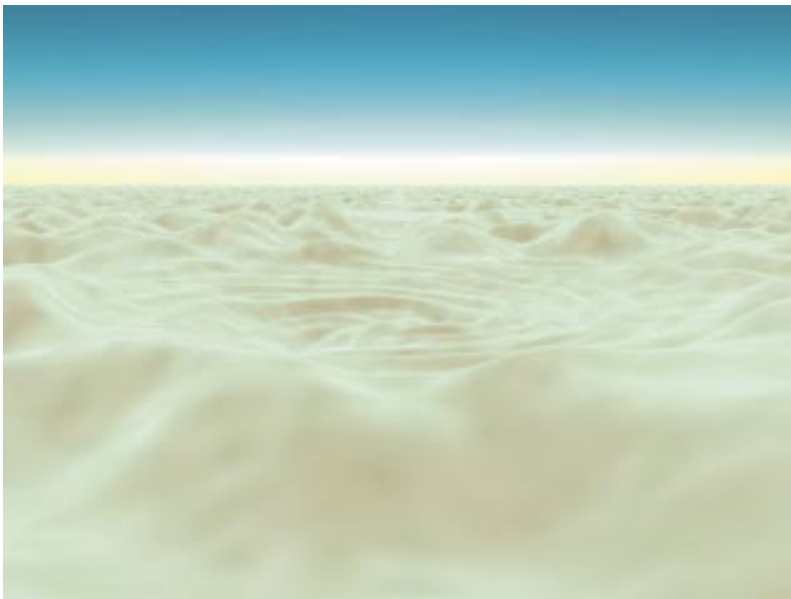


# swirling sands

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Use Psunami Water to create sand dunes and a swirling sand pit. A cool alternative use for a plugin designed to create water simulations.



a tutorial for : [psunami water](#)

**PSUNAMI**  
**PSUNAMI**



**photoreal 3D water simulation & effects.**

[ from Digital Anarchy ]

f/x tools for revolutionaries.



For this tutorial, we are changing the name of 'Psunami Water' to 'Arrakis'.

Those of you who are well-read will understand the reference. The rest of you heathens are required to buy a book called 'Dune', read it, and then return to this tutorial. Such is the price one must pay for not already having read one of the best sci-fi books ever. But we digress.

Of course, the reason for the name change is that we're about to create a swirling sand pit in the middle of the desert. In this tutorial, we will turn off the water simulation, and just use Psunami's built in 3D displacement mapping and texture controls

This will give you a glimpse into the power of the 3D displacement controls. You can have up to 3 other layers affect Psunami, either as a displacement map, texture, or both.

Not exactly what you would expect from a filter designed to do photorealistic water simulation, but Psunami is capable of doing quite a bit more than you would think at first glance. So let's get started.



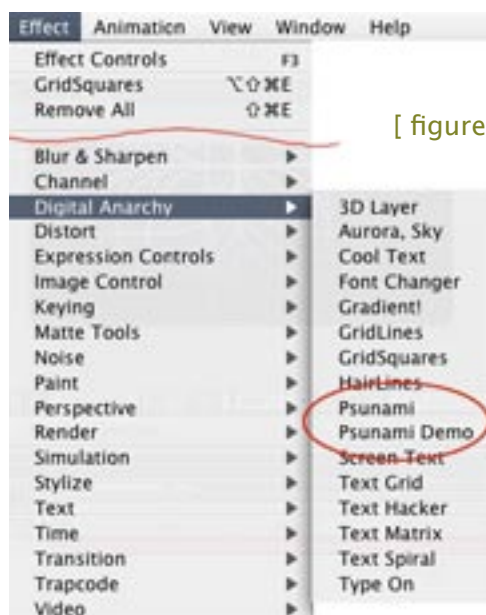
[ figure 1 ]

## 00- download & install

Before you start this tutorial, you will want to download the [psu\\_sands-tute.zip](#) file from our website. This ZIP file contains an After Effects .aep file and QuickTime example movies.

You also need to install our Psunami Water plugin into your After Effects/Plugins folder. The plugin will appear in the 'Effect' dropdown menu, in a 'Digital Anarchy' submenu. [ figure 2 ]

If you are working with the demo version of Psunami, a red 'X' will watermark your footage.



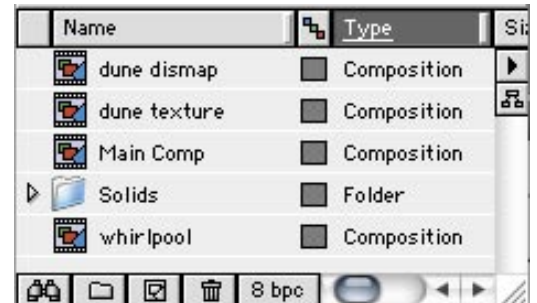
[ figure 2 ]



## 01- project setup

From your download folder, open up the [psu\\_sands.aep](#) project file in After Effects. The 'Final' comp shows your finished piece.

You can also play the QuickTime movie called [psu\\_sands-final.mov](#) to see the final composition that you will create. [ figure 3 ]



[ figure 3 ]

## 02- what is 3D displacement?

In this tutorial, both the sand dunes imagery and the swirling sand imagery will be created using 3D displacement maps. So you're going to become very familiar with this subject.

'3D displacement' is basically the same as '2D displacement'. Difference is that you're pushing around polygons instead of pixels.

For both kinds of displacement, you set a displacement amount and then match a grayscale image to your original image. Where the pixels (or polygons) meet determines how the original image will be pushed around, and by what amount of distance.

2D displacement example: [ figure 4 ]

- White pushes the pixels the maximum distance in the positive direction (up or to the right).
- Black pushes the pixels the maximum distance in the negative direction (down or to the left).
- Shades of gray push the pixels some percentage of the maximum amount.
- The closer to neutral/middle gray the less the pixels in the original image are affected.
- Neutral gray causes no displacement at all.



[ figure 4 ] The 2D displaced figure, at right, follows the shades of gray it is set against. Top, white pixels push the flag upwards. Bottom, black pixels push the model's leg downwards.



The same principles holds true in 3D displacement:

[ figure 5 ]

- White pushes the polygons up the maximum amount.
- Black pushes the polygons down the maximum amount.
- Shades of gray push the polygons some percentage of the maximum.

Now let's continue on to create your own grayscale displacement map. We'll abbreviate that term as 'dismap' from now on.



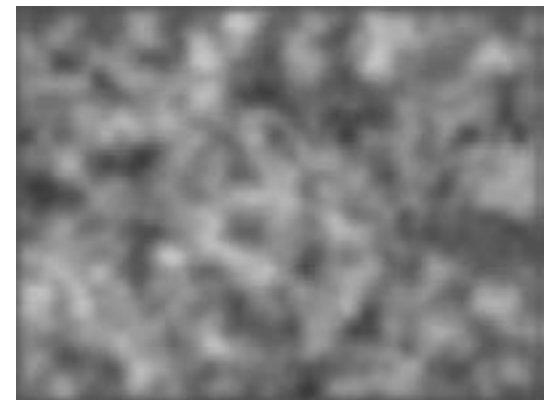
[ figure 5 ] 3D displacement example

## 03- begin the dune dismap

First step is to create the grayscale image that will create the dunes. We've already created it, and that is the 'Dune Dismap' comp. Check that comp out, then close it so you can make your own.

To start your own, create a comp that is 1024x768. This is a pretty large comp in order to give us a little extra resolution, since we're going to use it as a displacement map [dismap].

Now create a new Solid layer that's the same size as the comp (1024x768).



[ figure 6 ]

## 04- add noise and blur

Apply Fractal Noise (Effects>Noise>Fractal Noise) to the Solid. The default settings of the Noise filter work fine, so there's no need to make any changes.

However, we do want to blur the noise a bit. We can accomplish this by applying a Gaussian Blur (Effects>Blur & Sharpen> Gaussian Blur). Set 'Blurriness' to 25.

[ figure 6 ]



[ figure 7a ]

This will smooth the noise out and give us smoother sand dunes. [ figure 7a ] If left as is, the extra detail in the noise would create a very rough surface. [ figure 7b ] This might work if we wanted a rocky terrain, but for sand dunes, it helps to smooth things out a bit.

[ figure 7b ]



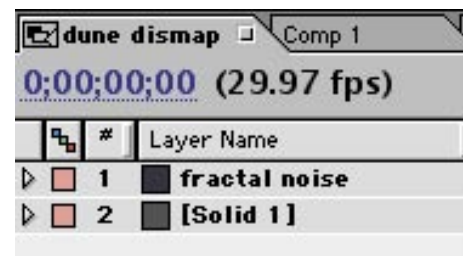


## 05- create a gray solid

We're going to tile this displacement map; that is, repeat it in a checkboard grid. We don't want the tile seams to show where sand dunes might abruptly stop or start, as that would kill the believability.

To remedy this 'edge creep', we can put a new Solid layer behind it. The layer should be dark gray. This puts a neutral color around the dismap's edges and creates a nice even seam. [ figure 8 ]

This might look a bit weird if the camera was going to move around. A different solution would be to shrink the comp. But the camera is going to be stationary, so we can get away with this fix.

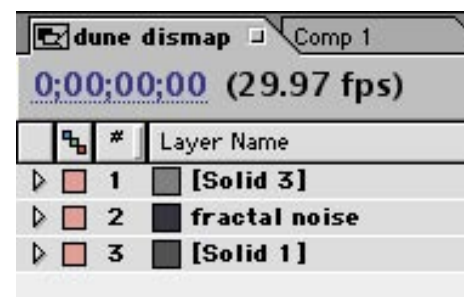


[ figure 8 ]

## 06- create a circular mask

Now we're going to create the area that the sandpit is going to be in.

Create a new Solid layer that's 400x400 and a neutral gray color (value of 128 in each RGB channel). [ figure 9 ] Those dimensions should plop our new Solid in the middle of the screen. That's a fabulous location, so we'll leave it there.



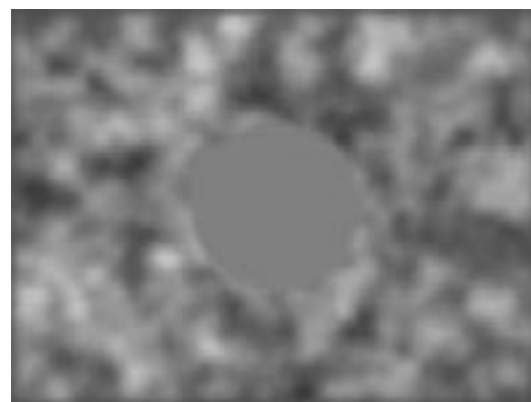
[ figure 9 ]

Now create a perfectly round mask that's about the size of the Solid. Grab the Circular Mask Tool, click and drag from the upper left corner to the lower right corner while holding the Shift key. Nice round circle, nice round mask. [ figure 10 ]

## 07- begin the swirling dismap

Now we want to create the dismap for the swirling sand. This will fit into the circular area we created in the first dismap. So, it needs to be the same size as that area.

Open the 'Whirlpool' comp to look at what we've already done. Then close that comp and create a new comp that's 400x400.



[ figure 10 ]

Create a new Solid that's also 400x400. Again, apply a circular mask that's about the size of the layer using the Shift-drag method from before.

To create the whirlpool, we're going use Fractal Noise and the Twirl filter to create a spinning, swirling effect.

## 08- apply noise and blur

The trick to our whirlpool dismap is that we only want the sand to move down. Remember from STEP 02 that any shade lighter than neutral gray will cause the polygons to be displaced upwards. Our effect won't look very whirlpool-like if the sand flew up in the air.

Monkeys can fly but sand doesn't, and if you want monkeys to fly that's your own neurotic hangup to deal with outside of this tutorial. WE need to make sure our shades of gray are all darker than neutral gray. This will cause all the polygons to be displaced downward.

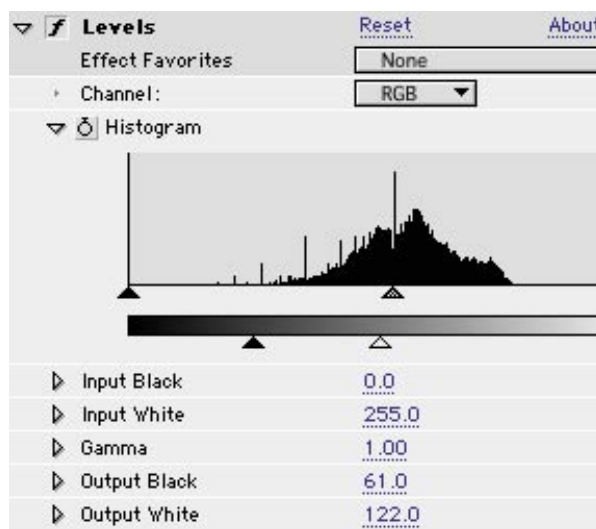
Apply Fractal Noise to the solid. Leave it at the default settings. Apply Gaussian Blur and set its blur to 10.

## 09- apply levels

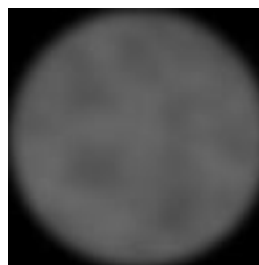
Now apply the Levels filter (Effects> Adjust> Levels). This is where we'll make sure all our shades of gray are darker than neutral gray. [ figure 11 ]

Set the 'Output Black' to 61, and set 'Output White' to 122. This will limit the shades of gray. [ figure 12 ]

If you don't understand how this process works, we highly recommend you read up on the Levels filter. Probably won't be as fun to read as the Dune novel, but it's an extremely important filter to understand.



[ figure 11 ]



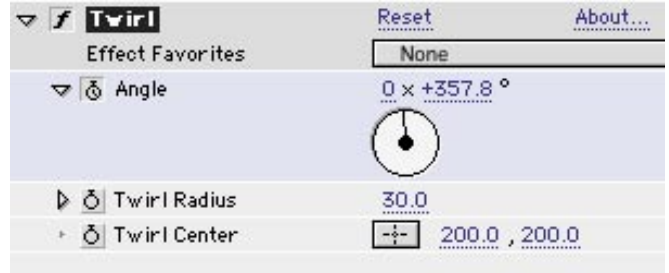
[ figure 12 ]



### 10- apply twirl

Next, apply the Twirl filter and set 'Angle' to 125.

We need to animate the Twirl, so go to 01:14 in the Timeline and set a keyframe. Jump to 06:14 in the Timeline and change the value to 1x 125. This makes one revolution plus 125 degrees. [ figure 13 ]



[ figure 13 ]

This setup will give us a nice twirling animation. [ figure 14 ]



[ figure 14 ]

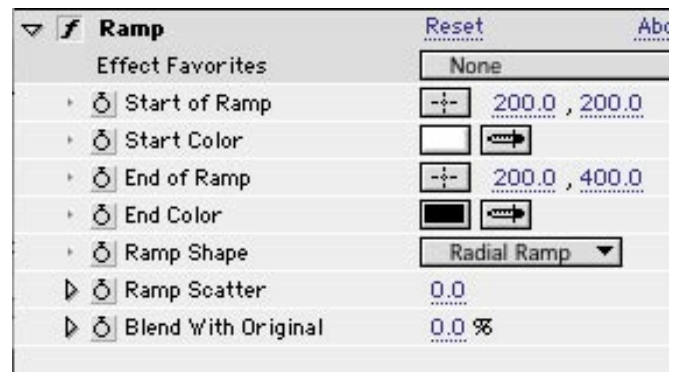
### 11- apply ramp

To make this effect really work, we want the sand around the edges not quite as affected as the sand in the middle. And we want the sand in the center to fall inward first, then slowly drag the sand around the edges in.

To accomplish this, we will need the shades of gray located around the edge of the twirling fractal noise to be closer to neutral gray.

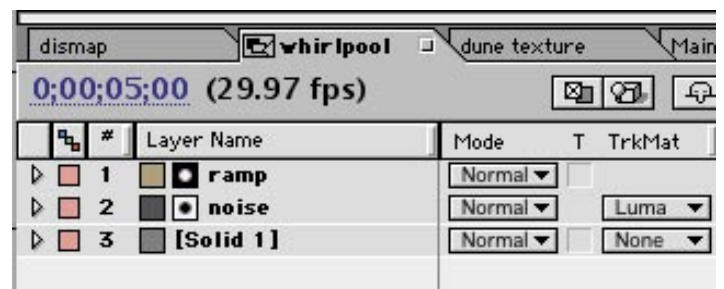
As with the Dune Dismap, create a new Solid that is neutral gray (128 per RGB channel) and put it behind the whirlpool layer. This will prevent any displacement from occurring around the edges of the map.

Create another new Solid and apply the Ramp filter (Effects> Render> Ramp). Set the 'Ramp Shape' to Radial Ramp. Set the 'Start Color' to white. Set the 'End Color' to black. Set the 'Start of Ramp' to 200,200. [ figure 15 ]



[ figure 15 ]

In your Timeline, show the Transfer Modes section. Change the track matte for the whirlpool layer to 'Luma Matte' and use the Ramp layer. [ figure 16 ]



[ figure 16 ]

The result: a seamless neutral gray animation. [ figure 17, next page ]



## 12- apply Psunami

In this final stage, we'll put both displacement maps into a new comp, and create Arrakis!

Create a new 640x480 comp and name it 'Arrakis'. Put both your 'Dune' dismap and the 'Whirlpool' dismap into the Arrakis comp. Turn both of them off in the Timeline (click the eye icon off).

Create a new Solid that's 640x480, make a comp-size Solid layer, and apply Psunami - er, Arrakis - from the Effects> Digital Anarchy menu.

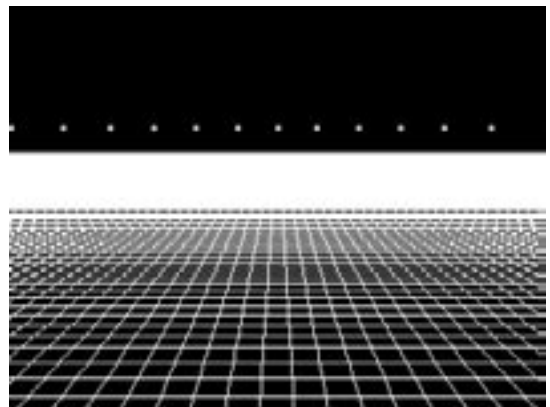


[ figure 17, previous page ]

## 13- change settings

In the 'Render Options' section, change the 'Render Mode' to Wireframe. Psunami can be a bit slow so when you're setting things up, so it's best to work in Wireframe mode. This mode renders quickly and makes setup a snap.

The first thing we need to do is go down to the 'Primary Waves' section and turn off the water simulation. We do this by setting the 'Wind Speed' parameter to 0. Once you do this, you'll notice the 3D grid now becomes flat. [ figure 18 ]



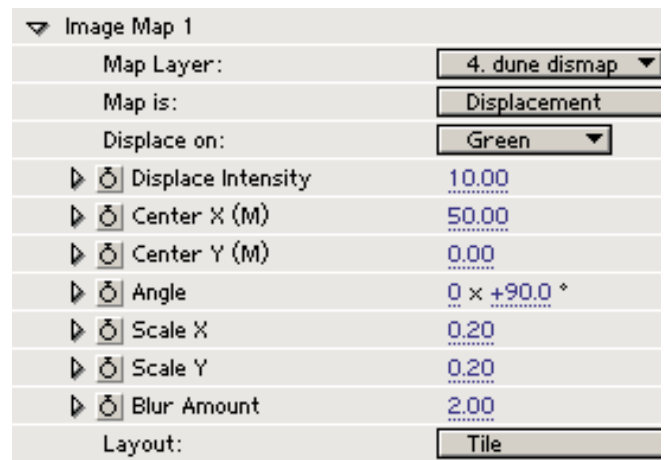
[ figure 18 ]

Now go to the 'Light 1' section, and set 'Light Elevation' to 75, and set 'Glitter Scale' to 0.

## 14- image map 1

Open up the 'Image Map 1' section of Psunami. We will create our dunes with this map. For 'Map Layer' choose the 'Dune' dismap comp that you placed a moment ago. [ figure 19 ]

You will notice the 3D grid becomes kind of 'lumpy' once we do this. Nothing moves, as you should expect.



[ figure 19 ]



Set 'Displace On' to green. For this project it could actually be red, green, or blue. Since we're dealing with a grayscale image, all the channels look the same.

Set 'Displace Intensity' to 10 and change 'Layout' to Tile.

## 15- image map 2

Now open up the Image Map 2 section. [ figure 20 ] We'll use this to create the whirlpool of sand, so choose the 'Whirlpool' comp layer for 'Map Layer'.

We want 'Displace On' to be Green, 'Displace Intensity' at 27.25, and 'Layout' at Normal.

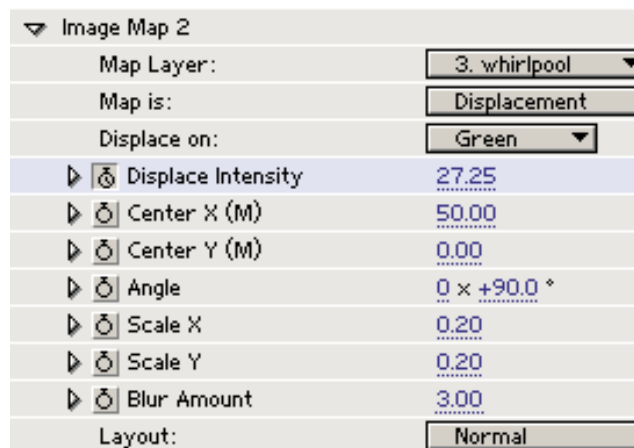
By default the images line up on top of each other. Since we created the gray circle in the middle of our Dune dismap, the Whirlpool dismap is centered on top of it, falling right into the gray circle.

## 12- camera and render

Let's back our camera up a little bit so the gray circle of the Dune dismap is directly in view. Open the 'Camera' section and set the 'X east-west' parameter to -20.

Go back to 'Render Options' and change the 'Render Mode' to Realistic. After a few moments, you will have a render that looks pretty good. [ figure 21 ]

The sand needs a texture, so we'll do a quick and dirty one. Hey, it's sand... it should be dirty.



[ figure 20 ]



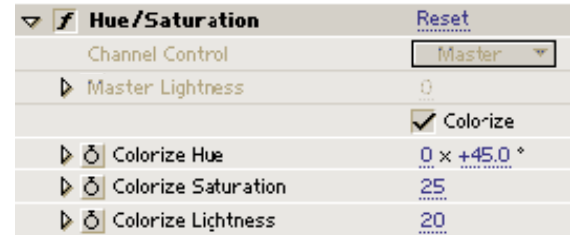
[ figure 21 ]



## 13- sanding the dunes

Still in our Arrakis/Psunami comp, create a new Solid (last one, promise!) that's 640x480. Apply Fractal Noise to it. Set 'Contrast' to 50, and 'Scale' to 5.

Apply the Hue/Saturation filter (Effect> Adjust> Hue/Saturation). Turn on 'Colorize'. Then change 'Colorize Hue' to 45 and 'Colorize Saturation' to 20. [ figure 22 ]



[ figure 22 ]

We now have a dirty beige texture. Precomp this (Layer> Precompose) and name the comp 'Dune Texture'. [ figure 23 ]



[ figure 23 ]

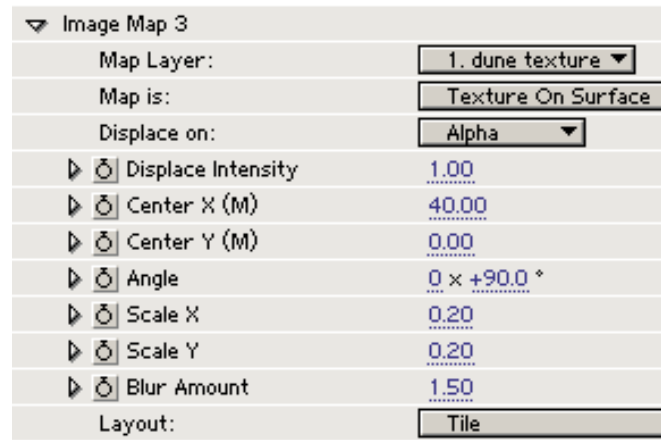
## 14- image map 3

Select your Psunami layer and in the 'Image Map 3' section, select the 'Dune Texture' layer.

The 'Map Layer' is set to Texture On Surface. This is because we are using the beige texture as a texture map.

Set 'Blur Amount' to 1.5. While noise is great for adding some variation to the color of the sand, by default it's a little too sharp. Blurring it makes one color blend nicely into the other.

We'll also move the map along the X axis by setting 'Center X' to 40. This moves the seam of the texture out of the view of the camera. As mentioned earlier, if the camera was moving around, we'd have to take much greater care about the edges of our texture and displacement maps. But this parameter suffices for our project.

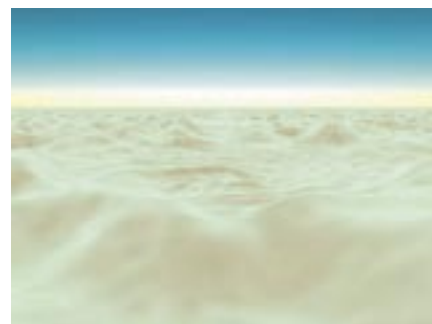


[ figure 24 ]

## conclusion

This project should give you something that looks like the final image at right. [ figure 25 ]

You can also check out the 'Main Comp' comp for these settings, and watch the QuickTime movie, [psu\\_sands-final.mov](#), that you downloaded. Have fun in the sand!



[ figure 25 ]