

Outside lighting

The following example is for general outdoor lighting.

Start by opening the file OutDoorSunny.Prj

In the project you will see a landscape cybermesh, an environment sphere and tree which was produced in Tree EIAS and exported as a fact file.

the first thing I will say is that this is not the end all, be all of lighting. Your lighting demands will depend on the project you have to complete. Use this lesson as a basic framework and improve upon it for your own look and feel.

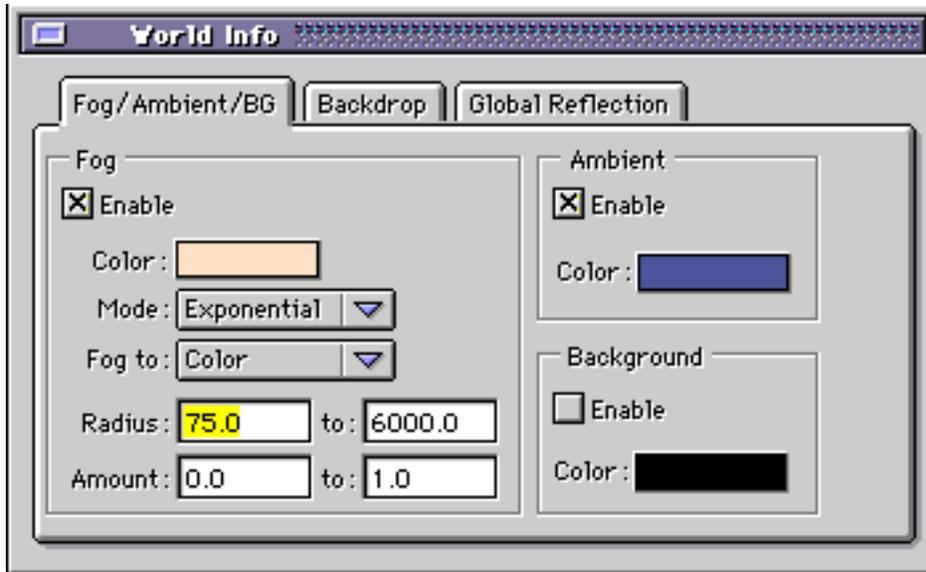
It is important to work one light at a time. It is easy to start adding lights without testing them and before you know it you have a big mess on your hands. Also, you may think that lighting has only to do with the way you place lights. But, It can be greatly dependent on surface attributes as well, specifically, the ambient and diffuse settings.

You may wish to take a minute to look at the surface attributes I've applied to objects. It is important to remember both settings effect the overall light level of an object. The setting in the object info dialog controls the amount of ambient light the object will accept from the world while the setting under the World Info dialog controls the general world ambient. This isn't a materials tutorial so won't go much further.

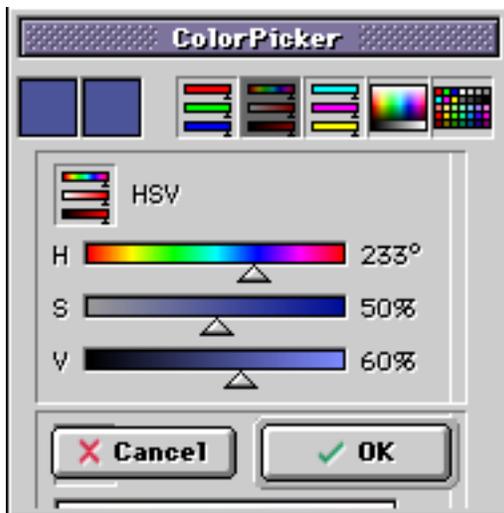
I deal with large environments which if I need to adjust the ambient levels for the entire project is easier to do with the World Info setting that it would be to adjust each material separately. especially if different color values have been used to effect textures or for surfaces such as glass or water.

If you double click on the trunk, bough or branches/twigs you will notice that I have the ambient settings set to white and 100%. This is because I will be controlling the ambient light with the "World" setting for this example.

Double click on the "World" object in the "project" window. Click the "Enable" box in the Ambient side of the dialog box.



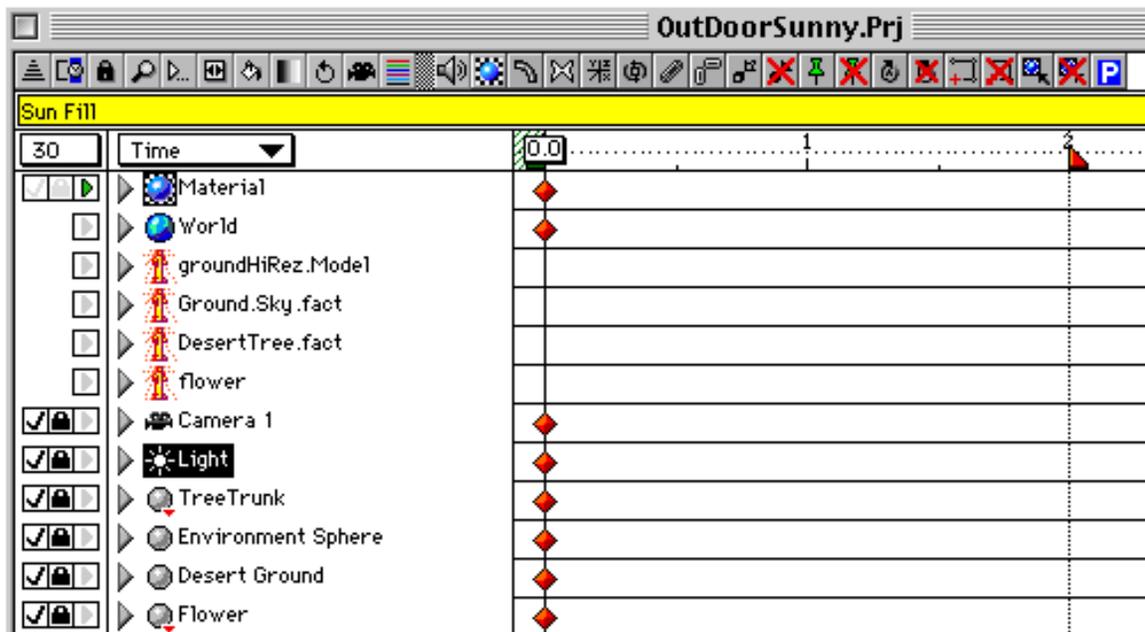
Now click on the color box. Adjust the HSV sliders to H(233), S(50) and V(60)



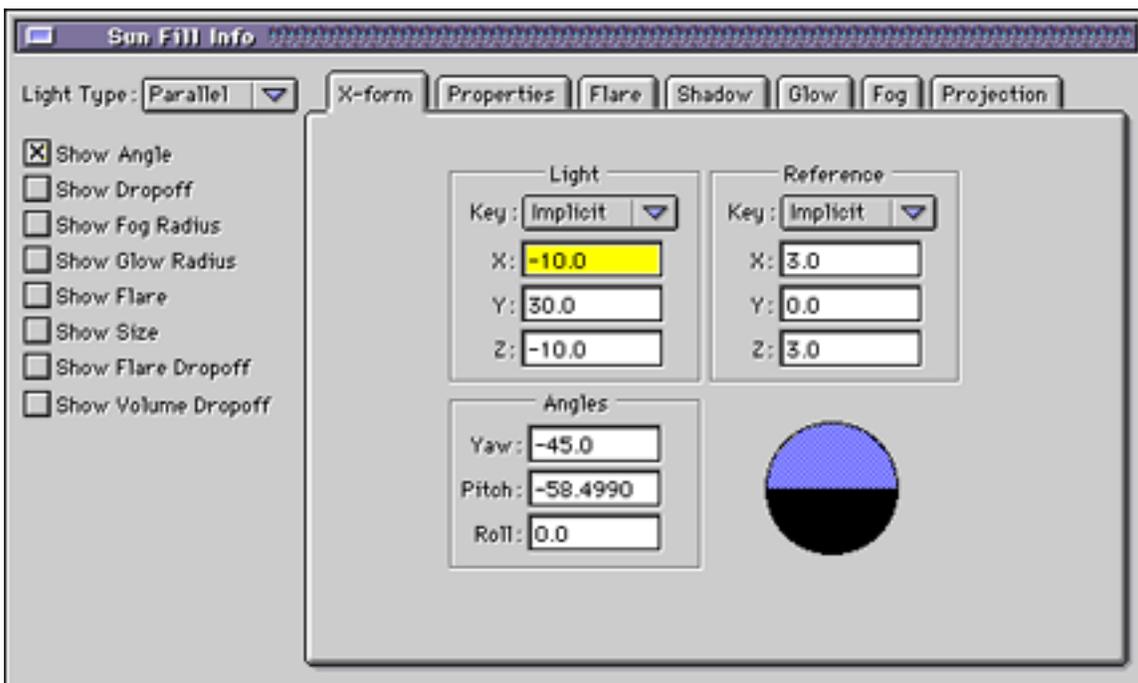
You will notice that this creates a medium to dark blue color. This will be the color and brightness of the ambient light in our scene. Because the time is day, want the ambient to be fairly bright but not so bright as to lose the ability to get good contrast between direct sunlight areas and shadows.

Render a test to see how the light looks. You'll notice the tree looks a little flat and the scene is still fairly dark with the exception of the environment sphere which is a luminance map. Although I'll give specific direction during this tutorial I encourage you to play with the values to achieve your own look and feel.

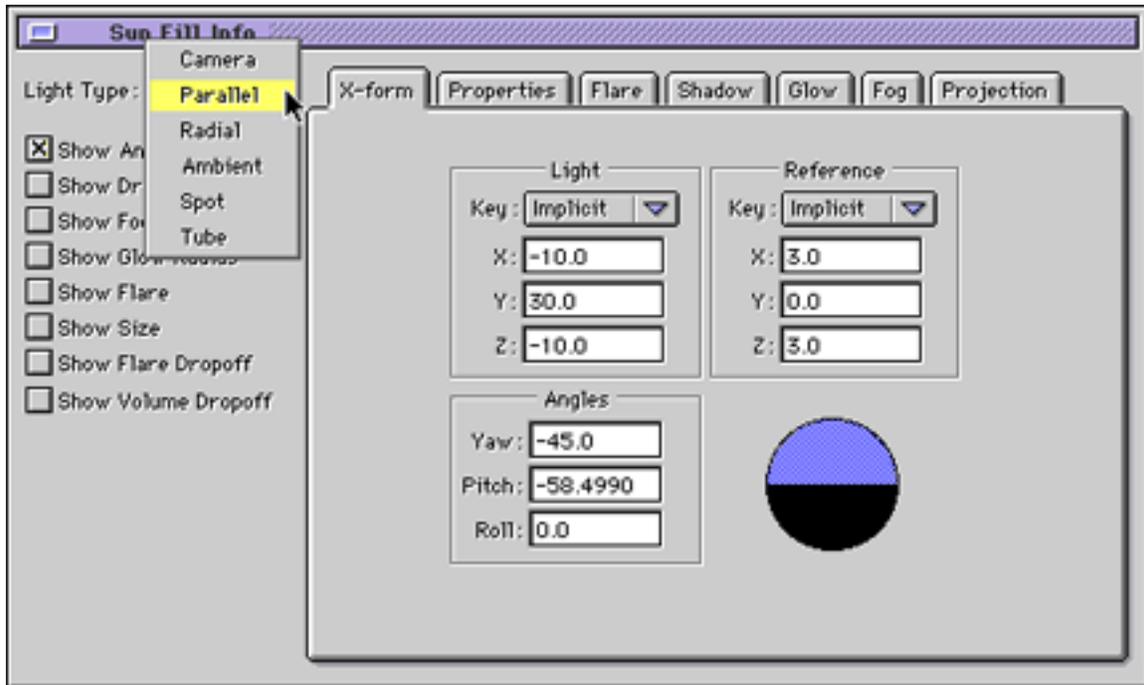
The first directional light in our scene is the sun. by default EI has one light in the scene. In the project window rename the light to "Sun Fill".



and then double click the light to bring up the light dialog box. Take a minute to click through and explore the seven different tabs within the lighting info dialog box.

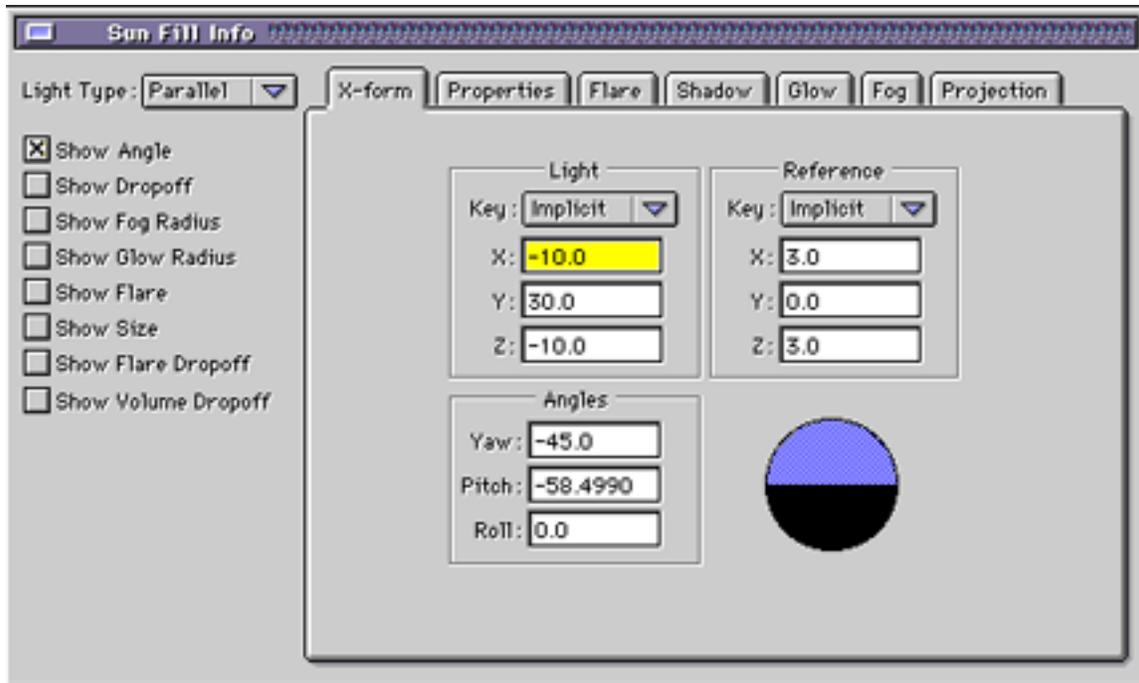


Click and pull down the Light type menu. Select parallel.

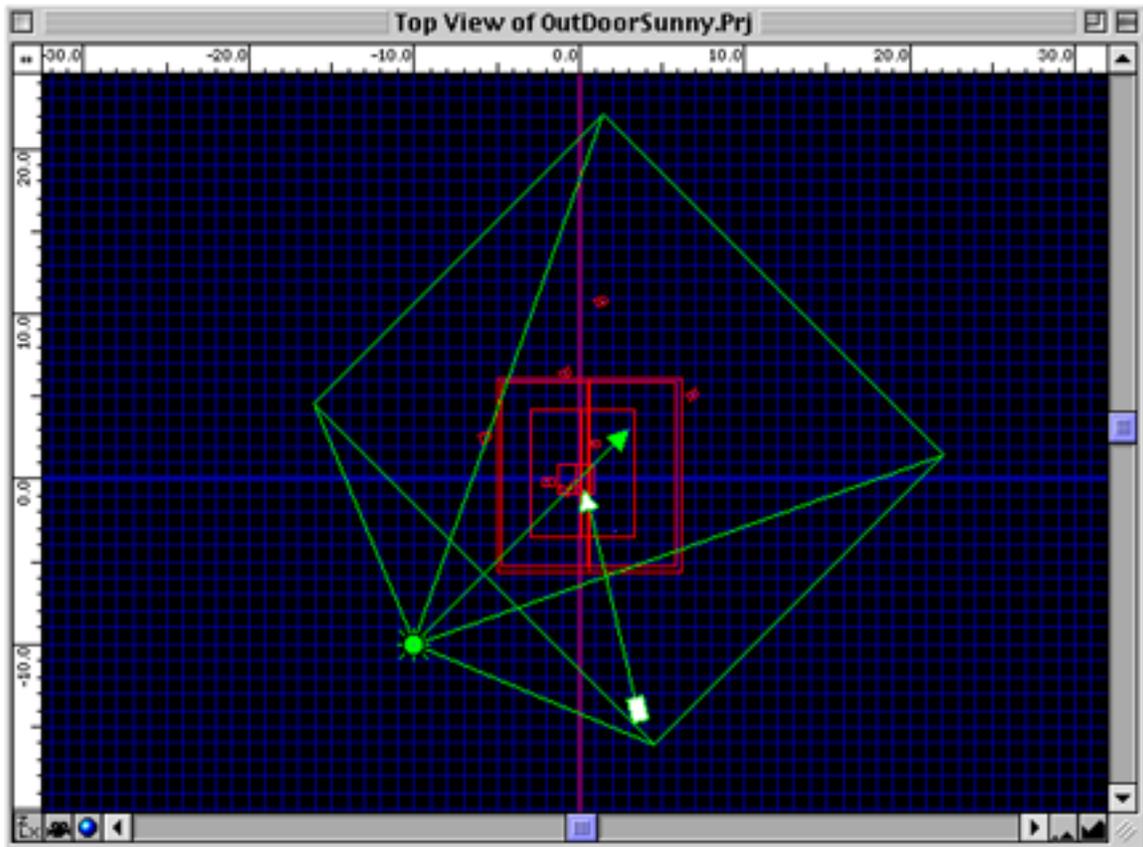


Sunlight requires the light cover a broad, even infinite, area. If a parallel light is parallel to the Y axis it will light everything infinitely on the ZX plane. Think of light above your head lighting the floor under you forever in all directions. It is important to remember that a parallel light still has a definable shadow cone which is not infinite and does not cast parallel shadows. This means you should keep the light close to the actual interest point but not so close as to distort the shadow it casts.

Click on the X-form tab

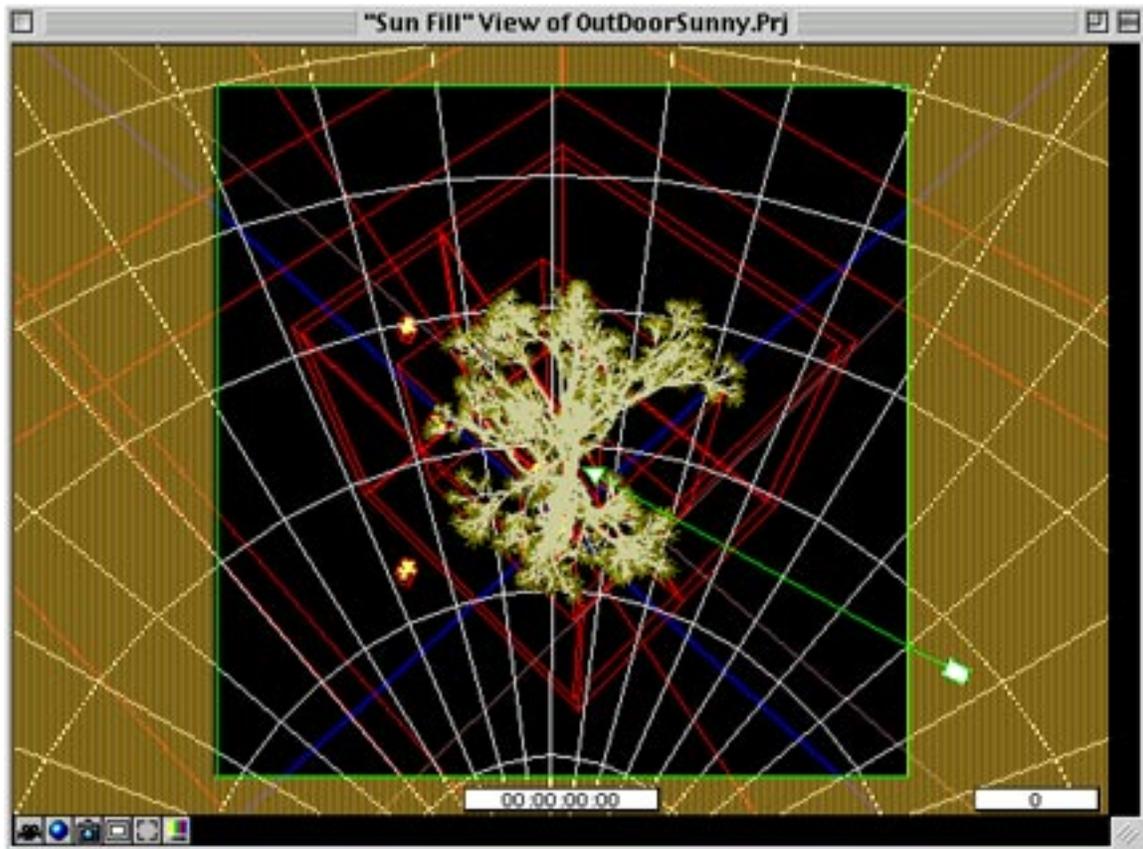


Here is where we will adjust the position of the source and the reference. the source being where the light starts and the reference where the light is going. For ease of example I will using a pretty generic camera position. Under "Light enter, X(-10) Y(30) and Z (-10). Under Reference type X (3) Y (-2) and Z (3). This will produce a northern latitudes noon sun position.



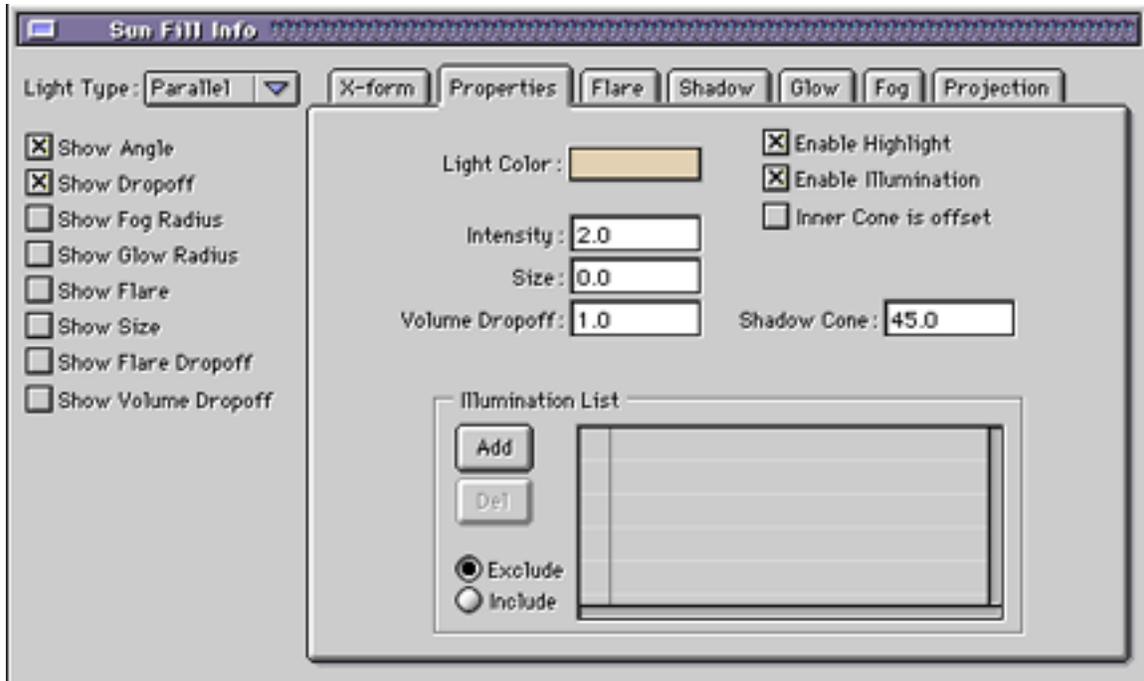
Notice you also have the ability to adjust the light by angles as well.

Lets check where this light is going. instead of looking at the top, front and side view lets go to the camera view. Holding the Option key click on the menu bar where it says "Camera view of OutsideSunny.prj". A drop down menu will appear with two options, "Camera1" and "Sun fill". Select "Sun fill".



you should be looking straight at the tree. In this view you can move lights the same way you would move the camera in the camera window, using Orbit, Pan, Dolly, Track and Zoom. I find this helpful in areas where the geometry isn't perpendicular to anything and also when I'm trying to line up a shadow cone to an object or a number of objects.

Click on the Properties tab.



Here we will be setting the variable of the light itself. Click on "Light color". Change the HSV settings to 39, 20 and 88. This will produce a tan color. When lighting outdoor sunny scenes I like to go with a warmer color. Not just because Sunlight contains tan in its spectrum but because I want the scene to have a warm feeling and I also want there to be temperature contrast between the sun lit areas and the shadows which will take on the blue ambient color we set in the world view.

Under Intensity enter "2". Sunlight is bright and creates a lot of contrast on a clear day. In bright sunlight from a distance a shadowed area may have the appearance of being nearly black until you actually look at it or get right up to it. In other words, there is more contrast than most people observe.

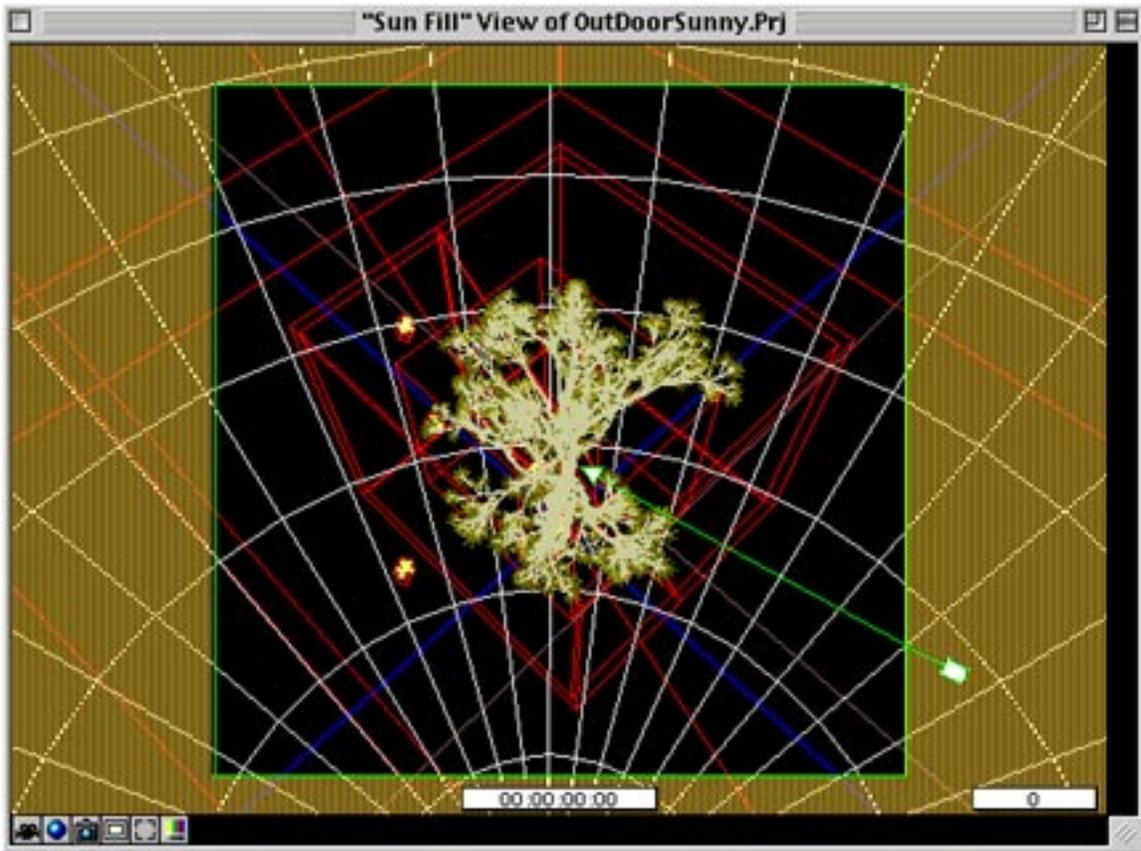
Leave the Size of the light at default. for this tutorial size won't change the end result.

Enter a "1" for the volume drop-off.

Make sure Enable Highlight and Enable Illumination are checked. We want the main fill light to cast highlights and of course illuminate the scene.

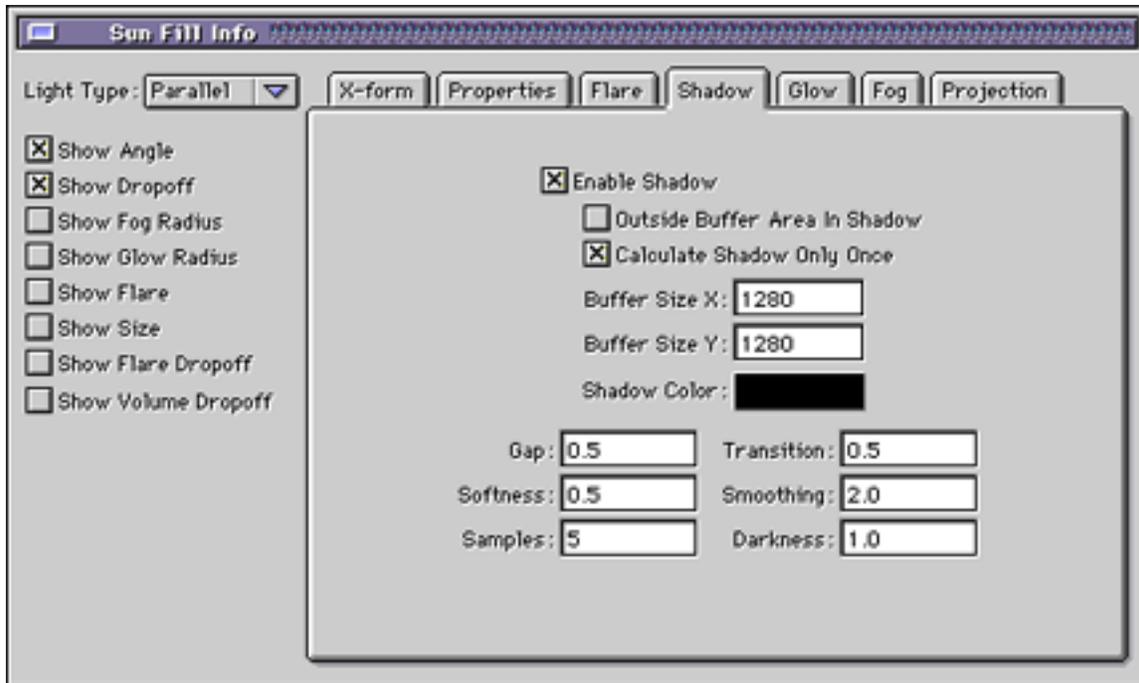
Under Shadow Cone enter a value of 45. If you switched the camera view back to the camera use the option key to again look at what we are including in the

shadow cone. Notice that it is only encompassing the tree and flowers but is not right on top of them.



This is because these are the only objects that need to cast shadows and I want the shadow to fall straight under the tree. Render a test. Look at the hills in the background. With noon lighting there won't be long shadows being cast by the sun so we don't have to worry about including them in the shadow cone. This could allow us to use a smaller shadow buffer which will speed rendering time, take less memory but soften our shadow. For this example I want crisp shadows so I'll leave it at the default setting of 1280x1280. (refer to chapterX) about shadow buffers)

Click on the Shadow Tab.



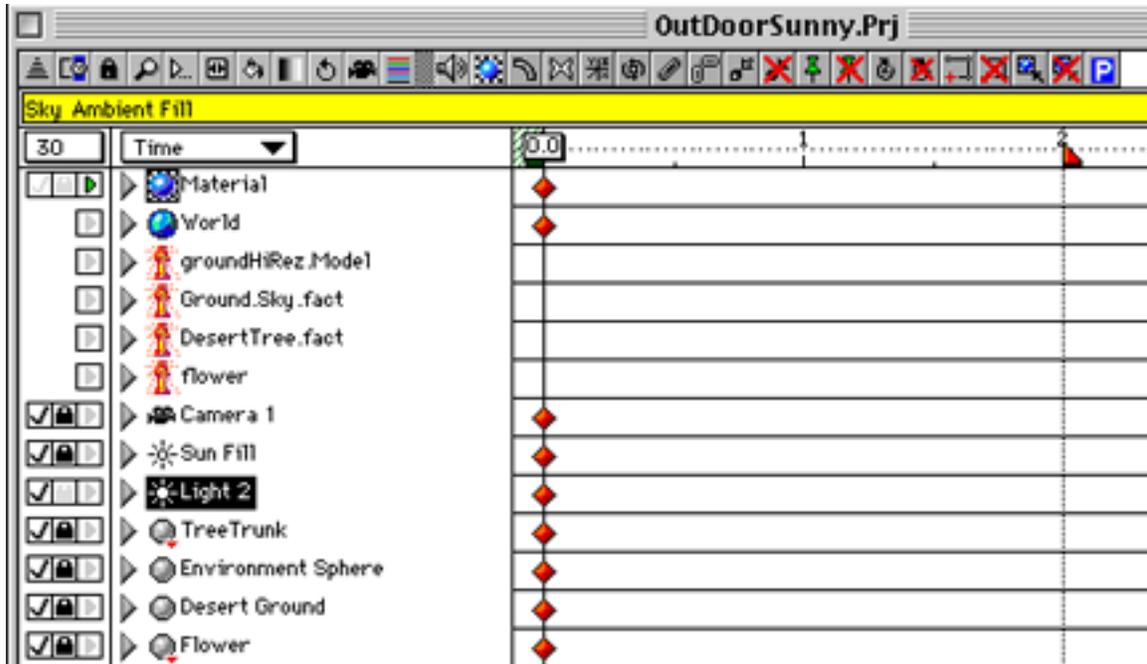
Make sure "Enable Shadow" and "Calculate Shadow only Once" are clicked. Enable Shadow allows us to toggle the shadow on or off. Calculate shadow only Once will do just that. For animation's with moving shadow lights we would want that check box off. An example of this would be the sun traveling across the sky causing the position of the shadow to change over time. Since we don't have moving lights It is not necessary to take the extra time each frame to calculate the shadow(not that we're rendering many frames but just in case....). The shadow will calculate once and store it for each frame beyond frame the first frame rendered. It will not, however, store the shadow buffer from test to test. We'll leave the shadow color at default black so we get a good dark shadow Ambient light will fill in to make it appear lighter. I want to make sure the shadow starts at the base of the tree so change the Gap to (.5) and the Transition to (.5). Because the scene is a crisp clean day I'm going to make the shadow fairly sharp. Even though there would be bounced ambient there isn't much atmosphere clutter to break up the light and soften the shadow. Set the Softnes to (.5) to create a sharper shadow. Set the Smoothing to (2). this will help smooth the curving of the edges making the shadow even more crisp. You can leave the Samples and Darkness at their default.

Type command E to bring up the object palette.



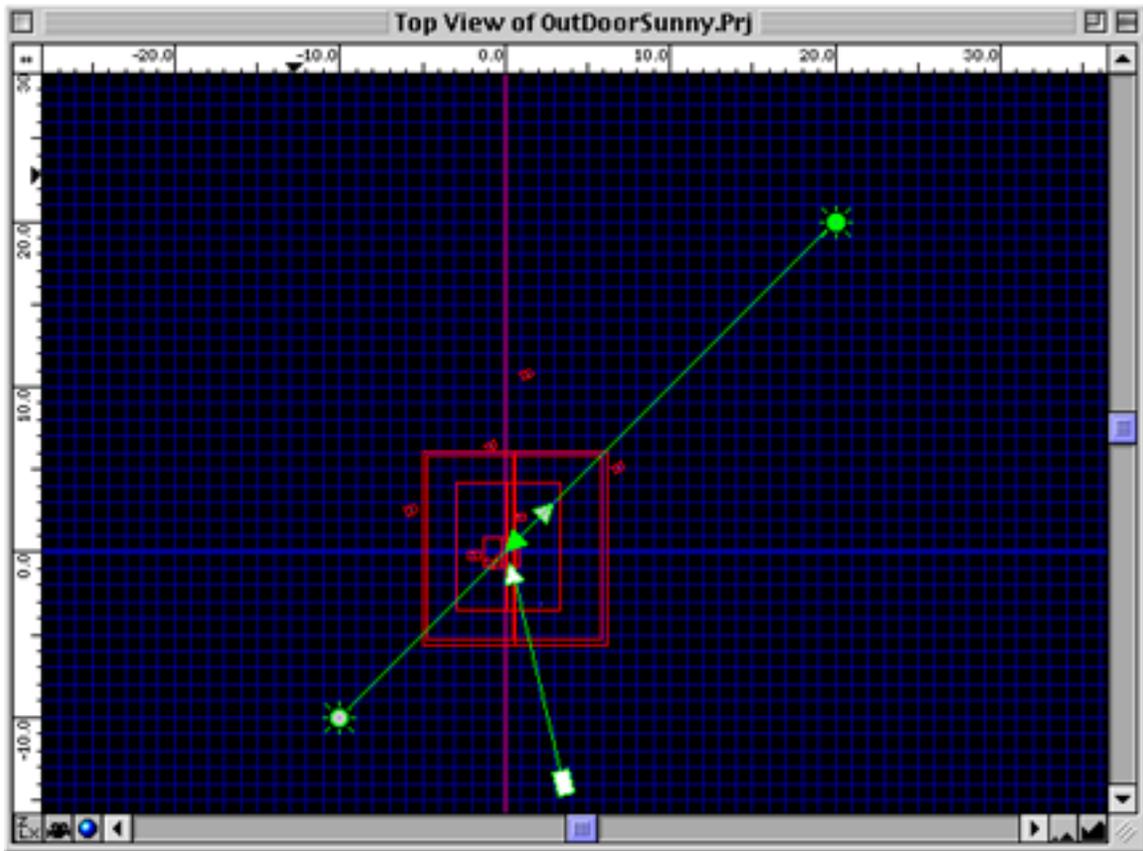
Three down on the left you will see a light bulb. Click hold and drag a new light into any view window. the initial placement of the light is not important because we'll be using numerical information to place the light.

In the Project window you will see one new light entitled light 2. This will be our ambient fill light. Rename the light to "Sky Ambient Fill".



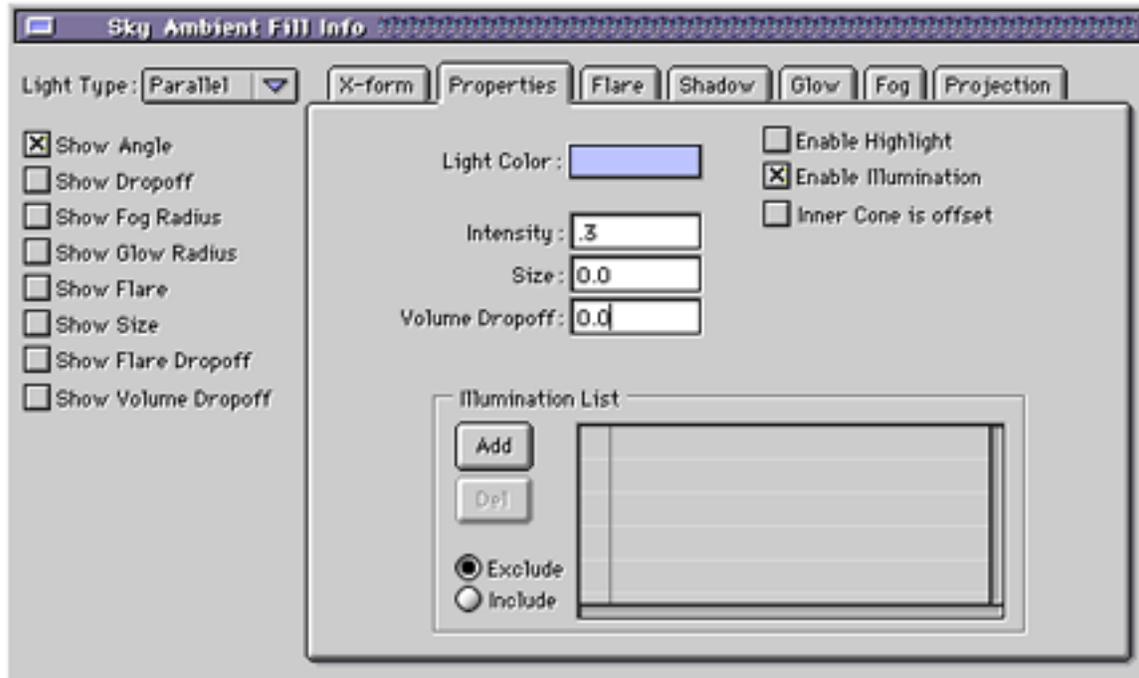
In addition to the "World" ambient we will be using a parallel light for directional ambient. the reason for using a directional ambient light instead of relying on world ambient is to help bring out the contrast in bump maps and to create better shading falloff on objects in shadowed areas.

Double click on Sky Ambient. Under light Type choose Parallel. Click on the X-form tab. Set the lights position to "Light" X(20) Y(30) and Z(20). Set the Reference to X(0) Y(0) and Z(0). You'll notice that puts the light facing in a generally opposite direction to the sun.



This is because ambient is generally the blue part of the visible light spectrum that is bounced around the atmosphere and back to earth. this is, of course, is not entirely scientific but generally the case. because this light is very diffuse and non directional in nature it is easily overpowered and added to by direct light from any direct source.

Click on the "properties" tab.

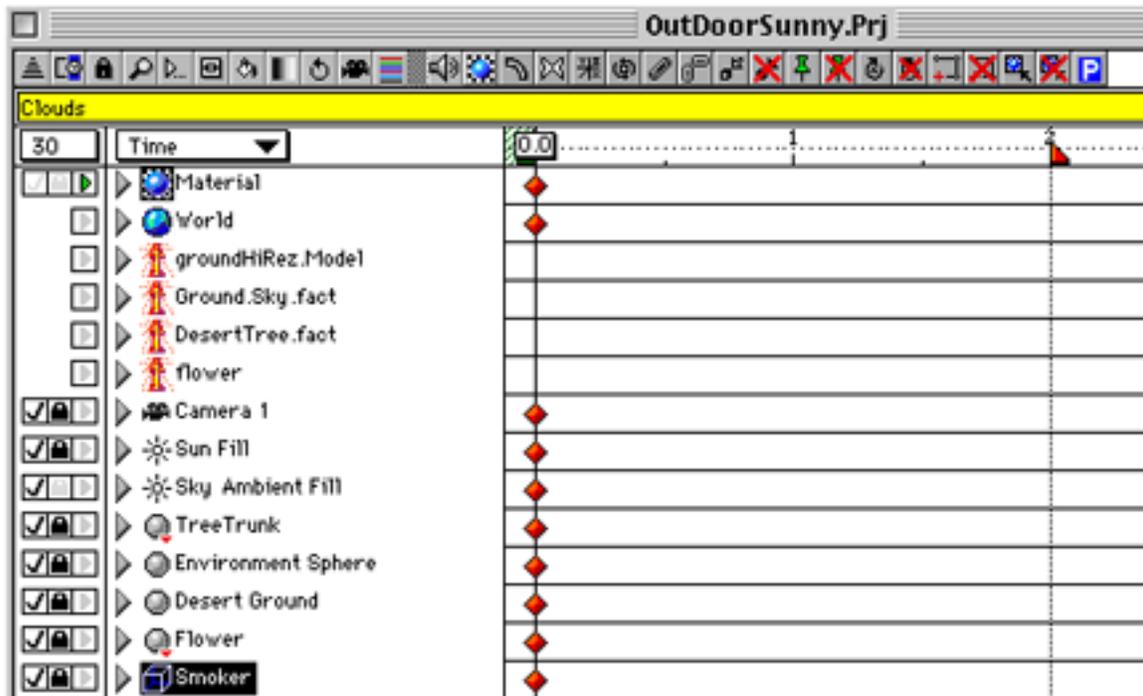


Set the light color to HSV 232, 25 and 100. Set the Intensity to (.3), Size to (0) and Volume Drop-off to (0). the Intensity setting of (.3) will be enough to bring out contrast in bump maps and shading drop-off but not enough to wash out the image or lose the contrast we want. Make sure the Enable Highlight checkbox NOT checked. there is no specific light source for ambient so there is most often no source for a highlight. Leave Enable Illumination on.

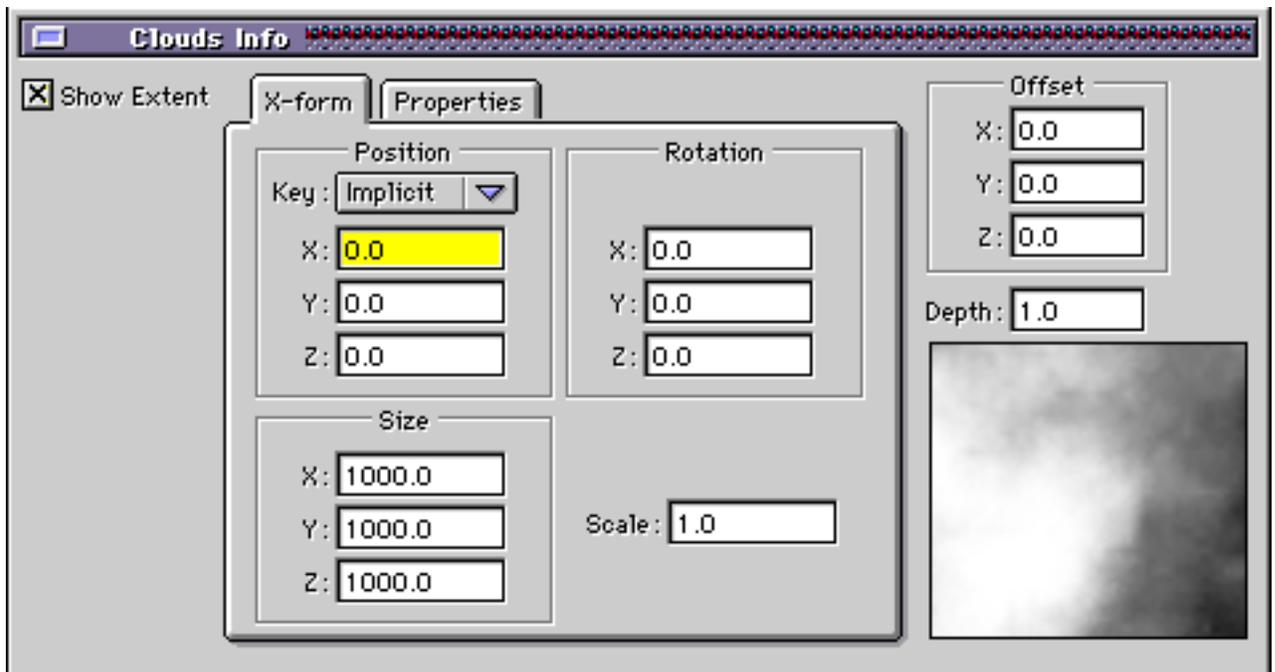
Click on the Shadow tab. Make sure "enable Shadow" is NOT checked. Again, since there is no specific source for ambient light there will be no cast shadows.

If you look at the final example image provided you will see clouds in the background. These are not a part of the textured environment. They are actually radial lights in combination with a smoker.

Under File/Add/Type/ there is an option called smoke. Select "smoke" and add smoker by drawing a marquee in any view window. A new object called "Smoker" will appear in the project window. Rename the smoker to "Clouds".



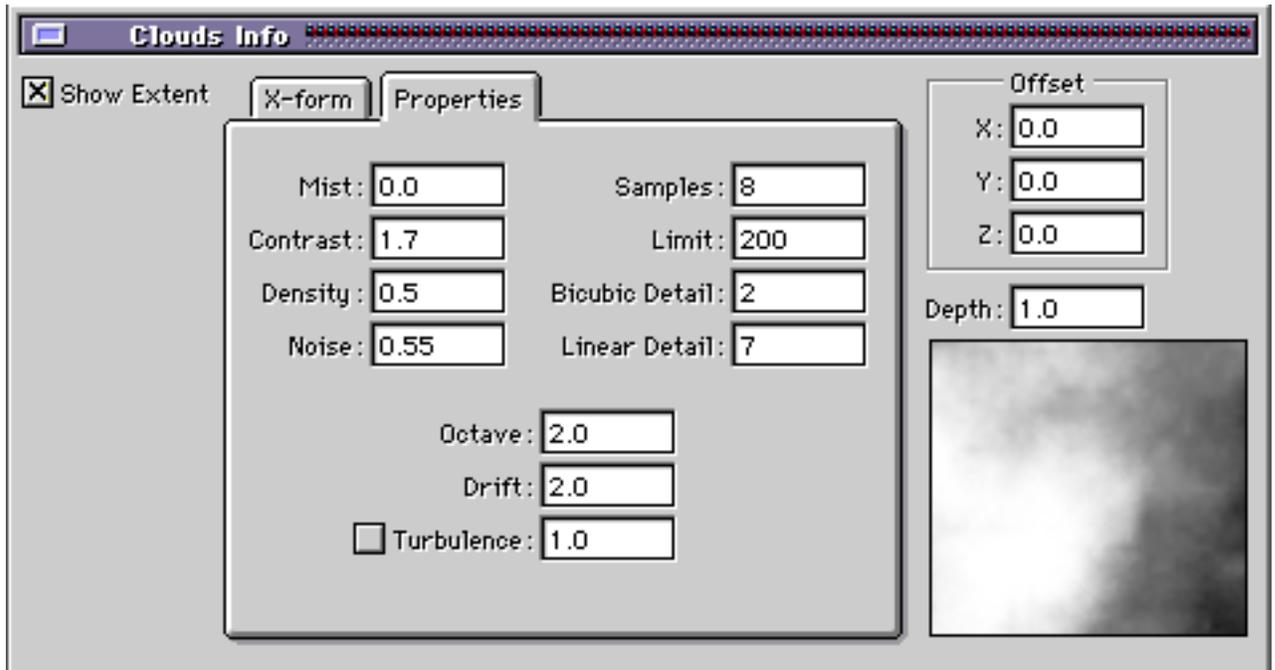
Double click on Clouds to bring up its dialog box.



Click on the X-form tab. Make sure the position is set to 0,0,0. Under Size enter X(1000) Y(1000) and Z(1000). Changing the "Size" will visibly scale the bounding box of the smoker. This in turn scales the size of the smoke clumps we will use

as clouds. Setting the size fairly large will produce good solid puffy clouds. We could have also set the Scale to achieve the same results. I prefer to scale the actual bounding box for visual reference and leave the "Scale" at (1).

Click the Properties Tab.



There are eleven variables in the smoker dialog box. Each can have a great impact on the kind of smoke you can produce.

Mist. Mist is the fill between the smoke clumps. The more mist there is the less contrast there would be between smoke clumps. Because we want nice puffy separate clouds lets put a (0) in for mist.

Contrast. Contrast is the amount of contrast between the smoke clumps and the mist areas. a value of (0) is zero reduces the areas of solid white areas while higher values increase the amount of solid white areas. Lets put a value of (1.7) in for the contrast because we want to have smaller solid white areas in our clouds.

Density. Density controls how many smoke clumps are in a given area. Lets say we have a 1x1x1 cube. A higher value increases the number, size and closeness of smoke clumps. A Lower value decreases the number of smoke clumps and reduces the general size and closeness of each clump. Remember, smoke clumps extend infinitely past the bounding box. Lets enter (.5) for our density. This will give us some spacing between clouds.

Noise: Noise will increase or decrease the texture or roughness of our cloud. Noise will also create more contrast in the individual clumps themselves. (0) has a really smooth silky look while (1) has a really choppy turbulent look. We want something in between. Enter (.55). This will give you a clumpy but not too turbulent looking preview.

Samples: enter sample def: set to 8

Limit:? make sure it is at 200.

Bicubic Detail: Bicubic Detail will add a more 3D feel to the smoke. If you plan on moving a camera through the smoke you may wish to increase the Bicubic Detail so there is more layering of the smoke clumps. Remember, as you increase the Bicubic Detail you will increase the render time as well. We'll leave this at the default setting because we want some depth but won't be getting too close to the clouds.

Linear Detail: Linear Detail will help bring out contrast in a more linear fashion. From a distance Smoke may look kind of flat. By increasing the Linear Detail we can effectively create the illusion of a 3D cloud but we won't suffer the render times associated with a high Bicubic Detail setting.

Octave: Octave decreases the time it takes to fade from transparent to opaque. Be careful not to put too high a number in for Octave because you will end up with solid white clumps that look very unnatural. We'll use a setting of (2) to achieve a cloud with a few opaque clumps to simulate cloud density.

Drift: Drift controls the morph of the clumps over time. The higher the number the more extreme the changes. We want the clouds to gently change over time so we'll go with a (2) here as well.

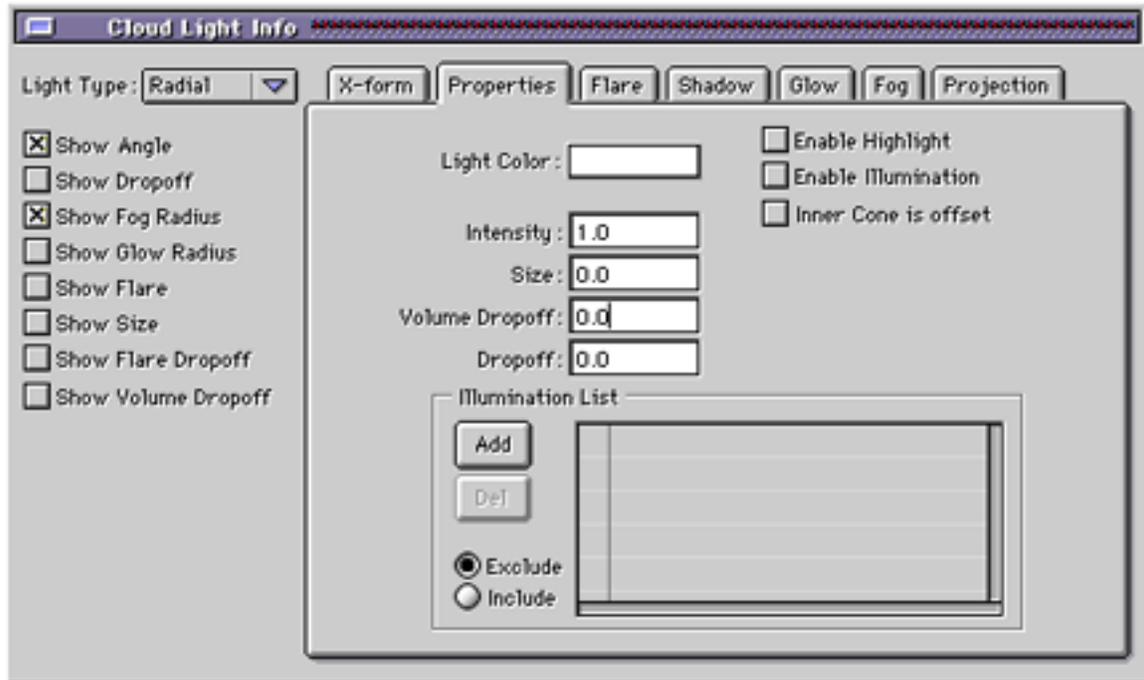
Turbulence: fucks shit up fast! Similar to noise in that it breaks up smoke clumps into smaller swirling clumps. We won't add Turbulence to our clouds because we want puffy clouds. Make sure the checkbox is off.

Now that we have our smoke set it is time to add the associated lights. From the object palette drag two lights into the project window.

For cloud lights we will use the default Radial lights. Rename both of them "Cloud Light1" and "Cloud Light2"

Double click on Cloud Light1. Click the X-form tab and enter a light value of X(1100) Y (936) z(1814). Reference and angles are not important because there will be no actual light being cast.

Click the Properties tab.



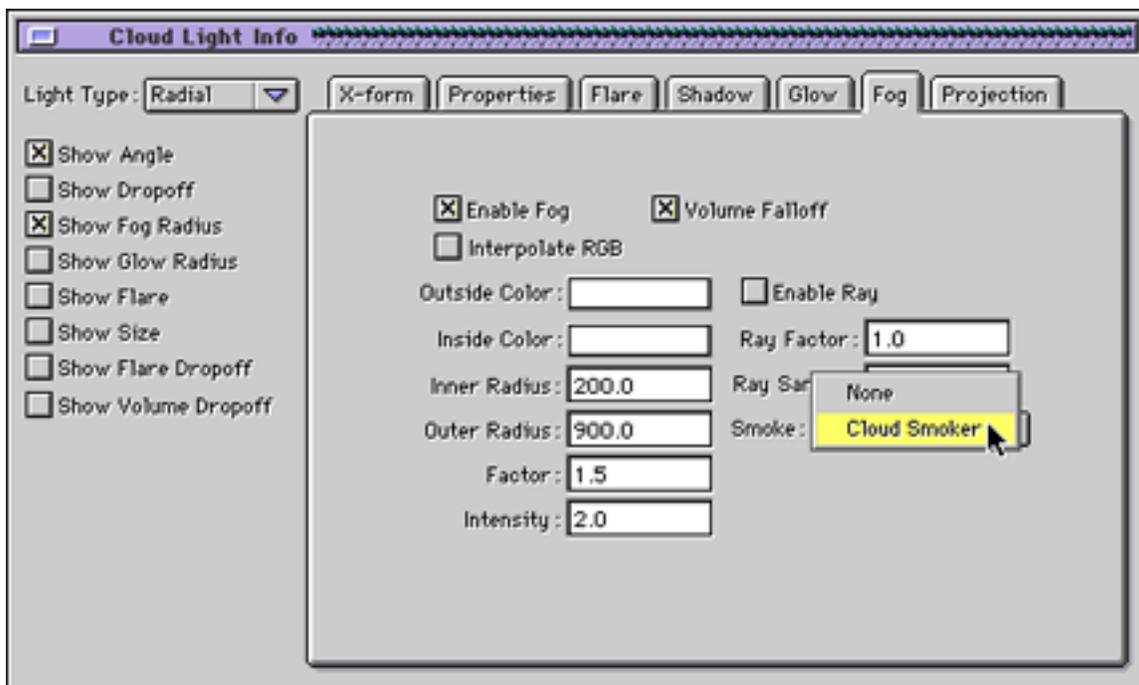
We can leave light color, Intensity, Size, Volume Drop-off and Drop-off at their default settings. Un-Check Enable Highlight and Enable Illumination. It is not necessary to use illumination or highlights with a smoker light.

Click on the Shadow tab. Un-click the Enable shadow button. As there is no lig so there will be no shadows either.

Click on the Fog Tab.



Click Enable Fog. This will turn the Fog function on. To the right there is a "Smoke" drop down menu of the available smokers you can assign to the light. Pull this menu down and select Cloud Smoker which is the smoker we added to the scene.

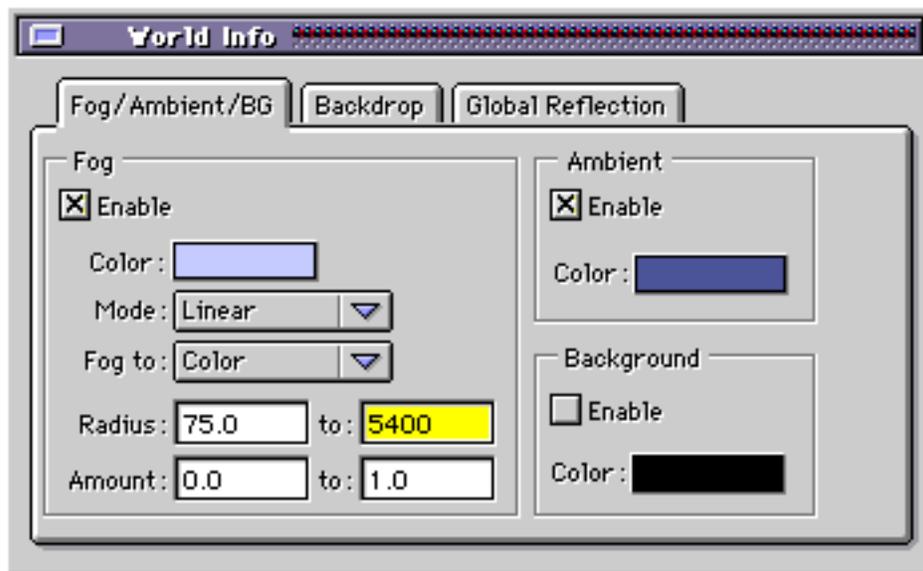


Since we just want simple with puffy clouds we can leave the outside and inside colors at their default white. We have a pretty big area to cover so we'll put an inner radius of 200. this means the clouds will be 100% from the light to the inner radius. To keep them looking more natural and avoid the "Ball of clouds" we will have them drop off to nothing slowly. Set the Outer Radius to 900. Set the Factor to (1.5). Setting the Factor higher than (1) will give a more gradual drop off to the edge of the clouds. Set the Intensity to (2). We want them to show up don't we. A setting of (2) will get them to show up nice and bright. For this example we won't be using Enable Ray.

For Cloud Light2 set the position to x820, y936, and z2640. For the Inner Radius enter (200). For the Outer Radius enter (750). All other settings you can enter from the Cloud Light1 example.

Render a sample to check out your clouds. Play with the settings to see what changes to the values look like.

The last thing We'll add for realism is depth cue. Atmosphere has depth because of particles in the atmosphere. Double click "world" in the project window.



Click on the Fog/Ambient/BG tab. Enable Fog by clicking in the check box. I'm going to add a realistic cool depth cue to simulate dust and moisture in the atmosphere. Click on the "Color" box. Enter HSV values 234, 22 and 100. This should produce a nice light blue color similar to the ambient. Make sure Mode set to Linear. this will give the effect of more dust along the ground and less as you look up into the sky. (This effect is furthered by squishing the environment sphere so the top is closer to the camera than the sides.) Set "Fog to" to Color so

drops off to the blue we picked under color. Under Radius we want to set the first number to (75). This will start the fog 75 units in front of the camera and give us a clear area. Set the "to" number to (5400). We want the fog to become totally opaque outside of the environment sphere. This will start to drop out the texture on the environment sphere and help simulate distance but not block it entirely. Set the first Amount to (0) and "to" to (1). We don't want any fog at the camera but we do want it to increase in density as the distance increases.

Again, I encourage you to play with all the settings creating your own version of this project.