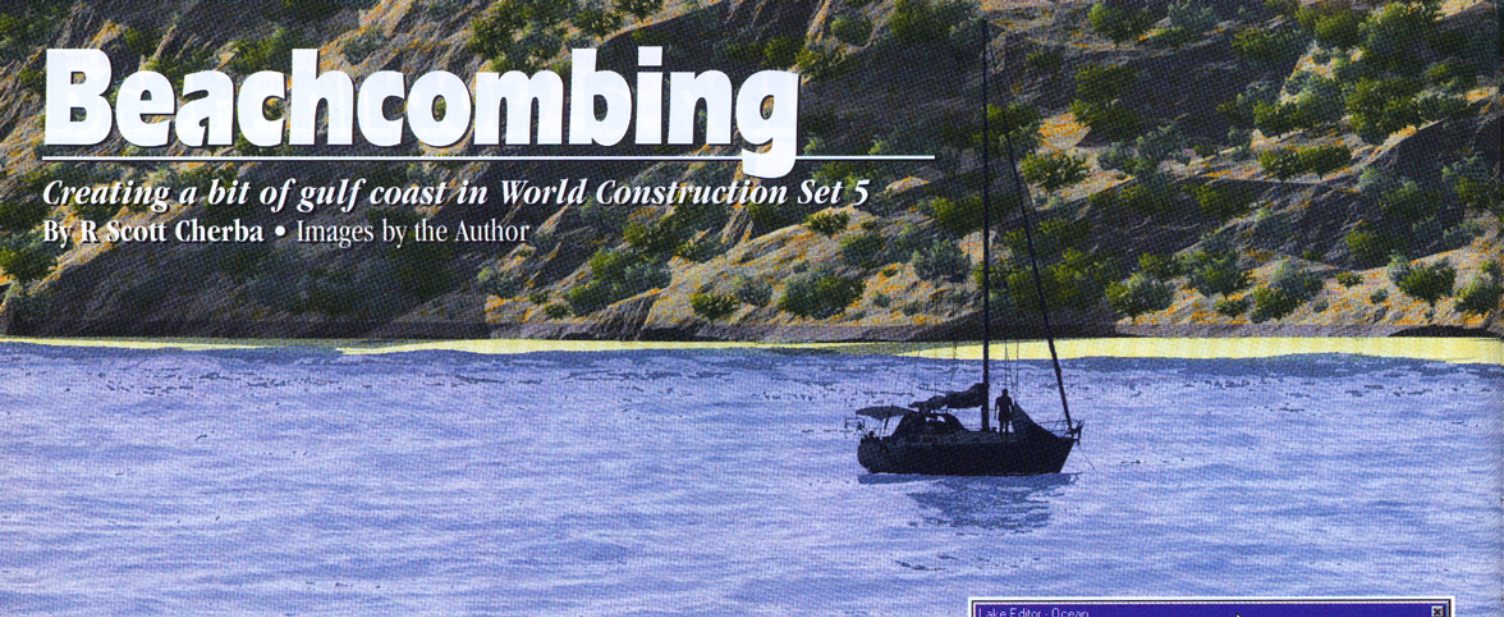


# Beachcombing

Creating a bit of gulf coast in World Construction Set 5

By R Scott Cherba • Images by the Author



As a World Construction Set (WCS) version 5 user, you know that Ecosystems are used to cover terrain with everything from a base level of detritus (Ground Overlay), to undergrowth (Understory), and full-blown trees (Overstory). A Ground Effect forms the ground beneath everything else. But that's terrain. What about water? Time to go to the Beach.

In WCS5, a Beach is to water what Ground Effect and Ecosystems are to land. A Beach makes it easy for you to plant foliage in and along a Lake. But we're going to look at an aspect of Beaches that's of more common use: Material Ground Overlay as a terrain texture around bodies of water. Somewhere along the way we'll discover more secrets of the Texture Editor.

Start with any terrain with water. My area is the Gulf of California, but detailed Mexico DEMs are hard to come by, so I used WCS's Terrain Generator to create my own coastline on a 33-meter grid. My textures are going to reflect the broad tidal zone characteristic of the Gulf, and everything we need is accessible on two pages in the Lake Editor.

Two notes: 1) Whenever I play with textures, I start with bright colors so I can easily see the effect in renders. In the interest of brevity, I'm going to omit that step here. 2) The project discussed here is available for you to dissect at [www.cherba.com/resource](http://www.cherba.com/resource) (including notes on the new WCS 5.21's slight changes in how Beach Height works).

## First stop, Beach Gradient

In the terrain Ecosystem Editor, the Material Gradient page controls Material placement. In the Lake Editor, it's the Beach Gradient page (Figure 1). Since we're viewing the scene at nearly high tide, we'll use a Beach Height Minimum of 0 meters and a Variation of 2m. This will vary more with waves (which we have). In other words, the 0 to 2 meters of terrain above the waterline will be controlled by our Beach parameters. Beach overrides all other Land Cover except snow.

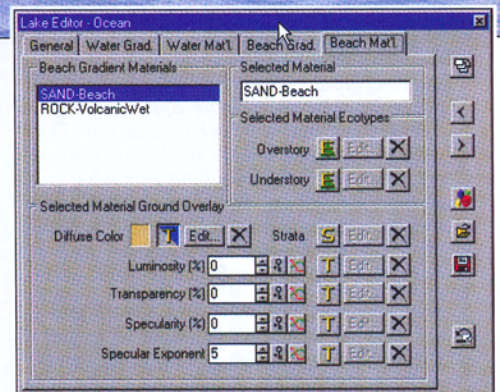
With the Material Gradient, we can use textures to control the placement of Materials. We're going to use it to place two Materials. *Why?* Much of the gulf is rocky coastline with sandy beaches tucked into coves. If we used only one Material, it would be applied to the entire coastline. Instead, we'll use one texture for steep rocky shoreline and another texture for the flatter sections of sandy beach.

Two Materials will represent our two types of beach: SAND-Beach and ROCK-VolcanicWet. Beach texture placement will be controlled with the Material Gradient Driver. That's where its Texture Editor comes in. Use Terrain Parameter as the Element and Slope (degrees) as the Parameter. Enter an Input Low value of 0 and Input High value of 15. This will instruct WCS to use the Material at the left end of the Material Gradient when the Beach terrain slope is 0 degrees and the right end Material when the slope is 15 degrees or higher.

So far, so good. Back on the Beach Gradient page, the Input values are now in their respective boxes at the ends of the Material Gradient. But what Material will be used if the terrain slope falls between 0 and 15 degrees? The selection box gives you transition options. Let's use Sharp Edge because we want either SAND or ROCK, not a blend of the two Materials. WCS now knows where to place SAND and ROCK Beach Material, but we still have to provide a description of what the two Materials are.

## Beach Materials, what else?

When you're covering non-Beach terrain, the Ecosystem Editor Material & Foliage



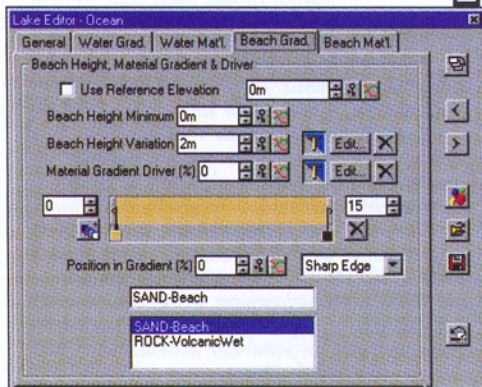
page controls coverage. When you're covering a Beach, it's the Lake Editor Beach Material page that guides Material and Foliage placement (Figure 2). Here we control the Material properties and any Ecotypes we want to use to grow botanicals in the water. For this project, we're just interested in parameters for the SAND and ROCK Materials.

Let's start with SAND. This time the Elevation Terrain Parameter is used to control the texture. Sandy beaches typically have a clean margin along the surf zone and storm-washed flotsam higher up. Our clean sand starts at 1000m (Lake Elevation) and extends to 1002m (0m Beach Height plus 2m Variation). We're not going to worry about the extra 1m variation introduced by 1m waves.

Now for the ROCK. The Elevation Terrain Parameter is again used to control the texture. In this case, the water level end of the gradient is a Fractal Noise texture sized and stretched in the Z-direction (vertical) to imitate seaweed clinging to the rocks. The upper elevation end of the gradient is color very close to the terrain color so that the beach blends into the higher terrain. A Specularity texture is added to represent water shining on the seaweed. Its Fractal Noise element is concentrated toward lower Beach elevation using the Elevation Terrain Parameter.

## Water Material

Shallow water along the shoreline also has salad greens clinging to rocks beneath the breaking swells. We can take advantage of the same texture we used for





ROCK seaweed to color shallow water. The Water Material page gives us access to Water, Elevation, Foam, and Waves. We're just interested in the Water Material.

This time the Water Depth Terrain Parameter is used to drive the texture in the depth range from 0 to 3 meters. At the 0 end of the gradient, a blue version of the seaweedy ROCK texture is used. At a depth of 3 meters the texture reaches ocean blue. (Actually, Gulf of California water tends to be a nutrient rich greenish-blue, but most people don't know it, so the water color would look wrong to them.)

### Final outcome

Figure 3 shows a close-up of beach rendered with these textures. Insets show texture thumbnails captured from the respective Texture Editors. *Note:* The close-up is for texture illustration only. This is too close for quality rendering of 33-meter grid terrain. The horizontal field of view is approximately 30m at the foreground rock. All the apparent terrain detail is created by WCS's Fractal Depth polygon subdivision of the 33m grid.

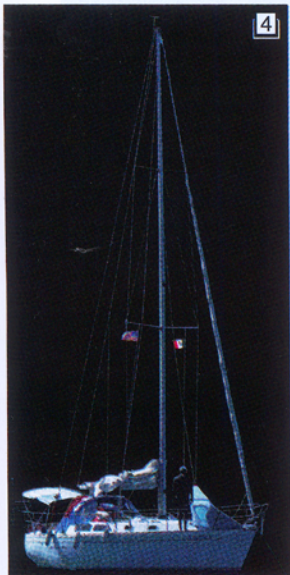
### Sailing away

We can't leave this idyllic spot without a focus for the final render. Place a Foliage Effect in the bay at water level (1000m) and assign it a sailboat Image Object

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(Figure 4). WCS shadows the sailboat image in response to the early morning sun in the rendering atop these pages.

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## RUN, don't WALK

If you are interested in designing your own landscapes or using realworld terrain data, *run, don't walk* to [www.daylongraphics.com](http://www.daylongraphics.com) and order the low-cost heightfield modeler and editor, Daylon Leveller, version 1.4.007. If you have an earlier version, upgrade it now.

Unfortunately, Leveller's developer, Ray Gardener, is going on to other pursuits and has placed his Leveller product on the block for sale. Though facing an uncertain future, Leveller is presently still available for purchase and is an exceptionally worthwhile addition to one's tool set for use now or in the future.

As the accompanying image shows, Leveller will stand alone. Its value, however, extends beyond. Notably, Leveller imports the native MicroDEM format, and it imports and exports World Construction Set version 5's .elev files as well as other formats.

Should you decide to add Leveller to your tool set, order it from

the Web site above, and be sure to follow any upgrade instructions received after the download. —Thomsen-Norre

*Thomsen-Norre is a nom de plume of a long-retired Army officer who has written in 3D Artist previously about MicroDEM, WCS, LightWave, and other tools for 3D map illustration and modeling realworld landscapes. Visit [www.3dartist.com/thomsnor.htm](http://www.3dartist.com/thomsnor.htm) for related online supplements.*

*Leveller's use in creating 16-bit grayscale elevation maps was noted in 3DA #40's "Architecture Without Modeling."*

### Custer's View: "DEM o'Graphics Potpourri"

Part 2 in 3DA#40 contains a view of what Custer might have seen from a balloon if he had had one during his 1874 Black Hills expedition. That image was developed and rendered in World Construction Set using data prepared with MicroDEM. The image here was developed and rendered in Leveller, using the same MicroDEM data and same grayscale-to-color process using Photoshop's Magic Wand and Variations.

