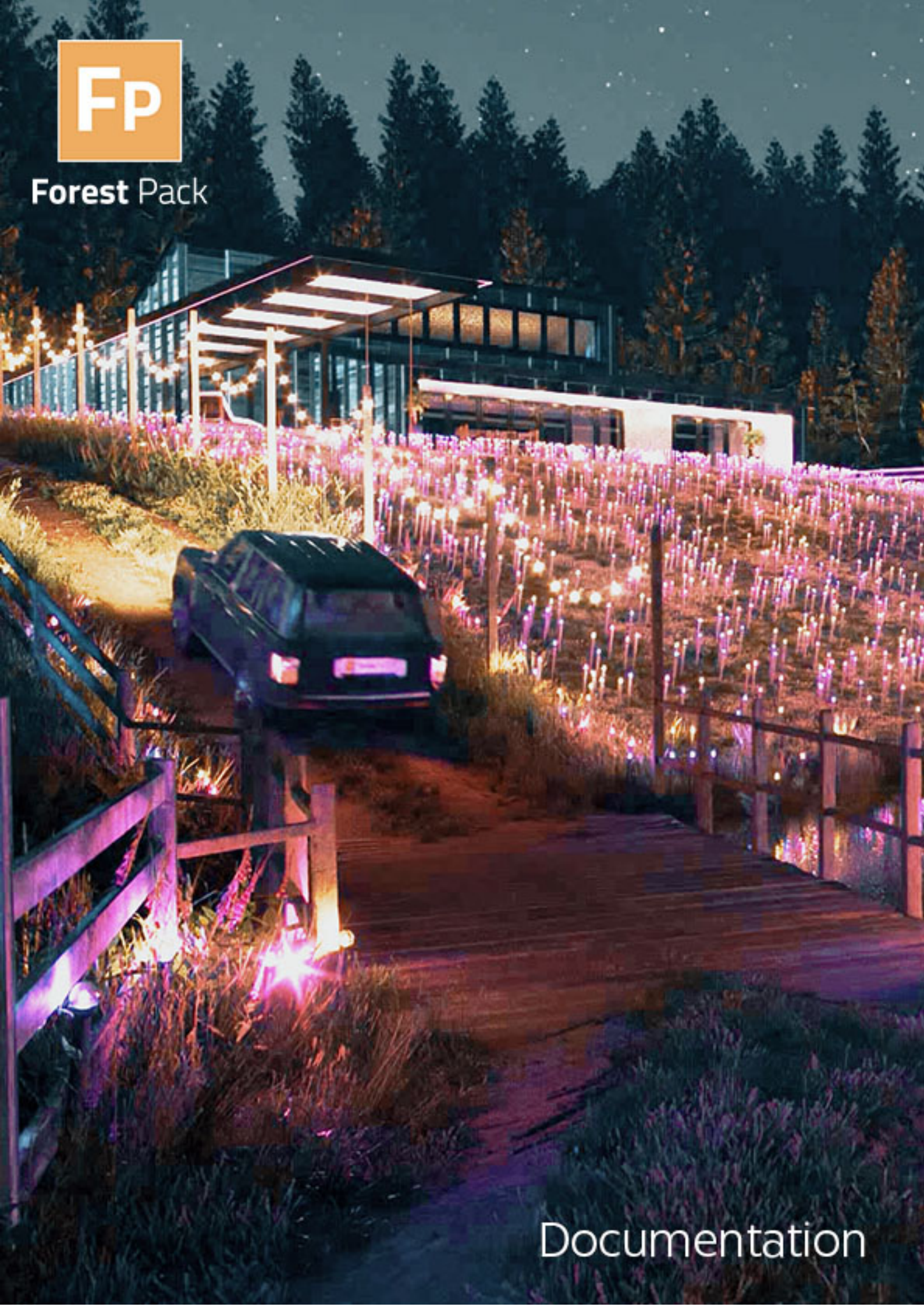




Forest Pack



Documentation

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But you can reach it using the following URL:

<https://www.youtube.com/watch?v=TvdWWcJGd18>

**Forest Pack** is a plugin for Autodesk 3ds max, and 3ds max design, designed to give a complete solution for creation of vast surfaces of trees and plants.

Forest enables you to scatter millions of proxies, high-poly meshes or billboards, and using custom geometry shaders, create scenes with virtually unlimited number of objects and polygons.

Download [Forest Pack Lite](#), the free version of the plugin and use it in your personal and commercial projects. If you are new to Forest, see the [Getting Started](#) guide for videos, tutorials and more help in your first steps using the software.

# 1 Getting Started

If you are new to Forest Pack and you're worried about where to start, you've come to the right place! Here is a very simple guide for getting started with the plugin.

To be current of new versions and latest news about our products, please subscribe to [forums](#). You can also [follow us on Twitter](#).

## 1.1 Installation

How you install Forest Pack depends on the type of license you own. Click on the following links depending on if you purchases a Standalone or a Networked (floating) license

- Help me install a [Standalone License](#).
- Help me install a [Network License](#).

## 1.2 Forum Access

As a registered user of Forest Pack Pro, you also have access to the private forums on our website (<http://www.itoosoft.com/forum>).

To gain access to the Pro forums, you have to create a forum account in the [User Panel> Forum Accounts](#) section or register a previously created account in this section. Please note that forum accounts can have different login and password from your main User Panel account.

iToo  
software

User Panel

### User Panel

- Last News

### Downloads

- My Products
- Beta versions
- Previous versions

### Licenses

- My Licenses
- Renewals
- Shop
- Coupons

### My Profile

- Account Info
- Change Password
- **Forum Accounts**

## Forums Accounts

Access to Forest Pack Pro and RailClone Pro boards in our forum is restricted to licensed customers of Pro products.

Default forum accounts can read posts, but not reply or create new topics in Pro boards.

From this page you can create new forum accounts, or link to existing ones. A maximum of 3 forum accounts is permitted. If you require more, please contact us.

Associate accounts of forum with user

+ CREATE FORUM ACCOUNT

🔗 USE EXISTING FORUM ACCOUNT

## 1.3

### Latest Release



Check out the latest features of Forest Pack 7 in our ["What's New?" page](#).

You can also check all the most recent changes for your current version in the [release notes](#).

## 1.4 Tutorials and Reference

For a fast introduction to the capabilities of the plugin, you can watch the [Basic tutorial](#). It shows how to use 3D high-poly trees in an architectural environment. It can be completed with Forest Lite. Next, we suggest you continue with the [Modern Barn](#) tutorial. Completing it, you will learn to use most of the software options, from areas splines area to advanced materials. It uses the V-Ray renderer but all the principles will apply to any other engine and includes five parts with 90 minutes of video. Finally Autumn Parks will get you quickly acquainted with [Forest Colour](#). You'll find many more tips and tricks videos in our [tutorials](#) section. They're regularly updated so check regularly!

## 1.5 The3dGarden plant models

If you have purchased some The3dGarden libraries, the following tutorial will help you to integrate the models in the library browser.

## 1.6 Lite & Pro

If you are using Forest Pack Lite, remember that it can be used freely for your personal or commercial projects. Click [here](#) if you want to see the differences with Forest Pack Pro, and the benefits of upgrading to it.

To complete your learning of the plugin, see the full list of [tutorials](#), visit the [Gallery](#) or read the [Help Reference](#). You can also ask to our technical staff, and share your experience with other users in the [forum](#).

Thank you and enjoy using Forest Pack !

## 2 Requirements

### 2.1 Supported versions of 3ds Max and 3ds Max Design

Our plugins support the following 3ds Max 64 bit versions.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>3ds Max</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>3ds Max Design</b>	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗

✗ = 3ds Max Design not available.

#### ⚠ Mental Ray compatibility in Max 2017 and 2018

From 3ds Max 2017 Mental Ray was an optional installation. Forest Pack for Max 2017 still has many dependencies on the Mental Ray libraries and is required by our plug-ins to operate correctly. Please make sure that Mental Ray is installed for 3DS Max 2017, even if you don't intend to use it to avoid errors.

From 3ds Max 2018 Mental Ray is no longer included, and for technical reasons we have had to temporarily suspend support.

### 2.2 Supported Renderers

Forest Pack supports native instancing in the renderers and versions listed below

- Arnold 5.1 and above is supported from **3ds Max 2018 onwards**. Please make sure the MaxToA plugin is up to date. You can download the most recent version from the [Solid Angle website](#).
- Mental Ray is supported in version **2012 - 2017 only**.
- V-Ray and V-Ray RT supported versions 3.6 or greater for V-Ray 3, V-Ray Next and V-Ray GPU update 1.1 or above and V-Ray 5.
- Thea Render 1.3 and onwards
- Corona Renderer 1 and onwards
- Maxwell 3.x and onwards
- Octane 1.x and onwards
- Arion
- Redshift 2.x and onwards
- FStorm
- Final Render



**! Billboard Library compatibility**

The 2D Billboard library is only supported by Scanline, Mental Ray and V-Ray.

**! Built in Library support**


Not all libraries have materials available for all the renderers. To see which renderers have partial library support, please check the compatibility matrix shown below. To see which renderers are supported by each library item, please see the [online library browser](#).

**! Billboard Library compatibility**

To use Forest Color and Forest Edge maps with Arnold, you will need to turn on **Legacy 3ds Max Map support** in **Render Settings->System**.


## 2.3 Feature Compatibility



























Due to technical limitations, feature support varies between renderers. The table below illustrates the compatibility of RailClone's key features with each render engine.

Fully compatible features are marked with a  and highlighted in green.

**✓ V-Ray GPU**

Forest Colour is partially supported by V-Ray GPU. Get colour from map using Random Values or As Texture on Surface is not currently supported.

Unsupported features are marked with a  and highlighted in red.

	Standard	V-Ray	V-Ray RT V-Ray GPU	Arnold	Mental Ray	Corona	Thea	Octane	Maxwell	Final Render	Arión	Redshift	Form
<b>Native instancing</b>													
<b>Create instances using Forest Tools</b>													

<b>Forest Colour</b>	✓	✓	✓ *	✓	✓	✓	✗ *	✗ *	✗	✓	✗	✗ *	✗ *
<b>Forest Material</b>	✓	✓	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗
<b>Edge mode</b>	✗	✓	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
<b>Material Optimiser</b>	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
<b>Points-cloud display</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Parametric areas</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Distribute using maps</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Automatic clustering</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Frustum culling and falloff</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Randomise and control transforms</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Manual edit mode</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Scatter animated geometry</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Randomise and control animated geometry</b>	✓	✓	✗	✓	✓	✓	✗	✗	✓	✗	✗	✗	✗
<b>Forest Effects</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<b>Library Browser</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Presets with compatible materials</b>	✓	✓	✓	✓	PARTIAL	✓	PARTIAL	PARTIAL	PARTIAL	✗	✗	✗	✗
<b>2D Billboards Library</b>	✓	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗



\* = Similar effects **may** be possible using the renderers own shaders.



#### **Billboard Library compatibility**

The 2D Billboard library is only supported by Scanline, Mental Ray and V-Ray.

For renderers not mentioned in the above list it is still possible to use Forest Pack using [Forest Tools](#) to convert scattered objects to standard Max instances.

## 2.4 License Manager

For network licenses, you will need to install the [license manager](#) on a networked PC. The license manager has the following OS requirements:

#### **Microsoft® Windows:**

- Windows 10 (32-bit and 64-bit)
- Windows 8/8.1 (32-bit and 64-bit)
- Windows 7 (32-bit and 64-bit)

#### **Microsoft Windows Server:**

- Windows Server 2016 (64-bit)
- Windows Server 2012 (64-bit)
- Windows Server 2012 R2 (64-bit)
- 2020

## 3 Installation and customisation

This guide describes the directory structure of Forest Pack and how to customize it. We will use a default Forest Pro installation, in Forest Lite some files may be different.

### 3.1 Directory Structure

We define *<forestdir>* as the folder where you installed Forest Pack (C:\Program Files\Itoo Software\Forest Pack Pro by default) , *<maxdir>* is your main 3DS directory, and *<librarydir>* as the location of libraries (C:\Users\username\AppData\Local\Itoo Software\Forest Pack Pro\ by default).

*<forestdir>* Contains the following files in the root directory:

File	Description
Forest Pack Pro.	Shortcut to the Forest Pack web page
forest_reference.html	Shortcut to the online reference manual
install.log	Installation log file
licenseMode.exe	License mode setup wizard
licpanel.exe	License manager
uninst.exe	Uninstaller for Forest Pack

The setup program also creates the folder structure shown below in *<forestdir>* :

Folder	Path
Distribution Maps	<i>&lt;forestdir&gt;</i> \distmaps
Image Formats	<i>&lt;forestdir&gt;</i> \imageformats
Billboard Geometry	<i>&lt;forestdir&gt;</i> \geometry

The setup program creates libraries using the folder structure shown below in *<librarydir>* :

Folder	Path
Forest Effects Files (.eff)	<i>&lt;librarydir&gt;</i> \effects
Library	<i>&lt;librarydir&gt;</i> \lib
Library Maps	<i>&lt;librarydir&gt;</i> \maps
Material Libraries	<i>&lt;librarydir&gt;</i> \matlib

The plugins and shaders for V-Ray and Mental Ray are copied to the 3ds Max directories as follows (Note only one of Lite or Pro plugins should be installed for each Max version):

Folder	Path
3DS plugin Lite	<maxdir>\plugins\ForestPackLite.dlo
3DS plugin Pro	<maxdir>\plugins\ForestPackPro.dlo
3DS Legacy plugin (optional install)	<maxdir>\plugins\ForestPackPro2.dlo
Maxscripts	<maxdir>\scripts\ForestPack\forest_utils.ms <maxdir>\scripts\ForestPack\optmat.mse <maxdir>\scripts\startup\forestpack.ms
Toolbar Icons	Max 2010- 2012:  <maxdir>\ui\Icons\fptoolbar16a.bmp <maxdir>\ui\Icons\fptoolbar16i.bmp <maxdir>\ui\Icons\fptoolbar24a.bmp <maxdir>\ui\Icons\fptoolbar24i.bmp  Max 2013 - 2017:  <maxdir>\ui_In\Icons\fptoolbar16a.bmp <maxdir>\ui_In\Icons\fptoolbar16i.bmp <maxdir>\ui_In\Icons\fptoolbar24a.bmp <maxdir>\ui_In\Icons\fptoolbar24i.bmp  <maxdir>\ui_In\Iconsdark\fptoolbar16a.bmp <maxdir>\ui_In\Iconsdark\fptoolbar16i.bmp <maxdir>\ui_In\Iconsdark\fptoolbar24a.bmp <maxdir>\ui_In\Iconsdark\fptoolbar24i.bmp
User Interface Files	<maxdir>\ForestQT.dll <maxdir>\QtCore_Itoo_4.dll <maxdir>\QtGui_Itoo_4.dll <maxdir>\QtXml_Itoo_4.dll <maxdir>\QtSolutions_MFCMigrationFramework-Itoo.dll
V-Ray shaders	Several <maxdir>\ForestV-Ray###.dll, usually one for each V-Ray major release. Note: some files may not exist depending of the Max and V-Ray versions

Folder	Path
MR shader library	Max 2010 and before: <maxdir>\mentalray\shaders_autoload\shaders\FShader3.dll Max 2011 and 2012: <maxdir>\mentalimages\shaders_autoload\mentalray\shaders\FShader3.dll Max 2013 and newer: <maxdir>\NVIDIA\shaders_autoload\mentalray\shaders\FShader3.dll
MR shader descriptor	Max 2010 and before: <maxdir>\mentalray\shaders_autoload\include\FShader3.mi Max 2011 and 2012: <maxdir>\mentalimages\shaders_autoload\mentalray\include\FShader3.mi Max 2013 and newer: <maxdir>\NVIDIA\shaders_autoload\mentalray\include\FShader3.mi

The following entries are created in the Windows Registry:



If the plug-in doesn't find the keys in HKEY\_LOCAL\_MACHINE, it searches the same values on HKEY\_CURRENT\_USER.


HKEY_LOCAL_MACHINE\SOFTWARE\Itoo Software\Forest Pack Pro	
<b>MainDir</b> = C:\Program Files (x86)\Itoo Software\Forest Pack Pro	<forestdir> is defined here
<b>UseLicServer</b> = 0	0 to use Stand-alone license, 1 for Network license
<b>LicservHost</b> = <host or ip>	License server hostname, undefined for automatic search
<b>LicservPort</b> = 16720	Protocol port number, by default 16720
<b>TexturePaths</b> (key)	Texture paths
<b>LibraryDir</b> (key)	Library paths

In **Forest Pack 6.1 and above** you can disable the iToo Toolbars (both Forest and RailClone) by adding the following registry key:

<b>HKEY_CURRENT_USER\SOFTWARE\Itoo Software\</b>	
DisableToolbars = 1 (DWORD)	1 to disable the toolbars, 0 to enable them

All commercial Itoo Software products use also additional keys for the licensing management:

<b>HKEY_LOCAL_MACHINE\SOFTWARE\Itoo Software\Licenses</b>	
<b>LicenseDir</b> = C:\ProgramData\Itoo Software\Licenses	Forest Pro license is stored here
<b>HKEY_LOCAL_MACHINE\SOFTWARE\Itoo Software\Licenses\Products</b>	
<b>Forest Pack</b> = 9	One entry for each Itoo Software product

 In a Windows 64 bit version, these registry keys are duplicated in *HKEY\_LOCAL\_MACHINE\SOFTWARE\Wow6432Node*

## 3.2 Unattended Installation

From Forest Pack 3.9.2 and above, the setup program supports unattended installations using the following parameters:

- /? - See available parameters
- /S - enable silent installation
- /MAXVER=[max9-32, max9-64, max2008-32, max2008-64, max2009-32, max2009-64, max2010-32, max2010-64, max2011-32, max2011-64, max2012-32, max2012-64, max2013-32, max2013-64, max2014-64, max2015-64]
- /MAXDIR=<3dmax installation path>
- /LICMODE=[rendernode, network, stand-alone]
- /LICHOST=[License server host]
- /LICPORT=<License server TCP port>
- /SHAREDFOlder=<network path for shared files>

<b>Example of a silent installation for Max 2013</b>
ForestPackPro.exe /S /MAXVER=max2013-64

## 3.3 Network Rendering

## 3.4 You can install Forest on your renderfarm computers using the setup program, or copying the files manually. In Forest Pro select "Render slave node", in Forest Lite use default installing option.

For a manual installation, these are the required files:

Type	Files
Plugin and shaders	As described in the <a href="#">plugin and shaders</a> table
Distribution Maps	from "C:\Program Files (x86)\Itoo Software\Forest Pack Pro\distmaps\images", copy them to any shared texture folder
Tree textures	all textures from "C:\Program Files (x86)\Itoo Software\Forest Pack Pro\maps" and your custom textures, when used

If you use Presets or other elements of the Library, they must be visible by the render nodes. Use the Asset Tracker to locate the texture maps and XRefs used by the scene.

From version 4.0.2, Forest configures automatically in the render nodes the paths listed in the registry at **HKEY\_LOCAL\_MACHINE\SOFTWARE\Itoo Software\Forest Pack Pro\TexturePaths**. These are the paths included by default by the installer:

c:\program files (x86)\itoo software\forest pack pro\distmaps\images
c:\program files (x86)\itoo software\forest pack pro\maps\HShadows
c:\program files (x86)\itoo software\forest pack pro\maps\Standard
c:\program files (x86)\itoo software\forest pack pro\maps\Classic
c:\program files (x86)\itoo software\forest pack pro\maps\presets
c:\program files (x86)\itoo software\forest pack pro\lib\free models\hqplants free\maps

All these files can be installed on network paths if you configure Max to use them (as shared plugins, Mental Ray shaders and textures). For details, see: *Autodesk 3ds Max Help -> Customizing the User Interface -> Configure Paths*.

### 3.5 Is it possible to modify the sub-objects of a Forest object from MaxScript?

Yes, but only if the Forest object is in "Custom Edit" mode. there is an interface named "trees" for using it provided by MaxScript. You can see all the functions included with "showinterfaces(\$forest01)". these are the some of them:

Add a tree in position p (local coordinates), using width, height and geometry ID values

```
<Forestobject>.trees.create p:<point3> width:<float> height:<float> geomid:<integer>
$forest01.trees.create p:[50,50,0] width:10 height:10 geomid:1
```

Delete the tree at position n in the array

```
<Forestobject>.trees.delete n:<integer>
$forest01.trees.delete n:0
```

Modify the properties of the the tree at position n (width, height, geometry ID, random seed)



```
<Forestobject>.trees.edit n:<integer> width:<float> height:<float> geomid:<integer> seed:<integer>
$forest01.trees.edit n:0 width:10 height:10 geomid:1 seed:123456
```

Returns the number of trees of the object

```
<Forestobject>.trees.count(<integer>)
$forest01.trees.count()
```

Move the n-th tree to the position p

```
<Forestobject>.trees.move n:<integer> p:<point3>
$forest01.trees.move n:0 p:[50,50,0]
```

Set the rotation of the n-th tree (angle in degrees)

```
<Forestobject>.trees.rotate n:<integer> angle:<float>
$forest01.trees.rotate n:0 angle:45
```

## 3.6 Configuring the plugin using environment variables

From Forest Pack 6 onwards it is now possible to configure the main attributes of the plugin using environment variables instead of registry keys. To do this each registry key used in the configuration can be replaced by a variable, replacing non alphanumeric characters with underscores (\_). For example: for "HKEY\_LOCAL\_MACHINE\SOFTWARE\Itoo Software\Forest Pack Pro\MainDir", you would define the variable "ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_MAINDIR"

The minimum variables to run Forest Pack are the following:

### For Network licenses:

- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_MAINDIR=C:\Program Files\Itoo Software\Forest Pack Pro
- ITOO\_SOFTWARE\_LICENSES\_LICENSEDIR=C:\ProgramData\Itoo Software\Licenses
- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_USELICSERVER=1
- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_LICSERVHOST=192.168.1.20
- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_LICSERVPORT=16720

### For Stand-alone licenses:

- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_MAINDIR=C:\Program Files\Itoo Software\Forest Pack Pro
- ITOO\_SOFTWARE\_LICENSES\_LICENSEDIR=C:\ProgramData\Itoo Software\Licenses
- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_USELICSERVER=0

### For Libraries

- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_LIBRARYDIR=C:\Users\<user name>\AppData\Local\Itoo Software\Forest Pack Pro\lib

### For Effects

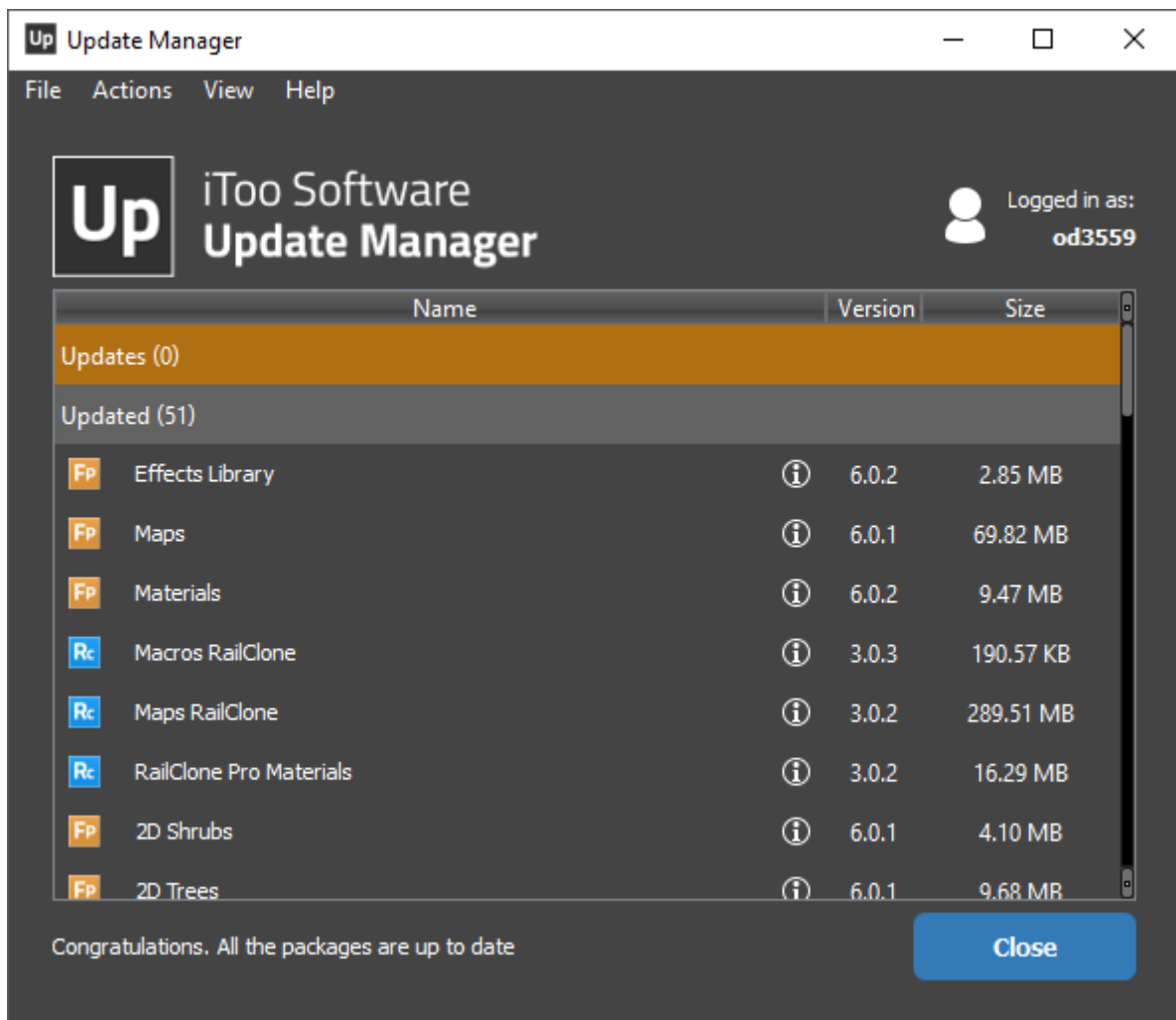
- ITOO\_SOFTWARE\_FOREST\_PACK\_PRO\_EFFECTSDIR=C:\Users\<user name>\AppData\Local\Itoo Software\Forest Pack Pro\effects



- If you define variables in a .BAT file, be sure to not include any space either side of the '=' symbol, or it will not work (this is a known Windows issue).
- Environment variables are used only by the Max plugin. Other tools as the License Manager still require configuration registry keys at the moment.
- If both registry keys and environment variables are defined, the variables have precedence over keys (priority order is Variables->HKLM->HKCU).


## 4 Update Manager

### 4.1 Overview



iToo Software Update Manager is an all in one solution that allows you to download, manage and install macros and libraries for Forest Pack and RailClone. This has several advantages: You only need to download the packages that you need, so there's no need to waste storage space and bandwidth on assets that you won't use; A significantly smaller payload for the core application making updating the software faster and easier; The ability to release new material at any time without the need to wait for a new release of the software, including beta material and new libraries and macros as soon as they become available.

Update manager runs when you first install our plugins, when you'll be prompted to download the current packages. Every time a new interactive Max session is started Update Manager will check for new content to make sure you are completely up to date, although you can change this behaviour to check manually if you prefer.

 Update Manager does not run automatically if Forest Pack or RailClone is being installed using silent mode or if Max is launched in non-interactive mode (for example on a render farm). To install packages using Silent mode, please see the procedures described below.


## 4.2 Procedures

### 4.2.1 To launch Update Manager

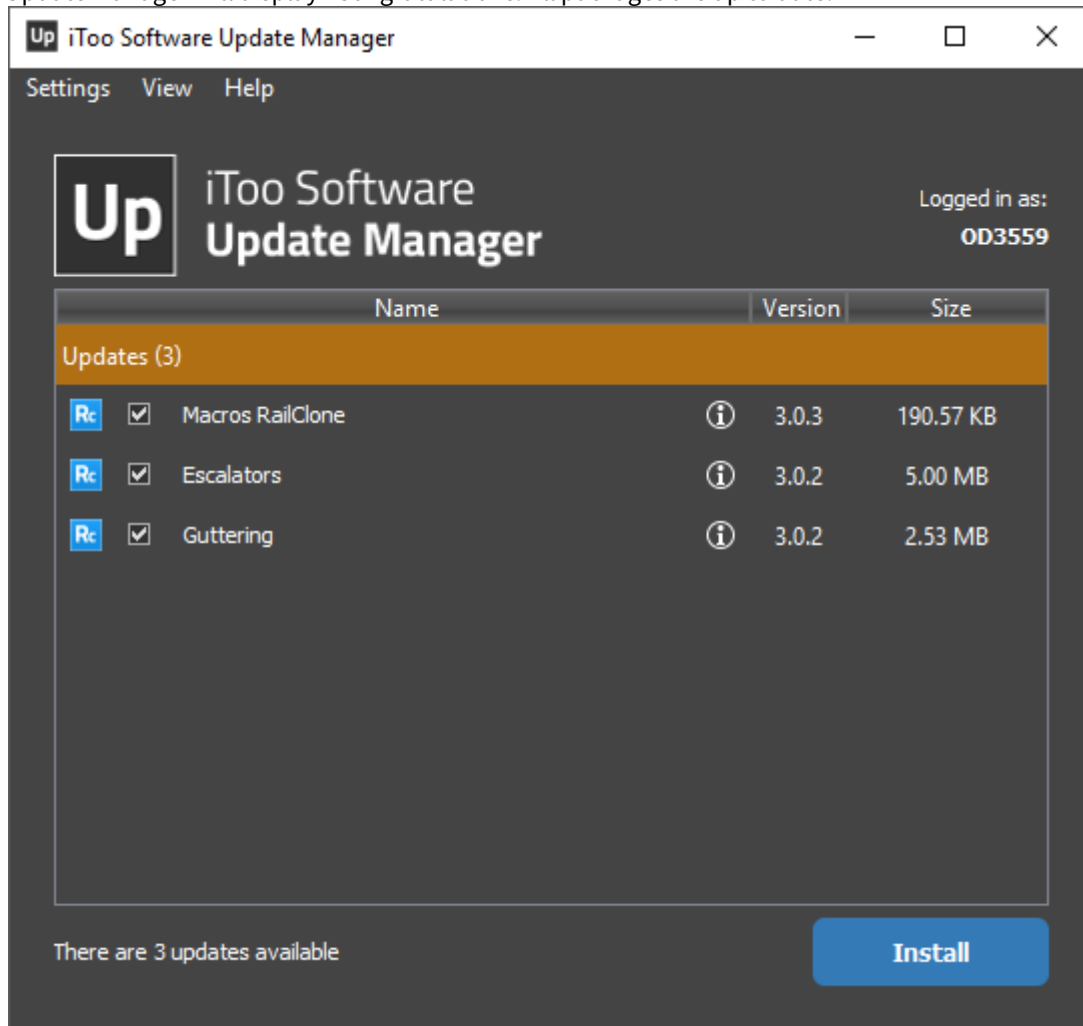
To launch update manager, either:

- Select **Update Manager** from the Windows **Start Menu**.

or:

1. Open **3ds Max**.
2. Select an existing Forest Pack or RailClone object, or create a new one.
3. From the **Modify** Panel, open the **General** rollout and click the **Check for Updates** button 

4. Any packages that are available to download will be listed. If no new or updated packages are available Update Manager will display "Congratulations. All packages are up to date."



## 4.2.2 To download packages

You have the option to download all or only a selection of the available packages. To do this:


1. Open **Update Manager**.
2. By default all new or updated packages are automatically selected. If you wish to change the selection, use the checkboxes to the left of each package's name.
3. Click **Install**. The selected packages will be downloaded and added to the Forest Pack or RailClone library.

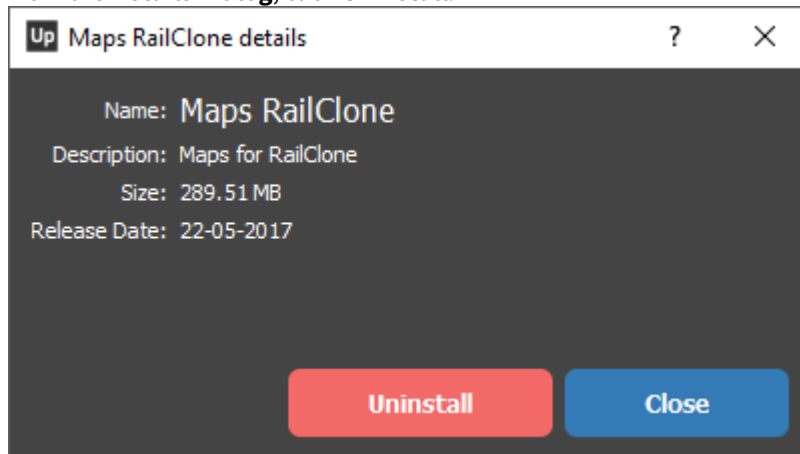
## 4.2.3 To show installed packages

By default Update Manager only shows packages that are available to be installed. To show packages that are already installed:

1. Open **Update Manager**.
2. Go to the **View** menu and select **Installed Packages**.

#### 4.2.4 To delete installed packages

1. If you cannot see installed packages, Go to the **View** menu and select **Installed Packages**.
2. Click on the  icon for the package you'd like to remove.
3. From the **Details Dialog**, click **Uninstall**.



#### 4.2.5 To download packages to a shared network location

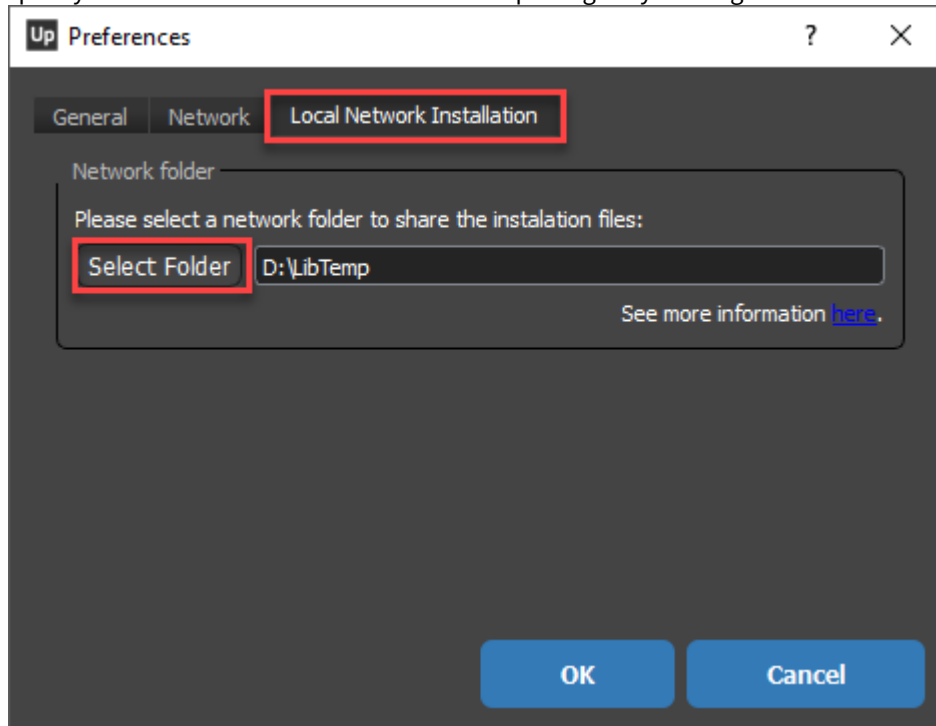
It is possible to install content from a shared network location. This can be useful to prevent each computer having to download potentially large files separately. It works by contacting the iToo Servers for a list of available packages, it then checks to see if they are already available in a shared directory and if they are found, installs them from there. If they are not available in the shared directory, they are downloaded and made available to all other computers on the network.

To do this is a 2 step process: First, download the assets to a networked location from any PC. Then configure the other PCs on the network to look in this location. To do this:

##### Step 1: Download packages

1. Go to the **Settings** menu and select **Preferences**.
2. Go to the **Local Network Installation** tab.

- Specify a network location for the installation packages by clicking on the **Select Folder** button.



- Click **OK**.
- The installation files for any libraries downloaded from now on will be saved to this location

## Step 2: Installing shared packages

- Open **Update Manager** on the offline machine
- Go to the **Settings** menu and select **Preferences**.
- Go to the **Local Network Installation** tab.
- Specify the same network location for the offline installation packages by clicking on the **Select Folder** button.
- Files will be installed from this location.

## 4.2.6 To use unattended installation

For render farms and large organizations where it is more efficient to update content silently, there are 2 options.

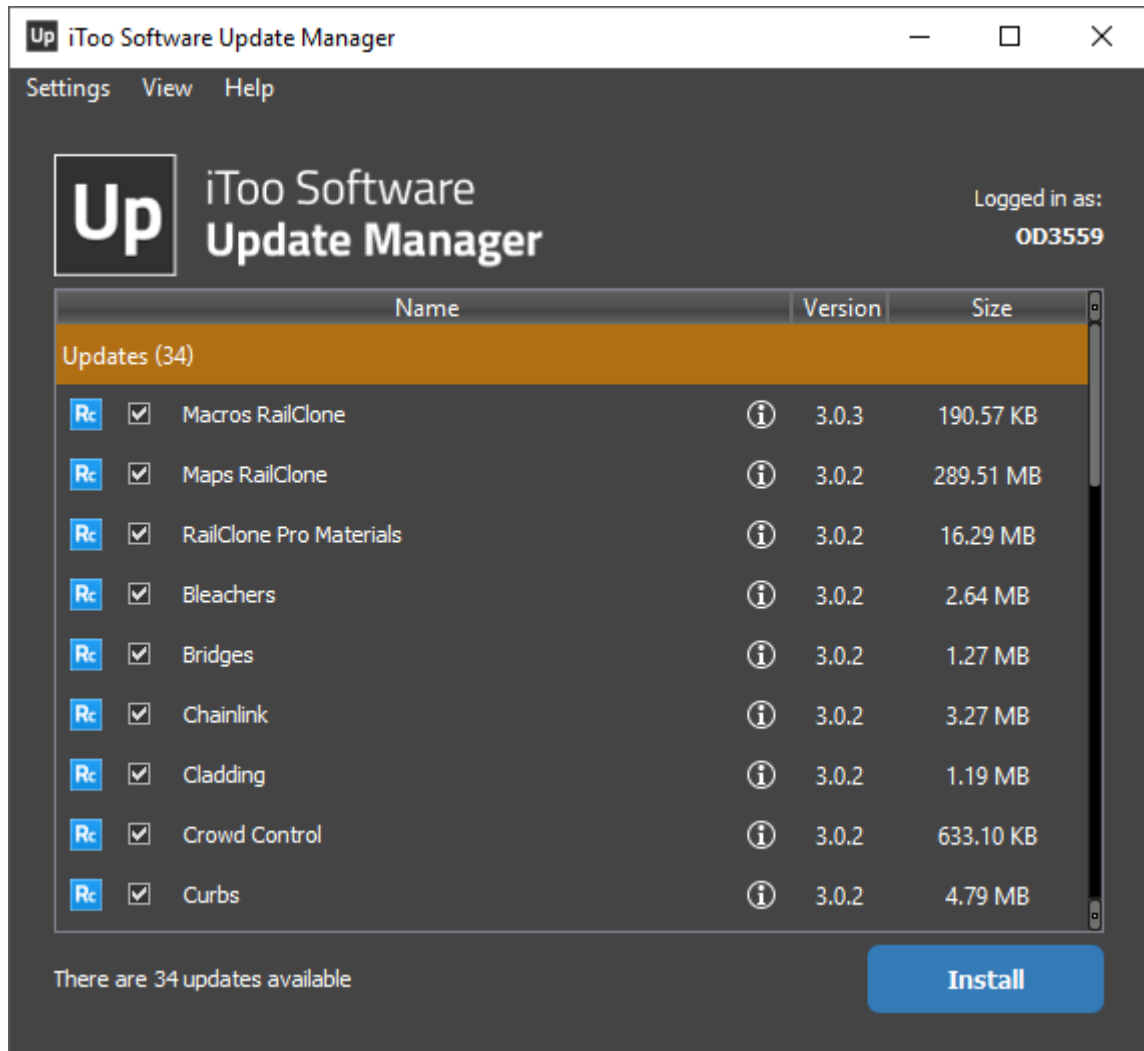
Either:

- Use Update Manager on your source PC to download the content you wish to distribute to the other nodes.
- Copy library content manually (or using a batch file) from C:\Users\<user>\AppData\Local\Ittoo Software\RailClone Pro or C:\Users\<user>\AppData\Local\Ittoo Software\Forest Pack Pro to the same location on your employee's machines or render nodes

Or:

- If the PCs have an Internet connection, you can run Update Manager silently using the command line, for example using **UpdateManager.exe -product rcp install ALL**. This will download and install all the packages. For other parameters that allow you to specify different products, packages and more, please see the reference at the bottom of this page.

## 4.3 nterface



### 4.3.1 Package List

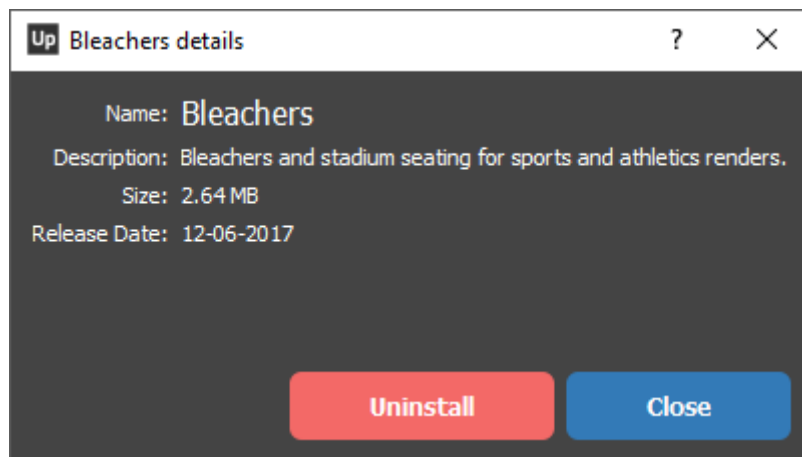
Displays packages that are available for download, including their names, version and size. Use the checkboxes to select packages to install.

Optionally can also be used to display packages that are already installed on the system by selecting the **Installed Packages** option from the **View** menu..

### 4.3.2 Information Button

Opens a dialog to display more information about a package, including the name, description, file size and release date. For packages that are already installed an option to **Delete** the package is also available





### 4.3.3 Install Button

Click to install selected packages

### 4.3.4 Settings

Options to **logout** of the Update Manager, open the **preferences** and **close** the application

### 4.3.5 View

Options to **refresh** the packages list and toggle on and off whether **installed packages** should also be displayed

### 4.3.6 Help

Options to open the **iToo Software** website and open the **About** dialog to see the installed versions of Update Manager, RailClone and Forest Pack.

### 4.3.7 Preferences

#### General > Temporary Folder

Allows the user to change the location in which downloaded packages are temporarily saved before they are installed.

#### General > Behavior

When RailClone or Forest Pack is first used in an interactive session, Update Manager will check to see if there are any new or updated packages and notify the user. Turn this option **off** if you would prefer to check for updates manually,

#### General > Channel

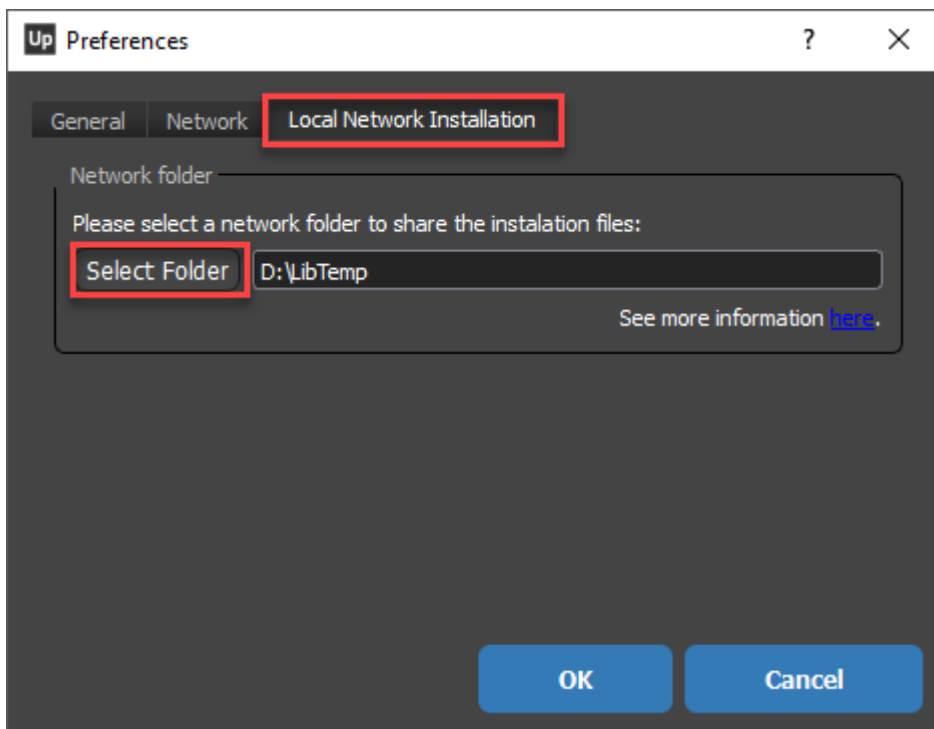
Allows you to choose to download only packages that are **stable**, or participate in **beta** testing new or experimental content.

## Network > Proxy

If your computer is using a proxy, you can configure the settings here. Includes parameters for **Address**, **Port**, and optional parameters for **Username** and **Password** if they are required.

## Offline Installation

This options enables you to download packages to a network location. Forest Pack will search this location for selected packages before downloading them from our servers. In that way you avoid downloading the same content multiple times in the same office.



**Select Folder** is used to choose a save location.

## 4.3.8 Command Line Installation

In addition to a user-friendly GUI, Update Manager also features a command line interface for unattended installations. Please see below for supported parameters.

Command	Function
<b>PRODUCT CODES</b>	
rcp	RailClone Pro
rcl	RailClone Lite
fpp	Forest Pack Pro

Command	Function
fpl	Forest Pack Lite
<b>MODIFIERS</b>	
-product <i>CODE</i>	Specify a specific product
-username <i>USERNAME</i>	Specify the iToo software username
-password <i>PASSWORD</i>	Specify the iToo software password
-shared-folder <i>PATH</i>	Path to shared network folder
-proxy-address <i>ADDRESS</i>	Specify the proxy address
-proxy-port <i>PORT</i>	Specify the proxy port
-proxy-password <i>PASSWORD</i>	Specify the proxy password
-proxy-username <i>USERNAME</i>	Specify the proxy username
<b>COMMANDS</b>	
H or help	Shows help information
C or check	Check if there are updates available.
L or list updated   installed   all	List packages using filters
I or Install package-name   all	Install specified package
U or uninstall package-name   all	Uninstall specified package

For example:

- **UpdateManager.exe -username USERNAME -password PASSWORD check** checks if there are updates available
- **UpdateManager.exe -username USERNAME -password PASSWORD -product rcp check** checks if there are updates for RailClone Pro content
- **UpdateManager.exe -username USERNAME -password PASSWORD -product rcp install all** upgrades RailClone Pro packages in silent mode

## 5 Lite and Pro

Currently two versions are available: **Forest Pack Lite** and **Forest Pack Pro**. Forest Pack Lite is free for any project, personal or commercial. However, some features are disabled and only available in Forest Pack Pro.

### 5.1 Forest Pack Lite

This version is **free for personal and commercial use for an unlimited period of time**. It is fully functional with some limitations listed below. You can get it from the [Download](#) page.

### 5.2 Forest Pack Pro

Forest Pack Pro has advanced features for surfaces, tree placement and importing/exporting tools. Also it includes a full library of planar trees and shrubs that you can edit it and add your own trees and textures. Visit our [Online Store](#) for more information about prices and license options.

#### 5.2.1 Feature list

Rendering	Lite	Pro
Native shaders for <b>Mental Ray</b>	✓	✓
Native shaders for <b>VRay</b>	✓	✓
Billboards optimization	✓	✓
Random tint by item	✓	✓
Tint by element (as leaves on a tree)		✓
Scattering	Lite	Pro
Unlimited types of plants by object		✓
Up to three types of plants by object	✓	
Unlimited areas by object		✓
Up to four areas by object	✓	
Scattering over uneven surfaces		✓
Diversity / Clusters	✓	✓
Custom Edit mode, to edit items individually	✓	✓
Distribution of items along a path	✓	✓
Real-time camera clipping	✓	✓

Points-cloud viewport mode	✓	✓
Random transformation of position, rotation and scale	✓	✓
Full Animation support, including multiple random samples	✓	✓
Collision checking	✓	✓
<b>Effects</b>	<b>Lite</b>	<b>Pro</b>
Effects Browser and built in effects	✓	✓
Load and edit 3rd party effects		✓
Create, save and share new effects		✓
<b>Libraries</b>	<b>Lite</b>	<b>Pro</b>
Library browser	✓	✓
Library editor		✓
More than 100 library items, including billboards, 3D models and Presets		✓
<b>Utilities</b>	<b>Lite</b>	<b>Pro</b>
Real time status window	✓	✓
User presets		✓
Creation tools		✓
Forest tools		✓
Conversion to editable Mesh	✓	✓
<b>Other Benefits</b>	<b>Lite</b>	<b>Pro</b>
Prioritized technical support		✓
Early access to beta versions		✓
Frequently patches and releases		✓

## 6 Forest Plugin

- [Create](#)
- [General](#)
- [Add Geometry](#)
- [Forest LOD](#)
- [Areas](#)
- [Distribution](#)
  - [Image Mode](#)
  - [Path mode](#)
  - [Reference mode](#)
  - [Particle Flow mode](#)
- [Effects](#)
  - [Effects Interface](#)
  - [Effects Library](#)
  - [Saving and Importing Effects Files](#)
  - [Creating and Editing Effects](#)
    - [Effects Syntax](#)
    - [Operators](#)
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    - [Parameters](#)
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    - [XY Local Translate](#)
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- [Surface](#)
- [Item Editor](#)
- [Camera](#)
- [Shadows](#)
- [Transform](#)
- [Material](#)
- [Animation](#)
- [Display](#)

### 6.1 Create

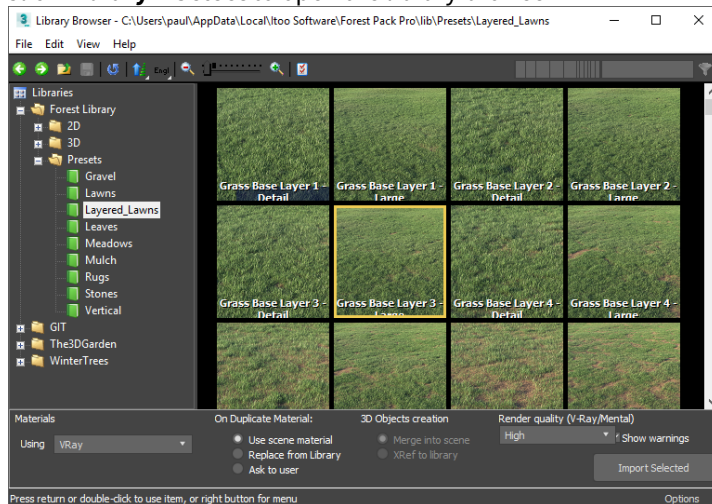
### 6.1.1 Overview

To create a new Forest Object you have three options. You can either start by clicking on an area such as a surface or a spline, place individual objects by using Item Editor mode, or create an empty Forest Object so that you can configure all the settings later.

### 6.1.2 Procedures

To pick a model or preset from the library

1. Go to the **Create** tab in the **Command** Panel and choose iToo Software from the dropdown list.
2. Click on the **Forest Pack** button.
3. Click **Library > Select** to open the library browser



4. Pick a preset and click **Import Selected**.

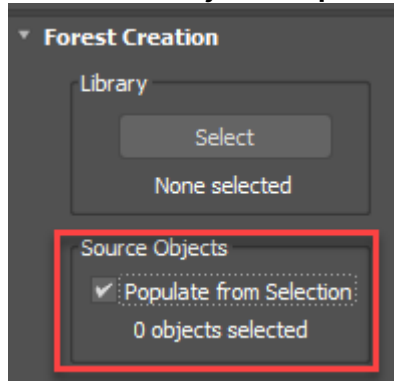
To create a Forest Object using a Spline or Surface

1. Go to the **Create** tab in the **Command** Panel and choose iToo Software from the dropdown list.
2. Click on the **Forest Pack** button.
3. Check **Mode > Generate**.
4. Click on a surface or spline in the scene to pick it as the first area.
5. Switch to the **Modify** tab for any subsequent edits.

To create a Forest Object that scatters the selected items

1. Select the objects you wish to scatter.
2. Go to the **Create** tab in the **Command** Panel and choose iToo Software from the dropdown list.
3. Click on the **Forest Pack** button.
4. Check **Mode > Generate** or **Icon Mode**

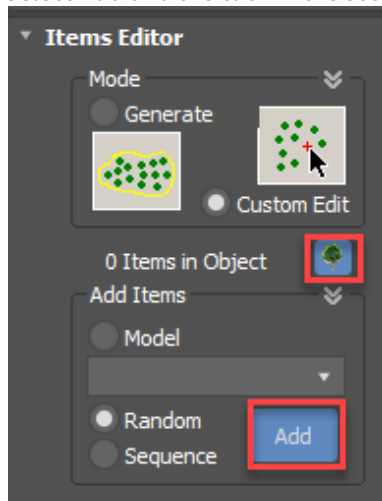
5. Enable **Source Objects > Populate from Selection**.



6. Click on a surface or spline in the scene to pick it as the first area or create an icon depending on the creation mode.
7. Switch to the **Modify** tab for any subsequent edits.

### To place individual objects

1. Go to the **Create** tab in the **Command** Panel and choose iToo Software from the dropdown list.
2. Click on the **Forest Pack** button.
3. Check **Mode > Icon Mode**
4. Check **Mode > Icon Mode**
5. Click and drag in the scene to create a Forest Pack icon
6. Switch to the **Modify** tab and add objects to the GeometryList.
7. Go to the **Items Editor** rollout and enable Custom Edit mode
8. Click on the Tree icon to enter the Tree sub object level
9. Select **Add** and then click in the scene to add objects



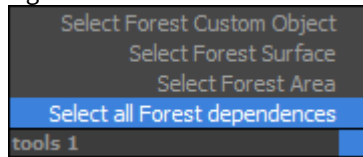
### To create a Forest object with no item placement


1. Go to the **Create** tab in the **Command** Panel and choose iToo Software from the dropdown list.
2. Click on the **Forest Pack** button.
3. Check **Mode > Icon Mode**
4. Click and drag in the scene to create a Forest Pack icon
5. Switch to the **Modify** tab for subsequent editing.

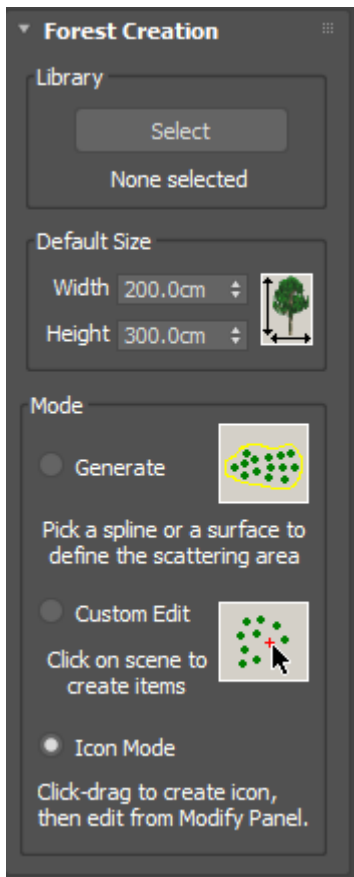


**To select all the items in the scene used by a Forest object**

1. Select a Forest object
2. Right-click and choose Select all Forest Dependencies from the quad menu.



 There are also options to select individual custom objects, surfaces, and areas

**6.1.3 Interface****Library**

From the Create panel you have the option to load models or a preset from the library. Just click on the Select button to open the [Library Browser](#).

## Default Size

Use the Width and Height parameters to set the default size of new 2D template objects.

## Mode

### **Generate**

Enables you to create a new Forest Pack object by picking a Spline or a Surface from the scene. This will be automatically added to the Areas or Geometry list. Subsequent edits should be done from the Modify panel.

### **Custom Edit**

Enables you to place individual objects by clicking in the scene. This mode automatically create a new Forest Object in Item Editor mode. Subsequent edits should be done from the Modify panel.

### **Icon Mode**

Enables you to create an empty Forest Pack object click-dragging an icon in the scene. The resultant Forest Pack has no areas assigned (but may contain geometry if you used the Library option). Subsequent edits should be done from the Modify panel.

## 6.2 General

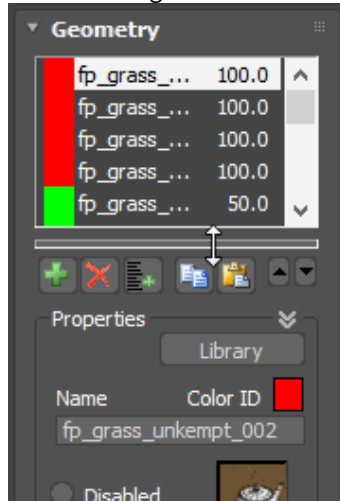
### 6.2.1 Overview

The General rollout contains plugin-wide settings including tools to create parameter-only presets (for presets that include geometry and other external objects, see the [Forest Library](#) section) . In the event that a render reports "Some forest were not built correctly in the last render" this rollout also contains useful information that can help you to determine the cause.


## 6.2.2 Procedures

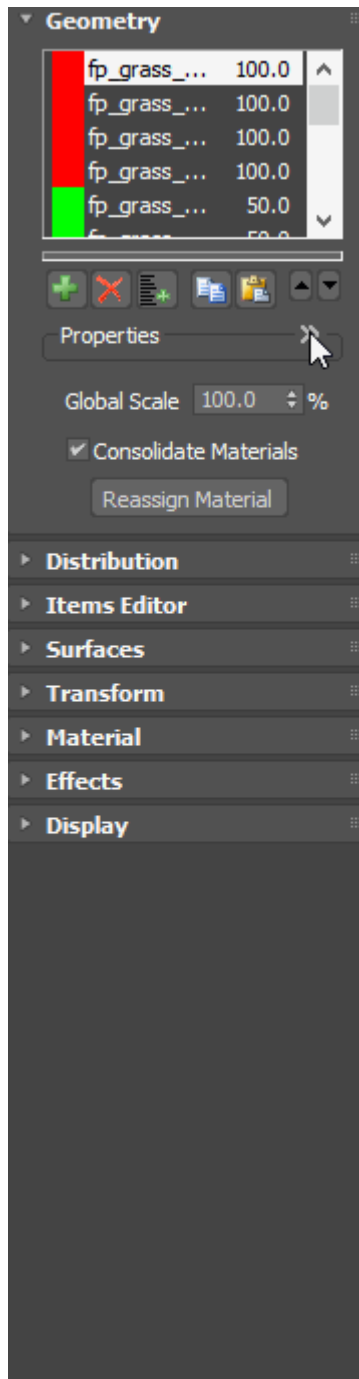
### To resize lists

- Click and drag on the bar below any list to resize it.




## To collapse groups


- Click on the  button to toggle open/collapsed any groups in the Forest Pack interface.




To check for a newer version of Forest Pack:

- Click the  (Search for updates) button.

To check for a new and updated libraries

- Click the  (Search for updates) button.
- Update manager will open. Please see the [documentation](#) for more information.


To open the help files:

- Click the  (Show Forest Pack Help) button.


To create variations of the current Forest object:

- Change the **Random Seed** number.


To save the current settings as a preset:

1. Set the Forest object's parameters.
2. Type a name for the Preset in the **Presets List** box.
3. Click  (Save current settings as a preset)



To save the current settings as default:

1. Set the Forest object's parameters.
2. Type default in the **Presets List** box.
3. Click  (Save current settings as a preset). Every new Forest object will now inherit these settings.

To save a preset to an external file:

1. Set the Forest object's parameters.
2. Click  (Export preset to external file).
3. Type a name for the new preset file and click **Save**

To load a preset from an external file:

1. Click  (Import preset from external file).
2. Select a .fpe file and click **Open**.
3. To add the preset to the drop down list for easy access at a later date, click  (Save current settings as a preset).

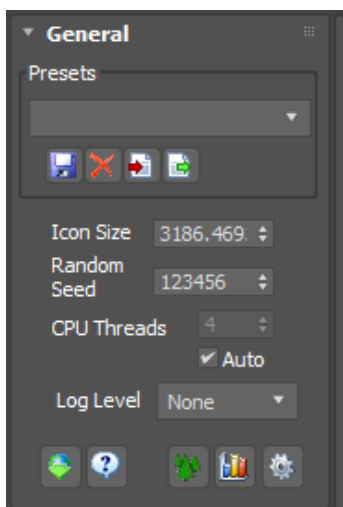
To disable Pop Ups

1. Click on **Global Settings**.
2. Check **Disable Pop-ups**. Only Critical messages will now be shown.

To show or hide a rollup





1. Click on **Global Settings**.
2. Check next to the rollouts you wish to display. Uncheck next to rollouts you wish to hide.
3. In this way you can streamline the Forest Pack interface to suit your workflow.

## 6.2.3 Interface




### Presets list

The presets field allows you to select from a list of saved presets or enter a new name and store the current settings as a new preset. Clicking a name from the list overwrites the current numeric parameters and options with those saved in the preset. References to all external objects, for example in the geometry list, surface list, and cameras rollout, remain unaffected. References to materials are saved, but they must be in the scene or the current material library.

	Save current settings as a preset
	Delete preset from list
	Import preset from external file
	Export preset to external file

If a preset is created with the name "default", its values will be used automatically for all new Forest objects.

You can copy the presets to any other computer that has Forest installed by copying the file named "forest\_presets.ini", located in the user's folder: %LOCALAPPDATA%\Autodesk\3dsMax\[max version]\ENU\en-US\plugcfg.

 For most uses this feature has been superseded by loading and saving presets via the [Forest Library](#), however it remains useful as a quick way of copying settings between Forest objects and setting defaults values.

## Icon Size

Defines the size of the Forest icon. This will display when the plugin cannot create objects because not all the required parameters have yet been defined, or because of an error condition,

## Random Seed


A numeric value used to initialize the random number generator. This number affects any randomised properties of the Forest Pack plugin. For a given seed value, the Forest object will always produce the same results.

## CPU Threads

Defines the number of threads used by Forest to build the scattered geometry. The default value (Auto) automatically detects the number of CPU cores. Usually is not recommended that you modify this parameter.

## Disable Pop Ups

When enabled all suggestions and warning messages are turned off except for critical errors (this option is global and persistent).

 The "XRef Unit's mismatch" popup (shown when loading items from the library) can be disabled by setting `disableXRefPopups=1` in `forestpack.ini`, or from **General->Configuration->Disable Popups**

Please note however that "General->Configuration->Disable Popups" will disable ALL Forest popups, not just this one and before turning off the popup, double check that **Rescale the XRef Objects** is enabled, as the default option. Otherwise, libraries will be not load correctly.



## Search for Updates

Checks the installed version of Forest Pack is up to date. If an update is available a dialog box will open with version information and an option to Go to the Update Site.



## Show Forest Pack Help

Opens Forest Pack's online help files in the user's default web browser.



## Launch Forest Lister

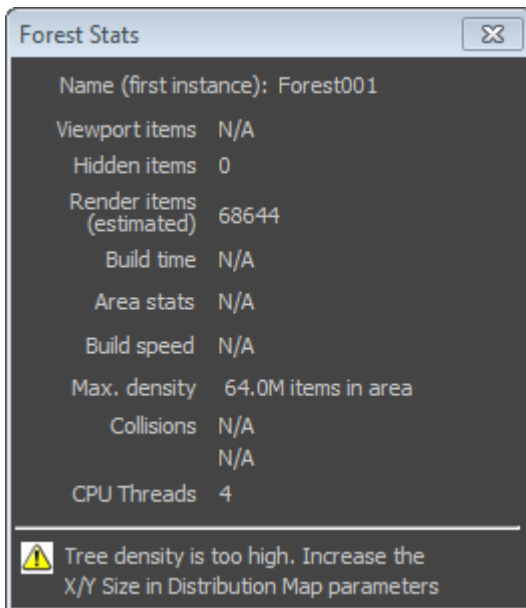
Opens [Forest Pack Lister](#).



## Statistics Window

Opens a floating window showing statistics of the last selected Forest object, including the number of trees created, build time, maximum density of trees in the area, etc.

If Forest cannot create trees because of an error condition (indicated by displaying an orange "F" icon in the viewport instead of the trees), this window can be used to get additional information about the cause of the problem.

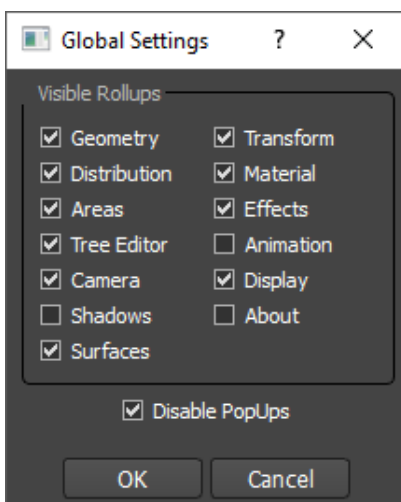


Forest stats showing a "density too high" error



## Global Settings.

Opens a dialog to set global settings that are used for all Forest Objects, including the ability to hide rollouts and disable pop-ups.





## 6.3 Add Geometry

### 6.3.1 Overview

Forest Pro enables you to choose from an unlimited number of different objects to scatter, these are managed from the Geometry List. Items can be loaded from the library or picked directly from the scene, any valid geometry object can be used, the table below outlines the types supported by each renderer. There is no need to convert meshes to Proxies, Forest pack use native geometric shaders to automatically creates instances on the fly for compatible renderers.

Renderer	Supported Objects
Scanline	Meshes (or any object that can be converted to mesh).
V-Ray	Meshes, V-Ray Proxies, lights and several other non-geometric objects
Corona	Meshes, lights and several other non-geometric objects
Arnold	Meshes, Procedurals, lights and several other non-geometric objects
Octane	Meshes, lights and several other non-geometric objects
FStorm	Meshes, FStorm Proxies
Redshift	Meshes, Redshift Proxies
Arion	Meshes
Maxwell	Meshes, Maxwell Proxies
Mental Ray	Meshes, MR Proxies and RPC objects

### 6.3.2 Procedures


To create a new Forest Object based on a spline area or surface:

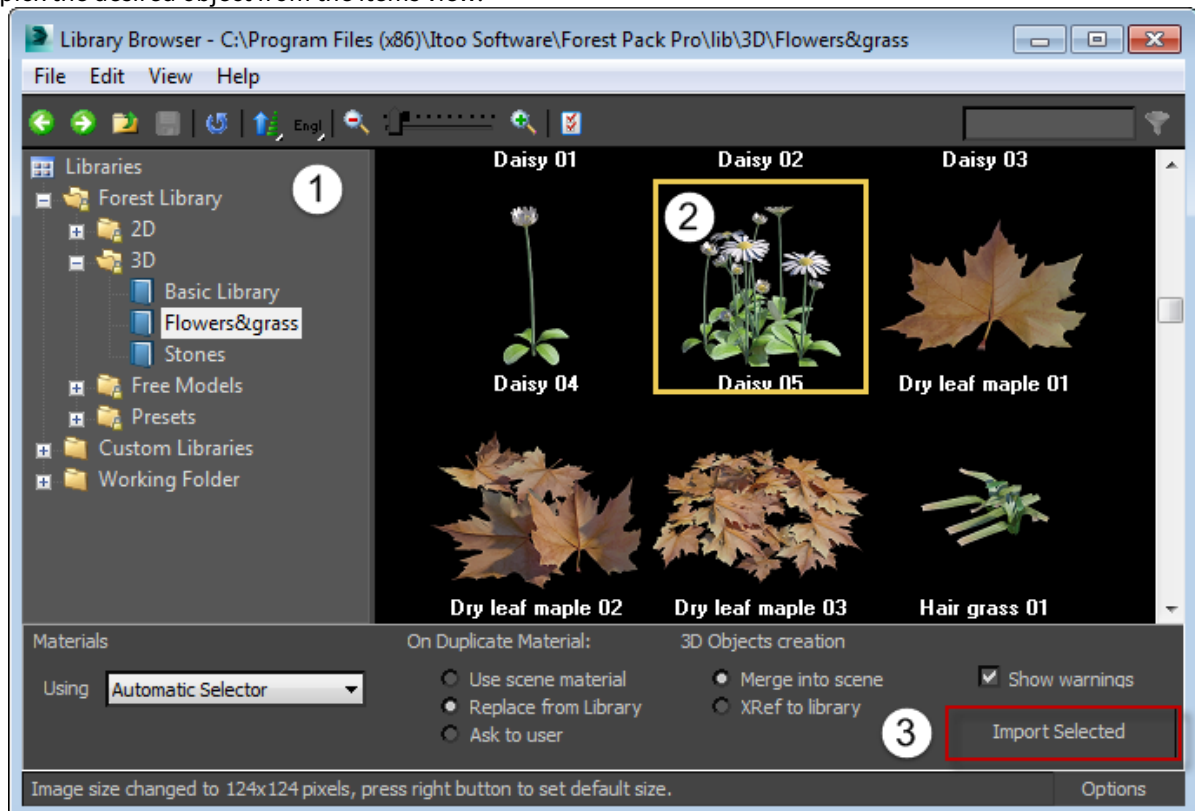
1. Go to Create > Geometry > Itoo Software and click **Forest Pro**
2. Select a mesh, billboard, or preset by clicking the **Select** button and picking from the [Forest Library](#). If the object you wish to use is not in the library, skip this step and a simple plane object will be used. This can be adjusted later to use your own custom objects in the Geometry rollout.
3. Ensure the mode is set to **Generate**.
4. Click a spline area or surface in the viewport. Go to the Modify panel to access parameters for [.Add Geometry v7.x](#), [Areas](#), [Distribution](#), [Camera](#), [Transforms](#), [Animation](#) and more.

To create a new Forest object using Custom Edit:

1. Go to Create > Geometry > Itoo Software and select **Forest Pro**.
2. Change the mode to **Custom Edit**.
3. Click anywhere in the scene to place trees.
4. When you are finished, right click to exit create mode. Further parameters such as [Add Geometry v7.x](#), [Surface](#), [Camera](#), [Transforms](#), [Animation](#) and more can now be adjusted in the modify panel, to further add or modify objects please see the [Item Editor](#) reference.


To add a new object to the Geometry list from the library:

1. Create a new Forest Object as described above.
2. Open the Geometry rollout and click  (Add New Item).
3. The properties section determines the type of geometry to create, to load an object from the library, Click on **Library**.
4. The library browser will open, use the directory navigator on the left of the interface to select an library, then pick the desired object from the items view.

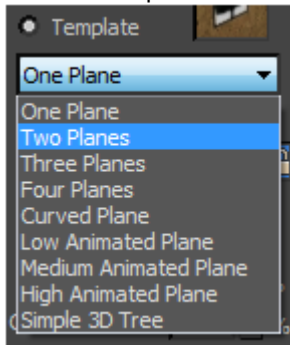



5. To use the selected object, either double click, right click and select Use Item(s), or click Import Selected.

To add a new Billboard object to the Geometry List:


1. Open the Geometry rollout and click on  (Add New Item).

- From the Properties section select **Template** and set the type of billboard geometry from the drop down list.




- Set the **Width** and **Height**, To constrain proportions click  (Lock Aspect Ratio) found to the right of the spinners.
- Apply a material to the planes by dragging or copy and pasting an instance to the Properties > Material pick button. Ensure you assign the material to this button, not the Forest object itself. Forest automatically manages a multi-sub object material based on the materials assigned in the Geometry List rollout. If you do accidentally overwrite this, recover it by clicking **Reassign Material**. See the reference section below for more information.
- If necessary, move the pivot position used for rotation by adjusting the Centre Displacement value. This is measured as a percentage of the overall billboard width.

#### To add a new geometry object to the Geometry List:

- Open the Geometry rollout and click on  (Add New Item).
- The Custom Object picker button (marked "none") will be automatically selected. Pick an object to be scattered from the scene. Any materials applied to the object will be retained.

#### To add lights and other non-geometric objects to the Geometry List:


- Open the Geometry rollout and click on  (Add New Item).
- The Custom Object picker button (marked "none") will be automatically selected. Pick an object to be scattered from the scene. Any materials applied to the object will be retained.
- Some objects will be detected as geometry even though they are not. If this is the case enable the **Non-Geometric Object** option




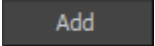
#### To add a group to the Geometry List:

Adding groups must be done using the name selector. Max does not support picking groups from the scene. A group can be added in two ways.

##### Either:

- Open the Geometry rollout and click  (Add New Item).
- From the Properties section, change the geometry type from template to **Custom Object**.
- Click on the Custom Object picker button (marked "none"). Groups cannot be selected by clicking on them in the scene, instead open the Select From Scene dialog by pressing H on the keyboard. Select a group from the list and either double click or press the **Use** button.

Or:

1. Click  (Add Multiple Custom Objects) from below the geometry list, this will automatically open the pick from scene geometry list .
2. Select either a single or multiple groups from the list and click .

#### **Groups (FP4 and above only)**


This mode is useful to scatter groups of objects, preserving their composition, for example clumps of plants like flowers or grass. It works well when used in combination with Distribution > Diversity > Clusters.

Once scattered elements of a group are handled as individual items, both for the boundary checking and surface placement. This also has a noticeable impact on the number of items generated, so care should be exercised when scattering groups that contain many objects.


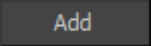
Do not use groups for objects that must be handled as a unique object (for example a tree and its leaves). In this case, attach all the individual parts into single mesh.

### To add a blank object to the Geometry List (to create gaps):



To create blank spaces or gaps in a scatter, null objects can be added to the geometry list. This will be taken into consideration as part of the distribution but no geometry will be generated.

1. Open the Geometry rollout and click  (Add New Item).
2. From the Properties section, change the geometry type from template to **Disabled**.
3. Change the probability of a null object being selected using the Properties > Probability parameter.


### To add multiple objects to the Geometry List:

1. Open the Geometry rollout and click  (Add Multiple Custom Objects).
2. Select the objects to use from the list. To select multiple object from the list either select individually while holding down control, or select a range by clicking the first object then hold down shift and click the last object.
3. Click  to use the selected objects.




OR

1. With a Forest Object selected, go to the Geometry rollout
2. Click the **Pin Stack button** . This will allow you to keep the Forest Interface in the Modify panel even when you select other items.
3. Select all of the items you wish to scatter.
4. Click on  **Add New Item** button in Forest Pack's Geometry rollout
5. All the selected items will be added to the Geometry list.
6. Reselect the Forest object and turn off **Pin Stack**

### To delete and object from the Geometry List:



1. Select the item from the the Geometry List.
2. Press  (Delete Item).

### To Copy and Paste objects:

1. Select the source item from the geometry list.
2. Click  (Copy item values).
3. Select the target item, or create a new one by clicking  (Add New Item).
4. Click  (Paste item values).

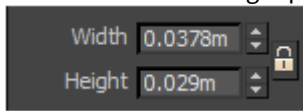
### To change the order of objects:


When using forest in custom edit mode items can be created in a sequence instead of randomly selected from the geometry list. When using this feature it is helpful to be able to rearrange the order of the objects in the Geometry list.

- To move an object up the Geometry list, select it and click on  (Move up).
- To move an object down the Geometry list, select it and click on the  (Move down).

### To manually set the height and width of a billboard or custom object:

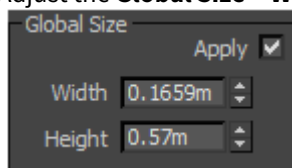
1. Select an item from the Geometry List.
2. If the item is a Custom Object, turn off **Use Objects Dimensions**.
3. Use the Width and Height parameters to set a new size for the object.



4. By default the Width and Height are constrained maintain proportions, uncheck  (Keep Aspect Ratio) to change the width and height independently.

### To manually set the height and width of all objects:

1. Turn on **Global Size>Apply**.
2. Adjust the **Global Size > Width** and **Height** parameters, all items in the geometry list will use the new values.



### To adjust the size of all objects, retaining the original proportions:

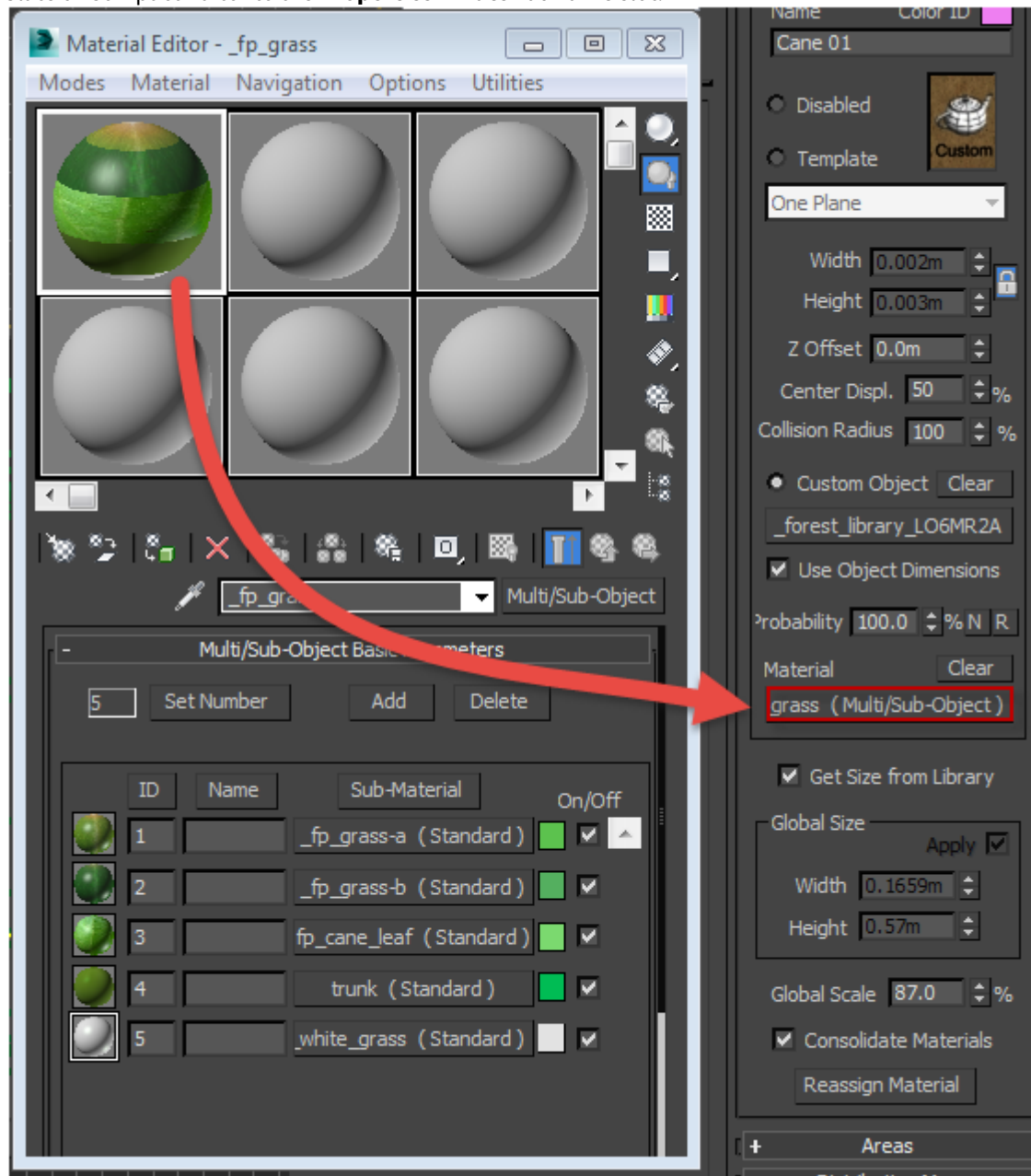
- Adjust the **Global Scale** value, measured as a percentage of either the items original size, or as set in the Properties > Width and Height parameter. The default scale value is 100%.

### To assign a color ID:

1. Select an object from the Items List.
2. Click on the Color ID color swatch to open the 3DS Max color picker.
3. Select a new color and click **OK**.
4. Turn on **Display > Viewport > Use Color ID** to display the color in the viewport, or see the [Distribution Map](#) reference to see how to use Color IDs in conjunction with RGB maps to place items.

To assign a material to an object:

- To apply a material to an object in the Items List, select the item from the list then drag a material from the Slate or Compact Editor to the **Properties > Material Name** slot.




To rebuild materials if accidentally overwritten:


- Since any object in Max can only have one material applied, Forest Pack Pro automatically creates a Multi/Sub object material based on the materials assigned to each individual item in the Geometry List. If accidentally overwritten or lost, simply press **Reassign Material** to recreate the Forest auto-material.

To adjust the probability of an object being used:

Either

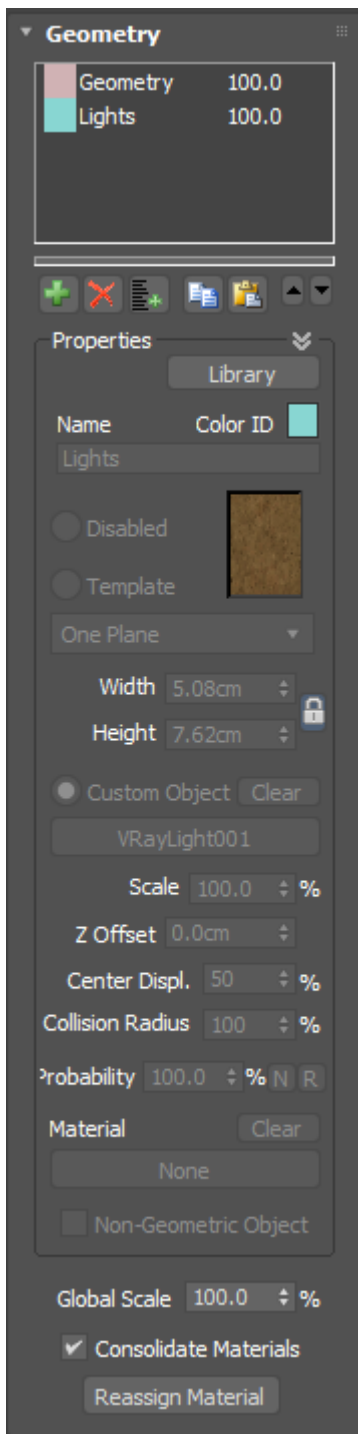
- To manually adjust the chance of an item from the geometry list being selected change the Properties>Probability percentage the value will be displayed next to the name in the items list. The percentages are normalised automatically behind the scenes, however, if you wish to display these values, click  (Normalise).

or

- To create randomised values for all objects in the Geometry List, click  (Randomize).









### 6.3.3 Interface



#### Geometry List

Description of the geometry list

	Add object to the Geometry List
	Remove selected object(s) from the Geometry List
	Add multiple objects to the Geometry List
	Copy selected object(s)
	Paste objects(s)
	Move selected object(s) up/down

## Properties group

### Library

Opens the [Forest Library](#) allowing you to import individual 3d meshes, billboards and complete presets.



Sorry, the widget is not supported in this export.  
But you can reach it using the following URL:

<http://www.youtube.com/watch?v=6Tg4A1QYU3M>

### Get Size from Library

When on an item will inherit Width, Height, Z Offset, and Center Displacement values from the library. When unselected only the material is imported.



In Forest Pack 4.3 this option is removed and enable by default

### Color ID

Used to define the color of items in the viewport when [Display](#) > Viewport > Use Color ID is active. This parameter can also be used in conjunction with [Image Mode](#) > Diversity > Match Color ID on Map. This mode allows you to place items according to pixel information most closely matching the Color ID on a bitmap or procedural map.

### Name

Shows the name of the selected item. The name updates automatically to match the source geometry but can also be edited manually.

### Disable

Disables geometry for the selected item. This is not the same as deleting the item, it will still be taken into consideration as part of the scatter algorithm, but will not render leaving a space.

## Template

Use a predefined geometry template from the drop-down list. Used for billboards, for 3d geometry use the [Forest Library](#)


It is possible to create your own templates by editing an *index.dat* text file and using standard Max scenes for the meshes, see [Installation and customisation](#) for details.

## Custom Object

Use a custom mesh. Click this button to select the source object from the scene. when an object is selected the button will display the source name, otherwise it will return *None*. To delete references to the source, click Clear.

## Use Object Dimensions


When on, objects use the size of the source object. When off the size is defined by the Width and Height values.

 From Forest Pack 4.3 this option is removed. To resize custom objects use the **Scale** value.


## Scale **Forest 4.3 and above Only**

Set the scale of a custom object. Measured as a percentage of its original size.

## Width

Set the width of Billboards. (use  to constrain proportions)

## Height

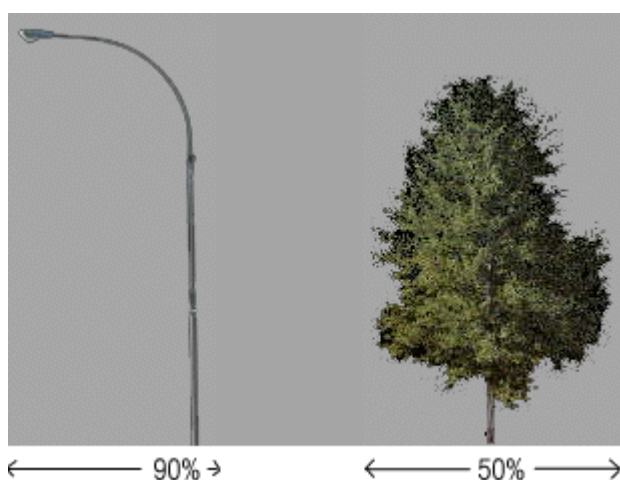
Set the height of Billboards. (use  to constrain proportions)

## Z Offset

Sets an offset value on the Z Axis, measured in scene units.

## Center Displace

Adjust the lateral pivot position. Useful when using billboards which can rotate on the Z axis to keep them facing toward the camera. Use this value to adjust the rotation point for textures that require an offset pivot.



### Collision Radius

Defines the collisions radius for the selected item. This value is multiplied by the global radius parameter found in the [Distribution Map](#) rollout, to compute the distance between objects to detect a collision.

### Probability

Defines a percentage probability that the item will be selected in the random distribution. If the sum of all the probabilities in the Geometry List exceeds 100%, the values are normalized internally by the distribution algorithm. You can also use the **N** to normalize the list manually and **R** to randomize the values.

### Material

Used to assign a material to the selected item.

#### **Forest Pack Auto-Material**

Forest needs to build a single multi-sub object material combining all the materials applied to the items in the Geometry List. Because creating this material and correctly assigning the material IDs manually would be a complex and time consuming procedure, Forest performs this action automatically.

Subsequently applying materials to items is very different compared with the normal workflow in 3DS Max. The material is NOT applied directly to the object using the Material Editor, but instead selected as a parameter in the Geometry rollout, using the "Material" pick button.


For Custom Objects, if material is not specified, Forest uses the material assigned to the source object.

If you accidentally assign another material to a Forest object, use the "Reassign Material" button to recover the auto-material.

### Non-Geometric Object

Enable this when scattering a non-geometric object but Forest Pack has detected it as standard geometry.

### Global Size group

 In Forest Pack 4.3 this option is removed although these parameters can still be accessed using maxscript using ("*globsize*", "*width*", "*height*")

### Apply

When on, all items take the Height and Width defined in the Global Size group settings. When off Items use their individual height and width settings

### Width

Defines the global width value.

### Height

Defines the global height value.

## Global Scale

Applies a global scale factor to all items in the Geometry List.

## Consolidate Materials

Is possible to disable the automaterial feature and assign the materials manually, although is not recommended. For this, uncheck the "Consolidate Materials" parameter in the Geometry rollout.

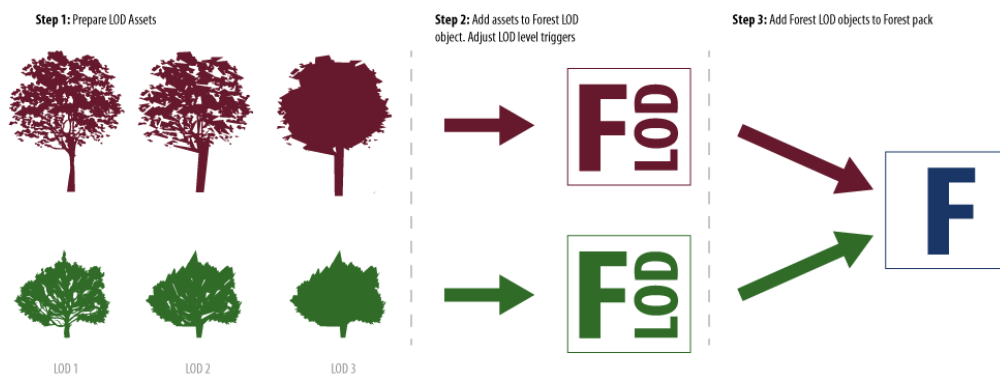
# 6.4 Forest LOD

## 6.4.1 Overview

Forest LOD allows you to switch geometry objects based on their distance from the camera or their size in the render view. The most common use for this feature is to create Level of Detail models so that less complex models and materials can be used further from the camera to help speed up renders.

Using LOD models with Forest Pack requires a slightly different workflow from using standard geometry objects.

1. Instead of a single model for each object, LOD models require 2 or more models. Each of these optionally can have unique materials.
2. Models are added to a **Forest LOD** object. From here you can configure the trigger distance or size to switch between models, assign materials and blur the transition between LOD levels.
3. Finally the Forest LOD object is scattered by adding it to the [Geometry List](#) inside a Forest Pack object. From here it is also possible to override the distances used to calculate the trigger points directly from the [Camera Rollout](#).


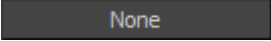



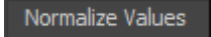
## 6.4.2 Procedures

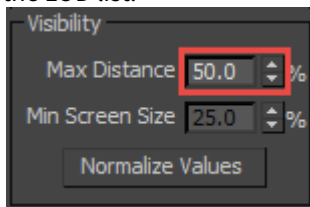
To create LODs based on distance from the camera

1. Go to **Create > Itoo Software > Forest LOD** and click and drag to create a new Forest LOD object in the viewport.

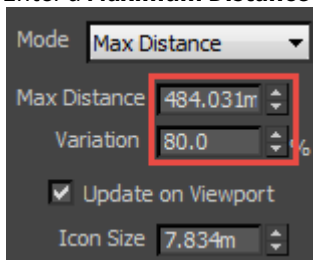



2. Add the objects to the Forest LOD object. To add a single object click on , select **Custom Object**, Click  and pick an item from the scene. To add multiple objects click  and pick 1 or more items from the **Object Picker**.
3. Add **Visibility > Max Distance** values for each LOD level. The lower the value the closer to the camera, so the more complex models should have the smaller values. See [below](#) for a more detailed explanation.

Alternatively you can click  to automatically create values based on the object's order in the LOD list.

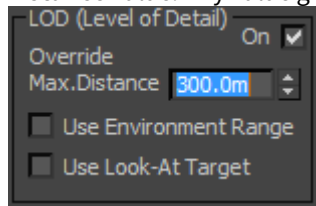


4. Enter a **Maximum Distance** value. This defines the distance range over which the LOD effect is calculated.



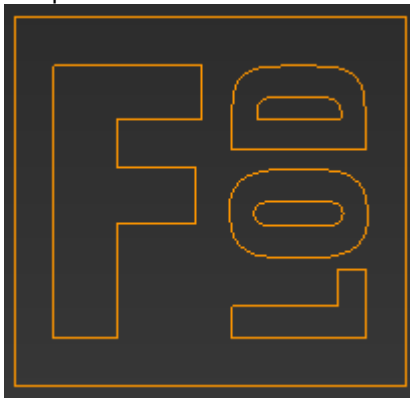
5. Add **Variation** if necessary to blur the transition between LOD levels.
6. Select or create a new Forest Pack object. Go to the [Geometry Rollout](#), click on  and select the Forest LOD object from the scene. There is no limit on the number of LOD objects that can be used.


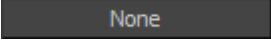

- If you want to override the maximum distance settings, go to the [Camera Rollout](#) and increase the **Max Distance** value. Any value greater than 0 will override the settings used in the Forest LOD object.

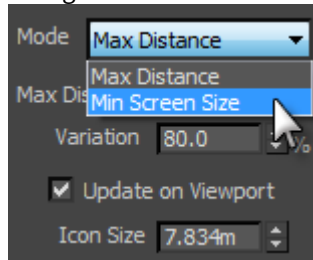


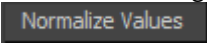
To create LODs based on screen size

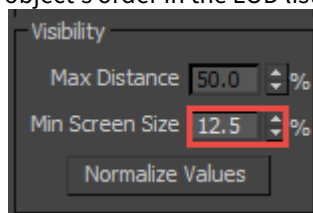
- Go to **Create > Itoo Software > Forest LOD** and click and drag to create a new Forest LOD object in the viewport.



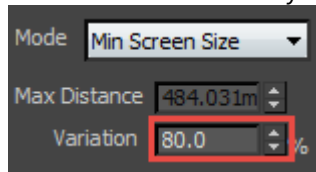
- Add the objects to the Forest LOD object. To add a single object click on , select **Custom Object**, Click  and pick an item from the scene. To add multiple objects click  and pick 1 or more items from the **Object Picker**.
- Change the mode to **Min Screen Size**.




- Add **Visibility > Max Min Screen Size** values for each LOD level. The higher the value the closer to the camera, so the more complex models should have the larger values. See [below](#) for a more detailed explanation. Alternatively you can click  to automatically create values based on the object's order in the LOD list.



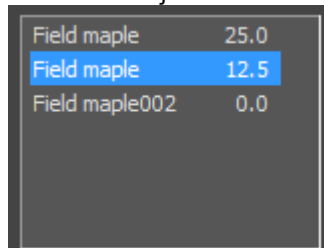
5. Add **Variation** if necessary to blur the transition between LOD levels.



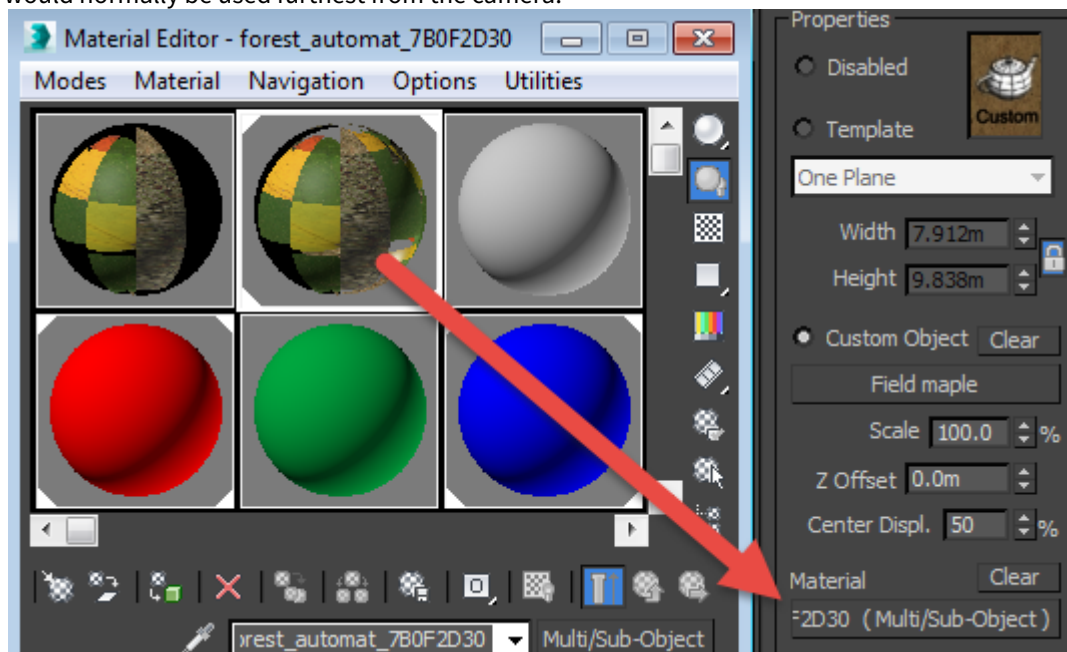
6. Select or create a new Forest Pack object. Go to the [Geometry Rollout](#), click on  and select the Forest LOD object from the scene. There is no limit on the number of LOD objects that can be used.

### To assign materials to LOD levels

1. Click on an object from the **LOD List**.



2. Drag a material from the Material Editor to the **Material** slot in the **Properties** group. Simpler materials would normally be used furthest from the camera.

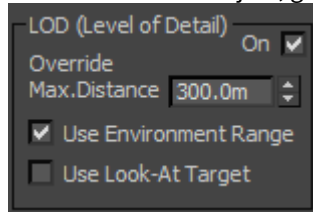


3. Repeat for each object in the LOD List. Alternatively if you have a unique object for each LOD level, you can apply materials directly to the source geometry.

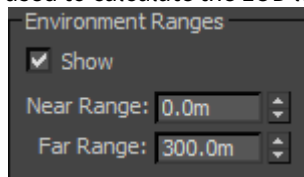


## To set Maximum Distance from a camera's Environment Range

1. In the Forest Pack object, go to the [Camera](#) rollout and turn on **Use Environment Range**

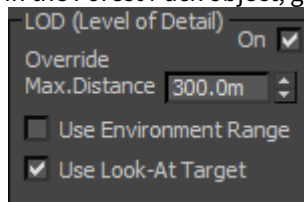


2. Select the camera and you can now use the **Environment Ranges** values to define the Maximum Distance used to calculate the LOD levels.

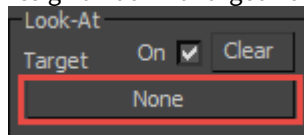


## To use a Custom Look-At Target

1. In the Forest Pack object, go to the [Camera](#) rollout and turn on **Use Look-At Target**.

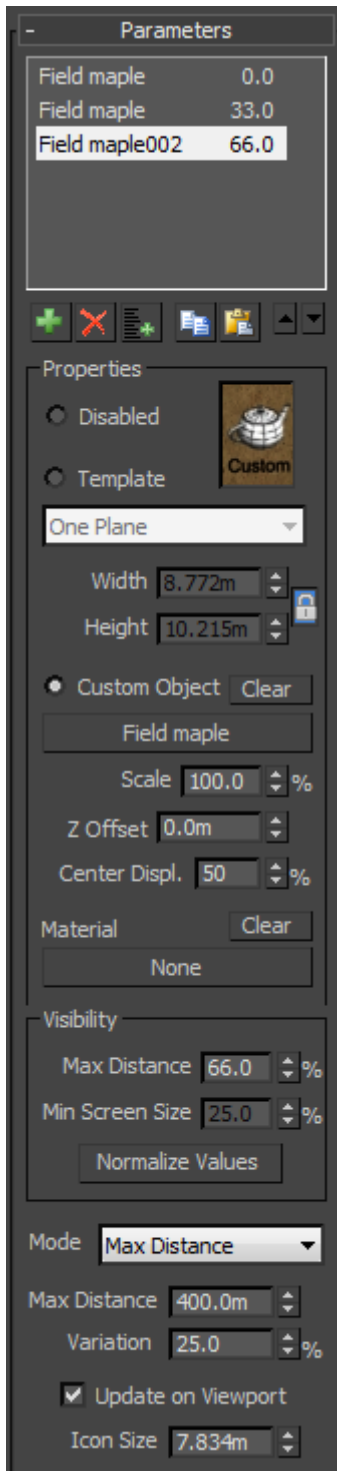


2. Assign a Look-At Target from the **Look-At** group



3. Adjust the Max Distance. this will now be calculated radially from the Look At object.

### 6.4.3 Interface



#### LOD List

Use this list to add LOD levels for the current object. Each item on this list represents a single LOD level. The number next to the name shows the percentage of either the distance from the camera or the screen size at which this level becomes active.

To add geometry use the following buttons:

	Add object to the LOD List
	Remove selected object(s) from the LOD List
	Add multiple objects to the LOD List
	Copy selected object(s)
	Paste object(s)
	Move selected object(s) up/down

#### Properties

##### Disabled

Disables geometry for the selected item. This is not the same as deleting the item, it will still be taken into consideration as part of the scatter algorithm, but will not render, leaving a space.

### Template

Use a predefined geometry template from the drop-down list. Used for billboards.

### Custom Object

Use a custom mesh. Click this button to select the source object from the scene. when an object is selected the button will display the source name, otherwise it will return *None*. To remove references to the source, click Clear.

### Scale

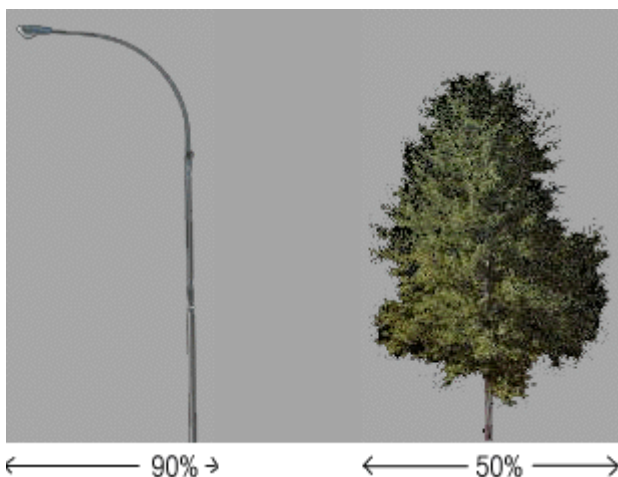
Allows you to proportionately scale the geometry as a percentage of its original size.

### Z Offset

Sets an offset value on the Z Axis, measured in scene units.

### Center Displace

Adjust the lateral pivot position. Useful when using billboards which can rotate on the Z axis to keep them facing toward the camera. Use this value to adjust the rotation point for textures that require an offset pivot.



### Material

Used to assign a material to the selected item. Each LOD level can use a different material

### Visibility

The visibility group is used to control the point at which the LOD object switches between levels.

### Max Distance

Used to set the trigger distance for each LOD level. Measured as a percentage of the Maximum Distance value. An object is used when it exceeds this distance. If more than one LOD is eligible, the one nearest the current distance value is used.

### Min Screen Size

Used to set the trigger size for each LOD level. Measured as a percentage of screen size as viewed from the active camera. An object is used when its size exceeds this value.

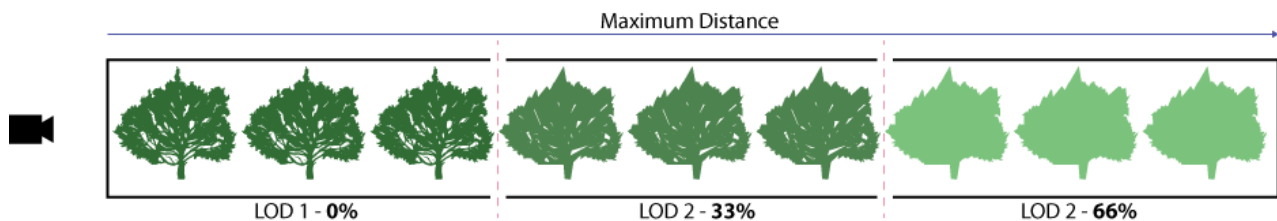
## Normalize Values

Click this to automatically assign values to Max Distance or Min Screen Size for all LOD levels. This function used the order of the objects in the LOD list to automatically calculate evenly distributed values.

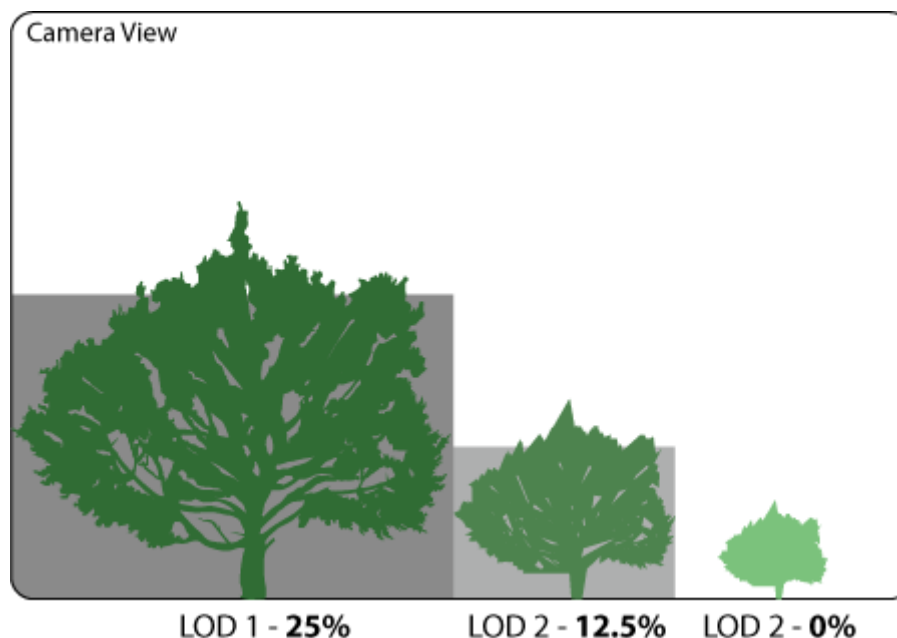
## Mode

There are two modes:

- **Maximum Distance.** This is the default mode and uses a distance measured in scene units radially from the active camera, or optionally a manually assigned custom look-at target. An LOD level is triggered when its distance from the camera exceeds the percentage specified by the **Visibility > Max Distance** value. In the illustration below LOD 1 is set to 0% so displays immediately. LOD 2 is set to 33% and so becomes active and replaces LOD 1 when an object's distance from the camera is a third of the maximum distance. Finally all objects displayed further than 66% of the maximum distance from the camera are replaced with LOD 3.

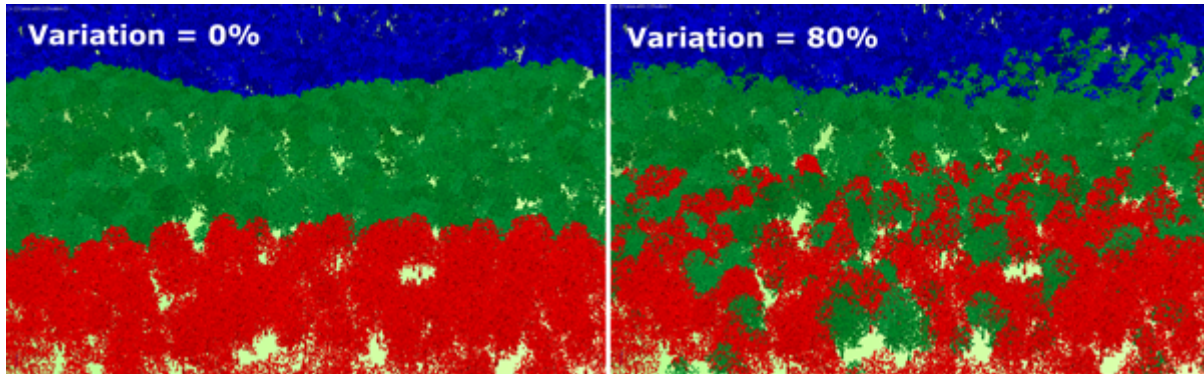


- **Minimum screen size:** This mode use the scatter object's size in the camera view to switch between LOD levels. This is measured by comparing the diagonal length of the bounding box to the diagonal length of the screen. In the illustration below LOD level 1 is set to appear only if the tree's diagonal length is greater than **25%** of the screen's diagonal. LOD 2 appears if the diagonal is **below 25%** but **above 12.5%**, and finally LOD 3 will appear when it's diagonal length is **below 12.5%** to infinity.



## Variation

Use this to add randomness to the Maximum distance or screen size settings creating a blurred boundary between LOD levels. This helps to disguise the transition from one LOD level to another and reduces obvious popping when rendering animations.



### Update on Viewport

When On, LOD effects will be visible in the viewport. When off LOD effects are only visible at render time.

### Icon Size

Used to set the size of the Forest LOD icon.

## 6.5 Areas


### 6.5.1 Overview

The areas rollout is used to define boundaries within which items from the [Geometry](#) list are scattered. There are 5 types of areas that can be used in combination in a single Forest object:

- Splines.
- Objects
- Forests
- Paint.
- Surfaces.

Depending on the type, an area can be set to either Include or Exclude scatter items. Include is an additive mode that creates items within the region, Exclude is subtractive, removing items from the region. The table below illustrates the modes available for each area type.

Area Type	Include	Exclude
Spline	✓	✓
Object		✓
Forest		✓
Paint	✓	✓

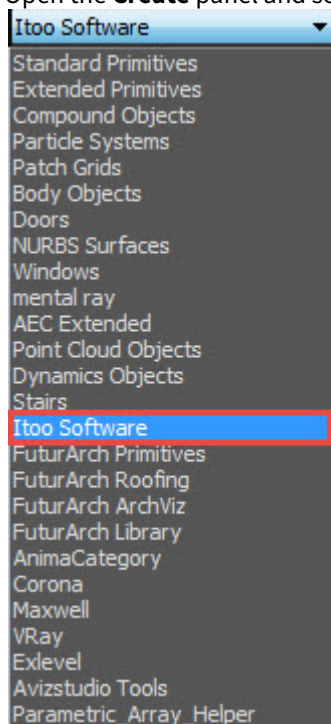
Area Type	Include	Exclude
Surface		

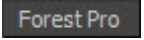
[Surfaces](#) allow you to scatter items on uneven surfaces, it is possible to toggle surface on and off from the areas rollout but adding new surface areas and editing the parameters is handled in a the [Surfaces rollout](#).

## 6.5.2 Procedures

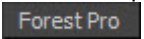
To create a new Forest object based on a spline

1. Open the **Create** panel and select **iToo Software** from the object subcategory list.




2. Click  and then click any spline in the viewport.
3. Open the **Modify** panel and make any necessary adjustment to the spline's settings from the **Area** rollout.


To create a new Forest object based on a surface

1. Open the **Create** panel select **iToo Software** from the object subcategory list.
2. Click  and then click a surface in the viewport.
3. Open the **Modify** panel and make any necessary adjustment to the settings from [Surface](#) rollout.


To add a new closed spline area



1. Open the **Areas** rollout.
2. Click  found below the Areas List.
3. Pick a closed spline from the scene.

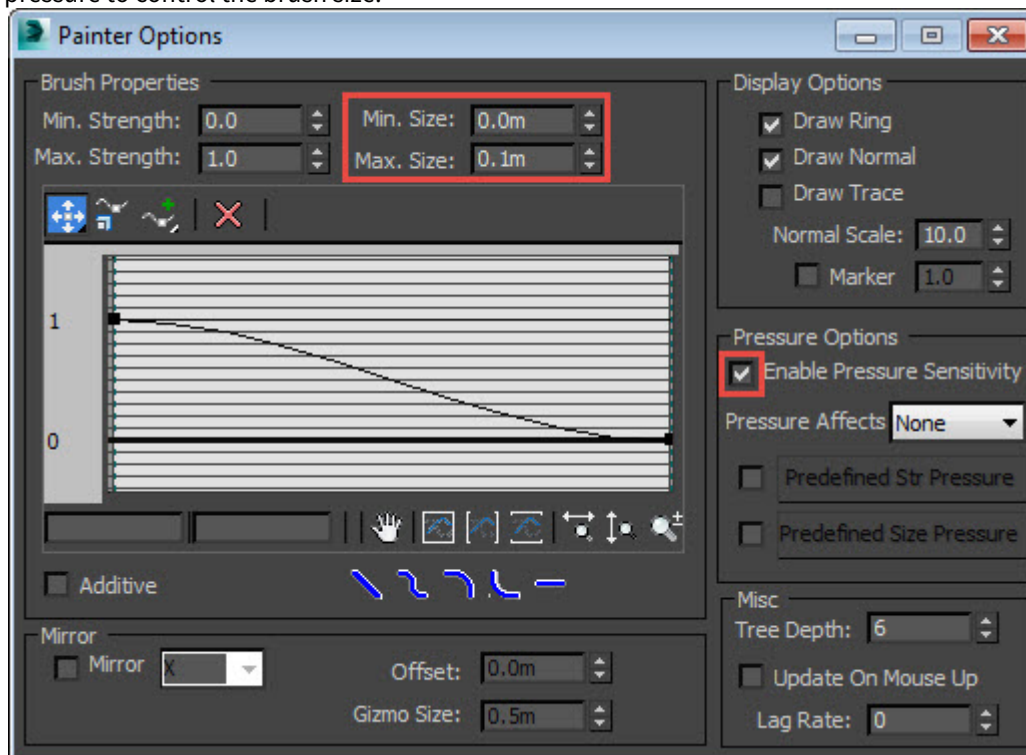
### To add a new open spline area


1. Open the **Areas** rollout.
2. Click  found below the Areas List.
3. Pick an open spline from the scene.
4. Adjust the **Thickness** value to define the width to scatter objects either side of the spline.

### To add a new paint area


 To use a paint area you must also have a [Surface](#) area set to XY mode but this should be switched off in the Areas list to restrict the scatter to only the painted regions.

1. Open the **Areas** rollout.
2. Click  found below the Areas List.
3. Click  to open the Painter Settings.
4. Set the **Min** and **Max** brush size, if you are using a tablet turn on **Enable Pressure Sensitivity** to use pen pressure to control the brush size.



5. Click  and paint on the surface in the viewport.





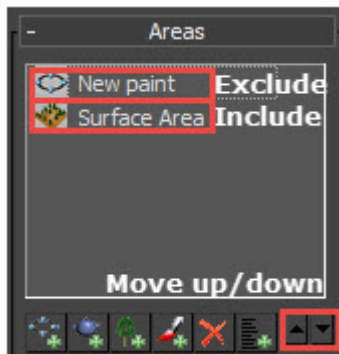
6. Click  and paint on the surface in the viewport to erase paint areas.


### To convert a paint area to splines

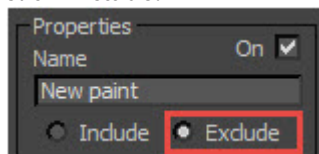
1. Click **Convert to Spline**.
2. Modify the spline using 3DS Max's standard spline modelling tools.
3. If necessary, click **Convert to Paint** to restore the spline to a paint area (This can be done with any spline object).

### To exclude scattered items using splines

- i** In order to work correctly, exclude areas need to be above an include area in the Areas List. To change the order of areas use  .




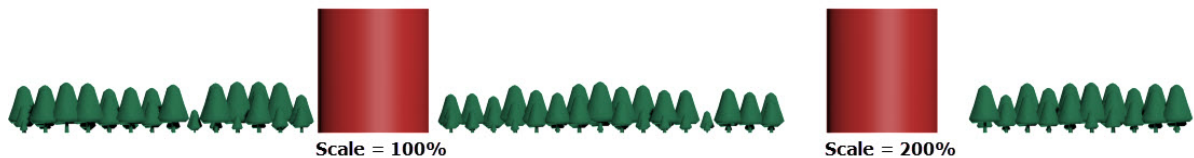
1. Open the **Areas** rollout.
2. Click  found below the Areas List.
3. Pick a spline from the scene, if it is an open spline enter a **Thickness** value.
4. Click **Exclude**.






## To exclude scattered items using an object

1. Open the **Areas** rollout.
2. Click  found below the Areas List.
3. Pick any geometry object from the scene. Where the object overlaps an include area the scatter items will be removed.
4. To improve accuracy for large scenes increase the **Resolution** value (default is 512px).
5. To Increase or decrease the distance between scattered items and the object, adjust the **Scale** value.



**i** You can also use groups but this is recommended only when the objects are close together. If you need to use multiple objects that are a large distance apart, assign each one as a separate area.

## To exclude scattered items using another Forest object

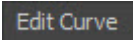
1. Open the **Areas** rollout.
2. Click  found below the Areas List.
3. Select a Forest object from the scene.
4. Adjust the **Scale** value if necessary to change the exclusion size around each tree.
5. Change **Falloff > Exclude** values for Density and scale (see below).

### To create a separate region around the base of each tree.

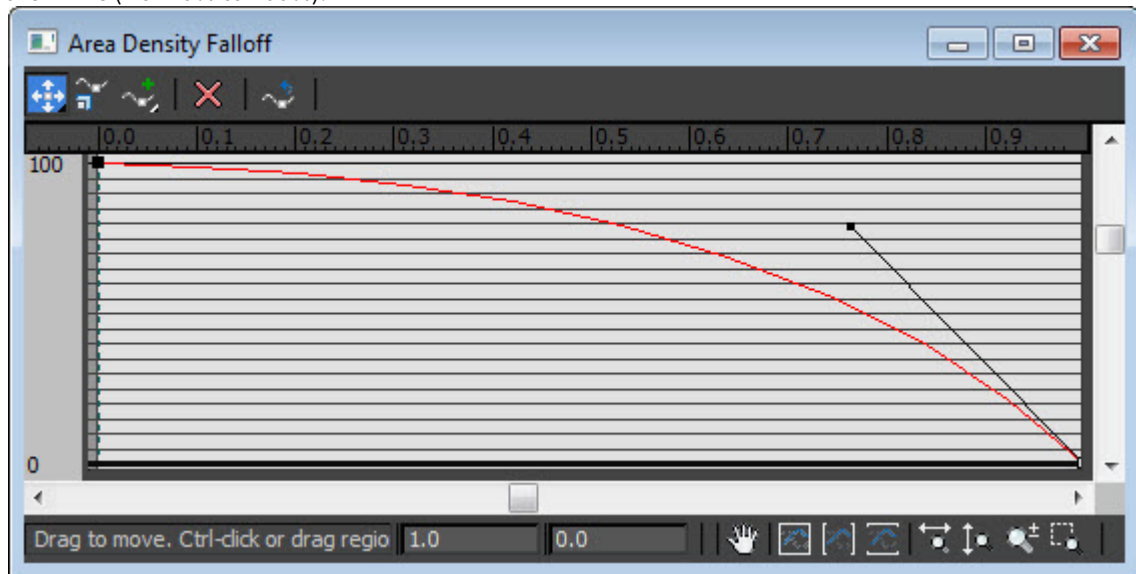
1. Clone the Forest Object use in the last steps
2. Select the the Forest area from the list and click on **Invert Curve**.
3. Adjust falloff, [Add Geometry](#) items and [Image Mode](#) as required.

## To add scale and density falloff along a boundary

Using falloff controls it is possible to affect the density and scale of objects near an area's boundary.

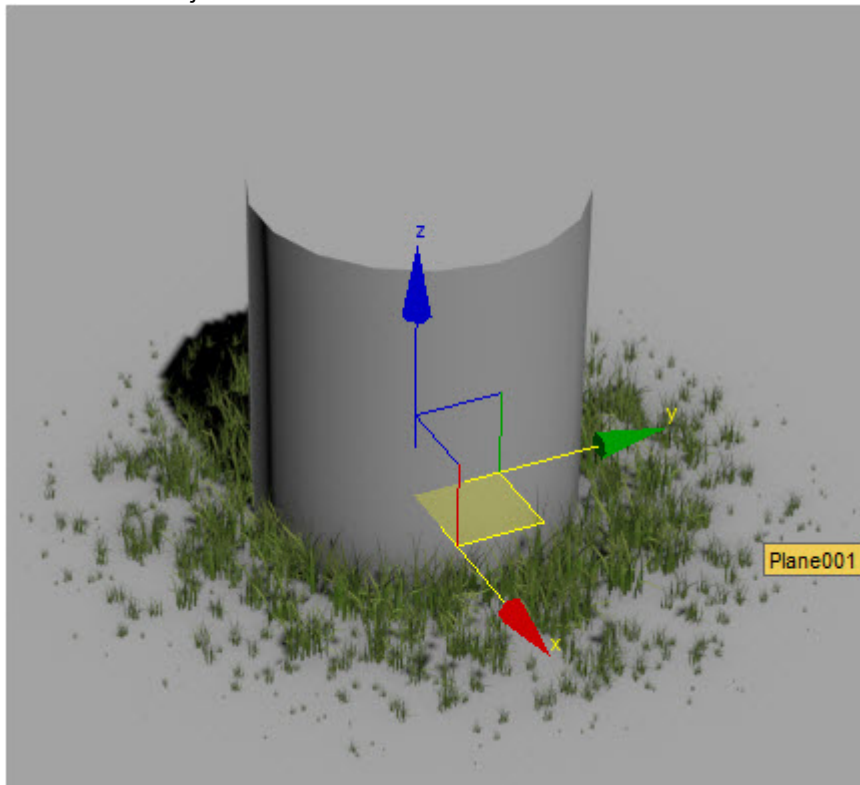
1. Click **Falloff > Density** and **Falloff > Scale**.
2. Enter **Include Range** values to define the distance affected measured from an include area's boundary.
3. Enter **Exclude Range** values to define the distance affected measured from an exclude area's boundary.
4. The default falloff setting is linear, to change the falloff curve click .

5. The falloff graphs have the range on the X Axis (from 100% to 0 %) and the Scale or Density percentage on the Y Axis (from 0% to 100%).



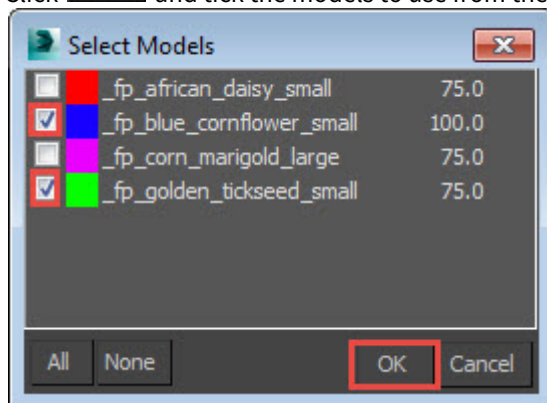
To add scatter items around the perimeter of an exclude object

1. Add a Spline, Paint or Surface include area.
2. Add an **Exclude** area above the include area in the Areas list.
3. Turn on **Falloff > Density** and/or **Falloff > Scale** and enter an **Exclude Range** value.
4. Click **Invert Curve**. This will reverse the effect of the falloff curve generating items only around the perimeter of the exclude object.



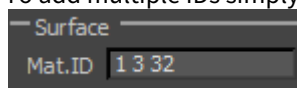
To override the geometry used in an individual area

1. Select the Area to parameterise from the **Areas List**.
2. Click **Plants > Select Models**.
3. Click **Pick** and tick the models to use from the **Select Models** menu. Click **OK**.



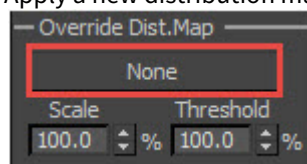
## To limit the scatter using material IDs

1. For this feature to work, a Surface must be assigned in the [Surface](#) rollout and Forest must be set to **X/Y Mode**.
2. In the **Mat. ID** list box, enter the Material ID numbers of the faces you wish to use to scatter objects
3. To add multiple IDs simply add a list, ensuring there is a space between each value.



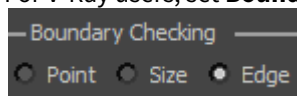
## To override the distribution map used in an individual area

1. Adjust the scale of the distribution map by adjusting **Override Dist. Map > Scale**.
2. Adjust the density of the distribution map by adjusting **Override Dist. Map > Threshold**.
3. Apply a new distribution map to the selected area by dragging a map to the **Distribution Map Slot**.



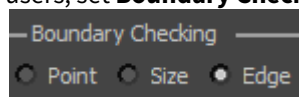
## To prevent scattered items from "leaking" outside an area perimeter

- For V-Ray users, set **Boundary Check** mode to **Edge**.



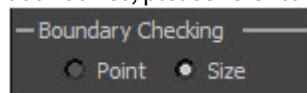
⚠ Please be aware that Edge Mode is not compatible with V-Ray proxies. If you wish to reduce file sizes and use Edge Mode it is recommended to use XRef objects instead.

- For Mental Ray and Corona
  - a. users, set **Boundary Check** mode to **Edge**.

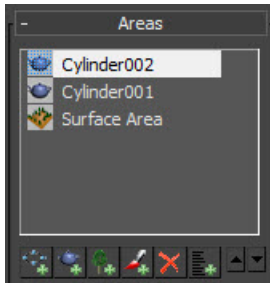


- b. Add a **Forest Edge** map to the **Opacity** or **Cutout** map slot of all the object's materials. You can automate this process for objects with large numbers of materials using the [Material Optimiser](#) tool.

- For all other renderers, set **Boundary Check** mode to **Size**. To create large areas with well defined boundaries, please refer to the [Grass Edges](#) tutorial.



## 6.5.3 Interface



### Areas List

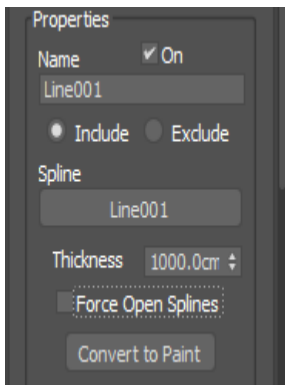
The areas list details all the items being used to define the scatter region. The order is important, areas are processed from the bottom of the list upwards, an exclude area will only affect areas that are below it in the geometry list.



- The areas are not available when working on [Custom Edit](#) mode or using [UV Surfaces](#).
- It is important not to overlap multiple Include areas. Overlapping areas duplicates geometry and the issue is not always obvious in the viewports, but you may get strange results in the render because of the coplanar faces.

Icon	Name	Description
	Add spline area	Adds an include/exclude area defined by a spline object.
	Add object area	Adds an exclude area defined by a geometry object.
	Add forest area	Adds an exclude area defined by a Forest Pack object.
	Add paint area	Adds an include/exclude area by painting a spline using the mouse or tablet
	Delete selected area	Removes the selected area.
	Add multiple areas	Adds multiple areas from a list.
	Move up	Move the selected area up.
	Move down	Move the selected area down

Selecting an area from the list will change the available options in the Properties group. Some properties are common to all types of areas, while other are unique:



## Spline Area Properties

### On

When active turns the current area on. If unselected the area will be ignored when calculating the scatter regions.

### Name

The name of the area. Default behaviour is to inherit the name of the source object but it can also be edited manually.

### Include

When active the area creates items within the region defined by the spline.

### Exclude

When active the area removes items within the region defined by the spline. Only items generated by areas below it in the Areas List will be affected.

### Spline

Displays the name of the selected spline. Click this to pick a new spline from the scene.

### Thickness

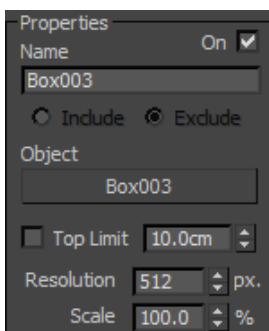
Used with open splines to define the width of the path in which items are scattered.

### Force Open Splines

When enabled, all splines in the Area are treated as open splines. A distance either side of the spline is determined using the Thickness parameter.

### Convert to Paint

Converts the Spline area to a Paint area.



## Object Area Properties

Object areas allow you to use any geometry to exclude scattered objects. Object areas are optimised for high polygon models and work by generating a black and white bitmap map by projecting the geometry onto the surface along the world Z axis.

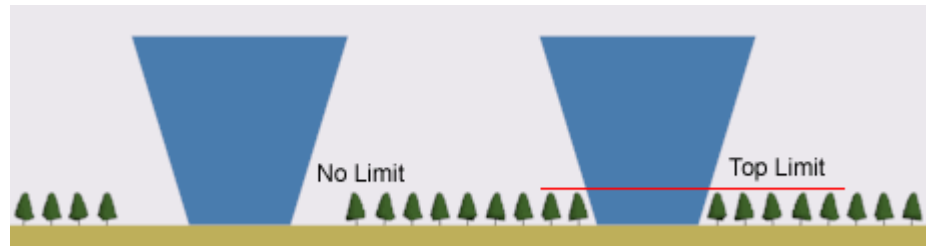
### Object

Displays the name of the assigned objects. Click this to pick a new object from the scene.

### Top Limit

Defines a height above which the object's geometry is ignored when calculating the exclusion map. This feature is typically used for objects that are wider at the top than

at the bottom.

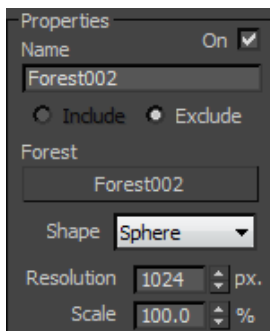


### Resolution

Defines the size of the bitmap. Higher numbers result in greater accuracy typically required when using large models. Default value is 512px.

### Scale

Scales the exclusion effect. Values of less than 100% will move scattered items closer to the object, values greater than 100% will push scattered items away from the object.



## Forest Area Properties

Forest objects work in a similar way to Object areas allowing the use of a Forest object to create an exclude area.

### Forest

Displays the name of the assigned Forest object. Click this to pick a new forest from the scene.

### Shape

Select from Sphere or Mesh to define the geometry used to create the exclusion effect. Sphere uses a virtual bounding sphere that is much faster though less accurate. The size of the sphere can be adjusted using the Scale value of the area or by changing the Collision Radius parameter for the Items found in the [Geometry Rollout](#).

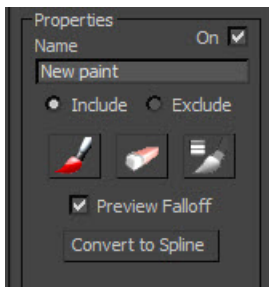
Mesh mode uses the full geometry to calculate the exclusion effect. The approach is more accurate but can be slower when using dense geometry.

### Resolution

Defines the size of the bitmap. Higher numbers result in greater accuracy typically required when using large models. Default value is 512px.

### Scale

Scales the exclusion effect. Values of less than 100% will move scattered items closer to the object, values greater than 100% will push scattered items away from the object.



## Paint Area Properties

Paint areas allow you to paint include and exclude regions with a mouse or tablet directly onto the terrain. Paint areas require a [Surface](#) set to XY mode.

### Include

When active the area creates items within the region defined by the spline.

### Exclude

When active the area removes items within the region defined by the spline. Only items generated by areas below it in the Areas List will be affected.



Paint

Paint on a surface in the viewport to add to the current area.



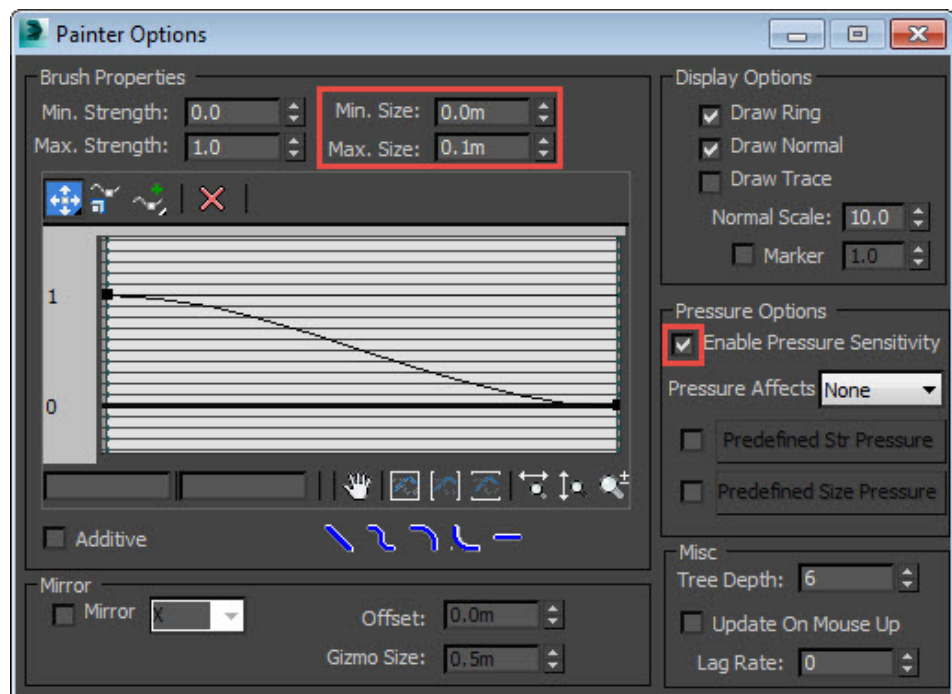
Erase

Paint on a surface in the viewport to subtract from the current area.



Settings

Click to open the brush settings. From this menu you can adjust the size and pressure sensitivity of the brush and erase modes.



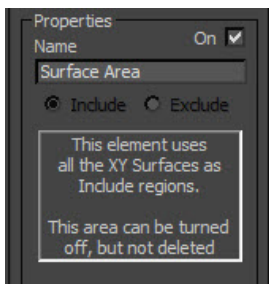


### Convert to Spline

Converts the Paint area to a Spline area.

### Preview Falloff

When active the falloff effect is visible while painting (enabled by default).



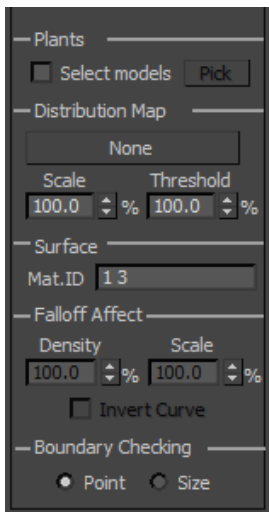
### Surface Area Properties

Due to the large number of options the majority of the surface areas settings are found in a separate [Surfaces rollout](#). They do however display in the Areas List and can be toggled on or off from the Areas rollout.

#### On

Turns the surface on or off.

**i** Surfaces are often used to define the scattered item's position on the Z axis in conjunction with splines and paint areas to define the region on the X and Y axes. Occasionally you may find that the full terrain is filled with items, even though there are spline areas in the Items List. If this is the case the usual problem is because the Area is on, when using surfaces with other Include areas it is important to turn the Surface off.



### Common Properties

These properties are found in all area types.

#### Select Models

When active the selected area uses a subset of the models from the [Geometry list](#) defined in the Pick menu

#### Override Distribution Map

Used to override the global distribution map.

#### Scale

Scales the distribution map only for the selected area.

#### Threshold

Adjusts the threshold only for the selected area.

#### Material ID

Limits the scatter surface to use faces with only the material IDs listed. To use multiple IDs, simply leave a space between them.

#### Falloff Affect

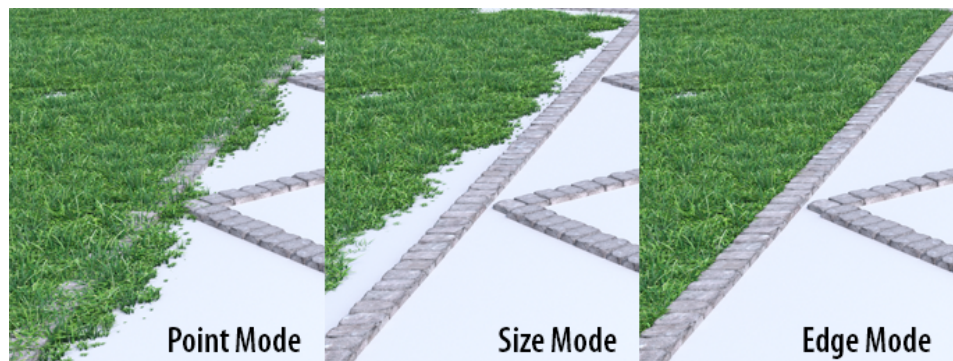
Adjusts the strength of the density and scale falloff curves. Setting this value to zero disables the effect completely.

#### Invert Curve

Inverts the falloff curve. Commonly use to create scatter items around boundaries and the perimeter of exclude areas.

#### Boundary Checking

Forest Pack 4.3 can use 3 potential modes to determine if an object falls outside of the scatter area and is removed.



- **Point:** Uses the item's pivot point to check if outside the scatter area. If true the entire item is removed and you may get overlaps.
- **Size:** Uses the item's width and collision radius to check if outside scatter area. If true the entire item is removed and you won't get overlaps but the boundary can be uneven if the item's size is too large.
- **Edge (V-Ray only):** Uses the lowest Z Vertex of each of the item's individual elements to check if outside the scatter area. If true only the individual element is removed creating a clean edge, without slicing the geometry. Note that when using edge mode, an element is defined as a group of connected faces that share the same material ID. These are the same elements used by [Forest Color](#).

### ⚠ Edge Mode does not preview in viewports

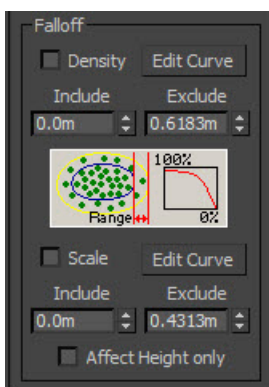
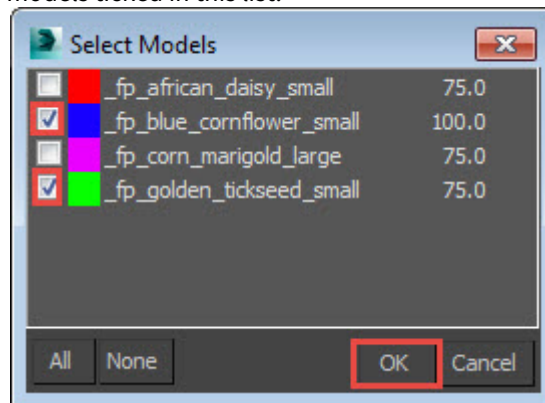
To improve viewport performance edge trimming is calculated only at render time. This means the effects of the this mode will not be previewed in the viewports. However, previews can be enabled by holding down the left CTRL key and clicking on the Edge radio button.



Please be aware that Edge Mode is not compatible with V-Ray proxies. If you wish to reduce file sizes and use Edge Mode it is recommended to use XRef objects instead.

### Pick

Opens the pick menu. When Select Models is active the current area will use only the models ticked in this list.



### Falloff

#### Density

When on, items will change density as they approach a boundary. The distance from the boundary is controlled by the include and exclude range values and the density is defined by a falloff curve.

#### Scale

When on, items will change scale as they approach a boundary. The distance from the boundary is controlled by the include and exclude range values and the density is defined by a falloff curve.

### Include

Sets the range for the falloff effect on the perimeter of Include splines and surfaces.

### Exclude

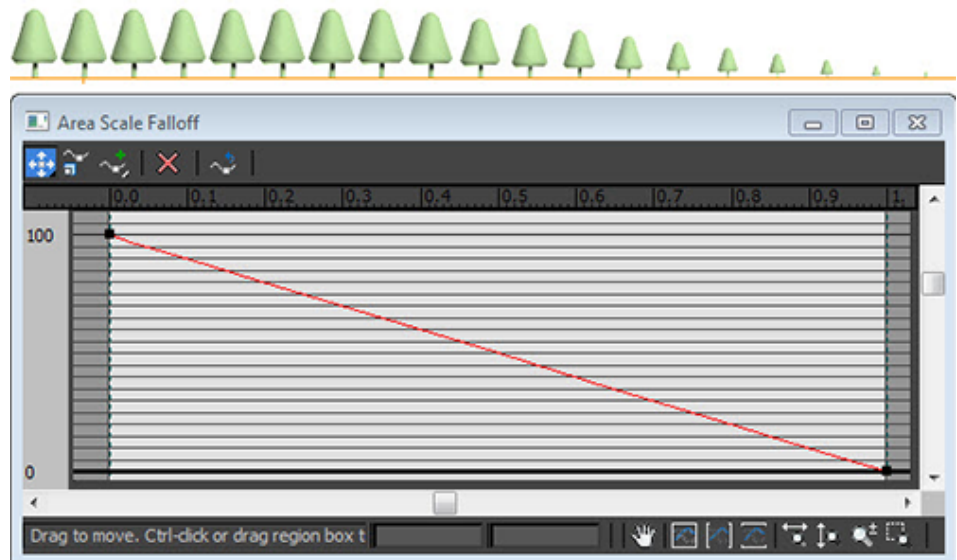
Sets the range for the falloff effect on the perimeter of Exclude objects, forests, and splines.

### Affect Height only

When on the scale falloff effect only affects the height of the items. Dimensions on the X and Y axes remain unchanged.

### Edit Curve

Edits the the falloff curves for the density and scale effect. There are separate curves for scale and density.



## 6.6 Distribution

Forest Pack 6 includes four distribution modes. Image mode is used for traditional scattering in areas, Path mode allows you to distribute items at regular intervals along one or more splines, Reference mode places items on individual marker, and PFlow mode places items on particles. For more information, follow the links below.

- [Image Mode](#)
- [Path mode](#)
- [Reference mode](#)
- [Particle Flow mode](#)

## 6.6.1 Image Mode

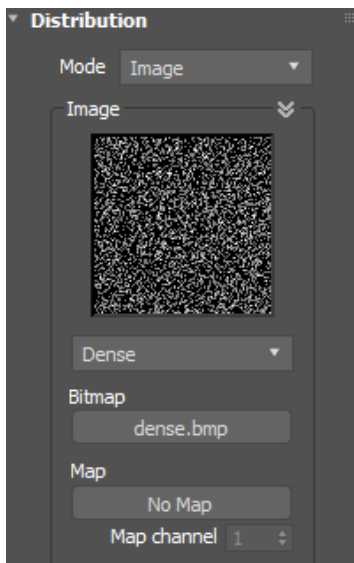
### Overview

This mode allows the user to specify a map to define the distribution of trees within the inclusion area.

To allow for the most flexibility an image is used as a distribution map. Each pixel in the image represents a potential tree position, a white pixels adds a tree, a black pixels leaves a space.

Using this method, it's possible to define nearly any distribution, from random scattering to very regular groups. In addition it is possible to choose which objects are placed either using built-in clustering algorithms or using a colour map.

## Interface



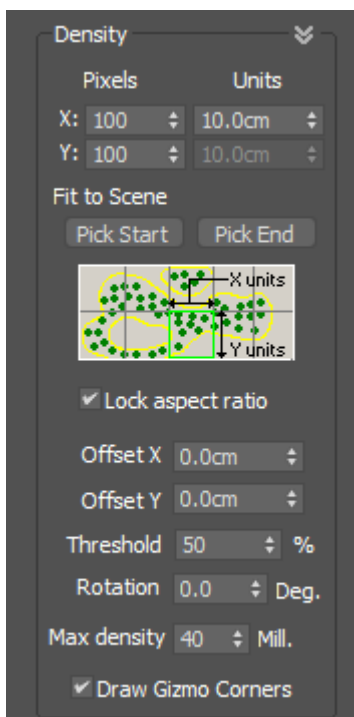
### Image Settings

Forest can use a bitmap or a map as distribution image.

The plugin comes with some standard bitmaps included (Very Scattered, Scattered, Spread 1, Spread 2 and more). A custom bitmap can be selected as well by clicking the button under "Bitmap". The list of bitmaps is user customizable. In C:\Program Files\Itoosoft\forestpackpro\distmaps, there is a text file named "index.dat". It includes a list of the bitmap names and the associated file names.

To use a map, click the 'Map' button and select it from the Material/Map browser. All Max texture types are supported, from static bitmaps to animated noise maps. Use the "Clear" button to remove it.

The "Map channel " parameter is described in the following section.



### Density

Lets the user choose the scale of the distribution map in the scene. The map is applied in a manner similar to the way texture maps are applied in Max. The image is scaled according to the defined size, and tiled in all directions.

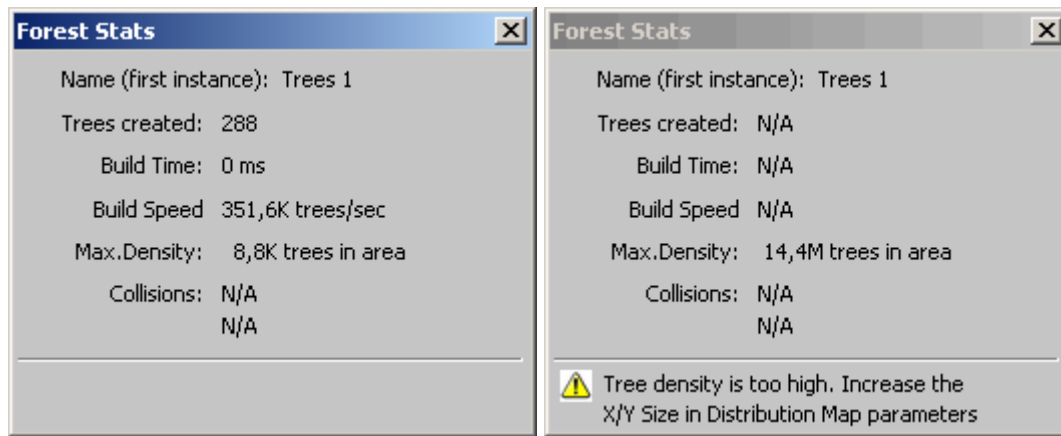
It's important to remember that the perimeter of the forest is always defined by a spline boundary. The distribution map only shows how the trees are arranged within that spline.

### X/Y Units

Defines the size of the distribution map in scene's units. If we use small values, we will see how the density of trees and the number of trees grows. Also, the process time and geometry size of the Forest object is higher. The plugin is optimized for speed, but to further speed up the plugin, here are some recommendations:

- If the bitmap has fewer white pixels (less trees) but you set lower X/Y values, the density will be very high but most of the processing time will be wasted in computing gaps. To increase the density of trees, first set a higher density map, then lower the X/Y parameters. You can see in real-time some build parameters (such as

density, number of trees) with the "Forest Stats" window. Open it clicking the "View Stats" button in the "General" rollout.



The "Stats" windows also alerts the user to some warning conditions such as when the area spline is not assigned, if the density is too high and other conditions.

- There is a limit for the number of trees created in a Forest object. This parameter is defined in the "Display" rollout, and the default value is 500,000. Also, when the resulting mesh has more than 100,000 faces, Forest builds the trees for the viewport using a simplified geometry (adaptive display). All this behavior may be adjusted with the "Display" parameters.

#### X/Y Pixels

These values are used to adjust the density in procedural maps, without modifying the X/Y Units scale. These parameters are locked when using bitmaps, using the number of pixels of the image as default value.

#### Image->Map Channel

As alternative of using the X/Y values to define the density of the distribution map, it's possible to get the scale from the UV coordinates of the surface. This mode is useful to adjust the position of trees in more precise way, using a surface map as reference.

To use this mode, a surface object must be assigned in the "Surface" rollout. The Surfaces can work in two operation modes, XY or UV (defined in the Surface rollout):

- XY mode: the UV coordinates are taken from the map channel defined with this parameter.
- UV mode: the map channel 1 is always used, and this parameter is locked.

#### Fit to scene

Allows the user to fit the map exactly over a position on the scene, automatically adjusting the offset and size values. Use Pick Start/Pick End to select on the scene the position of two opposite corners of the map. This tool is useful for adjusting maps which represent exact positions of elements in the image, such as modified aerial views using a white pixel per tree.

#### Lock Aspect Ratio

Locks the X/Y aspect of the map. When this checkbox is enabled, the Y size for map is ignored and only the X value is used.

### Offset

Adjusts the offset of the map over the scene. Values are in the scene's units.

### Threshold

Defines how the image pixels are converted to black/white levels when the bitmap is in grayscale or color mode.

### Rotation

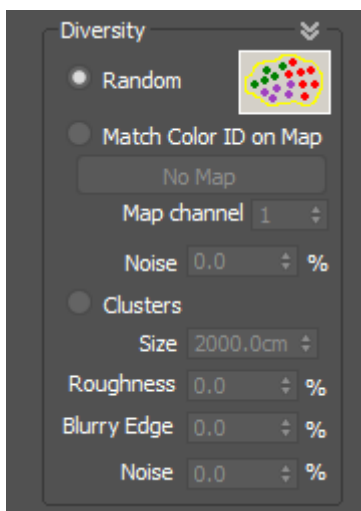
Rotates the distribution map a specific number of degrees.

### Max density

Set the limit of possible tree positions in the area (by default 10 million). Take care: this includes both white and black pixels in the distribution map, so you may reach the density limit using an empty map and low X/Y values, but not get a single tree in the scene.

### Draw Gizmo Corners

Draws the corners of the distribution map to adjust it more easily.



### Diversity Settings

This window defines different modes to select what type of object, from all items defined in the Geometry List, is used when planting a tree for each pixel of the Distribution map.

### Random

Creates plants randomly, using the "Probability" values of the Geometry List. This is the default mode.

### Match Color ID on Map

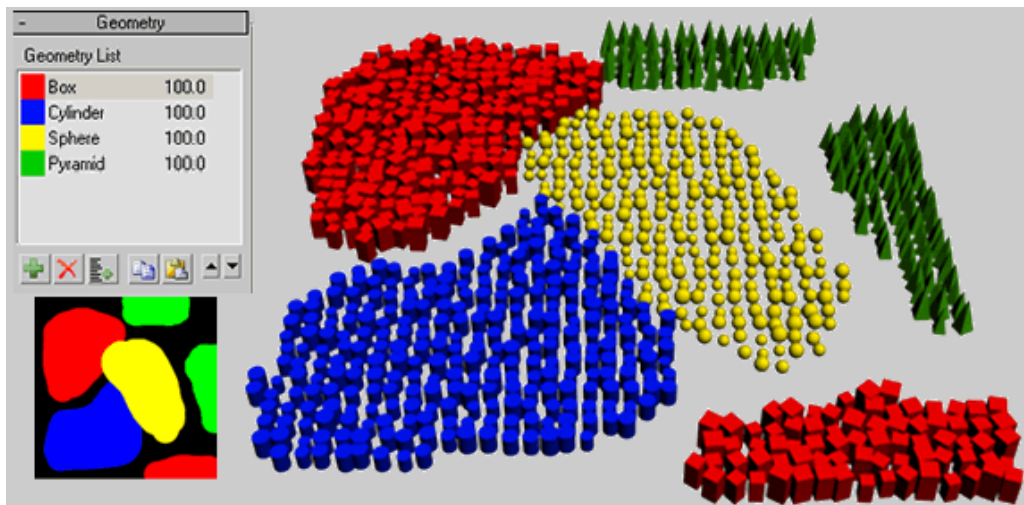
This mode allows you to use coloured distribution maps, where the color of each pixel defines a type of plant. In the scattering process, each pixel of the map is matched with the "Colour ID" values of the Geometry List, taking the most similar.

Note: the "Probability" values of Geometry List items are ignored on this mode.

Although it's not needed that colors be exact, to get the best results is recommended that "Color ID" values are the most similar possible to those used in the map. Also is better to use high contrast colours as red, blue, yellow, green... The gaps (empty positions) can be defined assigning a specific colour with a "Disabled" item of in the Geometry list.

The "Noise" parameter is used to add some random variation to the distribution.





## Clusters

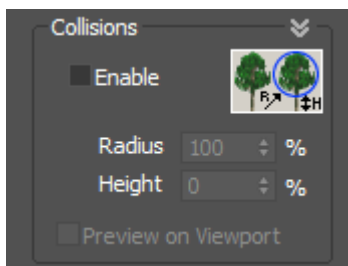
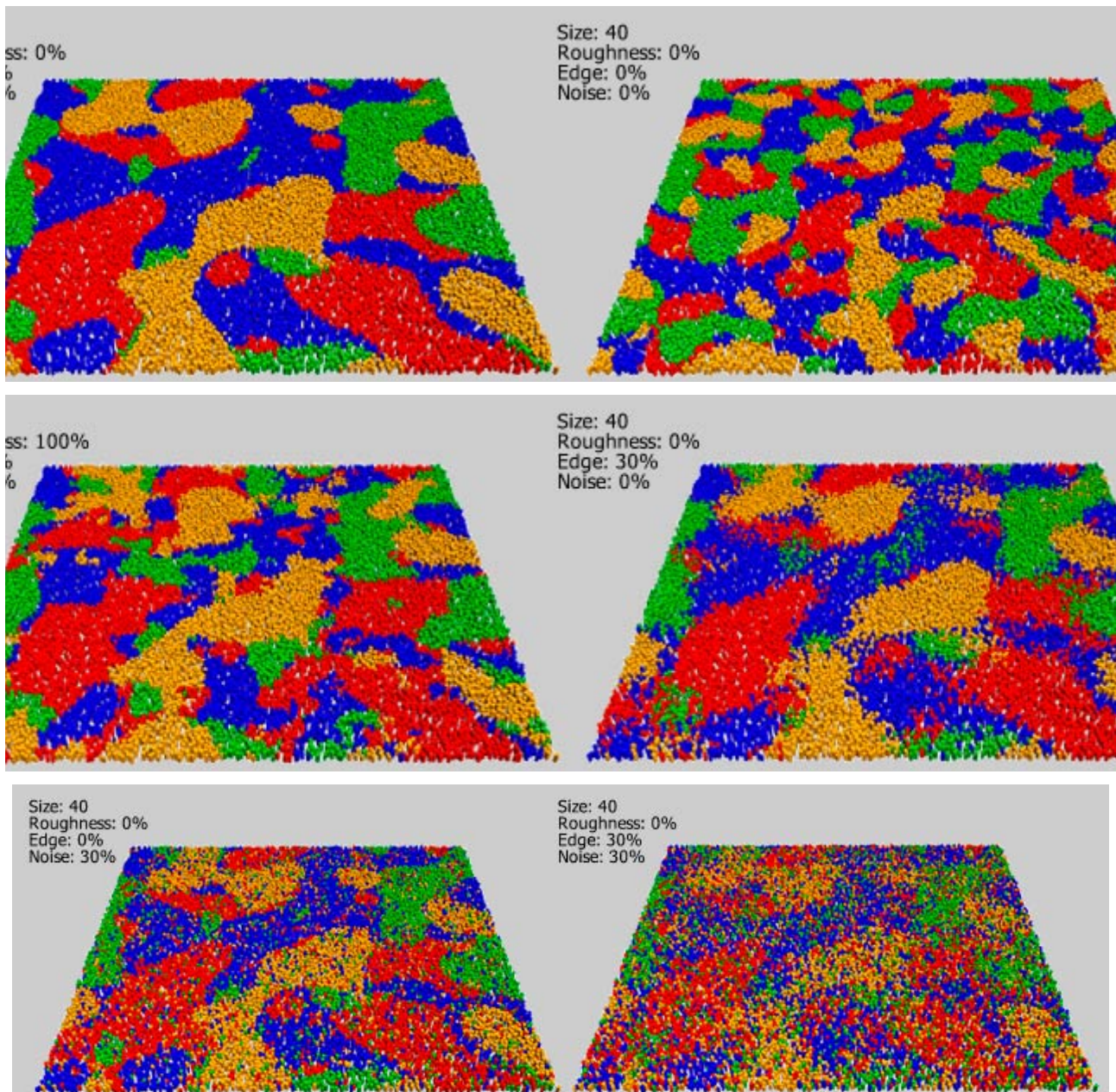
This mode works grouping items of same type, in a similar way that plants are found in the nature. These groups are called clusters.



The following parameters are used to define the cluster appearance:

- **Size:** use it to adjust the size of the clusters. This value is expressed in scene's units.
- **Roughness:** set the shape of the cluster (0% = smooth, 100% = rough)
- **Blurry Edge:** modifies cluster edge from sharp (0%) to blurred (100%)
- **Noise:** adds random items to the distribution (0% to 100%)

Clusters require to use more than one item in the Geometry List (grass and flowers, several types of plants, etc). If not, it has no effect.



### Collisions

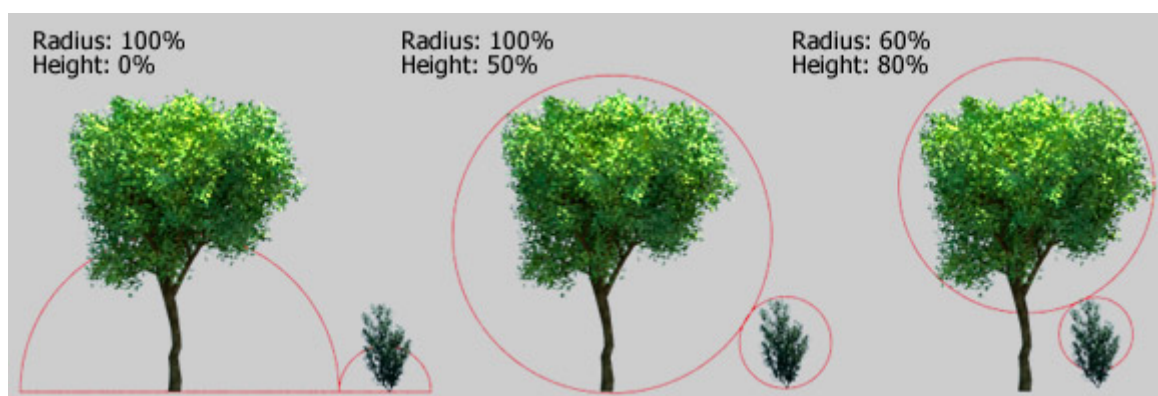
This feature checks the collisions between trees. It works scattering the items, and then deleting those trees that may collide with their neighbors.

Collision checking is based on exploring possible intersections between virtual bounding-spheres that surround each object.

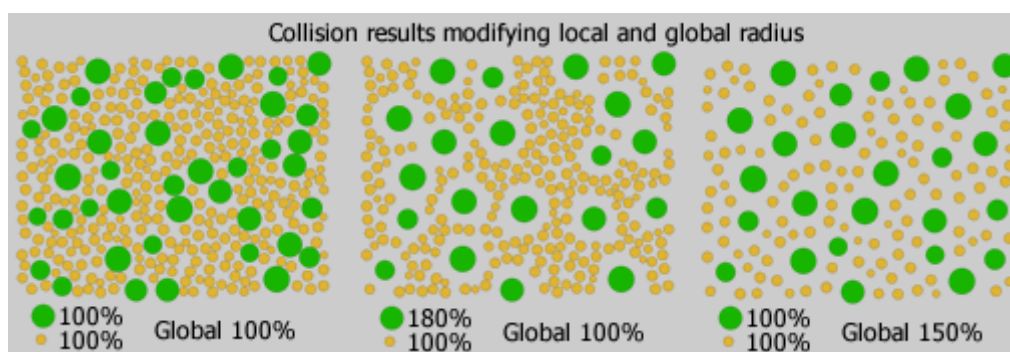
To get the sphere's size of each objet, two parameters are used: Geometry Rollout->Radius, that is defined by each item of the [Geometry List](#), and Distribution Map->Radius, that is a gobal value for the Forest object.. Both



parameters are multiplied to get the resulting size. The value is defined in percentage of tree's size (from 100% to 1%).



The "Height" value is used to define the sphere's center in Z axis. The default value (0%) builds the sphere at ground level, increase it to improve the collision detection when using tall trees with large treetops.



Take care when using Collision Detection: if you increase the density of trees (using a dense map or lowering the X/Y parameters), you may get the same number of trees, because most of them are discarded by collisions... but the plugin will have an extra workload in order to process them. This condition is alerted in the Forest Stats window, when the number of discarded trees is greater than 50%.

## 6.6.2 Path mode


### Overview

Path distribution was introduced in Forest Pack 6, it enables you to distribute objects at regular intervals along one or more splines. The distribution remains fully parametric so you can easily adjust the spacing, offset rotation and more at any time.


**⚠** This feature replaces the Distribute Along Spline feature found in the Tree Editor rollout in versions of Forest Pack prior to version 6.

## Procedures


To add spline

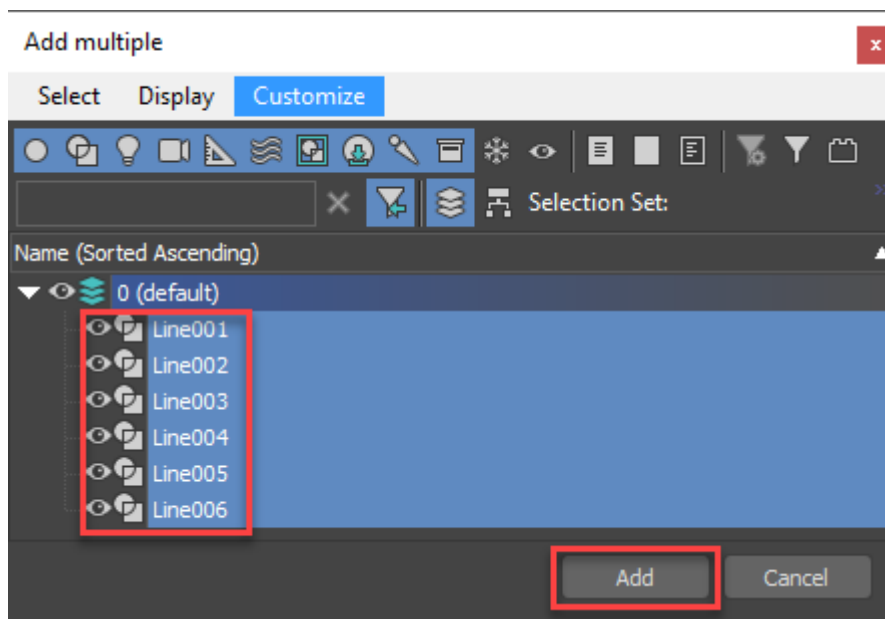
- Click on the  button and select one or more splines by clicking on them in the viewport

To delete splines

- Select the spline to remove from the paths list
- Click the  button.

To add multiple splines

- Click on the  button.
- A scene explorer will open called **Add Multiple**.
- Select all the splines you wish to add by holding down CTRL and clicking to select individual splines or using SHIFT and Click to select a range.
- Click **Add**



To distribute objects at evenly spaced intervals along spline(s)

- Add splines to the Path List.
- Enable **Spacing** mode.
- Adjust the distance between objects using the **Spacing Value**.

To distribute objects on the vertices of along spline(s)

- Add splines to the Path List.
- Enable **In Vertex positions** mode.

To align objects to follow the direction of spline(s)

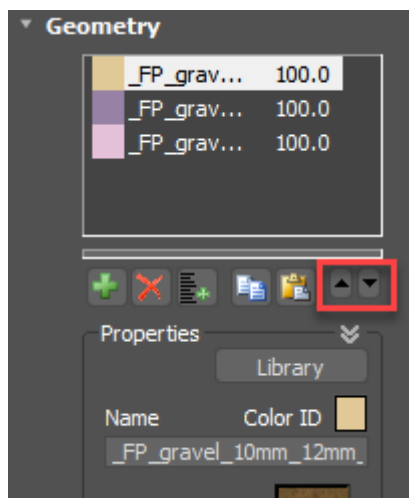
- To rotate objects on the X axis to follow the path enable **Follow Path > X**
- To rotate objects on the Z axis to follow the path enable **Follow Path > Z**

To offset items parallel to the spline(s)

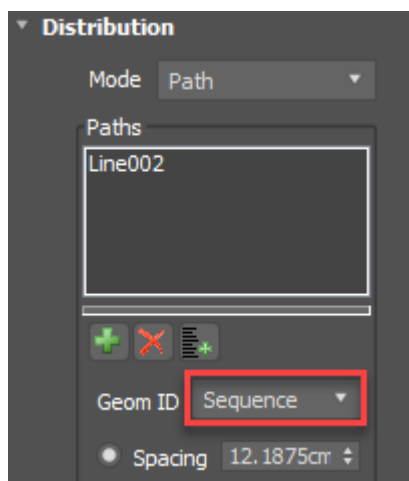
- Increase or decrease the **Offset property**.

To create a repeating sequence of items

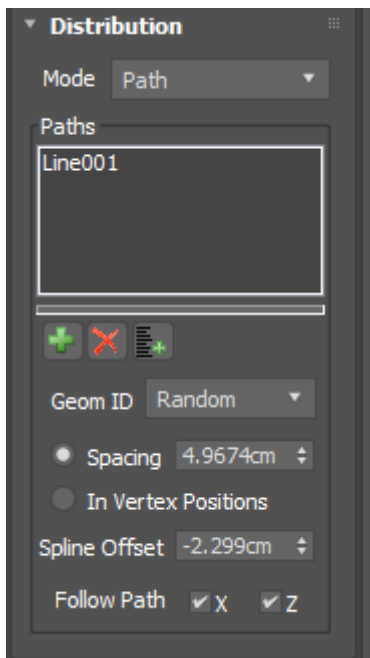
1. In the Geometry rollout, choose the order of items by moving them up and down in the stack using the arrow buttons.



2. Go to the Distribution rollout and enable Path Mode.
3. Add splines to the Splines List.
4. Change **Geom. ID** to **Sequence**.






## Interface



### Paths

The paths list allow to to select and manage the splines used in the scene along which items are distributed. Add and remove splines from the list using the buttons:

	Add a single spline to the list
	Delete the spline selected in the list
	Open a scene explorer window and add multiple splines to the list

### Geom ID

If you have more that one object in the Geometry List, this drop-down menu determines the order in which they are distributed along the spline. Use **Sequence** to loop through them in the order they appear in the Geometry list or use **Random** to shuffle the order.

### Spacing

In this mode items are positioned at regular intervals along the spline, defined using the distance paramter.

### In Vertex Positions

In this mode items are placed on a spline's vertices.

### Spline Offset

Offsets the items on the spline. Positive numbers move the items to one side of the spline, negative to the other.

### Follow Path

This options allow you to rotate the items to follow the path of the spline. There are separate controls for the X and Z axis.

## 6.6.3 Reference mode

### Overview

Reference mode allows you to place objects on markers. A typical usage might be to replace cad objects imported from an architect's plans with trees or other objects. Scattered items retain a dynamic link to reference object, so if the object is moved, the distribution is updated automatically. You also have the choice of whether to place one item on each pivot point of the reference objects, or alternatively, one per face if you're referencing polygonal geometry.



This feature replaces the reference tools found in the Items rollout prior to the release of Forest Pack 6


### Procedures

To select reference objects:

Either:

- Add items individually by clicking on the plus button  and then clicking on an item in the scene.

Or:

- Add several items at once by clicking on the Select Multiple Items By Name button . This launches a scene explorer so that you can filter and select reference items.

To delete reference objects:

- Click the Delete button  to clear all the reference objects.

To scatter one item per reference object:

- Enable **Distribute Using > Pivot** mode.

To scatter one item per face:

- Ensure that your references are mesh objects.
- Enable **Distribute Using > Face** mode.

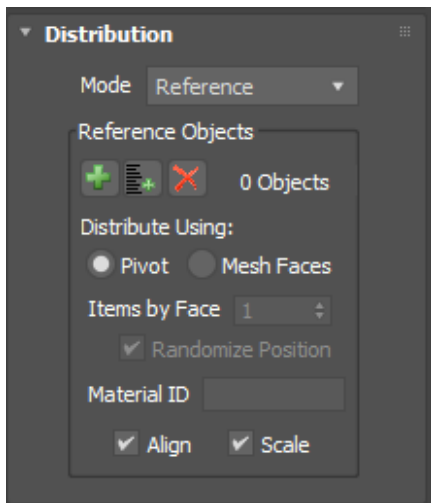
To scatter multiple items per face:

- Ensure that your references are mesh objects.
- Enable **Distribute Using > Face** mode.




To match the reference objects' orientation and scale:

- Enable Scale and/or Align checkboxes.

## Interface



### Reference Objects

	Add reference objects one at a time by picking them from the scene
	Add multiple reference objects, selecting them from a scene explorer
	Clear all reference objects

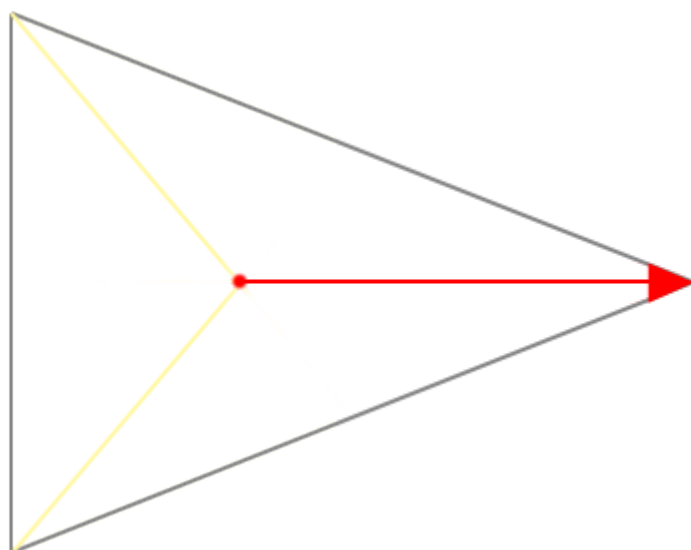
### Distribute using

Determines how items are placed on reference objects. Several modes are available:

- **Pivot Point:** the point of creation is the Pivot Point of the referenced objects. For example: to create a group of trees in specified points, which have been defined in an external program (such as AutoCad) and imported to 3D Studio Max as dummy reference objects. Align and Scale can be enabled to copy the scale and alignment based on the reference.



- **Mesh Faces:** creates an element for each face of the referenced meshes. If the Align option is enabled, items are aligned with the face, using as X axis a vector from the center to the farthest vertex in the triangle.



Alignment is calculated using a vector calculated from the center to the farthest vertex.

- **Items Per Face:** Choose the number of items to add per triangle. For values greater than 1 a grid-like distribution on the face is created unless the **Randomise Position** option is selected
- **Material ID.** Allows you to scatter on faces only with the specified material ID(s)
- **Align.** Aligns the orientation of the scattered object to match the reference object or triangles
- **Scale.** Scales the scattered object to match the reference object. In mesh faces mode, this setting has no effect.

## 6.6.4 Particle Flow mode


### Overview

Forest Pack 6 introduced the ability to scatter items on particles created using PFlow. Using this new mode it is possible to match the position, rotation and scale of particles and you can either choose to use all particle events or specify a selection. Animated particles are supported too as Forest Pack provides a live link to the particle object.



You are able to use all of Forest Pack's randomisation features including Forest Colour in PFlow mode.

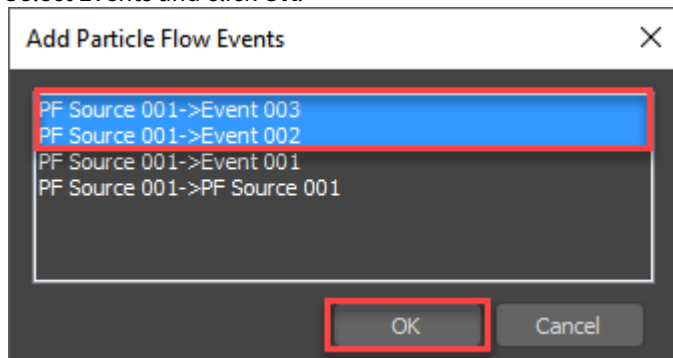
## Procedures

To distribute items on all particles:

1. Click on **Particle Flow > Add**  and select a PFlow object from the scene. Repeat this operation for each PFlow object you'd like to use as a scatter source.
2. Enable **All Particle Flow Events**.

To distribute items on specific particle events:

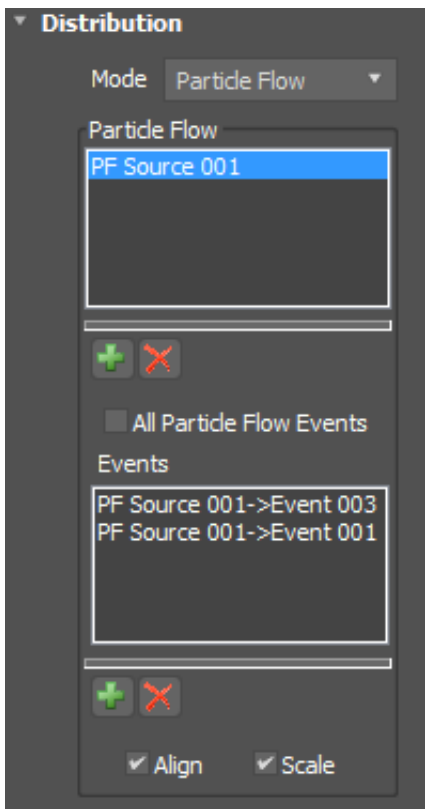
- Click on **Particle Flow > Add**  and select a PFlow object from the scene. Repeat this operation for each PFlow object you'd like to use as a scatter source.
- Disable **All Particle Flow Events**.
- Click **Events > Add** . A list of all the Events contained in the select PFlow objects will open.
- Select Events and click **OK**.



To match the orientation and scale of particles:



- Enable **Align** to match the orientation of particles.
- Enable **Scale** to match the scale of particle.

Interface



Particle Flow

Lists all the PFlow objects to be used to distribute items. To add and remove PFlow items use the following buttons:


	Add a PFlow item
	Delete the selected PFlow object

All Particle Flow Events

When enabled all the Events from the objects listed in the Particle Flow list will be used to distribute items. Disable this checkbox and to specify individual Events.

Events List

Lists all the events to be used to distribute items. For this list to be active, the **All Particle Flow Events** option must be **disabled**. To add and remove events use the following buttons:

	Add a PFlow item
---	------------------



Delete the selected PFlow object

## Align

When enabled, items are oriented to match the particles.

## Scale

When enabled, items are scaled to match the particles.



Several new attributes allow you to create effects for use with PFlow objects.

<b>fplItem.particleAge</b>	Particle Age in ticks (only for For Particle Flow distributions)	Integer	No
<b>fplItem.particleRotation</b>	Particle rotation defined by incremental rotations in world axes XYZ (in radians)	Vector	No
<b>fplItem.particleScale</b>	Particle scale (only for Particle Flow distributions)	Vector	No
<b>fplItem.particleSpeed</b>	Particle Speed (only for Particle Flow distributions)	Vector	No
<b>fplItem.particleEventID</b>	Numeric ID generated from the Event's name in a PFlow distribution (i.e. 'PF Source 01->Event 02' get ID = 2)	Integer	No

To learn more about Forest Effects, please visit the [documentation](#).

## 6.7 Effects

Effects allow you to extend the existing features of Forest Pack by adding new functionality from a library, importing them from individual files, or creating your own using Effects Expressions.

In this chapter we explain how to use Effects in the Forest Pack Pro 5.0 beta.

### 6.7.1 Contents

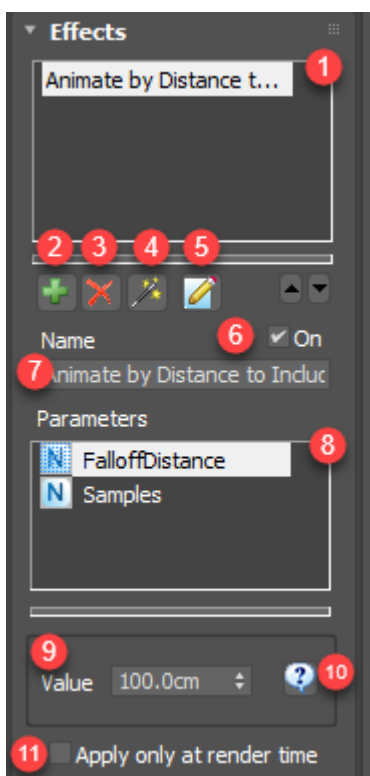
- [Effects Interface](#)
- [Effects Library](#)
- [Saving and Importing Effects Files](#)
- [Creating and Editing Effects](#)
  - [Effects Syntax](#)
  - [Operators](#)
  - [Functions](#)
  - [Attributes](#)
  - [Parameters](#)

- [Effects Examples](#)
  - [Stepped Rotation](#)
  - [Lean out](#)
  - [Tint by Object](#)
  - [Tint by Boundary](#)
  - [Look At object with Falloff](#)
  - [Look at Boundary with Falloff](#)
  - [Repulsion](#)
  - [Bend by Object](#)
  - [XY Local Translate](#)
  - [Cars along spline](#)
  - [Place items on a displaced surface](#)

## 6.7.2 Effects Interface

In Forest Pack 6 and onwards you'll find a revamped **Effects** rollout. Using this simple interface you can control the parameters of any effects loaded into the FP object. From here it is also possible to open the **Effects Browser** to load presets or open the **Editor** to create or edit effects. The interface comprises of three parts:

### 1 - The Effects Rollout

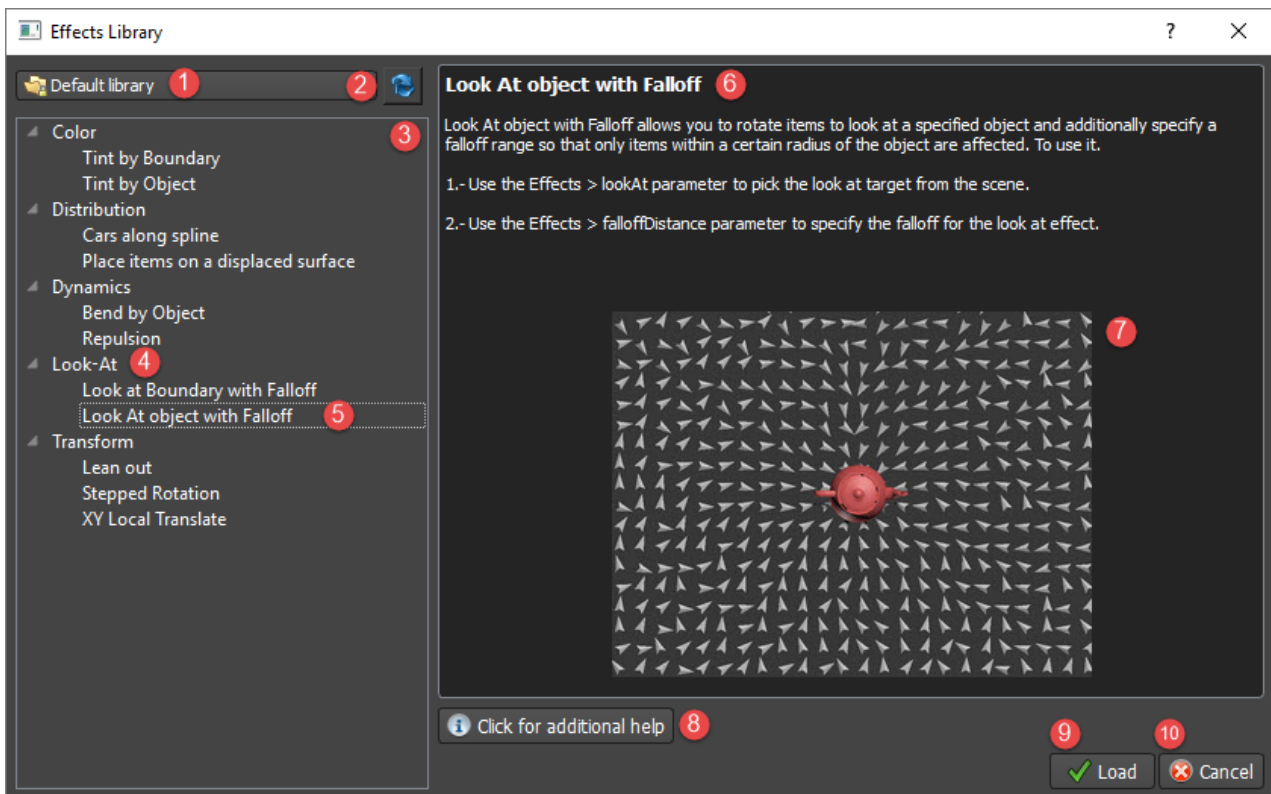


Use this interface to control effects parameters, and open the library and editor windows.

1. **The Effects List.** Lists all of the effects in the current object. Select an effect to see its properties.
2. **Add Effect.** Click this button to create a new empty effect.
3. **Delete Effect.** Click this button to delete the selected effect.
4. **The Effects Library.** Click this button to open the Library and load pre-built effects.
5. **The Effects Editor.** Click this button to open the Effects Editor used to create and edit effects scripts.
6. **On/Off.** Use this checkbox to toggle all effects on or off.

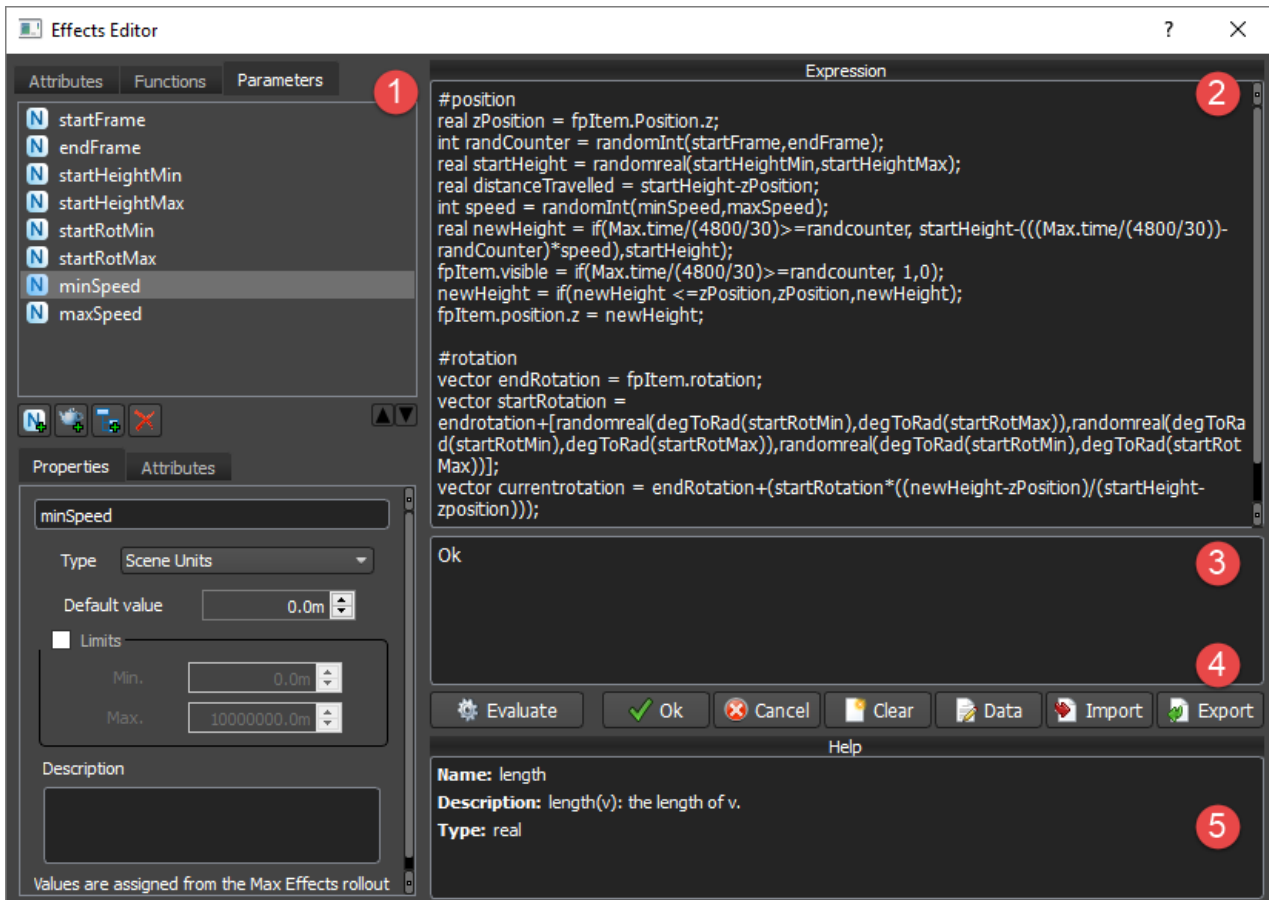
7. **Effect Name.** Used to name effects for easy identification
8. **Parameters List.** This list contains all the user editable values in the loaded effects.
9. **Parameter Value.** Used to enter a value for the parameter highlighted in the Parameters List.
10. **Parameter Help.** Displays an explanation of the parameter highlighted in the Parameters List.
11. **Apply Only at Render Time.** Activate this to apply the effect only at render time - this can speed up editing FP objects with complex processor intensive effects.

## 2 - The Effects Library



1. **Library Menu.** A drop down list to Select the library. By default you have two libraries, the Default library for built in effects and a User's library for your own effects.
2. **Refresh.** Click to refresh the effects navigator. This is usefully if you've made changes to the library manually in a file manager and you'd like to see these updates in the Effects Browser.
3. **Effects Navigator.** Displays a tree view of your selected library
4. **Category.** A category is a way of organising your effects. Categories can be nested.
5. **Effect.** An individual .eff file. Click to see more information about the effect.
6. **Description.** Shows a text description and instructions of the selected effect.
7. **Preview Image.** A image to illustrate the selected effect
8. **Click for additional help.** Click this button to go to online help for more information about the selected effect. For iToo effects this takes you to our documentation server.
9. **Load.** Click this button to load the selected effect.
10. **Cancel.** Click this button to close the Effects Browser without making any changes.

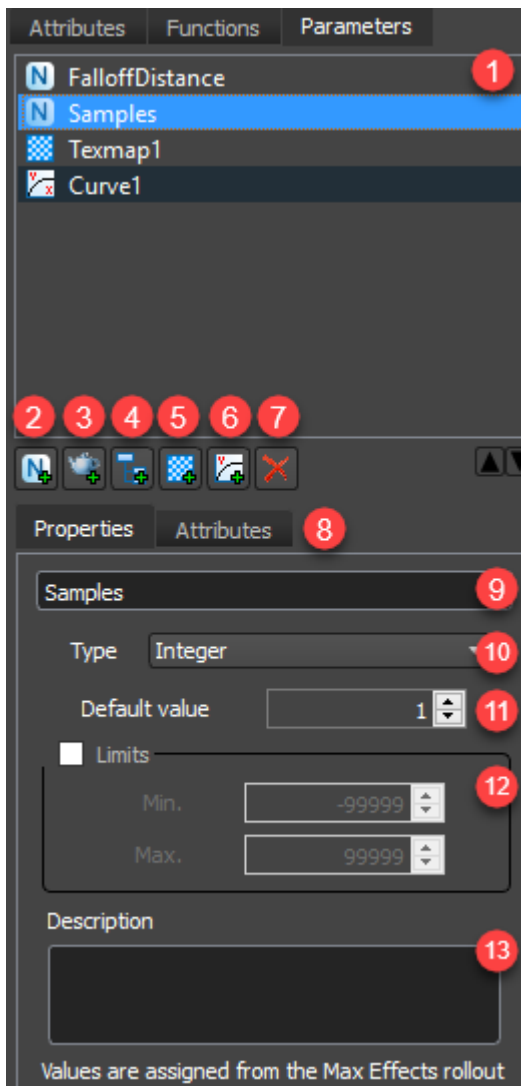
### 3 - The Effects Editor



Use the Effects Editor to author new effects.

- 1. Command List.** This 3 tabbed directory contains all the commands that are available to be used to create effects expressions. Click a command in this list one to show the help (5) or double click to insert the command at the current cursor point.
- 2. Expression Window.** Use this window to create and edit a new effect,
- 3. Output Window.** Shows the results of the expression, and any error or other system messages.
- 4. Toolbar:** Contains buttons to save, evaluate and manage effects. Includes the following buttons:
  - a. Evaluate.** Click to run the script in the expressions window.
  - b. OK.** Click to run the script in the expressions window and close the editor.
  - c. Cancel.** Close the editor without running or saving the script.
  - d. Clear.** Delete the contents of the Expression Windows.
  - e. Data.** Open the Additional Data Menu to add a name, description and thumbnail image (see below for more details).
  - f. Import.** Open an effects file (.eff) replacing the contents of the expressions window.
  - g. Export.** Save an effects file (.eff).
- 5. Help.** Shows help and information for the item selected in the command list.

### 3.1 - The Parameters Tab



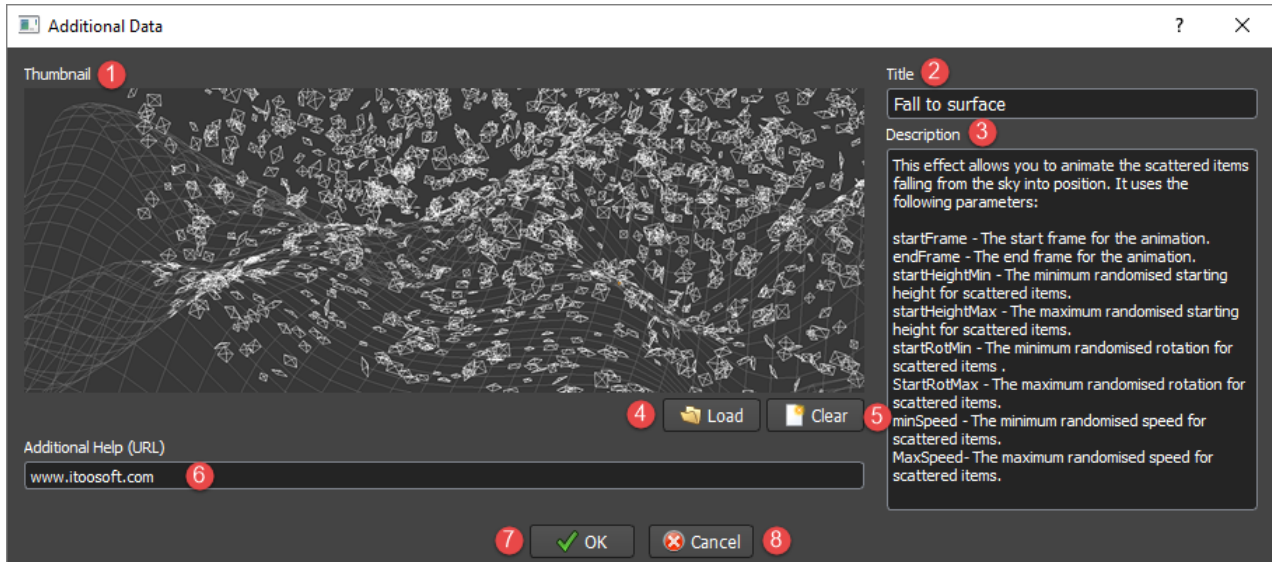
Use the Parameters tab in the Effects Editor to create variables whose values are assigned and edited from the Effects Rollout.

1. **Parameters List.** Contains all the parameters for this Forest object.
2. **Add new Numeric Parameter.** Create a new Numeric Parameter. The value for this is edited in the Effects rollout.
3. **Add new Object Parameter.** Create a new Object Parameter. Allows you to use the position of other objects in the scene to influence Forest's properties. Assigned from the the Effects rollout.
4. **Add new Controller Parameter.** Create a new Controller Parameter. Allows you to use any other object's controller to influence Forest's properties. Assigned from the the Effects rollout.
5. **Add new Texture Parameter.** Create a new Texture Parameter. Allows you to use any a map to influence Forest's properties. Assigned from the the Effects rollout.
6. **Add new Curve Parameter.** Create a new Curve Parameter. Allows you to use a curve to influence Forest's properties. Assigned and edited from the the Effects rollout.
7. **Delete Parameter.** Delete the item highlighted in the Parameters List.
8. **Properties Tab.** Show the properties and attributes of the item highlighted in the Parameters List.
9. **Parameter Name.** Name of the Parameter selected in the Parameters List.



10. **Parameter Type.** Changes the type of value used for Numeric Parameters.
11. **Default Value.** The default value used for Numeric Parameters.
12. **Limits.** Limit the values that can be entered within the minimum and maximum values
13. **Description.** This description can be viewed in the Effects rollout by clicking the Help button. Add instructions here to help explain an effects parameters for new users.

#### Additional Data menu



1. **Thumbnail.** Displays a preview of the selected effect. The browser does not rescale images so it's recommended to save them in a size that's appropriate.
2. **Title.** The name of the effect to be displayed in the Effects Navigator. If you leave this field blank the file name will be used.
3. **Description.** Add additional information about the effect such as a description and instructions for use.
4. **Load.** Click to select a preview image file in the format png, jpg, or xpm. The image is encoded in the .eff file so there's no need to include it if you share your files.
5. **Clear.** Click to remove the current preview image.
6. **Additional Help (URL).** Used to add a URL that can provide additional online help or information about the author.
7. **OK.** Click OK to save changes to the effect and return to the browser.
8. **Cancel.** Click Cancel to return to the browser without saving any changes.

## 6.7.3 Effects Library



### Overview

The Effects Browser allows you to easily navigate the effects that ship with Forest Pack. It also allows you to import and manage your own effects or effects obtained from a third party. Using the effects browser makes it fast and simple to quickly add additional functionality to Forest Pack exactly when you need it.

Effects are saved in .eff files. These can be created using the Export feature of the Effects Editor, see this feature's [reference](#) for more information.

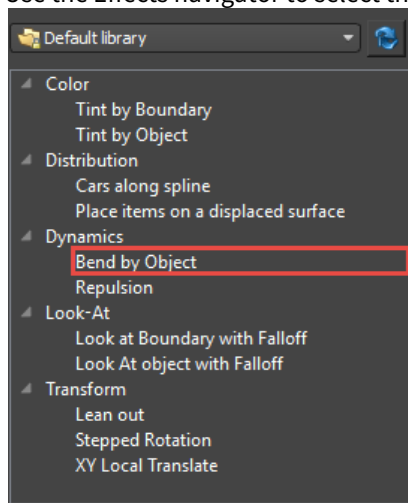
## Procedures

To open the Effects Browser

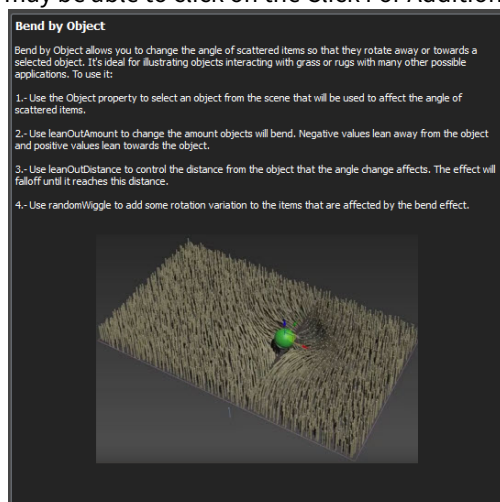
1. Go to the Effects rollout.
2. Click on the  button to add a new empty effect.
3. Click to  open the Effects Browser.

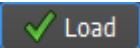
To load an Effect using the Browser

1. Open the **Effects Browser**.
2. Use the Effects navigator to select the Effect you wish to use



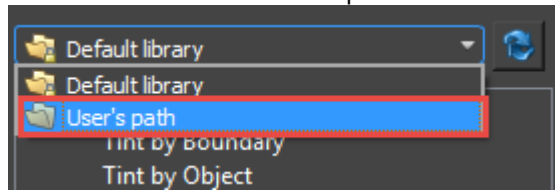
3. Read about the effect in the description pane to see instructions for its use. For extra information you may be able to click on the Click For Additional Help button to open our online documentation.

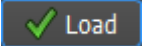


4. Click .
5. Adjust the properties if necessary from the **Effects** rollout.


To access and load user and 3rd part effects from the Effects Browser

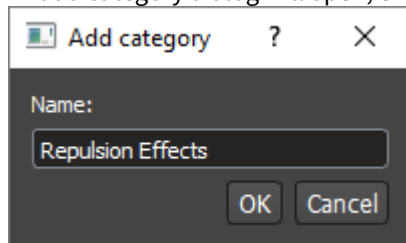
1. Choose User Path from the drop down list found above the Effects Navigator.



2. Select an effect from the effect navigator.
3. Click .

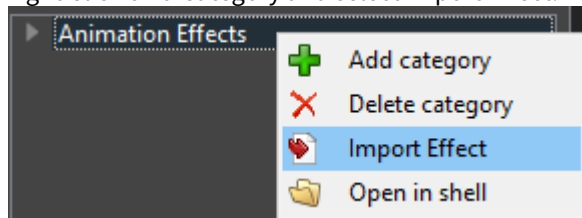
To create a Category in user Effects Library

1. Right click in the Effects Navigator
2. Click  Add category
3. An add category dialog will open, enter a name and click OK.

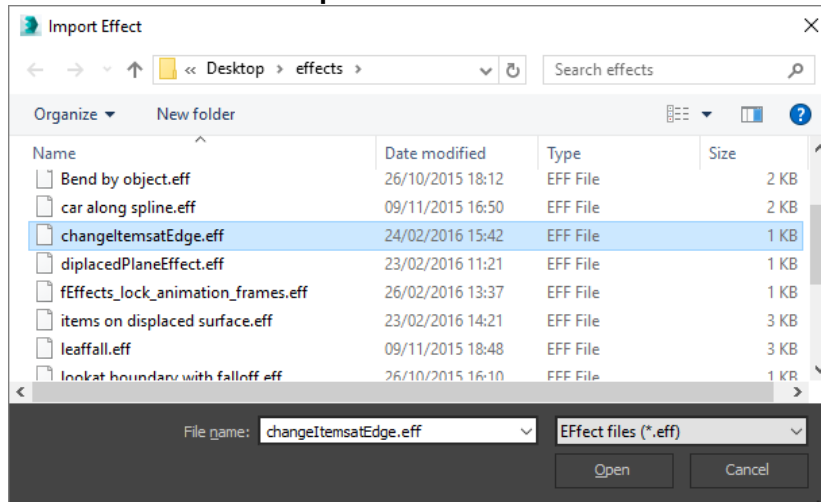


To add a new Effect to the User library

1. Right Click on a Category and select Import Effect.



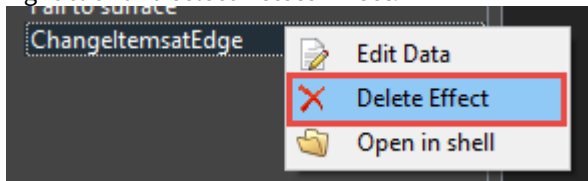
2. Select an **.eff** file and click **Open**.



3. The .eff file will be imported and saved to your Effects Directory.

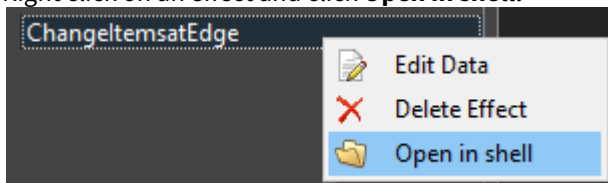
To delete an Effect from the library

1. Select the effect you wish to delete from the Effects Navigator.
2. Right click and select **Delete Effect**.



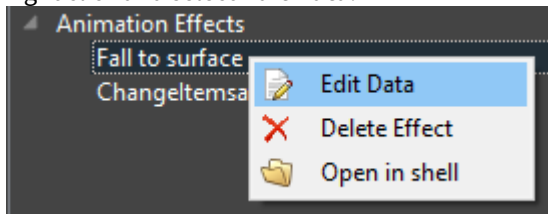
To open the Effect's save location in Windows Explorer.

- Right click on an effect and click **Open in shell**.



To add information about an effect

1. Select an effect from the Effects Navigator.
2. Right click and select **Edit Data**.



3. The Edit Data window will open.

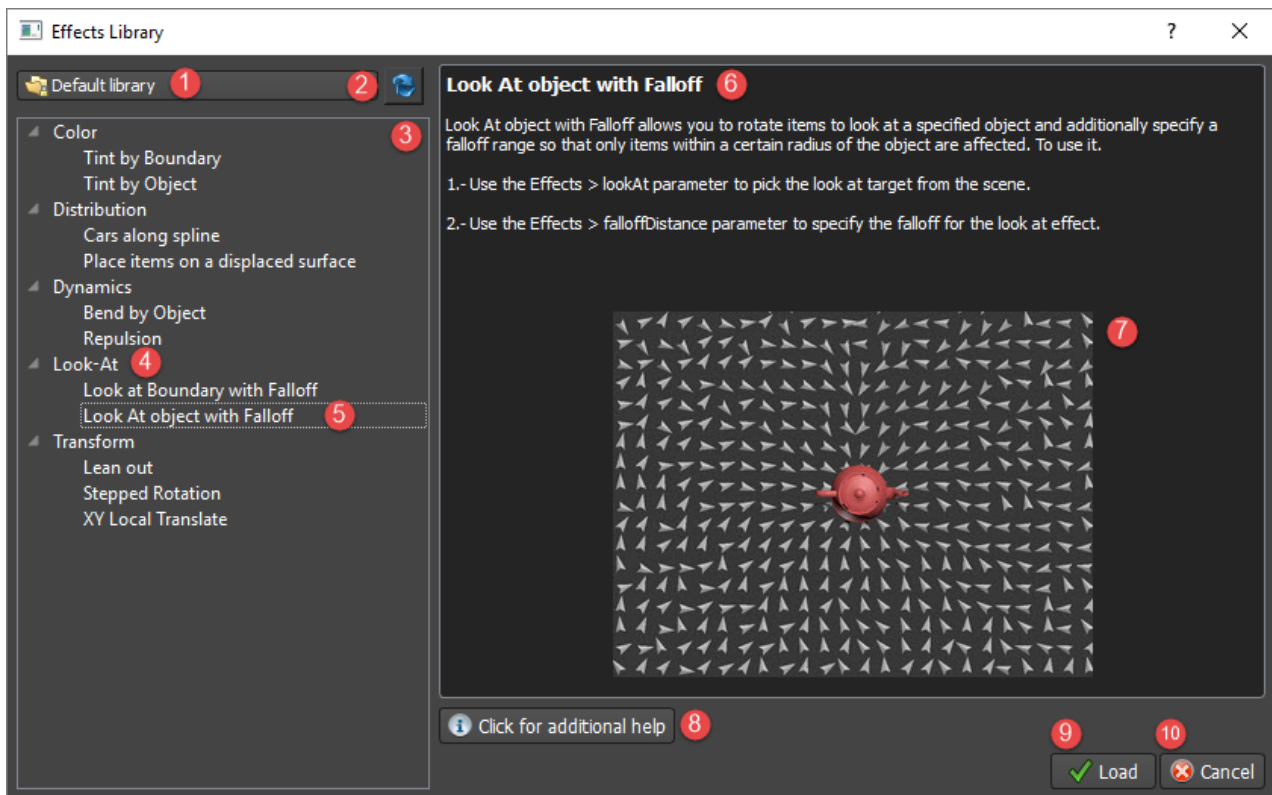


4. Enter a name for the effect in the title field (a). If this field is left blank the file name will be used.
5. Enter a description (b). This contain any instructions and additional information a user requires in order to use your effect. (optional)
6. Click Load to add a thumbnail (c). The plugin supports files of the type png, jpg, and .xpm. This image is displayed underneath the description in the effects browser. (optional)
7. Additional help is used to provide a link to a website (d). This could be more information about the effect, the author or anything else you feel is helpful. (optional)
8. Click OK.

**⚠** Though the Effect Browser allows you to import, delete and categorise your effects the plugin is actually just reading the directory structure of the user's effects folder. This means that it's easy to create new categories and organise effects using any file manager. By default user paths are saved in

*C:\Users\username\Documents\Forest Pack\effects*

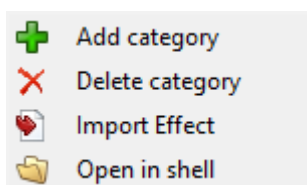
## Interface



1. **Library Menu.** A drop down list to Select the library. By default you have two libraries, the Default library for built in effects and a User's library for your own effects.
2. **Refresh.** Click to refresh the effects navigator. This is usefully if you've made changes to the library manually in a file manager and you'd like to see these updates in the Effects Browser.
3. **Effects Navigator.** Displays a tree view of your selected library
4. **Category.** A category is a way of organising your effects. Categories can be nested.
5. **Effect.** An individual .eff file. Click to see more information about the effect.
6. **Description.** Shows a text description and instructions of the selected effect.
7. **Preview Image.** A image to illustrate the selected effect
8. **Click for additional help.** Click this button to go to online help for more information about the selected effect. For iToo effects this takes you to our documentation server.
9. **Load.** Click this button to load the selected effect.
10. **Cancel.** Click this button to close the Effects Browser without making any changes.

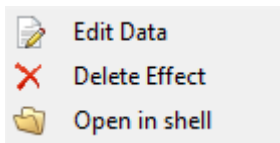
When editing the user library you can right click in the Effects Navigator to perform different functions. Depending on whether you click on a Category or an Effect you'll get the following menus:

### Category menu



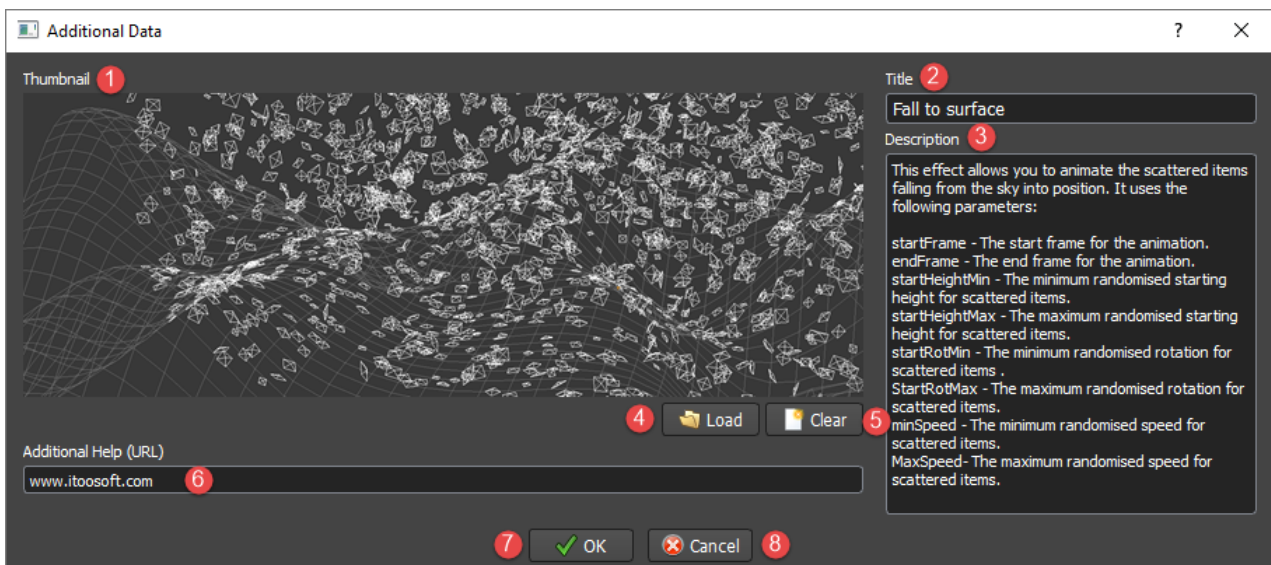
- **Add category.** Creates a new category in the selected location.
- **Delete category.** Deletes the current category and its contents.
- **Import Effect.** Import an .eff file into the current category.
- **Open in shell.** Opens the directory of the selected category using your default File Explorer.

#### Effects menu



- **Edit Data.** Opens the Additional Data menu used to include a title, description, preview image, and URL.
- **Delete Effect.** Deletes the selected effect.
- **Open in shell.** Opens the directory of the selected effect using your default File Explorer.

#### Additional Data menu





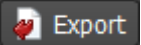
1. **Thumbnail.** Displays a preview of the selected effect. The browser does not rescale images so it's recommended to save them in a size that's appropriate.
2. **Title.** The name of the effect to be displayed in the Effects Navigator. If you leave this field blank the file name will be used.
3. **Description.** Add additional information about the effect such as a description and instructions for use.
4. **Load.** Click to select a preview image file in the format png, jpg, or xpm. The image is encoded in the .eff file so there's no need to include it if you share your files.
5. **Clear.** Click to remove the current preview image.
6. **Additional Help (URL).** Used to add a URL that can provide additional online help or information about the author.
7. **OK.** Click OK to save changes to the effect and return to the browser.
8. **Cancel.** Click Cancel to return to the browser without saving any changes.





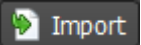
## 6.7.4 Saving and Importing Effects Files


If you'd like to import a pre-built effect or you've created one that you'd like to share with other users, then Forest Pack makes this process simple. Any effect, including its parameters, can be exported to an .eff file and distributed to colleagues or online. These files are small in size and can be easily shared. To import and export .eff files, follow the procedures described below.

### To export an effect

1. From the Effects rollout, click on the  button to add a new empty effect and then click  to Open the Effects Editor.
2. Click  to open the file selector.
3. Enter a filename and click **Save**.

### To import an effect

1. From the Effects rollout, click on the  button to add a new empty effect and then click  to Open the Effects Editor.
2. Click  to open the file selector.
3. Select a .eff file and click **Open**.

 Imported effects will overwrite any code or parameters you already have in the effects editor. A warning will be displayed to prevent accidentally losing work but be aware that the import process is not undoable.

## 6.7.5 Creating and Editing Effects

Forest Pack's new Effects Editor allows anyone with basic scripting knowledge to extend Forest Pack with new features at any time, without having to wait for a new release. In this chapter we will introduce you to the basic syntax and walk you through your first example script. You'll also find all the reference for mathematical operators, variables and parameters, attributes, and functions you need to start writing and sharing your own effects.

### Contents

- [Effects Syntax](#)
- [Operators](#)
- [Functions](#)
- [Attributes](#)
- [Parameters](#)

### Effects Syntax

From version 5.0 onwards you can use effects to control many of Forest Packs parameters using mathematical expressions. Effects are easy to use as long as you have some basic scripting and mathematics knowledge and use the syntax rules as described below.

#### Syntax reference

Effects expressions use a straightforward mathematical syntax comprising **operators** (+, -, \*, /, etc.), mathematical **Functions** that take one or more arguments and return a result, FP's built in variables (which we have called



**Attributes** for clarity), user declarable **Variables**, and customisable **Parameters** that are editable from the **Effects** rollout panel. There are many built in functions, and attributes already available and these are all documented in the **Command List** on the left hand side of the Effects Editor. To see an explanation for each entry, single click on it and a description and example syntax will display in the Help pane at the bottom of the interface. General syntax rules are describe below.

## Functions

Functions provide pre-built commands that can be used to perform common mathematical expressions. To use a function you use the name followed by any required arguments enclosed in parenthesis. For example, to convert 90 degrees to radians you use the degToRad function as follows:

**degToRad(90);**

Where a function requires multiple arguments, these should be separated using commas. For example to generate a random integer between 0 and 350 you would use the randomInt function as shown below:

**randomInt(0,359);**

Functions can also be nested by including them as arguments, for example:

**degToRad(randomInt(0,359));**

You can find a full list of supported functions, including information about the arguments they require [here](#).

## Attributes

Attributes are Forest Pack's pre-defined variables. Dot syntax is used to access an attribute's values. This means that when using an attribute, the statement must always start with a reference to some object, followed by a full stop (., or dot) and then the name of the property you wish to access. Each dot represents a move from more general access to the object to more specific levels of parameter detail. For example **fplItem** refers to the the entirety of the Forest object, whereas **fplItem.position** accesses the local coordinates of each scattered item. Continuing down the hierarchy, **fplItem.position.z** refers only to the items position on the Z axis. Dot syntax is also used to access the position coordinates of Object parameters and the components of vector variables.

To assign a value to an attribute you use equals (=). For example to set the Z rotation of all scattered objects to 45 degrees you would enter the following:

**fplItem.rotation.z = degToRad(45);**

Be aware that not all attributes in the Command List can be edited using expressions, but they can all be read. Studying the list of editable attributes is a useful first step in seeing what's possible with effects because these represent the aspects of Forest Pack that can be scripted with this new tool. A full list of attributes divided into editable and uneditable categories can be found [here](#).

## Variables

In addition to built-in attributes, variables can be created and edited in the expression script. They are declared as one of three types, either **real** for float values or scene units, **int** for whole numbers, or **vectors**. They are not case sensitive but there are a few restrictions on naming:

- Cannot be the same as an existing attribute, function, variable or parameter.
- Must only consist of alpha-numeric symbols and underscores (\_).
- Cannot start with a number.
- Cannot contain spaces.
- Variables are local to the Forest Object, this means you can use the same variable name in different objects without problems.

Below are examples that illustrate how to create each of the three types of variable as well as illustrating some acceptable ways to construct variable names based on the rules outlined above. Green text illustrates the variable type, blue the name, and red the assigned value.

```
int objectCount = 3;
real object_rotate_z = 10.5;
vector objectPosition1 = [10,10,0];
```

You can also create variables without assigning a value as follows:

```
int objectCount ;
real object_rotate_z ;
vector objectPosition1;
```

Once a variable has been declared, you assign a new value using equals (=). For example

```
objectCount = 5;
object_rotate_z = 22.5;
objectPosition1 = [20,20,20];
```

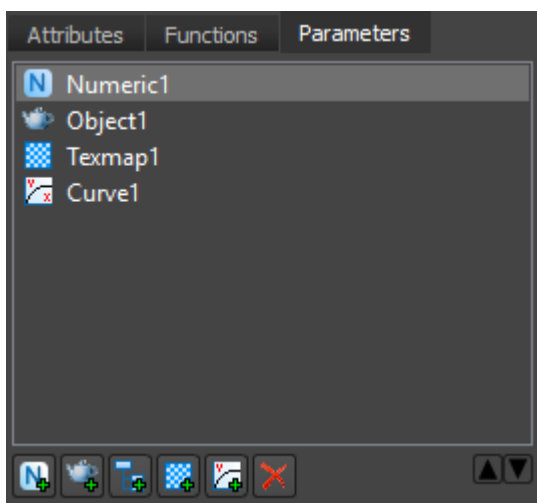
Variable types cannot be changed once created and though you can assign an integer value to a real variable, you can't assign a real value to an integer. In this case you will need to use the rounding functions `ceil()`, `floor()`, `trunc()`, or `round()` to convert the real value to an integer, for example:

```
int integer;
real float = 12.3;
integer = floor(float);
print integer;
```

If you evaluate this code then 12 will display in the output window. This is because the floor function rounds 12.3 to the lowest adjacent whole number which can then be assigned to the integer variable with no errors.

### Parameters

Parameters are a special type of variable whose values are assigned in the Effects rollout, this enables a user to control effects without needing to understand the code. Instead of being declared in the script like a normal variable, they are created in the parameters tab of the effects editor.



There are 5 types available which you create by clicking on the corresponding button:



**Numeric Parameters.** Adds a numeric spinner to the effects rollout. Number format can be set to real, integer, percentage (real), or scene units (real).



**Object Parameters.** Adds an object picker to the effects rollout and allows you to access the selected object's position vector.



**Controller Parameters.** Allow you to access the output from any controller in 3ds Max, picked from the effects rollout.



**Texture Parameters.** Allow you to use the RGB values from a map, picked from the effects rollout.



**Curve Parameters.** Allow you to use a curve to control values. The curve can be edited from the effects rollout.

Use the properties section to fine tune the parameter including the type of number, minimum and maximum limits, a default value and the name. Irrespective of the type, you reference a parameter in the expression using its name and because of this, parameters have the same naming restrictions as regular variables as described above.

To illustrate here's how you would assign parameters with names as shown in the screen capture above to a new variable:

```
int Variable1 = numericParameter; #if the type is set to integer
real Variable2 = numericParameter; #if the type is set to real, percentage or scene units
vector Variable3 = objectParameter.position;
real Variable4 = objectParameter.position.z; #to assign just one component of an object's position (in this case z)
real Variable5 = controllerParameter; #if the controller outputs a float number
vector Variable7 = controllerParameter; #to assign a vector controller
vector Variable8 = controllerParameter.z; #to assign just one component of a vector controller (in this case z)
```

A parameter's values cannot be edited in the expression, only by changing the value of the spinner in the effects rollout or by editing the object or controller to which it is linked.

To read more about parameters and how to create and edit them, please see the [parameters page](#).

#### Instruction separation

Each command must be terminated by a semi-colon (;).

#### Comments

Comments are added by starting the line with a # symbol. Anything after the # on the same line will be ignored:

```
# This is a comment
# This is another comment
```

Note that comment lines do not need to be terminated with a semi-colon, though it won't affect anything if you do so.

#### Debugging

To help debug effects we have provided a print command that displays the results of an expression or contents of a variable, parameter or attribute to the Output window. For example

```
real exampleVariable = 5.0;
print exampleVariable;
```

will print 5.0 to the output window.

Because you are often creating scripts designed to manipulate the values on thousands of scattered items it is not possible, or desirable, to see the results for every instance. Therefore the print command displays values for only the first scattered object

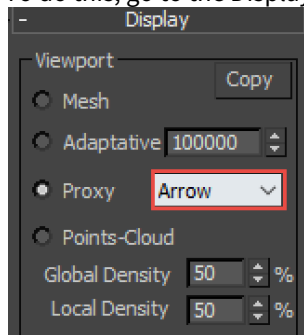
### Case Sensitivity

Functions, variables, properties and attributes are **not** case sensitive, for example fpltem.position, FPITEM.POSITION, fpitem.position, and fp.ITEM.position all refer to the same attribute.

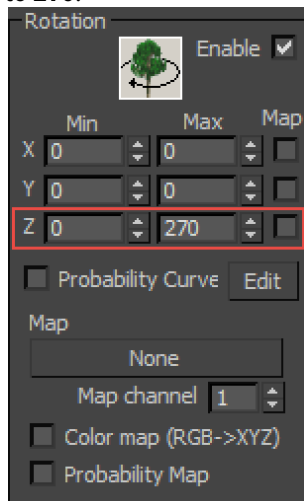
### Getting Started - A simple example

To illustrate the syntax described above it is useful to go through the steps necessary to create a new effect. In this example we'll add the ability to specify a [step increment](#) when using the existing Transform > Rotation > Z property. To do this:

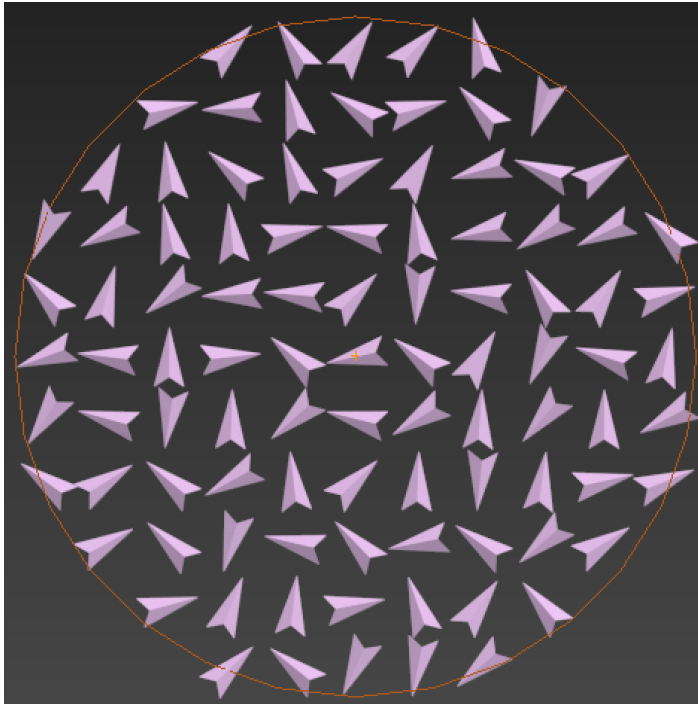
1. Create a new Forest Pack object and assign to a simple Spline area.
2. As this script will control the Z Rotation, we can change the display mode to arrows to clearly see the effects. To do this, go to the Display rollout and change the **Viewport** mode to **Proxy > Arrow**.



3. Go to the **Transform** rollout and turn on **Rotation**. Set the **Z Minimum** value to **0** and the **Z Maximum** value to **270**.



At this point the Forest object will randomise the rotation within the range specified by these two values.



We want to control it so that it randomises within this range, but only in increments of a specified value.

4. Go to the **Effects** rollout and click  to open the Effects Editor.

5. **Comments**

First let's add a comment to the effects so that anyone looking at the code knows what it does. Comments are added by starting the line with a # symbol. On line 1 write the following:

```
# Stepped Random Z Rotation
```

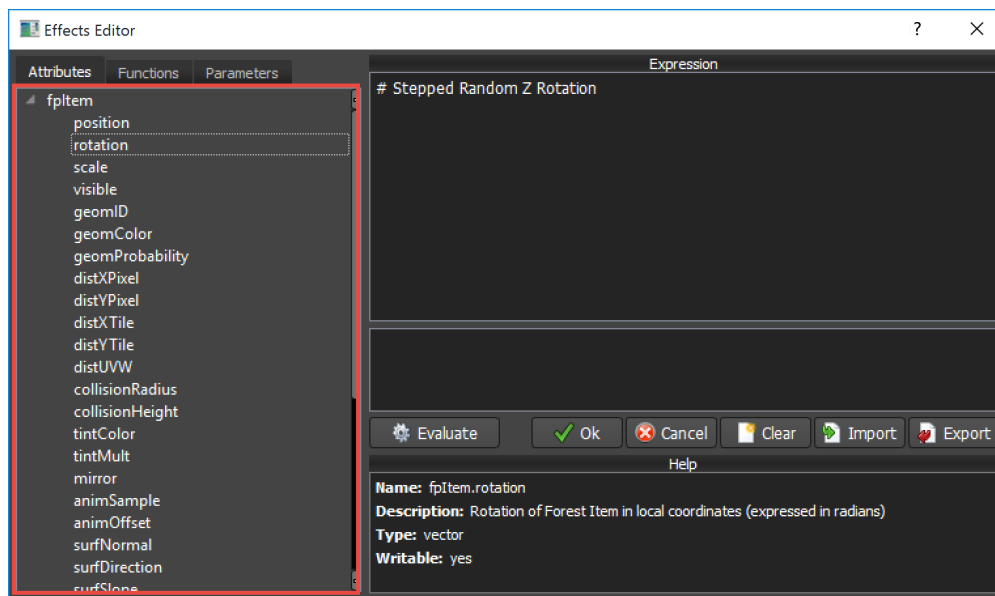
Because of the #, this line will be ignored when the interpreter parses the script.

6. **Variables**

Next we'll create a new **Variable** called *rotateRange* and assign to it the range specified by the **Transform > Rotation > Z Minimum** and **Maximum** values that we entered in step 2 above. To create a variable you must first specify the type of variable followed by the name. Numbers in the effects editor can one of three types: real (real), integers (int) or vectors (vector). In our example we want to create a Real variable called *rotateRange* so under the existing comment enter:

```
real rotateRange =
```

We want to assign the existing rotation randomisation range specified in the Transform rollout to *rotateRange*. To do this you need to use an **Attribute**. These are Forest Pack's predefined variables, and a full list can be found in the Attributes tab on the left side of the Effects Editor.



To find the range, we need to subtract the **Transform > Rotation > Z Minimum** value from the **Maximum**. To do this find **randRotMax** in the attributes list and double click on it. This will add the Attribute at the current cursor location.

```
real rotateRange = fpItem.randRotMax
```

You'll notice that the full text reads **fpItem.randRotMax**, this is because randRotMax is an attribute of the fpItem object. Effects use dot syntax to access the properties or methods related to an object, for example in this case we only want to access the Z rotation property of the randRotMax vector, so we add a **.z** to the end of fpItem.randRotMax to give us:

```
real rotateRange = fpItem.randRotMax.z
```

To deduct the minimum value, add a subtract sign and use the randRotMin attribute. It isn't necessary to use the Attributes list to add text; if you prefer too, and you're familiar with the commands, you can enter script manually. Type - **fpItem.randRotMin.z** so that the line now reads:

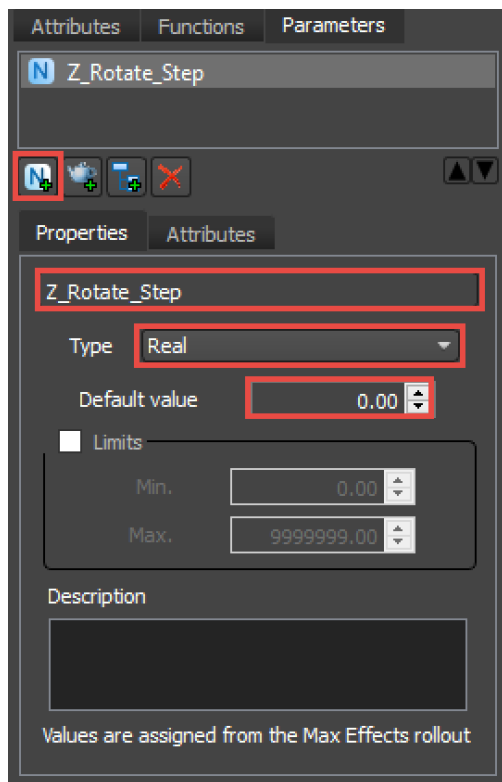
```
real rotateRange = fpItem.randRotMax.z - fpItem.randRotMin.z
```


Finally to separate instructions, every line (except comments) must be terminated with a semi-colon (;). So the final line will read:

```
real rotateRange = fpItem.randRotMax.z - fpItem.randRotMin.z;
```

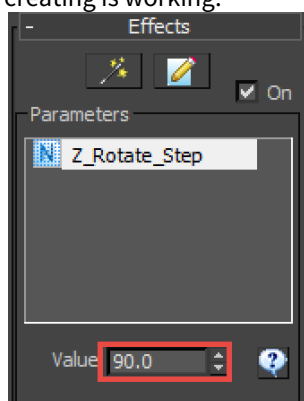
## 7. Parameters

Parameters are variables whose values are assigned and edited from the Effects rollout. These can either be numerical value, the position of another object in the scene, or the output from another object's controller. In this example we need a step value parameter that can be easily accessed by the user.



To add a new parameter you use the Parameters tab on the left of the Effects Editor. Click on the  button to add new numeric Parameter. You can then enter a name for the parameter, this will display in the Effects rollout and is also the variable name that you will use in the script to access the parameter's value. In this example we will name the parameter **Z\_Rotate\_Step** (note that spaces are not allowed). You should also set the type of variable from the drop down list, options are Integer, Real, Scene Units, and Percentage - in this case we need a **Real** number.

In the Effects rollout you will now see the Z\_Rotate\_Step parameter. Select it and enter a value of 90 degrees for testing purposes. Of course any value can be used but this will make it very clear when the effect we are creating is working.



In the next step we will use this parameter to compute to maximum number of random values that can be generated by a given step size within the rotation range. This value is then assigned to a new variable called *stepsInRange*. For example with a range of 270 degrees and a step size of 90, there are 4 possible rotation angles if you include zero: 0, 90, 180, and 270.

8. To calculate this value, at the end of the script and on a new line enter the following code:

```
real stepsInRange = rotateRange/Z_Rotate_Step;
```

This divides the variable we created in step 6 by the Parameter created in the previous step.

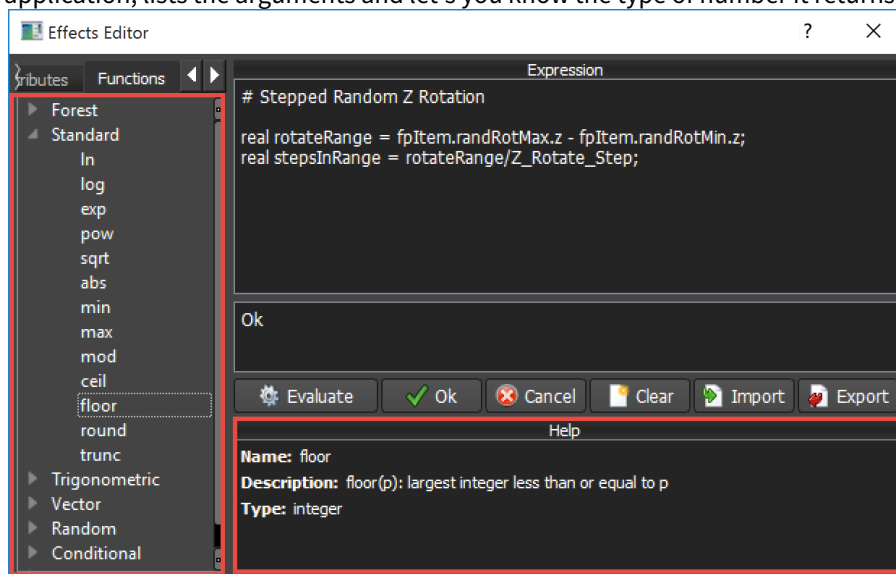
To see the value of *stepsInRange*, you can use the **Print** function:

```
print stepsInRange;
```

Click evaluate and with the current settings the output window will display 3 (because 90 divides into 270 three times). However if we change the **Random > Z Rotate > Max** value to 300 degrees and evaluate again we get **3.33333**. For this equation to work we need to know the number of times *Z\_Rotate\_Step* divides into *rotateRange* and return the results as a **whole** number. To do this we can use a function to round a fractional number down to the nearest whole value.

## 9. Functions

As with attributes, functions can be added by double clicking on them from the functions list or by entering them manually. If you select a function you will find help at the bottom of the effects editor that describes its application, lists the arguments and let's you know the type of number it returns.



To use a function you enter its name followed by the necessary arguments in parenthesis. For example to round **3.33333** down to **3** you would use the function *floor(3.333)*. In our example we will add a floor function to the existing *rotateRange/Z\_Rotate\_Step* equation, so the line will now read:

```
real stepsInRange = floor(rotateRange/Z_Rotate_Step);
```

- Now we know how many times the step value divides into the rotation range we can use this value to create random angles and assign them to the scattered objects. To do this we'll create a random number between 0 and *StepsInRange* and multiply this by *Z\_Rotate\_Step*. To do add this to the last line of the expressions:  

```
real ZRotation = randomInt(0,stepsInRange)*Z_Rotate_Step;
```

Let's look at each piece of this line.

- *real ZRotation* creates a new variable of the type Real.
- *randomInt(0,stepsInRange)* generates a random integer between 0 and the value stored in the variable *stepsInRange*.
- The resultant random number is multiplied by the original rotate *Z\_Rotate\_Steps* value to generate the final rotation values.

- Finally we need to assign the new rotation values to the Forest Pack objects. To do this you use another Attribute - *fpItem.rotation*. Because we only need to change the z axis you append a .z to the end to give us *fpItem.rotation.z*. If you write *fpItem.rotation.z = ZRotation* you won't actually get the correct results because we have been calculating the random angle in Degrees, but *fpItem.rotation* uses Radians. Thankfully it's easy to convert between the two using the *degToRad()* expression. So the final line will read:



```
fpItem.rotation.z = degtorad(ZRotation);
```

12. Remember, if you want to see more clearly what the variables are doing, add a Print command for each one. The final script should look like this:

steppedZRotate.eff	
1	# Stepped Random Z Rotation
2	real rotateRange = fpItem.randRotMax.z - fpItem.randRotMin.z;
3	real stepsInRange = floor(rotateRange/Z_Rotate_Step);
4	real ZRotation = randomInt(0,stepsInRange)*Z_Rotate_Step;
5	fpItem.rotation.z = degtorad(ZRotation);
6	
7	# Print variables for debugging - shows results of 1st Forest item.
8	print rotateRange;
9	print stepsInRange;
10	print ZRotation;

13. Click **OK** to save the expression. Congratulations, you've just created your first effect and you will now have a new spinner in the effects rollout that you can use to step the Transform Z Randomisation property of Forest Pack item. Remember if you want to save this effect to use on other Forest Pack objects in the future you can [Export it from the Effects editor](#).

Click to download the [.eff](#) file for this example. To load it into Forest Pack follow the procedure described [here](#).

## Operators

The operators described below can be used to manipulate data.

### Mathematical Operators

The following arithmetic operators are supported:

Operator	Example Use	Description
+	p+q	Addition
-	p-q	Subtraction
-	-p	Returns the negative of a variable's value
*	p * q	Multiplication
/	p/q	Division
^	p^q	Power

### Vector Operators

When using vectors the following operators apply:

Operator	Example Use	Description
<b>.x</b>	V.x (eg. fplItem.position.x)	Returns the 1st component of a vector
<b>.y</b>	V.y (eg. fplItem.position.y)	Returns the 2nd component of a vector
<b>.z</b>	V.x (eg. fplItem.position.z)	Returns the 3rd component of a vector
<b>+</b>	V+W (eg. fplItem.position+Object.position)	Addition
<b>-</b>	V-W (eg. fplItem.position+Object.position)	Subtraction
<b>*</b>	V*W (eg. fplItem.position*Object.position)	Dot Product
<b>*</b>	V*p (eg fplItem.position*5)	Scalar Multiplication
<b>/</b>	V/p (e.g. fplItem.position/2)	Scalar Division
<b>^</b>	V^W (eg. fplItem.position^Object.position)	Cross Product

### Comparative Operators

Forest effects includes an If function to allow you to create conditional rules.

This function uses the following syntax:

if(p,q,r)

Where p is a logic test which returns q if it returns true or r if it returns false.

To create the conditional tests for an IF function you use following operators:

Operator	Example Use	Description
<b>==</b>	p==q	Return true if p is <b>equal to</b> q
<b>&lt;</b>	p<q	Return true if p is <b>less than</b> q
<b>&gt;</b>	p>q	Return true if p is <b>greater than</b> q
<b>&gt;=</b>	p>=q	Return true if p is <b>greater than or equal to</b> q
<b>&lt;=</b>	p<=q	Return true if p is <b>less than or equal to</b> q
<b> </b>	p q	Return true if p <b>or</b> q are true
<b>&amp;</b>	p&q	Returns true if p <b>and</b> q are true

## Functions

Forest Effects provide access to a comprehensive list of Functions to provide many common mathematical expressions plus additional operations that are unique to Forest Pack. You'll find the full list including syntax, description and parameters in the list below. This information can also be accessed directly inside the [Effects Editor](#).

### Forest Functions

#### fpSurfaceHitZ

<b>Syntax</b>	fpSurfaceHitZ(p)
<b>Description</b>	Computes the projection of p onto the Forest surface (XY mode only). Returns z value
<b>Parameters</b>	P
<b>Returns</b>	Real

#### fpSurfaceHit

<b>Syntax</b>	fpSurfaceHit(p)
<b>Description</b>	Check if the projection of p hits onto the Forest surface (XY mode only). Returns 1 or 0.
<b>Parameters</b>	P
<b>Returns</b>	Vector

#### fpSurfaceHitNormal

<b>Syntax</b>	fpSurfaceHitNormal(p)
<b>Description</b>	Computes the projection of p onto the Forest surface (XY mode only). Returns normal vector
<b>Parameters</b>	P
<b>Returns</b>	Real

#### fpRandomGeom

<b>Syntax</b>	fpRandomGeom()
---------------	----------------

### Trigonometric Functions

#### sin

<b>Syntax</b>	sin(p)
<b>Description</b>	Sine of p (p expressed in radians)
<b>Parameters</b>	p
<b>Returns</b>	Real

#### cos

<b>Syntax</b>	cos(p)
<b>Description</b>	Cosine of p (p expressed in radians)
<b>Parameters</b>	p
<b>Returns</b>	Real

#### tan

<b>Syntax</b>	tan(p)
<b>Description</b>	Tangent of p (p expressed in radians)
<b>Parameters</b>	p
<b>Returns</b>	Real

#### asin

<b>Syntax</b>	asin(p)
<b>Description</b>	Arc sine of p (p expressed in radians)
<b>Parameters</b>	p
<b>Returns</b>	Real

**Description** Returns a random ID from the Geometry List. Can be assigned to fpltem.geomID

**Parameters** -

**Returns** Integer

---

Max Functions

#### evaluateTexture

**Syntax** evaluateTexture(texmap, uvw)

**Description** Evaluate a Texture Map Parameter, using specified uvw coordinates (vector). Return value as vector

**Parameters** Texmap, UVW

**Returns** Vector

---

#### evaluateCurve

**Syntax** evaluateCurve(curve, x)

**Description** Returns Y value for the Curve Parameter on X position

**Parameters** Curve, X

**Returns** Real

---

Standard Functions

#### ln

**Syntax** ln(p)

**Description** Natural (base e) logarithm

**Parameters** p

**Returns** Real

---

#### log

**Syntax** log(p)

---

#### acos

**Syntax** acos(p)

**Description** Arc cosine of p (p expressed in radians)

**Parameters** p

**Returns** Real

---

#### atan

**Syntax** atan(p)

**Description** Arc tangent of p (p expressed in radians)

**Parameters** p

**Returns** Real

---

#### atan2

**Syntax** atan2(x,y)

**Description** Returns the principal value of the arc tangent of y/x, expressed in radians

**Parameters** x  
y

**Returns** Real

---

#### sinh

**Syntax** sinh(p)

**Description** Hyperbolic sine of p (p expressed in radians)

**Parameters** p

**Returns** Real

---

#### cosh

**Syntax** cosh(p)

**Description** Common (base 10) logarithm

**Parameters** p

**Returns** Real

---

#### exp

**Syntax** exp(p)

**Description** Exponential function –  $\exp(e) = e^p$

**Parameters** p

**Returns** Real

---

#### pow

**Syntax** pow(p,q)

**Description** p to the power of q –  $p^q$

**Parameters** p  
q

**Returns** Real

---

#### sqrt

**Syntax** sqrt(p)

**Description** square root"

**Parameters** p

**Returns** Real

---

#### abs

**Syntax** abs(p)

**Description** absolute value

**Parameters** p

**Returns** Real

---

#### min

**Description** Hyperbolic cosine of p (p expressed in radians)

**Parameters** p

**Returns** Real

---

#### tanh

**Syntax** tanh(p)

**Description** Hyperbolic tangent of p (p expressed in radians)

**Parameters** p

**Returns** Real

---

#### radToDeg

**Syntax** radToDeg(p)

**Description** Takes p in radians and returns the same angle in degrees

**Parameters** p

**Returns** Real

---

#### degToRad

**Syntax** degToRad(p)

**Description** Takes p in degrees and returns the same angle in radians

**Parameters** p

**Returns** Real

---

#### Vector Functions

##### length

**Syntax** length(v)

**Description** The length of v.

<b>Syntax</b>	<code>min(p, q)</code>
<b>Description</b>	minimum: returns p or q depending on which is smaller
<b>Parameters</b>	p
<b>Returns</b>	Real

**max**

<b>Syntax</b>	<code>max(p, q)</code>
<b>Description</b>	maximum: returns p or q depending on which is larger
<b>Parameters</b>	p
<b>Returns</b>	Real

**mod{section****Syntax**`mod(p, q)`**Description**remainder of p divided by q**Parameters**p**Returns**Real**ceil**

<b>Syntax</b>	<code>ceil(p)</code>
<b>Description</b>	smallest integer greater than or equal to p
<b>Parameters</b>	p
<b>Returns</b>	Integer

**floor****Syntax**`floor(p)`**Parameters**`v`**Returns**Real**unit****Syntax**`unit(v)`**Description**Returns a unit vector in the same direction as v**Parameters**`v`**Returns**Vector**comp****Syntax**`comp(v,i)`**Description**l-th component, where i=0, 1, or 2.  
`comp(5,6,7, 1) = 6`**Parameters**  
v  
i**Returns**Real**dotprod****Syntax**`dotprod(u,v)`**Description**Dot product of vectors u and v. Same result can be obtained using `u * v`**Parameters**  
u  
v**Returns**Vector**crossprod****Syntax**`crossprod(u,v)`**Description**Cross product of vectors u and v. Same result can be obtained using `u ^ v`**Parameters**  
u  
v

**Description** largest integer less than or equal to p

**Parameters** p

**Returns** Integer

---

#### round

**Syntax** round(p)

**Description** value of p rounded to the nearest integral

**Parameters** p

**Returns** Integer

---

#### trunc

**Syntax** trunc(p)

**Description** nearest integral not larger in magnitude than p

**Parameters** p

**Returns** Integer

---

#### Conditional Functions

##### if

**Syntax** if(p,q,r)

**Description** Conditional: if p is nonzero then returns q, otherwise r

**Parameters** p  
q  
r

**Returns** Any

---

#### Interpolation Functions

##### easeln

**Syntax** easeln(x,x1,x2,y1,y2)

**Returns** Vector

---

#### Random Functions

##### randomReal

**Syntax** randomReal(a,b)

**Description** Returns a real random number in the range (a,b)

**Parameters** a  
b

**Returns** Real

---

##### randomInt

**Syntax** randomInt(a,b)

**Description** Returns an integer random number in the range [a,b](#)

**Parameters** a  
b

**Returns** Integer

---

**Description** Returns an ease-in interpolation between y1 and y2. Returns y1 when x < x1

**Parameters** x  
x1  
x2  
y1  
y2

**Returns** Real

---

#### easeOut

**Syntax** easeOut(x,x1,x2,y1,y2)

**Description** Returns an ease-out interpolation between y1 and y2. Returns y2 when x > x2

**Parameters** x  
x1  
x2  
y1  
y2

**Returns** Real

---

#### easeInOut

**Syntax** easeInOut(x,x1,x2,y1,y2)

**Description** Returns an ease-in-out interpolation between y1 and y2. Returns y1 when x < x1 and y2 when x > x2

**Parameters** x  
x1  
x2  
y1  
y2

**Returns** Real

---

#### Attributes

Attributes allow you to read and edit the properties of Forest Pack to create sophisticated new effects. The list below is also replicated in the Effects editor for easy access.



## Read/write Forest Pack item attributes

The attributes below can be both read and edited. These important attributes represent all the aspects of a scattered item that can be controlled using Forest Effects.

Attribute	Description	Returns	Writable
<b>fplItem.position</b>	Position of Forest Item in local coordinates	Vector	Yes
<b>fplItem.rotation</b>	Rotation of Forest Item in local coordinates (expressed in radians)	Vector	Yes
<b>fplItem.xrotaxis</b>	Rotation of Forest Item expressed as a system of 3 vectors (X component)	Vector	Yes
<b>fplItem.xrotaxis</b>	Rotation of Forest Item expressed as a system of 3 vectors (Y component)	Vector	Yes
<b>fplItem.xrotaxis</b>	Rotation of Forest Item expressed as a system of 3 vectors (Z component)	Vector	Yes
<b>fplItem.scale</b>	Scale of Forest Item in local coordinates	Vector	Yes
<b>fplItem.visible</b>	Set this to zero to hide the item from distribution	Integer	Yes
<b>fplItem.geomID</b>	Index in the Geometry List, starting at zero	Integer	Yes
<b>fplItem.tintColor</b>	Tint color (R,G,B)	Vector	Yes
<b>fplItem.tintMulti</b>	Tint Multiplier (0.0 to 1.0)	Float	Yes
<b>fplItem.animSample</b>	Animation Sample index (zero based)	Integer	Yes
<b>fplItem.surfDirection</b>	Direction on Surface (-100 to 100)	Integer	Yes
<b>fplItem.randTransMin</b>	Random translation minimum range (X,Y,Z)	Vector	Yes
<b>fplItem.randTransMax</b>	Random translation maximum range (X,Y,Z)	Vector	Yes
<b>fplItem.randRotMin</b>	Random rotation minimum range (X,Y,Z)	Vector	Yes
<b>fplItem.randRotMax</b>	Random rotation maximum range (X,Y,Z)	Vector	Yes
<b>fplItem.randScaleMin</b>	Random scale minimum range (X,Y,Z)	Vector	Yes
<b>fplItem.randScaleMax</b>	Random scale maximum range (X,Y,Z)	Vector	Yes

## Read-only Forest Pack item attributes

The attributes below are read only and cannot be edited using Forest Effects. You can however use them to create expressions that manipulate the values of attributes detailed in the list shown above.

Attribute	Description	Returns	Writable
<b>fplItem.geomColor</b>	Color ID in the Geometry List (R,G,B)	Vector	No
<b>fplItem.userID</b>	Generic value which can be assigned from Tree Editor	Integer	No
<b>fplItem.geomProbability</b>	Probability value in the Geometry List	Float	No
<b>fplItem.distXPixel</b>	X pixel index in the Distribution Map (Generate mode only)	Float	No
<b>fplItem.distYPixel</b>	Y pixel index in the Distribution Map (Generate mode only)	Float	No
<b>fplItem.distXTile</b>	X Tile index in the Distribution Map (Generate mode only)	Float	No
<b>fplItem.distYTile</b>	Y Tile index in the Distribution Map (Generate mode only)	Float	No
<b>fplItem.distUVW</b>	UVW Coordinates for Distribution Map (using Surfaces only)	Vector	No
<b>fplItem.distPathPos</b>	Normalized position of item on path (Distribution by Path only)	Real	No
<b>fplItem.distPathTangent</b>	Tangent vector of path on item position (Distribution by Path only)	Real	No
<b>fplItem.collisionRadius</b>	Radius of the virtual sphere used for Collisions checking	Float	No
<b>fplItem.collisionHeight</b>	Height of the virtual sphere used for Collisions checking	Float	No
<b>fplItem.mirror</b>	1 if item is mirrored, 0 if not	Integer	No
<b>fplItem.animOffset</b>	Animation Offset (in ticks, 4800 ticks per second)	Integer	No
<b>fplItem.animNumSamples</b>	Number of animation samples (as defined in Animation rollout)	Integer	No
<b>fplItem.surfNormal</b>	Normal to Surface	Vector	No
<b>fplItem.surfSlope</b>	Slope angle on Surface	Real	No

Attribute	Description	Returns	Writable
<b>fplItem.areaIncDistance</b>	Distance to nearest include area	Real	No
<b>fplItem.areaIncNearest</b>	Position of the nearest point of include areas (splines only)	Vector	No
<b>fplItem.areaExcDistance</b>	Distance to nearest exclude area	Real	No
<b>fplItem.areaExcNearest</b>	Position of the nearest point of exclude areas (splines only)	Vector	No
<b>fplItem.areaFalloffScale</b>	Scale factor applied to the item due to Areas->Falloff	Vector	No
<b>fplItem.particleAge</b>	Particle Age in ticks (only for For Particle Flow distributions)	Integer	No
<b>fplItem.particleRotation</b>	Particle rotation defined by incremental rotations in world axes XYZ (in radians)	Vector	No
<b>fplItem.particleScale</b>	Particle scale (only for Particle Flow distributions)	Vector	No
<b>fplItem.particleSpeed</b>	Particle Speed (only for Particle Flow distributions)	Vector	No
<b>fplItem.particleEventID</b>	Numeric ID generated from the Event's name in a PFlow distribution (i.e. 'PF Source 01->Event 02' get ID = 2)	Integer	No

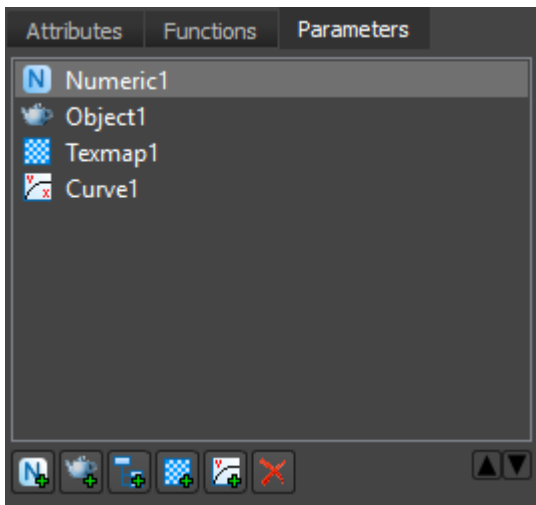
#### Read-only Max attributes

The list below details the attributes of Max that have been exposed if Forest Effects.

Attribute	Description	Returns	Writable
<b>max.time</b>	Current animation time (in ticks, 4800 ticks per second)	Integer	No

#### Parameters

In addition to variables declared directly in the expression and Forest Packs built-in attributes, you can also create Parameters. These allow the user to control effects by editing values directly in the Effects rollout without needing to open the Effects Editor or understand the expression. Parameters are created using the **Parameters Tab** found on the left side of the effects editor.



There are 5 types available which you create by clicking on the corresponding button:



**Numeric Parameters.** Adds a numeric spinner to the effects rollout. Number format can be set to real, integer, percentage (real), or scene units (real).



**Object Parameters.** Adds an object picker to the effects rollout and allows you to access the selected object's position vector.



**Controller Parameters.** Allow you to access the output from any controller in 3ds Max, picked from the effects rollout.



**Texture Parameters.** Allow you to use the RGB values from a map, picked from the effects rollout.



**Curve Parameters.** Allow you to use a curve to control values. The curve can be edited from the effects rollout.

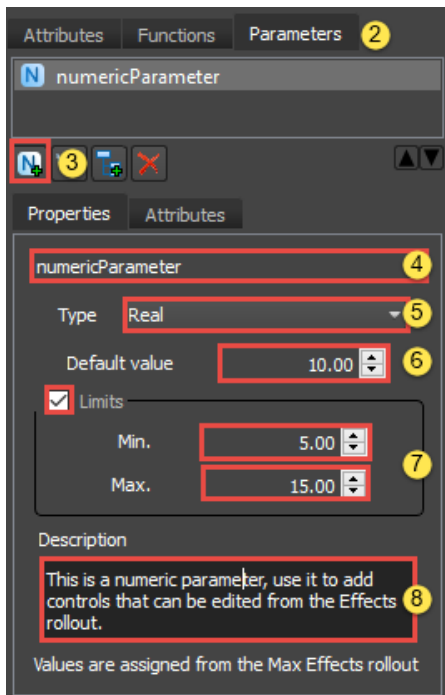
Each parameter must be assigned a unique name which is used in the expression to call the parameter's value, the following restrictions apply:




- Cannot be the same as an existing attribute, function, variable or parameter.
- Must only consist of alpha-numeric symbols and underscores (\_).
- Cannot start with a number.
- Cannot contain spaces.
- Parameters are local to the Forest Object, this means you can use the same name in different objects without problems.

The procedures show below explain how to create and edit the five different parameter types.

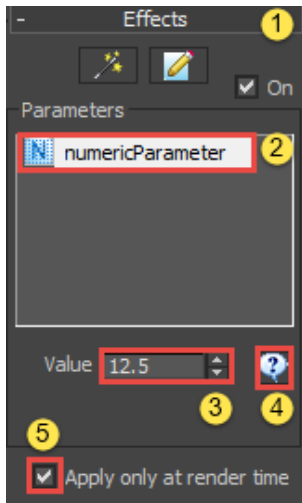
## Procedures


To create a Numeric Parameter



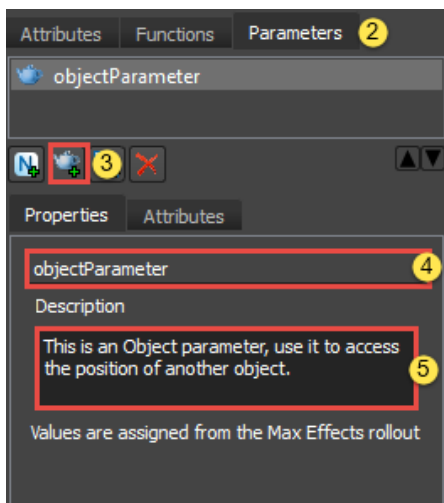
1. In the Effects rollout, click  to open the **Effects Editor**.
2. Select the **Parameters tab** in the Command List.
3. Click  to add a new **Numeric** Parameter.
4. In the Name box, assign the Parameter a unique **variable name**. This will be shown in the Effects rollout and is used in the expression to refer to the value it contains.
5. Use the **Type** dropdown to set the type of number from Integer, Real, Percentage (real) and Scene Units (real).
6. Set a **Default Value**, this is the value that will be used when the effect is first loaded and applied, before the user has made any edits.
7. If necessary active **Limits** and enter a **Minimum** and **Maximum** value to constrain the parameter to within a range.
8. Optionally enter a **Description** explaining the parameter. This message will display when a user clicks the  button in the effects rollout.




To edit a Numeric Parameter



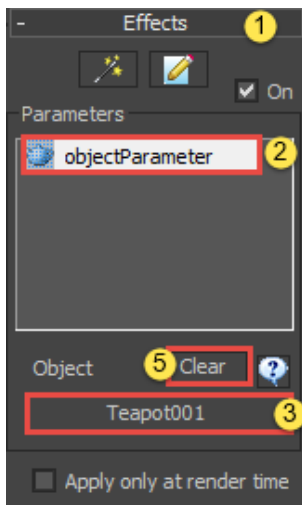
1. Open the **Effects rollout**.
2. Select a Parameter from the **list**.
3. Enter a new **value**.
4. To see a **description** of the parameter, click .
5. To deactivate an effect in the viewports, click the **Apply only at rendertime** checkbox. This can improve interactivity for complex effects.

To create an Object Parameter



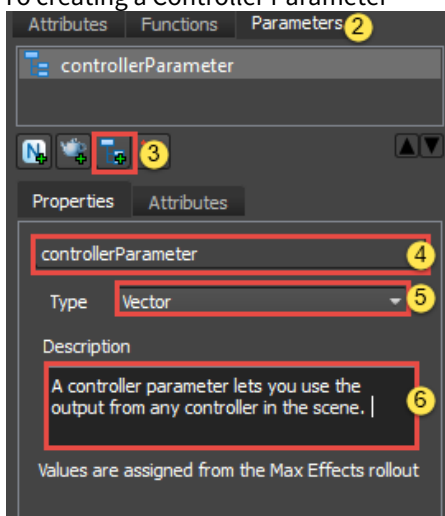
1. In the Effects rollout, click  to open the **Effects Editor**.
2. Select the **Parameters tab** in the Command List.
3. Click  to add a new **Object** Parameter.
4. In the Name box, assign the Parameter a unique **variable name**. This will be shown in the Effects rollout and is used in the expression to refer to the value it contains.
5. Optionally enter a **Description** explaining the parameter. This message will display when a user clicks the  button in the effects rollout.




To assigning an Object Parameter



1. Open the **Effects** rollout.
2. Select an Object Parameter from the **list**.
3. Click on **None**
4. Pick an object from the scene.
5. To remove the object from the Parameter, click **Clear**

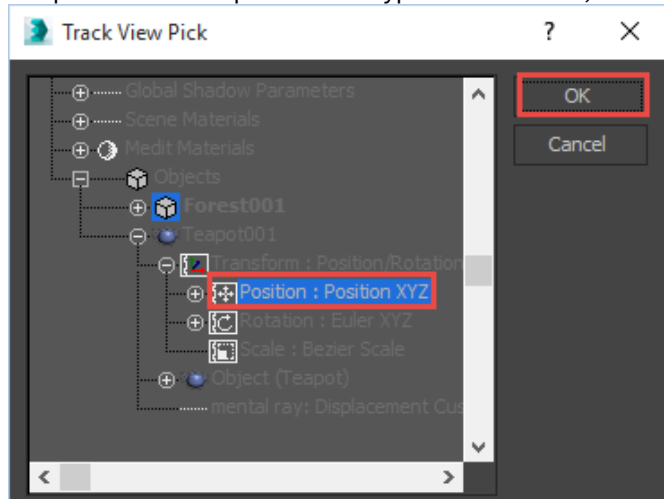
To creating a Controller Parameter



1. In the Effects rollout, click  to open the **Effects Editor**.
2. Select the **Parameters** tab in the Command List.
3. Click  to add a new **Controller** Parameter.
4. In the Name box, assign the Parameter a unique **variable name**. This will be shown in the Effects rollout and is used in the expression to refer to the value it contains.
5. Use the **Type** dropdown to set the type of number from Integer, Real, or Vector. Only tracks of the same type will be pickable from the Effects rollout.
6. Optionally enter a **Description** explaining the parameter. This message will display when a user clicks the  button in the effects rollout.

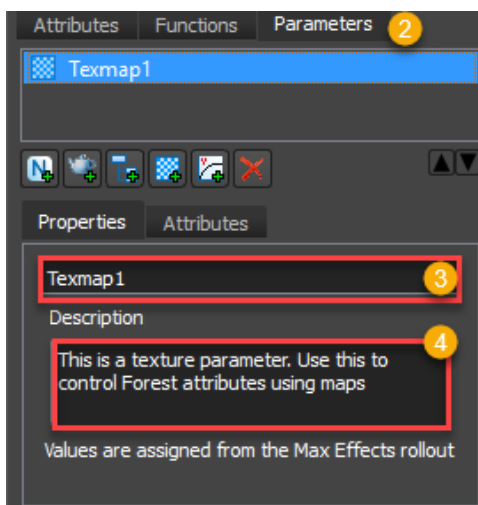
To assign a Controller parameter




1. Open the **Effects rollout**.
2. Select a Controller parameter from the **list**.
3. Click on **Pick**
4. The Track View Pick dialogue will open showing the scenes objects and their controllers. Controllers that are compatible with the parameter's type are selectable, incompatible tracks are greyed out.



5. Select a compatible controller and click **OK**.

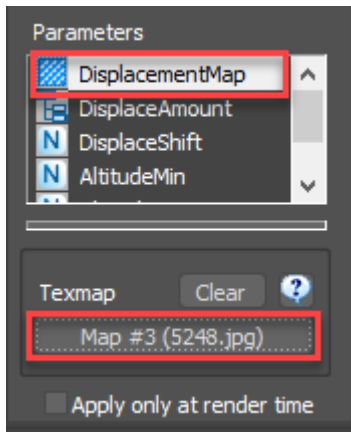
To create a Texture Parameter



1. In the Effects rollout, click  to open the **Effects Editor**.
2. Select the **Parameters tab** in the Command List.
3. Click  to add a new **Texture** Parameter.
4. In the **Name** box, assign the Parameter a unique **variable name**. This will be shown in the Effects rollout and is used in the expression to refer to the value it contains.
5. Optionally enter a **Description** explaining the parameter. This message will display when a user clicks the  button in the effects rollout.



To assigning a Texture Parameter



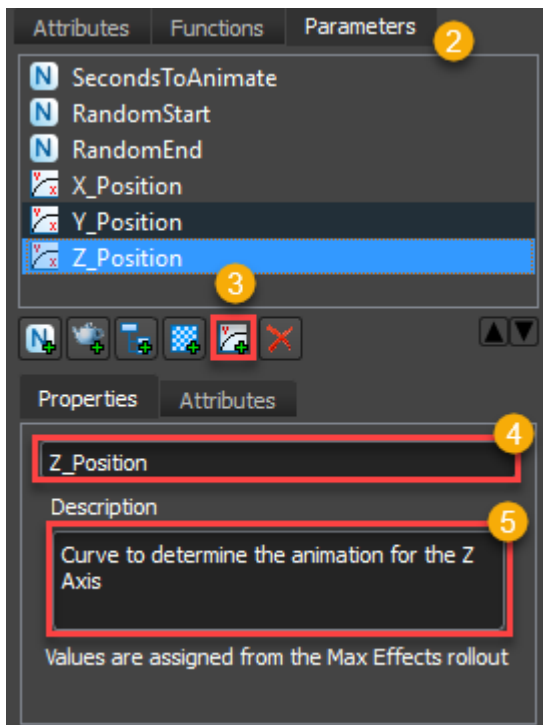
1. Open the **Effectsrollout** and go to the Parameters list
2. Pick the Texture parameter
3. Click on the TexMap picker and select a texture, or drag a texture from the material editor to this slot.
4. Use the Clear button to remove the existing Texture map.
5. In the Effect you can use the following format to access the texture information:

`evaluateTexture([parameter name], [UVW Coordinate]);`



**E.G.**

`vector tintColor = evaluateTexture(DisplacementMap,fpltem.distUVW);`

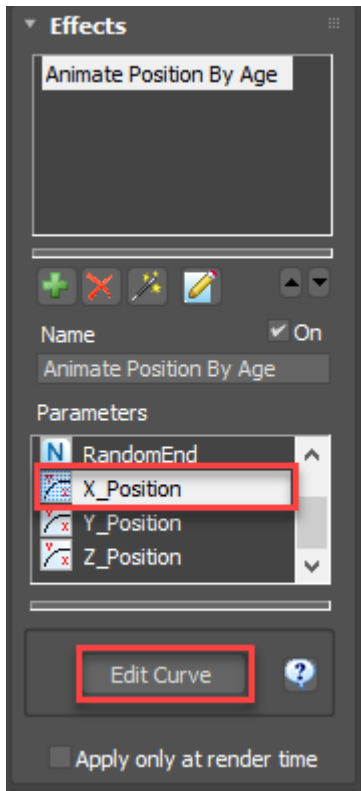
To create a Curve Parameter



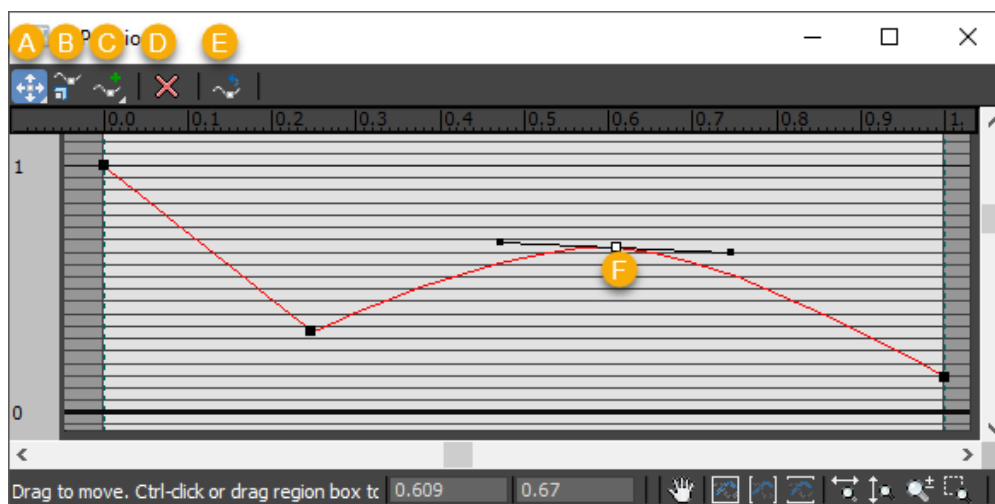
1. In the Effects rollout, click  to open the **Effects Editor**.

2. Select the **Parameters tab** in the Command List.
3. Click  to add a new **Curve** Parameter.
4. In the **Name** box, assign the Parameter a unique **variable name**. This will be shown in the Effects rollout and is used in the expression to refer to the value it contains.
5. Optionally enter a **Description** explaining the parameter. This message will display when a user clicks the  button in the effects rollout.

To edit a Curve Parameter



1. Open the **Effects rollout** and go to the Parameters list
2. Pick the Curve parameter
3. Click on Edit Curve to open the curve editor
4. Forest Pack uses Max's default curve editor.



Use:



- a - to move points
  - b - to scale points
  - c - to add points
  - d - to delete points
  - e - to reset curves
  - f - right click to change the curve type (choices include corner, bezier-smooth, and bezier-corner).
5. In the Effect you can use the following format to access the curve's output:

```
evaluateCurve([Curve name], [X Position]);
```

**E.G.**

```
fplItem.position.x = evaluateCurve(X_position,timePosition);
```

To delete a parameter

1. In the Effects rollout, click  to open the **Effects Editor**.
2. Select the **Parameters tab** in the Command List.
3. Select the parameter you wish to delete from the list.
4. Click .

To use a Parameter's value in an expression

1. Type the name of the parameter, case is ignored.
2. For vectors, append .x, .y, and .z to access the 3 components.

## 6.7.6 Effects Examples

Please find links to examples of effects below with accompanying .eff files and a list of the parameters, attributes and functions used.

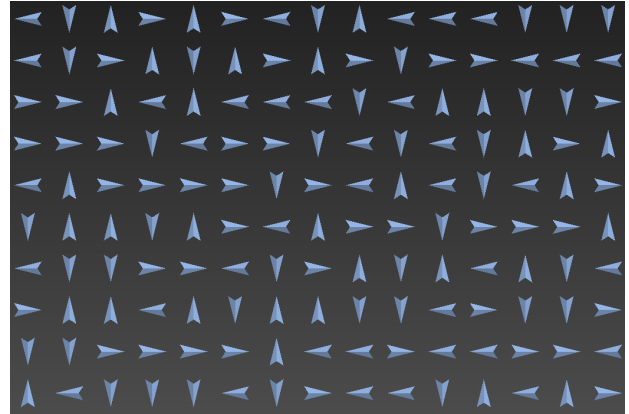
- [Stepped Rotation](#)
- [Lean out](#)
- [Tint by Object](#)
- [Tint by Boundary](#)
- [Look At object with Falloff](#)

- [Look at Boundary with Falloff](#)
- [Repulsion](#)
- [Bend by Object](#)
- [XY Local Translate](#)
- [Cars along spline](#)
- [Place items on a displaced surface](#)

## Stepped Rotation

Stepped rotation allows you to control the rotate the Z Rotation of forest items using a stepped increment. To use it:

1. Go to the **Transform** rollout and enable **Rotation**.
2. Enter a value for **Z > Min** and **Z > Max** as normal.
3. Go to the effects rollout and enter the stepped increment value in degrees for the parameter named **Z\_Rotate\_Step**. The objects will now only rotate using increments of this angle.



Effect Script:

```

1  real rotateRange = fpItem.randRotMax.z - fpItem.randRotMin.z;
2  real stepsInRange = floor(rotateRange/Z_Rotate_Step);
3  real ZRotation = randomInt(0,stepsInRange)*Z_Rotate_Step;
4  fpItem.rotation.z = degtorad(ZRotation);

```

You can find this Effect within the [Forest Effects Library](#).

This Effect Uses:

### Parameters

- **Z\_Rotate\_Step**  
Type: Real

### Attributes

- **fpItem.randRotMin.z**  
Minimum Z rotation as set in the Transform rollout.
- **fpItem.randRotMax.z**  
Maximum Z rotation as set in the Transform rollout.
- **fpItem.rotation.z**  
Individual item's Z rotation.

### Functions

- **Floor(p)**  
Lowers p to nearest whole number.
- **RandomInt(p,q)**  
Generate a random integer between p and q.
- **degToRad(p)**  
Converts degrees to radians. The opposite, radToDeg(p) is also possible.

## Lean out

The lean out expression rotates trees towards the nearest include spline boundary, to use it.

1. Create a Forest object with Splines defining the Include areas. Randomise rotation as you would Normally
2. Go to the Effects rollout and enter a value in **Lean\_Out\_Amount**. This will determine the angle of the lean effect
3. To adjust the distance from the boundary's edge that the lean out effect influences, edit the **Lean\_Out\_Distance** parameter.
4. Because the lean out rotation overwrites any randomised rotation use used in the transform rollout you can reintroduce to rotation variation using the **RandomWiggle** parameter.



Sorry, the widget is not supported in this export.

But you can reach it using the following URL:

<https://www.youtube.com/watch?v=WCiQmqdo9ck>

## Effect Script

```

1  #Find vector to nearest border
2  Vector vec1 = fpItem.areaIncNearest- fpItem.position;
3  #calculate lean angle
4  real angle = atan2(vec1.x,vec1.y)-degToRad(90);
5
6  #calculate falloff
7  real leanOutX = easeIN(fpItem.areaIncDistance,Lean_Out_Distance,
8  0,fpItem.rotation.x,sin(angle+degToRad(randomReal(-
9  randomWiggle,randomWiggle)))*Lean_Out_Amount);
10 real LeanOutY = easeIN(fpItem.areaIncDistance,Lean_Out_Distance,
11 0,fpItem.rotation.y,cos(angle+degToRad(randomReal(-
12 randomWiggle,randomWiggle)))*Lean_Out_Amount);
13
14 #assign lean angles to forest item
15 fpItem.rotation.x = leanOutX;
16 fpItem.rotation.y = leanOuty;
```

You can find this Effect within the [Forest Effects Library](#).

This Effect Uses:

### Parameters

- **Lean\_Out\_Amount**  
Type: Real
- **Lean\_Out\_Distance**  
Type: Scene Units
- **RandomWiggle**  
Type: Real

### Attributes

- **fpItem.areaIncNearest**  
Vector to nearest include area edge.
- **fpItem.areaIncDistance**  
Distance to nearest include area.

### Functions

- **atan2(x,y)**  
Returns the principal value of the arc tangent of y/x, expressed in radians
- **degToRad(p)**  
Converts degrees to radians.
- **easeIn(x,x1,x2,y1,y2)**  
Returns an ease-in interpolation

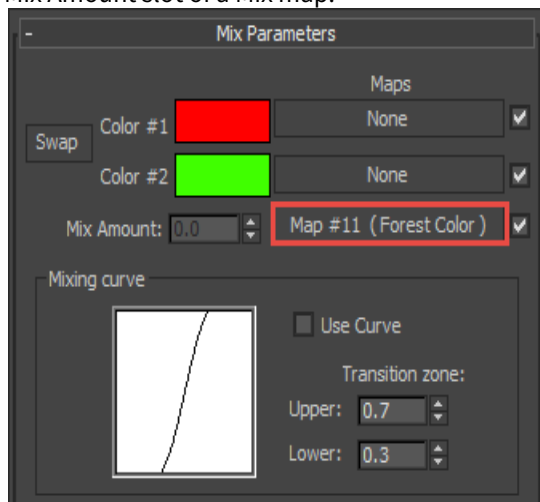
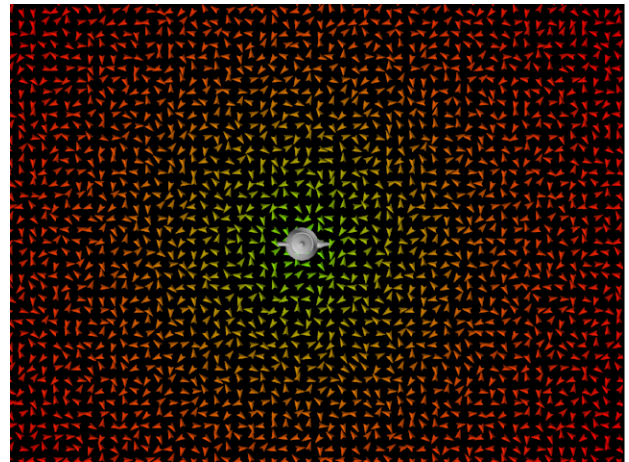
- **fpltem.position**  
Position vector of individual fp Item.
- **fpltem.rotation.x**  
Individual item's X rotation.
- **fpltem.rotation.y**  
Individual item's Y rotation.

between y1 and y2. Returns y1 when  $x < x1$

## Tint by Object

Tint by Object allows you to control the tint of a Forest Colour map based on the item's distance from an object. To use it:

1. Make sure the source objects have a material that uses a Forest Colour map.
2. The Forest Colour map must have override turned **Off** in order to be controlled by an expression.
3. In the Materials rollout the **Random Strength** value is still applicable - for the tint to work fully set the start and end to 100%. Use different values if you'd like to retain some randomisation.
4. Forest colour can be used as a sub-map. For example, the example code below is blending between black and white based on distance and the Forest colour map is then being used in the Mix Amount slot of a Mix map.



## Effect Script:

```

1  vector v = Lookat.Position - fpItem.Position;
2  real tintStrength = easein(length(v),tintFalloff,0,0,1);
3  fpItem.tintColor = [tintStrength,tintStrength,tintStrength];

```

You can find this Effect within the [Forest Effects Library](#).

## This Effect Uses:

## Parameters

- **lookAt**  
Type: Object
- **tintFalloff**  
Type: Scene  
Units

## Attributes

- **fpItem.position**  
Minimum Z  
rotation as set in  
the Transform  
rollout.
- **fpItem.tintColor**  
Maximum Z  
rotation as set in  
the Transform  
rollout.

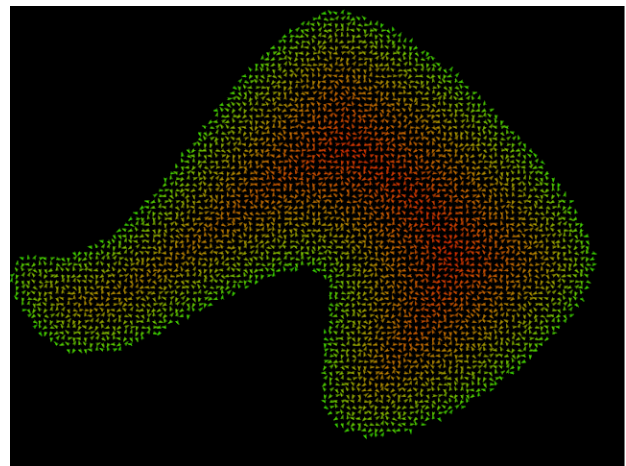
## Functions

- **easeIn(x,x1,x2,y1,y2)**  
Returns an ease-in interpolation between y1 and y2.  
Returns y1 when x < x1.
- **length(v)**  
The length of v.

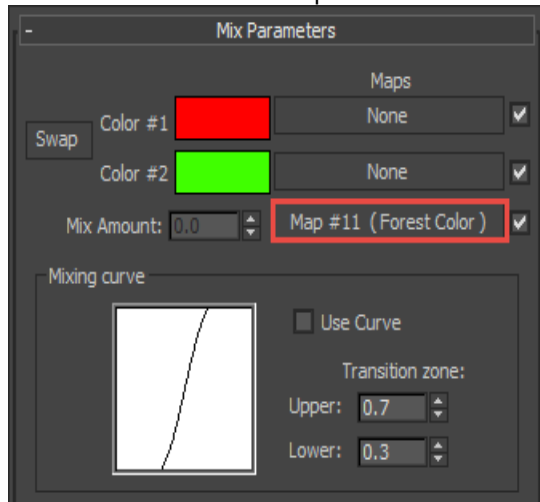
## Tint by Boundary

Tint by Object allows you to control the tint of a Forest Colour map based on the item's distance from an include spline's boundary. To use it:

1. Make sure the source objects have a material that uses a Forest Colour map.
2. The Forest Colour map must have override turned **Off** in order to be controlled by an expression.
3. In the Materials rollout the **Random Strength** value is still applicable - for the tint to work fully set the start and end to 100%. Use different values if you'd like to retain some randomisation.
4. Forest colour can be used as a sub-map. For example, the example code below is blending between black and white based on distance and the Forest colour map is then being used in the



Mix Amount slot of a Mix map.



5. Use the **tintFalloff** parameter to set the size of the falloff effect.

Effect Script:

```

1  vector v = fpItem.areaIncNearest - fpItem.Position;
2  real tintStrength = easeIn(fpItem.areaIncDistance,DistanceToEdge,0,0,1);
3  fpItem.tintColor = [tintStrength, tintStrength, tintStrength];

```

You can find this Effect within the [Forest Effects Library](#).

This Effect Uses:

#### Parameters

- **distanceToEdge**  
Type: Scene  
Units

#### Attributes

- **fpItem.position**  
Minimum Z rotation as set in the Transform rollout.
- **fpItem.areaIncNearest**  
Position of the nearest point of include areas (splines only).
- **fpItem.tintColor**  
Maximum Z rotation as set in the Transform rollout.

#### Functions

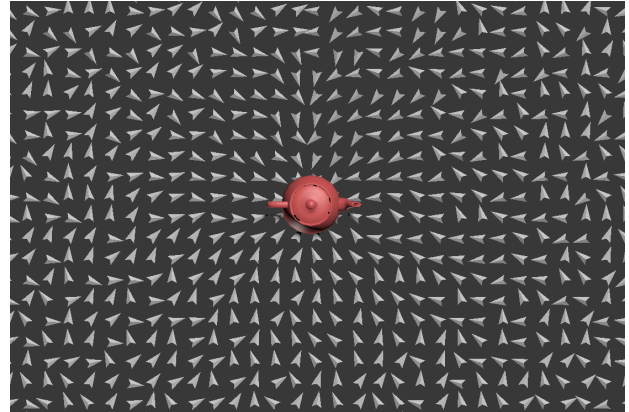
- **easeIn(x,x1,x2,y1,y2)**  
Returns an ease-in interpolation between y1 and y2. Returns y1 when x < x1.
- **length(v)**  
The length of v.



## Look At object with Falloff

Look At object with Falloff allows you to rotate items to look at a specified object and additionally specify a falloff range so that only items within a certain radius of the object are affected. To use it.

1. Use the **Effects > lookAt** parameter to pick the look at target from the scene.
2. Use the **Effects > falloffDistance** parameter to specify the falloff for the look at effect.



### Effect Script:

```

1  vector v = Lookat.Position - fpItem.Position;
2  fpItem.rotation.z = easein(length(v),falloffDistance,0,fpItem.rotation.z,
    -atan2(v.x, v.y));

```

You can find this Effect within the [Forest Effects Library](#).

### This Effect Uses:

#### Parameters

- **falloffDistance**  
Type: Scene  
Units
- **lookAt**  
Type: Object

#### Attributes

- **fpItem.position**  
Minimum Z  
rotation as set in  
the Transform  
rollout.
- **fpItem.rotation.z**  
Rotation of Forest  
Item on Z axis in  
local coordinates.

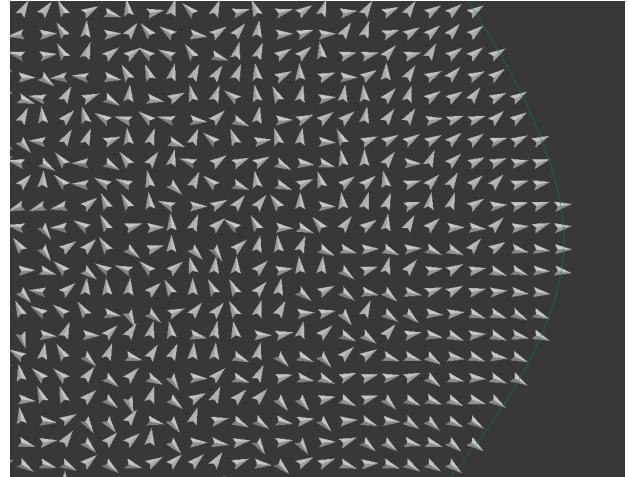
#### Functions

- **easeIn(x,x1,x2,y1,y2)**  
Returns an ease-in interpolation between y1 and y2.  
Returns y1 when x < x1.
- **length(v)**  
The length of v.
- **atan2(x,y)**  
Returns the principal value of the arc tangent of y/x,  
expressed in radians

## Look at Boundary with Falloff

Look at Boundary with Falloff allows you to rotate items to look at the nearest Include spline's boundary edge with additional controls to specify a falloff range so that only items within a certain distance of the edge are affected. To use it.

1. Make sure you use Splines as include areas (can be used in combination with surfaces).
2. Use the **Effects > distanceToEdge** parameter to specify the falloff for the look-at effect.



Effect Script:

```
1 vector v = fpItem.areaIncNearest - fpItem.Position;
2 fpItem.rotation.z = easein(fpItem.areaIncDistance,DistanceToEdge,
0,fpItem.rotation.z, -atan2(v.x, v.y));
```

You can find this Effect within the [Forest Effects Library](#).

This Effect Uses:

Parameters	Attributes	Functions
<ul style="list-style-type: none"> <li>• <b>distanceToEdge</b> Type: Scene Units</li> </ul>	<ul style="list-style-type: none"> <li>• <b>fpItem.position</b> Minimum Z rotation as set in the Transform rollout.</li> <li>• <b>fpItem.areaIncNearest</b> Position of the nearest point of include areas (splines only)</li> <li>• <b>fpItem.areaIncDistance</b> Distance to nearest include area</li> <li>• <b>fpItem.rotation.z</b> Rotation of Forest Item on Z axis in local coordinates.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>easeIn(x,x1,x2,y1,y2)</b> Returns an ease-in interpolation between y1 and y2. Returns y1 when x &lt; x1.</li> <li>• <b>atan2(x,y)</b> Returns the principal value of the arc tangent of y/x, expressed in radians</li> </ul>

## Repulsion

Repulsion computes the distance in 2 dimensions to a given object and applies a "repel" effect according to the distance and strength parameters. Next, the item is projected onto the surface in its new position using the `fpSurfaceHitZ` function. To use it:

1. Use **Object** to pick an object from the scene that will repel forest items.
2. Use the **Distance** parameter to set falloff limits of the repulsion effect.
3. Use the **Strength** parameter to push scattered items away from the repulsion object.
4. Use the **Controller** property to pick a track from the scene that is added to the distance parameter to control the falloff limits. For example if you are using a ball to repel Forest items you could use the Radius controller to automatically adjust the falloff distance as the ball is re-sized.



Sorry, the widget is not supported in this export.

But you can reach it using the following URL:

<https://www.youtube.com/watch?v=ReAHoaA3xnY&feature=youtu.be>

### Effect Script:

```

1  vector vec = [fpItem.position.x - Object.position.x, fpItem.position.y -
2  Object.position.y, 0];
3  vector dir = unit(vec);
4  real dist = length(vec);
5  real dd = easeOut(dist, 0, (Distance+Controller)*5,
6  (Distance+Controller)*2.5, 0) * Strength / 100;
7  vector displ = dir * dd;
8  fpItem.position = fpItem.position + displ;
9  fpItem.geomID = if(dd > 0,1, fpItem.geomID);
10 fpItem.position.z = fpSurfaceHitZ(fpItem.position);

```

You can find this Effect within the [Forest Effects Library](#).

### This Effect Uses:

Parameters	Attributes	Functions
<ul style="list-style-type: none"> <li>• <b>Object</b> Type: Object</li> <li>• <b>Distance</b> Type: Scene Units</li> <li>• <b>Strength</b> Type: Percentage</li> </ul>	<ul style="list-style-type: none"> <li>• <b>fpItem.position</b> Position of Forest Item in local coordinates</li> <li>• <b>fpItem.geomID</b> Index in the Geometry List, starting at zero</li> </ul>	<ul style="list-style-type: none"> <li>• <b>easeOut(x,x1,x2,y1,y2)</b> Returns an ease-out interpolation between y1 and y2. Returns y2 when x &gt; x2.</li> <li>• <b>unit(v)</b> Returns a unit vector in the same direction as v.</li> <li>• <b>length(v)</b> The length of v.</li> <li>• <b>fpSurfaceHitZ(p)</b> Computes the projection of p onto the Forest surface (XY mode only). Returns z value.</li> </ul>

- **Controller**

Type:  
Controller

## Bend by Object

Bend by Object allows you to change the angle of scattered items so that they rotate away or towards a selected object. It's ideal for illustrating objects interacting with grass or rugs with many other possible applications. To use it:

- Use the **Object** property to select an object from the scene that will be used to affect the angle of scattered items.
- Use **leanOutAmount** to change the amount objects will bend. Negative values lean away from the object and positive values lean towards the object.
- Use **leanOutDistance** to control the distance from the object that the angle change affects. The effect will falloff until it reaches this distance.
- Use **randomWiggle** to add some rotation variation to the items that are affected by the bend effect.



Sorry, the widget is not supported in this export.

But you can reach it using the following URL:

<https://www.youtube.com/watch?v=DKqugZ27eTw>

## Effect Script:

```

1  Vector vec1 = object.position - fpItem.position;
2  real angle = atan2(vec1.x,vec1.y)-degtorad(90);
3
4  real lengthVec = length(vec1);
5  real leanOutX = easeIN( length(vec1),Lean_Out_Distance,
6  0,fpItem.rotation.x,sin(angle+degtorad(randomReal(-
7  randomWiggle,randomWiggle)))*Lean_Out_Amount);
8  real LeanOutY = easeIN( length(vec1),Lean_Out_Distance,
9  0,fpItem.rotation.y,cos(angle+degtorad(randomReal(-
  randomWiggle,randomWiggle)))*Lean_Out_Amount);
10
11 fpItem.rotation.x = leanOutX;
12 fpItem.rotation.y = leanOuty;
```

You can find this Effect within the [Forest Effects Library](#).

This Effect Uses:

#### Parameters

- **Object**  
Type: Object
- **Lean\_Out\_Amount**  
Type: Real
- **Lean\_Out\_Distance**  
Type: Scene Units
- **RandomWiggle**  
Type: Real

#### Attributes

- **fpItem.areaIncNearest**  
Vector to nearest include area edge.
- **fpItem.areaIncDistance**  
Distance to nearest include area.
- **fpItem.position**  
Position vector of individual fp Item.
- **fpItem.rotation.x**  
Individual item's X rotation.
- **fpItem.rotation.y**  
Individual item's Y rotation.

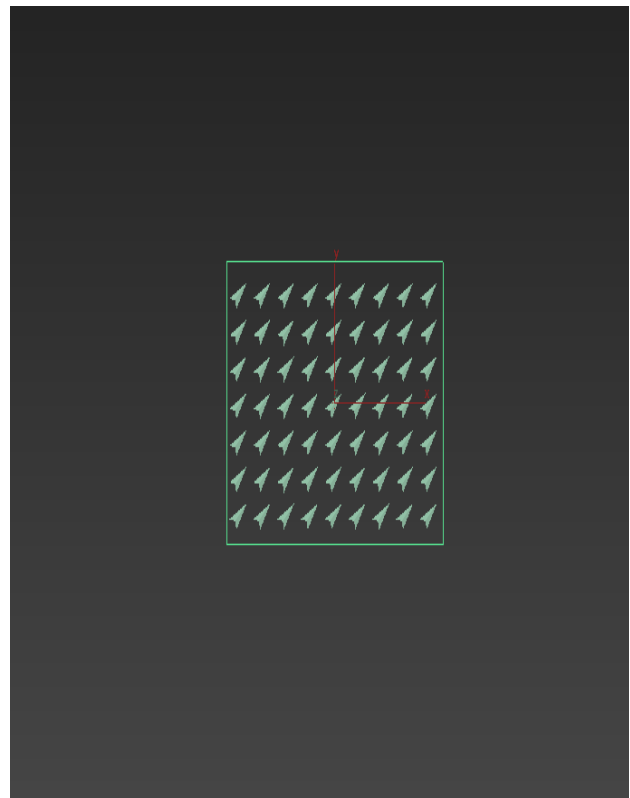
#### Functions

- **length(v)**  
The length of v.
- **atan2(x,y)**  
Returns the principal value of the arc tangent of y/x, expressed in radians
- **degToRad(p)**  
Converts degrees to radians.
- **easeIn(x,x1,x2,y1,y2)**  
Returns an ease-in interpolation between y1 and y2. Returns y1 when x < x1

## XY Local Translate

The translation controls found in the Transform rollout move each item on the world's XY axis. In contrast this effect allows you to randomly move the object along each individual item's local axis. It also works in scene units instead of as a percentage of the object's size. To use it:

- Use **xOffsetStart** to set a minimum X translation value, in scene units.
- Use **xOffsetEnd** to set a maximum X translation value, in scene units.
- Use **yOffsetStart** to set a minimum Y translation value, in scene units.
- Use **yOffsetEnd** to set a maximum Y translation value, in scene units.



## Effect Script:

```

1  real angle = fpItem.rotation.z;
2  real randomOffsetX = randomInt(xoffsetStart,xoffsetEnd);
3  real randomOffsetY = randomInt(YoffsetStart,YoffsetEnd);
4  vector positionX = [cos(angle)*randomoffsetX, sin(angle)*randomoffsetX,0];
5  vector positionY = [cos(angle-degtorad(90))*(randomOffsetY), sin(angle-
6  degtorad(90))*(randomOffsetY),0];
   fpItem.position = fpItem.position+positionX+PositionY;

```

You can find this Effect within the [Forest Effects Library](#).

## This Effect Uses:

## Parameters

- **YOffsetStart**  
Type: Scene  
Units
- **YOffsetEnd**  
Type: Scene  
Units
- **YOffsetStart**  
Type: Scene  
Units
- **YOffsetEnd**  
Type: Scene  
Units

## Attributes

- **fpItem.position**  
Position vector of  
individual fp Item.
- **fpItem.rotation.z**  
Individual item's  
Z rotation.

## Functions

- **randomInt**  
Returns an integer random number in the range a,b
- **degToRad(p)**  
Converts degrees to radians.
- **cos(p)**  
Cosine of p (p expressed in radians)
- **sin(p)**  
Sine of p (p expressed in radians)

## Cars along spline

We recently released a tutorial on how to use Forest Pack to scatter cars. In this we discussed the best way to place pivots and paths, and the final scene used splines that were placed through the centre of the car parks so that we could use the mirror and offset features to create parked cars facing in either direction.

You may however already have a spline at the top of the car park that you wish to re-use. Normally this would mean you couldn't mirror the car but with Forest Effects we can now easily extend the plugin to make this possible.

This Car Parking effect allows you to use a spline at the top or bottom of the parking bay and the vehicles are automatically offset along their length to fit into the space. In addition it also randomises the car's position along it's local axis and add controls to make it easier to adjust the probability of spaces and choose which side of the spline the cars should be positioned on. You can



Sorry, the widget is not supported in this export.  
But you can reach it using the following URL:

<https://www.youtube.com/watch?v=EXcCsHAJJZo&feature=youtu.be>

also randomise the direction of the cars by rotating through 180 degrees instead of flipping the car which removed any issues of left and right hand drive cars and mirrored number plates and logos. To use it, set up the cars as described in the tutorial with the pivot in the centre of the car. Place the cars using **Tree Editor > Creation Tools > Along a Path** as normal and then adjust the following parameters:

- Use **switchSides** to move all the cars from one side of the path to the other
- Use **emptySpaces** to change the probability of empty parking spaces
- Use **randomiseParkDirection** to randomise whether cars are parked bonnet or boot first in each space.
- Use **xOffsetStart** to set a minimum X translation value, in scene units.
- Use **xOffsetEnd** to set a maximum X translation value, in scene units.
- Use **YOffsetStart** to set a minimum Y translation value, in scene units.
- Use **YOffsetEnd** to set a maximum Y translation value, in scene units.

Effect Script:

```

1  real angle = fpItem.rotation.z;
2  fpItem.rotation.z = fpItem.rotation.z +
   if(randomInt(0,randomiseParkDirection)==1,degtorad(180),0);
3  real randomOffsetX = randomInt(xoffsetStart,xoffsetEnd);
4  real randomOffsetY = randomInt(YoffsetStart,YoffsetEnd);
5  vector position = [cos(angle)*(fpItem.collisionRadius+randomoffsetX),
   sin(angle)*(fpItem.collisionRadius+randomoffsetX),0];
6  position = position + [cos(angle-degtorad(90))*(randomOffsetY), sin(angle-
   degtorad(90))*(randomOffsetY),0];
7  fpItem.position = if(switchSides==0,fpItem.position+position,
   fpItem.position-position);
8  int spaceProbability = randomInt(1,100);
9  fpItem.visible = if(emptySpaces >= spaceProbability,0,1);

```

You can find this Effect within the [Forest Effects Library](#).

This Effect Uses:

#### Parameters

- **YOffsetStart**  
Type: Scene Units
- **YOffsetEnd**  
Type: Scene Units

#### Attributes

- **fpItem.position**  
Position vector of individual fp Item.

#### Functions

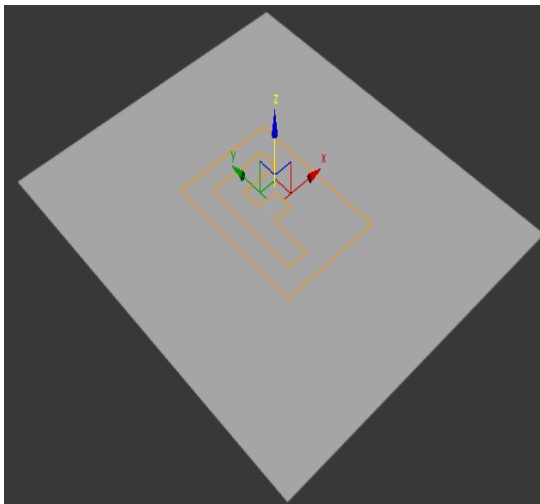
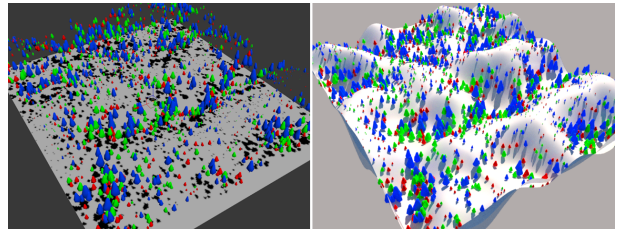
- **randomInt**  
Returns an integer random number in the range a,b

- **YOffsetStart**  
Type: Scene Units
- **YOffsetEnd**  
Type: Scene Units
- **switchSides**  
Type: Int (0 is off, 1 is on)
- **emptySpaces**  
Type: Int
- **randomiseParkDirection**  
Type: Int (0 is off, 1 is on)
- **fplItem.rotation.z**  
Individual item's Z rotation.
- **fplItem.visible**  
Individual item's visibility
- **fplItem.collisionRadius**  
The collision radius of the item. Measured as a sphere who's diameter matches the size of the object's largest dimension.
- **degToRad(p)**  
Converts degrees to radians.
- **cos(p)**  
Cosine of p (p expressed in radians)
- **sin(p)**  
Sine of p (p expressed in radians)

## Place items on a displaced surface

If you use Displacement maps to create terrain, then this effect can help. It allows you to position the objects on the Z axis to match the displaced mesh with additional controls to randomise each item's position on the Z axis. To use it download and load [items on displaced surface.eff](#) and follow these steps:

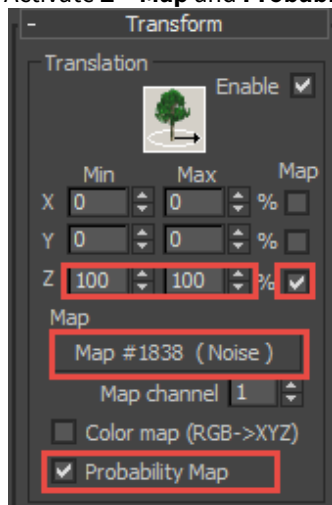
1. Add item(s) in the Geometry rollout in the usual way. You can mix items of different heights.
2. Align Forest Pack with the displaced plane on the **Z** axis.



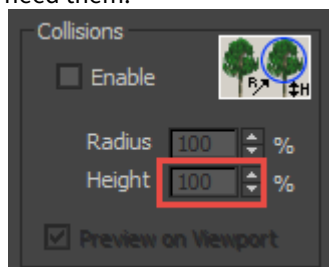
3. In the **Transform** rollout, enter a value of **100%** for both the **Z Min** and **Z Max** parameters.



Activate **Z > Map** and **Probability map**.

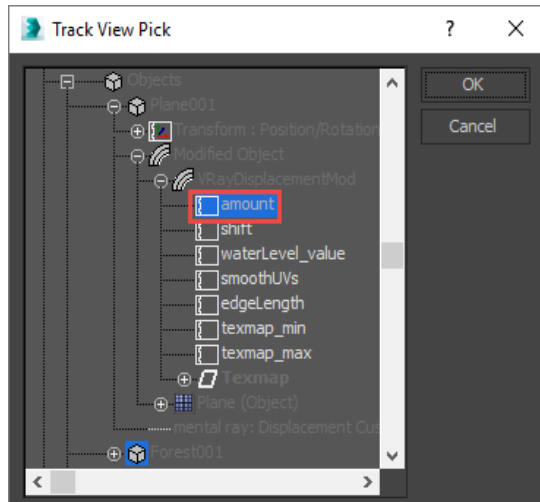


4. Apply the **displacement texture** to the **Map** input slot.
5. Feel free to add any **Scale** randomisation, the effect can compensate for differently sized items.
6. In the Distribution rollout, set the **Collision Height** to **100%**. Once the value has been changed, collisions can be turned off if you don't need them.



7. Go to the Effects rollout and click **DisplacementSize**, select the **Amount** controller of the V-Ray Displacement modifier (or other similar plugin) that is applied to the surface. The tree's Z position is now driven by this value, changing the parameter also automatically updates Forest Pack's

distribution.



8. Use **zRandMin** and **zRandMax** to add additional Z position randomisation to the items after displacement.
9. Use **AltitudeLimitTop** to hide objects above a certain height.
10. Use **AltitudeLimitBottom** to hide objects below certain height.
11. Use **topFalloff** to gradually scale objects to 0 as they approach the height set in **AltitudeLimitTop**.
12. Use **bottomFalloff** to gradually scale objects to 0 as they approach the height set in **AltitudeLimitBottom**.

! This effect will not allow you to use the **Slope** or **Direction** controls in the surface rollout.

## Effect Script:

```

1  #set position
2  real actualHeight = (fpItem.collisionHeight/fpItem.scale.z)*1;
3  real displacedPercentage = fpItem.position.z/actualHeight;
4  fpItem.position.z =(displacedPercentage*DisplacementSize)
   +randomReal(zRandMin, zRandMax);
5
6  #Limit by altitude
7  fpItem.visible = if(fpItem.position.z<AltitudeLimitTop,if(fpItem.position.
   z>AltitudeLimitBottom,1,0),0);
8
9  #Size by altitude
10 vector falloffScale = if(fpItem.position.z>AltitudeLimitTop-topFalloff,
   ((topFalloff-(fpItem.position.z-(AltitudeLimitTop-topFalloff)))/
   topFalloff)*fpItem.scale,fpItem.scale);
11 fpItem.scale = falloffScale;
12
13 falloffScale = if(fpItem.position.z<AltitudeLimitBottom+BottomFalloff,
   (((fpItem.position.z-AltitudeLimitBottom))/
   BottomFalloff)*fpItem.scale,fpItem.scale);
14 fpItem.scale = falloffScale;

```

You can find this Effect within the [Forest Effects Library](#).

Sample scene: [displacementEffect.max](#)

This Effect Uses:

## Parameters

- **DisplacementSize**  
Type: Scene Units  
This reads the value of another controller in the scene. Use it to select the Amount parameter of a displacement modifier.
- **zRandMin**  
Type: Scene Units
- **zRandMax**  
Type: Scene Units
- **AltitudeLimitTop**  
Type: Scene Units
- **AltitudeLimitBottom**  
Type: Scene Units
- **topFalloff**  
Type: Scene Units

## Attributes

- **fpItem.position**  
Position vector of individual fp Item.
- **fpItem.collisionHeight**  
The collision height of collision sphere for the current item.

## Functions

- **randomReal(a,b)**  
Returns a real random number in the range a,b

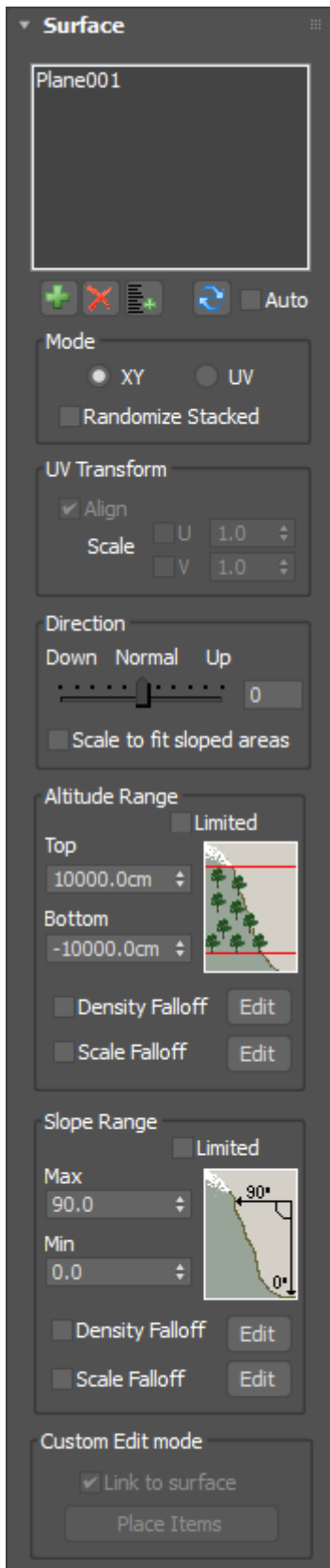
- **bottomFalloff**  
Type: Scene Units

## 6.8 Surface

### 6.8.1 Overview




In most Forest scenes, we will not be placing trees over planar surfaces, instead we have hills, mountains, etc. With this panel we can choose the surface that the trees will be placed over.


## 6.8.2 Interface




## Surfaces List

In the Surfaces list we can choose the objects which represents the terrain. They must be a simple meshes (we cannot use groups, etc.), and the trees will be placed along the local Z axis.

The "Add" button (  ) add a new surface to the list, and "Delete" (  ) removes the selected item.  Add multiple elements from a list of objects selected from the scene.

If we modify the terrain, the objects will not be adjusted automatically over the new surface, the user must press the  button to process the changes through Forest. This may be a limitation for scenes with animated terrain, but it's implemented this way because Forest builds an internal table with the terrain characteristics to optimize the speed of tree placement.

Anyway, this table is common for all Forest objects, so when we have used the same surface for several Forest objects it is only necessary to use the  button in one of them. All trees will be placed automatically. Use the 'Auto' checkbox if you need to update the surface automatically (this may add a performance hit for complex surfaces).

## Mode

Forest can use the surfaces in two modes of operation:

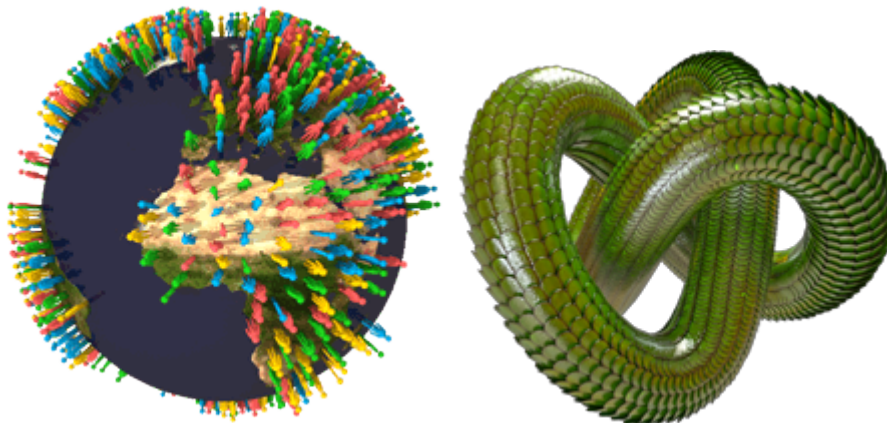
- **XY mode:** the items are scattered using the XY plane of the Forest object (in local coordinates), and then placed on the surface moving each object along its Z axis. This mode is best suitable for smooth terrains and used by default when there is not a surface assigned, using the [Area](#) splines as boundaries.
- **UV mode:** uses the mapping coordinates of the surface as alignment guide for the Distribution map. This mode is best used on rough terrains or to scatter items over convex 3D objects (as a sphere). Note that using this mode, the UV coordinates must be precisely defined to get a coherent result.

**Note:** Several Forest features are not available in UV mode: Area splines, Bitmap rotation, Dist.Map Channel (locked to 1) and "Link to Surface" on Custom Edit mode.

## Randomize Stacked

By default Forest uses the XY position of each item to compute its random seed. If you scatter items that are aligned on the same XY coordinates (i.e. adding several stacked surfaces), all of them will share the same random properties.

Turning on this parameter will avoid this issue, generating different items on stacked surfaces. It is disabled by default, to keep compatibility with scenes created with previous Forest versions.



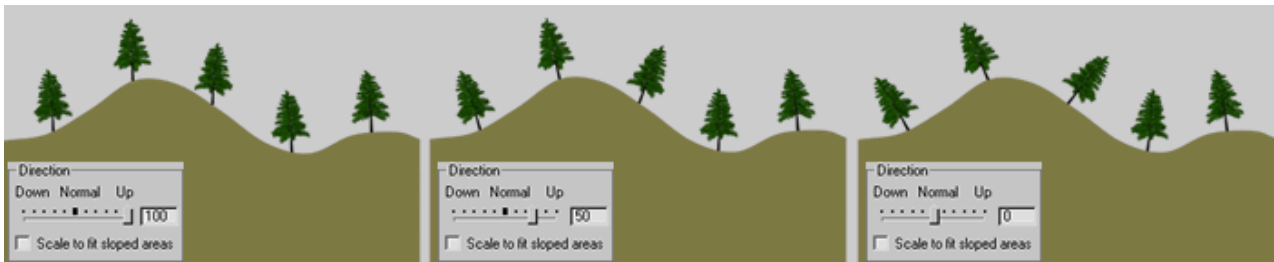
Scattering by UV coordinates

### 6.8.3 UV Transform

You can use the UV Transform parameters to modify the alignment and scale of the items according to the UV coordinates. These options are available only in the UV Surface mode.

### 6.8.4 Direction

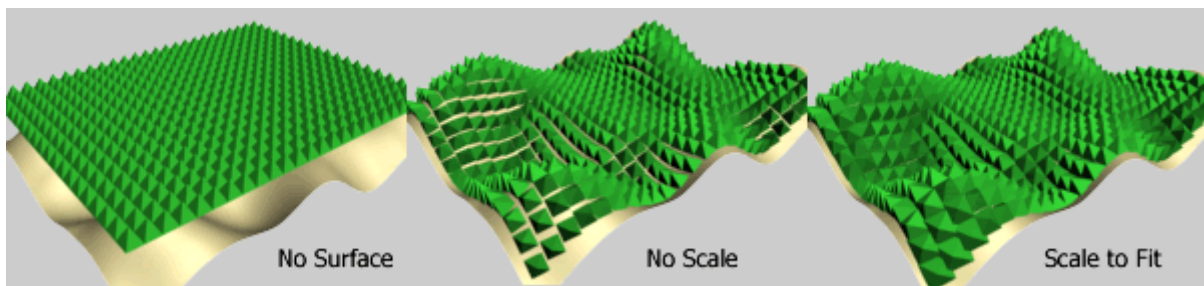
Lets you to modify the direction of the items relative to the surface's normal: -100 (Down), 0 (aligned with the Normal), 100 (Up).



### Scale to fit sloped areas

When using sloped terrains on XY mode, this may do that not all trees be equally spaced. This effect is more noticeable in high density distributions (as grass fields). To fix it, you can use this option to scale the items's width proportionally to the surface's slope.

When "Scale to fit" is enabled, the Direction value is fixed to 0 (Normal aligned). This feature is not used on UV mode.



### 6.8.5 Altitude Range

These parameters define the altitude limits for tree placement. When the "Limited" checkbox is enabled, trees will only be created in the range specified by Top and Bottom.

The Falloff parameters allows us to define density and scale curves based in the item's altitude. The falloff scale is applied in the range defined by the Top and Bottom values.

### 6.8.6 Slope Angle Range

Limits the creation of trees over a range of slope terrain. 0 degrees is equal to a horizontal surface, and 90 degrees is a totally vertical surface.

### 6.8.7 Custom Edit Mode only

Since in Custom Edit mode must be possible to move each tree individually (including Z axis), these parameters defines how the trees are placed over the surface: automatically, if "Link to Surface" checkbox is enabled, or manually using the "Place Trees" button.

## 6.9 Item Editor




## 6.9.1 Overview

To add scatter items Forest can work in two modes: Generate or Custom Edit. In Generate mode, items are created randomly within the regions defined in the [Areas](#) rollout according to the [Distribution](#) rules. The Custom Edit mode allow for a precise level of control, allowing you to edit and create individual items manually. A typical workflow might involve working between the two modes by creating an initial scatter of a large area of plants using Generate mode and then switching to Custom Edit to make final adjustments to individual objects to fine tune the composition.

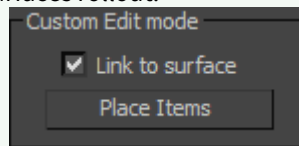
## 6.9.2 Procedures

To manually add individual scatter items

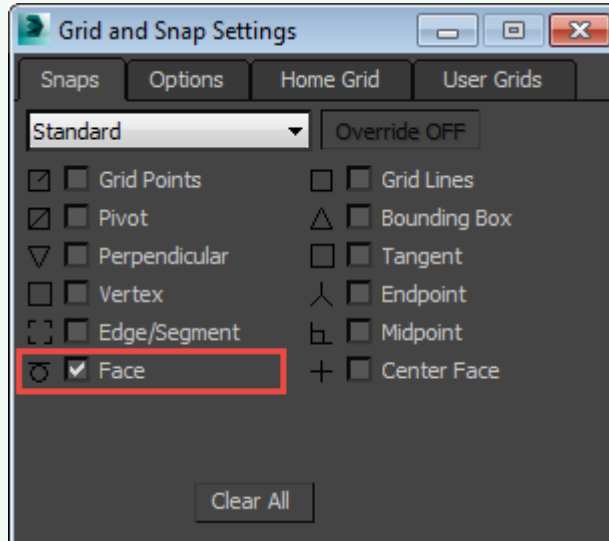
1. From the Tree Editor rollout, click Custom Edit.
2. Enable the tree sub object level from the Modifier Stack Display or by clicking 
3. To determine which items to use from the [Geometry](#) list select one of the following modes.
  - To use a specific model, click **Model** and select an item from the drop down list.
  - To use a random item from the [Geometry](#) list, click **Random**.
  - To use a sequence of items as defined in the [Geometry](#) list, Click **Sequence**.
4. Click **Add**.
5. Click in the scene to place a new item.




- New items will be positioned at zero on the Z axis unless a **Surface** area is being used and the **Link to Surface** option is active in the Surfaces rollout.

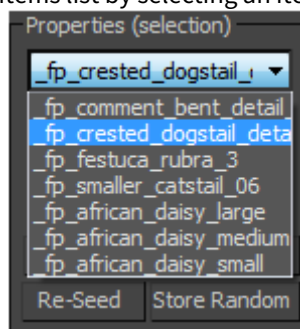


- Alternatively you can set 3DS Max's Grid and Snap settings to **Face** to click on any geometry to determine the Z position of a new item.



### To manually edit existing scattered items

- From the Tree Editor rollout, click Custom Edit.
- Enable the tree sub object level from the Modifier Stack Display or by clicking .
- You can now select individual or groups of trees in the viewport. Edit them using the following methods:
  - Manipulate them with the translate, rotate and scale tools in the usual way.
  - Randomise geometry by clicking **Randomise**.
  - Randomise transforms by clicking **Re-Seed**.
  - Specify the geometry used from the items list by selecting an item from the geometry drop-down list



## To attach another Forest object

To attach a single Forest object

1. Click **Attach > Single**.
2. Click the Forest object to add from the viewport.

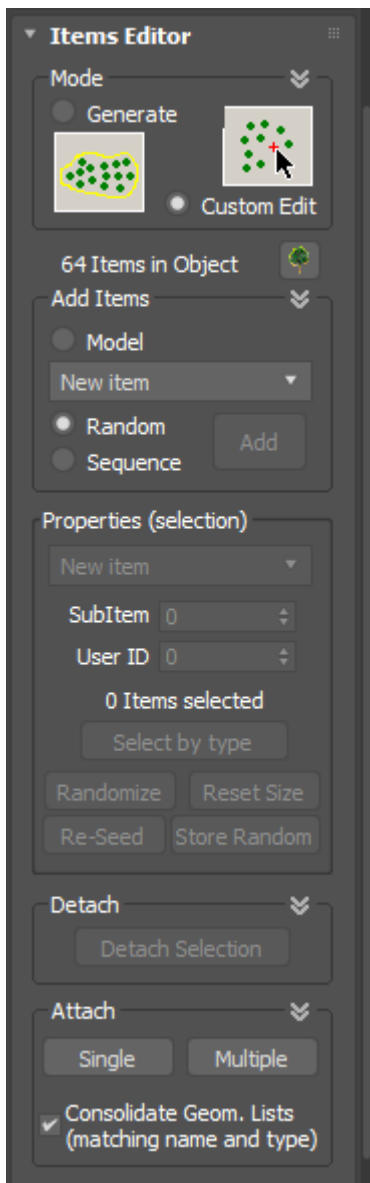
To attach multiple Forest objects

1. Click **Attach > Multiple**.
2. Select the Forest objects to add from the **Attach List**.
3. Click **Attach**.

## To detach selected items to a new Forest object

1. In Custom Edit mode, select the items to detach.
2. Click **Detach**.

### 6.9.3 Interface



#### Mode

##### Generate

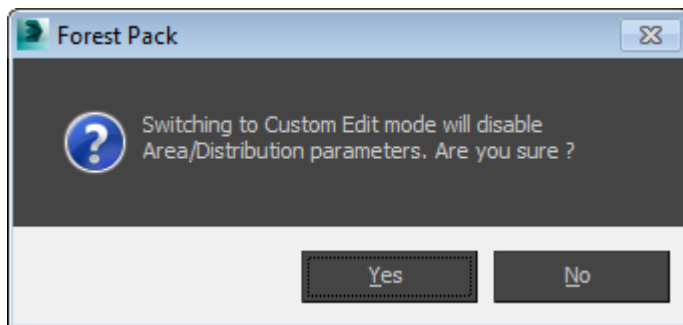
In generate mode scattered items are placed within regions defined in the [Geometry List](#) according to rules defined in the [Distribution](#) rollout.

## Custom Edit

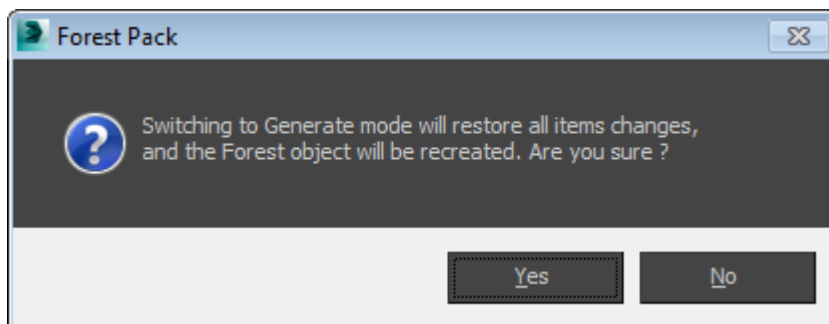
In custom edit mode, items can be created one at a time or distributing along paths or on the pivot points or faces of reference geometry. Once created, scattered objects can be edited manually using Max's default transform, rotate and scale tools.


When switching between Generate and Custom Edit mode, Forest Pack will always display a warning to ensure you don't accidentally lose any changes.

### Generate → Tree Editor



### Tree Editor → Generate



To edit the items, you must also activate the sub-object level using the Modify Stack Display on the Modify panel, or by clicking .

## Add Items

This button creates individual items by clicking in the scene. To use it you must be at the Trees sub-object level.

There are three selectable modes, that work when adding individual items and using the Creation Tools (described below).

- **Selection.** Uses the plant type defined in the Properties combo.
- **Random.** Select a random plant from the [Geometry List](#).
- **Sequence.** Gets the plants models sequentially, as defined in the Geometry List.

## Properties (Selection)

Lets you to change the type of plant (from the models defined in the [Geometry List](#).) for the selected items.

#### Sub Item

When using Groups as Custom Objects this value defines the index of the element inside the group.

#### Select By Type

Selects all the items that use the type defined in the selection combo box.

#### Randomize

Randomizes the plant type for all items selected.

#### Reset Size

Resets the scale of the items selected.

#### Re-Seed

Applies new random seeds to the selected item's transform setting. Use this option to re-randomize items that have been created by a copying process.

#### Store Transform

Stores the current random transformations into the items properties, and disables the randomness settings. Useful for attaching Forest objects but maintaining their original randomised transforms.

#### Detach

Detaches the selected elements to a separate Forest object.

#### Attach

Attaches items from other Forest objects. You may select a single object or choose from a list.

#### Consolidate Geometry List

If enabled, the plugin will try to match the Geometry Lists using the Name property and the type of geometry. If not, Forest will append the items from the Geometry List of the attached object.

#### Creation Tools

These tools are used to automatically build elements inside a Forest object.

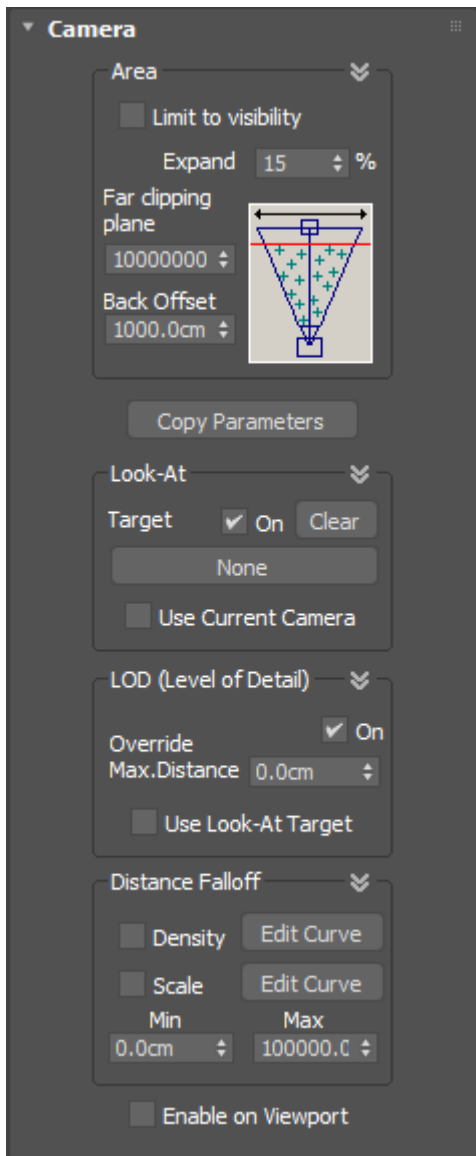
## 6.10 Camera

### 6.10.1 Overview

Top optimise your renders, Forest Pack can automatically remove items that are not visible to the camera. allowing you to create huge areas of vegetation while minimizing the number of scattered items.

**!** In Forest Pack 7 and above, it is no longer necessary to manually select the camera used for culling. Instead Forest Pack will automatically use the last camera view from the viewport or render. This does not include non-camera views such as perspective and orthographic cameras, if you switch to one of these views, then the last used camera view is retained.

## 6.10.2 Interface



Area

Limit to visibility

Using this checkbox, we limit the items only to the areas covered by the camera's field of view.

## Expand

Sometimes (in scenes with camera motion), it's possible that some items will appear or disappear "suddenly" from the edge of view because the vision limit is very narrow. With this parameter, we can widen the field of view. With a 10% or 20% value, the effect is solved in most scenes.

## Far Clipping Plane

This parameter limits the creation of items beyond a specified distance from the camera. This value is defined in scene's unit system.

## Back Offset

Extends the creation of items behind the camera's position. Use it in combination with the "Expand" parameter, to fix the problem of items and shadows appearing suddenly from the edge of view.

## Copy Parameters

Copy the current camera parameters to all Forest objects in the scene.

## Look-At

When enabled, rotates the items to look at a specified object (the camera or other node from the scene). This option is commonly used for One-plane billboards, but it also works with Custom Objects.

## LOD (Level of Detail)

When on [Forest LOD](#) objects added to the scatter are active. This features enables you to switch objects based on distance from the camera or by the size of the objects in the rendered view.

## Override Max. Distance

If zero Forest uses the Maximum Distance value specified in the [Forest LOD](#) objects. If greater than zero, the value specified in Forest LOD objects are ignored and the value specified here is used.

## Use Environment Range

When enabled, the maximum distance is derived from the Environment Range settings of the active camera.

## Use Look - At Target

When enabled Forest uses the pivot point of the object assigned in the Look-At Target slot as the origin for the Max Distance measurements. This enables you to separate the camera and origin used for all LOD calculations.

## Density/Scale Falloff

Lets you to define density and scale curves for camera distance.

If "Use Environment Range" is on, the range values are taken from the Camera's environment range. This allows us to assign different ranges from each camera easily.

Be careful if you use falloffs with camera motion, because items may appear or disappear suddenly (the distance to camera changes when moving).



## Density/Scale Falloff

Enable this option to preview Camera Culling in the viewport. This can cause slow viewport performance so it is disabled by default.

## 6.11 Shadows


### 6.11.1 Overview

The Shadow rollout is used to define the shadow casting behaviour when using billboards. Most of these features are not applied with mesh trees.

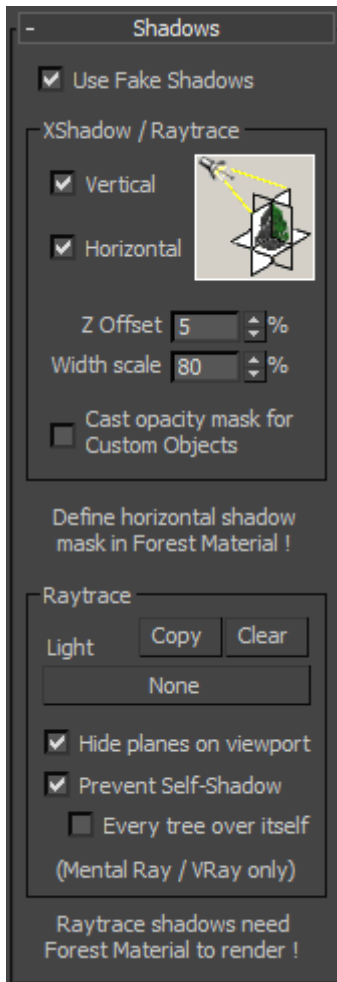
Forest can use two types of shadows for the trees: XShadow and Raytrace.

[XShadow](#) must be used exclusively with the Scanline renderer, for other render engines as Mental Ray or V-Ray use the Raytrace mode.

In the Raytrace mode, Forest automatically builds some additional planes, one vertical and the other horizontal, which are used ONLY to project the shadows. By default, these planes are not visible in the viewport or rendering.

 Raytraced shadows require [Forest Material](#) to work, because this plugin does the job of hiding or rendering the shadow / texture for each plane. Be sure that the material applied to the Forest object uses the "Forest Material" plugin as a base.

## 6.11.2 Interface



### Use Fake Shadows

This checkbox allows you to disable all XShadow and raytrace options, and cast standard shadows just as any other object in the scene.

### XShadow / Raytrace

#### Vertical

When enabled, this option builds a vertical texture for the trees.

#### Horizontal

Same as the horizontal shadow. The shadow mask must be defined in the "Forest Material" plugin.

#### Z Offset

Adjusts the separation of the horizontal shadow from the base of the tree. The value is defined as a percent of the height of the tree. By default it is 5%, you may use higher values if the shadow is hidden by the terrain or the bias parameter in the light is too low.

#### Width Scale

Use this option to scale the horizontal shadow. A value of 100% will create a shadow of same size as the tree's width. Note: the horizontal shadows created by Forest are squared.

### Cast opacity mask for Custom Objects

By default, the plugin casts opacity masks only for trees created from templates. Enable this option to use also on "Custom Object" trees.

### Raytrace

#### Pick/Clear

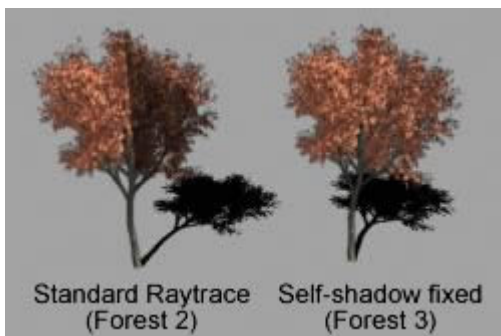
Assigns the light which casts the raytraced shadows. The shadow planes created by Forest will face this light automatically. "Clear" un-assigns it. Without a raytrace light assigned in this parameter, Forest doesn't build the shadow planes. The "Copy" buttons assigns the current Light to all Forest objects in the scene.

#### Hide Planes in viewport

By default the shadow planes are hidden, use this checkbox if you want to see these additional geometry in the viewports. This checkbox doesn't affect the visibility on the render; if a "Forest Material" is applied to Forest, the shadow planes are not visible but cast shadow. Without "Forest Material" the planes are visible and cast shadow (just as any other geometry in the scene).

#### Prevent Self-shadow

In Mental Ray and V-Ray, enable this checkbox to avoid that a tree cast the shadow over itself.



#### Every tree over itself

Defines how the self-shadowing detection is applied, to the full object (trees don't cast shadows to other trees on the same Forest object) or only each tree to itself.

{If you use Mental Ray, set Shadows Mode to "Simple" or "Sort", but not "Segments" (Render Setup -> Mental Ray Renderer> Renderer> Shadows & Displacement -> Shadows Mode). This mode is not supported by Forest.

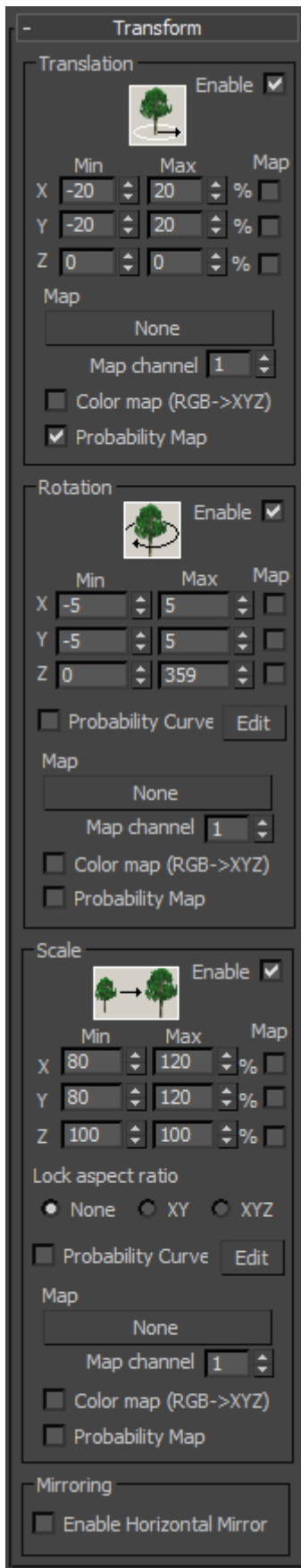
**i** If you use Mental Ray, set Shadows Mode to "Simple" or "Sort", but not "Segments" (Render Setup -> Mental Ray Renderer> Renderer> Shadows & Displacement -> Shadows Mode). This mode is not supported by Forest.

## 6.12 Transform

### 6.12.1 Overview

In a natural distribution, trees have different orientations and sizes. With this rollout we can apply these variations to the elements.

### 6.12.2 Interface



## Translation

When enabled, this value defines a random translation of the tree object over its original position. The translation come defined as a percentage of the width of the tree for X/Y and height for Z.

Note: This translation is applied after placing the tree over its position (as indicated in distribution map), so it's possible if we apply a high random translation the tree will be placed outside the area spline. If this happens, we must lower the translation value or modify the area spline until trees are placed in a good position.

## Rotation

These parameters apply a random rotation over each axis. The degree of rotation ranges from Min to Max values specified (from 0 to 359 degrees).

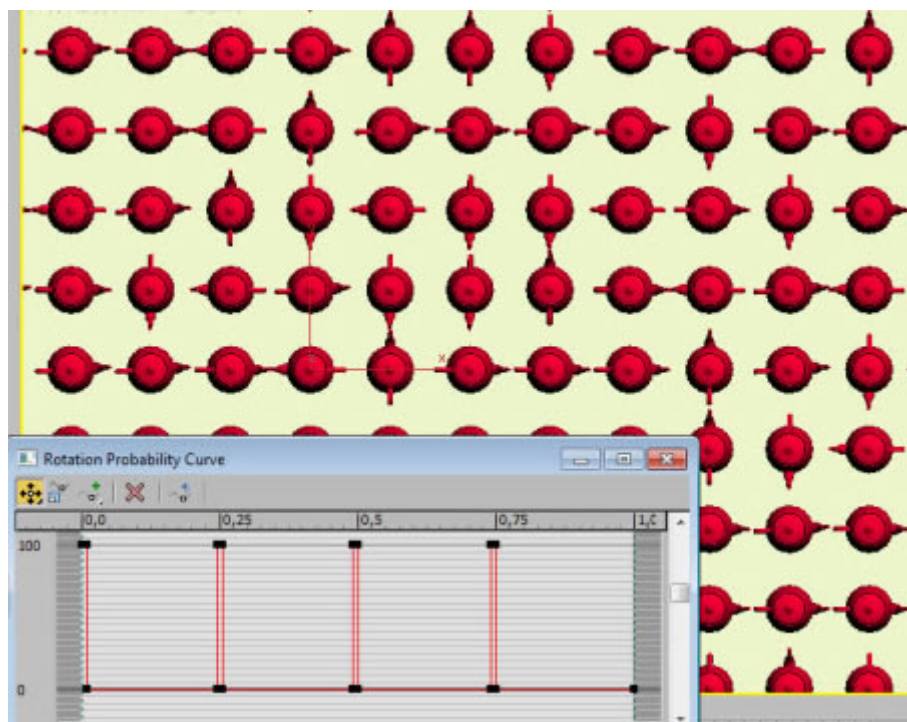
Note: the rotation is not applied if "facing camera" checkbox is enabled in the "Camera" rollout.

## Scale

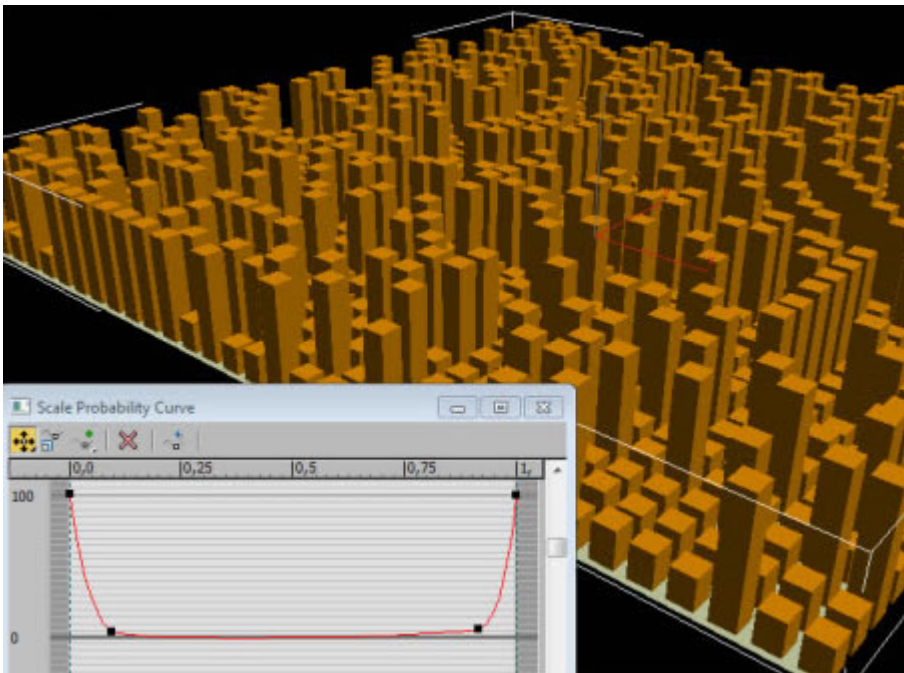
Use this option to apply a random scale for each tree. It's possible to define independent ranges for XYZ, and to lock the aspect ratio with the "Lock aspect ratio" option.

## Probability Curves

Lets you to define the probability of each random value in the rotation range (X axis = Min/Max range, Y axis: 0-100% probability).



**Rotating to discrete values of 0°, 90°, 270° using a Probability Curve**



**Non-uniform scale distribution using a Probability Curve**

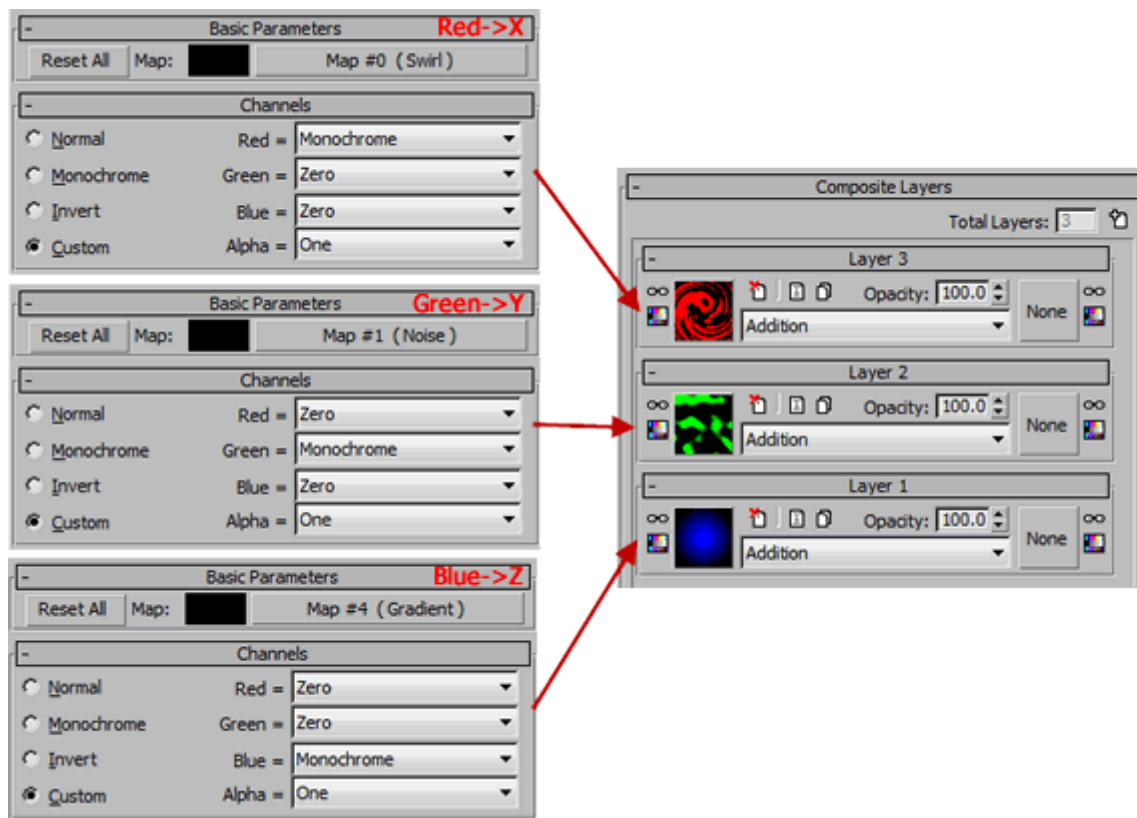
## Using Maps

The map parameter may be used to adjust the transform amounts using a texture map.

If the 'Color map' checkbox is off, the map is evaluated in monochrome mode, the white color is considered as the Max rotation value, and the black color as Min.

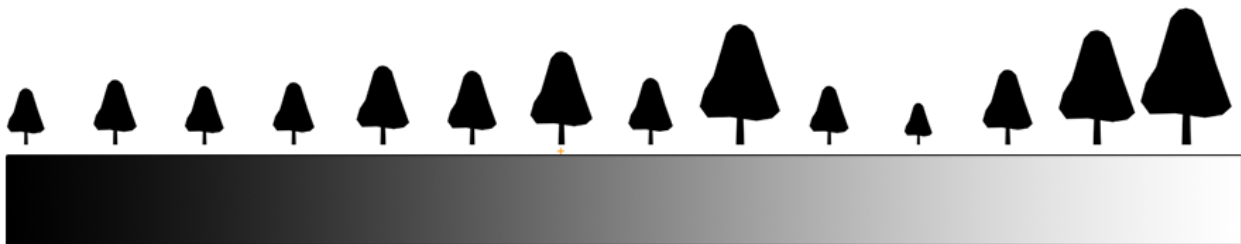
Turning on 'Color map', the RGB components of the image are used to define the scale for each axis, in this way: Red color-> X, Green color->Y, Blue color->Z.

If you have three monochrome scale maps, one for axis, it is easy to combine them in a unique RGB map using a Composite texture, in this way:



## Probability Map

Activating this option uses a map to define a probability amount for the random range defined by the **Min/Max** values. Scatter objects in black areas of the map will not be randomised, objects in white areas will receive a value selected from the full range.



Using a probability map to control scale randomisation. (black = no randomisation, white = full randomisation)

## Mirroring

This option flips the tree horizontally, creating a mirror image. It is useful to increase the variation of the textures without using additional maps. By default, it's applied only to trees created from templates, enable the "Use on Custom Objects" checkbox to use on custom object trees as well.

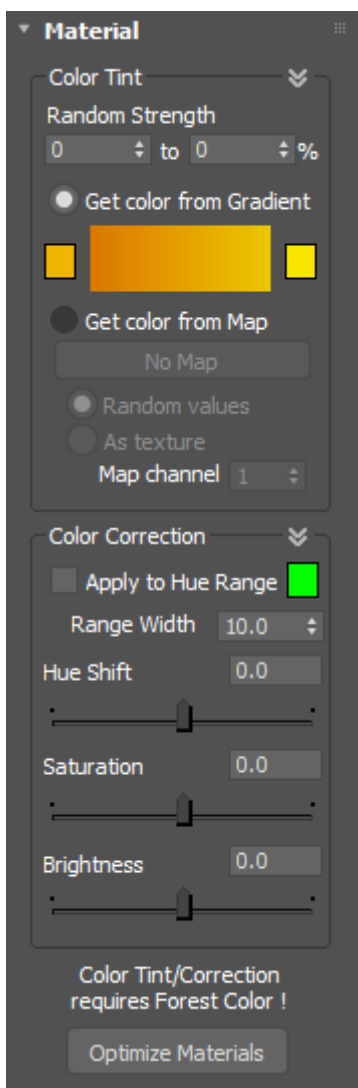


## 6.13 Material

### 6.13.1 Overview

Applies a random color tint to the items. There are two possible modes of operation, tint by gradient and tint by map. You can also use the settings in this rollout to colour correct all of the assets contained in a scatter from one easy-to-access location.

### 6.13.2 Interface



#### Color Tint

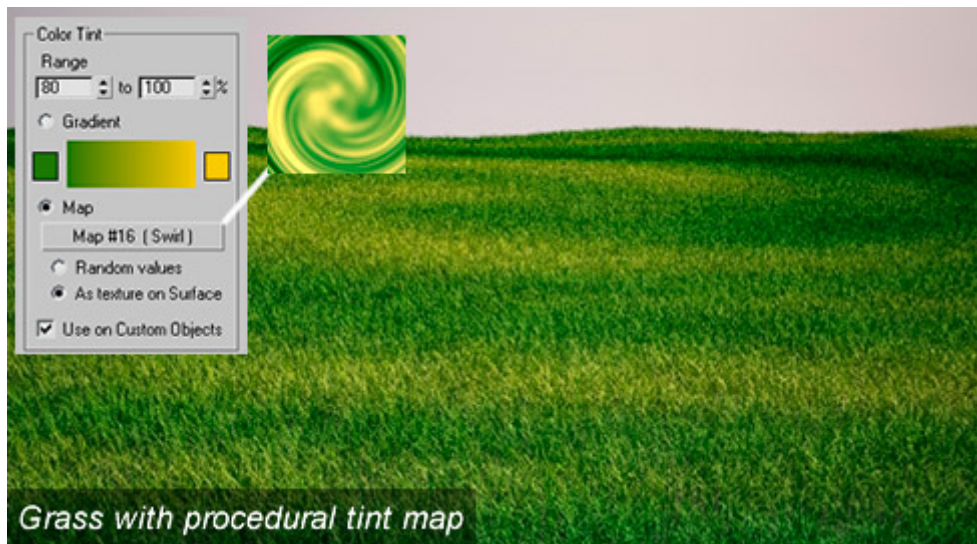
#### Get Color from Gradient

You may define a Color Range by clicking in the colour boxes, and the Random Strength range determine the magnitude of tint applied, from 0 to 100%. Use Min=0 and Max=0 to disable the effect.

## Get Color from Map

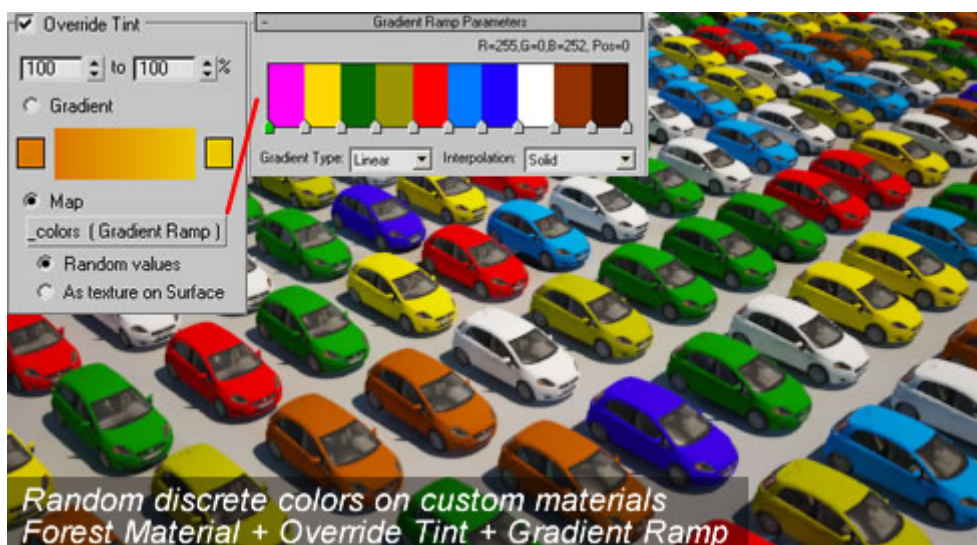
Forest uses a custom map as tinting source. With "Random Values", a random pixel from the map is taken for each tree, and "As Texture" applies it as a standard Max texture.

By default, Forest uses the parameters defined in the [Distribution Map](#) rollout (X/Y, offset, rotation...) for scaling, but it's also possible to get the mapping coordinates from the surface, if there any assigned in the [Surface](#) rollout, and a value greater than zero is assigned to "Map Channel".



**⚠** Color Tint requires [Forest Material](#) or [Forest Color](#) to work. Be sure that the materials used in the Forest object (assigned in the Geometry rollout or applied directly to the object) use one of these plugins. "Forest Material" is a custom Material included with Forest Pack, and "Forest Color" is a 2D texture map. Without them, Color Tint won't work.

It is possible to customize the tinting options for each material using the "Override" option. See [Forest Material](#) and [Forest Color](#) reference for details.



### 6.13.3 Color Correction

The Colour Correction settings allow you to modify the hue saturation and value all of the materials applied to objects in a scatter. It's designed to help artists adjust the look of their assets without the need to edit the materials directly which can be a fiddly and time consuming task.

#### Apply to Hue Range

Enabling this option allows the artist to constrain the colour correct effect so that it operates only on the hue identified in the colour swatch. Generally this feature is used in conjunction with the Range Width setting .

#### **Range Width**

Specifies a range either side of the selected Hue colour which will be affected by colour correction.

#### Hue Shift

Adjusts the Hue of all maps from materials used in the scatter that are connected to a Forest Colour map

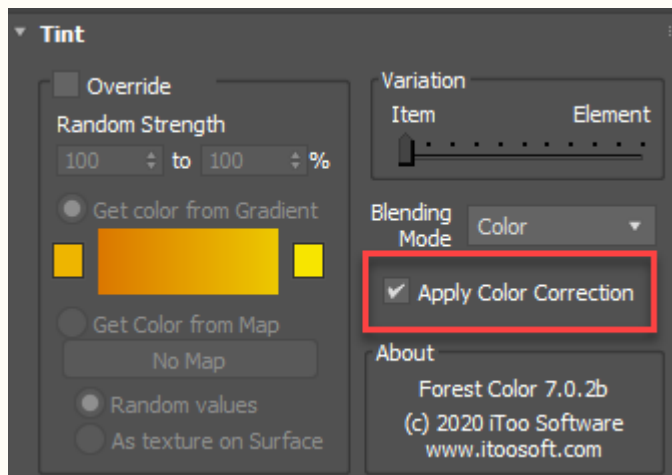
## Saturation

Adjusts the Saturation of all maps from materials used in the scatter that are connected to a Forest Colour map

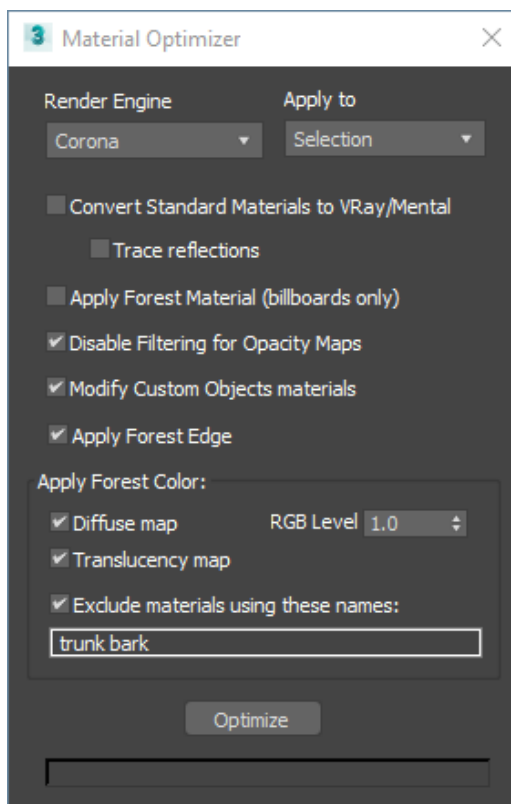
## Brightness

Adjusts the Brightness of all maps from materials used in the scatter that are connected to a Forest Colour map.

- ⚠ Colour correction can be disabled for individual maps by disabling the Apply Color Correction option in a Forest Color map



### 6.13.4 Optimize Materials



This tool helps you to convert and optimize the materials used by Forest, selecting automatically the best settings for each renderer. It includes the following features:

- Convert Standard Materials to V-Ray (VRayMtl) / Mental Ray (Arch & Design), or Corona.
- Apply Forest Color to the Diffuse maps.
  - You can optionally control the RGB level
  - If there are materials you do not wish to use a Forest colour map include their names here. For example it is often the case that you only want to randomise leaf colours not the trunk and branches. Separate material names with spaces.
- Apply Forest Material (billboards only).
- Disable filtering for Opacity Maps (recommended for leaves created using alphas).
- Modify Custom Objects material. When this is on materials applied to custom objects as well as billboards will be optimised
- Apply Forest Edge. Add Forest Edge maps to opacity slots to enable the object to function with [Areas > Edge](#) mode.

## 6.14 Animation

### 6.14.1 Overview

The animation rollout provides a number of options to allow you to control animated scatter objects. By default animation is turned off so animated scatter objects will appear static, to use animation, choose from one of the following 4 methods.

- **Follow Geometry:** All scattered instances animate in sync with the source geometry.
- **Random Samples:** The starting frame of scattered instances is randomised from a fixed number of sample points along the timeline.
- **Random from Map:** The starting frame of scattered instances is selected using a grayscale map from a fixed number of sample points along the timeline.
- **Frames from Map:** The absolute frame of the scattered instance is controlled by a grayscale map.

See the [Interface](#) section below for a more detailed description of these modes.



Some renderers that use our custom interface are not currently compatible with the **Disabled**, **Random Sample**, **Random From Map**, and **Frame from Map** animation modes. This limitation affects **V-Ray RT**, **Octane**, **Thea**, **Moskito**, and **Arion**. Currently Forest Pack returns only a pointer to the custom object in the scene and a transformation matrix, so all items are pure instances of the original geometry and animation will be treated as though it is **Follow Geometry** mode.

To improve this behaviour we have included new functions to our API, and then all 3rd party renderers update their Forest Pack implementation using the new interface.

## 6.14.2 Procedures

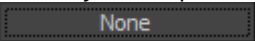
### To sync animations

1. Add 1 or more animated scatter objects from the [Add Geometry](#) rollout.
2. From the Animation rollout, activate **Follow Geometry**.
3. To preview the results in the viewport, deselect **Animate Only at Render Time**.

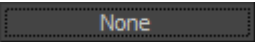
### To create randomised animations

1. Add 1 or more animated scatter objects from the [Add Geometry](#) rollout.
2. From the Animation rollout, activate **Random Samples**.
3. Set the number of samples using the **Count** value. Higher numbers create a greater variation.
4. Set the number of frames between each sample using the **Time Offset** parameter. Time Offset and Count work together, for example a time offset of 10 and count of 3 will randomly select between animation start points at frames 0, 10, and 20.
5. To preview the results in the viewport, deselect **Animate Only at Render Time**.

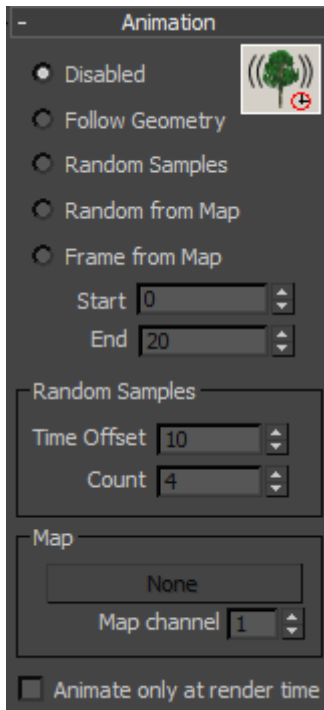
### To control the starting frame of an animation using a map

1. Add 1 or more animated scatter objects from the [Add Geometry](#) rollout.
2. From the Animation rollout, activate **Random From Map**.
3. Set the number of samples using the **Count** value. Higher numbers create greater variation.
4. Set the number of frames between each sample using the **Time Offset** parameter. Time Offset and Count work together, for example a time offset of 10 and count of 3 creates samples at frames 0, 10, and 20 that will be selected by the map.
5. Click  in the map group to open the Map Browser and select a grayscale image or procedural map. Alternatively assign a map by dragging onto this button from the Material Editor.
6. To preview the results in the viewport, deselect **Animate Only at Render Time**.

### To control the absolute frame of an animation using map

1. Add 1 or more animated scatter objects from the [Add Geometry](#) rollout.
2. From the Animation rollout, activate **Frame From Map**.
3. Define the animation range to be controlled by the map by entering the appropriate frame numbers from the timeline in the **Start** and **End** value boxes.
4. Click  in the map group to open the Map Browser and select an **animated** grayscale image or procedural map. Alternatively assign a map by dragging onto this button from the Material Editor.
5. To preview the results in the viewport, deselect **Animate Only at Render Time**.

### 6.14.3 Interface



#### Disabled

The plugin doesn't apply animation to the trees. All geometry, including templates and custom objects remain static.

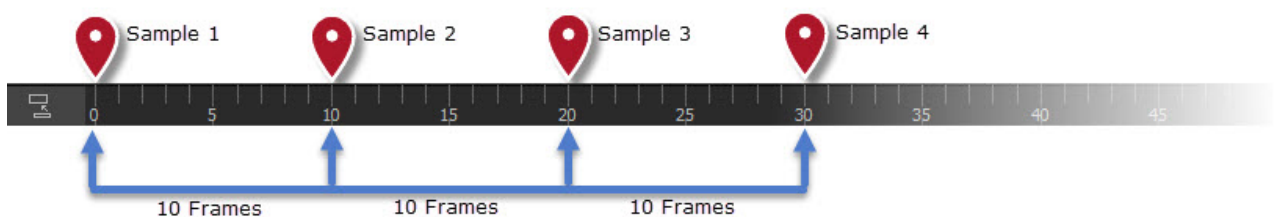
#### Follow Geometry

Forest follows the mesh animation of the source trees (defined in the Geometry rollout), for each frame. If you use the built in billboard templates, only the "Low/Medium/High Animated Planes" templates have animation applied. For "Custom

Object" trees, the animation depends on the the selected objects.

#### Random Samples

Using this option, Forest takes several sample points along the timeline, and selects them randomly to set the starting point for the animation. The "Samples" parameters, defines the number of mesh samples, and "Time Offset", the difference in time between them, starting from time 0.

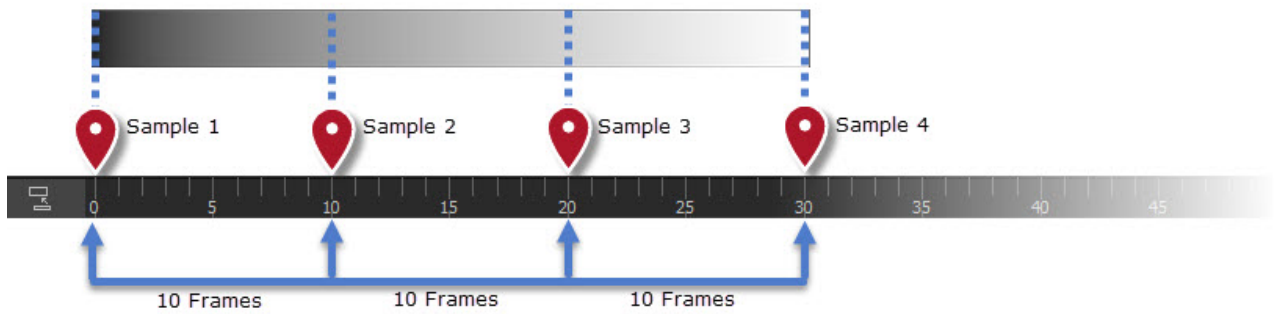


**In this example, Count=4, Time Offset=10 (using frames as unit-time), will take four mesh samples at frames 0, 10, 20, 30.**

#### Random from Map

This option works similar to Random Samples, but uses a grayscale map to select the sample point from which the animation will start. The UV coordinates for the map are derived from the surface assigned in the [Surfaces](#) rollout.

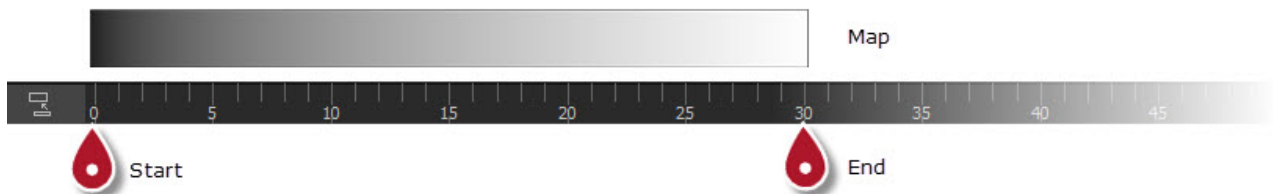




Following the above example of Count=4, Time Offset=10, a black pixel in the map will take an animation sample at frame 0, a white pixel at frame 30, and interpolated samples for pixels in the gray range.

## Frame from Map

Using this option you can control the absolute frame of an animated object using a grayscale map. This map can then be animated to control the playback of the scattered objects. The animation range controlled by the map is defined using the **Start** and **End** parameters.



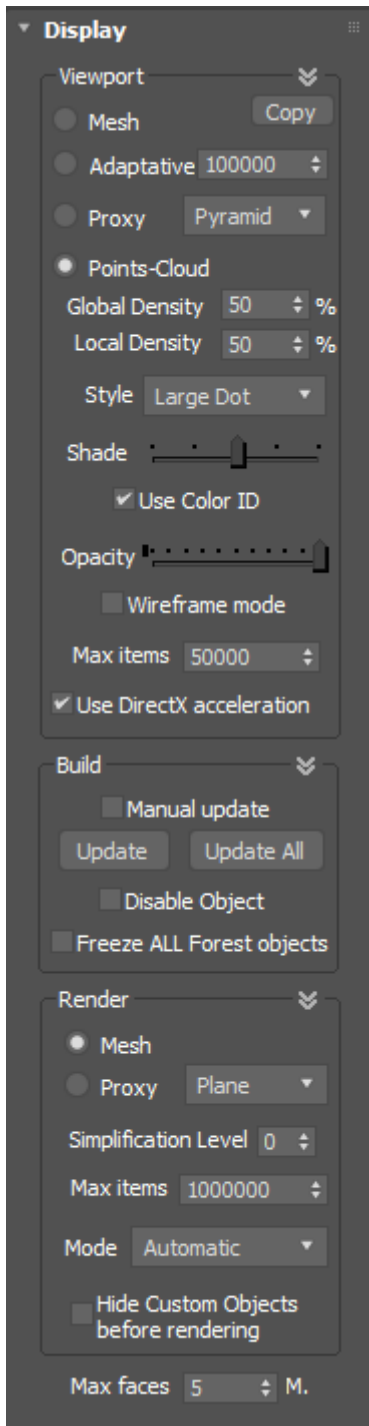
In this example the Start is set to 0 and the End is set to 30. A black pixel on the map will set the object to frame 0 and a white pixel sets the object to frame 30. Other grayscale values smoothly interpolate between these two frames.

## 6.15 Display

### 6.15.1 Overview

6.15.2 This rollout allows the user to define different levels of visualization for viewport and render modes.

### 6.15.3 Interface



#### Display

#### Mesh/Adaptative/Proxy

These options allows Max to display the items using the original geometry or a proxy (Planes, Pyramid, Box, Thin Box, Plant). For proxy objects, it's possible to adjust the transparency and display them in wireframe mode.

The Adaptative option, automatically switches the display mode when the number of faces exceeds the specified value.

## Points Cloud

This is an ultra-fast view mode which lets you to see a 3D preview of plants on Viewport. Some of its features are:

- Adjustable density of points, both to the local object or global to all Forest objects.
- Color by ID or from Material. Forest gets the material color from the Diffuse slot.
- See Random Tint colors in real-time.
- Fake shading effect, to enhance 3D look. Adjust it using the Shade slider.

## Display

Selects the size of points-cloud dot. Choices are small and large. This is a global setting that affects all Max scenes.

## Max Items

Defines the maximum number of items drawn on screen. This is an approximated value, Forest adjusts the density of the distribution to not exceed this limit. Setting this value to 0 removes the limitation, but users should be careful if they use this option not to create huge amounts of geometry that could slow down or even crash Max.

## Manual Update

Set the update mode of the selected Forest object: automatic or manual (clicking the Update button).

## Disable Object

When enabled the object is disabled in the viewports and the render.

## Freeze All

This option allows you to Freeze ALL Forest objects in the scene, except before rendering a frame. It is useful to reduce the load on 3D Studio when there are a lot of objects.

## Render

### Mesh/Adaptative/Proxy

These options allows Max to render the items using the original geometry or a proxy (Planes, Pyramid, Box, Thin Box, Plant).

### Simplification Level

With "Simplification Level" we can reduce the number of items created by the plugin. With the 0 value, all trees are built, and with 1,2, etc., the number of trees is reduced progressively.

Normally, we leave the simplification level to 0 for normal render. Higher values are used to quickly reduce the final density of trees over the scene without changing the distribution map parameters.

### Render Mode

This parameter defines the behaviour of Forest when it creates the elements for rendering. The possible values are "Automatic" and "Meshes".

In "Automatic" mode, the plugin uses all capabilities of the renderer to get the best results in complex scenes, creating automatically instances, meshes or proxies according to the type of objects defined in the Geometry rollout. Currently, this mode is used only in Mental Ray and VRay.

In "Meshes" mode, Forest creates a single mesh containing all trees. This mode may be useful, as instance, if you want to create a Forest object that uses another Forest as tree sample (this must use "Meshes" mode to work with MR/VRay).

#### Max Items / Max Faces

Limits the maximum number of items or mesh's faces created by the plugin. The default value is 1000,000 objects and 5 million faces. When this limit is reached, the plugin builds an "F" icon instead of trees, and the [Forest Stats](#) window shows a warning message. Setting these values to 0 removes the limitation, but users should be careful if they use this option not to create huge amounts of geometry that could slow down or even crash Max.

**Note:** The "Max Faces" value is ignored in Mental Ray / VRay and "Automatic" mode, since these renderers are not limited by the number of faces when working on this mode.

#### Hide Custom Objects before rendering

If this option is on, the plugin hides from the render the objects assigned in the Geometry->Custom Object rollout. Use it to avoid rendering the high-poly meshes, proxies and other objects that are used only as source geometry for Forest.

## 7 Forest Library

- [Library Browser](#)
- [Editing a library](#)
- [Integrating third-party libraries with Forest Pack](#)
- [Installing The3dGarden plant collections](#)

### 7.1 Library Browser

#### 7.1.1 Overview

The library browser allows you to easily organise, access and share objects and presets that you use regularly. Forest Pack comes with an expanding range of objects including 2D Billboards, flower, grass and rock 3d models and grass, leaf and stone presets. Additional libraries from XFrog, Evermotion and HQ Plant can be purchased that integrate easily with the library browser, or custom libraries can be created from your own objects.

##### Object types



The library is able to store three types of object:

- 2D Billboards use bitmap textures stored in a material library. These are mapped to 2D planes generated automatically by the plugin. No geometry is stored in the external file
- 3D Objects use geometry stored in an external .max file. When used the object can be either XReferenced or merged into the current scene. Forest Pack will use the material assigned to the object in the original file unless specifically overridden.
- Presets import complete Forest Pack objects, including any combination of Billboards and 3D objects plus all the rules that govern their distribution and appearance. Using presets allows you to quickly share and reuse complete styles without having to set the Forest Parameters for each use. Presets are simply created by referencing a completed Forest Object in an external .max file.

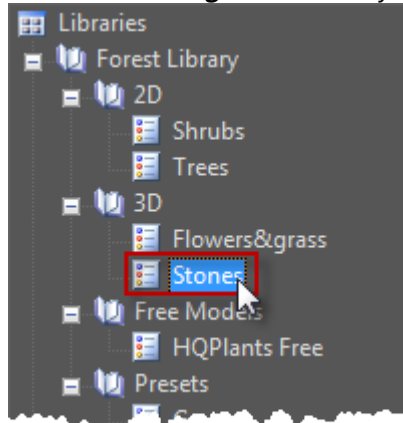
#### 7.1.2 Procedures

##### To open the Library Browser

- To access the library go to the Geometry rollout, select or add a geometry item and click on Properties>Library to open the Library Browser.

## To use a library object

1. Use the **Tree Navigator** to locate your library.



2. Select the library object you wish to use from **Items Grid**.



3. Either double click, right click and select use item, or click **Import Selected** to use.
4. Set area, distribution, transform and other settings as appropriate.

Import Selected

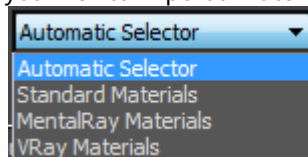
## To use a preset

1. Use the **Tree Navigator** to select your presets library.
2. Select the preset you wish to use from the **Items Grid**.
3. Either double click, right click and select **Use Item**, or click **Import Selected** to use.
4. Most of the Forest Pack parameters will be imported, update the Area or Surfaces controls if required.

## To manually choose a material for a renderer

1. Select the item you wish to use, note that not all library objects have multiple materials assigned.

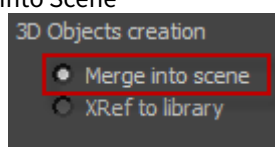
2. From the options bar at the bottom of the Library Browser, go to **Materials > Using** and select the renderer you wish to import a material for from the drop-down list.



3. Either double click, right click and select Use Item, or click Import Selected to use.

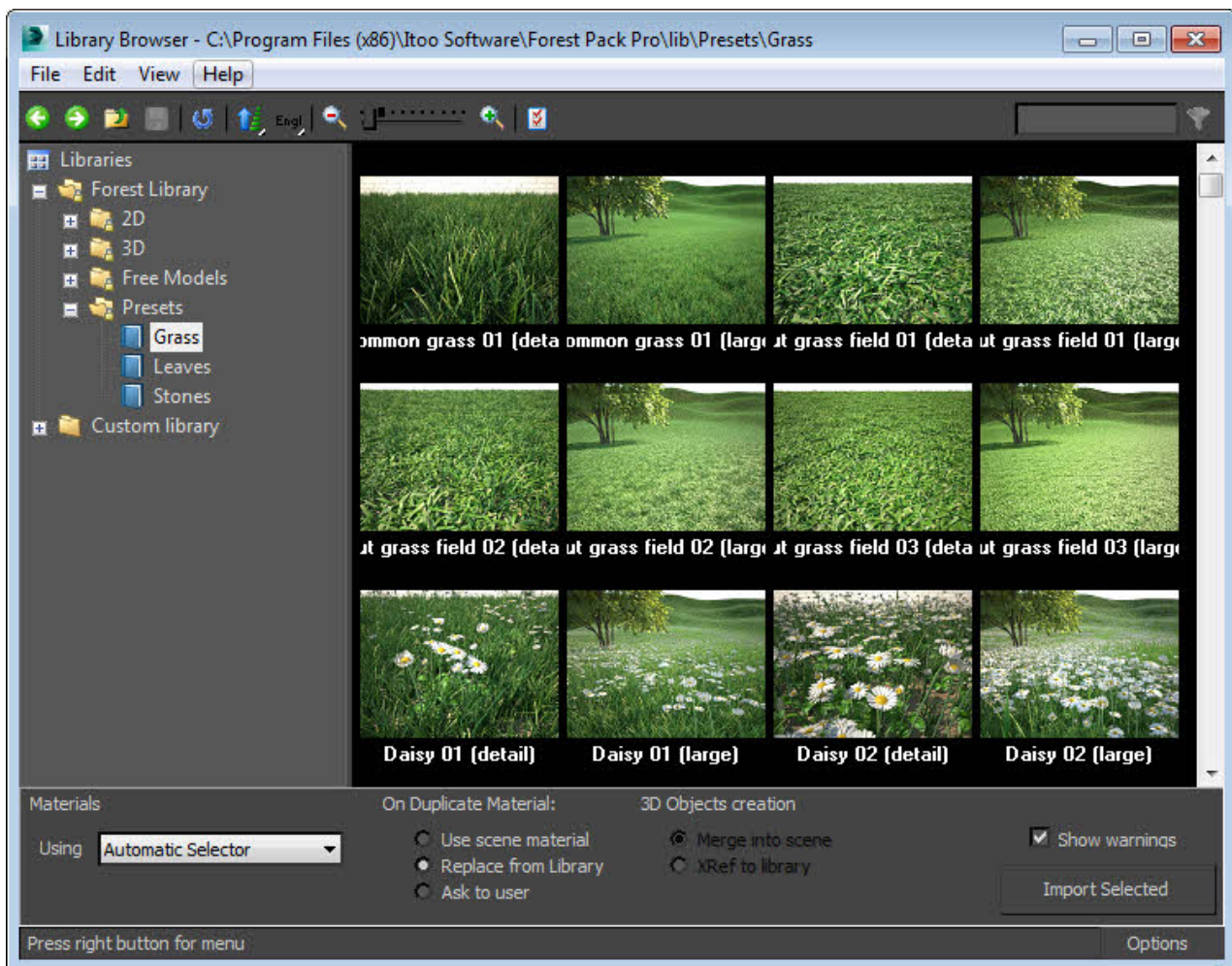
### To merge the library object's geometry into the scene

1. Select the item you wish to use.
2. From the Options bar at the bottom of the library browser, change the 3D Objects Creation mode to Merge into Scene



## 7.1.3 Interface

The Library Browser is divided into three parts. On the left is the tree navigator, where you select, edit and open your libraries. These are organised into two types of folder. System folders, represented in blue, are the default libraries that come with Forest Pack. These are read-only and cannot be modified. Editable user folders are green and are where your custom libraries can be found. On the right is the Items grid, where the contents of the selected library are shown. Along the top is the toolbar, with several command buttons.



## Tree navigator

The tree is used to navigate, edit and select libraries. To use simply use the mouse or keyboard to expand folders and select libraries as you would in Windows Explorer, the following operations also apply:

- To open a library: left click on it.
- To move libraries: left click and drag to the new location.
- To copy libraries: left click + CTRL key while dragging.

As mentioned system wide folders are read-only, if you wish to modify them, simply make a copy to a User's library folder. Libraries can be copied between computers or shared in a network.

## Items grid

To choose an item, use the mouse or the arrow keys. The selected item is identified by a yellow border. To use the selected item in Forest Pack Plugin, press return, double click, right-click>use item, or press "Import Selected". To add multiple items at same time, select while pressing the SHIFT or CTRL key and press Enter

When using Billboards, each item has an associated Width, Height, Z Offset and Center Displacement values. To use these parameters in the Forest object, ensure the "Get Size from Library" checkbox in the [Geometry](#) panel is on.



## Options Bar

At the bottom of the screen are the options to control various aspects of how the library item is imported into the scene

### Materials Using.

Library items can be configured to use a different materials dependant on renderer. This drop down list allows you to manually select which materials to import, or to let Forest Pack automatically select the best material for the current renderer, leave on automatic.

### On Duplicate Material.

Determines what to do in the event that a material applied to an item shares a name with a material already in the scene. Options include using the scene material, replacing the scene material with the library material, or prompting a decision from the user for each item.








### 3D Objects Creation.






Defines how to import the geometry, the default option is to XRef to the library files but it is also possible to merge the original geometry into the scene.

### Show Warnings.

Turns on/off any warning prompts related to these settings.

### Toolbar

Icon	Name	Description
	Previous folder	Go to previous folder.
	Next folder	Go to next folder.
	Up one level	Go to parent folder.
	Refresh view	Forces the reload all folders, libraries and items from disk.
	Ordering	Choose to view items ordered in alphabet or inverse order.
	Language	Choose to view the common name or scientific names in the grid.
	Zoom out	Decrease size of thumbnail images.

Icon	Name	Description
	Zoom in	Increase size of thumbnail images.
	Zoom slider	Click and drag right to increase size of thumbnail images and left to decrease size of thumbnail images.
	Save changes	Saves to disk the changes in current library.
	Edit preferences	Open the catalog preferences window.
	Search	Write text to filter items.

## 7.2 Editing a library

### 7.2.1 Overview

In addition to the tree libraries included with Forest Pack and a comprehensive range of Xfrog, Evermotion and HQ Plants expansions it is often desirable to create and edit custom libraries to re-use and share commonly used assets. The library browser allows you to easily organise and edit your libraries and create new 3d objects and billboards.

#### In this Section:



- User editable libraries are available to Forest Pack Pro users only.
- Only user libraries are modifiable, to change the built in libraries they must be duplicated to a users location.

### 7.2.2 Procedures

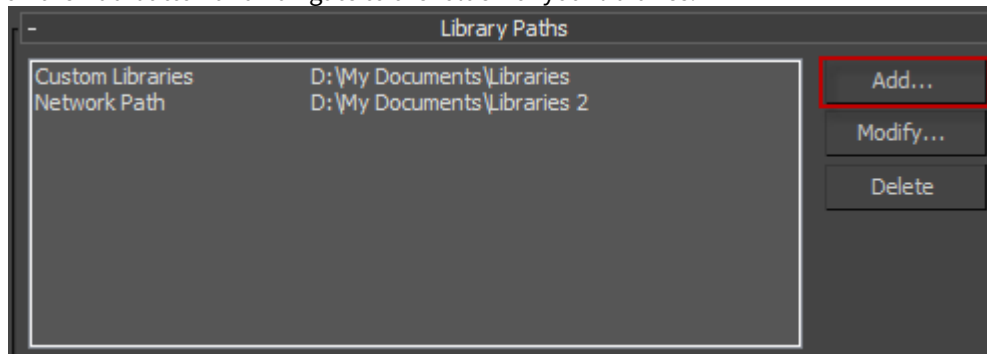
#### To add and modify library locations



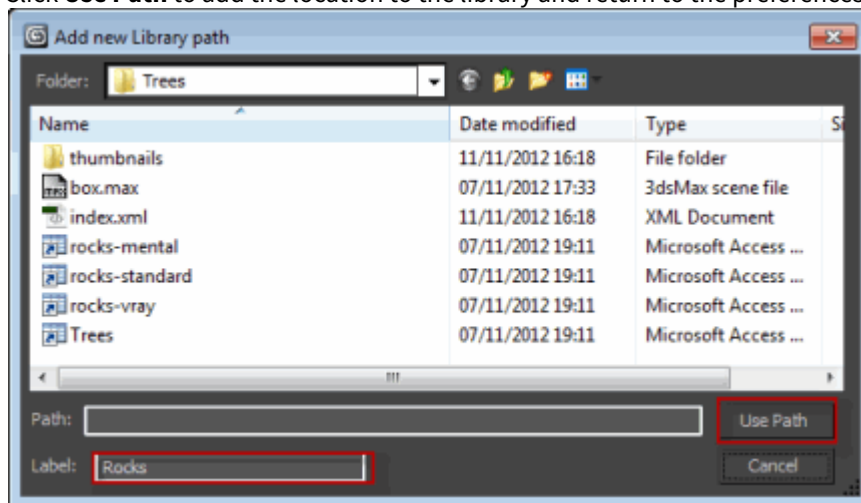
Forest Pack can access objects from a number of different libraries. These are located automatically from a list of folder paths defined in the preferences. Folders can be stored locally or in a shared network location.

1. With the library editor open go to **File>Preferences...** or click the preferences button from the top toolbar.

2. The **Library Paths** rollout shows a list of all the locations currently being used. To add a new location click on the **Add** button and navigate to the folder for your libraries.




3. In the **Label** field enter a location name to display in the tree navigator.
4. Click **Use Path** to add the location to the library and return to the preferences.



5. Click **OK** and you should now see all the sub folders and libraries displayed in the tree navigator on the left hand side of library browser.

Alternatively to modify or update an existing location:

1. With the library editor open go to **File>Preferences** or click  from the top toolbar. Setting button.
2. To modify a location select it from the library paths list and click **Modify**.
3. Navigate to the root folder of the new location and select **Use Path**.

## To organise and Create new libraries.

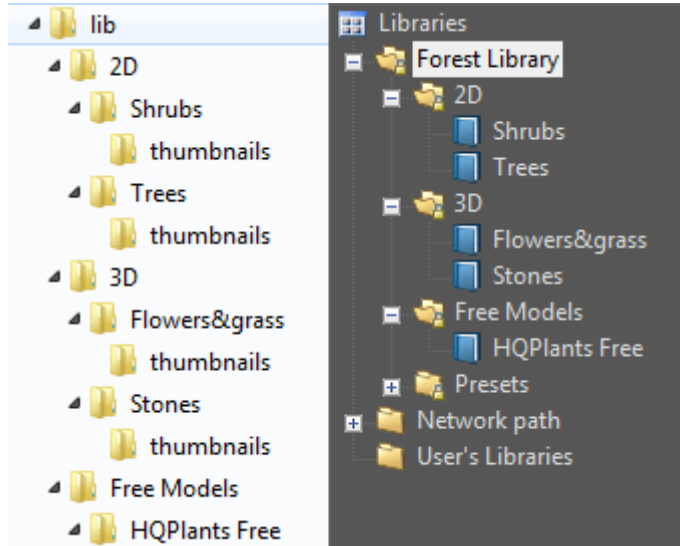
Each library location path can be further organised into subfolders. Forest Pack will scan these subfolders and replicate the directory tree in the tree navigator found on the left hand side of the library browser window. From this panel folders and libraries can be created and deleted using the procedures outline below, and the directory structure easily reorganised using drag and drop.

To create a subfolder:

1. With the Library Browser open, in the tree navigator on the left hand side, right click on a user library and select **Create Folder**.
2. A new folder has been created. The name will be highlighted, type in a new name for the folder.

Alternatively to create the subfolders directly in Windows Explorer:

1. Navigate to the library location in Windows Explorer or locate it automatically using the Library Browser by right clicking its name from the tree navigator and selecting **Open in Shell...**
2. Create your directory structure in the usual way using Windows Explorer
3. When you are done, update the view in the Library Browser to reflect the new directory tree by clicking on the **Refresh** button (button image) from the top toolbar or select from the View menu.



The same directory shown in Windows Explorer and the Tree Navigator

To create a new library:

When you create a library Forest Pack creates a new folder that includes an XML file and sub folders for thumbnails. This and any other sub folders found in the library location will not be displayed. This allows you to add additional directories for models, maps and materials used by the library without them cluttering up the tree navigator.

1. In the tree navigator, right click on the folder where you would like to save your new library and select **Create Library**
2. The library name will be highlighted, enter a title and press return
3. If you need to rename your library at a later date, simply right click on it and select **Rename**.


To delete a library or folder

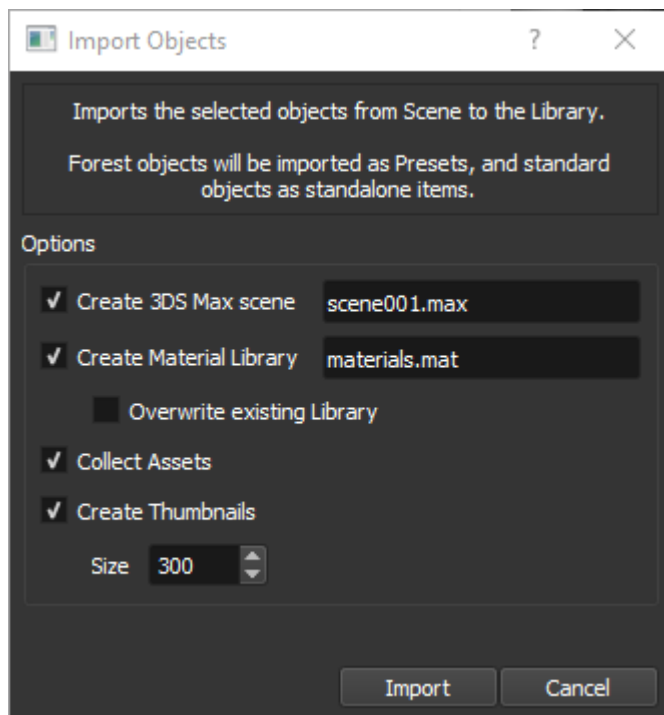
1. To delete a folder or library, simply right click and select **Delete**.

To add a new object or preset to a library from the scene

It is possible to add selected objects from a scene directly to a library with just a few clicks. This can include Forest Pack object which will be added as a complete preset with their source objects.

To add a new object or preset:

1. Select the objects you wish to add to the library
2. Open the **Library Browser** using the button on the Forest Toolbar 
3. Navigate to the library to which you wish to add the items
4. Right-click in the items list and select **Import Objects**.
5. A new dialog will open with a number of options. For the most part you won't need to change much here and it's pretty self explanatory, but let's take a look at what each option does.



**Create 3DS Max Scene** allows you to change the name of the Max file to store the new library objects. You can let FP automatically name files for you, or you can specify them manually. The browser cannot add objects to an existing file, so a new max file will be created each time you run the process, and you'll be warned if you try to overwrite something.

**Create Material Library** will save the materials assigned to the objects to a new material library. The materials in this library are assigned to the objects on import. We separate them in this way to allow users to have a different matlib for each renderer should they want it. If you choose a material library name that already exists, the new materials are appended to the existing file. This option allows you to overwrite the file instead.

**Collect Assets** moves all the external files referenced by the selected objects to a Maps folder in the library location. This will help to ensure that assets never go missing and can be found by Max.

**Create Thumbnails** allows you to create and assign a thumbnail captured from the viewport for each object.

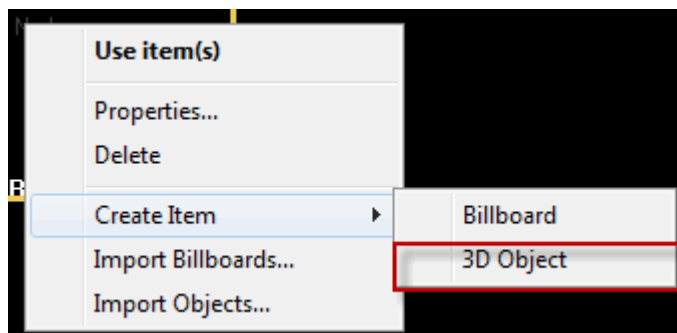
6. Click Import. Wait a few seconds and the items will be added to the whole library

### To add a new 3D object to a library from a file

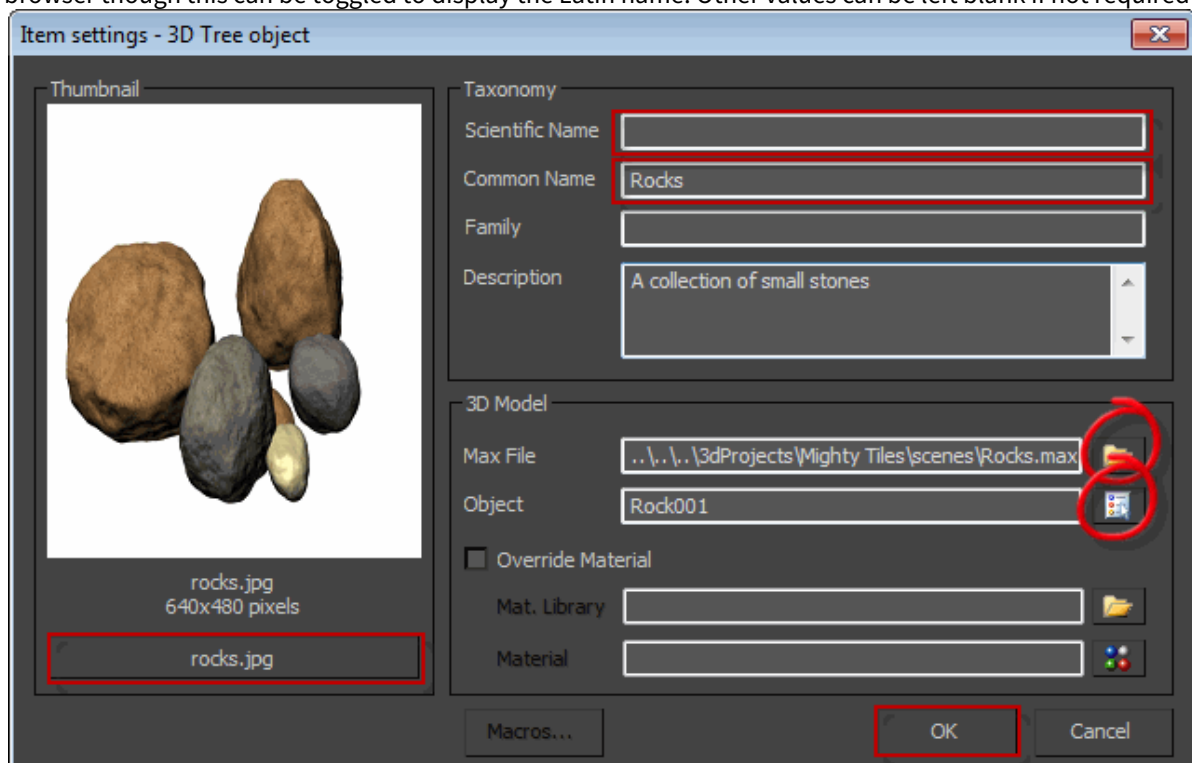
3D geometry can be added to any library saved in a user location (represented in the tree navigator as a green folder). Items are stored in .max files located anywhere on your computer or network. However sharing is simplified if the files and any material libraries and bitmaps use relative paths and are located in the library folder. If images with the same name as the object are placed in the thumbnails folder, these will be used automatically.

To add a new 3d object:

1. From the navigator on the left, select a user's library.
2. Right click in the browser and select **Create Item>3d Object**



3. A new blank 3d item will be created in the item browser. To edit, right click on the item and select **Properties...**
4. Fill in the **Taxonomy** values, note that the common name is the text displayed by default in the library browser though this can be toggled to display the Latin name. Other values can be left blank if not required



5. Click on the folder item next to the **Max File** field to select the .max scene file that contains the new object
6. A list will open containing the objects in the scene, pick the item you wish to add to the library.


#### Adding grouped content

If an item is grouped instead of a single object its elements can automatically be attached into one mesh upon import. To do this, when selecting your item from the objects list, simply select the group name containing the object's elements.

### Using nested forest objects


From Forest Pack 5.0, presets can use nested Forest objects as items. In order for this to work the nested objects must adhere to the following restrictions:

- Nested objects must use only area splines, not surfaces or exclusion objects.
- There should be no duplicate names in custom objects or areas.

1. If the object had a material applied this will be also be used in Forest Pack. It is also possible to override the material from an external material library. In order to do this enable the **Override Material** tick box.
2. Select the material library by clicking the folder icon next to the **Mat. Library** field. Find the library and click **Open**
3. Next click the **Select Material** button, this brings up a list of the contents of the material library. Highlight the material to be used and click **OK**.
4. Add a thumbnail by clicking the **image file** button below the thumbnail preview window. Select an image file and click **OK**.
5. Click **OK** to accept the changes
6. Save the library by going to **File>Save** or selecting  from the top toolbar.

### To create a new preset

Creating a new preset is the same as creating a new 3d object, the only difference being that you select a pre-made Forest object in an external file instead of a mesh.

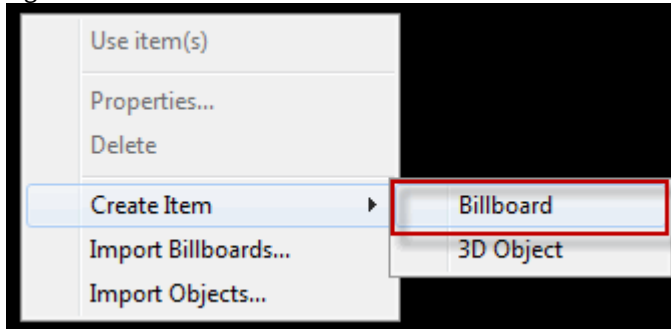
1. First prepare **.max** files, these will contain a separate Forest object for each preset. Configure the Forest object's parameters as you would normally including geometry, distribution, transforms, materials, diversity etc.
2. Save the max file to your Forest library folder, see below for more information on file structures.
3. Open the library browser and from the navigator on the left, select a user library.
4. Right click in the items grid and select **Create Item>3d Object**
5. A new blank Preset will be created in the item browser. To edit, right click on the item and select **Properties ...**
6. Fill in the **Taxonomy** values if required
7. Click on the folder icon next to the **Max File** field to select the .max scene file that contains the preset (created in step 1).
8. A list will open containing the objects in the scene, pick a Forest object that you wish to use as a preset. A single max file can contain multiple objects, geometry and presets that be combined in a single external file without problems.
9. Add a **thumbnail** by clicking the image file button below the thumbnail preview window. Select an image file and click **OK**.
10. Click **OK** to accept the changes
11. Save the library by going to **File>Save...** or selecting  from the top toolbar.
12. To use the preset, select in the same way as though it were a 3d object. See the [Library Browser](#) reference for more information.



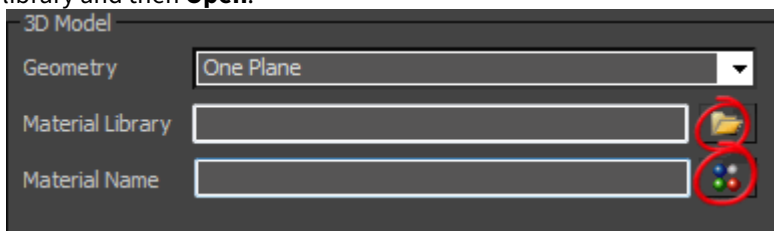
## To add a new billboard object to a library

2D billboards can easily be added to a user's library. These are loaded from a material library file that can be saved anywhere on the local machine or network though for ease of sharing it is common to move the files to the library folder and use relative paths.

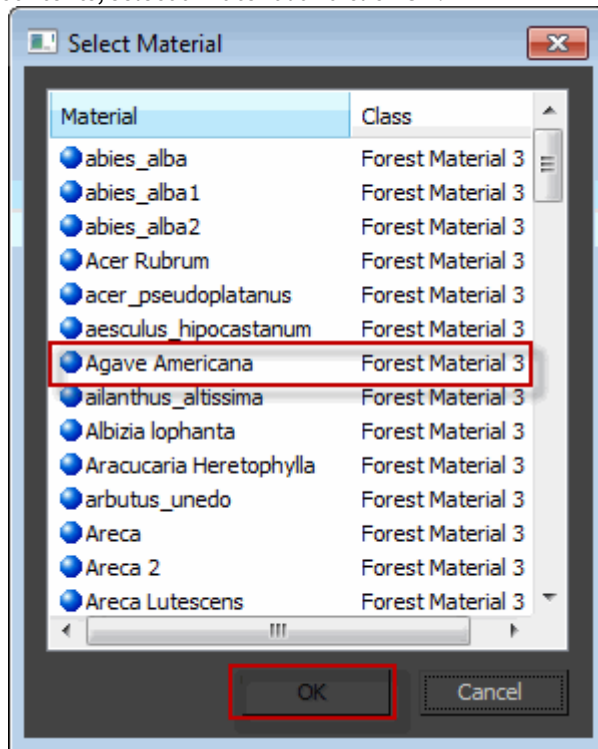
1. From the navigator on the left, select the library you wish to add a new object too.
2. Right click in the browser and select **Create Item>Billboard**



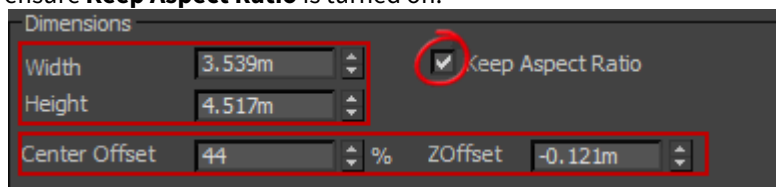
3. A new blank billboard item will be created, to edit it right click on the item and select **Properties...**
4. As above, fill in the **Taxonomy** values.
5. Choose the material library by clicking on the folder icon to the right of the **Material Library** field, select the library and then **Open**.



6. Choose the material from the library by clicking on the **Select Material** button to bring up a list of the contents, select a material and click **OK**.



7. Add a thumbnail by clicking the **image file** button below the thumbnail preview window. Select an image file and click **OK**.
8. Set a **Default Height** and **Width** from the **Dimensions** settings. To retain the proportions of the image ensure **Keep Aspect Ratio** is turned on.



9. The center point for the rotation, scale and position can be adjusted using the **Center Offset** and **ZOffset** attributes, represented as a percentage. A dashed line on the thumbnail illustrates the

effect of these settings. Typically the lines should intersect at the base of a plant's trunk or stem.



10. Click **OK** to finish and save the library by going to **File>Save Library** or pressing **F2**

## To adding multiple 3D objects to a library

The library editor can speed up the creation of libraries by loading multiple objects from a single scene file

### **Prerequisites**

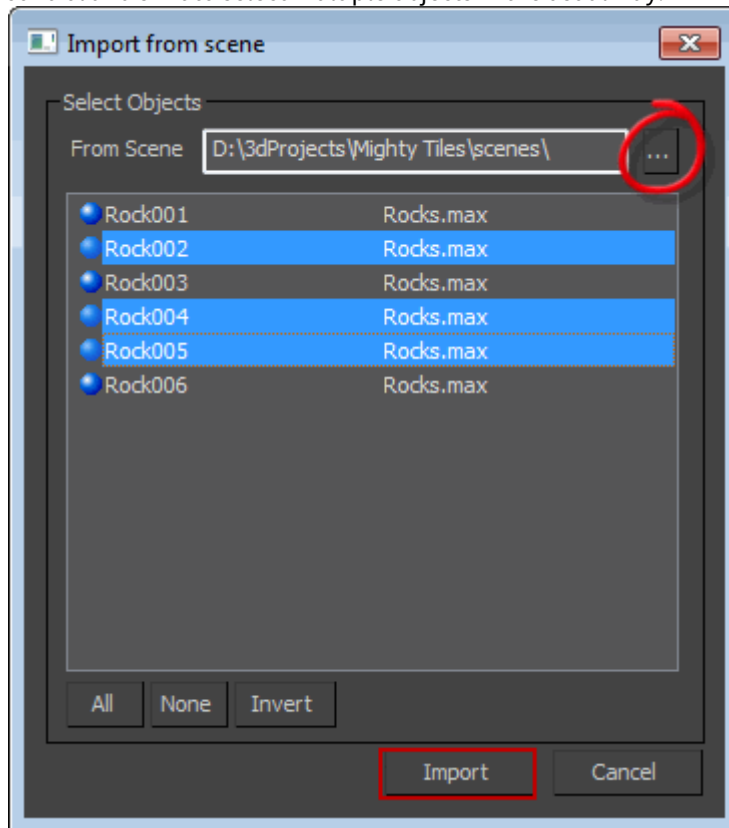
To automatically create thumbnails, preview images that share the same name as the scene objects should be moved to the thumbnails folder.

1. Open the **Library Browser** and use the tree navigator to locate the library you wish to add items to.
2. Right click anywhere in the items grid and select **Import Objects...**
3. An **Import From Scene** window will open, select the .max file containing the objects by clicking on the ellipsis (...), locating the files and clicking **Open**.

### **Adding objects from multiple .max files**

It is possible to import objects from multiple source files. To do this, you just select additional .max files while holding down CTRL or SHIFT.

4. You will now see a list of all the objects in the scene. Select the items you wish to add to the library. Use control and shift to select multiple objects in the usual way.



5. Click import. If bitmaps are located in the thumbnails folder with the same name as the items being loaded, these will be used as previews in the item browser.
6. If necessary edit the objects as described above.

## Adding Multiple Billboards to the Library

The library editor can greatly speed up the creation of libraries by loading multiple billboards contained within a single material (.mat) file. When creating libraries using this process thumbnails can be generated automatically and materials can remain in the original location or be consolidated into a single material file in the library folder.

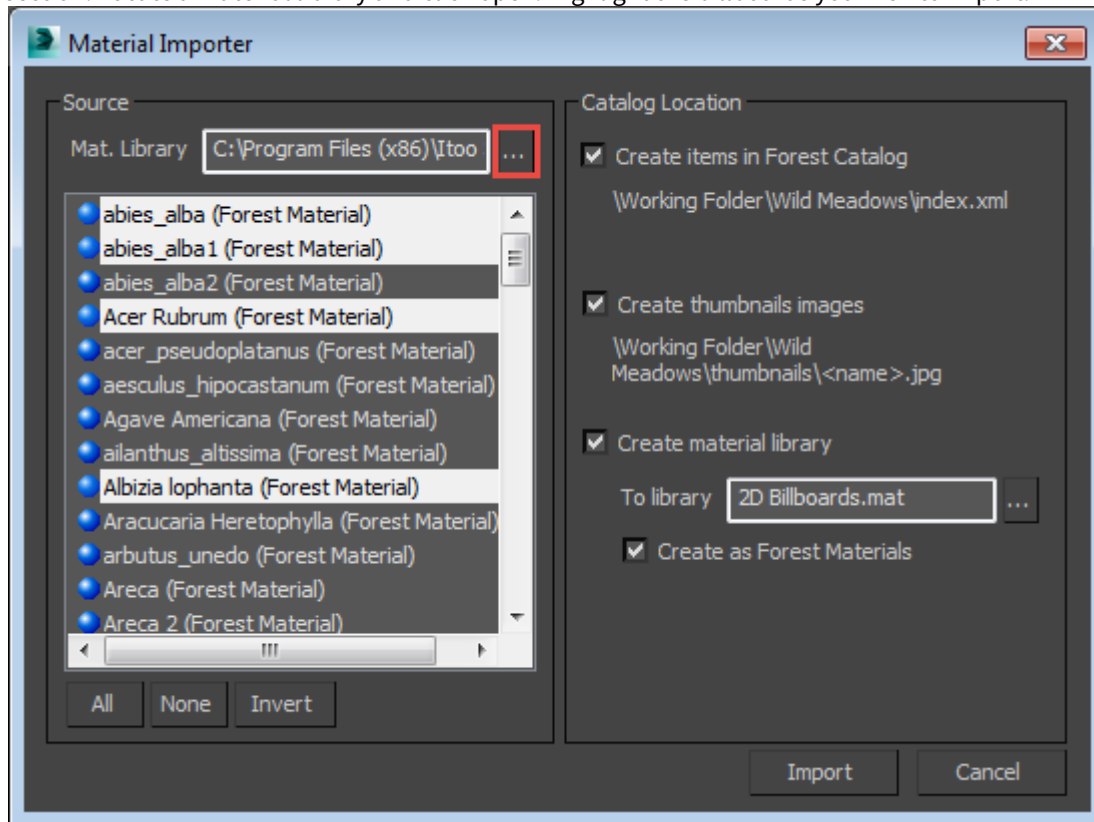
Prerequisites:

- A single .mat file containing multiple billboard materials.

To add multiple billboards:

1. Open the **Library Browser** and use the tree navigator to locate the library you wish to add items to.
2. Right click anywhere in the items grid and select **Import Billboards...**

3. The **Material Importer** will open. Select a material library by clicking on the ellipsis under the Source section. Locate a material library and click open. Highlight the billboards you wish to import.



4. Under the **Catalog Location** section tick the desired options:

**Create Items in Forest Catalog** adds the selected materials as billboards to the active library

**Create Thumbnail Images** automatically generates thumbnails from the diffuse maps of the selected materials

**Create Material Library** consolidates the selected materials into a single material library located in the library folder. There is also an option to automatically convert them to Forest Materials.

The default settings are generally OK.

5. Click **Import** and the materials will be added to the library.

## To add a macro to assign a material according to the active renderer

When creating libraries it is possible to use macros to add variables to an item's property fields. This is very useful for creating flexible libraries that can dynamically respond to individual installations or changeable 3DS Max settings. One common usage is the creation of library items that automatically load appropriate materials based on the active renderer.

### ⚠ Prerequisites

- Items are created in the usual way but materials are taken from a separate material library. In this example we assume three libraries, one for each of the three supported renderers: Mental Ray, V-Ray, and scanline.
- Each material library's name should have two sections, one part that will be identical for all three files and a second part that matches the variable names assigned by Forest Pack's macro. [libraryName][macroValue].mat
- Forest Pack uses "**mental**", "**vray**", and "**standard**" as values for the renderer macro. The following three file names demonstrate appropriate file names.

**MaterialLibraryName-mental.mat**

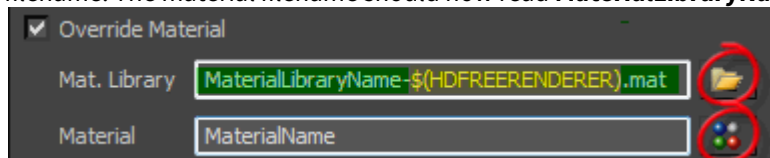
**MaterialLibraryName-vray.mat**

**MaterialLibraryName-standard.mat**

- The actual materials contained in each library should have identical names irrespective of the render. This allows you to dynamically switch between materials by automatically loading a different library for each renderer.

Auto-loading a material library by renderer:

1. Either create a new object as described above, or right click and select **Properties** to edit an existing item.
2. Turn on **Override Material**, this allows you to use a separate material library to texture the object. In this example it will automatically select a different material library according to the current renderer.
3. In the **Max File** field type the parts of your material library name that is common to all files. In the examples given above you would type MaterialLibraryName-.mat
4. Position the cursor where you want to add the renderer variable, in this case it would after **MaterialLibrary Name-** and before **.mat**
5. Click on **Macros...** and select **hdfreerenderer** from the subsequent list. Click **OK** to add the variable to the filename. The material filename should now read **MaterialLibraryName-\$(HDFREERENDERER).mat**.



6. Select an appropriate material by clicking the **select material** button and picking one from the list. If the materials are identically named in each library, this macro will change the material depending on the currently selected renderer.

## 7.2.3 Interface

### Library Browser Preferences

To access the Library Browsers go to **File>Preferences** or click  from the toolbar



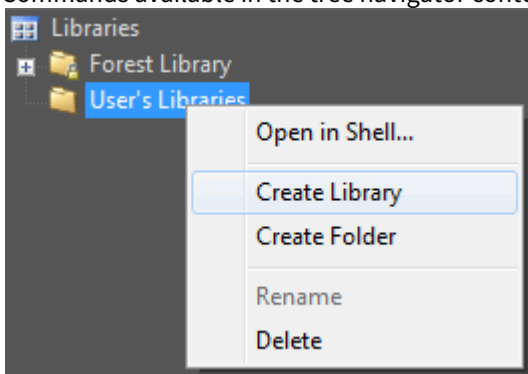
Name	Description
<b>Use scene material</b>	When selected in the event of a duplicate material the version already in the scene will be used
<b>Replace material from library</b>	When selected in the event of a duplicate material the version in the library will be used
<b>Ask user</b>	When selected in the event of a duplicate material the which of the two options above should be used
<b>Merge into scene</b>	When adding objects the geometry will be merged into the scene.
<b>XRef to library</b>	When adding objects the geometry remains in a external file and is XRef is used to add to the scene
<b>Add...</b>	Adds a new library location.
<b>Modify...</b>	Modifies the location of an existing library.

Name	Description
<b>Delete</b>	Deletes a library location.
<b>Evaluate</b>	Shows the current values for all macros.

## Folder and Library Addition

Use the context menu accessible by right clicking in the tree navigator to create new sub folders and libraries, and reorganise your directory using the mouse to drag and drop folders and libraries.

Commands available in the tree navigator context menu :

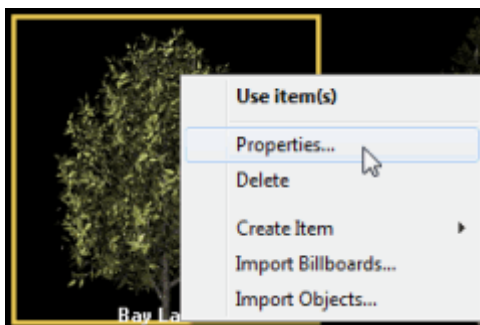


Name	Description
<b>Open in Shell</b>	Opens the file location of the library in Windows Explorer.
<b>Create Library</b>	Creates a folder with and a new "index.xml" file.
<b>Create Folder</b>	Creates an empty folder on the disk.
<b>Rename</b>	Renames a Folder or Library.
<b>Delete</b>	Deletes a Folder or Library with all its contents. <b>Use with caution !</b>

## Item Addition

To access the commands to edit a library's content, right click anywhere in the item grid. Note that changes are only stored in the system memory until the library is saved to disk.

Commands available in the item context menu :



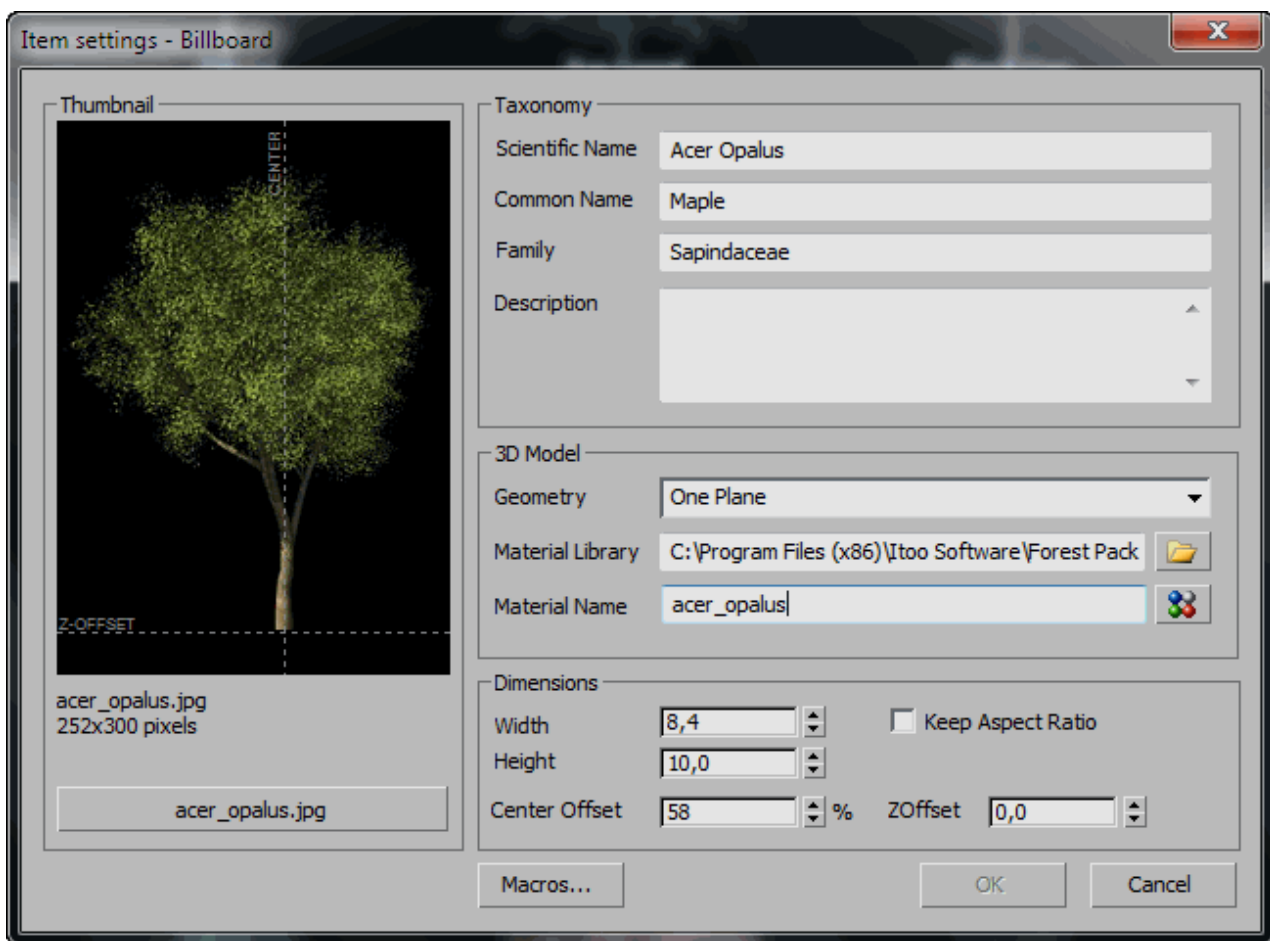
Name	Description
<b>Use Item(s)</b>	Adds the selected item to Forest's geometry list..
<b>Properties</b>	Shows the <a href="#">Item Settings</a> dialog box.
<b>Delete</b>	Delete the selected item.
<b>Create Item</b>	Creates either a billboard or 3d object



Name	Description	
<b>Import Materials</b>	Loads multiple billboards from a .mat material library <a href="#">Material Importer</a> .	
<b>Import Objects</b>	Loads multiple 3d objects from a .max scene file <a href="#">Object Importer</a> .	

## Item Settings, Billboards

This window is used to set the properties for a billboard item. The Forest plugin uses this settings to construct the plant object, most of them match properties in the plugin [Geometry](#) panel.



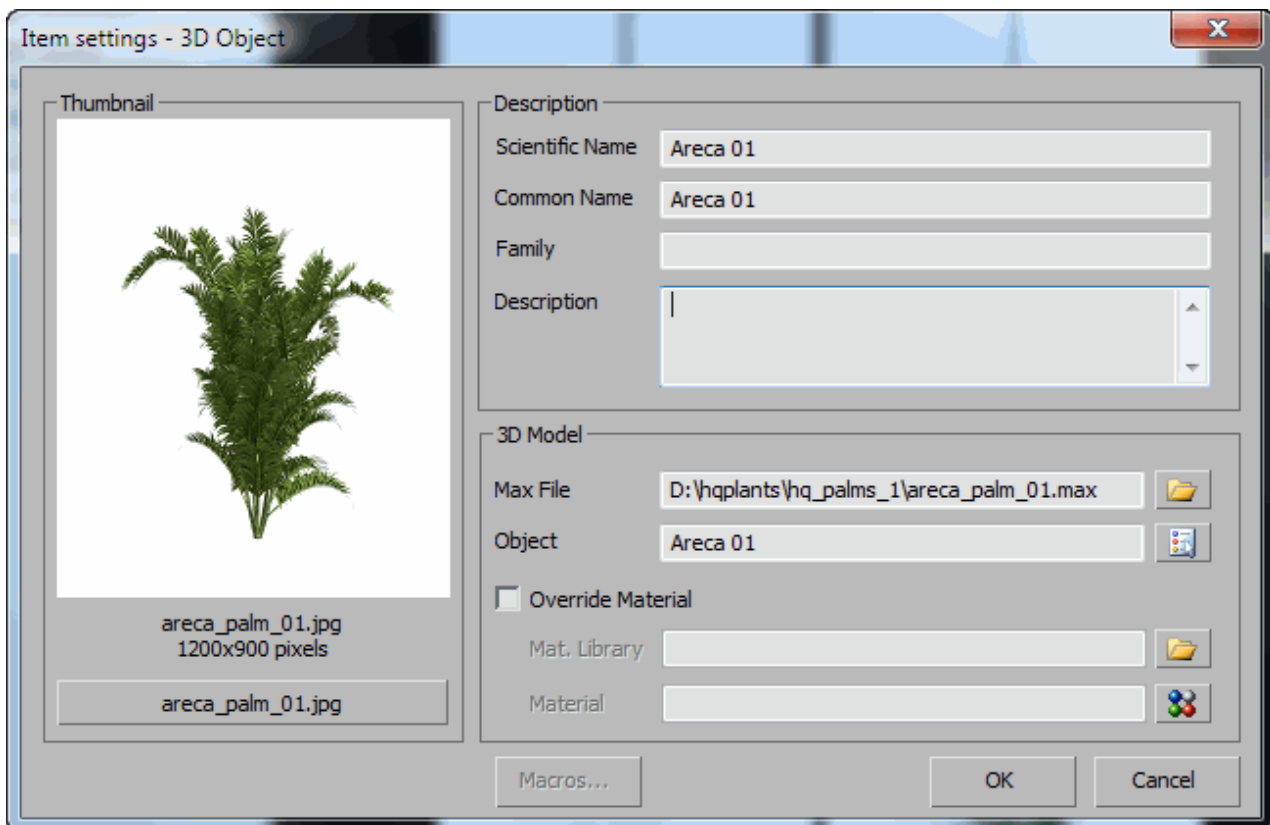
Settings available for items :

Name	Description
<b>Scientific name</b>	Latin plant name.

Name	Description
<b>Common name</b>	Common plant name.
<b>Family</b>	Botanical family of plant.
<b>Description</b>	Textual description about the plant.
<b>Geometry</b>	3D Geometry applied to the plant when is generated. Choose one of the general Forest geometry templates.
<b>Material library</b>	3DS Material library for material.
<b>Material name</b>	Name of the material to apply. Choose one of the materials in the selected material library.
<b>Width</b>	Width of the tree object in world units.
<b>Height</b>	Height of the tree object in world units.
<b>Keep aspect ratio</b>	Keep the width/height of the object synchronized with map aspect ratio.
<b>Center Offset</b>	Center of rotation for the object in % of width.
<b>ZOffset</b>	Elevation offset from the floor level.
<b>Thumbnail</b>	Preview image of object, represented with the same aspect ratio as real object.
<b>Thumbnail Selector button</b>	Press this button to change the thumbnail image.

## Item Settings, 3D Objects

This window is used to set the properties for a 3d object item. The Forest plugin uses this settings to construct the plant object, most of them match properties in the plugin [Geometry](#) panel.



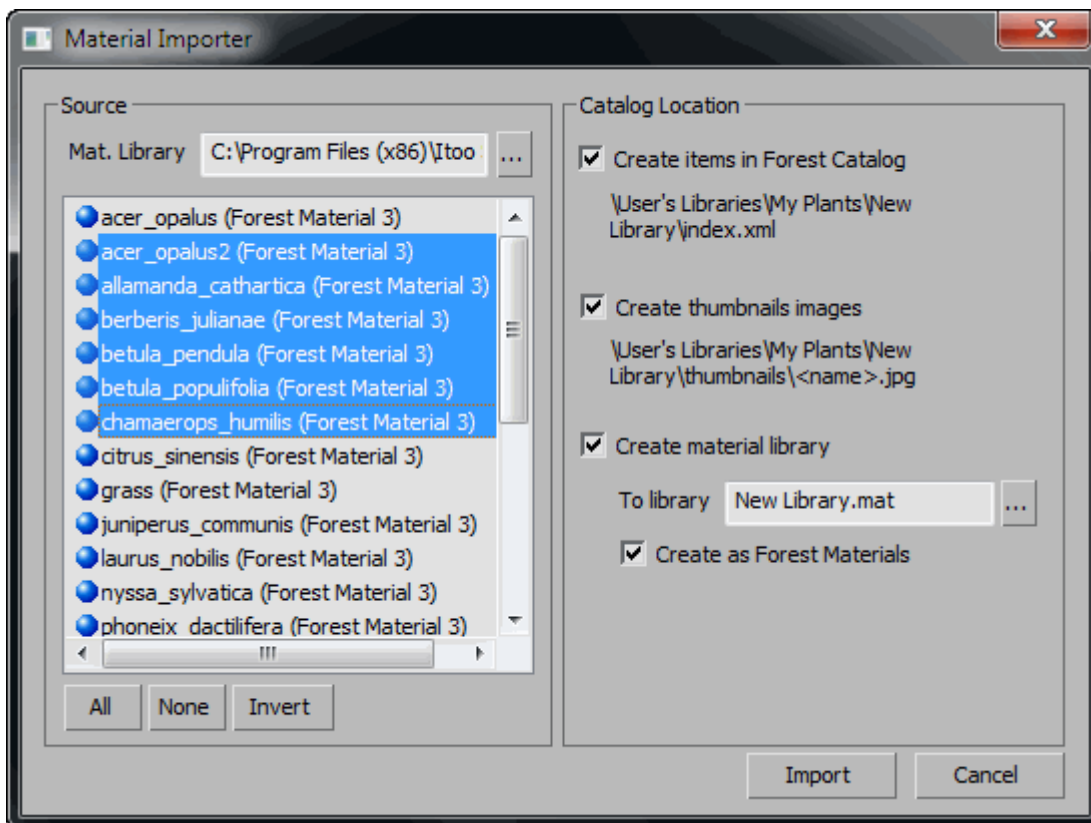
Settings available for items :

Name	Description
<b>Scientific name</b>	Latin plant name.
<b>Common name</b>	Common plant name.
<b>Family</b>	Botanical family of plant.
<b>Description</b>	Textual description about the plant.
<b>Max File</b>	The location of the scene file containing the item geometry
<b>Object</b>	The name of the object in the scene file.
<b>Override material</b>	When on the object uses a material from a separate material library.
<b>Mat. Library</b>	The location of the material library
<b>Material</b>	The name of the material to be used if override is on.
<b>Thumbnail</b>	Preview image of object, represented with the same aspect ratio as real object.
<b>Thumbnail Selector button</b>	Press this button to change the thumbnail image.

The settings are similar as for billboards, however instead loading a material we supply a 3dsmax scene with a object name. Optionally is possible to set a material override. The loading process can be done merging or XREF the object into our scene.

## Material Importer

If you have a 3DS material library with tree materials and textures, you can import them directly into a Forest Library as billboards using this window. Forest and Planes Materials are recognized in the process and their properties (such as plane size or offsets) are copied to the new items.



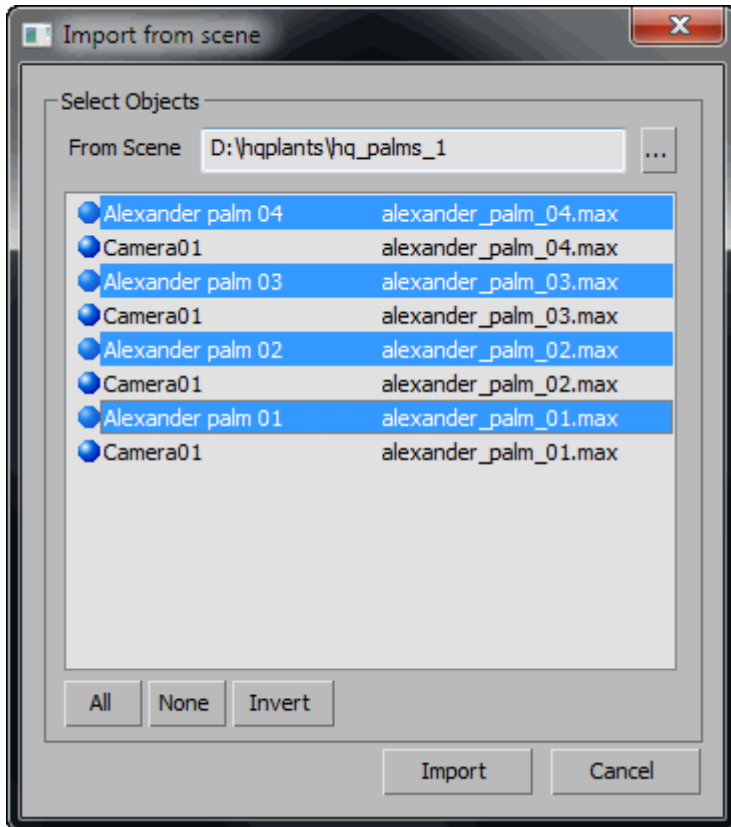
Name	Description
<b>Mat. Library</b>	Used to select a material library to import billboard materials from.
<b>Create items in Forest Catalog</b>	When activated adds the selected materials to the current library.
<b>Create thumbnail images</b>	When activated automatically generates thumbnail images and saves them to the thumbnails folder.
<b>Create material library</b>	When activated adds and consolidates the selected materials to a new material library.
<b>Create as Forest Materials</b>	Saves new billboards as Forest Materials.

## Object Importer

As for materials, you can import a whole directory of 3DS Max objects into a library automatically.

### ⚠ Adding objects from multiple .max files

It is possible to import objects from multiple source files. To do this, you just select additional .max files while holding down CTRL or SHIFT.



Name	Description
<b>From Scene</b>	Used to select a Max scene to import geometry.
<b>Object list</b>	Lists all the objects found in the selected scene.
<b>All</b>	Selects all objects.
<b>None</b>	Deselects all objects.
<b>Invert</b>	Inverts the current selection.

## File Structure

A library is a special folder on the disk which contains an **index.xml** file, where the items are listed. This file points to the files necessary to define a library item. The browser stops to scan directories when an index.xml file is found, so a library folder can't contain other libraries and all subfolders are hidden in the interface, this permits to you to organize the data in several subfolders.

Each library item points to a single template object in a **.max** file or to a material in a **.mat** file. Each time you select a library item, all settings in the template object are loaded and applied to the current Forest object. You can group several objects in a single file, or have separate files for each one. You can also use macro substitution (see section below) to use conditions or complex structures.

Each library item also has an associated image file, typically stored in the **thumbnails** folder. This image is used to show the image preview in the library and you should have one image for each library item. If you name the files using the same name of the object, the image is automatically selected in the editor.

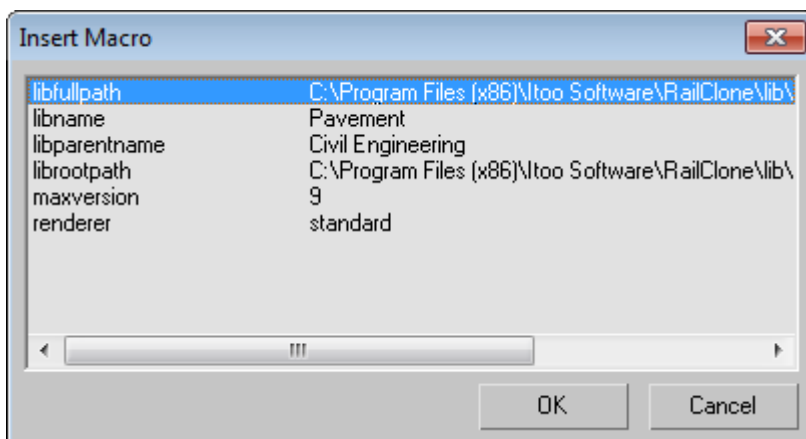
Additionally, you can have **materials libraries** to override the object's default material. This way you can have several library items with the same geometric base, but with different materials and textures.



## Macros

In some fields, such as filenames and object or material names, you can use macro substitutions to add more flexibility to your library structures. These macros represent the library root location, current folder, or 3dsmax state values. The macros are instanced using the **\$(NAME)** format.

To open the Insert Macro window, press the **Macros...** button in the properties window, select a macro and click OK, the selected macro will be inserted in the current field of the properties.



## 7.3 Integrating third-party libraries with Forest Pack

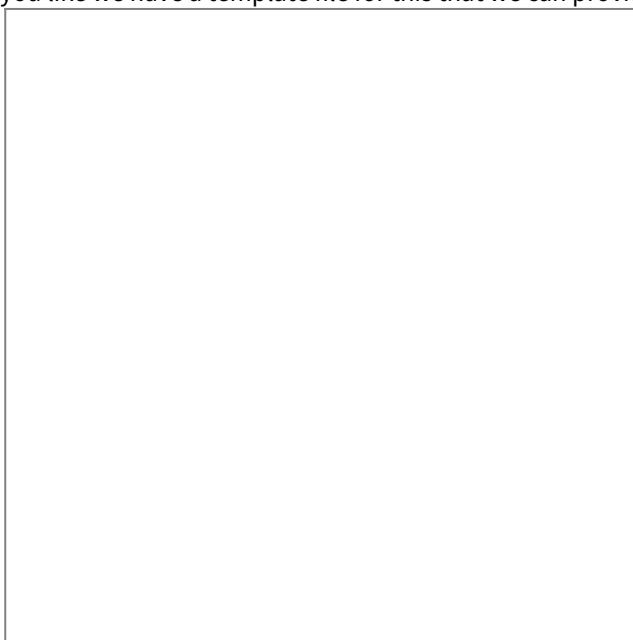
### 7.3.1 Overview

Users expect that libraries sold through our store should be integrated with the Forest Pack library. This will allow them to quickly preview and load assets directly inside Forest Pack with materials automatically applied to match their current renderer..

In the case of ground cover assets like grass, rather than provide individual models we prefer to create presets with key Forest Pack settings already applied. You can find out more about this in our [Creating Presets tutorial](#).

### 7.3.2 General rules:

- Each item should use just one material. It could be a "consolidated" Multi/Sub-Object material containing materials for the current renderer. Then by using a macro, user can choose from several material libraries upon renderer used in the scene.
- Materials should be stripped from the objects in the Max file, or replaced with Standard materials. This is to avoid problems with users getting messages about missing maps and shaders.
- Each item must have a unique name - in case of variations numbering should be used.
- Do not use Proxy objects with the Forest Pack library. It increases file sizes by requiring a separate file for each renderer and there is very little performance advantage in using Proxies with Forest Pack.
- Each asset in the library needs its own thumbnail, rendered in a square 1:1 aspect ratio no smaller than 800 x 800 and ideally 1024 x 1024. This should be on a simple light background similar to the one shown below. If you like we have a template file for this that we can provide.



- Where possible use standardised specular and glossiness [PBR workflows](#), this will allow us and our users to easily create additional materials to support new renderers with relatively predictable results.
- Plant information and descriptions are need for each asset. Naming is important. We believe we should try to be as specific as possible about the species of plant or tree. A short description of each plant can also be included in the library XML. For multiple versions of the same plant, this can simply be duplicated. The asset names, descriptions and thumbnails are also used to automatically populate an online catalogue.



- Where possible add **Forest Colour** maps to add texture and/or tint variety to your objects. Users expect that libraries provided for use with Forest Pack make full use of its features.
- Where possible it is better to use leaf geometry than opacity maps which can have a negative impact on render times. For some very large trees or for leaves that have complex leaf shapes we understand it may not always be necessary.
- Keep polygon counts reasonable. It's impossible to give an exact figure because it depends on the size and complexity of the tree/plant, but for a large tree up to 2 million should be OK. Less if possible and only go higher than this if absolutely necessary.

### 7.3.3 Creating the Library

Forest Pack's [Library Browser](#) needs to have a folder structure with an index.xml file (storing all library information needed) and a set of thumbnail images, that are be stored in thumbnails folder (containing thumbnail images) or in the same path as object files.

Additionally, it's recommended to have a <library name>.ms maxscript file handling any function needed by the library, like getRenderer for detecting the current renderer, custom actions etc...

#### File Names and directory structure

Items can share maps and materials, all necessary maps and material libraries should be stored in separate directories, as follows:

- \objects\<plant\_name>.max (one mesh object per file, same name as filename)
- \thumbnails\<plant\_name>.jpg
- \maps\<mapname>.jpg
- \matlibs\scanline.mat
- \matlibs\mentalray.mat
- \matlibs\vray.mat

If possible, please add a “fp\_” to the start of all files and names of objects. It makes it easier for users to identify the origins of the files. For maps use the following formula:

**fp\_assetname\_<maptype>.jpg**

For example an asset named daffodil1 might have these assets

- fp\_daffodil1\_diffuse.jpg
- fp\_daffodil1\_glossiness.jpg
- fp\_daffodil1\_normal.jpg
- fp\_daffodil1\_translucence.jpg
- fp\_daffodil1\_opacity.jpg

This also makes it simpler for us to recreate materials for other renderers and opens the option to automate the process further down the line, similar to the approach used by Quixel.

Index.xml structure:

**Header**

```

1  <?xml version="1.0"?>
2  <library version="100" order="1">
3      <select class="material" setmacro="<product name>RENDERER">
4          <option value="@forestlib.ms:getRenderer()" default="1">Automatic
Selector</option>
5          <option value="standard">Standard</option>
6          <option value="mental">MentalRay</option>
7          <option value="vray">VRay</option>
8      </select>

```

**The Header** part is used to assign correct materials to selected item by calling the `getRenderer()` function defined in the `forestlib.ms` maxscript file (or in the `<product name>catalog.ms`) to evaluate the currently used renderer in the scene.

In any case (using the default `forestlib.ms` or custom `<product name>catalog.ms`), the macro name needs to be set up properly by `setmacro="<product name>RENDERER">` and needs to be different from default `setmacro="RENDERER">` to avoid any error possible error messages.

**Item**

```

<item class="maxobject">
  <name lang="english">Latin plant name</name>
  <name lang="latin">Common plant name</name>
  <family>Botanical family of plant</family>
  <description>Textual description about the plant</description>
  <bitmap>\thumbnails\<plant_name>.jpg</bitmap>
  <maxfile>\objects\<plant_name>.max</maxfile>
  <object><plant_name></object>
  <matlib>\matlibs\$(<product name>RENDERER).mat</matlib>
  <material><plant_material></material>
</item>

```

The path to any models / textures could be also handled in two ways:

**Relative to the location of XML file:**

```
<maxfile>objects\_fp_<plant_name>.max</maxfile>
```

**Reference by macros:**

```
<maxfile>$(<product name>_PATH)\objects\_fp_<plant_name>.max</maxfile>
```

The use of macros for mapping files is not mandatory, however this mechanism is useful for point to models stored in another location, or add variations to the library (by renderer, season or other criterias).

## Library Installation

**Note: If you are producing libraries to be branded as iToo products, you can ignore this section.**

The Library Paths section of Forest Pack's Library Browser holds the location of the different libraries. The user can add their manually their own libraries under File - Preferences ... Library Paths section and by Add... the path where the .xml files are stored. This values are stored in the user's registry:

```
[HKEY_CURRENT_USER\Software\Ittoo Software\Forest Pack Pro\LibraryDir]
```

Also, it could be defined globally in following system registry key by any third-party installer:

```
[HKEY_LOCAL_MACHINE\Software\Ittoo Software\Forest Pack Pro\LibraryDir]
```

Each library vendor is responsible to install, manage and reference all their objects and files. Although custom automation is possible via the .ms, the library doesn't copy or move any file from their original locations.

## Library Macros

The Library Macros are the mechanism to store and automate elements in the library. The library macros are stored in the registry in the following locations:

Macros modifiable by maxscript and stored in the user's profile:

```
[HKEY_CURRENT_USER\Software\Ittoo Software\Forest Pack Pro\LibraryMacros]
```

Macros defined globally by any third-party installer:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Ittoo Software\RailClone Pro\LibraryMacros]
```

The content of the macro can be any free text, when applied to any of the maxfile, object, matlib or material fields, the text is substituted and applied to the item. Additionally, it's possible to get the macro value from maxscript, using the following format:

```
@<library name>.ms:<maxscript call>
```

For example

```
@hqcatalog.ms:getHDFLowerRenderer()
```

Where the function asks 3dsmax for the current renderer and returns the appropriate prefix to modify the file or object paths. The .ms file must be located in the same path as .xml file.

#### Macros selectors

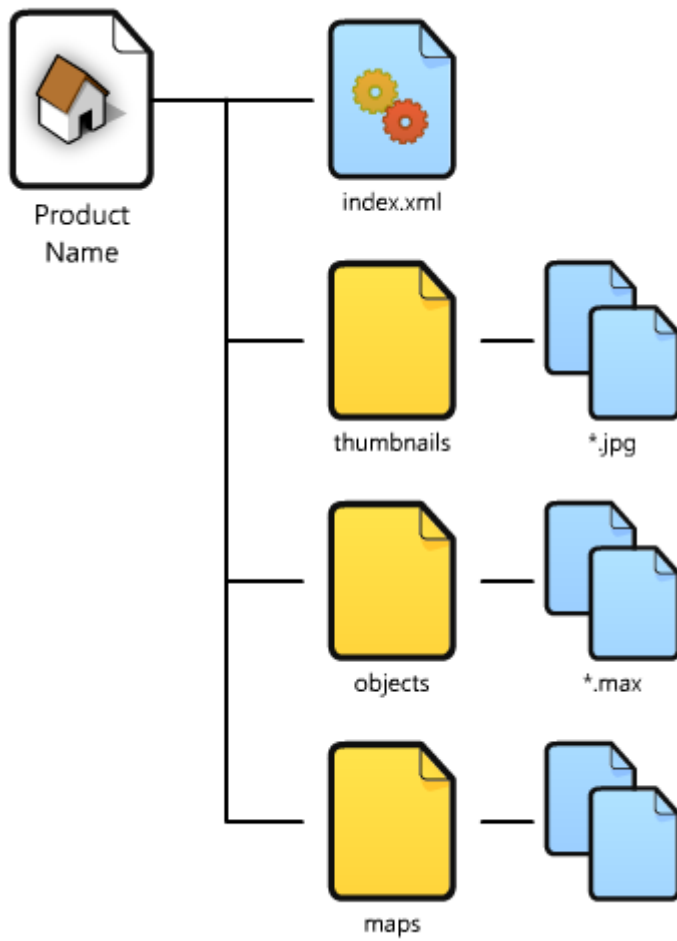
For values that can be selected dynamically by user, is possible to show a combo box handled by the library code. This option allows to change macros values without the need of programming additional code:

```
1      <select class="material" setmacro="<product name>RENDERER">
2          <option value="@forestlib.ms:getRenderer()" default="1">Automatic
Selector</option>
3          <option value="standard">Standard</option>
4          <option value="mental">MentalRay</option>
5          <option value="vray">VRay</option>
6      </select>
```

Currently only combo for material selection is allowed, however could be possible to add more combo boxes in the future.

## Library examples:

Simple library without macros:



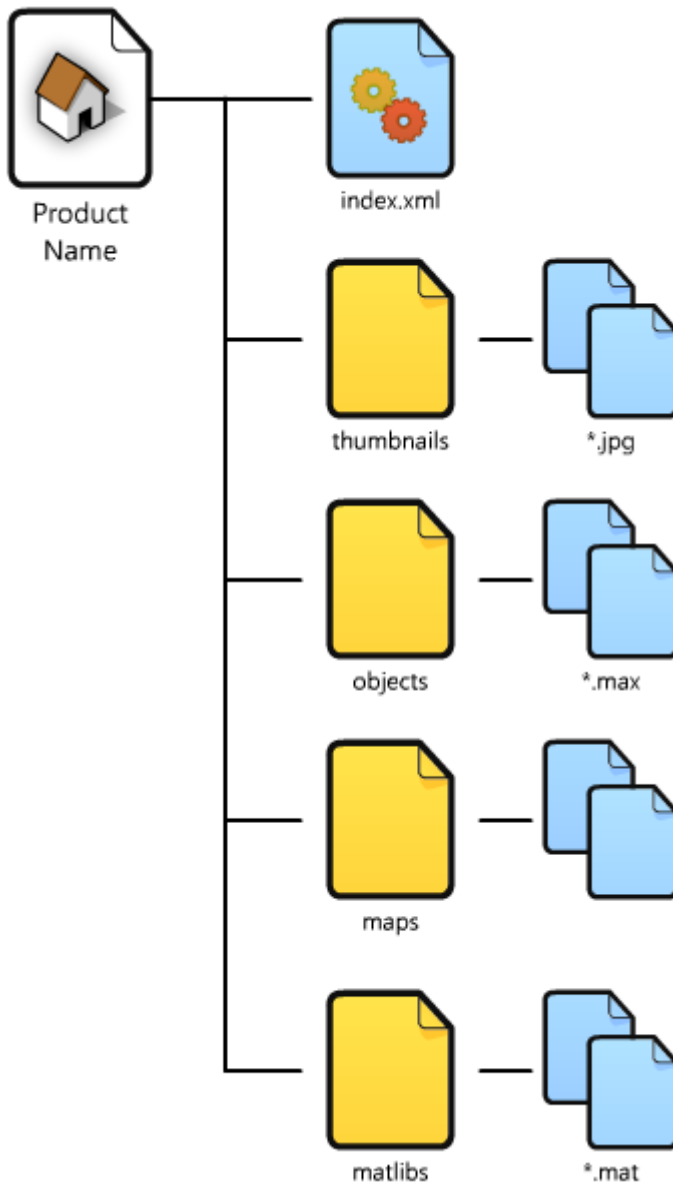
**Index.xml:**

```

1  <?xml version="1.0"?>
2  <library version="100" order="1">
3    <item class="maxobject">
4      <name lang="english">English Oak</name>
5      <name lang="latin">Quercus robur</name>
6      <family>Fagaceae</family>
7      <description>Quercus robur is commonly known as the English oak or
pedunculate oak or French oak.
8      It is native to most of Europe, and to Anatolia to the Caucasus,
and also to parts of North Africa.</description>
9      <bitmap>_fp_English Oak01.jpg</bitmap>
10     <maxfile>objects\_fp_English Oak01.max</maxfile>
11     <object>_fp_English Oak01</object>
12   </item>
13   <item class="maxobject">
14     <name lang="english">Holm Oak</name>
15     <name lang="latin">Quercus Ilex</name>
16     <family>Fagaceae</family>
17     <description>Quercus ilex, the evergreen oak, holm oak, or holly
oak is a large evergreen oak native to the Mediterranean region.
18     It takes its name from holm, an ancient name for holly. It is a
member of the white oak section of the genus,
19     with acorns that mature in a single summer.</description>
20     <bitmap>_fp_Holm Oak01.jpg</bitmap>
21     <maxfile>objects\_fp_Holm Oak01.max</maxfile>
22     <object>_fp_Holm Oak01</object>
23   </item>
24   <item class="maxobject">
25     <name lang="english">Silver Maple</name>
26     <name lang="latin">Acer saccharinum</name>
27     <family>Sapindaceae</family>
28     <description>Acer saccharinum, commonly known as silver maple,
creek maple, silverleaf maple,
29     soft maple, water maple, swamp maple, or white maple – is a
species of maple native to eastern
30     North America in the eastern United States and Canada. It is one
of the most common trees in the United States.</description>
31     <bitmap>_fp_Silver Maple01.jpg</bitmap>
32     <maxfile>objects\_fp_Silver Maple01.max</maxfile>
33     <object>_fp_Silver Maple01</object>
34   </item>
35 </library>

```

Library with auto-shader selections:



## Index.xml:

```

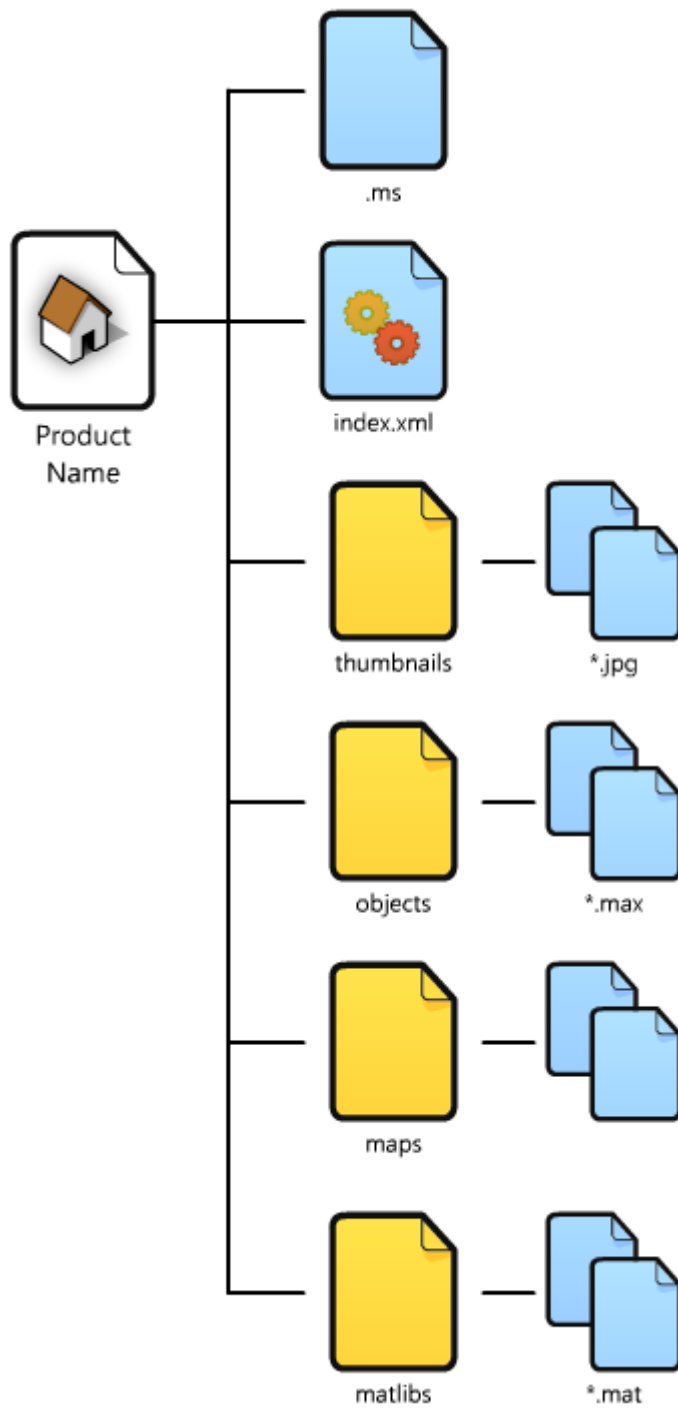
1
2 <?xml version="1.0"?>
3 <library version="100" order="1">
4   <select class="material" setmacro="RENDERER">
5     <option value="@forestlib.ms:getRenderer()" default="1">Automatic
Selector</option>
6     <option value="scanline">Standard</option>
7     <option value="mentalray">MentalRay</option>
8     <option value="vray">VRay</option>
9   </select>
10  <item class="maxobject">
11    <name lang="english">English Oak</name>
12    <name lang="latin">Quercus robur</name>
13    <family>Fagaceae</family>
14    <description>Quercus robur is commonly known as the English oak or
pedunculate oak or French oak.
15    It is native to most of Europe, and to Anatolia to the Caucasus,
and also to parts of North Africa.</description>
16    <bitmap>_fp_English Oak01.jpg</bitmap>
17    <maxfile>objects\_fp_English Oak01.max</maxfile>
18    <object>_fp_English Oak01</object>
19    <matlib>matlibs\$(RENDERER).mat</matlib>
20    <material>_fp_English Oak</material>
21  </item>
22  <item class="maxobject">
23    <name lang="english">Holm Oak</name>
24    <name lang="latin">Quercus Ilex</name>
25    <family>Fagaceae</family>
26    <description>Quercus ilex, the evergreen oak, holm oak, or holly
oak is a large evergreen oak native to the Mediterranean region.
27    It takes its name from holm, an ancient name for holly. It is a
member of the white oak section of the genus,
28    with acorns that mature in a single summer.</description>
29    <bitmap>_fp_Holm Oak01.jpg</bitmap>
30    <maxfile>objects\_fp_Holm Oak01.max</maxfile>
31    <object>_fp_Holm Oak01</object>
32    <matlib>matlibs\$(RENDERER).mat</matlib>
33    <material>_fp_Holm Oak01</material>
34  </item>
35  <item class="maxobject">
36    <name lang="english">Silver Maple</name>
37    <name lang="latin">Acer saccharinum</name>
38    <family>Sapindaceae</family>
39    <description>Acer saccharinum, commonly known as silver maple,
creek maple,
40    silverleaf maple, soft maple, water maple, swamp maple, or white
maple – is a species of maple native to eastern
41    North America in the eastern United States and Canada.

```



```
42         It is one of the most common trees in the United States.</  
description>  
43     <bitmap>_fp_Silver Maple01.jpg</bitmap>  
44     <maxfile>objects\_fp_Silver Maple01.max</maxfile>  
45     <object>_fp_Silver Maple01</object>  
46     <matlib>matlibs\$(RENDERER).mat</matlib>  
47     <material>_fp_Silver Maple01</material>  
48 </item>  
49 </library>
```

Custom actions (open website):



**Index.xml:**

```

1  <?xml version="1.0"?>
2  <library version="100" order="1">
3      <maxscript file="CustomActionsLibrary.ms" script='onLibOpen
"CustomAction1";' execute_on="lib_open"/>
4      <maxscript file="CustomActionsLibrary.ms" script='onItemSelect
"CustomAction2";' execute_on="item_select"/>
5      <select class="material" setmacro="CustomActionsLibraryRENDERER">
6          <option value="@CustomActionsLibrary.ms:getRenderer()" default="1">
Automatic Selector</option>
7          <option value="scanline">Standard</option>
8          <option value="mentalray">MentalRay</option>
9          <option value="vray">VRay</option>
10     </select>
11     <item class="maxobject">
12         <name lang="english">English Oak</name>
13         <name lang="latin">Quercus robur</name>
14         <family>Fagaceae</family>
15         <description>Quercus robur is commonly known as the English oak or
pedunculate oak or French oak.
16         It is native to most of Europe, and to Anatolia to the Caucasus,
and also to parts of North Africa.</description>
17         <bitmap>_fp_English Oak01.jpg</bitmap>
18         <maxfile>objects\_fp_English Oak01.max</maxfile>
19         <object>_fp_English Oak01</object>
20         <matlib>matlibs\$(RENDERER).mat</matlib>
21         <material>_fp_English Oak</material>
22     </item>
23     <item class="maxobject">
24         <name lang="english">Holm Oak</name>
25         <name lang="latin">Quercus Ilex</name>
26         <family>Fagaceae</family>
27         <description>Quercus ilex, the evergreen oak, holm oak, or holly
oak is a large evergreen oak native to the Mediterranean region.
28         It takes its name from holm, an ancient name for holly. It is a
member of the white oak section of the
29         genus, with acorns that mature in a single summer.</description>
30         <bitmap>_fp_Holm Oak01.jpg</bitmap>
31         <maxfile>objects\_fp_Holm Oak01.max</maxfile>
32         <object>_fp_Holm Oak01</object>
33         <matlib>matlibs\$(RENDERER).mat</matlib>
34         <material>_fp_Holm Oak01</material>
35     </item>
36     <item class="maxobject">
37         <name lang="english">Silver Maple</name>
38         <name lang="latin">Acer saccharinum</name>
39         <family>Sapindaceae</family>
40         <description>Acer saccharinum, commonly known as silver maple,
creek maple, silverleaf maple, soft maple, water maple, swamp maple,

```

```

41         or white maple – is a species of maple native to eastern North
42         America in the eastern United States and Canada.
43         It is one of the most common trees in the United States.</
44         description>
45         <bitmapbitmapmaxfilemaxfileobjectobjectmatlibmatlibmaterialmaterialitem>
42     </library>

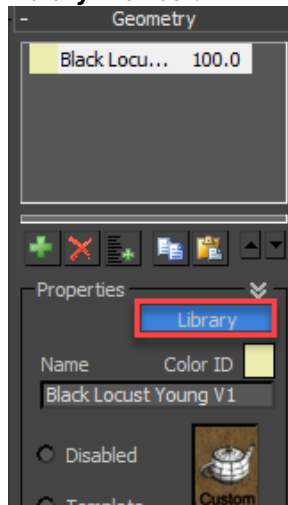
```

## 7.4 Installing The3dGarden plant collections

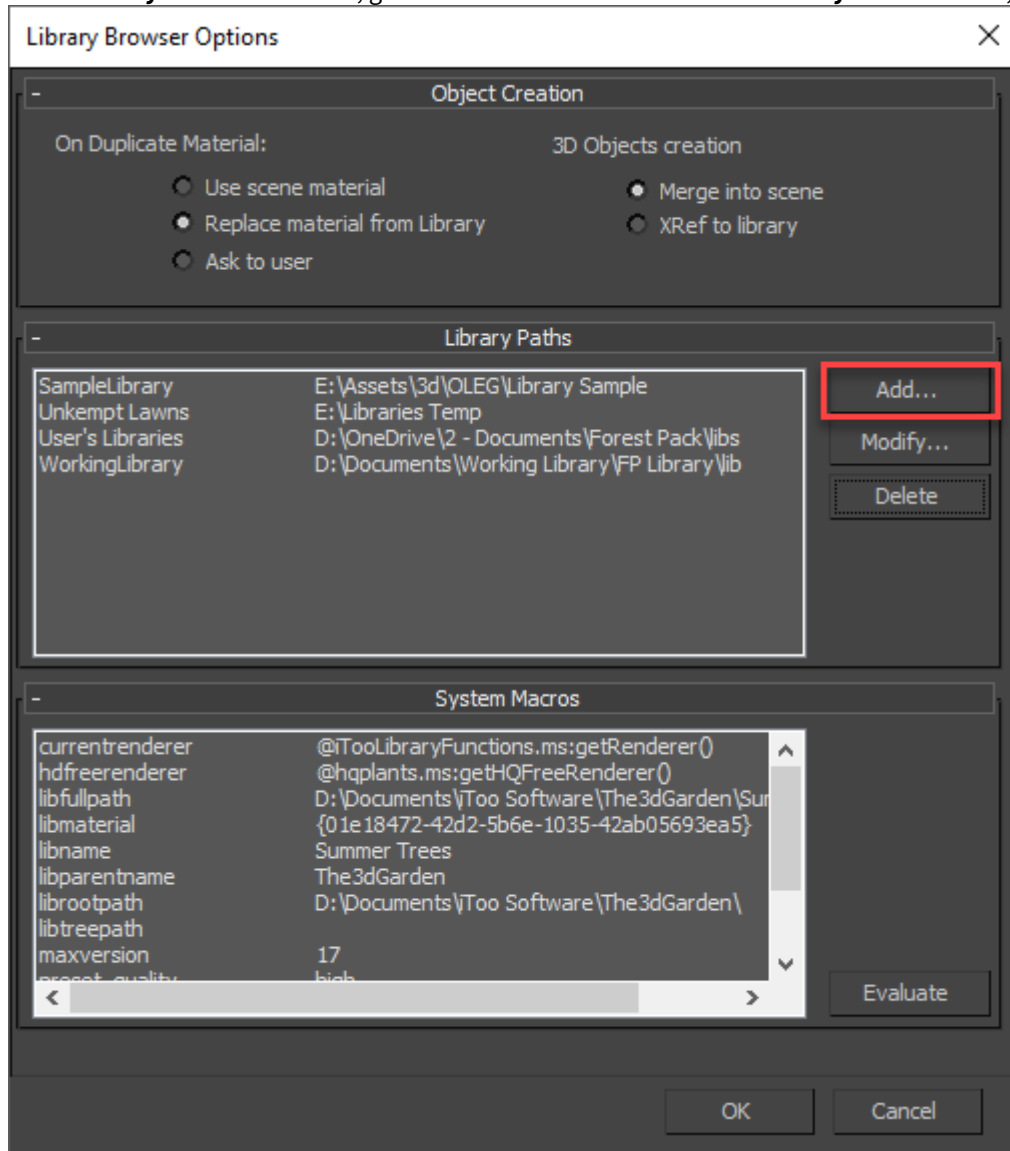
To install The3dGarden collection manually to your Forest Pack library, just follow these easy steps.

1. When you purchase The3dGarden plant collections you will receive an email with the download links. They are also available from your [User Panel](#).
2. To add the trees to the Forest Pack library, first of all, just unzip the folder to your HDD. It doesn't matter where, as long as the directory structure remains intact.

3. Now in **3DS Max**, create a new **Forest Pack** object. switch to the **Modify** panel and open the **Forest Pack Library Browser**.

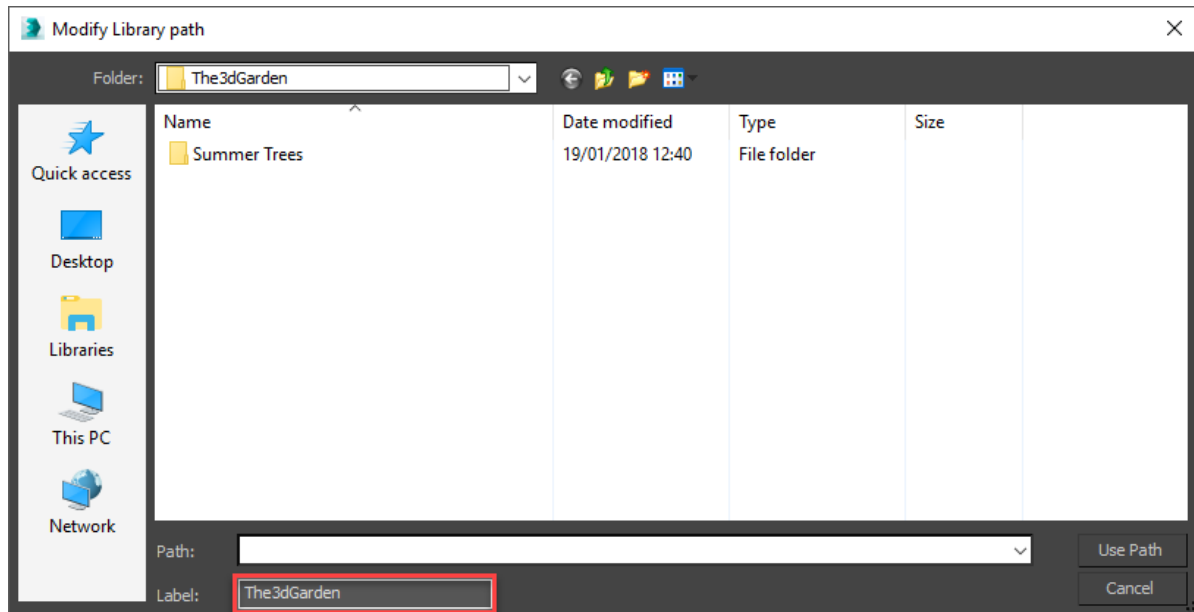


4. In the **Library Browser** window, go to **File > Preferences** and in the **Library Paths** section, click **Add**.

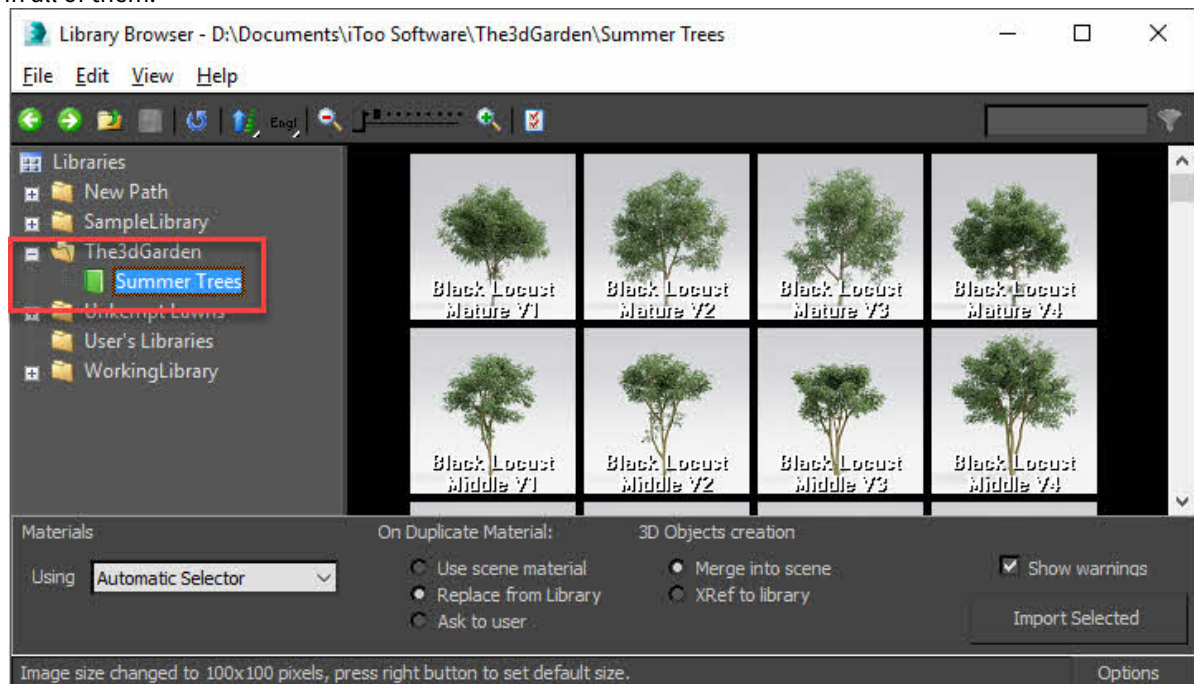


5. Navigate to where you saved your files in step 1. You should select the folder called The3dGarden (or Itoo Libraries, depending on the collection).

6. Give the library a name in the Label field.




7. And then click **Use Path**.
8. Click **OK** to accept the change of settings and you should now see the new library has been added to the library browser and is ready to go! If you have multiple versions of Max installed, the new library will appear in all of them.




## 8 Forest Lister

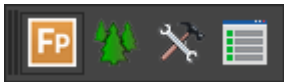
### 8.1 Overview

Forest Lister simplifies the management of scenes that contain multiple Forest Pack objects. It comprises a simplified interface allowing you to rename, enable/disable, hide/unhide, and select Forest objects, display useful information, and speed up editing properties. To access Forest Lister:

1. Select any **Forest Pack** object.
2. Open the **General** rollout.
3. Click  to open the **Forest Lister** window.

Or:

- Click the  button from the RailClone toolbar



The interface consists of a table view of all Forest objects in the scene with a row for each object and a column for each of the commonly used rollouts. Each rollout is represented by a **Label** which displays relevant information and also acts as a button to take you to the modify panel so that you can edit the object's parameters. Forest Lister's layout can be customised to show only the columns you need and change their order, for example for still images you may want to hide the Animation column as it's not required, in this way the interface can be customised to suit your individual workflow.

### 8.2 Procedures

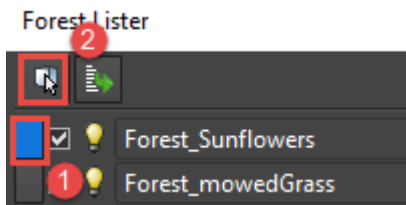
#### 8.2.1 To select a Forest object using Lister

To select a Forest object using Forest Lister you have **2** options, either:

- Click any **Label** and Forest Lister automatically selects the Forest Pack object.

Or:

- Highlight a Forest object by activating the **Selection Marker** in the first column and then click .





#### 8.2.2 To pick multiple Forest objects using Selection Markers


1. Forest Lister allows you to easily select multiple Forest objects using **Selection Markers**. These are the buttons in the first column that are highlighted blue when clicked to indicate a Forest object has been selected. You use markers with the following mouse and keyboard combinations:



- **Ctrl + Left Click** to **add** Forest objects to the selection.
- **Alt + Left Click** to **remove** Forest objects from the selection.
- **Right Click** to **clear** the current selection.
- **Left Click** and then **Shift + Left Click** to select a range.

- Click  to select all Forest objects in lister.


- Click  to deselect all currently selected objects.

2. Marking objects in the lister does not automatically select them in the scene. To select marked objects, click the  button.

### 8.2.3 To edit a Forest object's properties




- Click any **Label**. Forest Lister automatically selects the Forest Pack object and takes you to the relevant rollout in the modify panel.

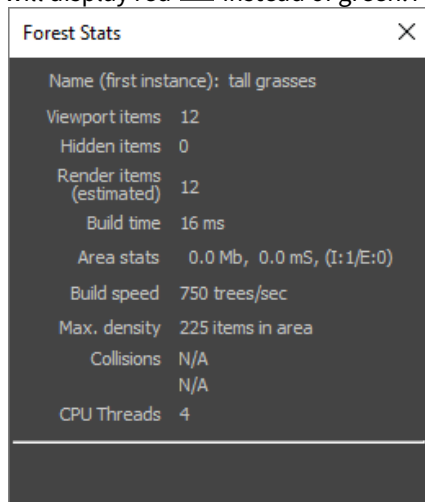
### 8.2.4 To edit multiple Forest object's properties

 In this release it is only possible to batch modify the Enable/Disable, Hide, and Display Mode properties. In future releases we will extend this function to include other parameters.

1. Use **Selection Markers** to highlight the Forest objects you intend to edit (see above). There's no need to select them in the scene, they only need to be highlighted in Forest Lister.
2. Change the enable/disable, hide/unhide or display mode settings in Forest Lister.

### 8.2.5 To display a Forest object's statistics

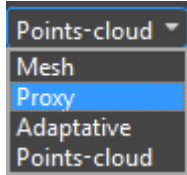
- Click  next to the Forest object's name to display its statistics. If an object is in an error state the sphere will display red  instead of green. A warning is signified by an orange sphere .



- To close the window you can either click the sphere a second time or use the close button.

## 8.2.6 To change display mode

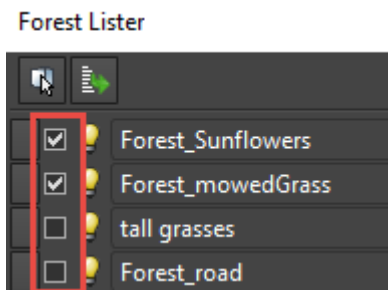
- Choose a display mode using the drop-down list. Note that there's no need to select the Forest Pack object first.



- To change the display mode of multiple Forest Pack objects, highlight them first using **Selection Markers** (see above)


## 8.2.7 To enable or disable a Forest object

- Click on the checkbox in the second column



- To enable/disable multiple Forest Pack objects, highlight them first using **Selection Markers** (see above)


## 8.2.8 To hide or unhide a Forest object

- Click on the lightbulb icon  in the third column
- To hide/unhide multiple Forest Pack objects, highlight them first using **Selection Markers** (see above)

## 8.2.9 To rename a Forest object

- Click in the Name field and enter a new value.

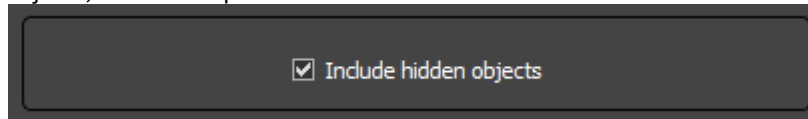
## 8.2.10 To synchronise lister with the Max selection

- To synchronise the selection markers in the lister so that they match the Forest objects selected in the scene, click 


## 8.2.11 To show/hide hidden Forest objects in the lister

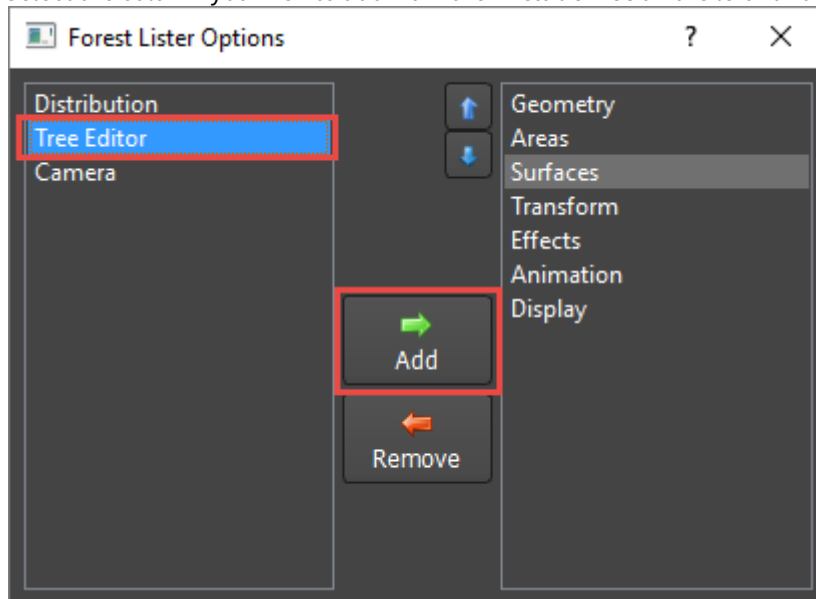
- Click the gear icon  to open the **Settings** menu.

2. Turn on **Include hidden objects** to show hidden Forest object's in the lister. If you'd prefer to see only visible objects, leave this option unselected.



## 8.2.12 To add columns

1. Click the gear icon  to open the **Settings** menu.
2. Select the column you wish to add from the **Exclude List** on the left hand side.

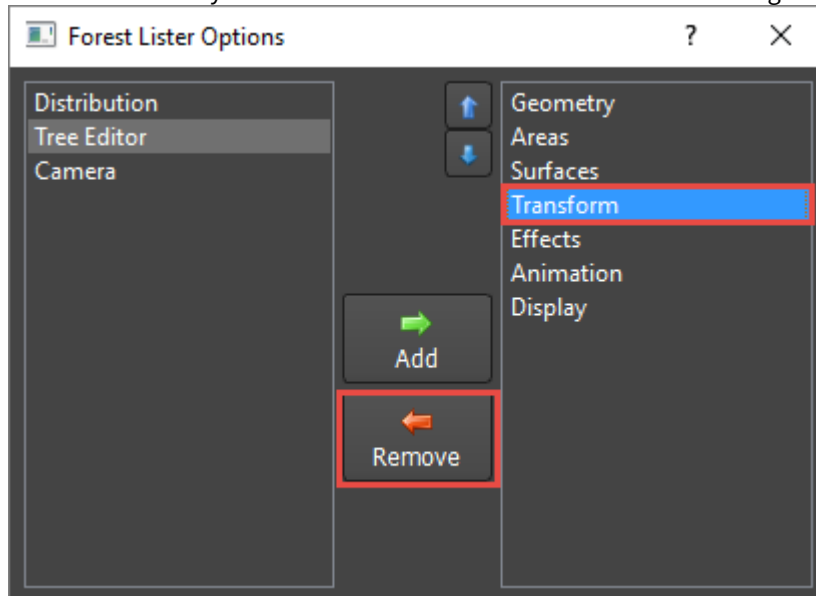


3. Click the **Add** button.

## 8.2.13 To remove columns

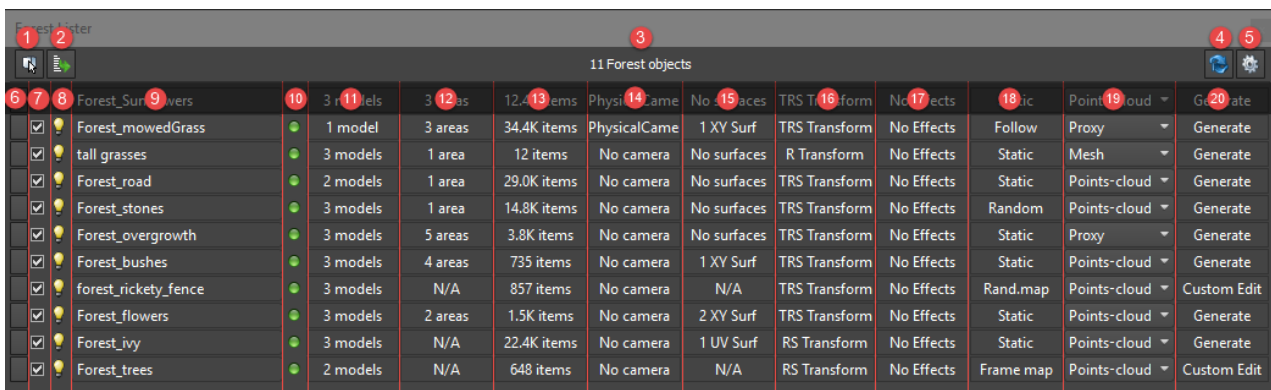
1. Click the gear icon  to open the **Settings** menu.

2. Select the column you wish to remove from the **Include List** on the right hand side.







3. Click the **Remove** button.

## 8.3 Interface




### 8.3.1 Forest Lister

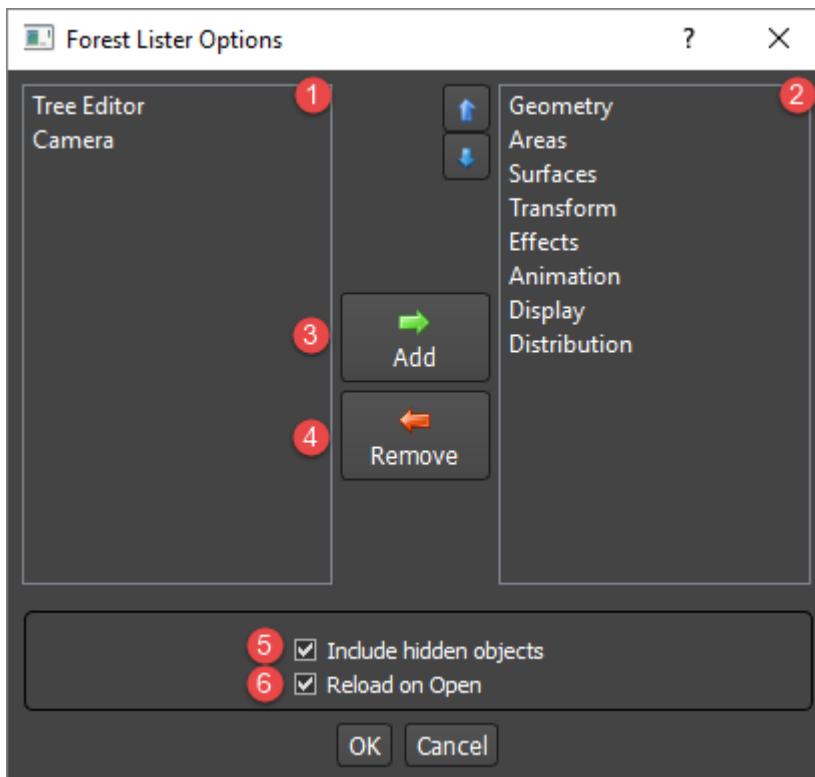
1. **Select.** Selects the Forest objects in the scene that have been highlighted using Selection Markers (6).
2. **Synchronise with Max Selection.** Highlights the Selection Markers for the objects in Forest Lister that are currently selected in the scene.
3. **Number of Objects.** Displays the number of Forest objects managed in Forest Lister.
4. **Refresh.** Forces a manual update of Forest Lister. Use this in the rare event that Lister and the scene are out of sync.
5. **Settings.** Opens the settings menu (see below).
6. **Selection Marker.** Click this to select Forest objects in the Lister. Note that this **does not** also select the objects in the scene unless you click .
7. **Enable/Disable.** Toggle the Forest object **on** or **off**.
8. **Visible. Hide** or **Unhide** the Forest object.

9. **Name.** Used to display and edit a Forest object's name.
10. **Statistics.** Displays the health of the Forest object:  = OK,  = Warning,  = error. Click the label to open the **Forest Stats** window for more information.
11. **Geometry.** Displays the number of entries in the **Items List**. Click the label to open the **Geometry rollout**.
12. **Areas.** Displays the number of areas used. Click the label to open the **Areas rollout**.
13. **Distribution.** Displays the number of scattered items. Click the label to open the **Distribution rollout**.
14. **Camera.** Displays the **name** of the camera assigned to the Forest object or **No Camera** if none is used. Click the label to open the **Camera rollout**.
15. **Surfaces.** Displays the number and type of surfaces used by the scatter. Click the label to open the **Surfaces rollout**.
16. **Transforms.** Displays types of Transform randomisation used: **T** = translation, **R** = Rotation, **S** = Scale. Click the label to open the **Transform rollout**.
17. **Effects.** Displays **Effects On** if an effect is loaded and active or **No Effects** if this feature is not used. Click the label to open the **Effects rollout**.
18. **Animation.** Displays the type of Animation control used: **Static** = disabled, **Follow** = follow geometry, **Random** = random samples, **Rand.Map** = random from map, **Frame Map** = frame from map. Click the label to open the **Animation rollout**.
19. **Display Mode.** Displays the current display mode. The parameter can be changed directly in the Lister using the drop down list.
20. **Edit Mode.** Displays the Forest object's distribution mode. Click the label to open the **Tree Editor rollout**.



The columns and their order may be different for your configuration. To change these options, open **Settings** by clicking 

### 8.3.2 Settings



The settings menu is used to configure the columns that are displayed in the Lister window. Use the left and right arrows to add or remove columns, and the up and down arrows to change their order.

1. **Exclude list.** Contains the columns that are not shown in Forest Lister.
2. **Include list.** Contains the columns that are shown in Forest Lister.
3. **Add.** Moves the selected item in the Exclude list to the Include list.
4. **Remove.** Moves the selected item in the Include list to the Exclude list.
5. **Include hidden objects.** When active the lister shows all Forest objects, even if they're hidden. If the checkbox is disabled hidden Forest objects will not be seen.
6. **Reload on Open.** Forces Lister to automatically refresh when it is opened. Can slow down scenes with over 100 Forest objects

## 9 Instantiating and Exporting

This section includes information about converting Forest Pack objects to standard Max instances for use when the plugin is not available, as well as how to export to other popular programs. Please see the sections below.

- [Forest Tools](#)
- [Exporting to Unity](#)
- [Exporting to Unreal](#)
- [Exporting to Chaos Vantage](#)

### 9.1 Forest Tools

#### 9.1.1 Overview

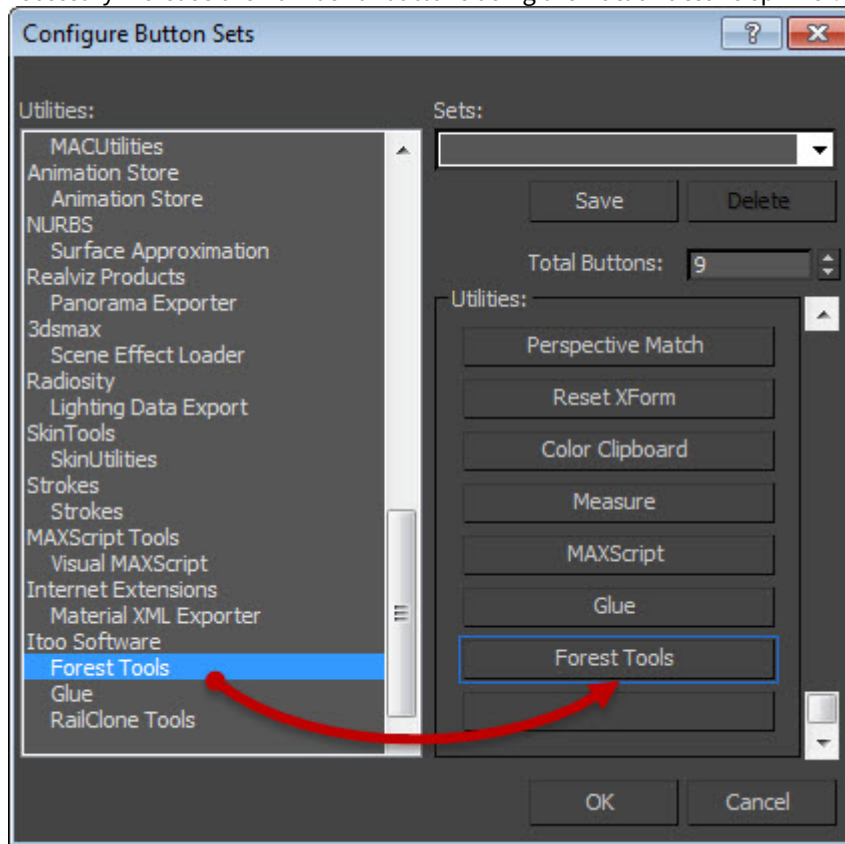
Forest Tools is a utility that allows you to convert a forest object to individual instanced geometry. This can be used when you need to share a file with someone who does not have the forest plugin, use a renderer that does not natively support Forest Pack, or export the scene to another program.

#### 9.1.2 Procedures

To add Forest Tools to the Utilities panel

1. From the Command Panel click  to open the **Utilities Panel**.
2. Click  to open the **Configure Button Sets** menu.

- From the Utilities list on the left, drag **Ito Software > Forest Tools** to an empty button slot on the right. If necessary increase the number of buttons using the **Total Buttons** spinner.



- Click **OK**.

### To create instances from a Forest Pack object

- Select the Forest object to instantiate.
- Open **Forest Tools** from the **Utilities Panel**.
- In the objects group activate **Move to layer** and enter a name for the new layer.

**i** It is also possible to add instances to the current layer or add them to a new group, however creating a new layer is recommended for more efficient scene management.

- Optionally select the **Freeze** checkbox to freeze the layer and select the **Boxes** checkbox speed up viewport performance by displaying instances as boxes.
- Click **Instantiate**.

### To delete existing instances

- Select a Forest Object that has previously been used to create instances.
- Open **Forest Tools** from the **Utilities Panel**.
- From the **Objects** group, click **Delete**.

### To update instances

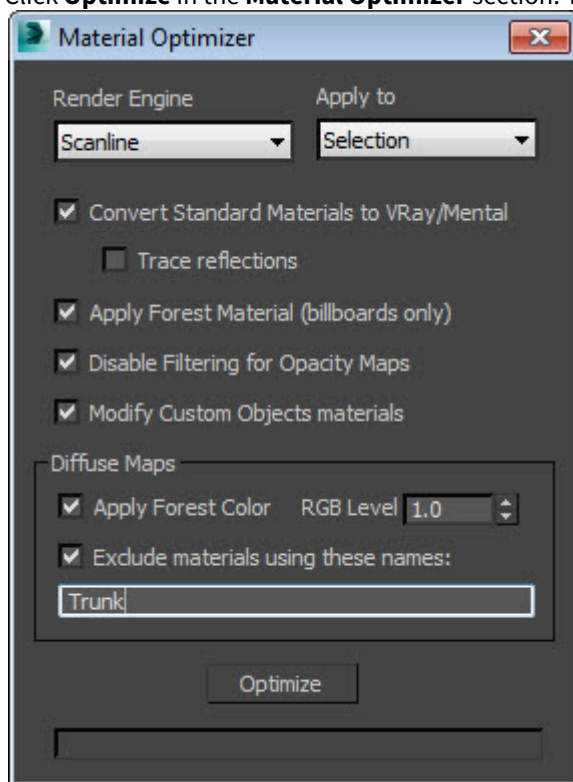
- Select the Forest object to update.



2. Open **Forest Tools** from the **Utilities Panel**.
3. If there are instances already in the scene that you need to replace, from the **Objects** group click on the **Auto delete old items** checkbox. This will delete any existing instances before creating new ones. Alternatively to remove them immediately click on **Delete**.
4. If the forest object is disabled, click **Enable** and make the necessary changes. If the Forest object is disabled and you do not need to enable it to make the changes, ensure that the **Enable before start** checkbox is selected.
5. To automatically disable the Forest object after instances have been created, select the **Disable at end** checkbox.
6. Click **Instantiate**.

### To optimise materials for the active renderer

1. Open **Forest Tools** from the **Utilities Panel**.
2. Click **Optimize** in the **Material Optimizer** section. The material optimizer tool will open.

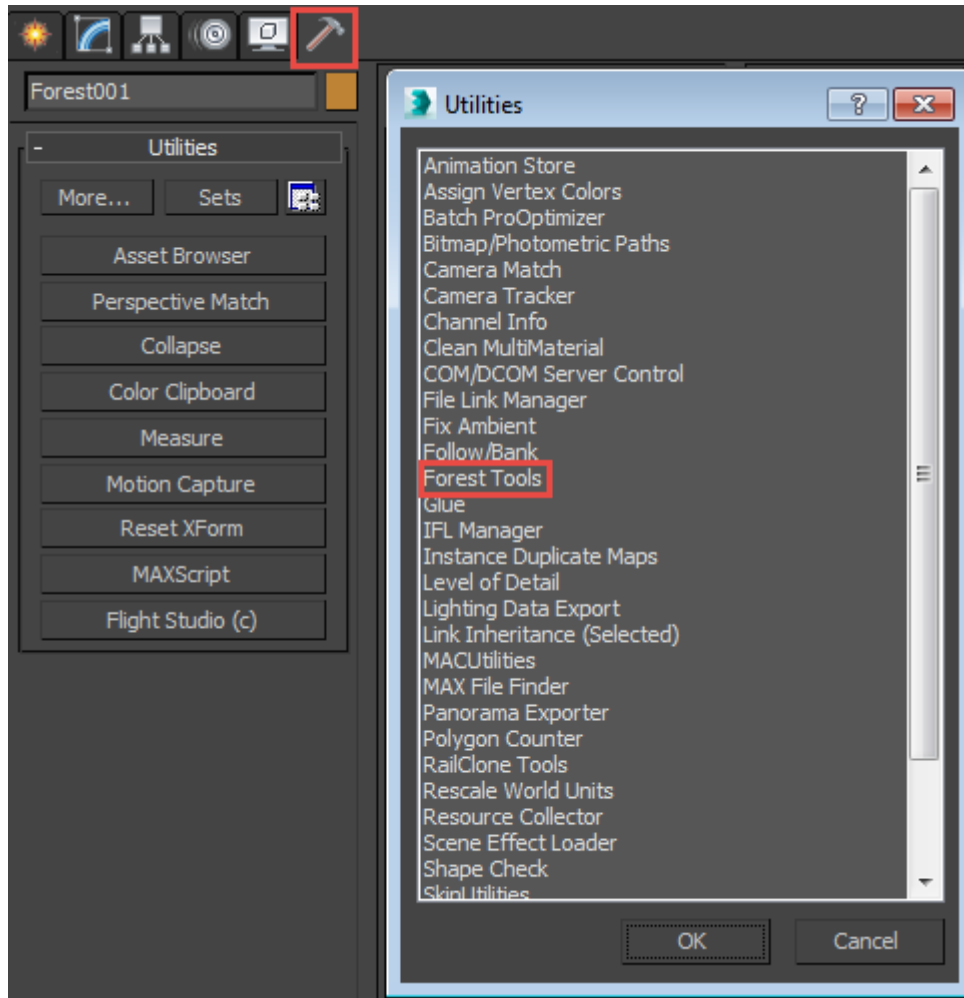


3. From the **Render Engine** drop down list, pick the current render engine (this should be automatic).
4. From the **Apply to** drop down list, select whether to run the optimizer on the current **Selection** or the **Material Library**.
5. For most situations the default settings are suitable. To exclude specific diffuse maps from being optimized, enter their names, separated by commas, in the **Exclude materials using these names** text box.
6. Click **Optimize**.

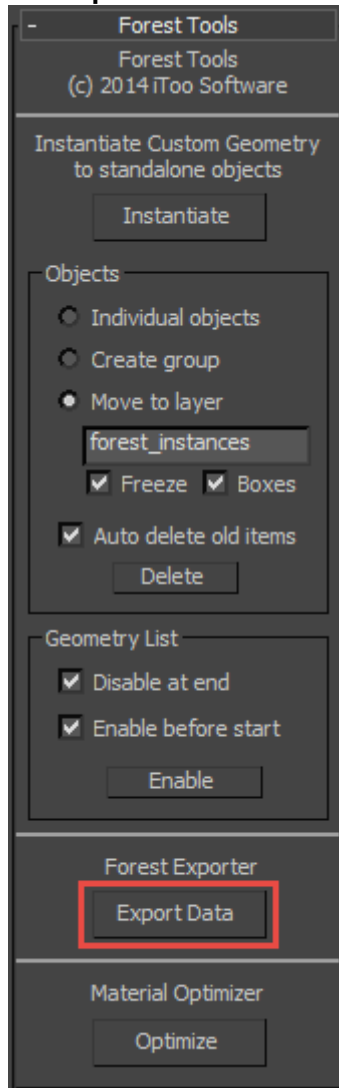
### To export XML data


1. Select a Forest Pack object

2. Go to the **Command Panel > Utilities** and click **Forest Tools**.



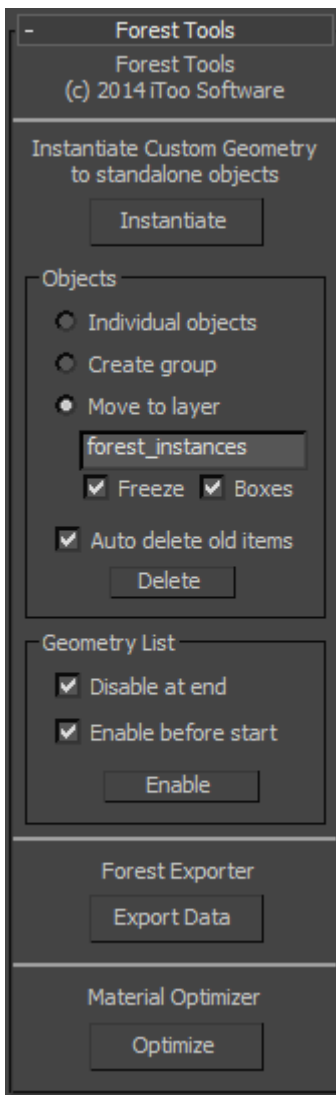
3. Click **Export Data**.



4. From the **Forest Data Exporter** utility set a save path by clicking 
5. Enable the **IDs** of the channels you want to export.

6. Click **Export**.

### 9.1.3 Interface



#### Instantiate

Converts the geometry items of the selected Forest object to instances.

#### Objects

##### Individual objects

When enabled, creates instances as stand-alone objects.

##### Create group

When enabled, adds all instances to a new groups.

### Move to layer

When enabled, creates a new layer and moves the instances to it. Use with the following options:

- **Freeze.** Freezes the new layer
- **Boxes.** Displays new instances as boxes, useful for improving viewport performance with large numbers of instances or complex meshes.

### Auto delete old items

When enabled, old instances are removed before creating new objects.

### Delete

Removes instances manually. This only works if the instances and the Forest object and the have not been renamed .

## Geometry List

### Disable at end

When the instances are created, we don't need anymore the trees created by the Forest object in the scene. To hide them, Forest Tools set the elements of the Geometry List to "Disabled". So, if you would like to recover the Forest mesh, set the Geometry back to "Custom Object". If this checkbox is disabled, Forest Tools doesn't modify the Geometry List.

### Enable before start

Sets the Geometry to "Custom Mesh" automatically before creating the instanced objects.

### Enable

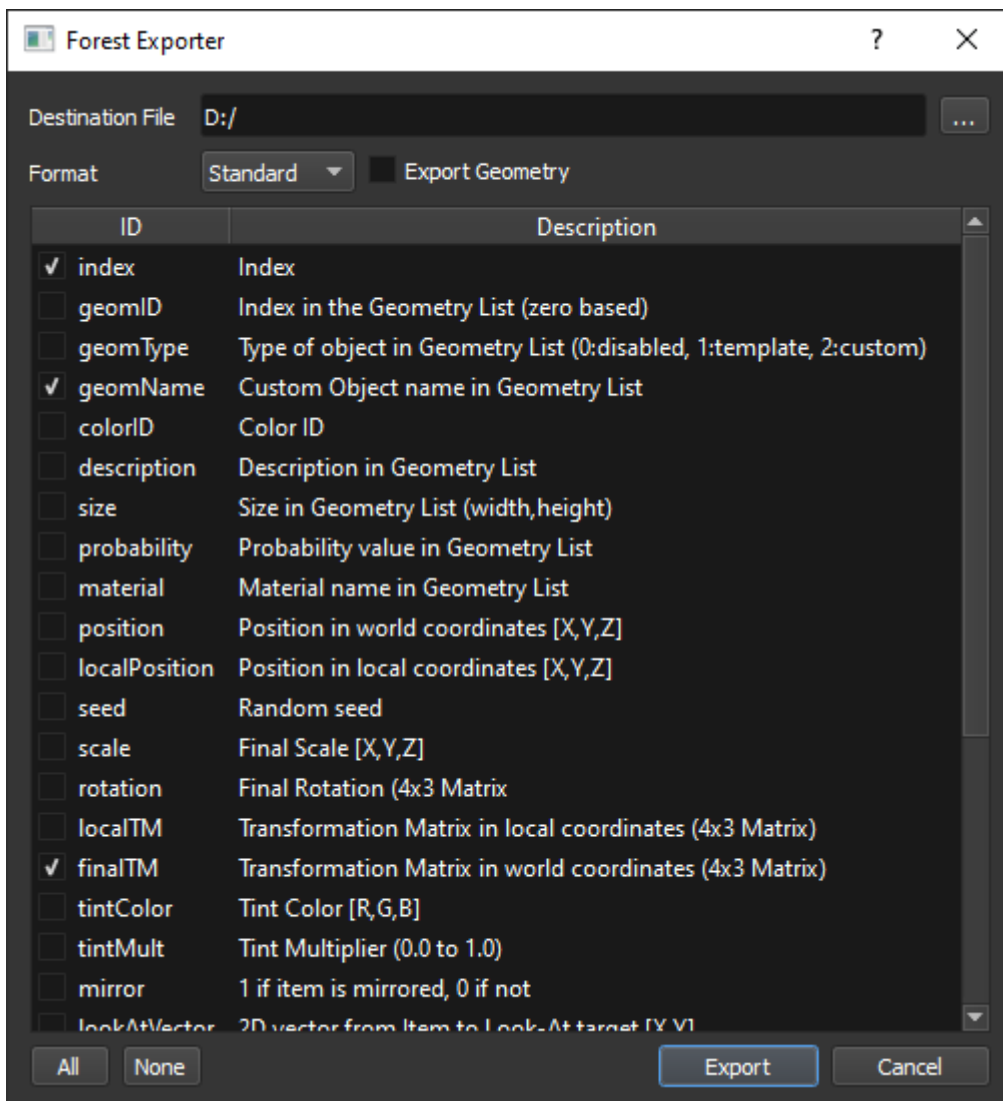
Used to set the "Custom Mesh" mode in the Geometry List manually (of the selected Forest object).


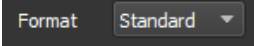
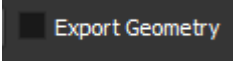




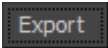

3DS may be very slow handling a huge number of objects in a group, most of times is better to put them as non grouped objects in a separate layer.

## Forest Exporter

**Export Data.** Click this button to open the XML exporter tool. Using this menu you can export most of the internal options in a standardised format for use in advanced pipelines and to aid interoperability between software.



	Click to set the save path for the XML file.
	Choose from a generic export with configurable settings, or a Unity export that prepares files for use with the Forest Pack Unity plugin.
	Exports the source geometry to an FBX file. Used to import a scatter into other applications such as Unity
ID <input checked="" type="checkbox"/> ...	Enables the data channels to be exported. By default all are selected.
	Click to select all IDs.
	Click to deselect all IDs.

	Click to save the XML data to disk.
	Click to close the XML export utility.

### ✓ Accessing Forest Exporter using Maxscript

To export all the Forest objects in a scene to an XML file using maxscript, you use the following command:

**Forest\_pro.ForestPack.exportData** <file> <list of fields separated by spaces>

For example:

**Forest\_pro.ForestPack.exportData** "c:\\tmp\\data.xml" "geomID colorID size"

## Material Optimizer

Runs the Material Optimizer for the selected Forest objects. See [Materials](#) for more information about this tool.

## 9.2 Exporting to Unity




Using Forest Tools and our Plugin for the Unity asset store, it is possible to export items scattered with Forest Pack to **Unity** for use in games and other real-time products. To export with Forest Tools and the Unity plugin, you must be using Forest Pack 7 or above and Unity 2018 or above.

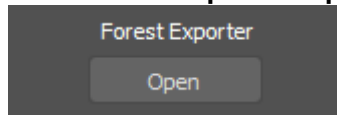
The basic procedure for sending a scatter to a unity project involves 3 steps

1. Export Scatters using Forest Tools. This will create a .forest file that contains the distribution information and .fbx files that contain the source geometry.
2. Install our Importer package in Unity
3. Import the .forest and .fbx files to Unity

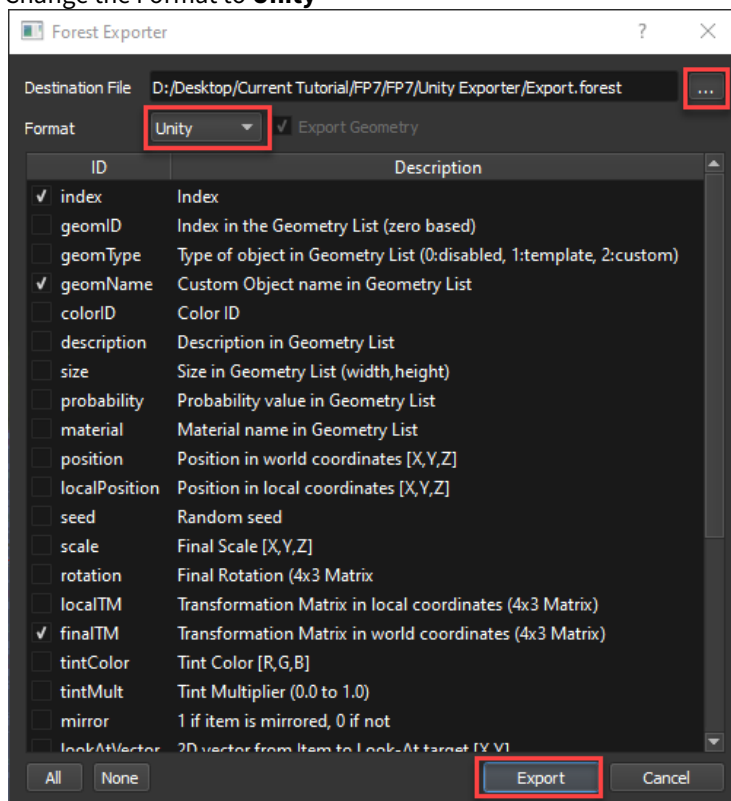
## 9.2.1 1 - Export Scatters

To export a scatter from 3DS Max.

1. Select one or more Forest Object
2. Open Forest Tools from the Utilities panel. You can also access this by clicking the  button on the Forest toolbar.
3. Click on **Forest Exporter > Open**



4. Change the Format to **Unity**



5. Click the elipsis button (...) to choose a save location
6. Click **Export**. A .forest and .fbx file will be created.

## 9.2.2 2 - Install Importer Packages in Unity

To import the assets exported in Step 1, you will need to install the plugin packages to your Unity project. To do this

### Manual Installation

1. Download the plugin package from the iToo Software website
2. Drag the package to Unity's asset browser.

### Asset Store Installation

- Pending asset store approval

## 9.2.3 3 - Import Forest Objects to Unity

Once the packages are installed, you can import the Forest Objects. To do this:

1. Drag and drop your .forest files along the .fbx files generated by the Forest Tools exporter, alternatively, you can right-click and select "Import New Assets"
2. Your scatter will import and display with a FP logo in the asset browser. You can add this to the scene like any other object

### ECS - Experimental Features

Unity's Data-Oriented Technology Stack (DOTS) allows programmers to improve performance when using multicore processors. This feature is still experimental and is in constant evolution. The iToo Uity plugin is only compatible and tested with specific versions of Unity 2018 and 2019. To use it you'll need to install several additional Packages. To do this:

1. In Unity go to Windows -> Package Manager
2. Enable **Show Preview Packages**.
3. Find and install the following packages

#### For Unity 2018

Burst version 1.3.6 or above  
 Entities version 0.012-preview.24 or above  
 Hybrid Renderer version 0.01-preview.4

#### For Unity 2019

Burst version 1.3.0 or above  
 Entities version 0.11.1-preview.24 or above  
 Hybrid Renderer version 0.5.2

4. Once the packages have compiled correctly you can open a test scene included in the iToo Package. It can be found in Assets>Scenes >SampleScene.

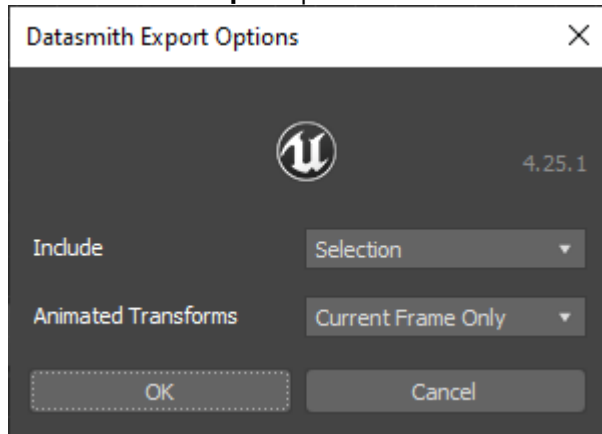
## 9.3 Exporting to Unreal

Unreal Engine's Datasmith tools support exporting Forest Pack and RailClone objects to Unreal with no need to Instantiate using Forest Tools. To use these features you need to install a [Datasmith plugin for 3ds Max](#) that's compatible with the Unreal Engine version that you are using.

### 9.3.1 To export a full Forest Pack or RailClone object to Unreal

1. Select the Forest or RailClone object(s) you wish to export. Go to **File > Export > Export Selected**.
2. Choose a file name and change the filetype to **Datasmith**

3. In the **Datasmith Export** options. Make sure that **Include** is set to **Selection**.

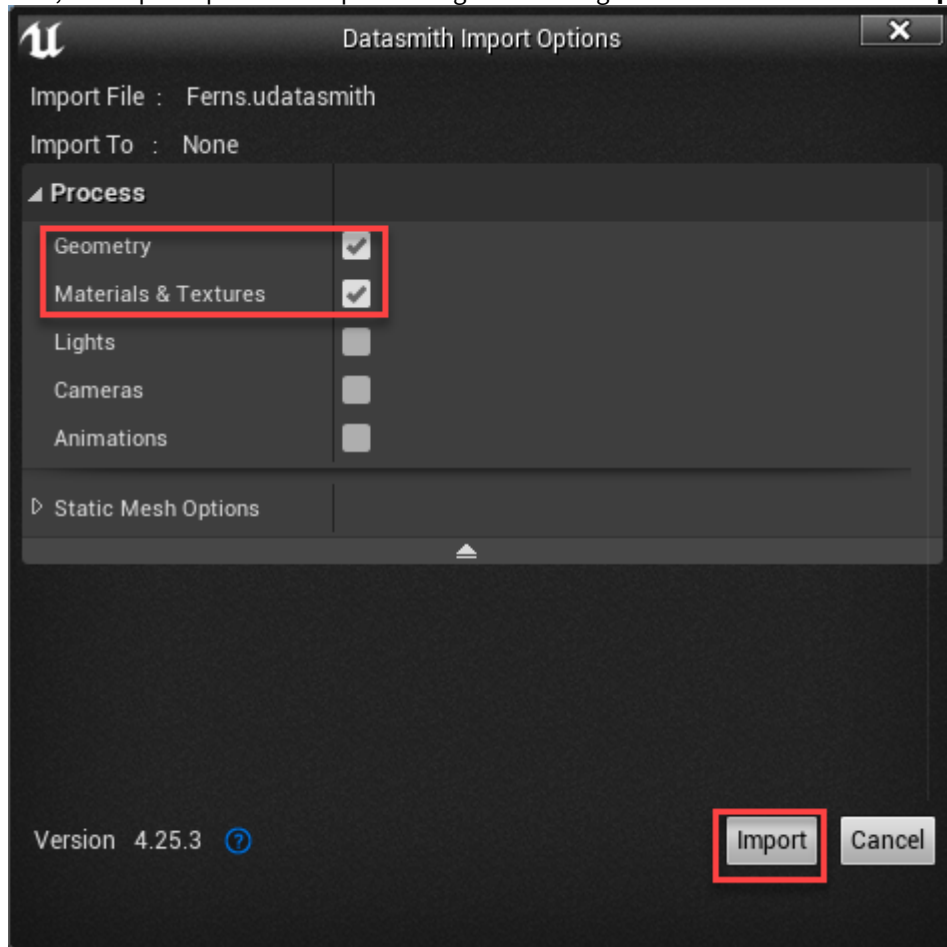


4. Click **Export**. And wait a while. Depending on the number of instances and sources geometry this can take anything from a few seconds to a few minutes.
5. Once that's done, switch over to Unreal and click the **Datasmith** button



6. Select the file you just exported from 3ds Max and click **Open**
7. Choose the folder in which you wish to save the Forest Objects. Create a new one if necessary, then click **OK**.

8. Next, the import options will open. Change the settings as desired and then click **Import**



9. Datasmith creates a single Actor in the Unreal Engine Level, named according to the name of the object in 3ds Max.

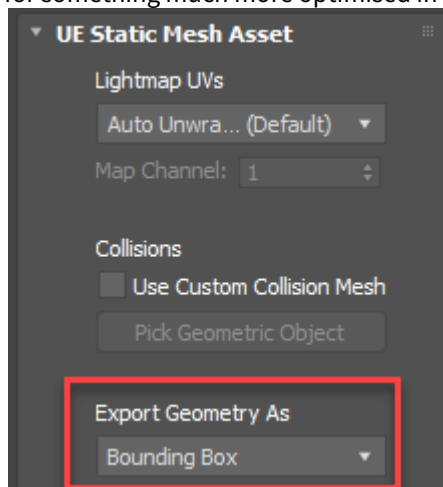
Each Forest or RailClone object is reconstructed in Unreal as a Hierarchical Static Mesh. This is a very efficient way of creating thousands of instances in real-time. It also creates a Static Mesh asset for each unique piece of geometry. In Forest Pack this will match the number of source models, in RailClone it depends on whether segments are sliced or bent as to whether they are instance or not and therefore exported as unique items.

If you click on a Hierarchical Static Mesh actor, you will see that it contains one Hierarchical Static Mesh component for each asset as well a list of all the individual instances. From here you can swap the geometry if you like simply by selecting another Static Mesh from the content browser and clicking the Use Selected Assets button.

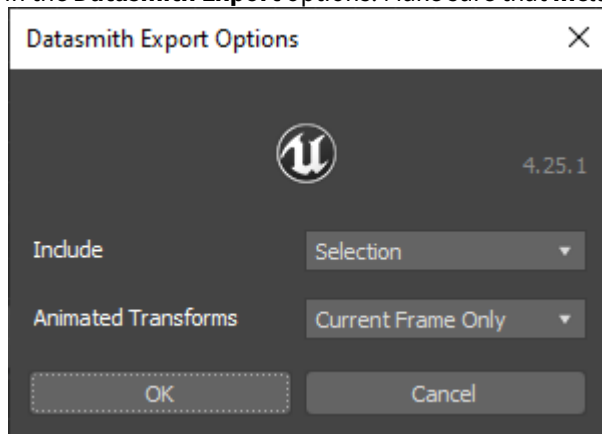
### 9.3.2 To export only Bounding Boxes

1. Locate and select the source geometry used by the Forest objects you wish to export. With a Forest Object selected, you can do this easily by right-clicking and selecting the **Select Forest Custom Objects** option.
2. Add a **Datasmith Attributes Modifier** to each one. Change the **Export Geometry As** option to **Bounding Box**. When this is active, a simple box is exported in place of the original geometry, allowing you to swap it

for something much more optimised in Unreal.



3. Go to **File > Export > Export Selected**.
4. Choose a file name and change the filetype to **Datasmith**
5. In the **Datasmith Export** options. Make sure that **Include** is set to **Selection**.

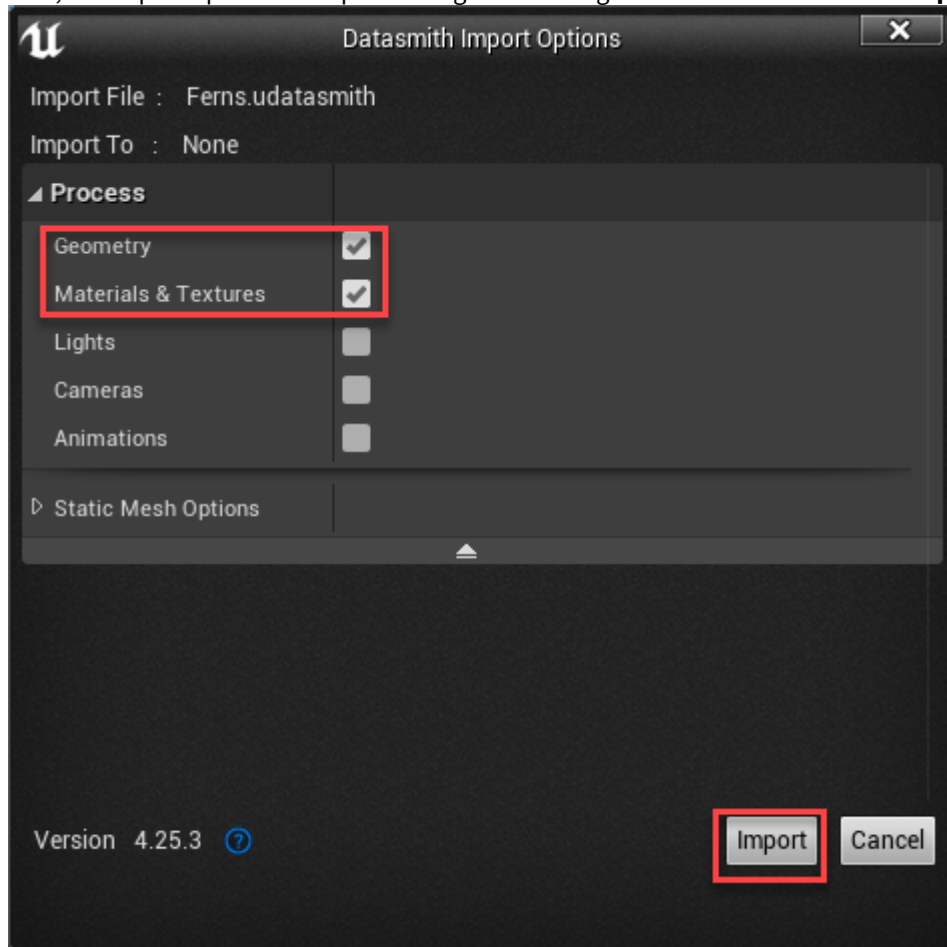


6. Click **Export**. And wait a while. Depending on the number of instances and sources geometry this can take anything from a few seconds to a few minutes.
7. Once that's done, switch over to Unreal and click the **Datasmith** button



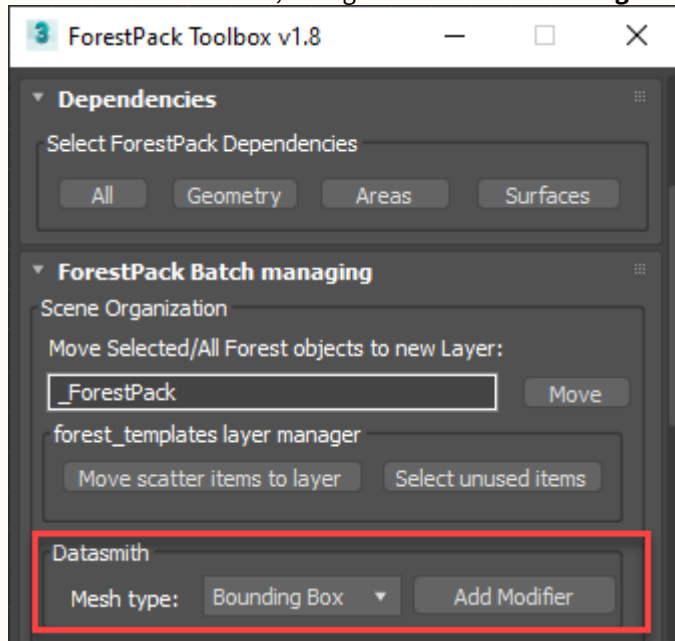
8. Select the file you just exported from 3ds Max and click **Open**
9. Choose the folder in which you wish to save the Forest Objects. Create a new one if necessary, then click **OK**.

10. Next, the import options will open. Change the settings as desired and then click **Import**



- ⚠ Locating source objects and adding Datasmith modifiers can be a somewhat tedious task if you have a lot of Forest Objects in the scene. So we have written a script to automate the process. It's a part of the ForestToolbox, an ever-evolving set of handy functions that registered users can download from our [forum](#). To use this:

1. Select one or more Forest Objects.
2. In the Datasmith section, change the mode to **Bounding Box** and click **Add Modifier**.



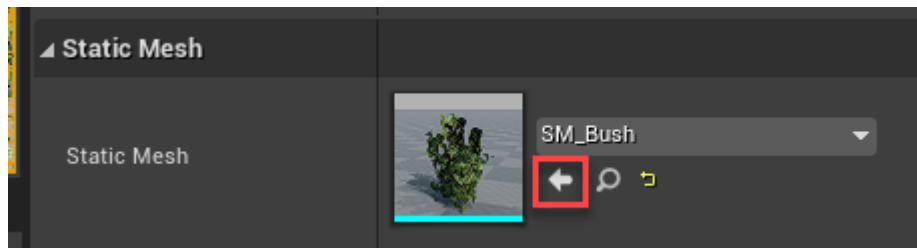
### 9.3.3 Swapping Source Objects in Unreal

Once a scatter has been imported into Unreal, it's possible to swap the source geometry. You might want to do this if you've just imported bounding boxes, or if you've imported meshes that are not well optimised for realtime and you want to replace them with something more performant. There are two ways depending on how many items there are in a scatter.

#### For scatters in the early thousands or less

1. Select the **Hierarchical Static Mesh actor** and in the **Details panel**, select the **Hierarchical Static Mesh component** for the object you wish to replace.
2. Select an object you wish to **substitute** from the **Content Browser**
3. Click the **Use Selected Asset in Content Browser** button to assign the new object to the Hierarchical Static Mesh component. All instances will be updated.

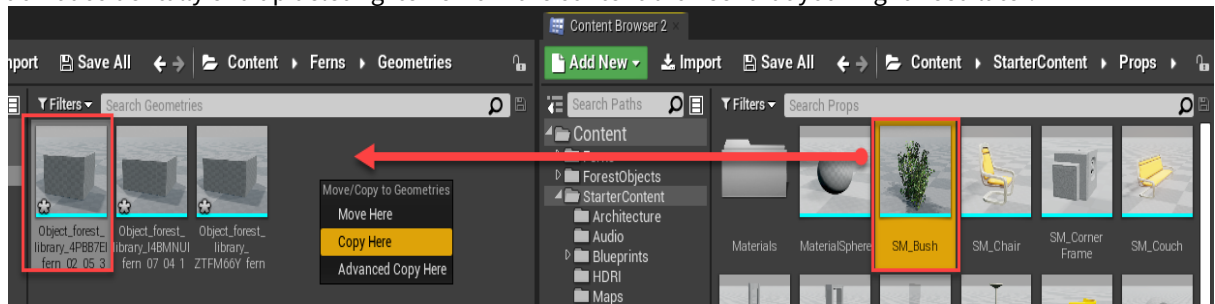




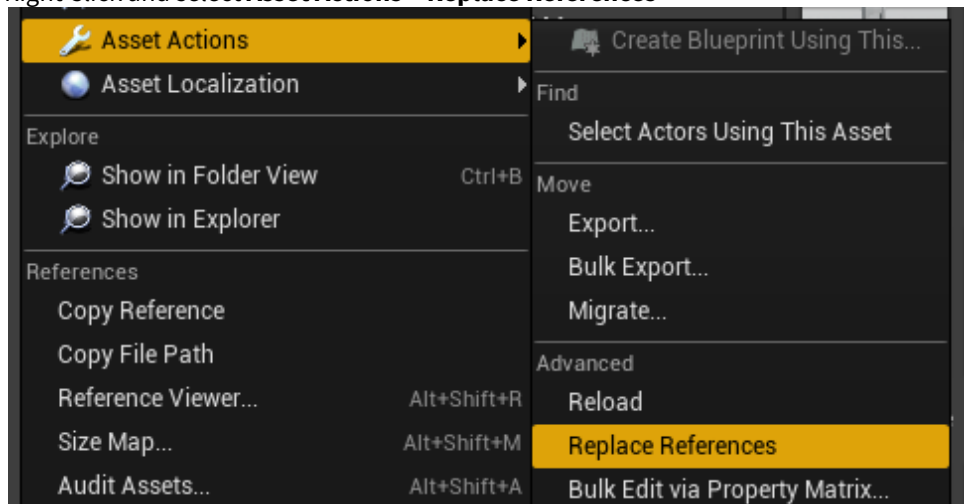
### For scatter greater than a few thousand objects

The Hierarchical Static Mesh Component lists all the instances in the UI. Because of this, scatters that contain too many objects can cause slow-down or freezing as the UI attempts to list all the items. To swap items like this, you can use a different approach that doesn't involve you needing to open the UI for the component. Here's how:

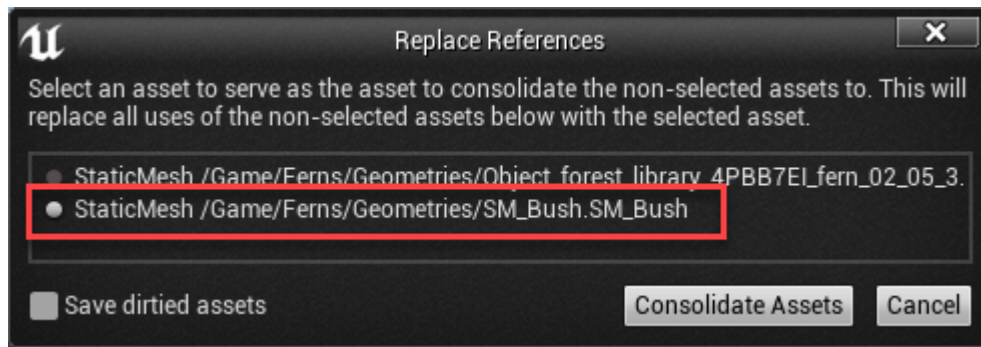
1. In the **Content Browser**, find the folder containing the placeholder assets used in the scatter.
2. Open a second **Content Browser** and locate the object you'd like to substitute
3. Drag the new plant into the same folder as the placeholder. Makes sure you choose **Copy**. This is so that you don't accidentally end up deleting items from the content browser that you might need later.



4. Now select the new object and the placeholder object.
5. Right Click and select **Asset Actions > Replace References**



6. A dialog opens. From the list you need to select the asset you wish to **keep**. The unselected assets will be removed and the references swapped to the selected asset.

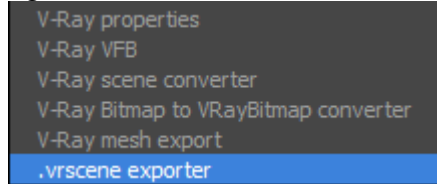


7. Click **Consolidate Assets**.
8. The scatter will update in the scene.
9. Using this technique you can easily swap any geometry imported from Forest Pack.

## 9.4 Exporting to Chaos Vantage

Chaos Vantage support exporting Forest Pack and RailClone items without any need to instantiate the geometry. To export a scene containing Forest Pack and/or RailClone items the usual procedure can be followed:


1. Right-click in the scene and choose the export to .vrScene option.

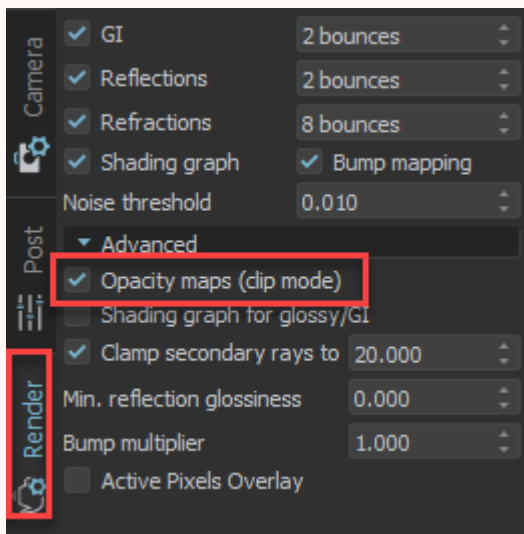


2. Open the exported file in Chaos Vantage. For large scenes you may have a short wait while as it reconstructs the scene but even with thousands or even millions of instances scattered with FP it should load without issues

### **Forest Color Support**

As with exporting to any other renderer, you need to be mindful of material and map compatibility. At present Forest and RailClone Colour aren't supported. When these maps are found they are bypassed and Chaos Vantage will use the map in the first input slot.


-  It's common that tree, plant and other foliage asset use Opacity maps, but by default these are disabled in Chaos Vantage. To enable them, go to the **Renderer > Advanced** options and enable **Opacity Maps (Clip Mode)**.




## 10 Forest Color

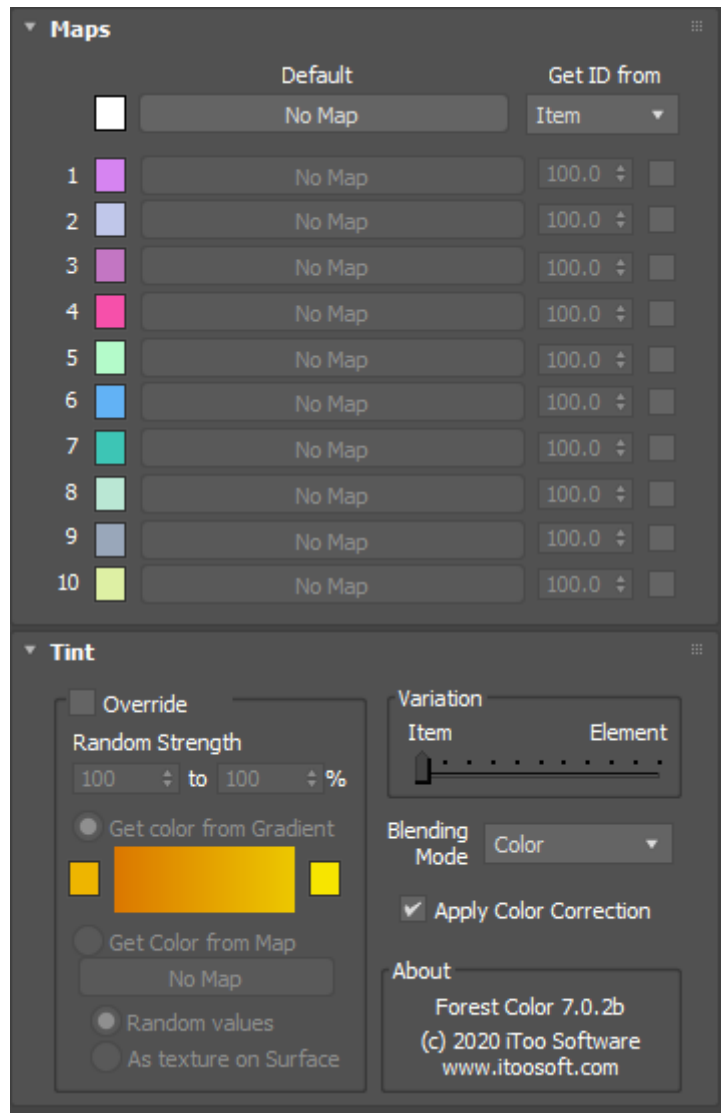
### 10.1 Overview

This 2D texture map is used to add color variation to the Forest items. It works similar to [Forest Material](#) but it is a 2D map instead a material. Usually, Forest Material is used for billboards and Forest Color for 3D objects.

 Even with Path, Reference and Particle modes, it's still possible to assign a Surface while retaining the item's Z position. This is useful for using the Colour By Texture feature with modes that don't actually require a surface. To enable this feature, turn off "Non Image modes->Link to Surface" in the Surface rollup.

 From Forest Pack 7 and onwards Forest Colour maps can be used on items that have been instantiated with Forest tools. Forest Colour maps can also be used on items outside of Forest pack but Tint By Surface and get ID by "Element" are not supported.

## 10.2 Interface



### 10.2.1 Maps

You can define up to 10 texture maps to Forest Color, that are assigned randomly on two selectable modes: by 'Item' or by 'Element':

- The Items are the base objects assigned in the Geometry List, and scattered by Forest creating the main distribution, for example the trees on a nature scene.
- The Elements are the mesh pieces that define an Item, as the leaves or the branches of an individual tree. Note that the Elements are not the faces of a mesh, but an upper hierarchy. Internally, Forest Color considers an Element as each group of adjacent faces of a mesh that share the same material ID.

The "Default" map is used as default texture when the other 10 map slots are disabled.

## 10.2.2 Tint

By default Forest Color applies the Color Tint defined in the [.Forest Color v7.x](#) rollout of Forest object to the resulting map. This includes Color Range, Min and Max values and the other parameters (see [Forest->Material](#) for details). You can override these values on each instance of Forest Color, turning on the "Override" checkbox.

In this rollout you can find some additional parameters that define how the Color Tint is applied to the map:

### Variation

Defines the amount of Color Tint applied by Item or by Element (see above the definition of these concepts), using a weight scale from 0% (Item) to 100% (Element). See the following images for some examples of use.



"Get color from map->As Texture on Surface" works only at Item level, it's not compatible with tint by Element.

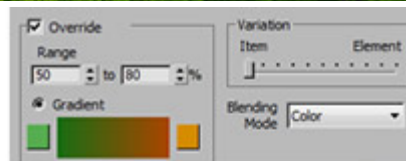
### Blending Mode

Use the drop-down list to choose how the Color Tint is mixed with the map. The following modes are available: Normal, Color, Additive, Average and Multiply. These modes work in the same way that the Composite map included in Max.

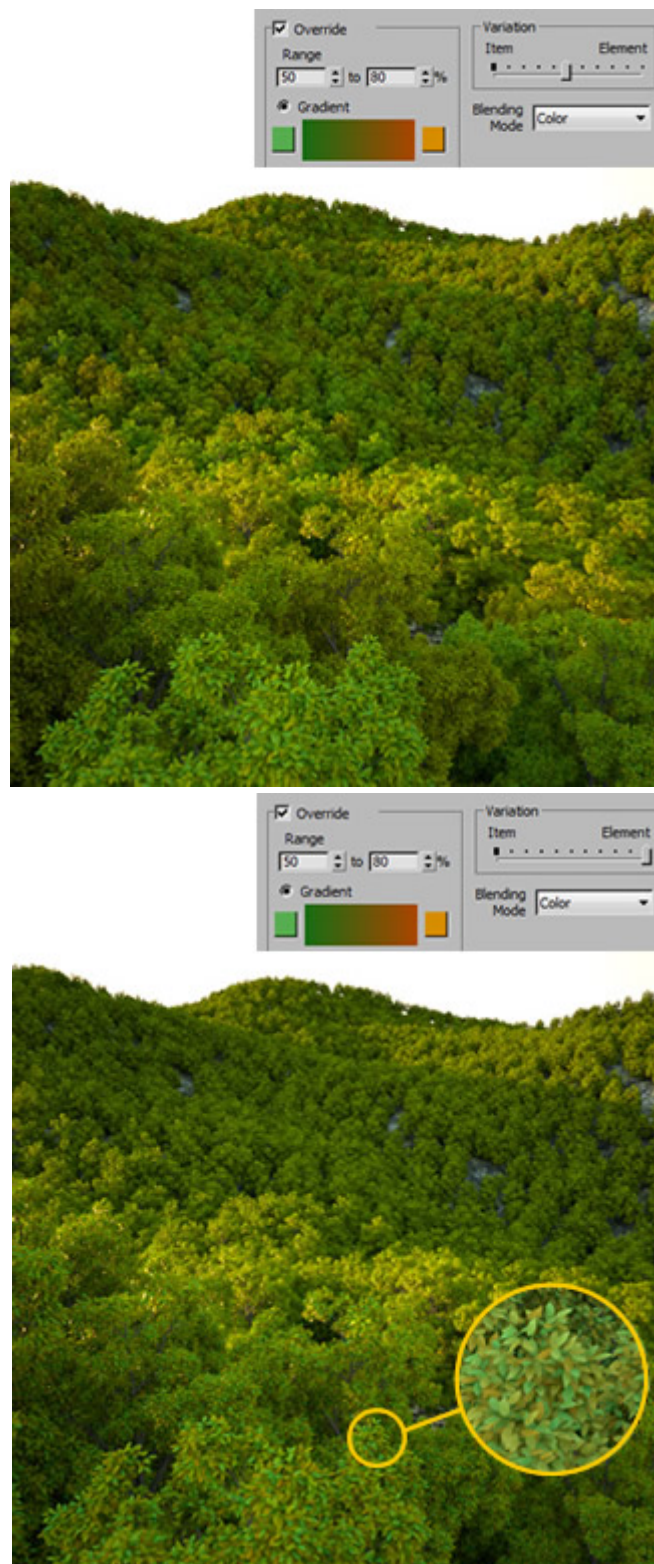
### Sample Images

**A Forest scene using different values of Color Tint. Note how changes the Variation weight from trees (Item), to leaves (Element)**

Original Scene







This scene uses a clump of grass as custom object, using Tint by Element to apply a different colour to each blade of grass





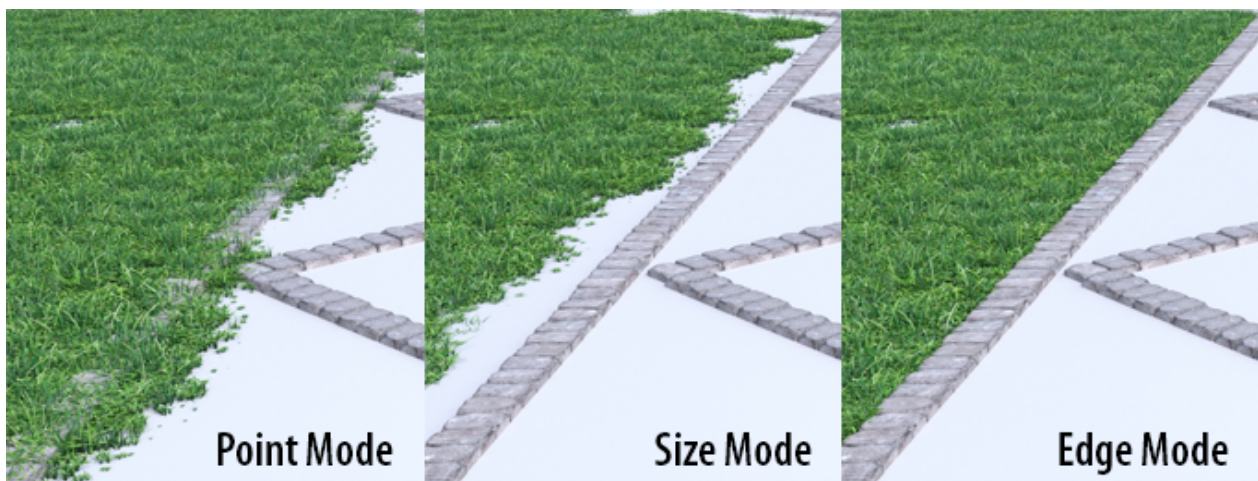
## Apply Color Correction

This option (enabled by default) allows you to turn on or off the effect of the Color Correct settings found in Forest Pack's Material rollout. It gives users the ability to override these settings on a per map basis.

## 11 Forest Edge map

### 11.1 Overview

Forest Edge is a map used in conjunction with Edge boundary checking mode when using Corona and Mental Ray renderers to create clean edges. In this mode Forest Pack uses the lowest Z Vertex of each of the item's individual elements to check if they're outside the scatter area. If so, only the individual element is removed creating a clean edge, without slicing the geometry. Note that when using edge mode, an element is defined as a group of connected faces that share the same material ID. These are the same elements used by [Forest Color](#). In order for this mode to work correctly in Corona and Mental Ray, a Forest Edge map must be applied to the material's opacity channel.

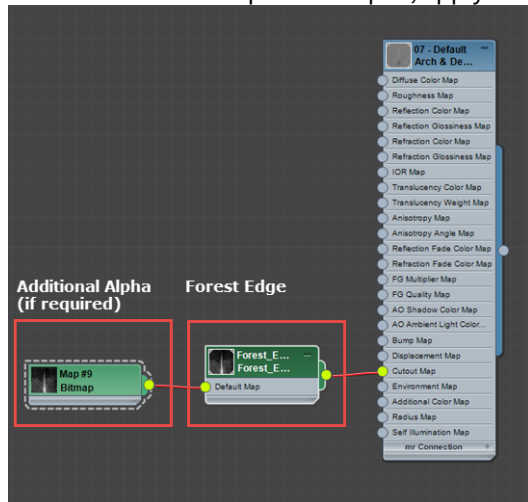


### 11.2 Procedures

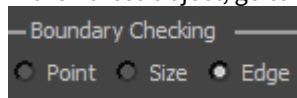
#### 11.2.1 To use Edge Boundary checking with Mental Ray

1. Apply a **Forest Edge** map to the material's **Cutout** map slot.

- If the material also requires an alpha, apply this to the **Forest Edge** map's **Opacity** map slot.

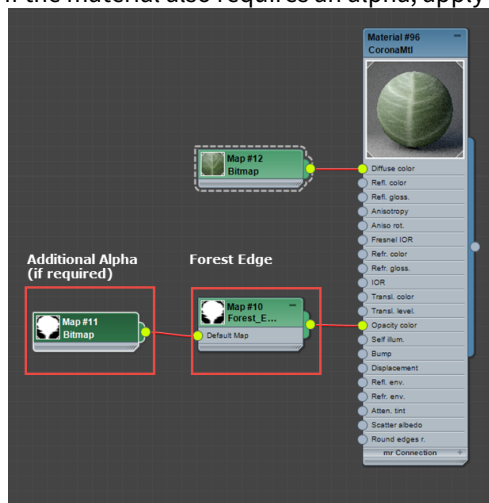


- In the Forest Object, go to the Area's rollout and set **Boundary Check** mode to **Edge**.

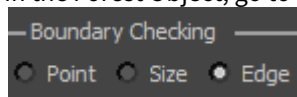


### 11.2.2 To use Edge Boundary checking with Corona

- Apply a **Forest Edge** map to the material's **Opacity Color** map slot.
- If the material also requires an alpha, apply this to the **Forest Edge** map's **Opacity** map slot.

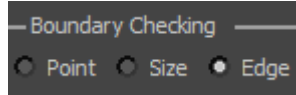


- In the Forest Object, go to the Area's rollout and set **Boundary Check** mode to **Edge**.



### 11.2.3 To use Edge Boundary checking with V-Ray

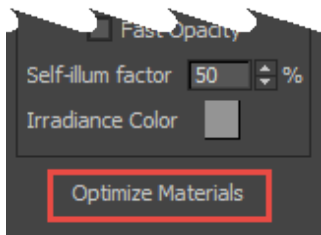
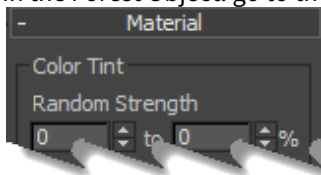
- In the Area's rollout set **Boundary Check** mode to **Edge**.



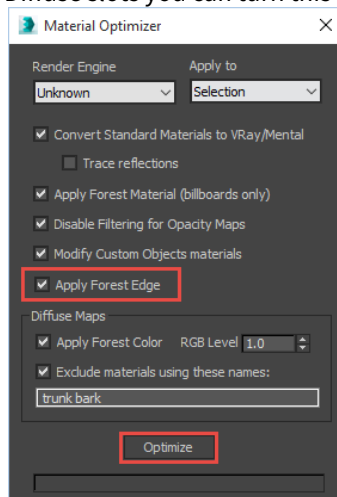
- When using V-Ray there's no need to apply a Forest Edge map to the materials.

### 11.2.4 To automatically apply Forest Edge to multiple materials

- In the Forest Object, go to the Material rollout and click **Optimise Materials**.



- In the Material Optimiser, turn on **Apply Forest Edge**, if you also need to add **Forest Colour** maps to the Diffuse slots you can turn this on too.



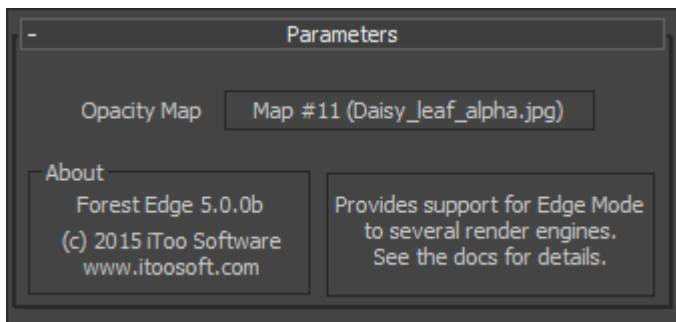
- Click **Optimise**. To find out more about the Optimise Tool and its settings, see the reference section for the [Material rollout](#).



### Edge Mode does not preview in viewports

To improve viewport performance edge trimming is calculated only at render time. This means the effects of this mode will not be previewed in the viewports. However, previews can be enabled by holding down the left CTRL key and clicking on the Edge radio button.

## 11.3 Interface



Forest Edge maps should be used in the Opacity or Cutout map slot of materials. If your material already has maps in these slots, then these should be added to Forest Edge's Opacity Map slot.

## 12 Forest Material

### 12.1 Overview

This material plugin is used for some advanced features of Forest, as Random Tinting or Fake Shadows.

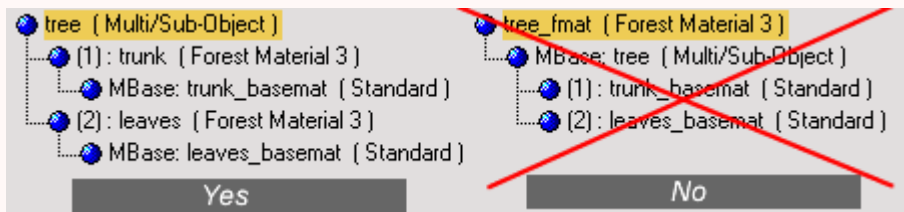
It is mainly used on billboards, if you want to add color variation on 3D objects, we suggest to use [Forest Color](#), that is a 2D texture map.

It works as a enveloping layer over the base material used on the object, and modifying the result of this (applying the tint, or hiding the shadow planes).

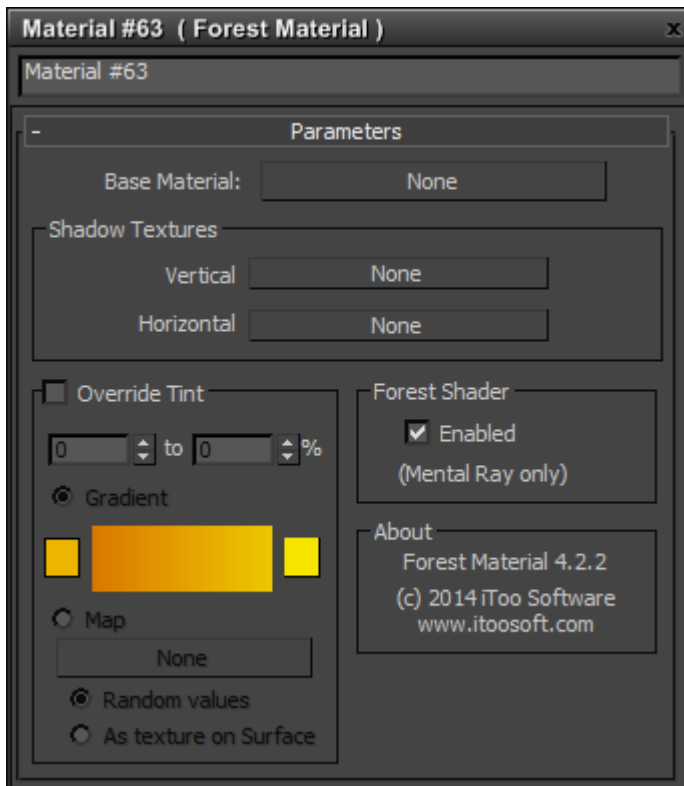
You can use any material as base (from Standard Mat. to V-RayMtl), but for billboard trees we suggest to use a Standard Material (specially with Mental Ray), because some features only work with it.

**i** Forest Material is compatible with V-Ray, Mental Ray and Scanline renderers only. For other renderers you can use native shaders for billboards.

**!** On Multi-sub materials, always use "Forest Material" as a sub-material, in this way:



## 12.2 Interface



### 12.2.1 Shadow Textures

When billboard trees are used, Forest has native support of shadows using our XShadow plugin or raytraced lights. For each tree, two opacity textures are used: vertical and horizontal.

By default, XShadow searches automatically in the the material tree to find the vertical texture (Standard, Multi Sub-Object and "Forest Material" only) but this can be defined explicitly in Planes Material using this parameter. The horizontal texture must always be assigned here.

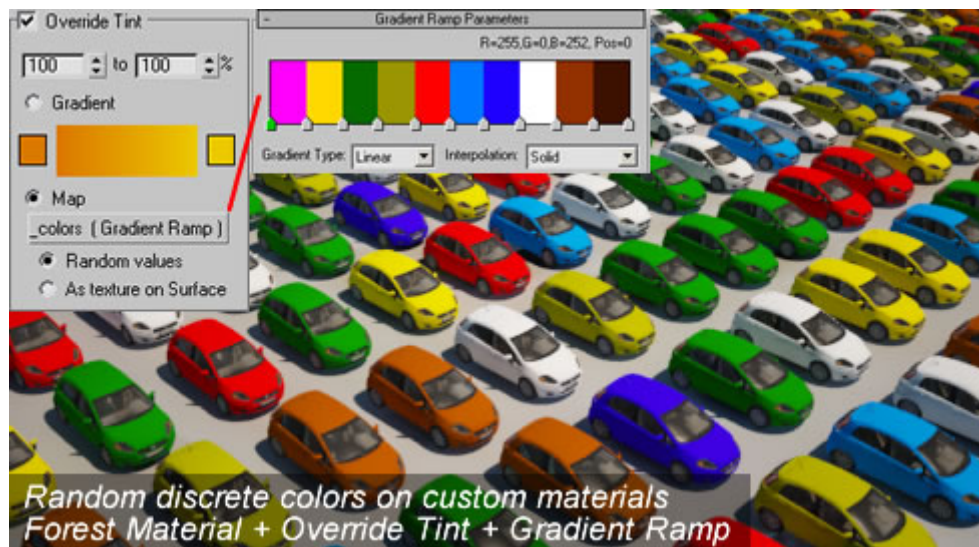
Raytraced shadows and Mental Ray need "Forest material" to work, because this plugin does the job of hiding or rendering the shadow / texture for each plane. Be sure that the material applied to the Forest object uses the "Forest Material" plugin as a base.

### 12.2.2 Override Tint

By default, Forest uses the Random Tint values defined in [Forest->Material](#) rollout for all tree samples used in the object, but those parameters may be overridden here for each material.

This feature is specially useful for mesh objects that use a Multi-sub material (as mat.ID 1 for trunk, mat.ID 2 for leaves), allowing to apply different tint for leaves and trunk (or disable tinting setting Min/Max values to 0).





### 12.2.3 Forest Shader (Mental Ray only)

Forest includes a custom shader that enhances the rendering of billboard trees. It fixes some problems inherent to planar trees, as the illumination or the slow transparency computing in raytracing modes. Although the shader must work in all modes, if you are experiencing some material issue or get unexpected results, you can disable it from here.

Forest Shader works only if a "Standard Material" is used as base material. This is specially important for billboard trees, for Custom Objects you can use other type of materials if you like.

The behaviour of Forest Shader is defined by some parameters of the Forest object as well. See [Forest reference->Material](#) for details.



## 13 X Shadow

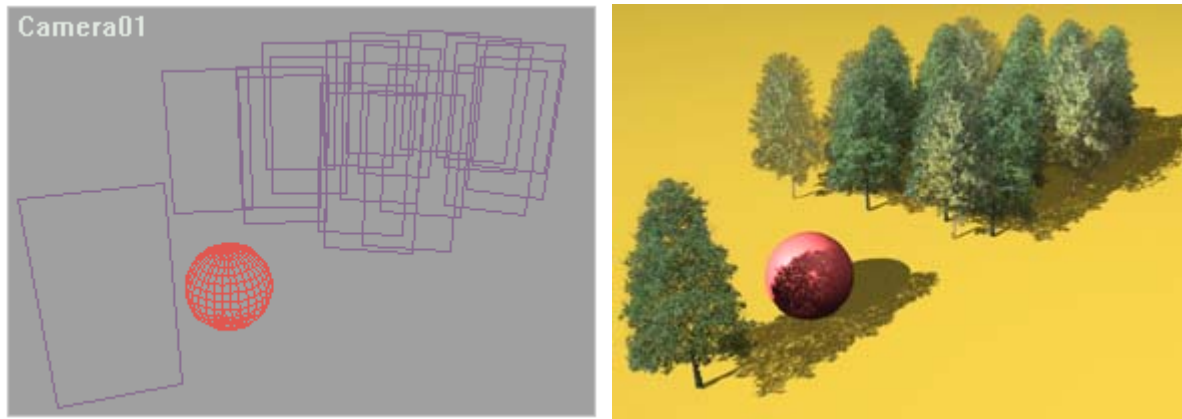
### 13.1 Overview

Shadow is a plugin to create realistic shadows for billboard trees.

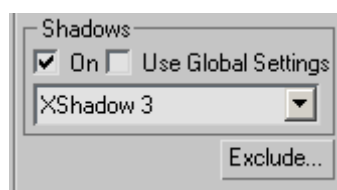
⚠ This plugin is used only with Scanline renderer, it's not compatible and there is not any benefit for using with Mental Ray or V-Ray.

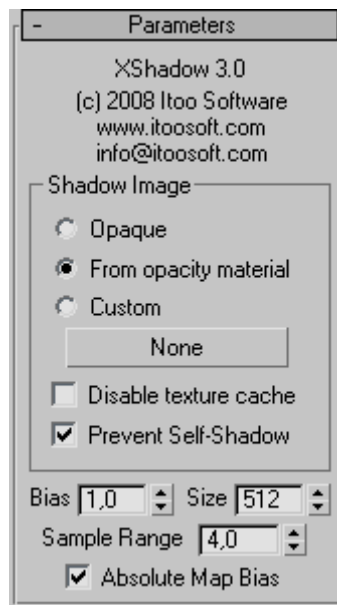
### 13.2 Interface

When you create trees using planar geometry, they cast ugly rectangular shadows. You must use Raytrace Shadows to get a good projection, but it's very slow. This plugin builds a perfect shadow for Forest objects in all conditions. It works as a Shadow Map and there are no problems at render time:



This is a shadow plugin, and must be chosen in the shadow parameters of each light. At present, it only works with directional lights (with spots and omnis it doesn't create any shadows for trees):





### 13.2.1 Shadow image

XShadow uses two opacity textures to build the shadow: one vertical and the other horizontal.

By default, the plugin searches automatically in the material tree to find the vertical texture (Standard, Multi Sub-Object and "Forest Material" only). The horizontal texture must be defined in a "Forest Material" (see [Forest Material reference](#) for details).

These parameters define the vertical texture in the XShadow plugin:

#### Opaque

Builds the rectangular original shadow (from Forest mesh)

#### Opacity material

Use the opacity texture applied for each tree as shadow.

#### Custom

Lets you choose a custom texture map.

#### Disable texture cache

The plugin builds an optimized cache buffer to increase the render speed. In the most scenes, it works well, but if you get some "blocky" shadows or other visual problems, use this option to disable the cache (you can use it also to compare the render time in both states).

The other parameters works the same as standard shadow maps, and for non Forest objects the shadows obtained are the same.

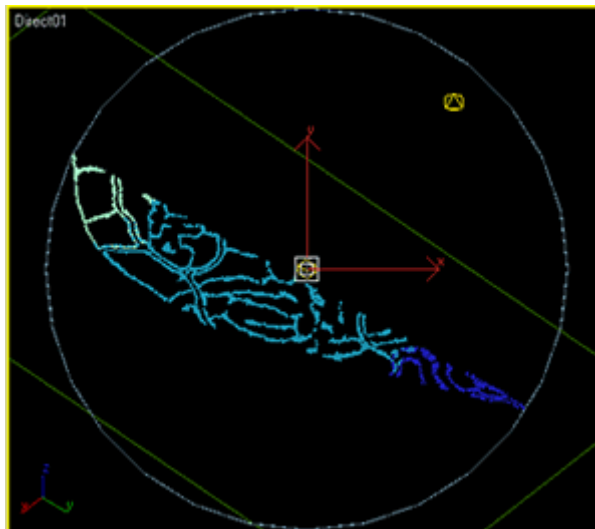
## Prevent Self-Shadow

Enable this checkbox to avoid that a tree cast the shadow over itself.

### 13.2.2 Optimizing XShadow

To get the best results with XShadow, we must understand how shadow maps work:

The "size" parameter in XShadow defines that Max will use a bitmap of that number of pixels to draw the shadows on it. But this map is applied ONLY to the light's hotspot area. So, to get better shadows you must close the hotspot to surround only the objects to shadow. This is a sample of a well adjusted hotspot for XShadow (seen from a light viewport):



Light hotspot adjusted to object

Using a well adjusted hotspot, a shadow map of 4000 pixels should be enough for most scenes. For very large terrains, we suggest you use different cameras and lights, adjusting them individually to shadow only the trees visible in each view or use raytraced shadows.

XShadow needs large buffers of memory to work, and if the scene is complex, Windows might not have enough free memory for it. If this occurs, XShadow stops and displays an error.

And sometimes adding more memory to the system may not solve the problem, especially if you are using a 32 bit version of Windows, because there are other limits due to the 32 bit architecture, for instance memory fragmentation is an issue (when there is free memory that cannot be allocated in a contiguous space).

This is not only an XShadow problem. When Max uses its standard shadow map plugin, and there is not enough memory for the buffers, it doesn't build the shadows but doesn't show any error! This may be annoying for the user, who doesn't know why shadows are not working. In XShadow, we prefer to display a warning message. In order to fix the problem, here are some possible solutions:

- If you have at least 4 GB of memory, always use Windows 64 and 3D Studio 64 bit versions.
- Don't use a higher value than 4000 for the "size" parameter in XShadow. The memory needed grows exponentially with this value. Also, optimize the shadow hotspot of the light (see previous section in this FAQ).
- In XShadow, enable the checkbox "Disable exclusivity buffer" to reduce memory used for XShadow by half. When this option is enabled, the plugin doesn't check to see if each tree shadows itself... but this effect is not noticeable in most of scenes.

- Use raytraced shadows, which are natively supported by Forest.



- XShadow works only with directional lights (targeted or free).
- If you use other lights in scene with shadow enabled (without using XShadow), they cast rectangular shadows for Forest objects... the Forest mesh always exists, of course.
- When using Forest Pro and custom meshes, XShadow builds the standard shadow of an object, except if you enable the checkbox "Cast opacity mask for Custom Object" in Forest's Shadows rollout.

## 14 Rendering Best Practice

Forest Pack includes native geometric shaders for the renderers listed below, making it possible to render scenes with millions of high poly trees, meshes and proxies:

- Arnold
- Mental Ray
- V-Ray
- V-Ray RT
- Maxwell Render
- Octane Render
- Arion Render
- Corona Renderer
- Thea Render
- Mosquito Render
- Redshift
- Fstorm
- Final Render

Usually, these techniques push the rendering engine to its limits. In the following notes, we include technical information that can help you to optimize your renderings, and avoid some problems.

### 14.1 Common Tips

- [Boundary Checking > Edge Mode](#) is compatible with **V-Ray, Corona, Arnold and Mental Ray**. If this mode is used with unsupported renderers, point mode is used instead.

- To use Boundary Checking mode with **Mental Ray, Arnold** and **Corona**, it is necessary to add a [Forest Edge map](#) Map to the material's Opacity input.

- Minimize the use of opacity maps in your plants. Raytracers are slow computing transparencies, when possible use mesh leaves instead masked textures, although number of polygons be higher. If you need to use opacities, disabling the filter map may help to speed up the render.

- You can use the [Material Optimizer](#) included with Forest Pack, to converts the materials to V-Ray/Mental Ray and tune up the texture maps.

- When possible, use Max 64 bit. The 32 bit versions are very limited, and you may get memory errors when rendering complex scenes.

- Don't mix 32 bit and 64 bit environments for rendering, you would get unexpected results. Because the different numeric precision of both architectures, some problems may appear as: misaligned objects, color variation and others. Generally, it's not a good idea to mix 32 bit and 64 bit nodes in 3DS Max, to avoid issues as rendering flickering or glitches in procedural textures.

- [XShadow](#) is not compatible with Mental Ray and V-Ray. This plugin, based on Shadow maps, was written for Scanline renderer but is obsolete with the new rendering engines. Instead it, use raytraced shadows in Mental Ray or V-RayShadow in V-Ray. If you use billboards, don't forget to assign the main light in the [Shadows](#) rollout.

### 14.2 Arnold

- To use Forest Color and Forest Edge maps with Arnold, you will need to turn on **Legacy 3ds Max Map support** in **Render Settings->System**.

## 14.3 Mental Ray

- To get acceptable rendering times in large scenes, it's necessary to use **BSP2 as raytrace method**. It is available only in Max 2009 or greater. For previous versions, or small-to-medium size scenes, you can use BSP instead.
- Always **disable "Scanline"** checkbox (in "Rendering Algorithms" rollout), and we suggest to **enable "Use Placeholder Objects"** (in "Translator Options"). These settings are specially necessary when rendering complex scenes with large number of instances.
- In Forest Pack 6, **Material->Forest Shader** parameters are removed from the interface. These are only used for billboards in Mental Ray and if needed, you can modify them from Maxscript as: fastopac, tracedepth, opaclevel, selfillum, irradiance.

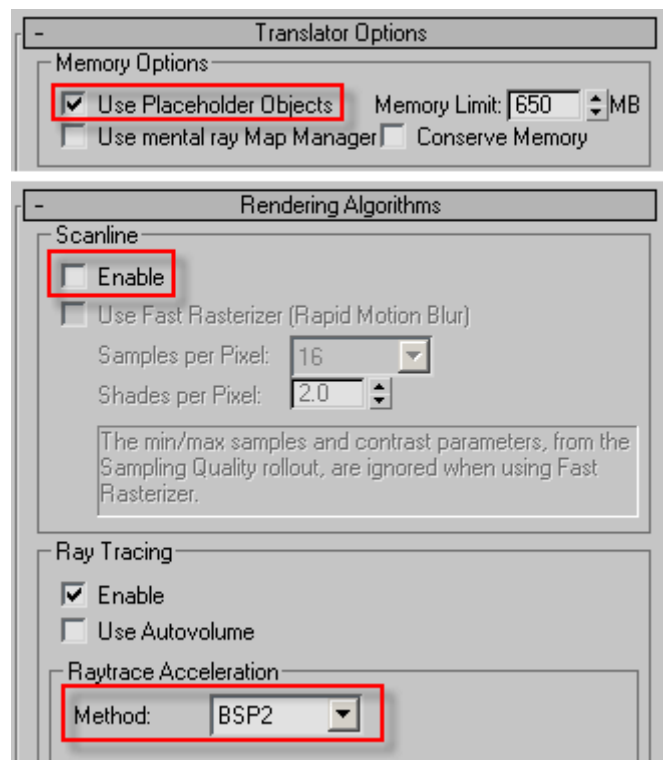
**Note 1:** The use of Placeholder objects is incompatible with the G-Buffer channel "Coverage". This channel is used in the RPF format, for some Render Effects and by third-party plugins as "PSD Manager" from Cebas. If the Placeholders are enabled, the channel is rendered as pure black. Unfortunately, this is a Mental Ray limitation and there are not known workarounds for it.

**Note 2:** We also found that the Placeholder objects feature crashes with some types of proxy elements used on Civil View (3DS Max Design), specifically the Street Lamps. Be care if you use these elements in your scene.

- You can use assign billboards, meshes, mrProxies or any other object for your trees. In our sample scenes, we have not found differences (in render time or memory used) between using meshes or proxies, but we suggest that you make your own tests.

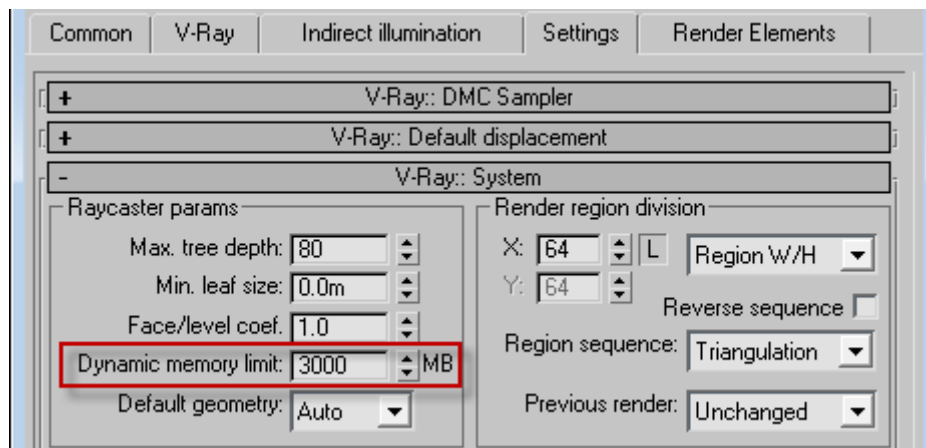
- Forest Color using "Element" mode is not compatible with Distributed Rendering. Instead, this feature works fine rendering locally.

- Rendering times with more than 500.000 items may grow exponentially. However in the latest Max releases (2014 and above), we have noticed improvements on this limitation. If you plan to scatter large distributions, we suggest you make your own tests, to know the limitations of the render engine.



## 14.4 V-Ray

- V-Ray native shader requires Max 9 with V-Ray 1.50 SP3 or greater.
- To render high-poly objects or proxies, increase the Dynamic Memory Limit from the default value to a percentage of your total RAM. The optimal value depends of the complexity of the scene, but usually a minimum of 2000 or 3000 Mb. is required. In V-Ray 2.0 and later, you can set this to 0 to remove any limit in that case, V-Ray will take as much memory as needed.
- You can use billboards, meshes, or V-Ray proxies in Forest. In our test scenes, we have found that meshes usually render slightly faster than proxies.



## 14.5 V-RayRT / Maxwell Render / Octane / Arion / Thea Render

Due to technical restrictions, support for these engines is limited and several features are supported.

You can find the compatibility list [here](#).

Version

## 15 Forest Release Notes

Full release notes are [online](#).



## 16 Forest Pack Licensing Guide

### 16.1 Overview

Software License Management is available in two models, [Standalone Licenses](#) and [Floating/Network](#) licenses. Under a stand-alone license, any given product is constrained to a certain host. A license is needed for each computer that the software will be installed on. In floating license mode, a pool of licenses is available on the server, for use in any computer on the network. You only need to have licenses for the maximum number of simultaneous users expected, not for each computer where the software will be installed.

Depending on the size of your business and expected use of the software, one of the two models is usually preferred. In small sites with few computers, the Stand-alone licenses is fast and easy to deploy, the licensing process is part of the software installation, leaving the software ready to use in one step. For larger sites, the floating network licensing is preferred because it provides more flexible use of licenses, you only pay for simultaneous users and not for nodes, while the centralized management tool simplifies control of all your licenses.

#### 16.1.1 Stand-alone License

The [Stand-alone license](#) ties a single software application to a single computer. This method of licensing requires a machine's unique identifier (SID) to be incorporated in the license activation process. After buying the product, a generic license code is sent to you, the license is installed and activated. In the activation process the license is linked to the computer and can be used only for that computer.

#### 16.1.2 Floating Network Licenses

[Network licenses](#) (also known as floating licenses) allow multiple users to share a limited pool of licenses in a local network. After installing the License Server on a server machine, the server will handle requests for licenses from the users computers. If you have a team of 20 people and 10 licenses for a product, the entire team will share access to the 10 licenses, while no more than 10 people can use the software at the same time.

While Stand-alone licenses use a license file installed and activated for each computer, and can be used only in that machine, the network licenses are installed and activated only one time in a server. When a license request arrives, the server determines whether the proper license for a requested product is available. If an appropriate license is present and not in use, the server will allow access to the software.

As the licenses are stored on a server, you cannot use the software if you are not connected to the network. Although the server software does not require a powerful system, it is mandatory that the computer hosting the license server be running and available while there are computers using the licensed software.



#### **Can I open scenes which use the plugin in computers that don't have an active license?**

Yes. You can open and work with the scenes no problem, but the objects cannot be edited or rendered and in RailClone 4 and later will not display in the viewports.

### 16.2 License Activation

When you acquire a license from Itoo Software, a generic license code is sent to you. Before using the software, this license must be linked to your hardware, this process is called activation. You can activate the license during the software installation (only for Stand-alone mode), or from the License Manager once the software is installed.

During the activation of a license, you can choose two different methods, Automatic or Manual. With Automatic activation you must be connected to the Internet, the software will connect with our activation server through a secure connection, and the activation codes will be sent and installed automatically. No personal information is sent during the process.

If you experience difficulties with on-line activation, or the computer where you are using the license does not have Internet access, you can use Manual activation instead. In this case, the software gives to you the necessary codes and a link to our secure activation page. In this web page, you enter the codes and the activation key is generated. Write or print out this code, and provide it when the Activation Wizard runs, then the license will be activated and ready to use.

For security reasons, our activation server allows you to activate a license only a certain number of times (5 by default). If you exhaust the maximum number of activations, please send us an email at [activate@itoosoft.com](mailto:activate@itoosoft.com), we will increment the activation counter associated with your license. In the authorization process, the server informs you of the number of activations remaining.

In either case, if you have trouble during the activation, please contact us at [activate@itoosoft.com](mailto:activate@itoosoft.com).

## 16.3 Network rendering licenses

Our commercial plugins require a license for each computer, to open or edit the scenes, but NOT for network rendering nodes. The installation for slave nodes is much simpler, and does not requiring licenses or activations.

## 16.4 Floating/Network licenses

### 16.4.1 Introduction

Network licenses (also known as floating licenses) allow multiple users to share a limited pool of licenses in a local network. After installing the License Server on the computer being used as a server, the server will handle requests for licenses from users computers. If you have a team of 20 people and 10 licenses for a product, the entire team will share access to the 10 licenses, while no more than 10 people can use the software at the same time.

While Stand-alone licenses use a license file installed and activated for each computer, and can be used only in that machine, network licenses are installed and activated only one time on your server. When a license request arrives, the server determines whether the proper license for a requested product is available. If an appropriate license is present and not in use, the server will allow access to the software.

As the licenses are stored on a server, you cannot use the software if you are not connected to the network. Although the server software does not require a powerful system, it is mandatory that the computer hosting the license server be running and available while there are computers using the licensed software.

#### In order to deploy Network Licenses you must:

1. Install the **License Server** on the server computer.
2. Install and activate one or more **Network Licenses** on the server using the **License Manager**.
3. **Configure each client** to retrieve the licenses from the license server.

#### Can I open scenes which use the plugin in computers that don't have an active license?

Yes. You can open and work with the scenes no problem, but the objects cannot be edited or rendered and in RailClone 4 and later will not display in the viewports.

## 16.4.2 License Server Installation

To be able to use network licenses, a computer in the network must be designated as the license server. Once you have selected it:

1. First make sure that you have *administrative rights* on the target computer.
2. Download the **License Server** software from the links you received after purchasing the software (in the registration email).
3. Run the **setup** program and follow the steps.

The License Server will be installed as a system service named "Itoo Software License Server". A shortcut to the License Manager is also created on the start menu.

## 16.4.3 License Manager

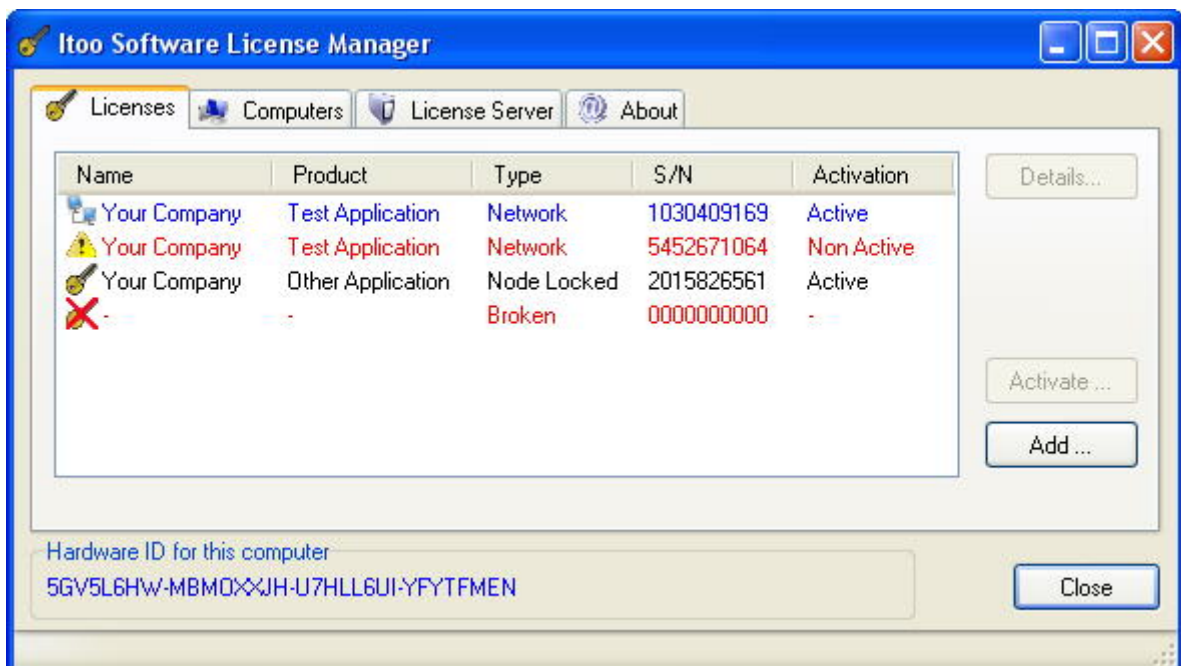
You must use this tool to manage the licenses of all products purchased. It's the same one used to manage the Stand-alone licenses.

To use it, select the **License Manager** in the **Itoo Software/ License Server** group of the Start menu. There are four tabs in this tool, two of them are only available if you have a license server installed:





- **Licenses:** On this page the licenses are listed and managed
- **Computers** (only with License Server installed): Here you can see which computers are connected and manage them.
- **License Server:** (only with License Server installed) On this page, the system administrator controls the License Server. You can check the status of the service, start and stop it.
- **About:** Here you can find information version and contact information.

### Licenses

When opened, the License Manager displays the installed licenses. You can retrieve license details, check its status, activate it, or add new licenses as shown below:



Licenses can appear in different states, depending on the type of license and its activation status:

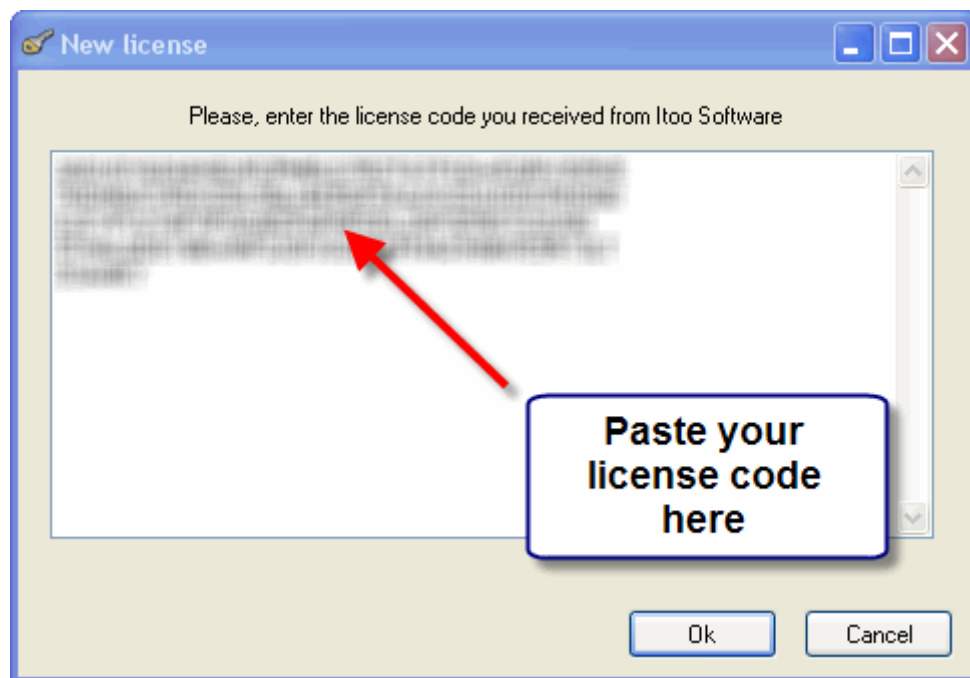
-  **Activated Stand-alone licenses:** Shown in black text, these licenses are not used by the License Server (see [Stand-alone license](#)).
-  **Activated Network Licenses:** Shown in blue text, these licenses are activated and ready to be shared on the network.
-  **Un-activated licenses:** Red text with a warning icon, these licenses are valid but have not yet been activated. You must activate them before using.
-  **Broken licenses:** Red text with an error icon. These licenses have corrupted data and can't be used in any form. They must be reinstalled.

To obtain more information about a license, use the **Details...** button, here you can see the data stored on it.

#### Installation of new network licenses

Unlike Stand-alone licenses, that are authorized for use only on a single workstation (the computer on which it is installed), a network license allows for concurrent usage for a specific number of workstations. This number is shown in the license's details as "Licensed for x users". For instance, if you purchase 5 network licenses, you won't receive 5 separate license codes, you will only receive one code that once installed creates a license for 5 users in the License Manager. Later, if you purchase licenses for 3 additional workstations, you will receive a new license code for 3 users, that must be added in the License Manager.

When you acquire licenses from Itoo Software, in the e-mail you get the license code, as a block of letters and numbers. To install it, use the "Add.." button on the Licenses tab. Copy and paste the code in the window. Please be sure that you do not include any text other than the code itself:



If the entered code is valid, press Ok. The license is installed on your computer and ready to be activated.

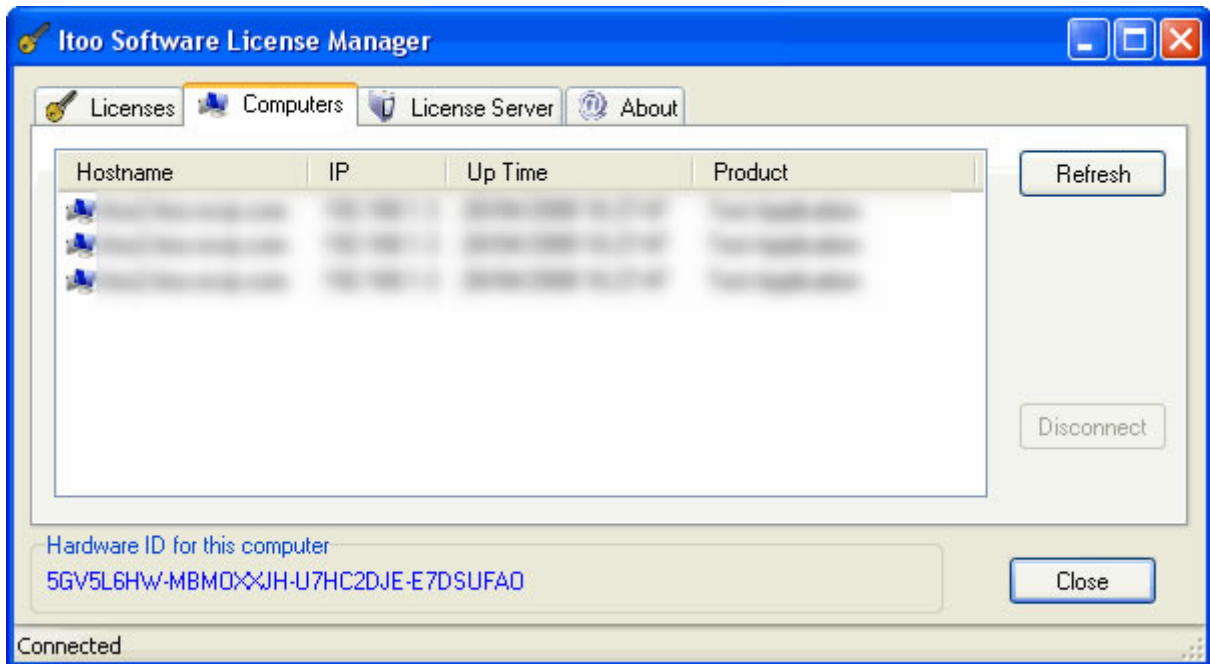
#### License activation

The activation process is identical for Network as for Stand-alone licenses. The difference is that the network licenses are activated and linked to the hardware of the License Server.

After an new license is installed, you'll be asked to start the activation wizard. You can activate manually using the "Activate" button as well. Please, see the [activation process](#) in Stand-alone licenses for instructions on how to do this.

## Computers

In the "Computers" panel, you can see all clients that are connected to the server, what licenses are being used and how long each computer has been connected.

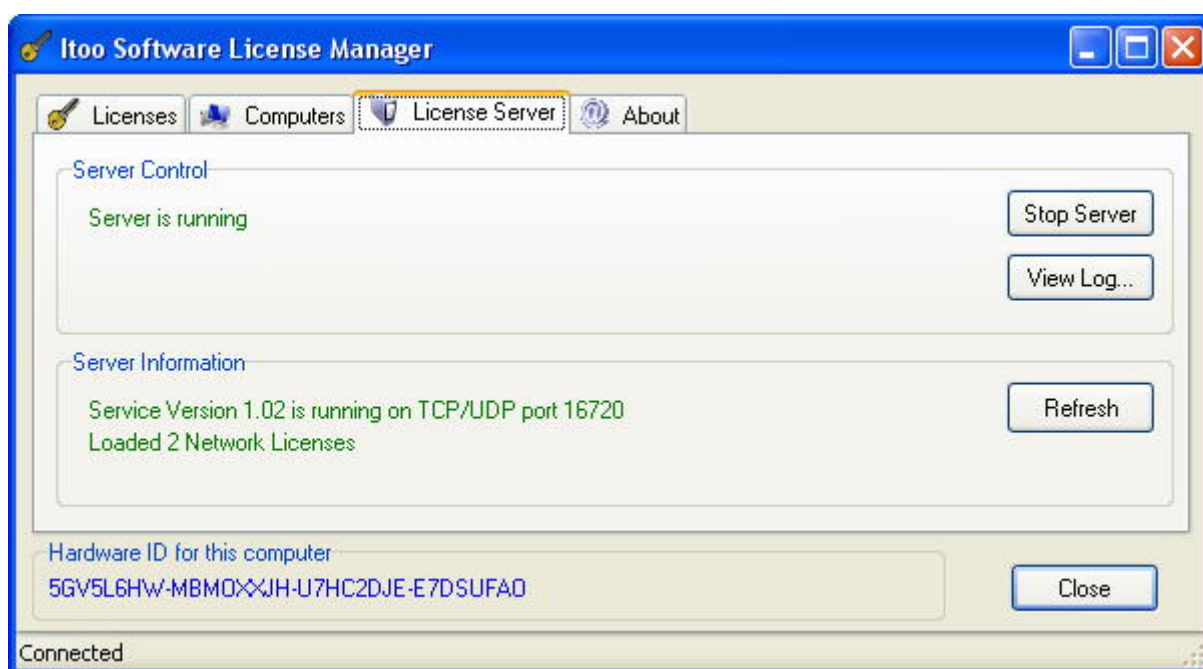


Each time that a workstation uses a network license, it connects to the License Server and starts a lease of the license for a limited time period. Before that period expires (by default ten minutes), the license must be refreshed or the lease will be lost and the license can be requested by another user.

Using the "Disconnect" button you can force the server to disconnect a computer before the lease time expires. The typical use of this control is when a workstation has locked up, and it's license is locked to that computer. In this case, you can unlock the license by manually forcing a disconnection. If a workstation doesn't reply after the lease time period, it is disconnected automatically by the server.

## License Server

On the "License Server" page, you can check the status of the service, start and stop it. A detailed log of the server activity is also available, to diagnose any problems.



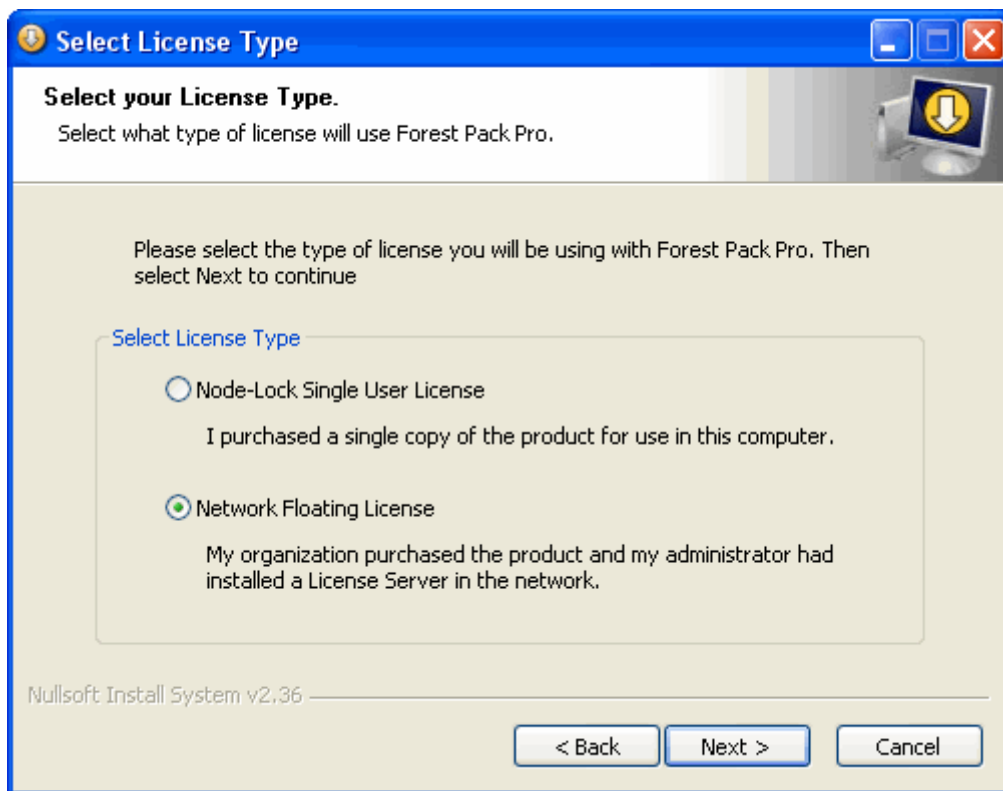
The top panel shows information about the windows service, whether it's installed correctly and if the service is started. Using the "Start/Stop Server" button you can stop the service and restart it at any time, please note that if you stop the service, all connected clients will lose their leased licenses and will try to reconnect.

The bottom panels gives you more detailed information about the service, such as the server version, TCP ports used and the total number of connected users. This data is updated each time you enter this tab, or by clicking the "Refresh" button.

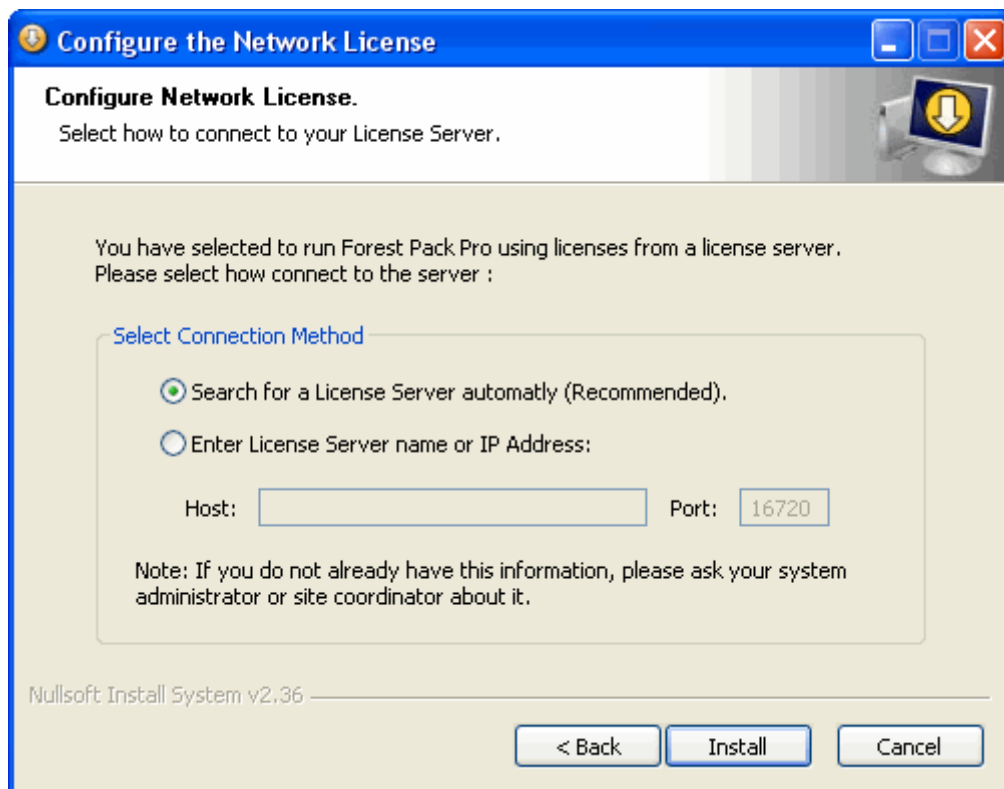
#### 16.4.4 Configure Clients

A network license can be used from any computer that can connect to the License Server over the network. The license server or network licenses should not be installed on the client computer. To configure your software for using network licenses, please follow the procedure below:

From the Start menu, search for the application group and select "Change License Mode". You will get the license configuration window:



In this window, you select with type of license the software will use. The first option uses a locally installed [Stand-alone license](#). Selecting the second option, the software will use network licenses. You will be asked how to connect to the license server in this dialog box:



The first method is the recommended procedure, the client will search for an active server over the local network using a broadcast query. The server will be located each time that a license is needed by the software. If the server is accessed through a router, and the automatic method doesn't work, you must use the manual configuration and enter the IP address used to retrieve the license.

**Please note:** If you have installed multiple commercial Itoo Software products, each one has its own license configuration. You can use one product with a Stand-alone license, and another with a corporate network license. Please make sure that each product is configured to use its license correctly.

### 16.4.5 Accessing the License Server through a Firewall

The License Server installer checks for the Windows Firewall and adds the necessary rules if it is present. If you use another firewall software, or a physical firewall between the server and the client computers, the following ports must be opened:

- TCP Port 16720
- UDP Port 16720

## 16.5 Stand-alone Licenses

The Stand-alone license ties a given software application to a single machine. This method of licensing requires a machine's unique identifier (SID) to be incorporated in the license activation process. After buying the product, a generic license is sent to you. This license must be installed and activated before you can use the software. In the activation process, the license is linked to the hardware.

As soon as your order is authorized, we will send you an e-mail with the license code. On this page, we explain how to install and activate a Stand-alone license.

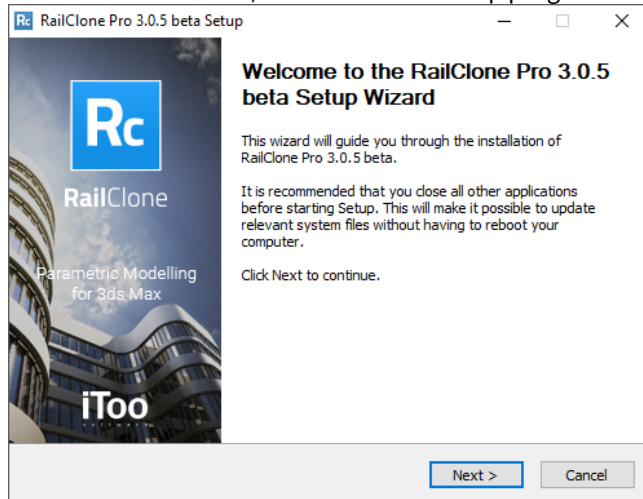


## 16.5.1 Downloading the software

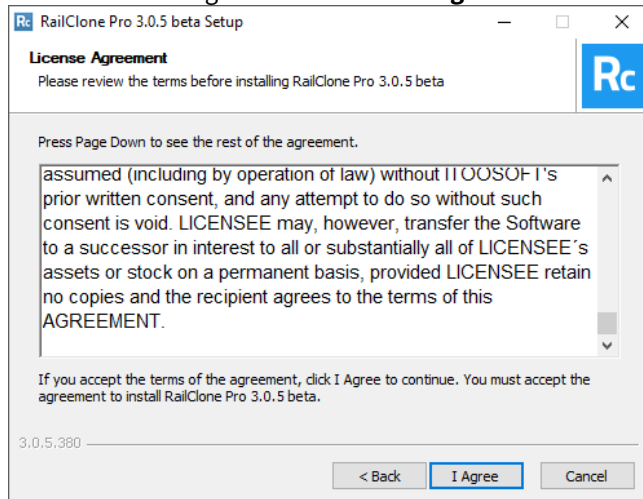
1. Access your [User Panel](#) entering you iToo Software account username and password.
2. Go to My Products and download RailClone Pro/Forest Pack Pro . The user panel also gives you access to the latest patches and beta versions.
3. Make sure all version of 3ds Max are closed

## 16.5.2 Installation and licensing

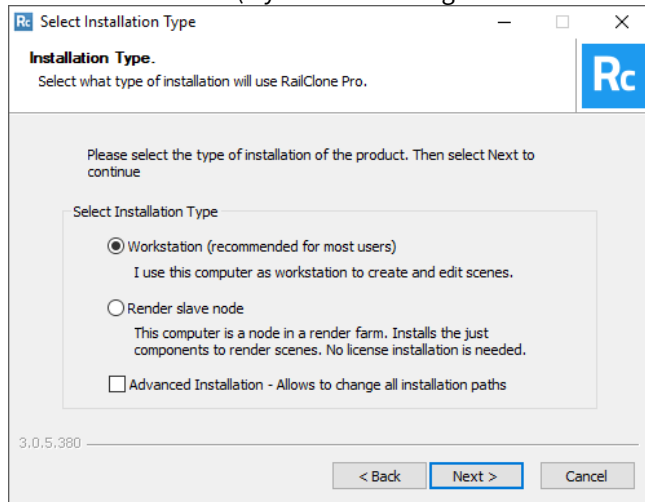
1. Run the RailClone Pro/Forest Pack Pro setup program




2. Read the license agreement and click **I agree** to continue.

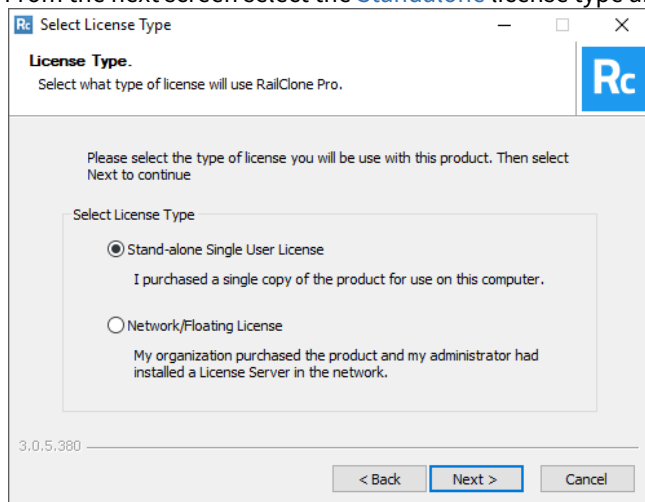


3. Select **Workstation**. (If you are installing RailClone on a render node, please select Render Slave Mode)

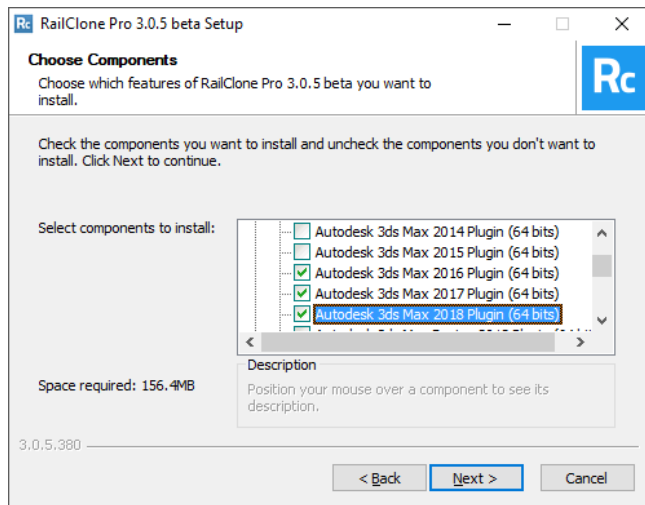


 If you would like to change the installation paths, please check the **Advanced Installation** option.

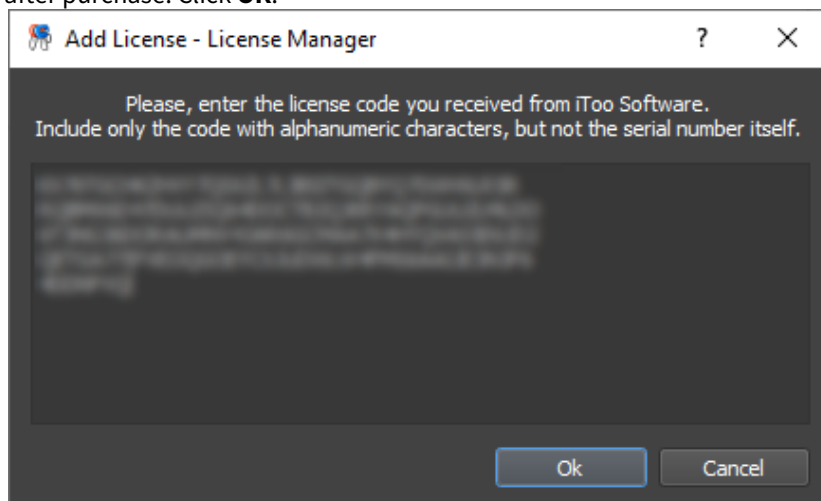
4. From the next screen select the **Standalone** license type and click **Next**.



5. The installer will automatically detect the versions of 3ds Max installed on the system. By default, RailClone/ Forest Pack will be installed on all compatible versions, but you can change this using the **Select Components to Install** options if required. When you are done, click **Next**

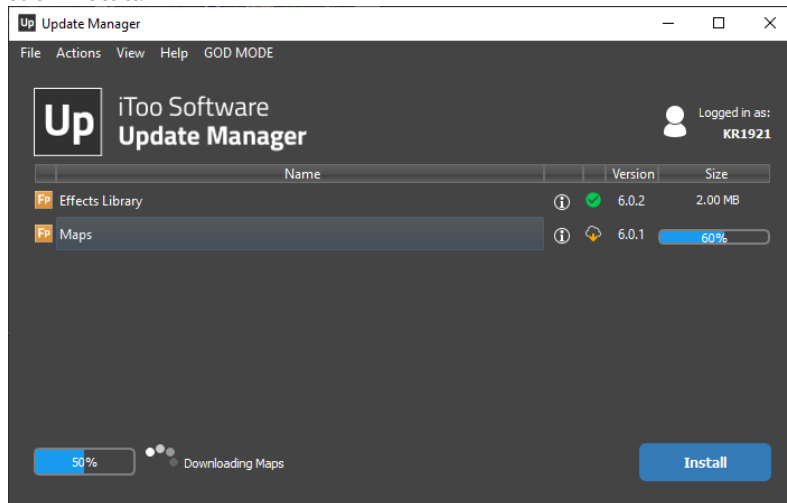


- If you chose advanced installation you'll be prompted to select a path, otherwise, RailClone/Forest Pack will be installed using the default location at **C:\Program Files (x86)\iToo Software\**
- Add License will open. Paste in the long license code (not the serial number found in the email we sent you after purchase). Click **OK**.

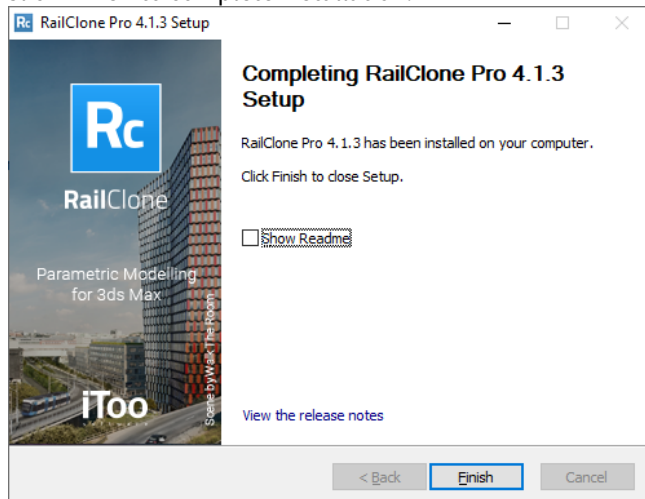


- Your licenses will attempt to activate online,

9. Next update manager will be launched allowing you to install additional content like libraries and Macros. Click **Install**.



10. Click **Finish** to complete installation.



### 16.5.3 Offline Activation

If you have trouble with online activation, or the computer where you're are using the license does not have Internet access, you can Manual activation.

1. Select "Activate Manually" as the activation method.
2. Open a link to our [Activation Web page](#) and enter the codes given by the dialog.
3. Following the steps indicated in the page, you'll be given an Activation Code, enter this code in the dialog box when requested to activate your license.

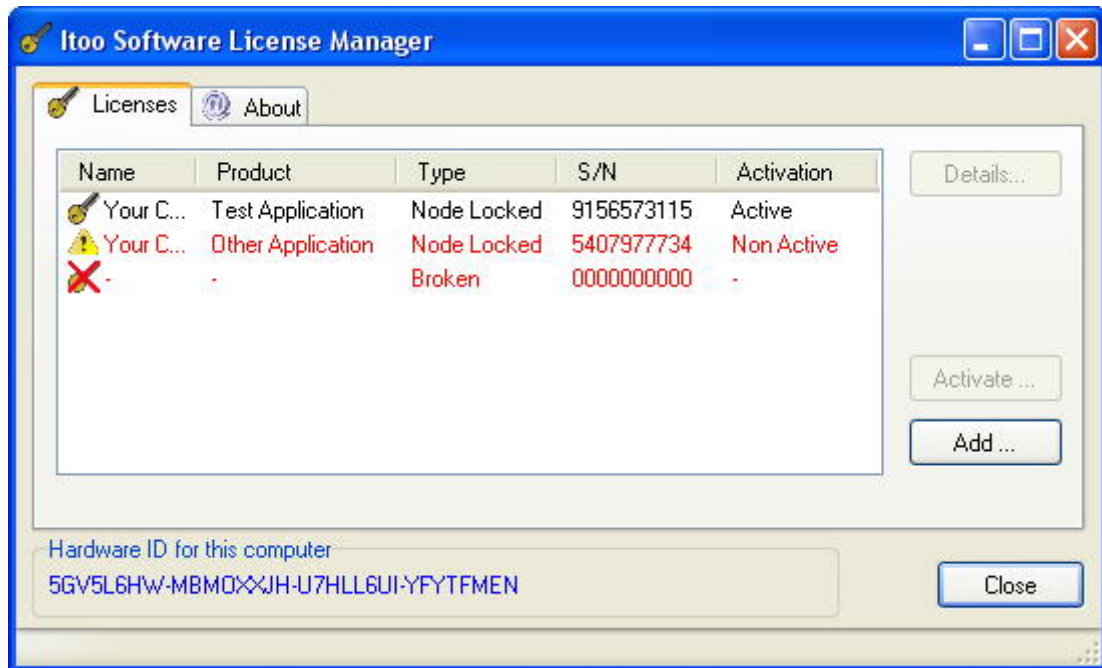
In either case, if you have trouble during the activation, you may contact us at [helpdesk@itoosoft.com](mailto:helpdesk@itoosoft.com).

### 16.5.4 License Manager

When you install any Itoo Software commercial product, the installer also includes the Itoo Software License Manager. This tool is used to manage the licenses of your purchased software.

To open the License Manager, select "License Manager" in the "Itoo Software" group of the Start menu. There are four tabs in this tool, two of them are only visible if your computer acts as a license server (not applied for Stand-alone method, see [Floating/Network](#) licenses):

When opened, the License Manager displays the installed licenses. You can retrieve license details, check its status, add new licenses or activate them as shown below:



Licenses can be in different states, depending of the type of license and its activation status:

- **Activated Stand-alone licenses:** Shown in black text, these licenses are ready to be used.
- **Un activated licenses:** Red text with a warning icon, these licenses are valid but have not yet been activated. You must activate them before using.
- **Broken licenses:** Red text with an error icon. These licenses have corrupted data and can't be used in any form. You must reinstall them.

For more information about a license, you can click on the "Details..." button, where you can see the data stored in the license.

### Installation of new licenses

If you have not installed a license with the software installation process, use the "Add.." button in the licenses tab. The installation process is the same as the one described above for the installer.

### Activation of the selected License

When a new license is installed, you're asked to activate it. In this process the license is linked to your hardware. The activation process is the same as the one described above for the installer.