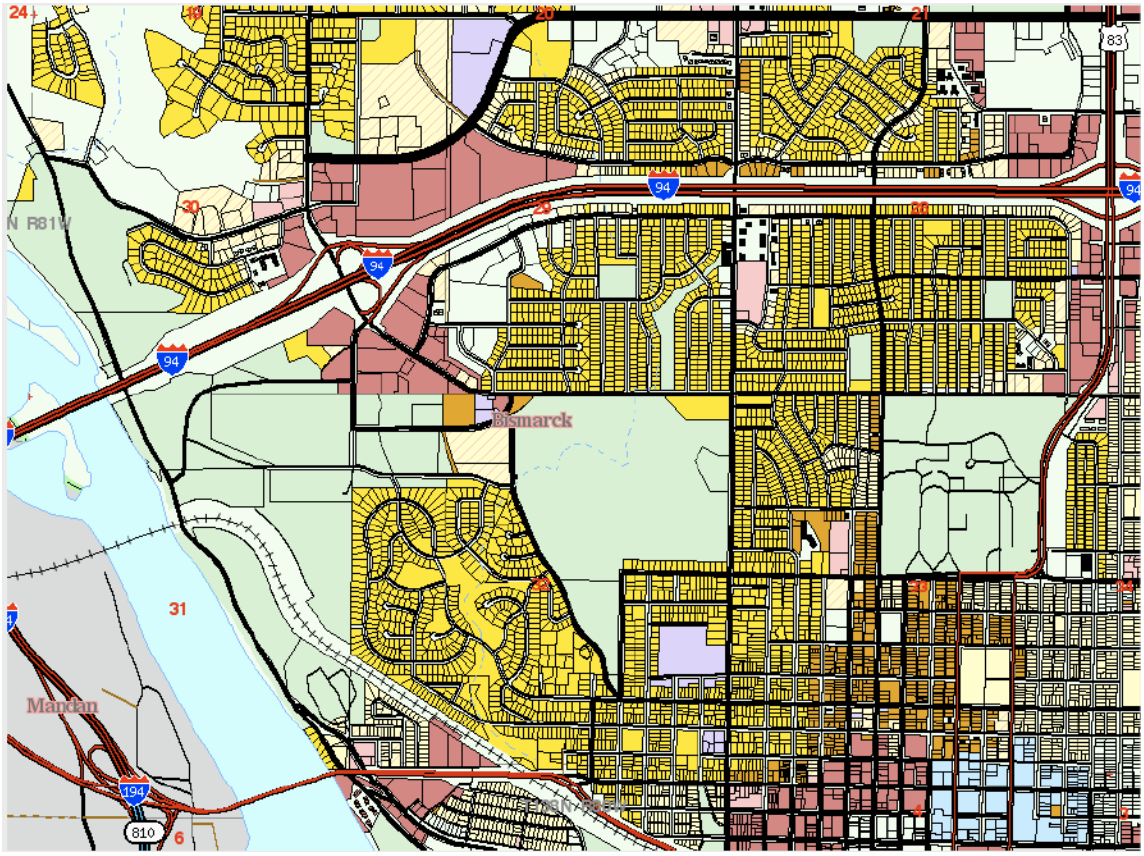
OffRoad GIS

County Management System

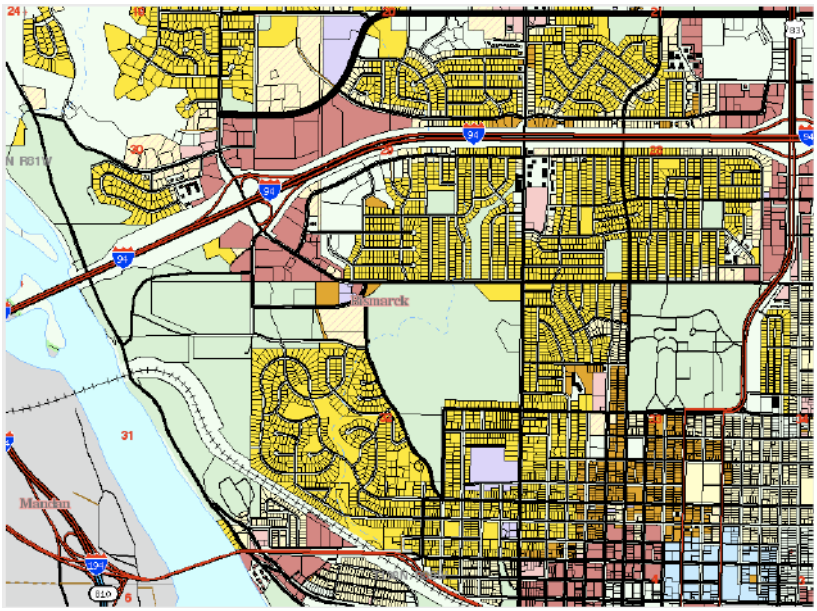


By

OffRoad Software Inc.

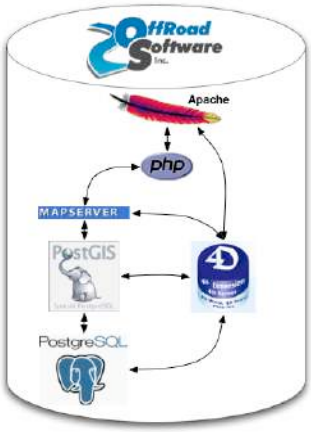
Chapter 1 - Introduction, Installation, and Setup

Offroad Software introduces a revolutionary new GIS, which is a comprehensive GIS management solution targeting County government. Offroad GIS incorporates spatial management and delivery services that have historically required very complex and expensive infrastructure to implement. More importantly, Offroad GIS has provided integration between management applications and the data delivery services that will completely change what Counties have grown to expect from GIS.



In a world where GIS infrastructure is complex and difficult to deploy, Offroad Software has made significant efforts to make the deployment of Offroad GIS as simple as point-and-click. That is not to say that Offroad GIS is incapable of addressing complex management requirements. Quite the contrary, Offroad GIS has been custom designed to address county management needs and provides a solution as robust as any comparable infrastructure without the

steep learning curves associated with many commercial software solutions.



The Offroad GIS system has been designed around a combination of commercial and open source software to integrate the best possible combination of tools, simplicity, and ease of use. The Offroad GIS system includes an integrated spatial data engine that accommodates most major client GIS applications including ESRI's ArcMap, QGIS, GRASS, and many others. In addition the architecture of the Offroad GIS infrastructure also includes the necessary tools and resources to drive an integrated Web Mapping System. What this means is that there is no additional effort required to implement Internet map services and serve your data over the Internet.

The Offroad GIS system currently includes the core module that addresses Parcel Management and all of the various facets of Tax Assessment, Tax Equalization, and Tax Reporting that are associated with the management of the county cadastre. Additional modules will soon follow that will include Roads and Right of Way, Signs, Bridges, and Culverts.

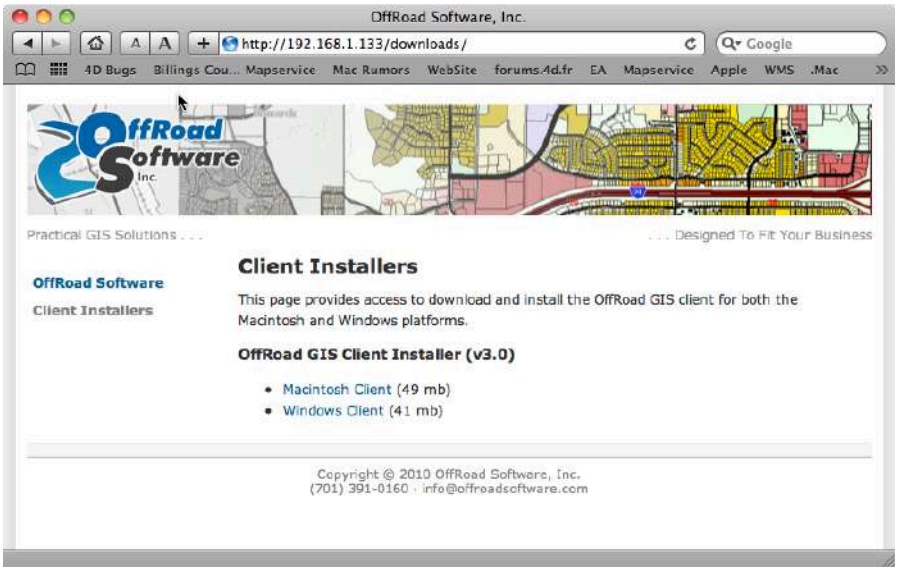
- Integrated Web and Map Services
- Client-Server Architecture
- Open-Source Web Mapping Engine
- Supports Industry standard Formats
- ESRI Shape File import/export
- Disaster recovery services
- Service based pricing structure
- No up-front startup costs
- No Long Term Contract Requirements
- Data is Customer owned

Installation

System Requirements

Windows	Mac OS
Pentium III	Mac Intel ® or PowerPC (G5
Windows XP or Vista	Mac OS 10.5.1 or later
1 GB recommended	1 GB recommended
Screen Resolution 1280X1024	Screen Resolution 1280X1024

Your spatial server contains all of the files necessary to install the OffRoad GIS client on your local machine. The downloads page can be accessed on the spatial server at the following address http://spatialserver.yourdomain.com/downloads/. (You will need to substitute "spatialserver.yourdomain.com" with a valid DNS name for your spatial server or the IP address of your server. The following page should be displayed.



Windows

To install the program on your hard disk

1 Download the installer from the spatial server by clicking on the Windows Client link.

2 Create a directory on your machine where you want the program to reside. This can be in the Programs directory or in any user defined directory on your system.

3 Unzip the archive and select the folder that was just created as the destination.

4 Create a shortcut to the Offroad.exe file on your desktop by selecting the file and moving it to your desktop. (Right-click on the item prior to dragging it, you will then be prompted to move the original or make a shortcut. Select the 'Make a Shortcut" option). Another option is to select the Create Shortcut menu option from the File menu.

Macintosh

To install the program on your hard disk

1 Download the installer from the spatial server by clicking on the Macintosh Client link.

2 Unzip the archive.

3 Drag the Offroad.app file to your Applications folder

4 To place the application in your Dock. Drag the Offroad.app file from the Applications folder to the Dock.

Removing Software

You can quickly and easily remove all files installed on your disk by selecting the installation directory and dragging it to the Trash.

Launching Offroad GIS for the First Time

When you launch Offroad GIS for the first time, it will attempt to perform the necessary process of identifying the spatial server. If the server exists on your network, the proper broadcast should make this connection automatically. If it does not you will be prompted to find and connect to the server. This will only occur the first time you launch the client. After the initial connection, the OffRoad Client will automatically connect to the server unless the server has changed or your network configuration has changed.

1 Launch the Offroad GIS application

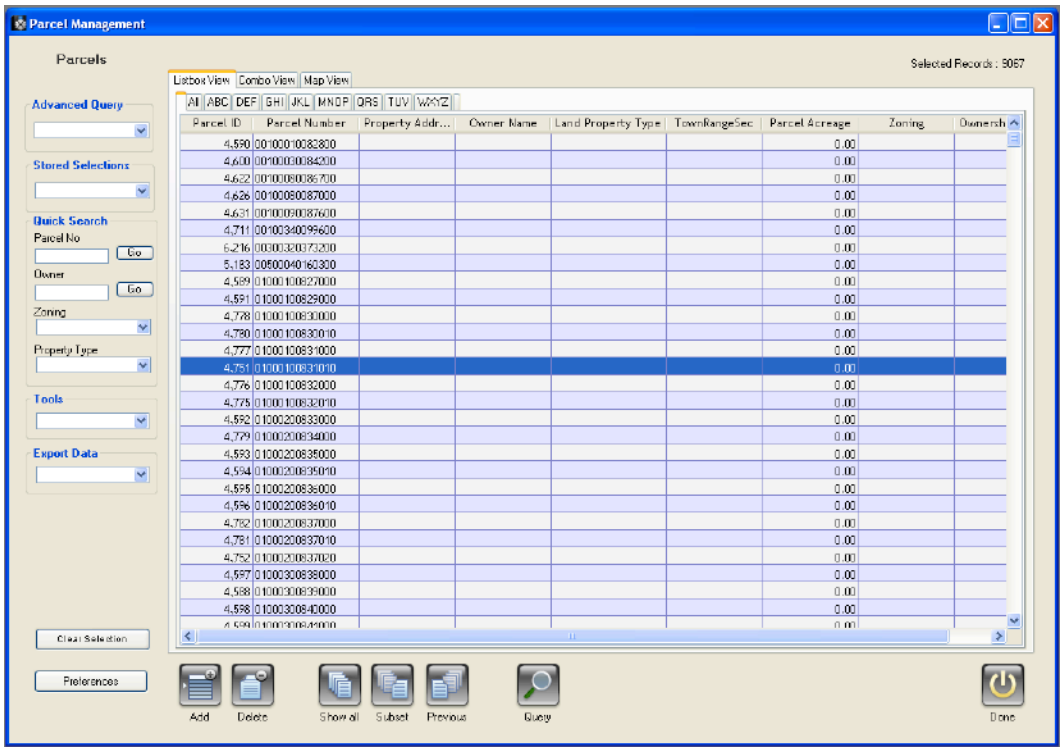
A Password dialog will be displayed

2 The program ships with a default Administration account that should be changed after the program setup has been completed

Username: Administrator

Password: admin

3 The Parcel Management dialog will be presented:

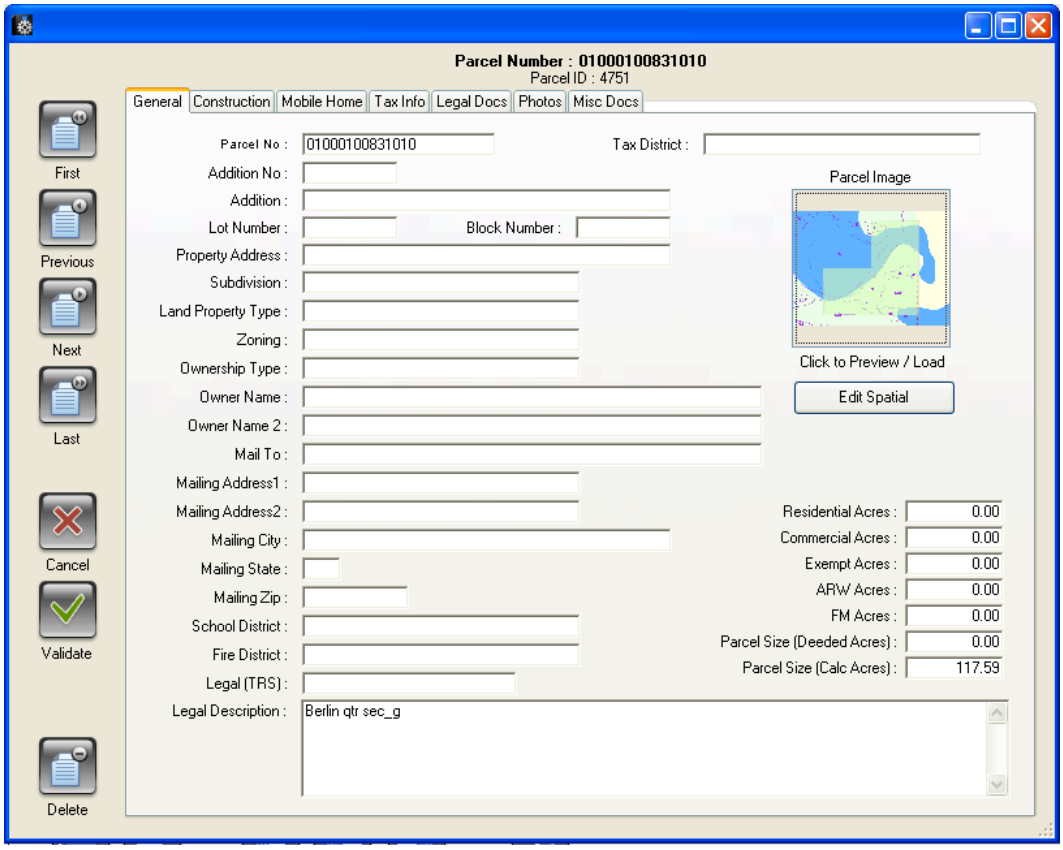


Chapter 2 - Forms, Buttons & Data Entry

This chapter provides the information required to understand the various interface elements that exist within the Offroad GIS application. Understanding these basic elements should provide the skills required to manage data and successfully navigate the various interface features that are consistently presented throughout the application.

Input Forms

Input forms provide access to record level information for purposes of adding, displaying, or modifying individual records. The Input form displays one record at a time with navigation tools to move between records and between different pages of the same record.



Parcel Record Input Form

Enterable Areas and Data Entry Order

The Input form consists of enterable areas. Enterable areas differ depending upon the data type of the field to which they are attached. When entering or modifying data, the cursor moves from one enterable area to another in a consistent order. This order is called the ***data entry order***. Every active field

or variable in which data can be entered is included in the data entry order. Boolean fields (typically shown as radio buttons or check boxes) are also included in the entry order. The entry order is defined independently for each form and for each page within a form.

To move forward in the data entry order:

- Press the Tab key or the Enter key on the numeric keyboard.

Note *In a Text field, pressing the Return key on the alphanumeric keyboard ends the paragraph and moves the insertion point to the next line in the field.*

To move backward in the data entry order:

- Hold down the Shift key and press the Tab or the Enter key on the numeric keyboard.

To select any enterable area:

- Click in the area or tab into it using either Tab or Shift+Tab.

Entering and Modifying Different Types of Data

Each field in the Offroad GIS has a field type that dictates the kind of data that can be entered. Most fields are numeric or alphanumeric. Data can be entered in these fields simply by typing the data. Other types of fields accept data only in particular formats.

Alpha, Numeric, Date, and Time fields can have display formats associated with them. For fields with display formats, the format is actually applied to the data when the field does not have current data entry focus. For example, if the value 15199 is entered in the Assessed Value field, tabbing out of the field would produce 15,199.00 as this field is a real field with a display format that is instructed to display the comma, decimal, and two decimal places.

Alpha Fields

An Alpha field can contain alphanumeric character (letters and numbers), punctuation marks, and special characters such as *, %, and {. The maximum length of an Alpha field is predefined within the Offroad GIS system. If more characters are typed than the maximum allowed, the extra characters are truncated.

Numeric Fields

Offroad GIS supports Real, Integer, and Long Integer numeric fields. If a decimal point and numbers to the right of the decimal point are entered in an Integer or Long Integer field, the number will be truncated.

Numeric fields do not store formatting characters such as the dollar sign or the comma. If formatting characters are entered, they are ignored.

The only non-numeric characters that are significant when entered in a numeric field are the following:

Character	Purpose	Example
Decimal Point (.)	Used as the decimal separator	15,159.00
Hyphen (-)	Used for negative numbers	-15,159.00

Text Fields

A Text field functions like a text processor and can hold up to 2 GB of data. Text fields are used for entering long blocks of text such as notes or comments. A text field can have a vertical scroll bar.

A Text field provides basic text editing features: scrolling, word wrapping within the field, and double-clicking to select words. It also supports use of the arrow keys and the standard cut, copy, and paste operations. Using the **Enter** key on the keyboard (or **Return** on Macintosh), a Return character can be entered into a Text field to form paragraphs. Return characters can not be entered in an Alpha field.

Tabs cannot be used in a Text field. If you press the **Tab** key while in a Text field, the insertion point moves to the next enterable area in the data entry order.

Date Fields

A Date field accepts any date entered in a standard month/day/year format (MM/DD/YYYY). Dates are stored between the year 100 A.D. and the year 32767. The year component of the date can be entered either as two or four digits. If a two digit year is entered, it is assumed that the date is in the 21st century and “20” is added before the digits if the two digits are between 00 and 24. If the two digits entered are between 25 and 99, the date is assumed to be in the 20th century and “19” is added before the digits.

The month, day, and year can be separated by any character except a number.

Boolean Fields

A Boolean field takes on one of two values, TRUE or FALSE. Boolean fields are generally displayed as check boxes. When a boolean field is selected, it is outlined by a marquee (a border that surrounds the field).

A Boolean field presented as a check box is considered to be TRUE if it has been checked and FALSE if it has not been checked.

To enter a value for a Boolean field displayed as a checkbox:

- Click the check box to change the value of the field.

If there is a marquee surrounding the field, the checkbox can be toggled between the checked and unchecked state using the Space bar. It is also possible to set the Boolean field to true by pressing the “Y” and to false by pressing the “N” keys.

Fields with Choice Lists

Moving the insertion point into a field with a choice list displays a list from which a value can be selected. The list is displayed in the Choice List window. An example Choice List window is shown below:

A choice list is often used to limit entries to specific values and prevent misspellings. For example, the Zoning field is associated with a list of all the pre-defined zoning types.

To enter data using a choice list:

- Select the field for data entry be pressing Tab or clicking in the field (the associated choice list will be displayed)
- Double-click the desired item to select and enter the item

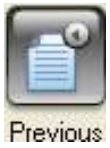
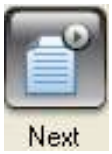
OR

- Click the value to be entered, and press Enter on the alphanumeric keyboard (Return on Macintosh) to select the highlighted value.

To cancel data entry from a choice list, simply click **Cancel or press the Escape Key**.

Icons and Buttons

Offroad GIS uses a number of buttons in all input forms and management consoles that are used to perform standardized functions. The following provides a detailed description of the button functions associated with each button.

Icon	Button	Description
	First Record	Moves to the first record in the current selection, and saves any changes made to the record displayed in the input layout.
	Previous Record	Moves to the record in the current selection that precedes the record currently displayed in the input layout, and saves any changes made to the records displayed in the input layout.
	Next Record	Moves to the record in the current selection immediately following the record currently displayed in the input layout, and saves any changes made to the record displayed in the input layout.
	Last Record	Moves to the last record in the current selection, and saves any changes made to the record displayed in the input layout.
	Cancel	Cancels the current transaction. Any changes that have been made to the record are ignored, and the user is returned to the previous layout.
	Save	Accepts the current transaction. Saves the record and any changes made to the record displayed in the input layout to the database file. If none of the fields for the selected record have been changed, no action is completed by the button. The button also returns the user to the previous layout.
	Add Record	Adds a record to the current table and presents the new record in the appropriate input form.

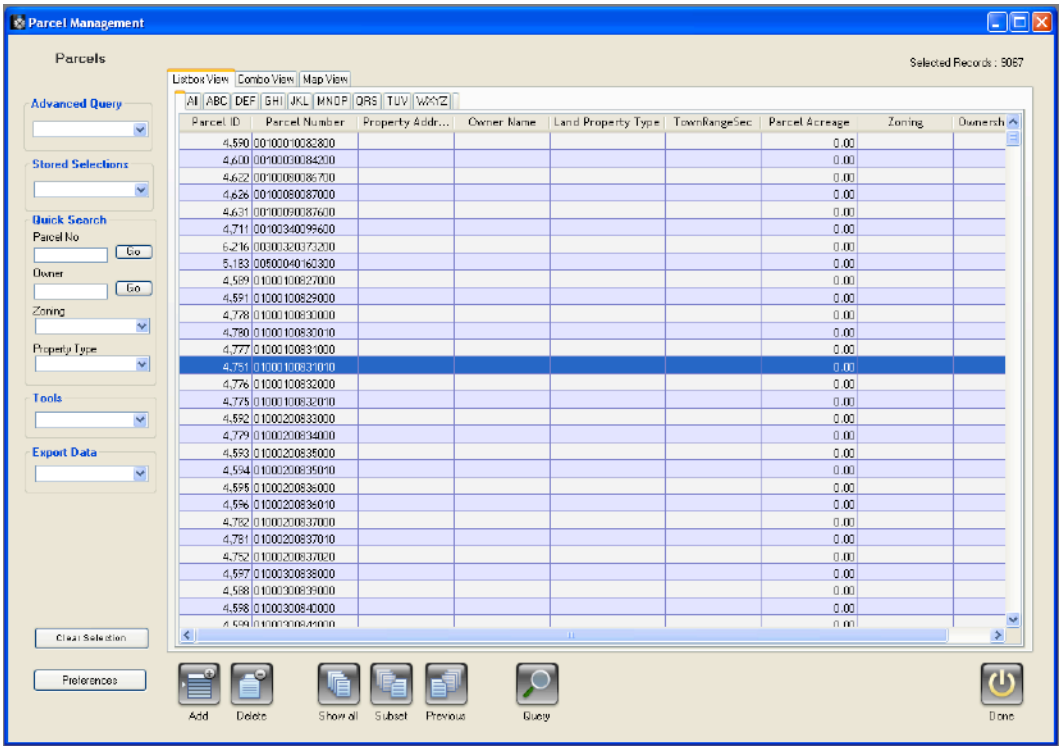
Icon	Button	Description
	Delete Record(s)	Deletes an individual record or multiple records. If the button is selected from an input form, it is used to delete the current selected record. If the button is selected from the management console, it will delete all of the records currently highlighted.
	All Records	Displays all records in the management console for the current selected table.
	Subset	Reduces the current selection to the currently highlighted records in the record selection list.
	Previous Selection	Restores the previous selection that was displayed in the record selection list of the management console.
	Query	Invokes the Query editor.

Chapter 3 - Management Consoles

The management console is the primary interface for working with data within the Offroad GIS application. While the management console for each type of data will be uniquely developed to address the challenges associated with the targeted data, the management console provides a consistent data management approach throughout the Offroad GIS application.

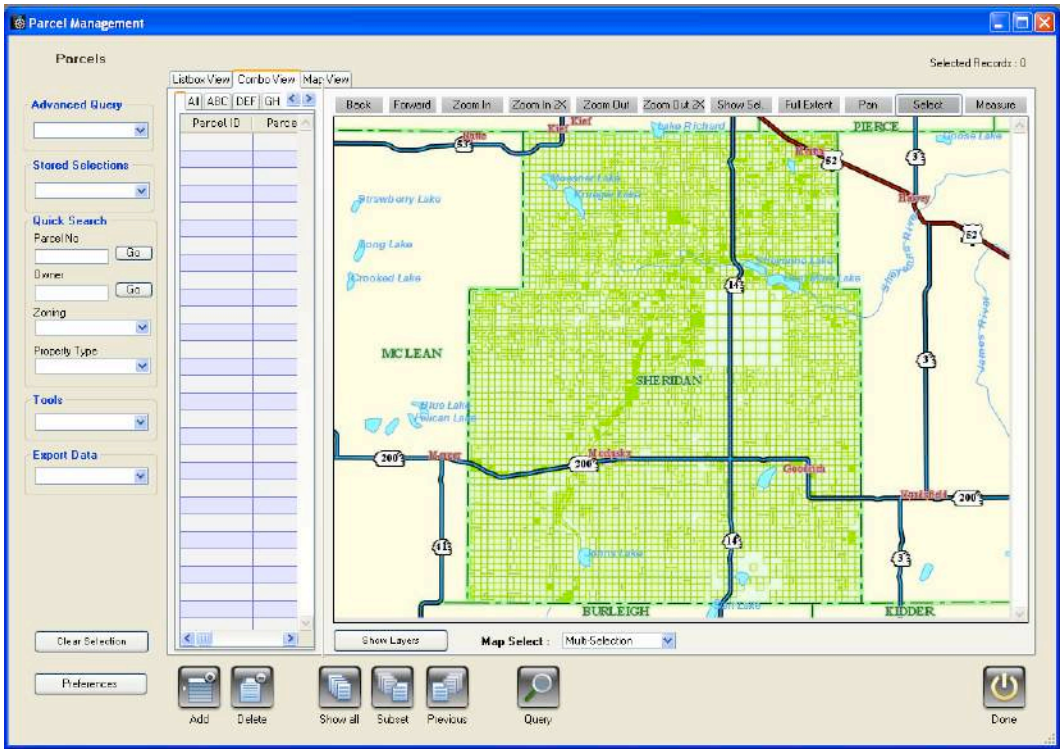
The primary function of the management console is to provide the necessary tools to easily build and access selections of records for performing a variety of data management functions ranging from data entry to data export. The management console has been designed to integrate the more traditional tabular database interface with a more modern mapping interface. This allows the management console to leverage the strengths of both types of interfaces so that it can be used efficiently by all users.

The Management console was designed to provide an efficient means of presenting the tabular data with an integrated map interface that can easily be toggled between three different states; Tabular View, Combo View, and Map View. When initially presented the Management console is displayed with the tabular view as demonstrated below.

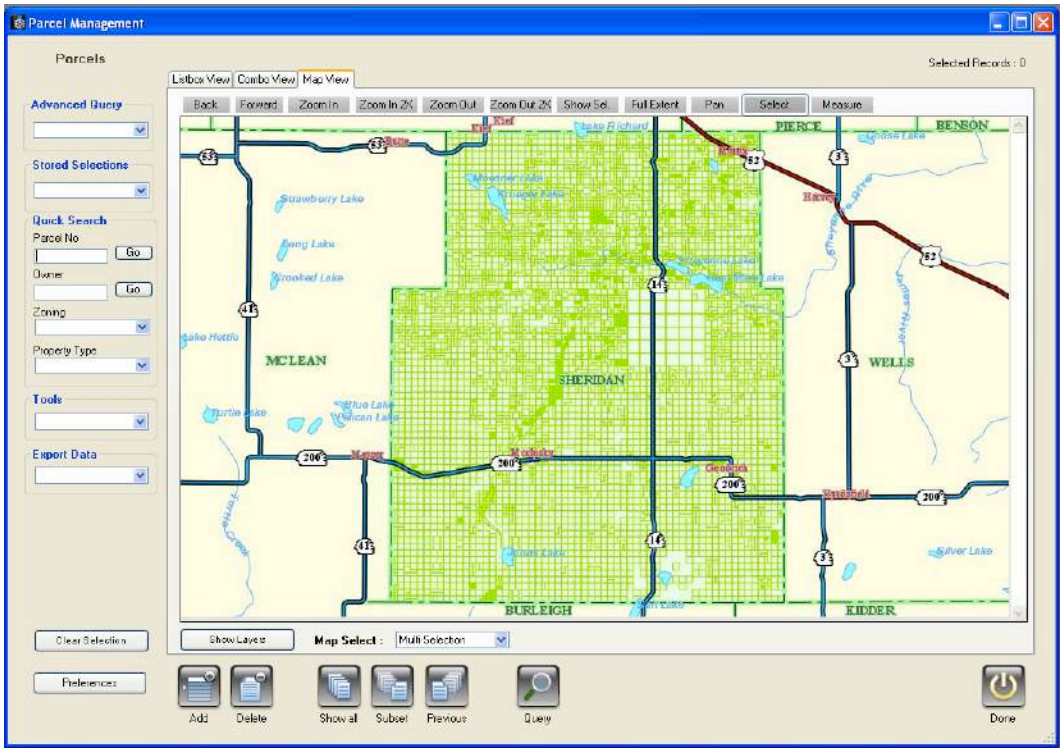


Management Console (Tabular View)

In order to switch between the three different views, select the appropriate tab at the top of the display area.

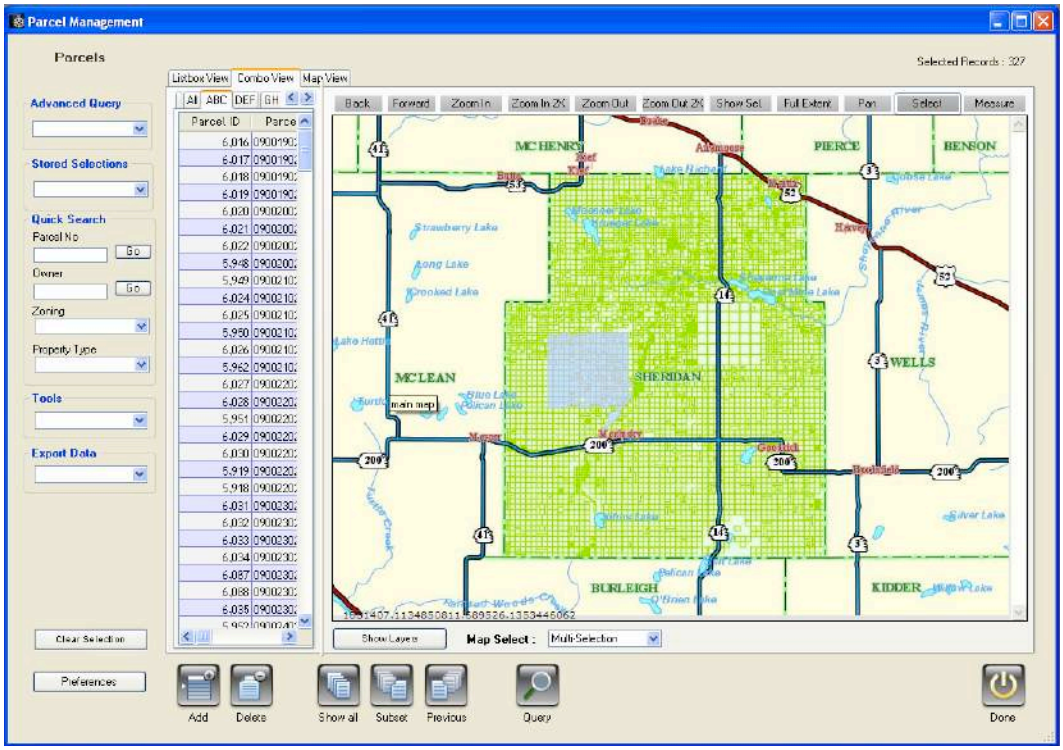


Management Console (Combo View)



Management Console (Map View)

Regardless of which view is displayed, the map and the tabular list are synchronized. As a result, any records displayed in the record selection are automatically selected and displayed on the map. Also, any selection that is performed while in map view is displayed both in the tabular view and on the map.



Management Console (Selected Records)

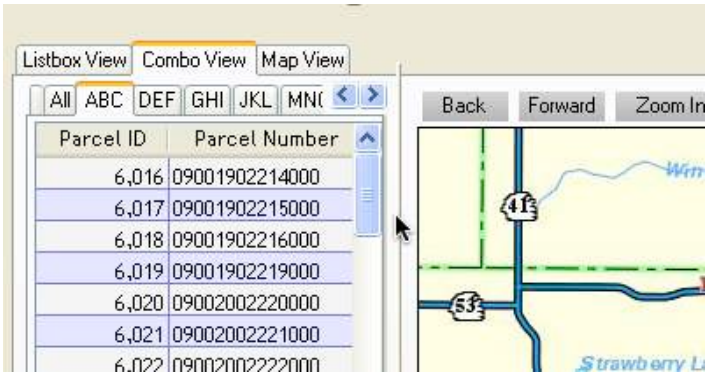
Note *The display of the map view requires additional overhead to render and display the map data and associated graphic elements. For performance reasons, it may be advantageous to work in the tabular view if the map interface is not required.*

Resizing the Management Console

The Management Console is presented in a standard window that can be resized. As the window is resized the elements on the page are resized to take advantage of the available computer screen extents. When the console is displayed in the tabular view the record selection will resize and scale with the window. In the combo view, the record selection will scale vertically, but the map area will scale with the window to provide the maximum available screen area. In map view, the map area will scale with the window to provide maximum view area.

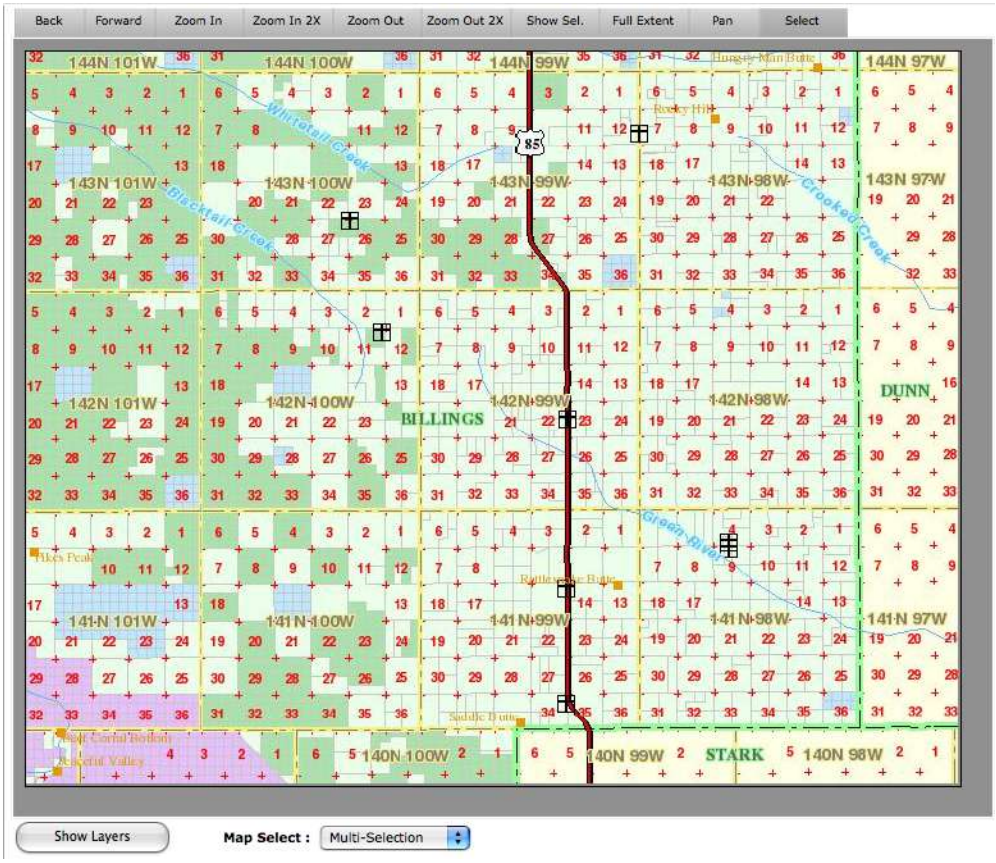
When displayed in the combo view, the Management Console provides a slider to adjust the area associated with the record selection and the map area. The

slider makes it possible to expand the tabular area or the map area depending upon individual needs. There are limits to the extent that the slider can be moved to the left or the right and the larger the window the more flexibility that this provides.



Map View Elements

When the map view is displayed in the Management console, there are additional interface elements that are available.



Map View

These include the standard map navigation buttons located at the top of the map area, the Show Layers button and the Map Select pop-up button located below the map area.

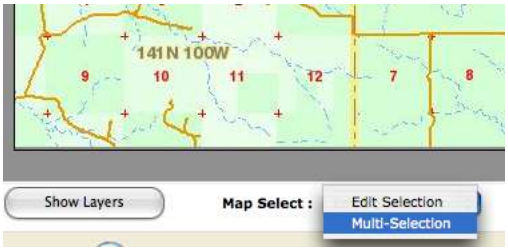
Map Navigation Buttons

- **Back** - allows you to move back to the previous view of the map area. For example, if you zoom in, the Back button will allow you to move back to the previous zoom level. The back button also honors the state of the map which includes enabled layers, etc.
- **Forward** - allow you to move forward to the next view of the map area. For example, if you had zoomed in and then hit the back button, the forward button would allow you to go forward to the zoomed view prior to hitting the Back button. Like the Back button, the Forward button honors the state of the map which includes enabled layers, etc.
- **Zoom In** - allows you to draw a marquee on the map to select the extent to which the new map is drawn. This provides the ability to zoom in freely to any area within the map view.
- **Zoom In 2X** - clicking on this button will zoom the map in by a factor of 2. The width and height of the current view will be decreased to 1/2 of the current value. The map extent will display 1/4 of the area that was displayed in the previous extent.
- **Zoom Out** - allows you to draw a marquee on the map to set the extent to which the current map is to be drawn. This will essentially expand the map area displayed and shrink the current map view to fit in the area drawn with the marquee.
- **Zoom Out 2X** - clicking on this button will zoom out by a factor of 2. The width and height of the current view will be increased to twice the current value. The new map extent will display 4 times the area that was displayed in the previous extent.
- **Show Sel.** - clicking this button will set the map extent to include all of the selected records. Therefore, the map extent and associated zoom level will depend largely on the records that are currently selected.
- **Full Extent** - clicking on this button will reset the map extent to the default which is to display the entire county area.
- **Pan** - clicking on this button allows you to move the current map view by clicking and dragging the current map view. Once the mouse button has been released, the map will be redrawn to fit the current extent.
- **Select** - provides the tools to interact with the parcel records drawn on the map. The functionality of this button depends upon which option is selected in the Map Select pop-up button.

- **Measure** - provides tools that can be used to measure distance and area on the map.

Map Select Options

The Map Select pop-up button allows you to set the selection state for the map view. The button is only activated if the Select navigation button is currently selected. Otherwise, the state of this button is ignored.

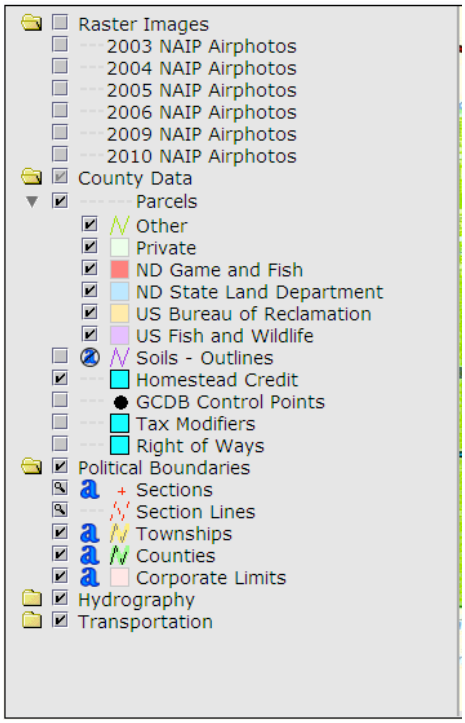


There are two options available under Map Select:

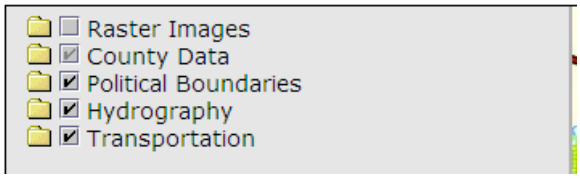
- **Multi-Selection** - This is the default option. The Multi-Selection options sets the map view to the mutli-select mode which provides the option to add the selected features to the current record selection. If you click on a single feature, the individual feature will be selected and added to the record selection list. If you click and drag a box around a group of features, all of the features that are within or intersect the box are selected and added to the record selection list. The multi-select mode behaves as a toggle. If a record is not in the current record selection, it is added to the current record selection. If a record is already in the current record selection, selecting it again will remove it from the current record selection list.
- **Edit Selection** - The Edit Selection option sets the map view to the edit mode which provides the ability to select the record within the map view for editing. If this state is set, clicking on a feature on the map will display the selected record in the current Input form for editing. When the map view is in this state, it is not possible to select multiple records.

Map Layer Control

The Show/Hide Layers Button provides access to the map Layer Control. The Layer Control is used to turn layers on or off and to view the symbolization that is applied to the various map elements. The Show/Hide layers button essentially does as the name implies in that it Shows the Layer Control or Hides the Layer Control depending on whether the Layer Control is displayed or hidden.



The Layer Control is essentially a hierarchical structure of the map layers that are available to the map interface. The available layers are grouped by major category that are represented by the various folders that are displayed. Individual layers are displayed under each folder. When first displayed, the Layer Control simply displays all of the major groups available.



Simply click on any of the group folders to display the associated layers. The folder icon will change to an open folder and the associated layers will be displayed.

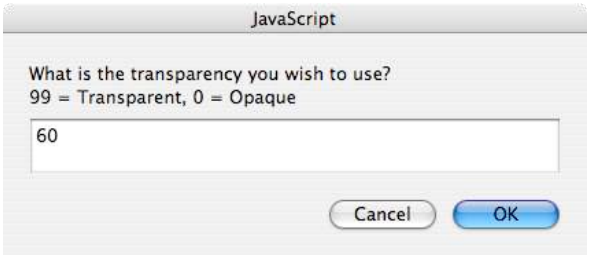
Layers can be enabled or disabled either from the Group level or individually after the Group folder has been expanded. If you click on the checkbox next to the Group folder, all of the enclosed layers will be enabled. Likewise, if all of the layers are enabled, they can be disabled by clicking on the checkbox next to the Group folder. If the check mark in the Group folder is grayed out, it means that some of the enclosed layers are enabled and others are disabled. In this case, clicking on the Group folder checkbox will enable all of the layers. Individual layers can be enabled or disabled by selecting the checkbox next to the respective layer name.

The Layer Control also provides additional functionality for those layers that have additional display attributes. If the layer checkbox is preceded by a triangle, the layer has additional filters that can be applied to the display of the layer. In most cases, this means that the layer has been symbolized based upon a unique attribute. For example, the parcel data is displayed based upon property type. By clicking on the triangle, the parcel layer can be expanded to present the different classes of property type. Each layer class can be selected for display, independent of the setting for other layer classes. Just as in the Group class, if the check mark in the layer check box is grayed out, one or more of the layer classes has been disabled.

If a magnifying glass is displayed in the check box of any group or layer, it means that the layer or group is active, but it is not currently displayed because the current scale at which the map is displayed is outside of the limits set for the respective layer. As you zoom out of a layers preset display scale, the magnifying glass will be displayed.

The Layer Control also provides access to other tools to modify display settings for specific layers. As in any GIS environment, it is often difficult to view different aspects of multiple polygons or raster layers because the layer that is

last drawn will cover other layers that are below it in the map presentation. In order to address this, Offroad GIS provides the ability to set the transparency of selected raster and polygon layers so that underlying layers can be viewed as well. Within the Layer Control, the transparency can be set for any layer by selecting the [T] button following the check box. When selected, a dialog will be displayed prompting for a transparency level.



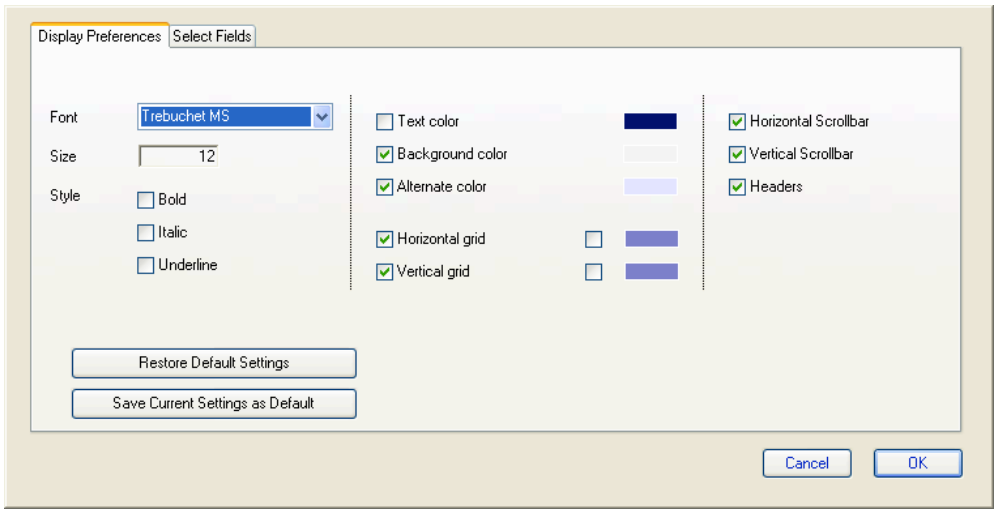
Annotation can also be enabled or disabled for certain layers within the Layer Control. If the annotation can be set for a particular layer, a graphic alpha "a" will be displayed following the check box. If the annotation is disabled, the graphic will be displayed with a slash through it. The annotation can enabled or disabled simply by clicking on the "a" button.

Selecting Records

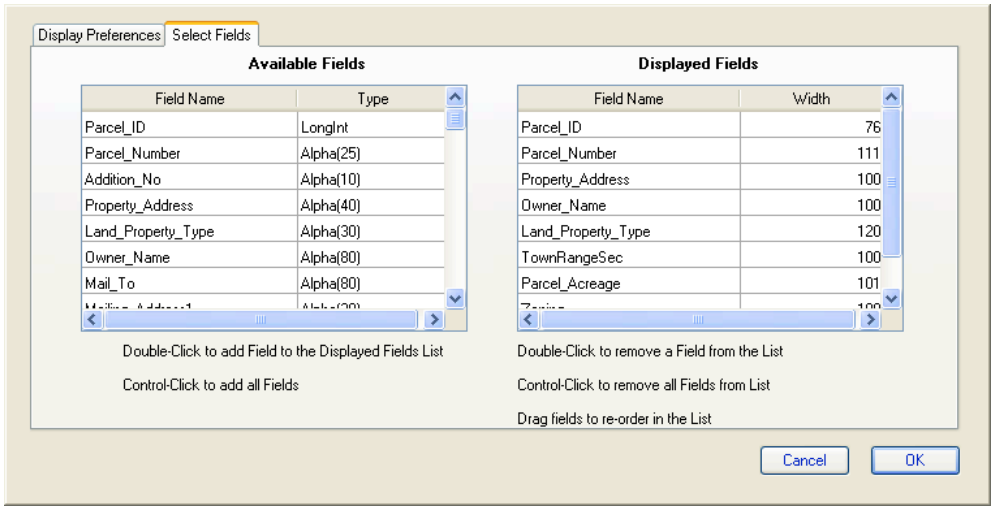
The Management console provides a variety of options for efficiently selecting the records on which you wish to work. Chapter 5 provides details related to selecting records and the use of the various tools available to perform record selections. Most of the preset query options involve a single point-and-click to develop a record selection. In addition to the preset queries and the more structured query options, the map view interface provides additional options for selecting and interacting with records.

Customizing the Appearance of the Tabular View

The record selection can be customized to fit the unique needs of individual users. This customization includes selecting the fields that are displayed, the order of the fields, as well as display characteristics for each of the displayed fields. In order to customize the style of the record selection and the fields that are displayed, click on the Preferences button. The dialog that is displayed includes two tabs. The first tab titled "Display Preferences" is dedicated to the font type, size, and style, as well as tools to select text color, row color, and grid characteristics.

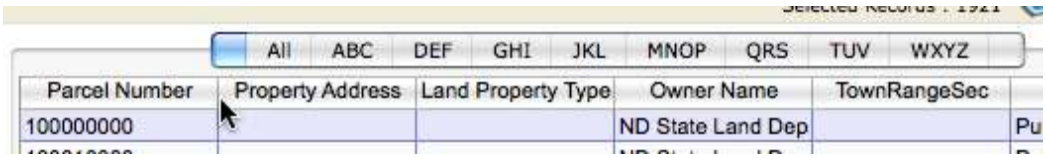


The second tab titled “Select Fields” provides access to select the fields that will be displayed and order in which the fields are displayed. The list of fields on the left includes all of the available fields and the data type for each field. The list of fields on the right include all of the fields that will be displayed within the record selection and their widths. As Fields are initially added to the list they are assigned a default width which can be edited later by resizing the field within the record selection list.



Once the desired changes have been made, select the OK button. While this sets up the basic display preferences additional settings can now be made from the record selection directly

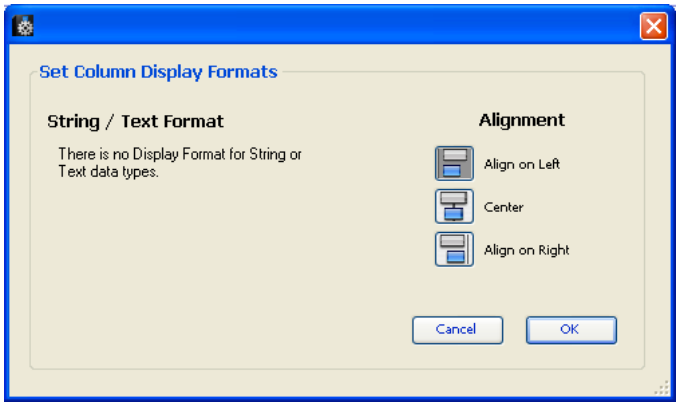
Changing field widths is completed simply by hovering the cursor over the field boundary in the header row and then dragging the field to adjust the size to fit your needs. This works best if you display several records and then adjust the field widths to fit the data that is included.



In addition to changing field widths, display formats can be set for each field by holding down the Control key and clicking on the respective field column header. The field format wizard is context sensitive and will display format options that are appropriate for each field type. The format wizard also provides the ability to set the justification for each column.

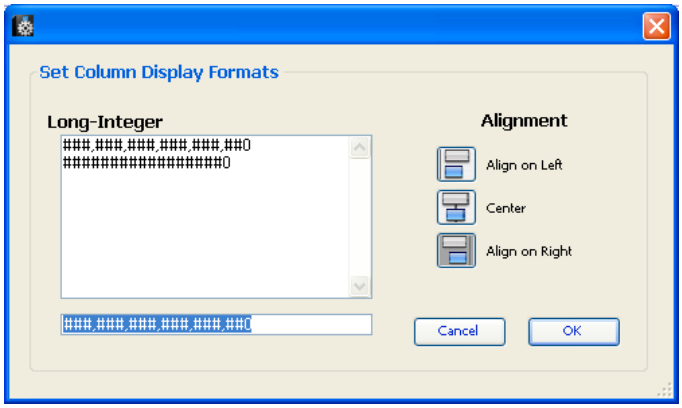
String / Text Fields

String and Text fields provide no display format options, but the alignment for these fields can be set.



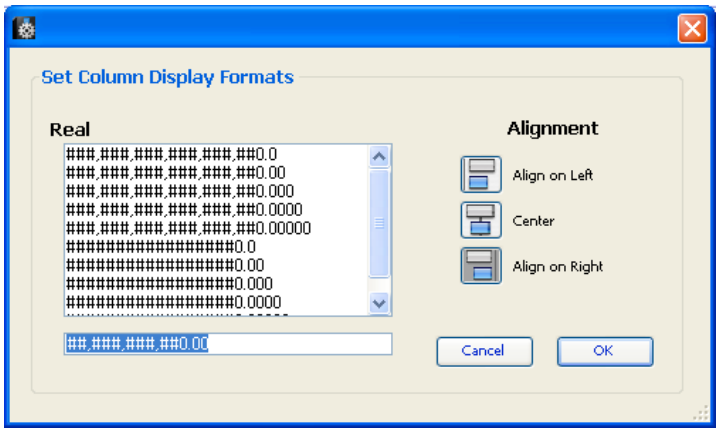
Integer Fields

Integer and Long Integer fields include the ability to set display styles to include commas and size. To set the format, select the appropriate format from the list. The selected format will then be displayed in the entry area. The entry area can be edited to either shorten or modify the preset format. In addition , the alignment for the column can also be set.



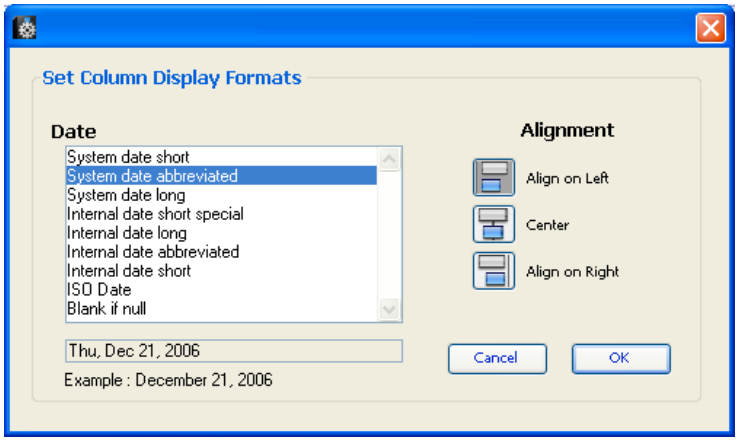
Real Fields

Real fields include the ability to set display styles to include commas, size, and trailing zeros. To set the format, select the appropriate preset format from the list. The selected format will then be displayed in the entry area. The entry area can be edited to either shorten or modify the preset format including the trailing zeros. In addition, the alignment for the column can also be set.



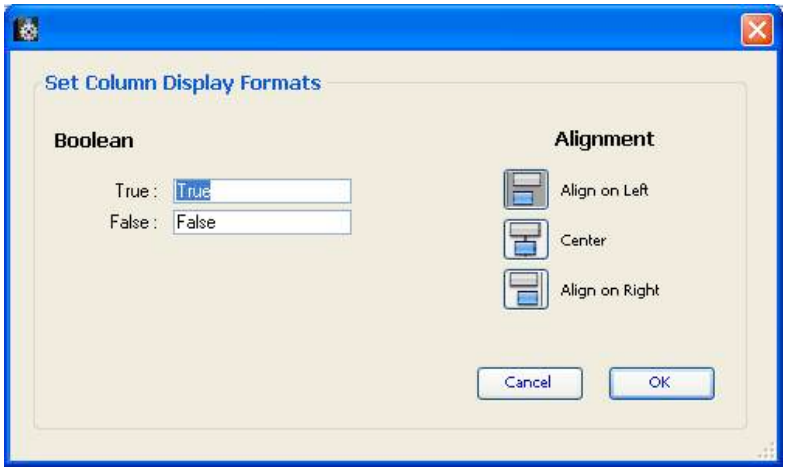
Date Fields

Date fields include the ability to select several preset date formats that the system supports. To set the format, select the appropriate preset format from the list. An example of the format will be displayed in the entry area. In the case of date formats, the entry area is not editable because the system can only interpret dates in one of the pre-defined formats. In addition, the alignment for the column can also be set.



Boolean Fields

Boolean fields are treated differently than other fields. Because boolean fields are based upon their state, they are generally presented as true or false within the system. By default the display format for these fields is set to true and false; however, these defaults can be changed to whatever values that may be appropriate for the respective field. For example, if you are presented with a boolean field that defines the exempt status of a property, it would be appropriate to defined the True state for this field to “Exempt” and the False state to “Non-Exempt”. It is also possible to set either value to a blank. In the example given, you could set the True state to “Exempt” and the False state to “”. As is the case with all other data types, the alignment for boolean fields can also be set.

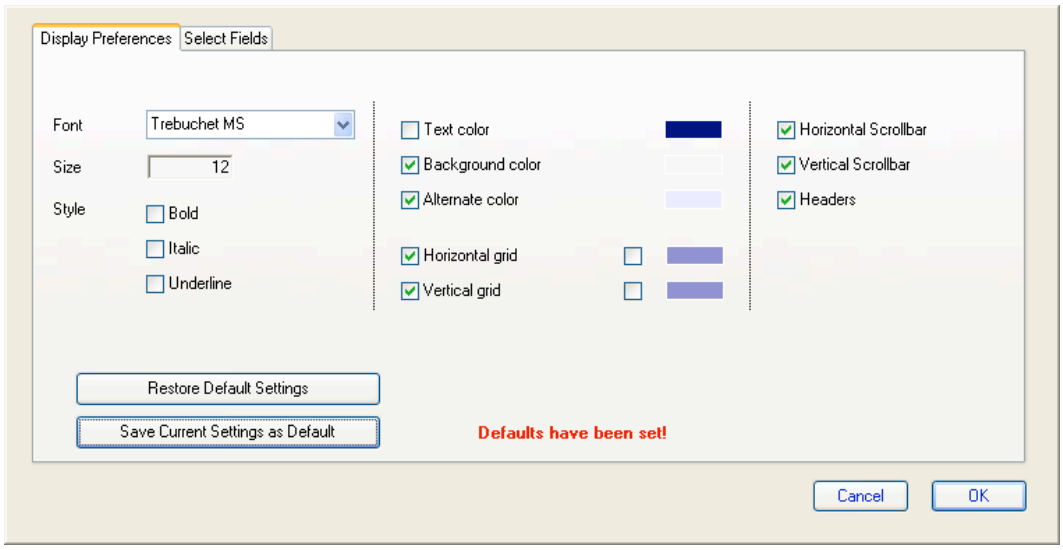


Setting the Listbox Default Display

Once the records selection has been set up to include the columns and the appropriate formats to fit individual needs, it is important to save these settings before closing the respective management console. All of the changes that are made are temporary until they are committed as the default for the respective user and the respective management listbox area.

By providing the ability to change any of the display attributes, the management listbox can be easily modified to fit unique needs without modifying the default display attributes. However, the settings can be saved as the default settings that will be used every time the respective management listbox is presented by selecting the Preferences Button. This will display the Preferences dialog which provides the capability of saving current settings as the default.

Once the preferences dialog is displayed, select the “Save Default Settings” button to save the current settings for the Record Selection area as the default for the respective user. Likewise, the Preferences dialog provides the ability to restore default settings. If significant changes have been made to the record selection, it is possible to return to the previous display setting by selecting the “Restore Default Settings” button. Previous default settings can also be restored, simply by dismissing the current record management listbox and opening up a new one.

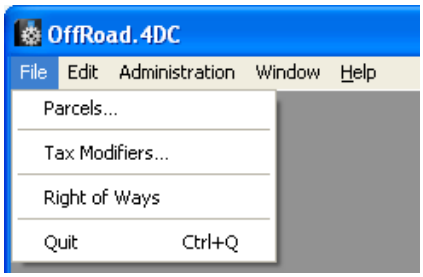


Chapter 4 - Menu Bars & Options

This chapter covers the Menu bar and the menu options that are available within the Offroad GIS application. The Offroad GIS application uses a standard menu that is available when any of the forms or dialogs are displayed.

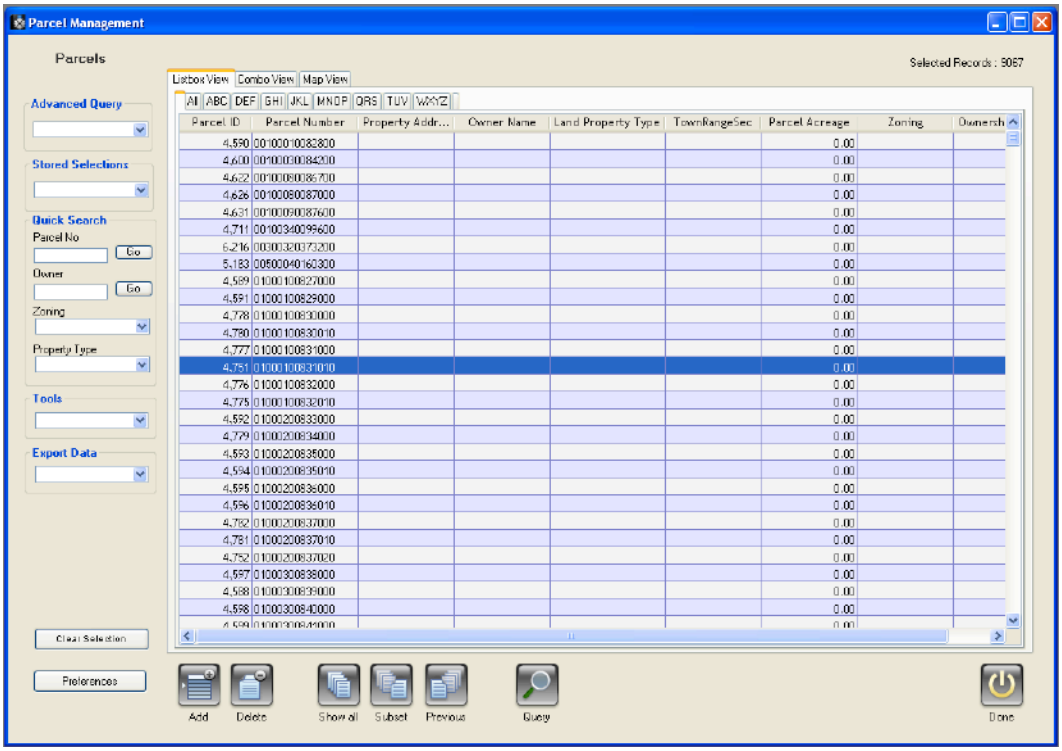
File Menu

The File Menu provides access to the individual data modules that are available within the Offroad GIS package. Currently, this includes the Parcels, Tax Modifiers, and Right of Ways. The File Menu also provides the Quit menu option for terminating the program.



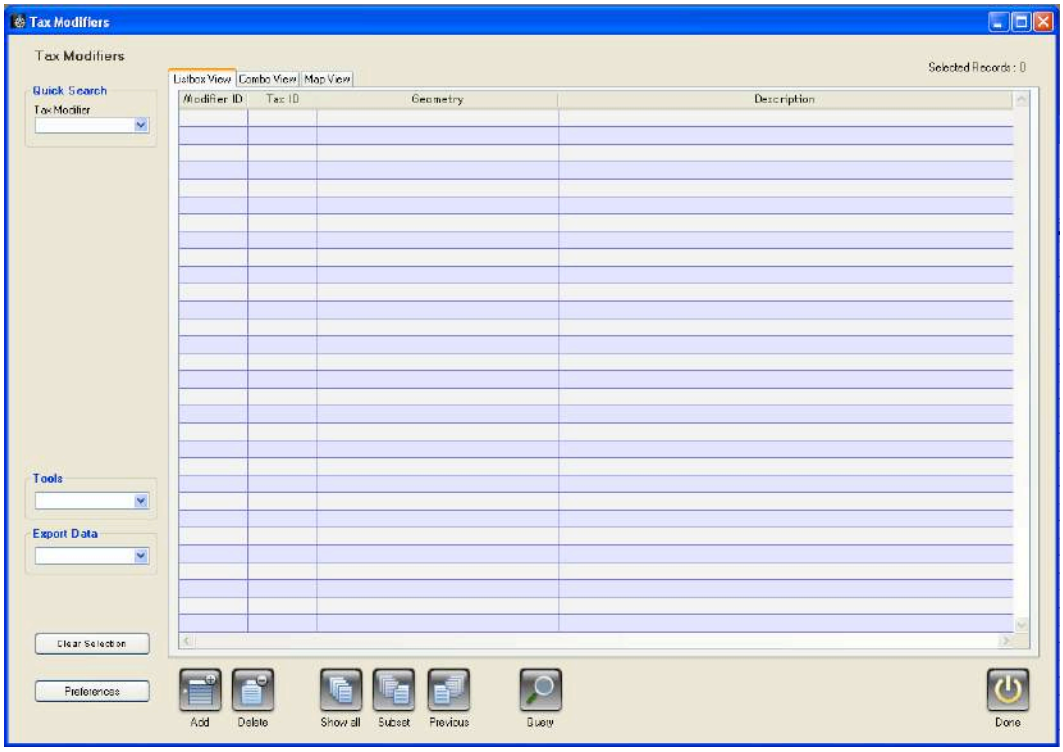
Parcels

The Parcels menu option provides access to the parcel management listbox. This is the central focus for adding, editing, and maintaining the parcel data including related aspects such as document management for deeds and other related parcel records. Parcel management includes more advanced functions such as splitting and merging parcels. For more information about parcel management and related functions, please refer to Chapter 5, which covers the parcels module in detail.



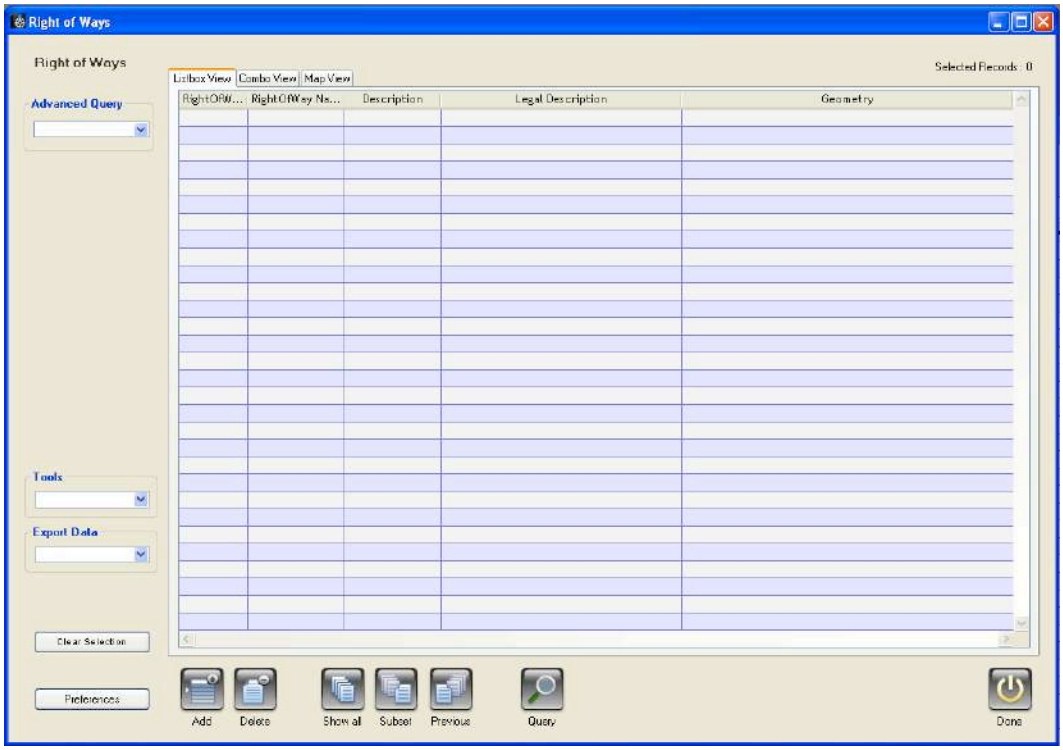
Tax Modifiers

The Tax Modifiers menu option provides access to management tools to address Tax Modifiers. Offroad GIS addresses management of tax modifiers with an independent management focus as this provides tools for managing the modifiers independent of the parcels. This approach eliminates problems associated with splitting and merging parcels. For more information related to managing tax modifiers, please refer to Chapter 7, which provides the necessary details covering tax modifiers.



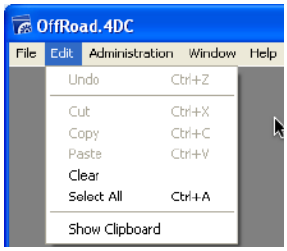
Right of Ways

The Right of Ways menu option provides access to management tools to address right of ways. Offroad GIS addresses management of Right of Ways with an independent management focus as this provides tools for managing the right of ways independent of the parcels. While right of ways are used in conjunction with preparing the tax assessment for the parcels, they are joined dynamically which makes it easier to manage the parcels. For more information related to managing right of ways, please refer to Chapter 8, which provides the necessary details covering right of ways.



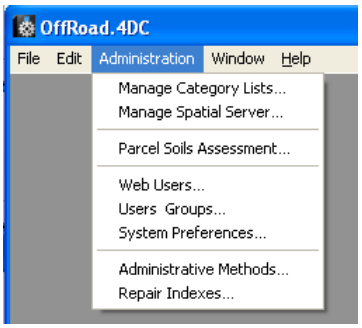
Edit Menu

The Edit Menu contains all of the standard Edit Menu functions for each of the respective platforms. This provides access to standard functions like Cut, Copy, and Paste. Offroad GIS does not include any special menu options under the Edit Menu.



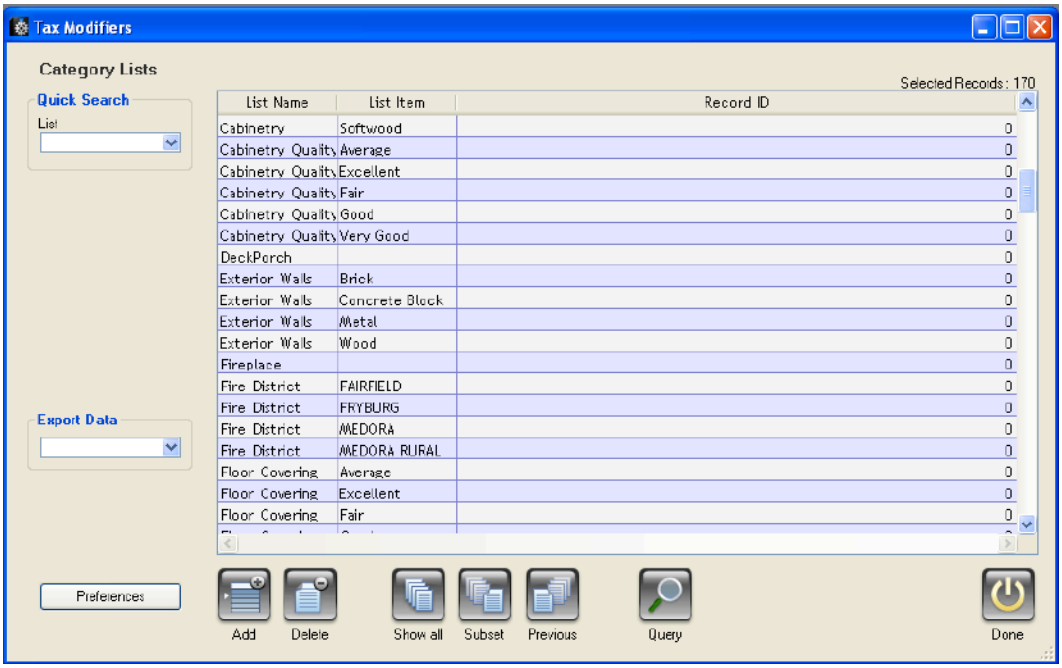
Administration Menu

The Administration Menu provides access to a suite of management tools that are related to maintaining the Offroad GIS system and other management functions that are not specifically related to managing the core data areas that are addressed within the Offroad GIS. This includes management of Category Lists, Web Users, internal Users and Groups as well as a few additional functions.



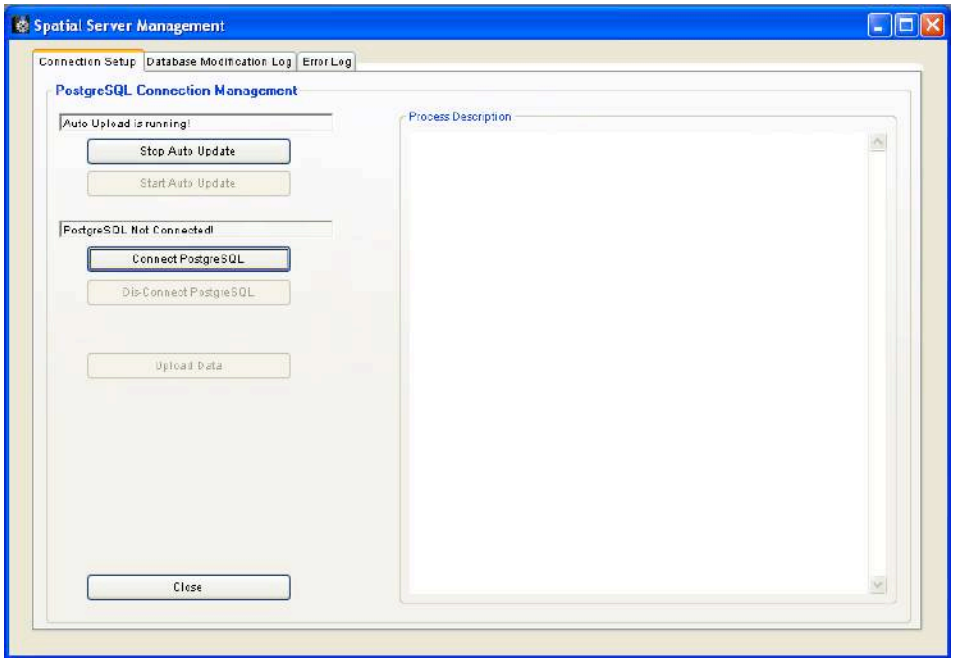
Manage Category Lists

Category Lists are used throughout the OffRoad GIS application. These include all of the pop-up lists that are used in the various input forms to maintain data entry integrity. This includes such fields as the Fire Districts, Garage Type, Building Style, etc. Once the Category List data has been modified, the modified list entries are reloaded to the lists that are used within the pop-up lists in the various data input forms. These lists are also available within the Query Editor when the target list field is selected for a query.



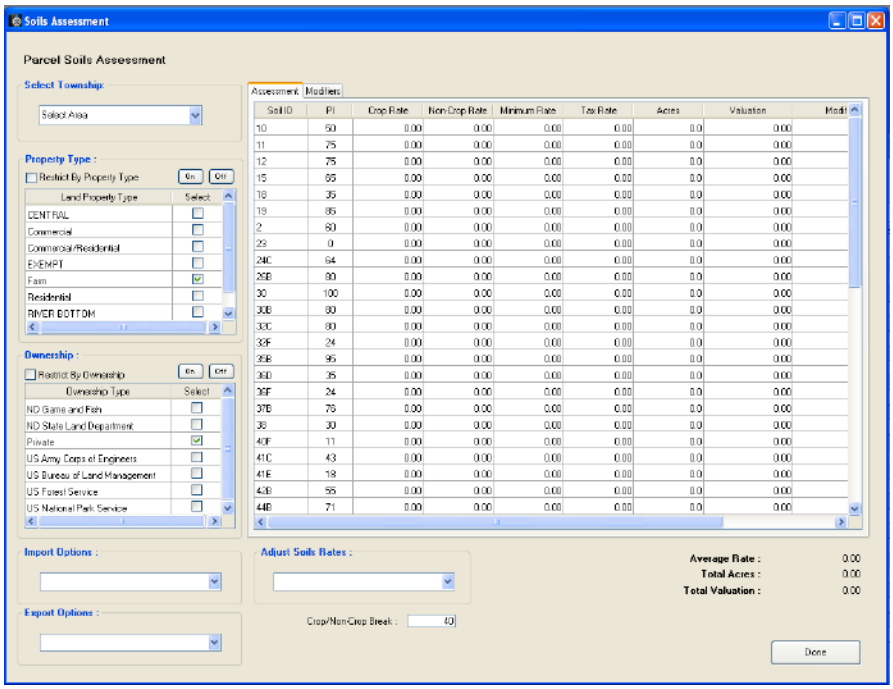
Manage Spatial Server

The Manage Spatial Server menu option provides access to an array of tools to interact with the spatial service that supports Offroad GIS. This includes tools to review modification errors and other general errors that occur when Offroad GIS interacts with the spatial engine. For more information, please refer to Chapter 13.



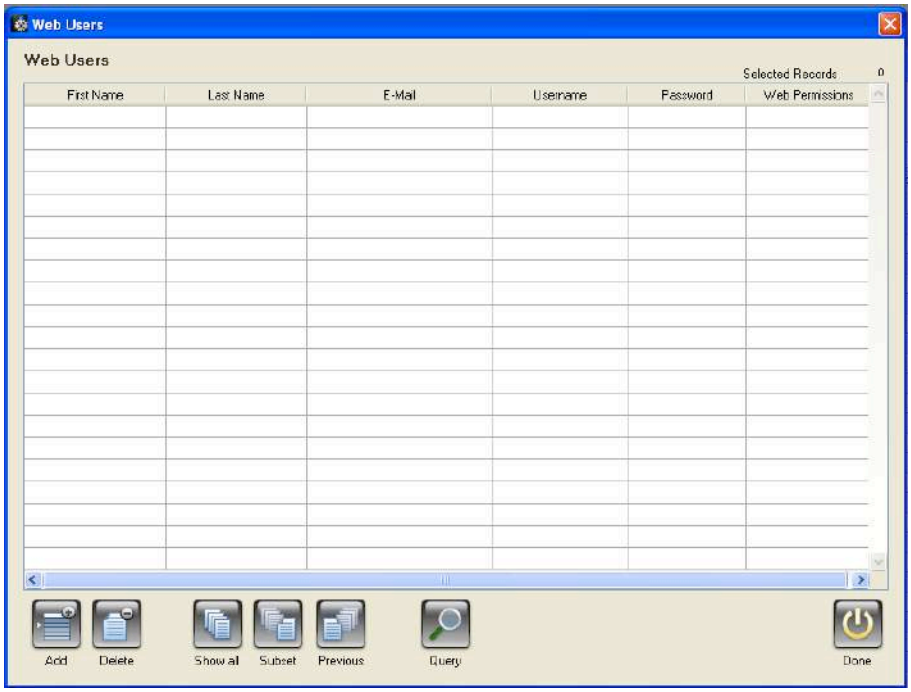
Parcel Soils Assessment

The Parcel Soils Assessment menu option presents the Soils Assessment Wizard. The Soils Assessment Wizard is used to process and develop the soils assessment for the agricultural parcels. This wizard provides point-and-click tools to assess and develop the crop and non-crop rates to be used for developing county wide assessment of agricultural parcels. This wizard combines the parcels with the soils and performs the appropriate GIS analysis to join the tax modifiers, right of ways, and homestead areas to provide an accurate soils assessment for your county. For more information, please refer to Chapter 12.



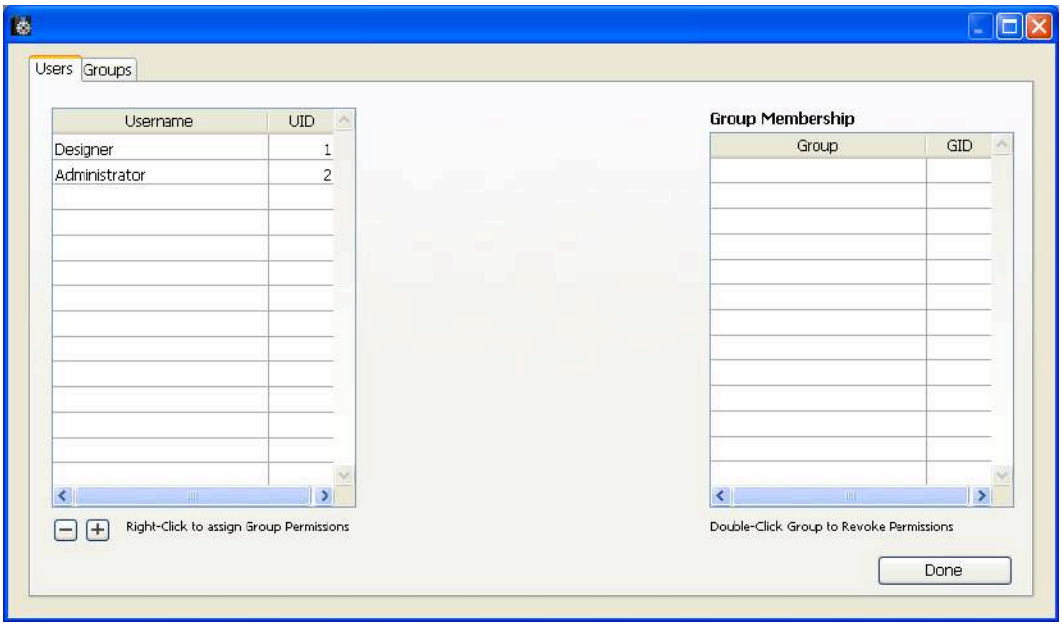
Web Users

The Web Users menu option provides the tools to set up accounts for web users. Web user accounts can be set up by request through the related county map services. This menu option also provides the necessary tools to manage access levels and permissions for all web users. Please refer to Chapter 11 for more details related to management of the web users.



Users & Groups

The Users & Groups menu option provides access to manage the internal users that will access the Offroad GIS application. This menu option also provides access to manage Group access which ultimately determines user access within the system. For more details, please refer to Chapter 11.



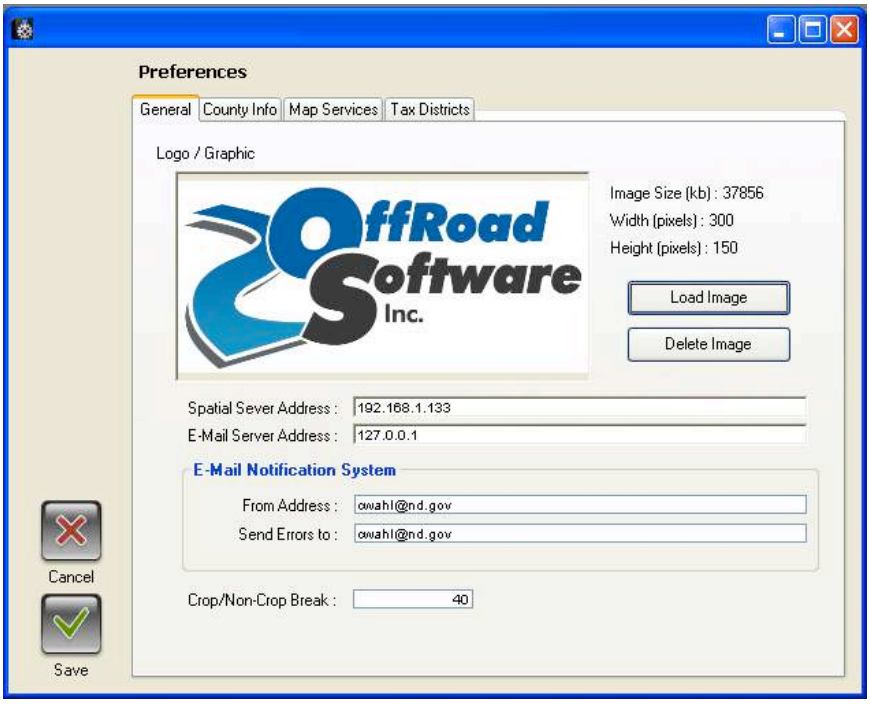
System Preferences

The System Preferences menu option provides access to manage settings that are important to the setup and general operation of the Offroad GIS system. This includes settings for General Information, County Information, Map Service settings, and Tax Districts.

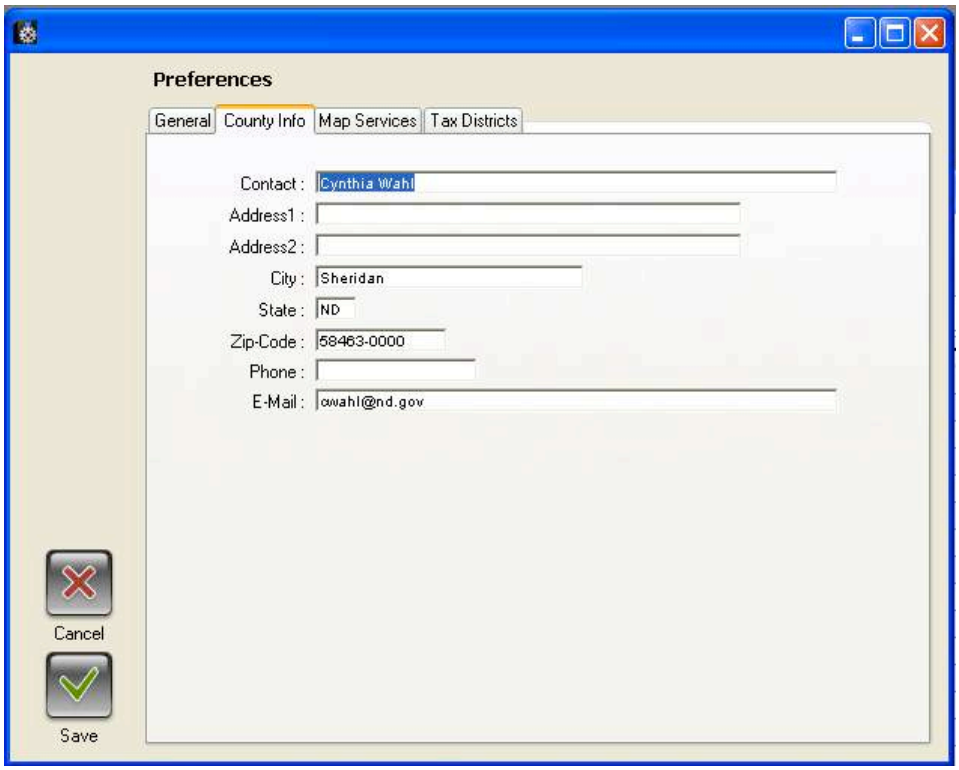
General Information - includes the Logo/Graphic which is used in various reports including the Parcel Tax Assessment report, as well as various graphic placeholders within the web presentation. In addition, this area includes the Server Address used for the spatial services and the Notification subsystem.

The spatial server address defines the address for the spatial server engine. This is important to address the different service levels and the associated architecture required to support these different service levels. This address is set up during account setup and will rarely be edited and should NOT be changed unless an alternate spatial server is set up.

The E-Mail Notification System settings are used to define the from address and the to address to be used when sending error notices that may occur during the day to day operation of the system.

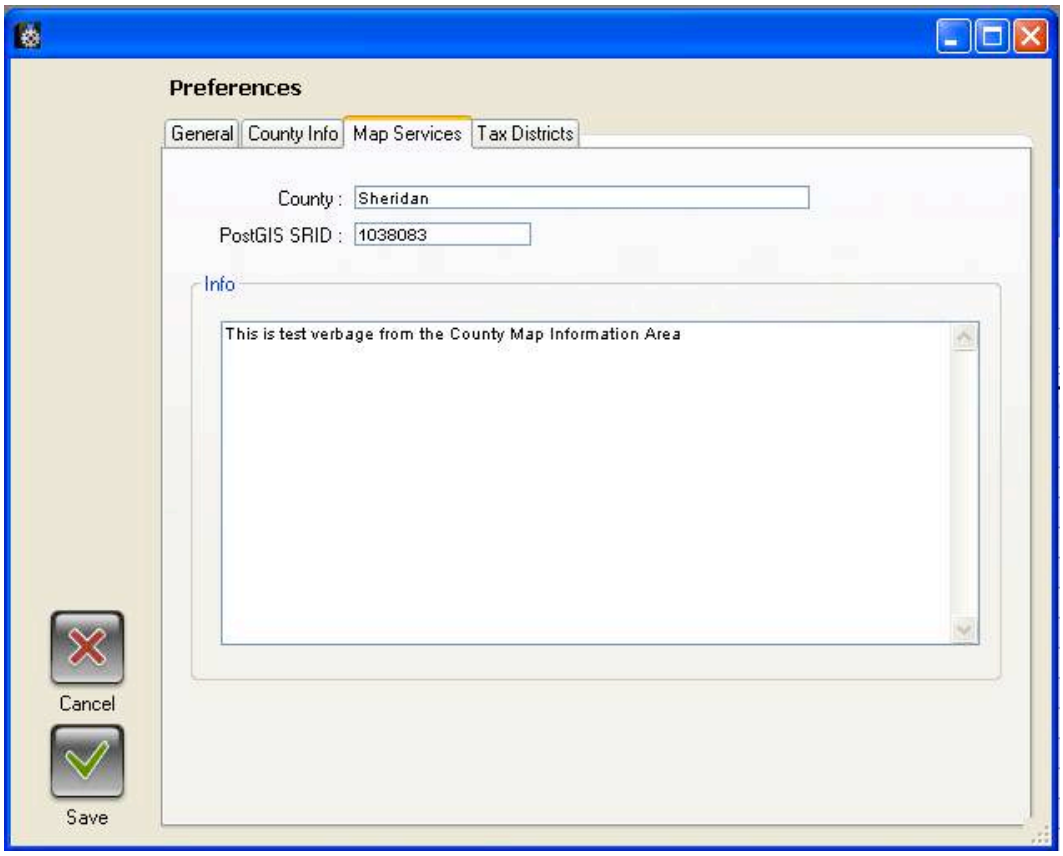


County Information - includes general county contact and billing information. This information is initially defined during the setup process, but can be edited at any time. None of this information is used in the spatial management processes.

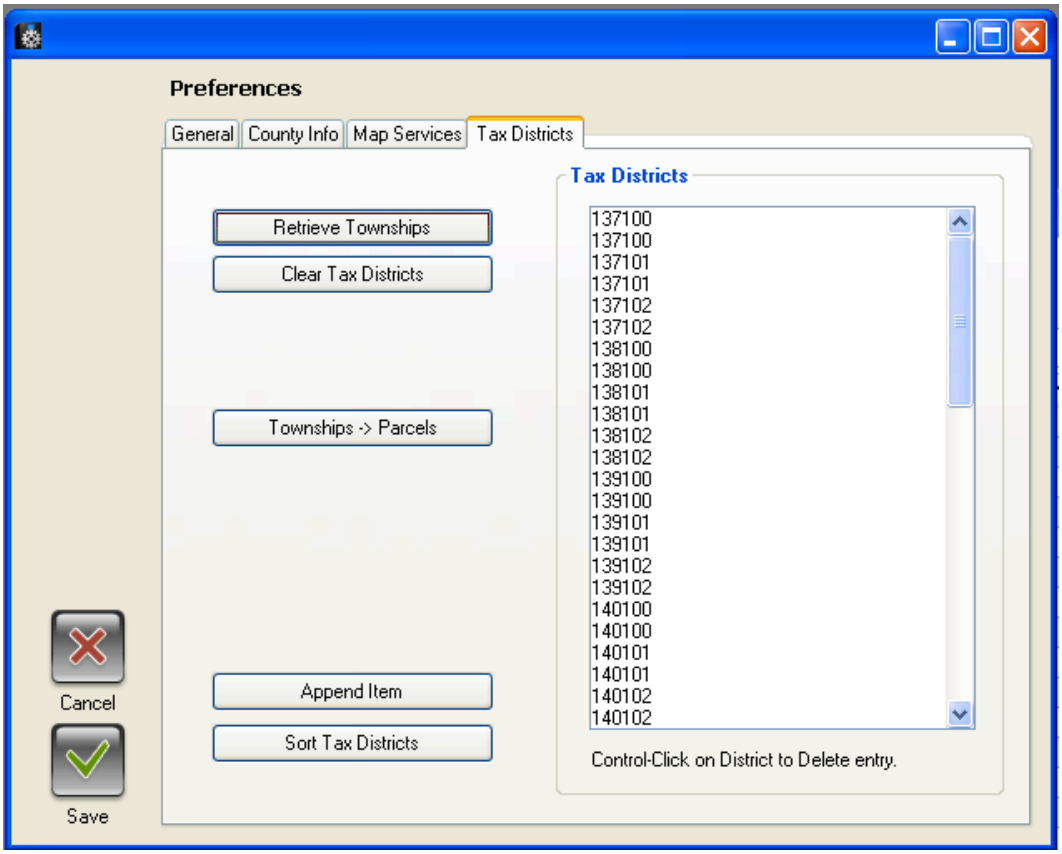


Map Services - includes data that is pertinent to effective management within the map services. This includes the definition of the County and the associated PostGIS SRID. These values are setup during the initial setup and should NOT be edited. The PostGIS SRID essentially defines the projection that is used within the underlying spatial server. Any changes to the SRID within this form must be coordinated with the underlying spatial server.

The Info text area is used to provide general disclaimer information within the map services. This field is a free form text field and can be modified to suit the individual needs of each County.



Tax Districts - presents the tools to manage the Tax Districts for your county. For most counties, this list is going to consist of the legal townships. This list will also include other political subdivisions as well. OffRoad GIS provides a simple solution to retrieve the townships from the underlying spatial engine. Once these have been retrieved the list can be further modified manually to include other political subdivisions as well.

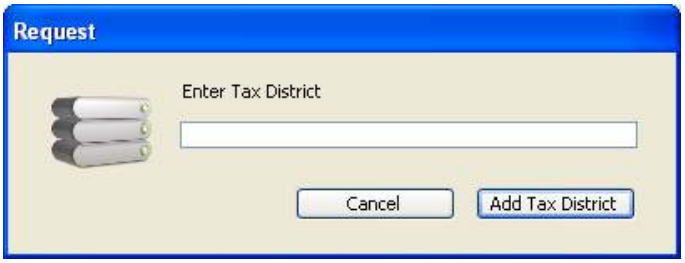


"Retrieve Townships" - This button simply retrieves the township names from the underlying spatial engine. It does not clear the list, it simply appends the list to whatever is currently displayed.

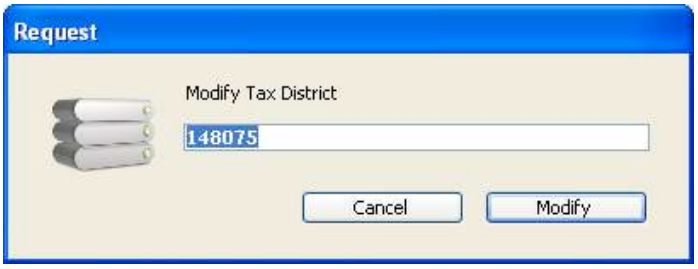
"Clear Tax Districts" - This button simply clears whatever exists in the list.

"Townships -> Parcels" - Provides a very simple way to attach township tax district to each parcel. This is performed using a straight forward spatial join between the township layer and the parcel layer. This will overwrite any tax district data that is already entered in the parcels and should only be run after the parcels have been initially created. It will not be necessary to run this option if the tax district was properly defined for the parcels as they were created.

"Append Item" - This button provides a means of adding items to the list. When clicked a Request dialog will be displayed prompting for the item to be added. If you click the Add Tax District button, the item will be appended to the end of the current list.



To edit an existing entry, double-click on the item in the list. A Request dialog will be displayed prompting for the change.

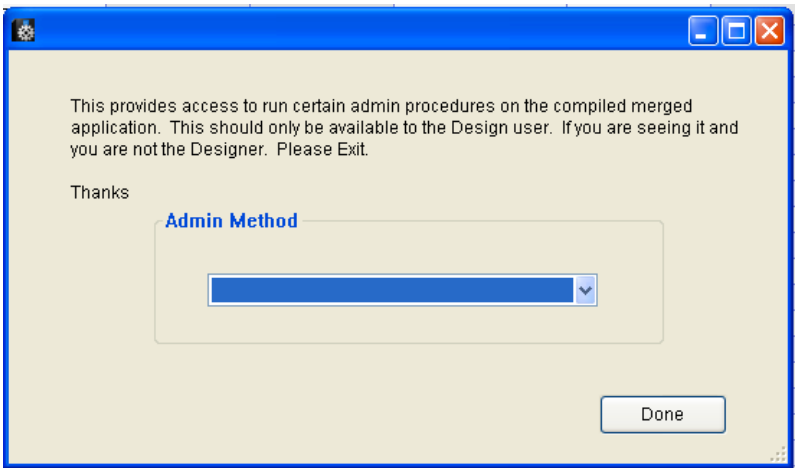


To Delete an item from the list, Control-Click on the item. A confirmation dialog will be presented before the item is deleted.

"Sort Tax Districts" - This button provides a means of sorting the list of tax districts so that they will be presented in the proper order when displayed throughout the application. It is a good idea to Sort the tax districts after any additions or modifications.

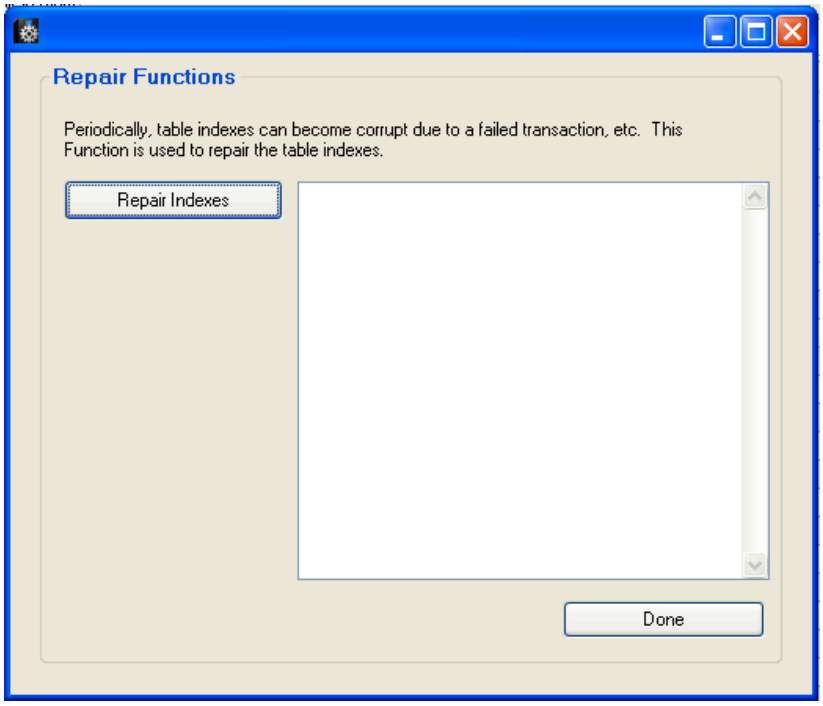
Administrative Methods

The Administrative Methods menu option provides access to perform various types of administrative methods that are generally associated with an upgrade of the OffRoad GIS application. This area should only be accessed by an Administrative user, and the associated functions should only be run if instructed to do so after an upgrade has been completed.



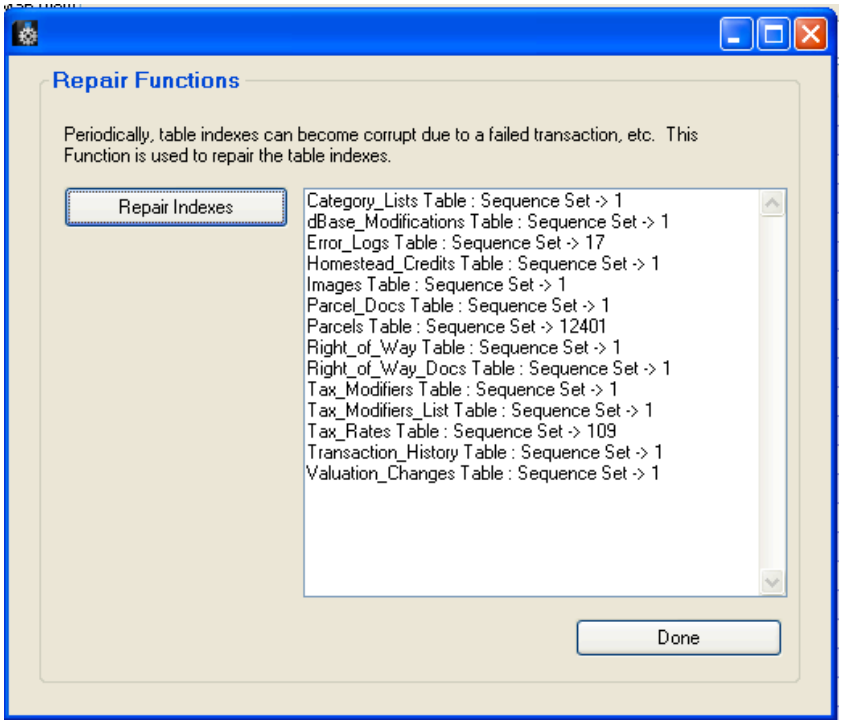
Repair Indexes

OffRoad GIS like any database application makes extensive use of indexes for various fields and tables. As with any complex application, these indices can occasionally become corrupt. The Repair Indexes menu option provide access to utilities that will rebuild these indices from the data. This will not need to be preformed very often, but if you get any type of error when adding records that indicates that a duplicate index exists for the record that you are creating, it may be necessary to repair the indices before you can proceed.



To repair the Indexes, click on the Repair Indexes button. A confirmation dialog will be displayed.

If you click the Repair Indexes button on the confirmation dialog, the status log will display the results of the repair.



Window Menu

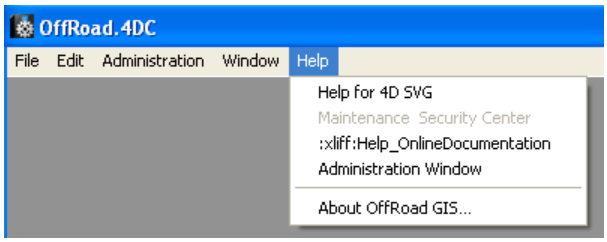
Offroad GIS provides multi-processing capabilities. As a result, it is possible to open up several windows at the same time. The number that can be opened simultaneously is dictated by the available memory on the computer.

The Window menu is designed to provide navigation capabilities to move from one open process to another. The Window menu is divided into two areas that are separated by a line. The upper area identifies active management consoles and related management processes, while the lower area identifies all of the individual record windows that are open. While the entries in the upper area do not change, the entries in the lower area are dynamic in that when created they indicate the individual parcel record that is opened within the record process. However, if you navigate forward or back within the selection, the associated Window menu entry will change to reflect the current parcel that is the focus of the process.

In order to make a process listed in the Window menu the active process, simply select the process name in the menu. The current active process is denoted with a check mark preceding the name of the process.

Help Menu

The help menu will include the on-line help components of the software. These resources are currently not available, but will be incorporated in a later version of Offroad GIS.



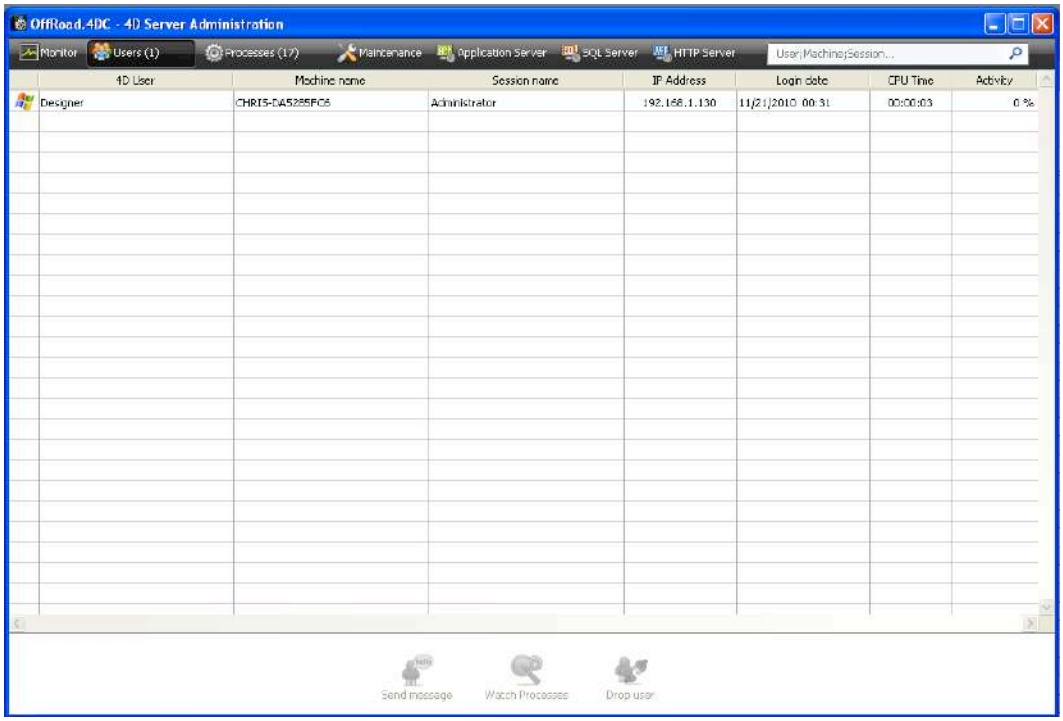
In addition, the Help menu includes the version information for the Offroad GIS application.

To dismiss the dialog, simply click anywhere on the displayed area.

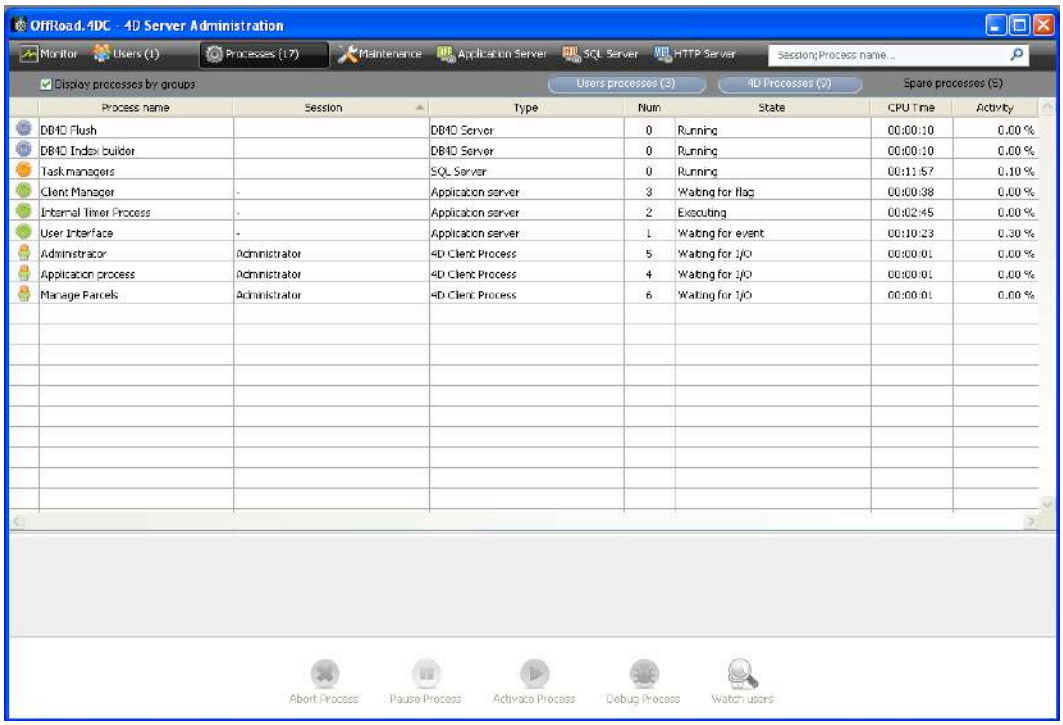
Administration Menu - The Administration Menu option will display the Administration dialog from the Server application. This is the same dialog that is generally displayed on the server and it provides access to the same functionality, which includes monitoring functions, maintenance functions, and configuration functions.

“Monitor Pane” - presents general information about the status of the server. This includes CPU Usage, Hard drive utilization, and memory statistics.

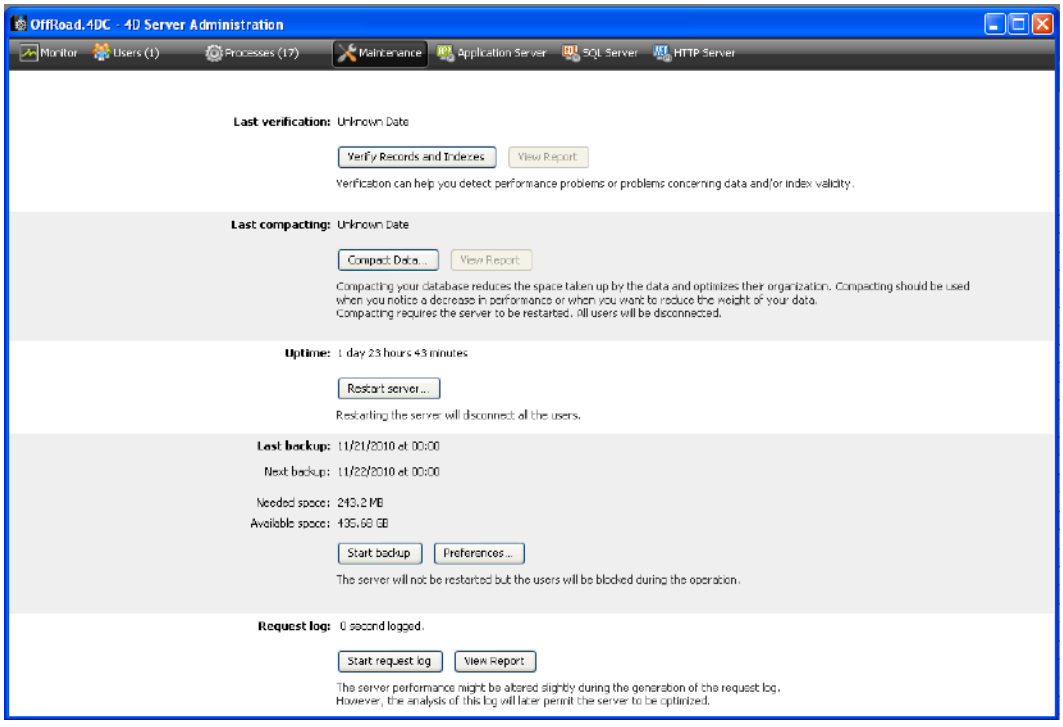
"Users Pane" - Displays the current users and provides tools to send messages to users in the event that you need to take the server down, etc. It also provides access to the tools to drop or "kill" a user process in the event that a user process is hung.



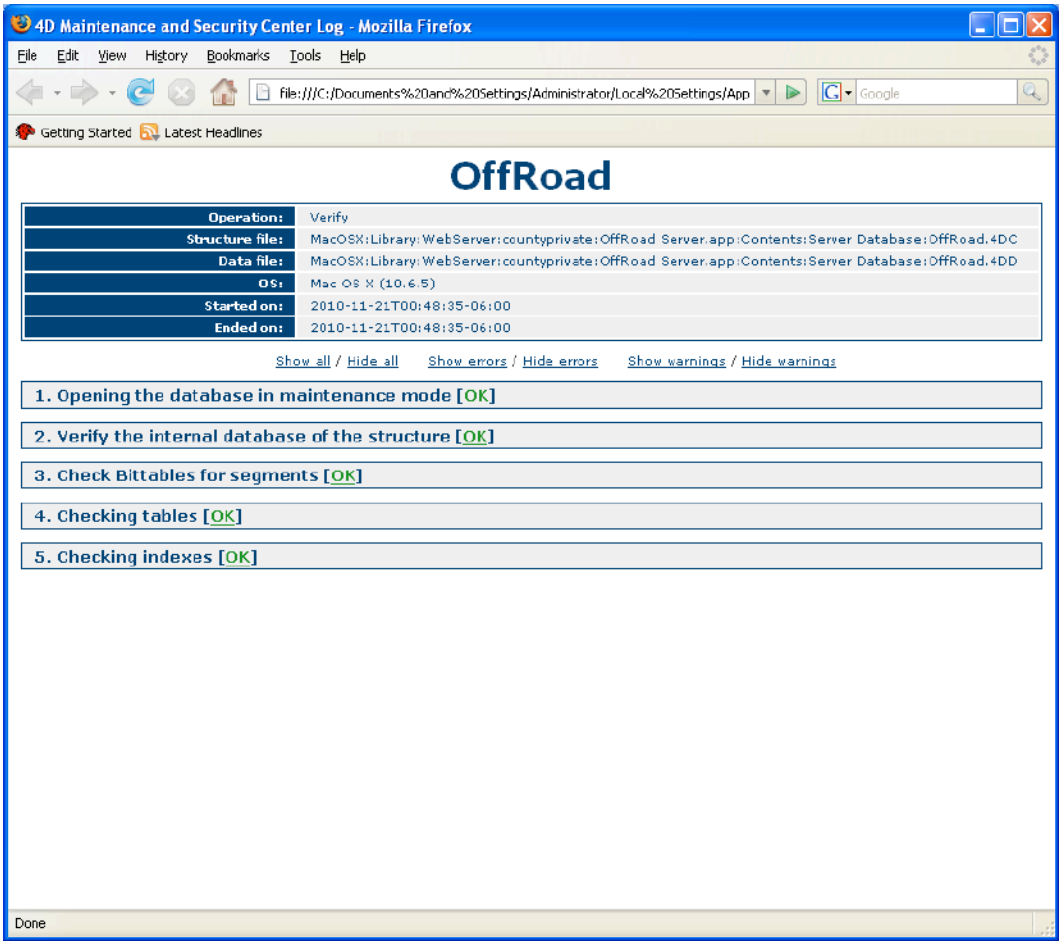
"Process Pane" - presents the current and active processes. This pane can also be used to Abort a process, which may be useful if a user process becomes unresponsive.



"Maintenance Pane" - presents access to various maintenance tools for the OffRoad GIS application.



The Verify Records and Indexes button will Verify the Records and indexes. This can be useful if data errors are reported during data entry. The View Report button will display the resulting report after the Verify Records and Indexes button has been executed. The report will be displayed in your default Internet browser.



The Compact Data button should generally not be selected unless data errors have been reported. It will compact the data file and re-generate the appropriate indexes.

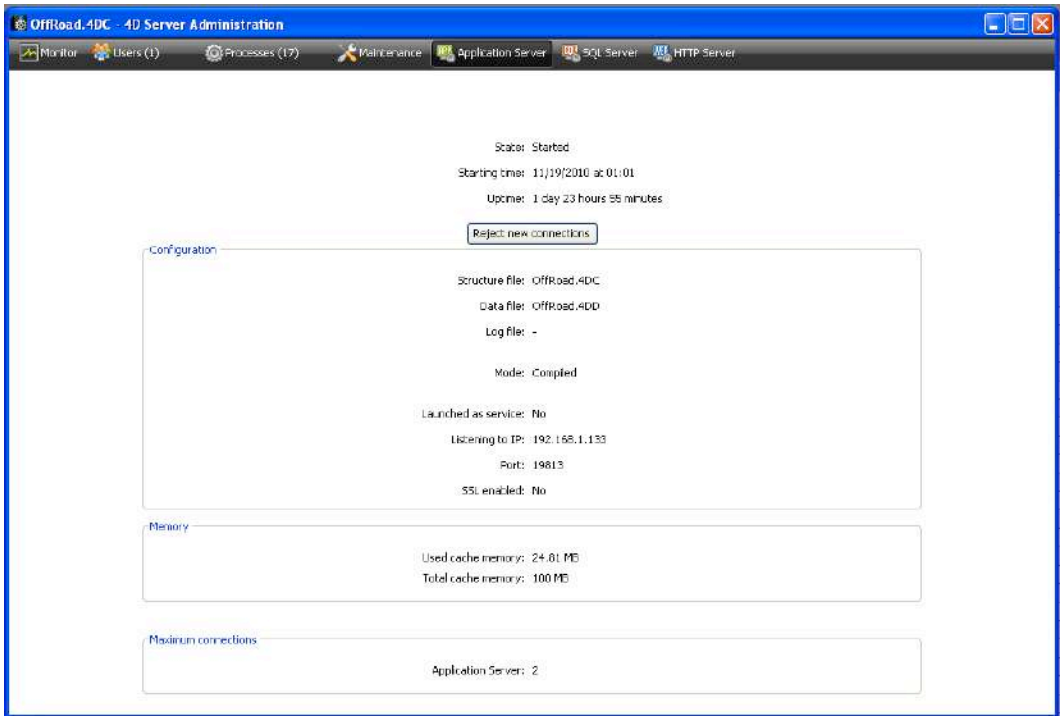
The Restart Server button does just as the name implies, it has the same effect as if the server application were shut down and re-launched on the server. All active processes will be terminated and any active user sessions will also be terminated. So it should be executed with caution.

Start Backup and the Backup preferences buttons provide access to configure and execute the backup services for your application. These options are covered in detail in Chapter 14.

The Start Request Log and View Report buttons are used to provide statistics for tuning your server. In all be extreme cases, the settings that are configured

when the server is set up provide effective performance parameters for your application. Using these requires advanced knowledge of the application and set up and will not be discussed further in this manual.

“Application Server Pane” - presents configuration details related to the Application services for OffRoad GIS. These settings are established when the application is initially set up and will generally not require any modifications.



“SQL Server Pane” and “HTTP Server Pane” display the settings for the embedded SQL Server and the HTTP Server. However, these servers are not used within the OffRoad GIS application. They will not be discussed further in this manual.

Chapter 5 - Selecting Records

Searching is one of the most common database operations. A query is a set of instructions that tells the database which records to include in the ***"current selection"***. The current selection consists of the currently selected records that are displayed in the record selection component of the management console. The current selection is important because it is generally the record list that is used when performing operations on the data for exporting or processing data.

A query always has three elements: *field name, comparison operator, and value*. The field name is from the current table or a related table. The comparison operator tells the database how to compare the contents of the field to the value specified (i.e. equal to, greater than, less than, etc). The value specifies the number, string, or other value to which each record is to be compared.

Suppose a selection is to be made that includes all records with parcel acreage greater than 10 acres. The query would be "Parcel Acreage is greater than 10. "Parcel Acreage" is the field, "is greater than" is the comparison operator, and "10" is the value.

When a search of the database is performed the contents of the field in the query are compared to the value specified. The new current selection is made up of records that satisfy the rules stated in the query. The new selection can be no records, one record, a group of records, or all of the records in the table.

The underlying database for the county management system is based upon a relational architecture. In relational systems, it is possible to search in fields from other tables, provided that a relation between the tables has been established.

Indexed and Sequential Queries

The Offroad GIS management system can perform queries very quickly if it has an ordered list of records to work from. An ordered list is called an *index*. An index is associated with a particular field and many of the fields within this system have been indexed to optimize the query process. A query that is performed without an index is slower than an indexed query because the system must start at the beginning of the table and examine each record until it finds the records that meet the criteria that have been specified. To be sure that it has found all of the records, the system must examine every record in the table sequentially.

A good analogy for an index is a card catalog in a library. The card catalog is an alphabetized list of all of the books in the library. Each record in the catalog

contains information about the book's location. If you are looking for a particular book, it would be inefficient to conduct a sequential search of the library's entire holdings. It is much faster to consult the card catalog, obtain the location of the book, and then search the particular shelf on which the book is stored.

Comparison Operators

When a query is developed, the database is instructed how to compare the value that was specified to the contents of the database. For example, the query, "Owner Name equals 'Smith'" uses the "is equal to" comparison operator. It tells the database to compare the values in the Owner Name field to the string "Smith".

Comparisons involving alphanumeric values are not case-sensitive. A search on the last name "Smith" will find records containing "smith", "SMITH", "sMith", and so on.

The following comparison operators are available:

- Is equal to - Is not equal to
- Is greater than - Is greater than or equal to
- Is less than - Is less than or equal to
- Contains - Does not contain.

Note Queries using Contains and Does not Contain operators are always sequential queries.

Wildcard Character

To make queries easier to specify, Offroad GIS supports a wildcard character (@) that can replace one or more characters in a search involving an Alpha or Text field. For example, if looking for all occurrences of the name "Belmondo" in a field, you may specify the search value in several ways:

A search for:	Finds
Bel@	All values beginning with "Bel"
@do	All values ending with "do"
Bel@do	All values starting with "Bel" and ending with "do"

A search for:	Finds
@elm@	All values containing “elm”

Simple and Compound Queries

Offroad GIS supports both simple and compound queries. A query on one field is called a *simple* query. For example, the search “Last name equals ‘Smith’” is a simple query. When you do a simple query, the database examines the contents of one field when searching the database.

A query on two or more fields is called a compound query. For a compound query, separate queries are combined using a *conjunction operator*. The conjunction operator tells the database how to combine the results of the individual queries.

There are three conjunction operators:

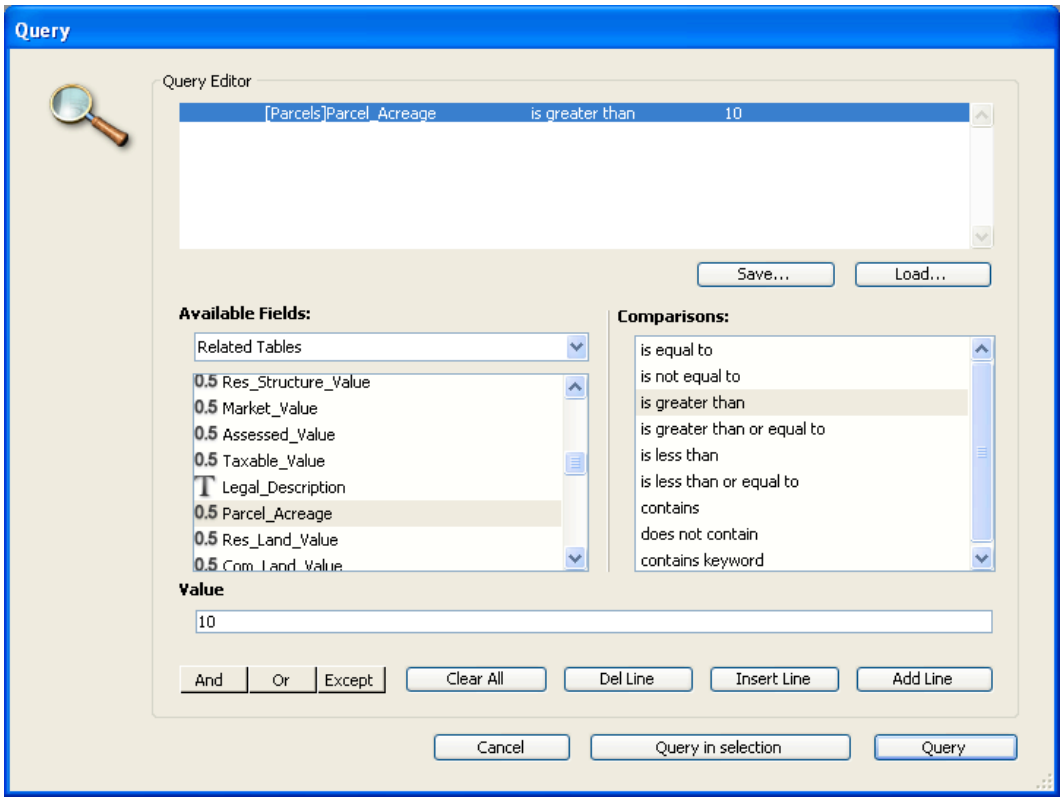
And: This operator finds all of the records that meet the two conditions simultaneously. For example, the query “Find all the parcels that are designated for public use and are larger than 10 acres” will find the records of only those parcels zoned as public use that are larger than 10 acres.

Or: This operator finds all the records that meet either of the two simple queries. For example, the query “Find all the parcels that are designated for public use *or* are larger than 10 acres” will find the records of all parcels zoned for public use, as well as all the parcels that are larger than 10 acres.

Except: This operator is the equivalent of “not”. The query “Find all the parcels that are designated for public use *except* those that are larger than 10 acres” will exclude the parcels that are larger than 10 acres.

The conjunction operators allow the creation of compound queries such as “Find the parcels that are designated as Public Use *or* the parcels that are designated as Agricultural *and* parcel size is greater than 10 acres”.

The figure below shows this query being specified in the Query editor.



When this query is executed, all records that are zoned for public use or for agricultural use and are larger than 10 acres will be presented.

Query Editor

The Query editor is a general-purpose editor that can be used to create simple or compound queries:

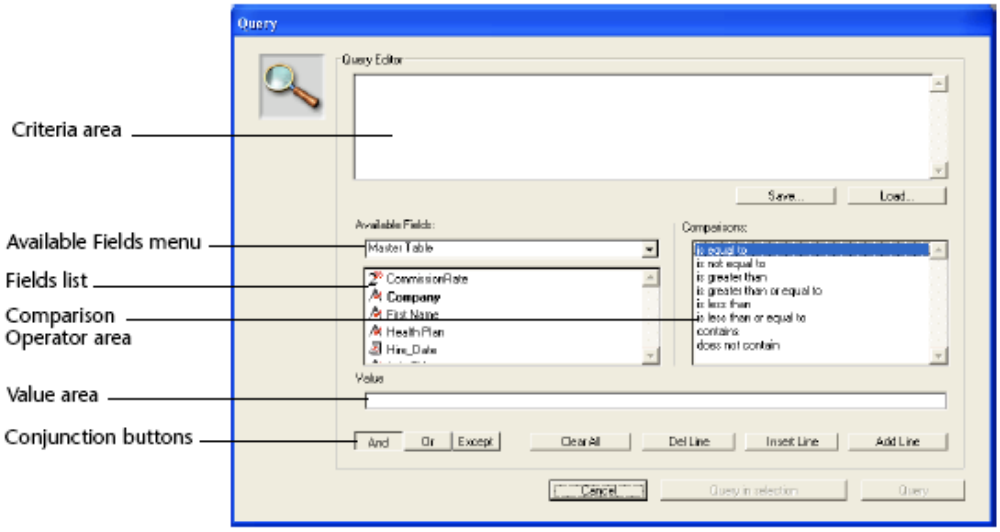
Compound searches can be performed that are linked with the And, Or, or Except conjunctions. For example, the Query editor can be used to perform a query for all parcels that are zoned agricultural *or* are larger than 10 acres.

The scope of the search can be performed only on the current selection of records or all the records in the table.

Queries can be saved to a file on disk so that they can be opened and re-used for future queries.

Queries can be performed on fields of the current table as well as fields of related tables. A query on a field in a related Many table works like a search of sub-records. The new current selection in the One table consists of all records that are related to at least one record in the Many table that meets the query. Queries on related tables are always sequential, even if the field being searched is indexed.

The query editor is shown below:



The Query editor contains the following areas:

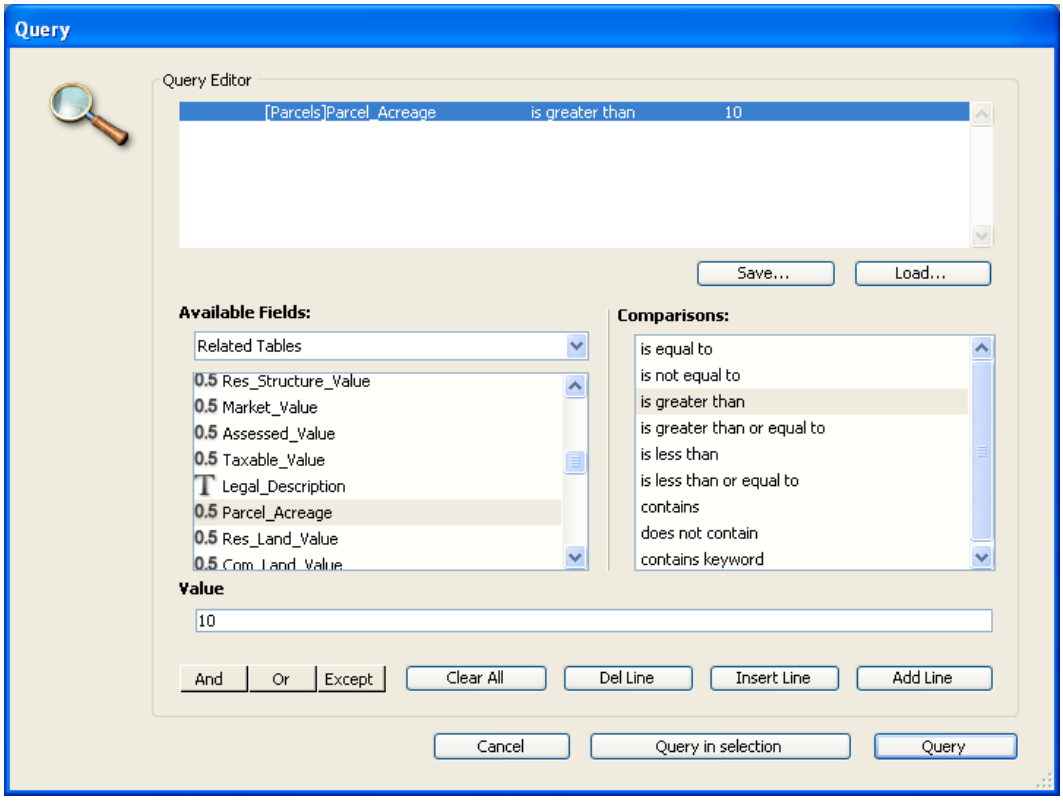
- **Criteria area:** This area displays the query as it is created or after it was loaded from a disk file.
- **Available Fields menu:** This menu allows the selection of the table or tables from which to display fields in the Fields list. Fields can be displayed from the Master table, the Related tables, or All tables.
- **Fields list:** This area displays a hierarchical list of the fields in the selected table or tables. Indexed fields are shown in boldface.
- **Comparison Operator area:** This area displays a list of comparison operators.
- **Conjunction buttons:** This area contains three buttons that correspond to conjunction operators that can be used to join the current simple query to the previous simple query.
- **Value area:** Enter the value for which the query is to be performed in this area.
- **Query in selection button:** This button performs the query only on the records in the current selection.
- **Query editor buttons:** This area can be used to save queries, load previously saved queries from disk, cancel the query, or execute the query.

Creating a Query

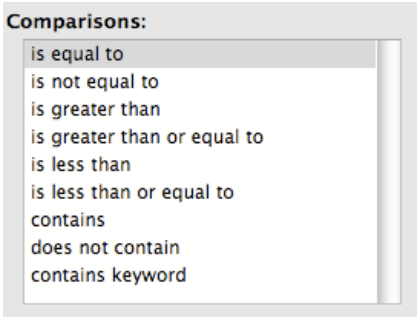
1 Select the Query button from the Parcel Management Console, which will open the query dialog window similar to the one shown below.

2 Click a field name in the Fields list

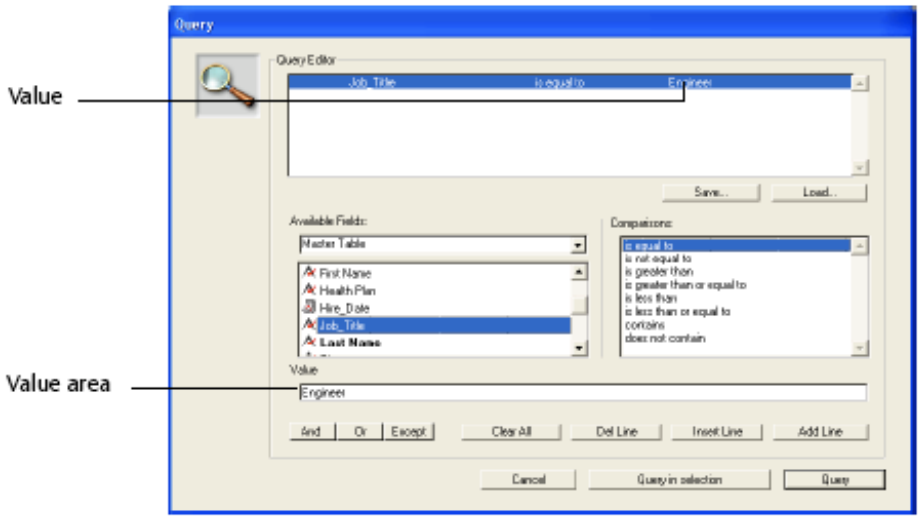
The query editor will display the field name in the Criteria area and then add the “is equal to” comparison operator, as shown below.



3 If a different comparison operator is needed than the “is equal to”, click the desired comparison operator from the list



4 Type the value to be used in the search in the Value area.



In a Text or Alpha field, the wildcard character (@) can be used at the end of the value to request a “Begins with” search.

If the selected field is associated with a choice list, the list will be displayed prompting the selection of a value from the list. If the selected field is a Boolean field, a pair of radio buttons will be displayed.

5 In order to add another simple query, click the Add Line button.

A new line will be added to the query using the “And” conjunction operator.

6 In order to use the “Or” or “Except” operator, click the desired conjunction operator button.

Repeat steps 2 through 4 to build the second simple query.

When building a compound query, the simple queries are evaluated in the order in which they appear in the Query editor (i.e. from top to bottom). There is no precedence among the conjunctions. In other words, *And* does not have priority over *Or*. Therefore, if more than two simple queries are used when building the compound query, the order in which the simple queries are entered can affect the results of the query.

In order to add a third simple query, it can either be added to the existing compound query or inserted between the first two simple queries. To add the new query to the end of the existing queries, click the **Add Line** button. To insert the new query, highlight the last query and click the **Insert Line** button. The new query is inserted above the line that was highlighted.

As the compound query is built, any existing parts of the query can be modified by clicking the line that is to be changed. Any of the simple queries can also be removed by selecting the line and clicking the **Del Line** button.

7 (Optional) To save the query to disk, click the **Save** button and enter a filename in the create-file dialog box.

The query need not be saved to perform the search.

8 Click the **Query** button to perform the search on the entire table.

Or

Click the **Query in Selection** to restrict the query to the current selection.

Click the **Cancel** button to put away the Query editor without doing a query.

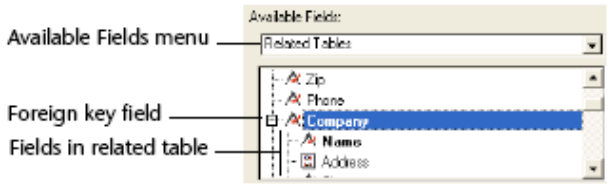
Selecting a Field from Another Table

The Query editor provides the necessary tools to search in related tables. If the field to be searched is in a related table, choose **Related Tables** in the Available Fields menu, or select **All Tables** and expand the foreign key field in the master table to display fields from the related table. The illustration in the following set of instructions shows an expanded foreign key field.

To select a field from another table

1 Choose **Related Tables** from the Available Fields menu.

2 Expand the foreign key field by clicking the plus sign (on Windows) or arrow (on Macintosh) In the hierarchical list of fields. The fields belonging to the related table appear in the hierarchical list



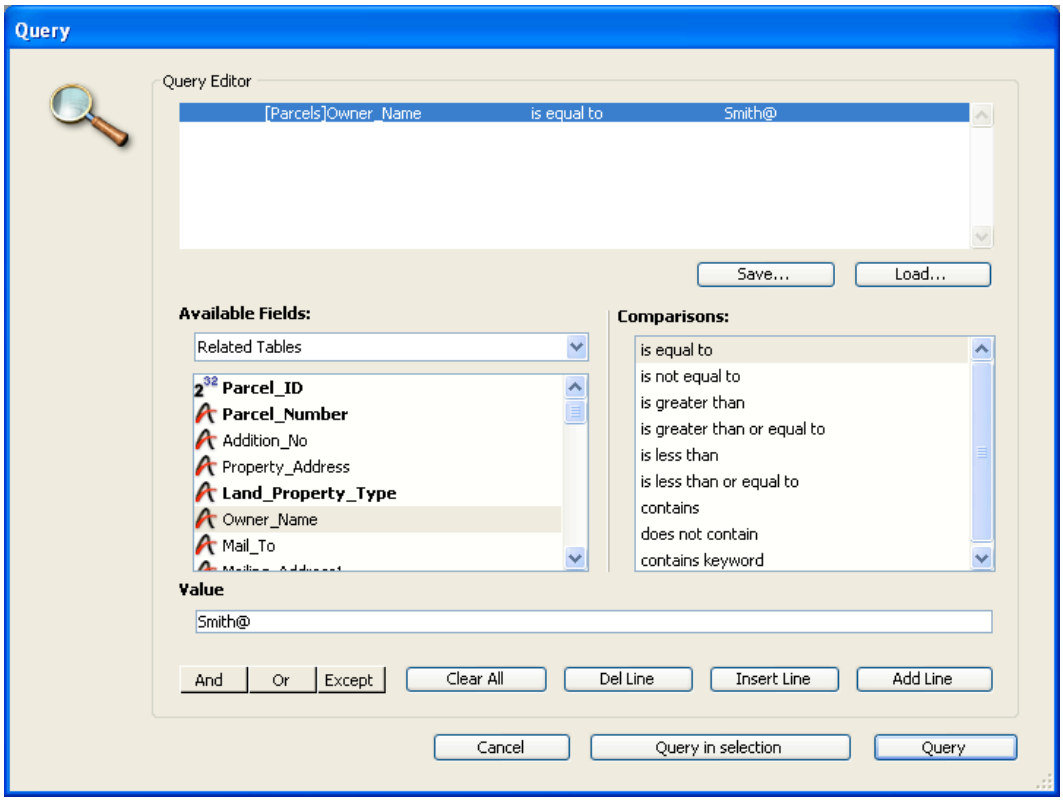
3 Click the desired field in the related table.

4 Follow steps 3 through 7 at the beginning of this section for directions on creating the rest of the query.

Using the "Begins With" Operator

In order to search for records that begin with a specified string, use the "is equal to" operator and enter the wildcard character ("@") at the end of the value to search for.

For example, to search for Owner Name whose names begin with the string "Smith", the following query would be used:



Saving a Query to Disk

If a query is performed often, it can be saved to disk. When the query is saved to disk, it is necessary to only create it once. In subsequent uses of the Query editor, the query can simply be loaded from disk and then executed.

To save a query to disk:

1 Click the **Save** button.

The save-file dialog box is displayed where the filename can be entered.

2 Click **Save**

The query is saved to disk. The next time the query is needed, it can be loaded into the Query editor from the saved file.

Loading a Saved Query

A query can be reused at any time.

To load a saved query:

1 Click the **Load** button.

The open-file dialog box is displayed

2 Select and open the desired file

The saved query is loaded into the Query editor. When a file is loaded, it replaces any query that previously appeared in the Query editor.

Preset Queries

While the query editor provides a very robust interface for developing record queries, developing queries using the query editor involves some overhead. In order to simplify record selection, the record management consoles contain a number of preset queries that address many of the more common types of queries that may be routinely executed. All of the query capabilities provided within the preset queries can be also be accomplished using the query editor, but the preset queries provide simple point-and-click access to these queries.

The preset queries are designed to query all records for the simple query defined by the preset. However, many of the preset queries can also be applied to the current selection by holding down the Control key while clicking on the preset query button or interface element. This provides a very efficient method narrowing record selections based upon combinations of the preset queries.

Quick Search - Parcel No

The Parcel No quick search performs a “begins with” simple query to find all records that have a parcel number that begin with the value that is entered. The parcel number preset query does not provide the ability to query within an existing selection. This preset query always operates on all records.

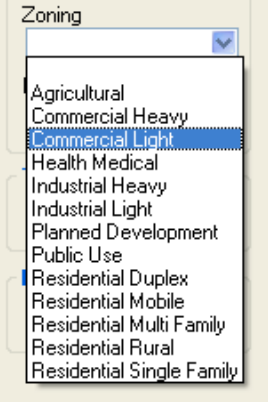
Quick Search - Owner

The Owner quick search performs a “begins with” simple query to find all records for which the owner field begins with the value entered. The owner preset query does not provide the ability to query within an existing selection. This preset query always operates on all records.

Quick Search - Zoning

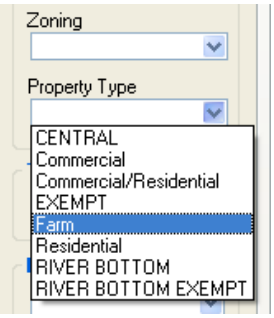
The zoning quick search performs a simple query to find all records that match one of the system supplied values available within the zoning choice list. The zoning preset can be performed against all records, or it can be performed

against the current selection by holding down the Control key while selecting the desired zoning type.



Quick Search - Property Type

The Property Type quick search performs a simple query to find all records that match one of the system supplied values available within the property type choice list. The property type preset can be performed against all records, or it can be performed against the current selection by holding down the Control key while selecting the desired property type.



Owner Name Tab-Bar

The tab-bar located above the record selection provides a preset query to find all parcels where the owner name starts with one of the defined values in the tab bar. This includes a preset to locate all records, records where the owner begins with either “A”, “B”, or “C”, etc. The owner name preset can be performed against all records, or it can be performed against the current selection by holding down the Control key while selecting the desired alphabetic tab.

Standard Selection Buttons

In addition to the Query editor and the preset queries, the management console includes buttons to perform standard record selection functions that are essential when working with record selections. These include the All, Subset, and Previous buttons:

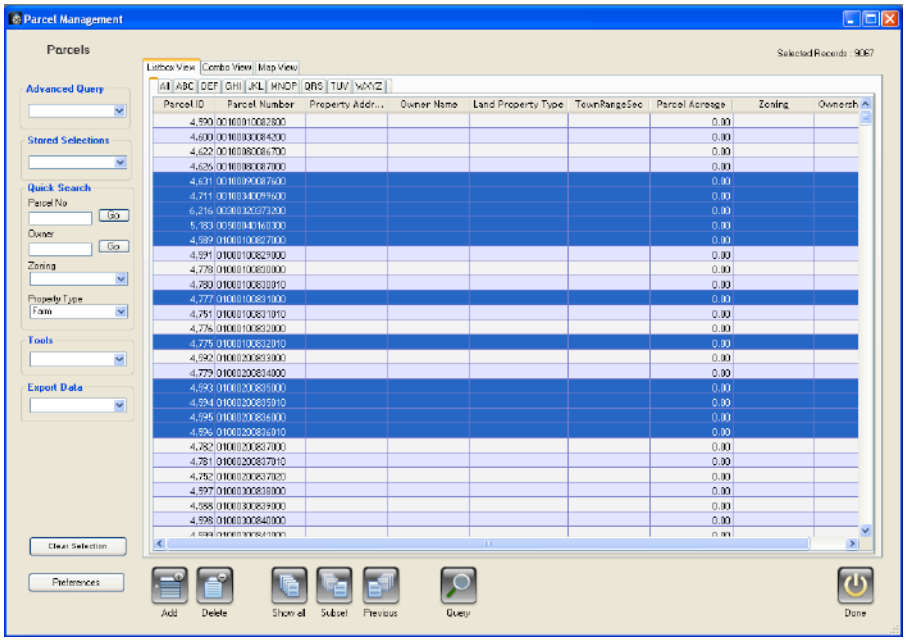
Show All

The Show All button simply displays all records.

Subset

The subset button provides the ability to reduce the current selection to only those records that are selected. Records can be selected in a number of ways. A record can be highlighted (selected) from record selection by clicking on it in the list. It is possible to highlight one record, two or more adjacent records, or two or more non-adjacent records. Adjacent records are highlighted by clicking on the first record and then holding down the shift key while clicking on the last record to be targeted. Non-adjacent records are highlighted by clicking on the first record or block of records and then holding down the Ctrl key (Command key on Macintosh) and clicking additional records one at a time.

Once selected, simply click the Subset button to reduce the current selection to the highlighted records.



Previous

The Previous button provides the utility to restore the previous selection. Regardless of the query that is performed, the previous selection can be restored simply by selecting this button. Currently, the Offroad GIS only supports one level for the previous command.

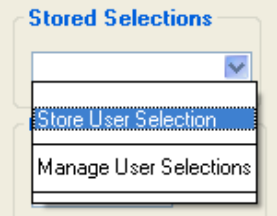
Stored Selections

Offroad GIS provides the utility to create and manage stored selections that are unique to individual users. This provides tremendous flexibility to build and then restore custom record selections as they are needed.

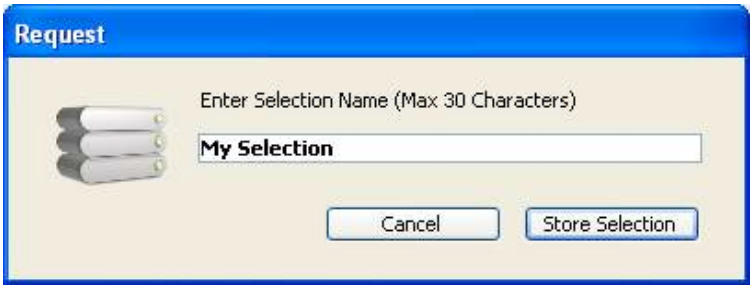
Creating a Stored Selection

In order to build a stored selection:

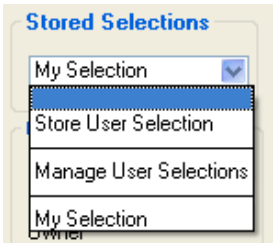
- Select the records that are to be included in the selection using any of the record selection capabilities previously described. This includes any of the Quick Search methods used in combination and the Query Editor.
- Once the selection has been completed, click on the Stored Selections pop-up button and select the item “Store User Selection”



- Enter the name for the selection, and click the Store Selection button



- The stored selection includes all of the records within the current selection that are displayed in the record selection area.
- The new selection will now be displayed in the Stored Selections pop-up button within the list of available selections below the Manage User Selections option.



Using a Stored Selection

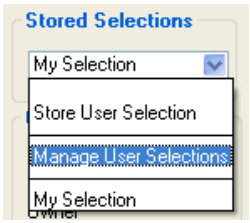
In order to make a Stored Selection the active selection

- Select the stored selection from the list of available stored selections in the bottom portion of the Stored Selections pop-up button

Deleting a Stored Selection

In order to delete a stored selection:

- Select Manage User Selections from the Stored Selections pop-up button.



- Click on the Stored Selection to be deleted from the Stored Selection List

- Click on the Commit Changes button and the changes that have been made will be committed.

There are no limitations of the number of records included within a stored selection nor are there any limitations on the number of stored selections created by a user.

Note *Stored Selections are unique to each individual user. They are not shared nor are they available between different user id's.*

Chapter 6 - Parcel Management

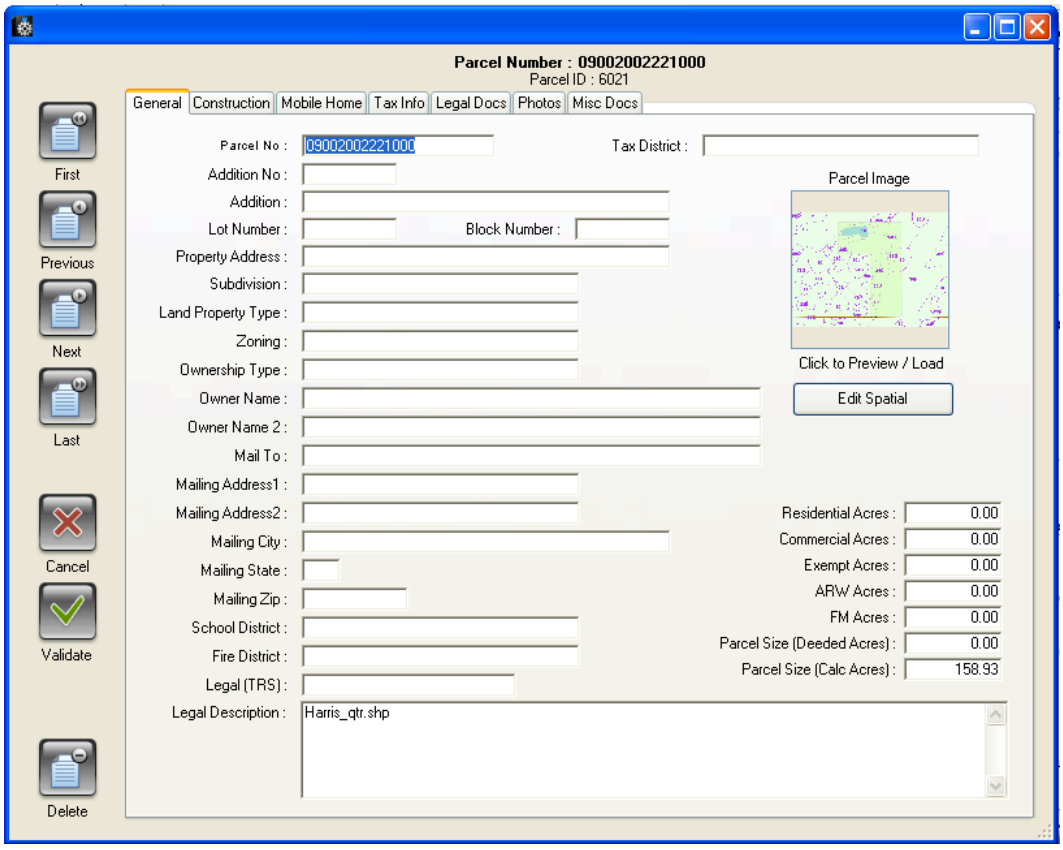
Offroad GIS provides a complete solution to address the unique parcel management requirements for County government. In order to achieve this, the Offroad GIS system was designed using a unique combination of more traditional tabular data management tools with modern geo-spatial tools. When Offroad GIS is compared to the more traditional management tools where management of the tabular data and the associated spatial data are performed in separate non-integrated systems, Offroad GIS provides many compelling advantages and a much simpler management approach than has been previously available for parcel management.

The Parcel Management console is the primary focus for managing parcel data within the Offroad GIS system. The parcel management console includes numerous tools that provide access to your records through simple point-and-click processes. These tools include the preset query features that allow you to drill down into the data by selecting a single entry from a pop-up list. The parcel management console also provides utilities to store and manage user selections to develop customized user record sets that can also be retrieved through a single point-and-click process. Common tools for splitting and merging parcels are also integrated into this interface. Everything about the management console has been designed to make accessing parcel data fast and efficient.

Parcel Management involves a broad range of attributes that include general parcel owner information, construction details, assessment information, and related tax data. In addition, Parcel Management includes the necessary features to store and manage the documents and deeds related to each parcel as well as photos, images, and plans. These tools round out the services surrounding the Parcel layer to provide a comprehensive management solution for your parcels that integrates all of the different functions related to your parcel records into a single integrated application. Ultimately, this will reduce the work associated with parcel management and present a more unified process for making your data available to your staff, the County Commissioners, and more importantly to the public.

Editing Parcel Records

Editing parcel records can be accomplished either by double-clicking on the record displayed in the record selection or by selecting the Edit Selection option of the Map Select pop-up button and then clicking on the parcel feature displayed in the map interface. Either approach will present the parcel input form which provides access to edit the parcel data.



The parcel input form includes 7 different pages that are dedicated to different aspects of parcel records. Each of these pages is described below

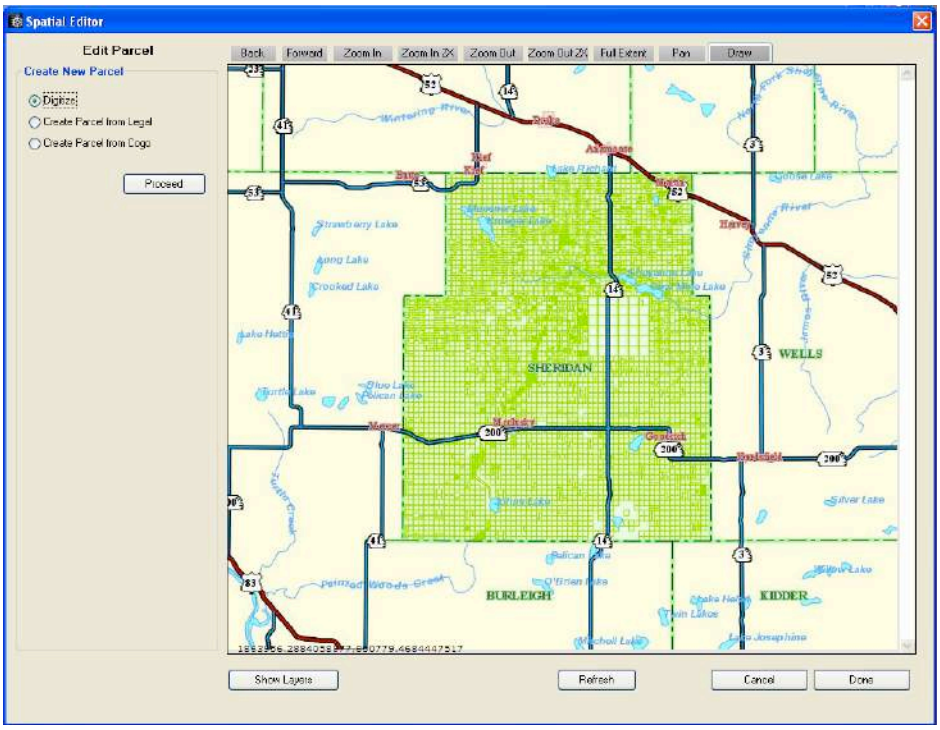
- **General** - provides access to general parcel information including parcel ownership, zoning, type, address, legal description, and mailing address information.
- **Construction** - provides access to lot details, construction information, and other construction related details.
- **Mobile Home** - provides access to information relevant to mobile home information.
- **Tax Info** - provides access to the current assessment information including historic valuations, and soils based tax assessment for agricultural parcels.

- **Legal Docs** - provides the utility to store and manage relevant documents for the parcel record. There are no limitations as to the types of documents that can be stored with a parcel record. Currently, only the PDF document format is supported at this time.
- **Photos** - provides the utility to include any photographs relevant to associated parcel record. There are no limitations as to the types of photos or the number of photos or images that can be stored. Currently, most major graphic formats are currently supported including, TIFF, PNG, BMP, JPEG, PICT, as well as many others.
- **Misc Docs** - provides the utility to store a wide variety of documents with a parcel. This area typically includes documents that may not be relevant to the legal Docs section as they may have nothing to do with the transaction history of the parcel. The Misc Docs currently only support PDF and RTF format documents. This area can be used to house notes or other documentation relevant to a parcel including scans of the plans and drawing for any buildings that may be attached to the parcel.

Creating Parcel Geometry

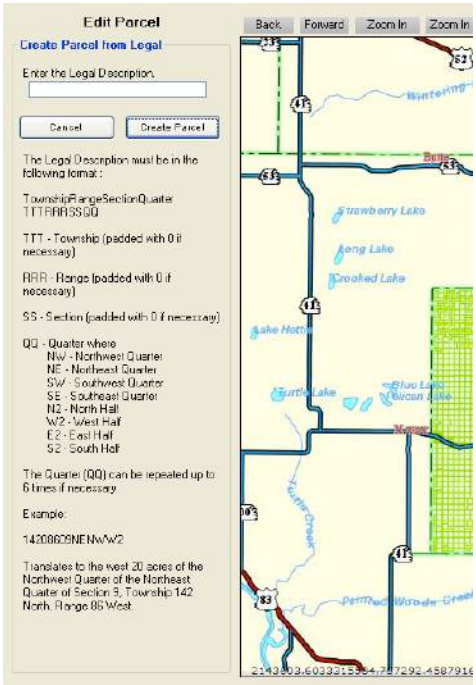
When a parcel is initially created it is created without geometry and the Parcel Image preview displays a default image. The default image that is used is the image loaded into the preferences. If no image was loaded into the preferences, the default image is the Offroad Software logo.

In order to create the geometry for a parcel, click on the Create Spatial button. The Edit Parcel dialog will be presented with the default spatial options for creating the parcel. This presents options to create the initial parcel geometry by digitizing, legal description, or using COGO text.

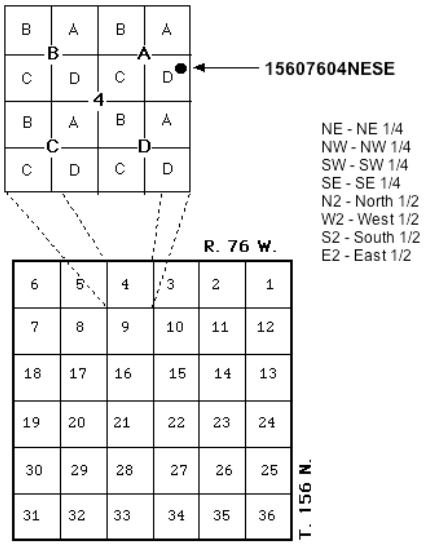


The first option, Digitize, simply allows you to bypass the wizard and begin digitizing the parcel using the editing tools available within the edit dialog.

The second option, Create Parcel by Legal Description, provides tools to generate an initial parcel based upon USGS legal description. Selecting this option will present an intermediate dialog prompting for the legal description to be used.



The legal description uses USGS naming conventions. The first three characters represent the township, the second three represent the range and must be padded with a 0 for ranges below 100. Characters 7 and 8 are used to define the section which again is padded with a 0 for sections below 10. The remainder of the description identifies the general position within the section as outlined in the following schematic.

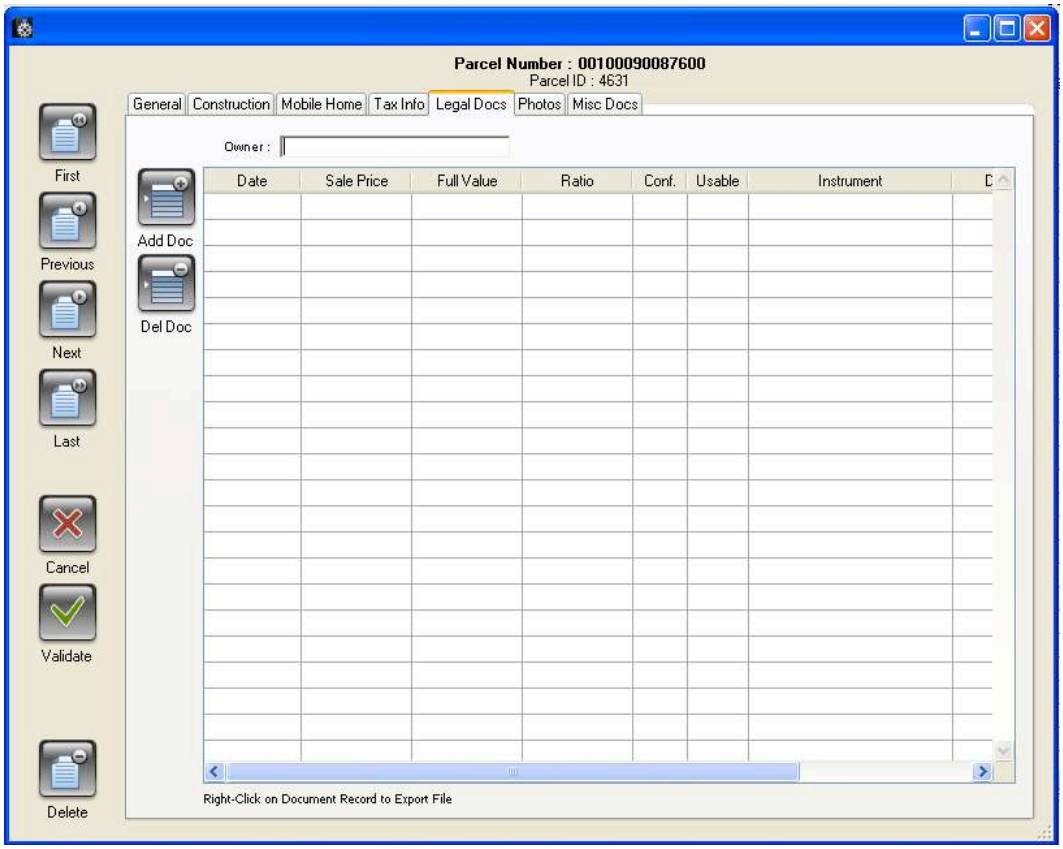


The third option, Create Parcel with Cogo text, provides tools to generate the initial parcel based upon COGO.

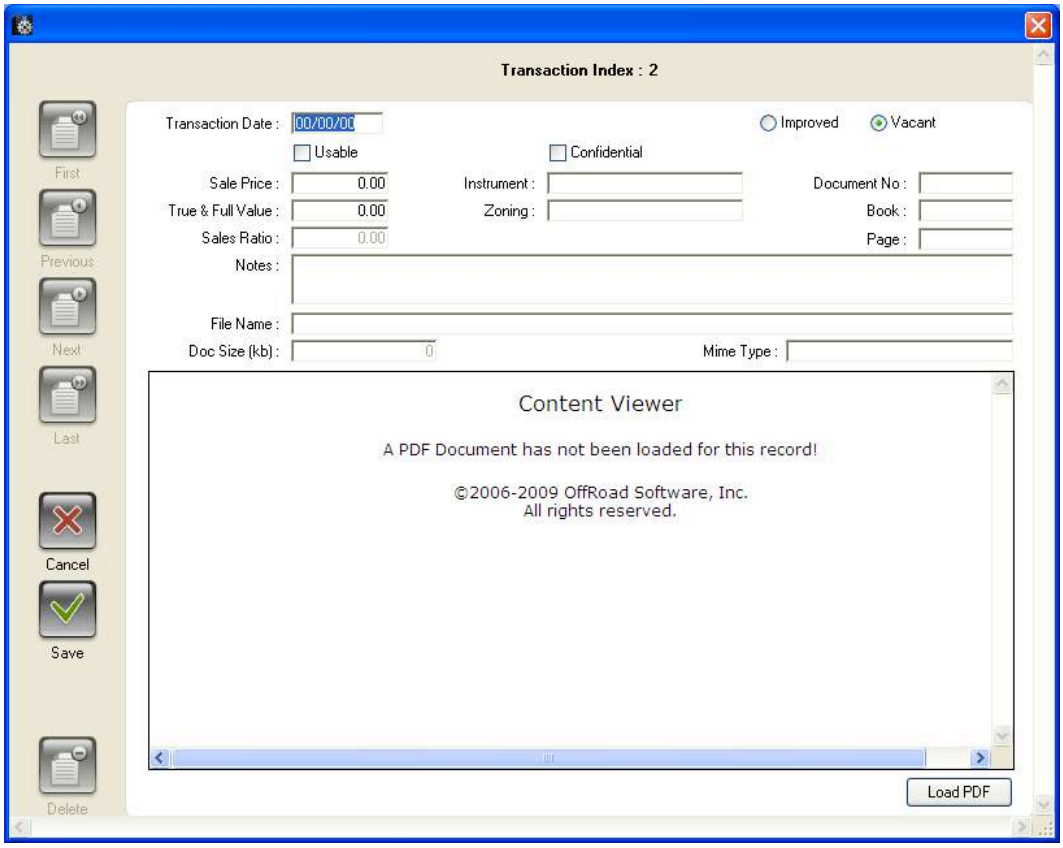
Legal Documents

Offroad GIS provides integrated tools to manage the transactions and the legal documents related to the transactions for individual parcels. By integrating the transactions and associated document management, Offroad GIS eliminates redundant management functions and delivers seamless capabilities to deliver these transactions and their associated documents over the web. Currently, Offroad GIS only provides support for Adobe's PDF format and implements the Adobe Acrobat plugin for purposes of displaying the documents. There are no limitations imposed relative to the size of the documents or the number of documents that can be stored. As a result, Offroad GIS is capable of providing a complete historic reference of any documents filed for each parcel.

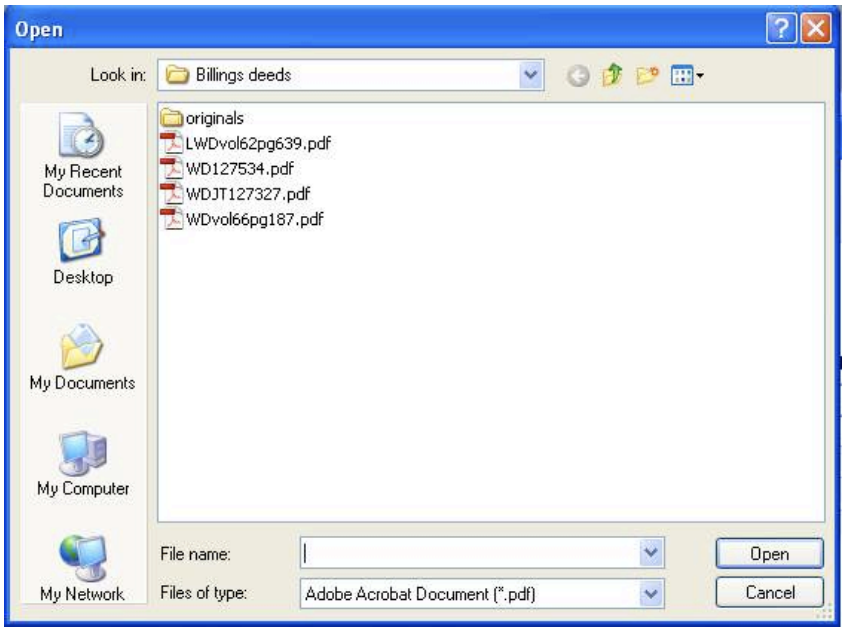
The parcel document management is accessed through the Legal Docs tab of the parcel input form. The available document records are sorted by date with the newest documents displayed at the top of the list.



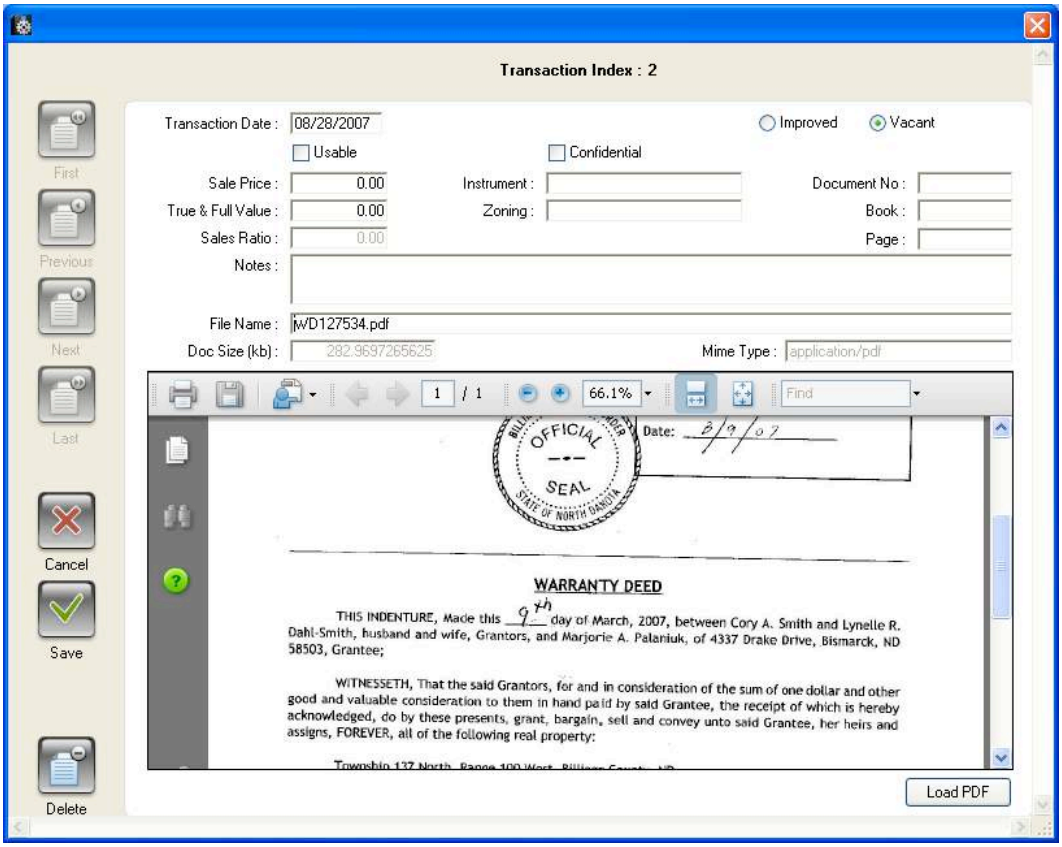
In order to add a Transaction record click on the Add Doc button. This will create a new Transaction record upon which the PDF file can be loaded.



When creating a new record the Content Viewer displays the blank document notice. In order to load a PDF document for the transaction record, click on the Load button. This will present the standard file selection dialog from which the PDF document can be selected.



Select the appropriate PDF document and then click on the Open button. The PDF document will then be loaded and displayed in the Transaction record form.



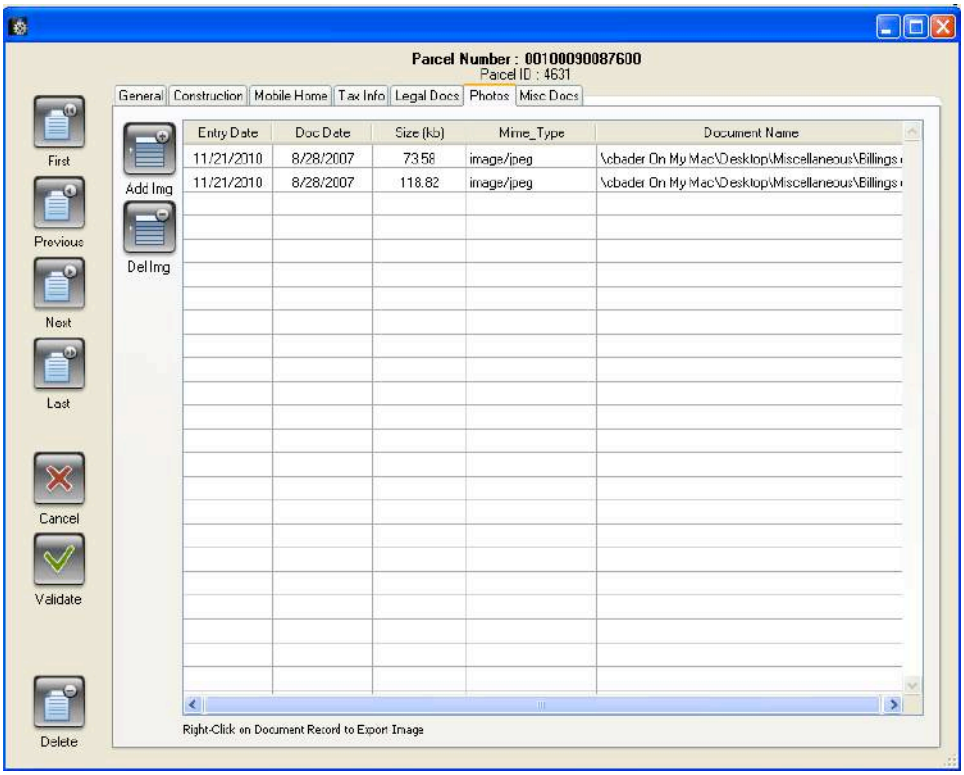
The PDF document is displayed with an Acrobat plug-in area very similar to what would be displayed inside of a web browser. From this plug-in the PDF can be printed, saved, exported, or e-mailed. In addition, the scroll bars allow navigation within the plug-in area to scroll through the enclosed PDF document. The PDF area also scales with the form so that it will grow or shrink as the form is resized.

In order to delete the PDF document, you will need to click on the Delete record button, which will delete the Transaction record and the enclosed PDF document.

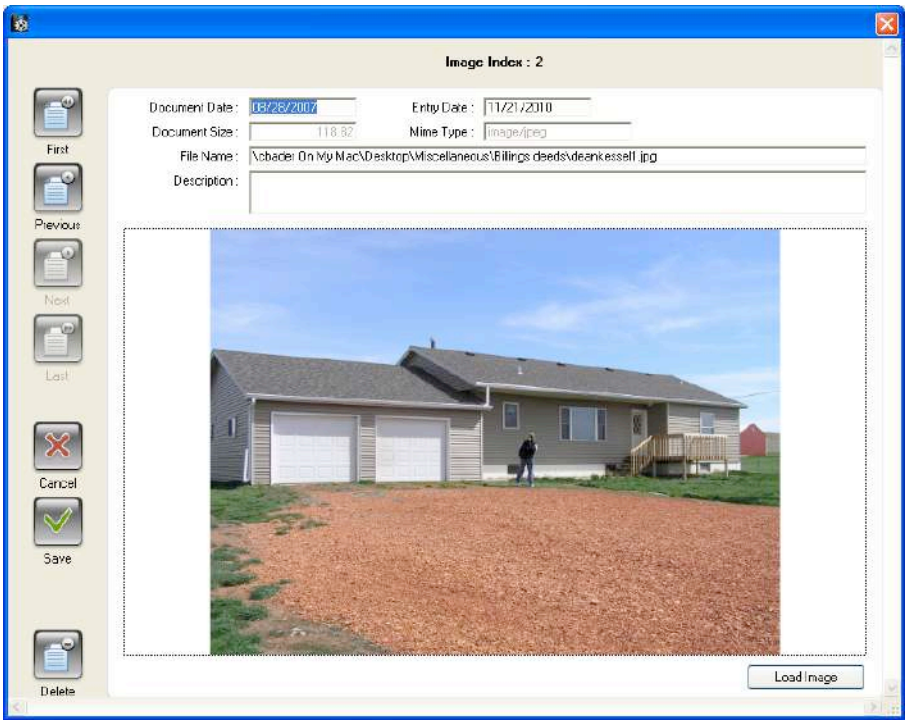
Photos

Offroad GIS provides tools to store a variety of images that are associated with each parcel record. These images are generally photos of the associated property. There are no limits as to the size of each image or the number of images that can be stored with a parcel. In addition to the photo, a brief description is also saved with each photo record.

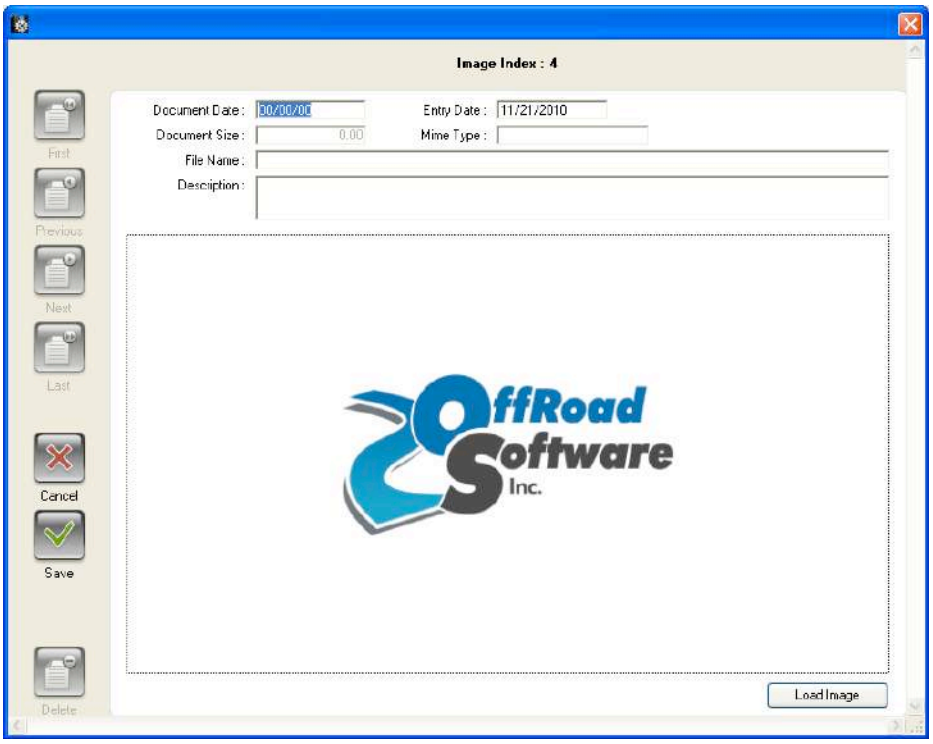
The photos are accessed through the Photos tab of the Parcel Input form. The available photo records are presented by date with the newest photos at the top of the list.



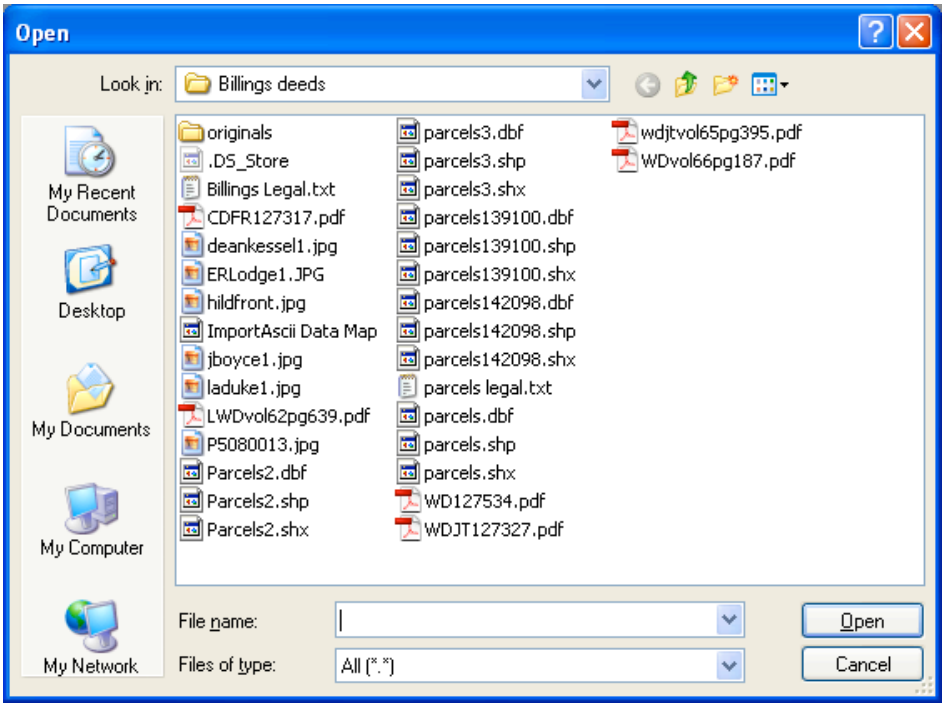
In order to access an existing record, simply double-click on the listed record.



In order to add a new photo record, click on the Add Img button. This will add a new record and present the photo input layout.



To load an Image, click on the Load Image button. This will present the standard file selection dialog box.



Once the image has been selected, click on the Open button to load the image file. This will present the image in the input layout with the previously selected image displayed in the image area. It will also set the Document Size, Mime-Type, and File Name based upon the Image file that was loaded.

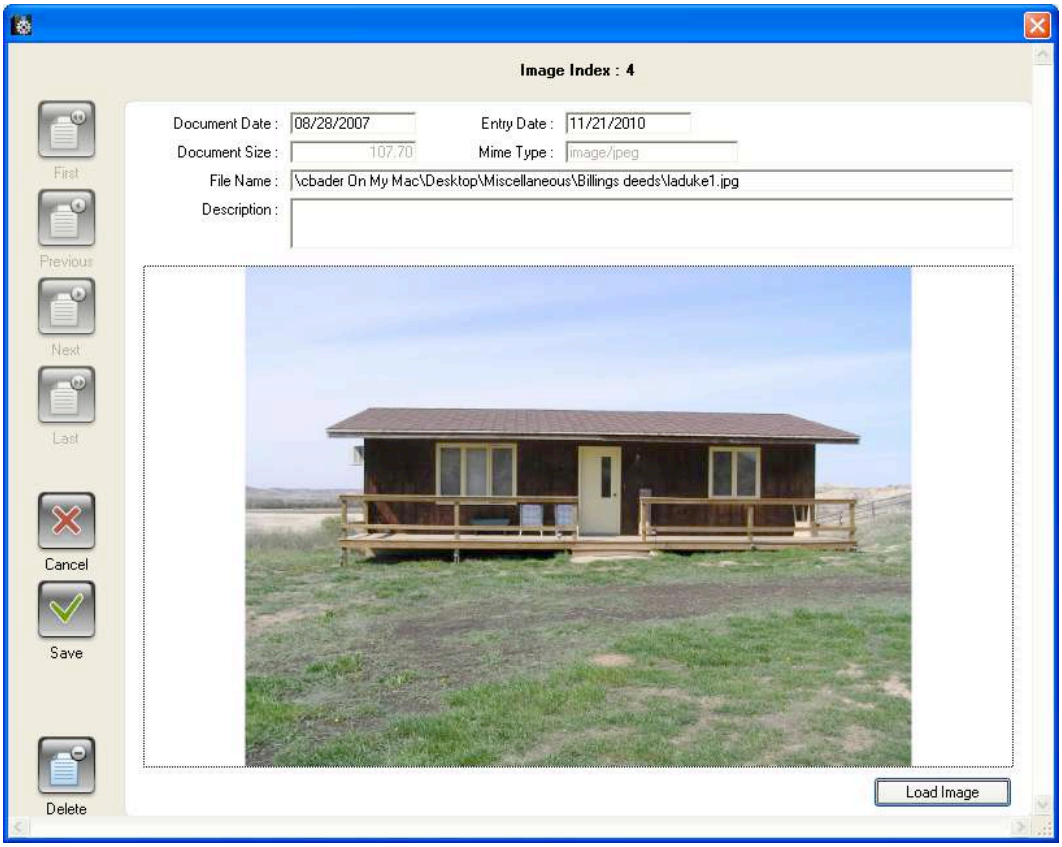
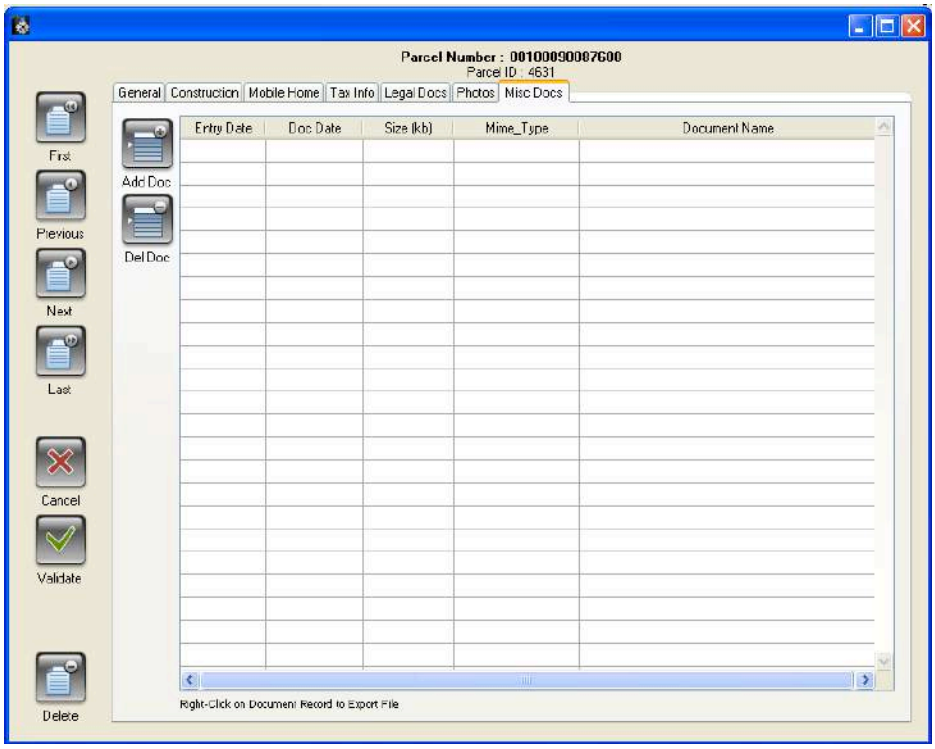


Image records can be deleted by selecting the Delete button from the Photo Input layout, or by highlighting the image records that you want to delete and pressing the Del Img button from within the Parcel Input form. The advantage of deleting the images from the Parcel Input form is that you can delete multiple images at one time.

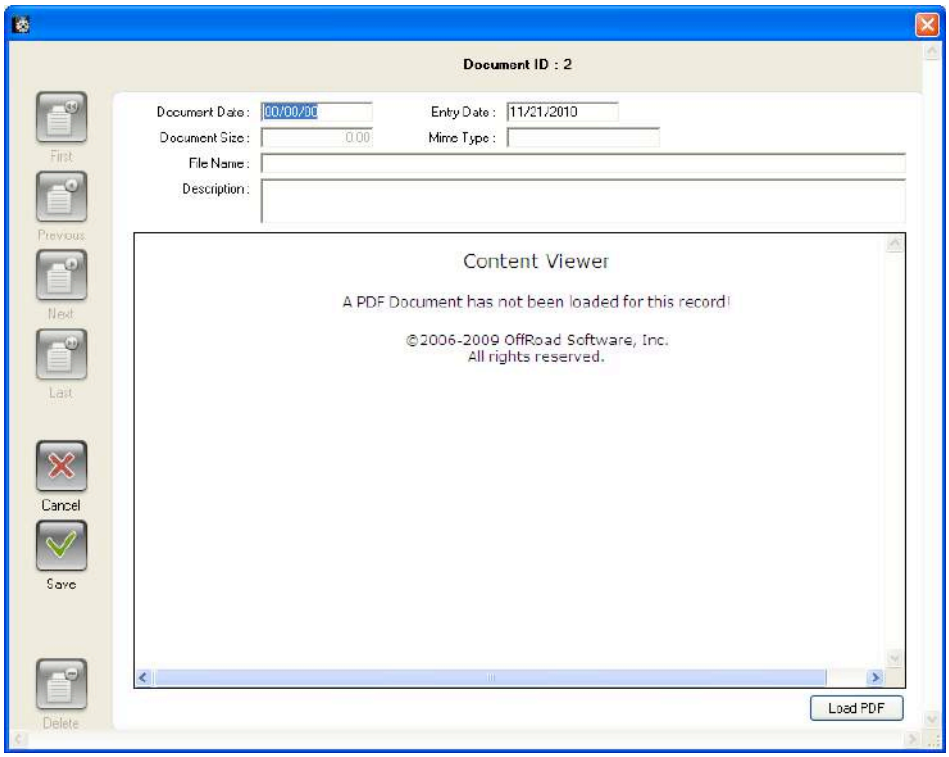
Parcel Documents (Miscellaneous Docs)

In addition to the legal documents, Offroad GIS also provides tools to manage miscellaneous documents for individual parcels. The Parcel Documents are available under the Misc Docs tab. This area is intended to provide a means of managing documentation related to the parcels that doesn't necessarily belong under the Legal Documents tab. Like the Legal Documents, Offroad GIS only provides support for Adobe's PDF format and implements the Adobe Acrobat plugin for purposes of displaying the documents. There are no limitations imposed relative to the size of the documents or the number of documents that can be stored.

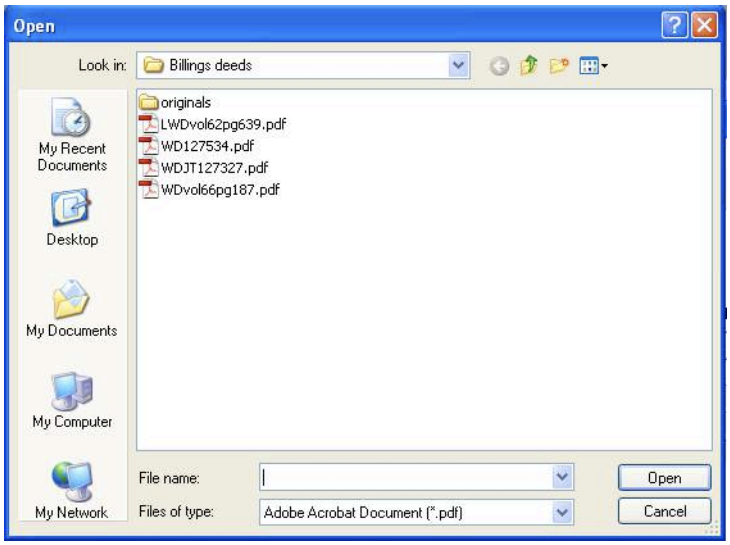
The available records are sorted by date with the newest documents displayed at the top of the list.



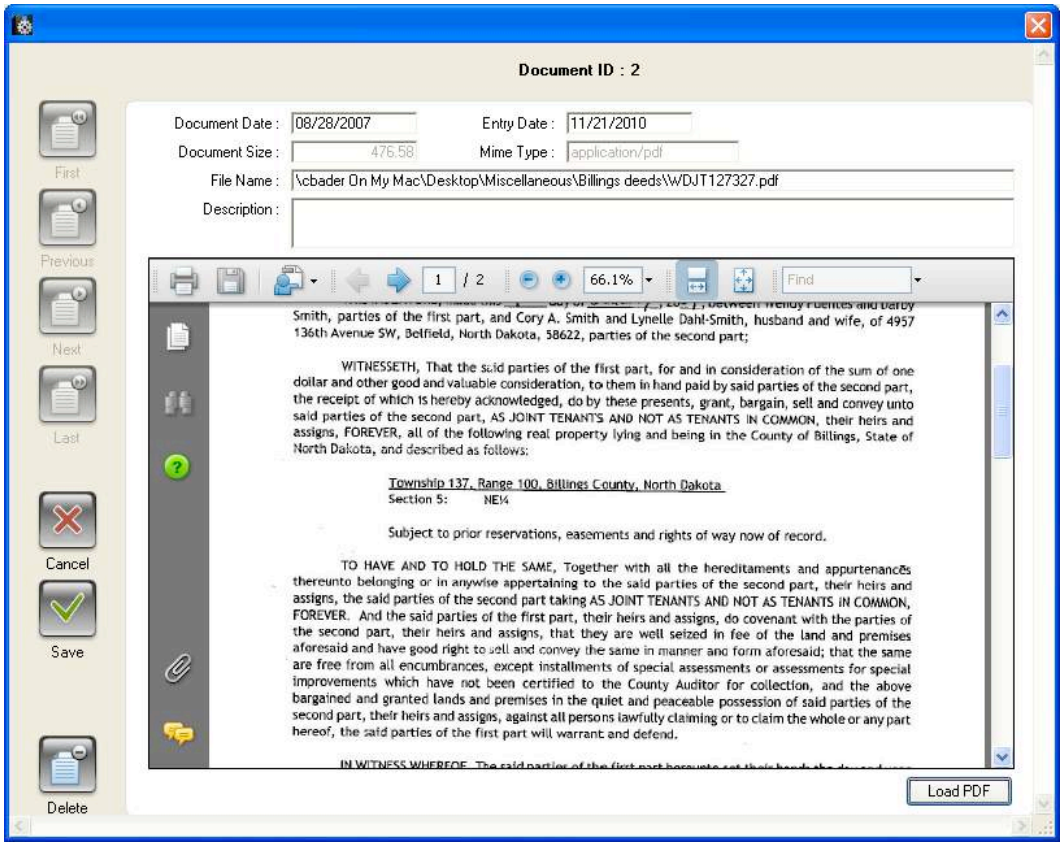
In order to add a document record click on the Add Doc button. This will create a new document record upon which the PDF file can be loaded.



When creating a new record the Content Viewer displays the blank document notice. In order to load a PDF document for the document record, click on the Load PDF button. This will present the standard file selection dialog from which the PDF document can be selected.



Select the appropriate PDF document and then click on the Open button. The PDF document will then be loaded and displayed in the Transaction record form.



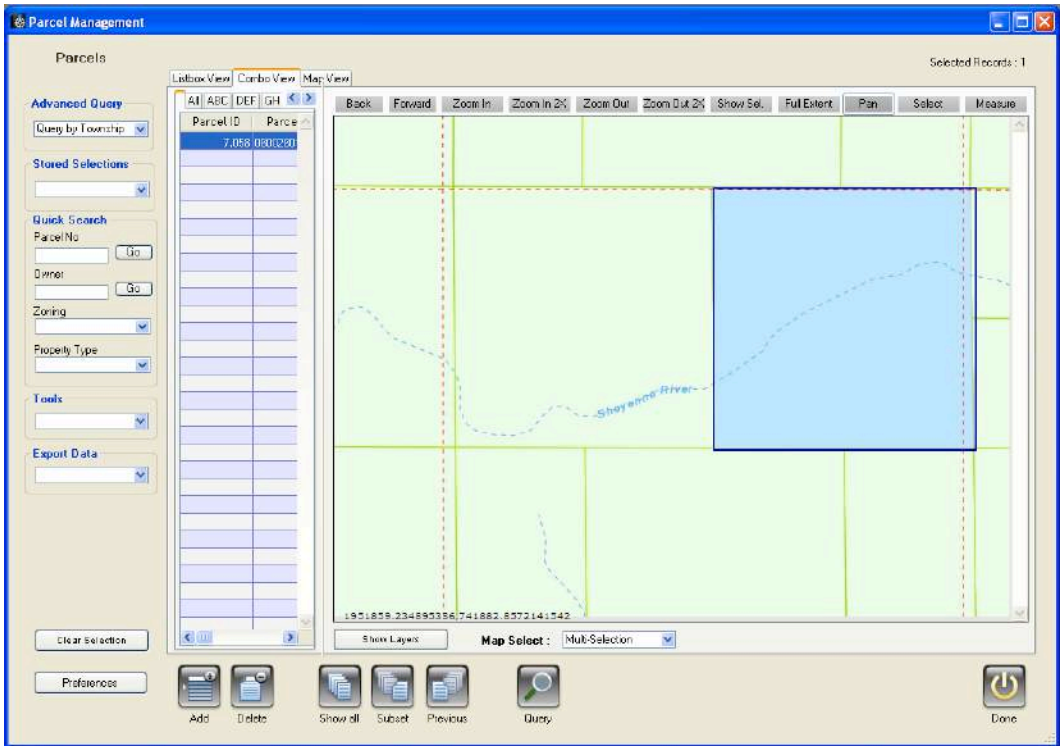
The PDF document is displayed with an Acrobat plug-in area very similar to what would be displayed inside of a web browser. From this plug-in the PDF can be printed, saved, exported, or e-mailed. In addition, the scroll bars allow navigation within the plug-in area to scroll through the enclosed PDF document. The PDF area also scales with the form so that it will grow or shrink as the form is resized.

In order to delete the PDF document, you will need to click on the Delete record button, which will delete the document record and the enclosed PDF document.

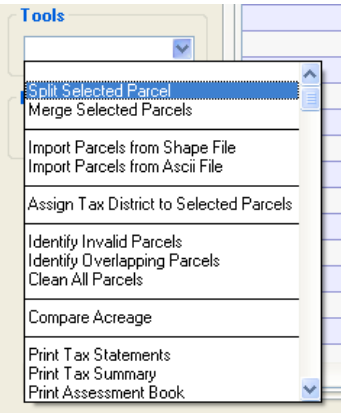
Splitting Parcels

Offroad GIS provides a number of tools to aid in splitting parcels. This includes simple splits based upon legal description, simple dimensions, and advanced dimensions. In addition more advanced split capabilities are available based upon other map features.

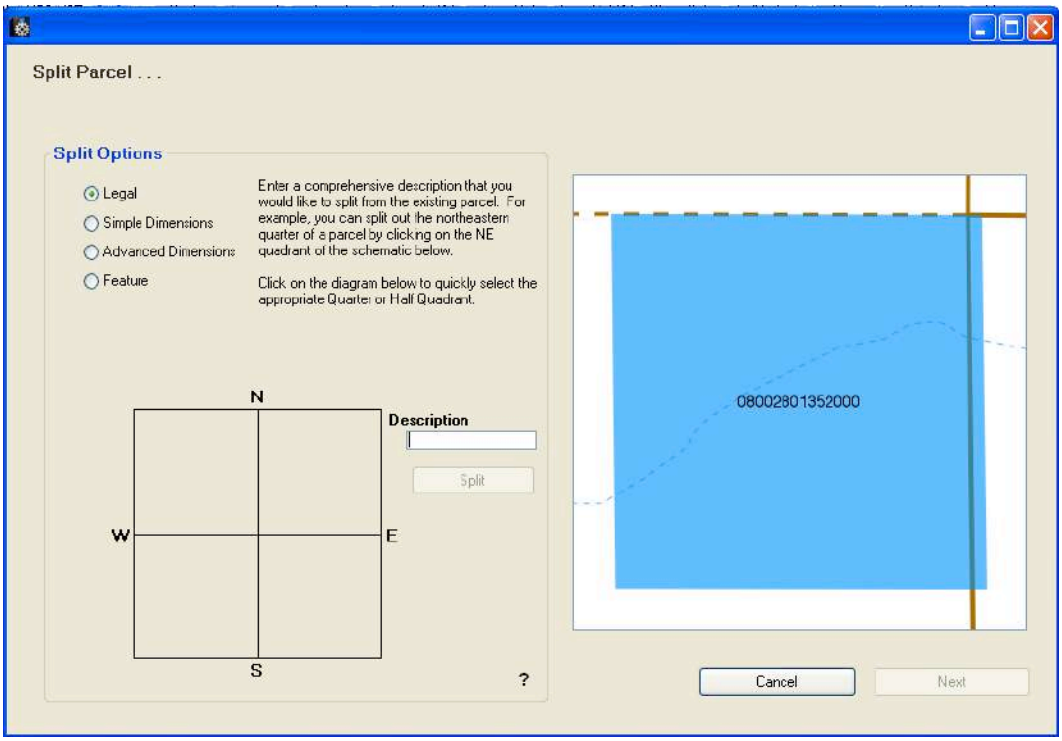
In order to split a parcel, select the desired parcel from the record selection list.



Select Split Selected Parcel from the Tools pop-up menu.



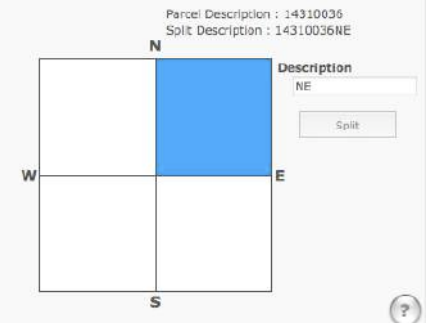
The Split Parcel Wizard will be presented from which you can select the type of split that is to be performed.



Each of the different split methods addresses different spatial capabilities for splitting the geometry associated with the parcel. Once the geometry has been split, the Split Parcel Wizard will then address the attributes. Each of the Geometry types will be addressed in subsequent sections which will then be followed by a section that address the attributes as the assignment of the attributes is the same regardless of the method used to split the geometry

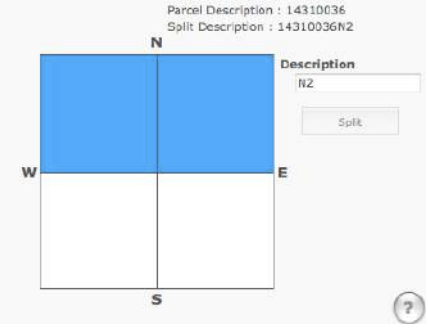
Split by Legal

Split by legal uses a straight forward approach to splitting a parcel and the Split Parcel Wizard makes this a fairly simple process. The Split Description defines the area that will be split out of the existing parcel. The Parcel Description includes the current legal description of the parcel that has been selected. You have two different options or you can use a combination of the two options to define the Split Description. By clicking on the schematic you can define the initial component to split out of the parcel. For example if you wish to split out the NE quarter of the existing parcel, you can click in the NE quadrant of the schematic to define the NE quarter.



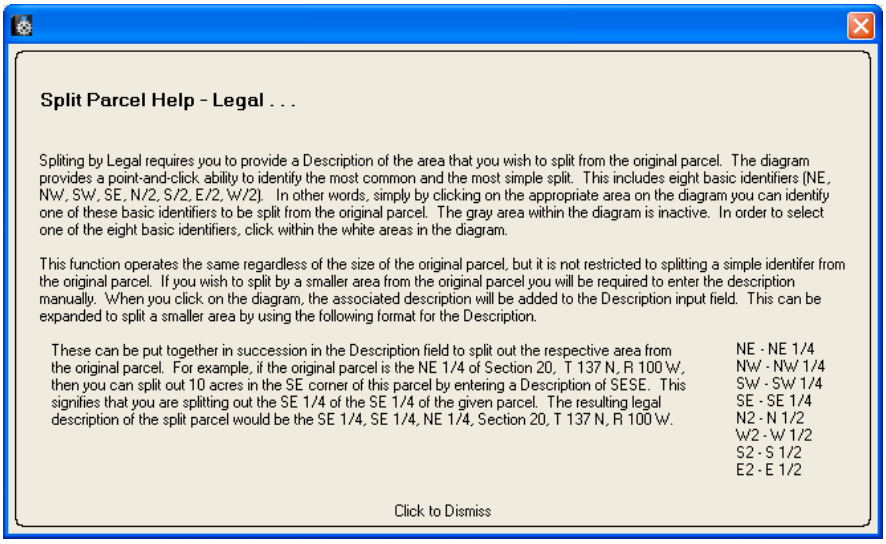
By clicking on any quadrant, the Split Description will be defined and the Description field will identify the currently selected quarter.

In addition to selecting a quarter section, you can also click on the N, S, E, or W lines to also define the respective 1/2 area designation for splitting the parcel. This provides the ability to pull the North, South, East, or West half of the existing parcel.

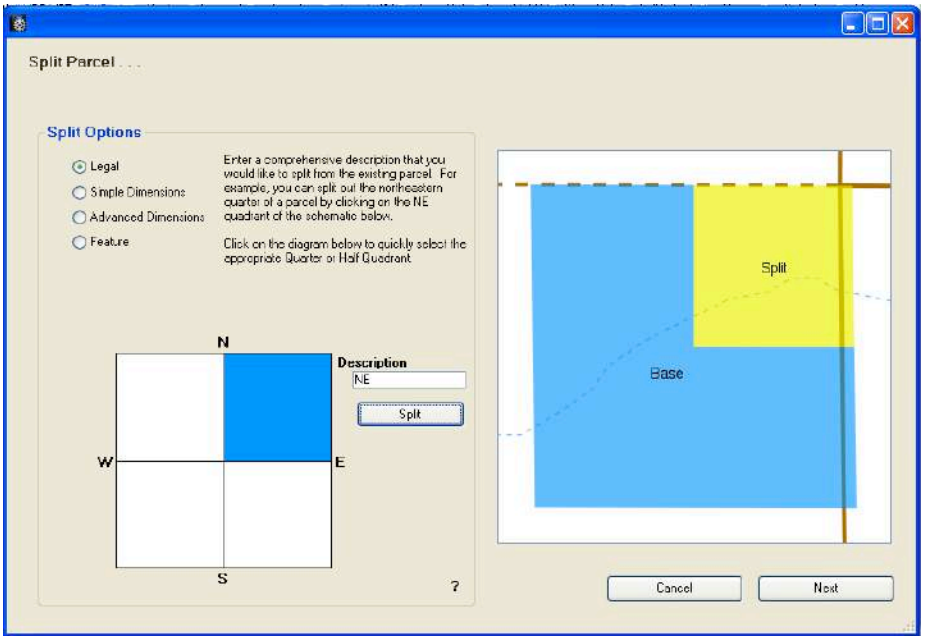


While the quadrant schematic allows the selection of the basic quarter or half component of the existing parcel, it may be necessary to split a smaller component. For example, you could split out the NE 1/4 of the NE 1/4 of the SE 1/4 of the existing parcel. In order to accomplish this, you would simply need to type in the Description field SENENE.

For a detailed list of all of the legal description options select the (?) help button displayed in the Split Parcel Dialog.

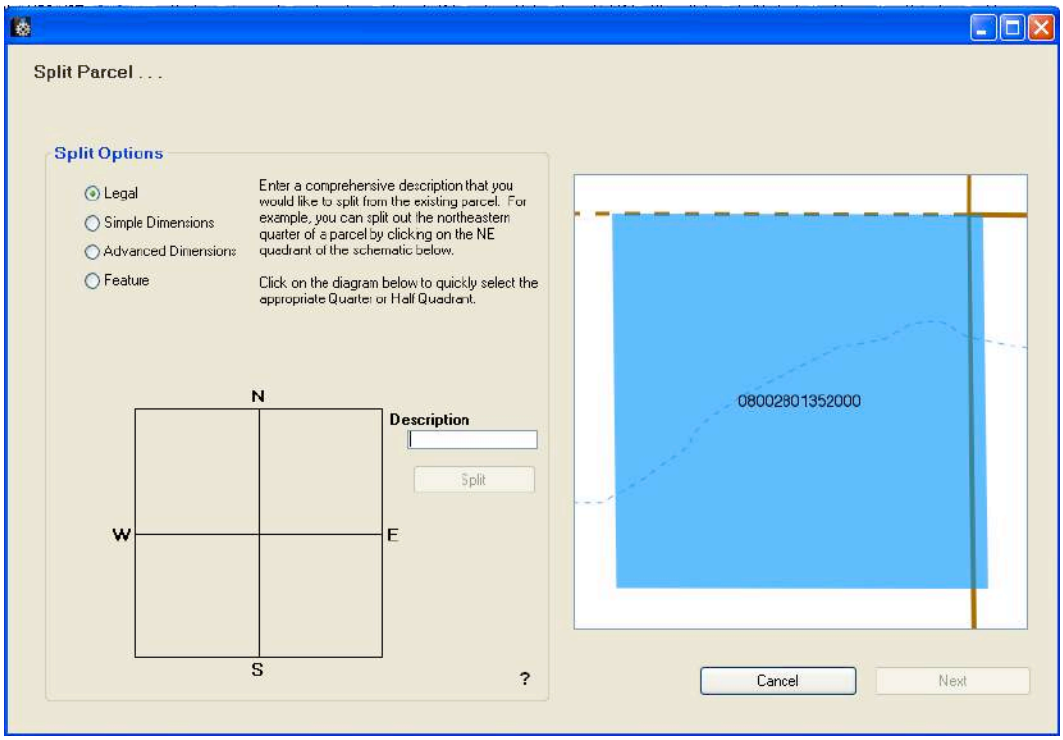


In order to perform the split, select the Split button. This will present a preview window for you to review the split parcel to confirm that it was defined properly.

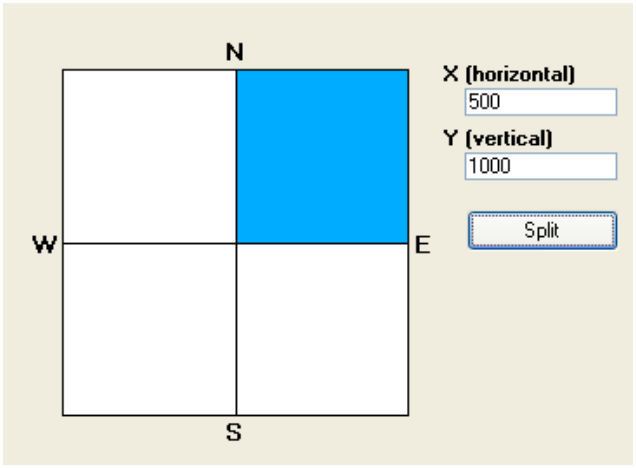


Split by Simple Dimensions

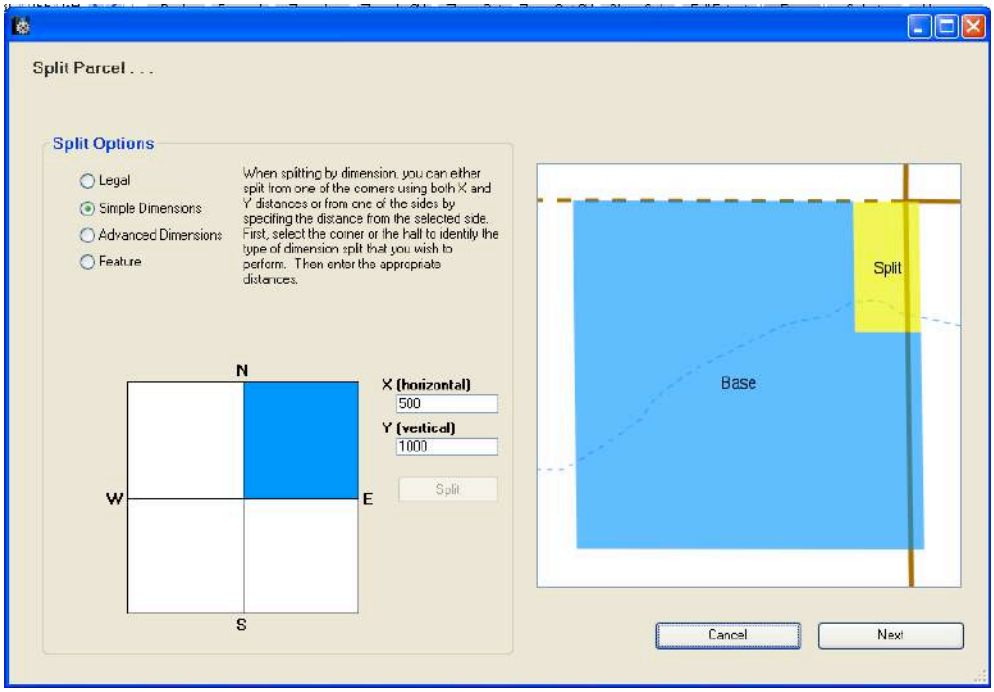
The Split by Simple Dimensions provides a means of splitting a parcel based upon a simple expression of dimensions from one or two sides. The quadrant schematic is used to define the portion of the parcel from which the simple dimensions are defined.



If you select a quarter by clicking on one of the NE, NW, SW, or SE corners you will be required to enter both the X and Y dimensions. The new parcel will be split from the corner of the parcel using these dimensions. If you select the N, W, S, or E half, you will only need to enter either the X or the Y dimension depending upon which of the cardinal direction that you selected.

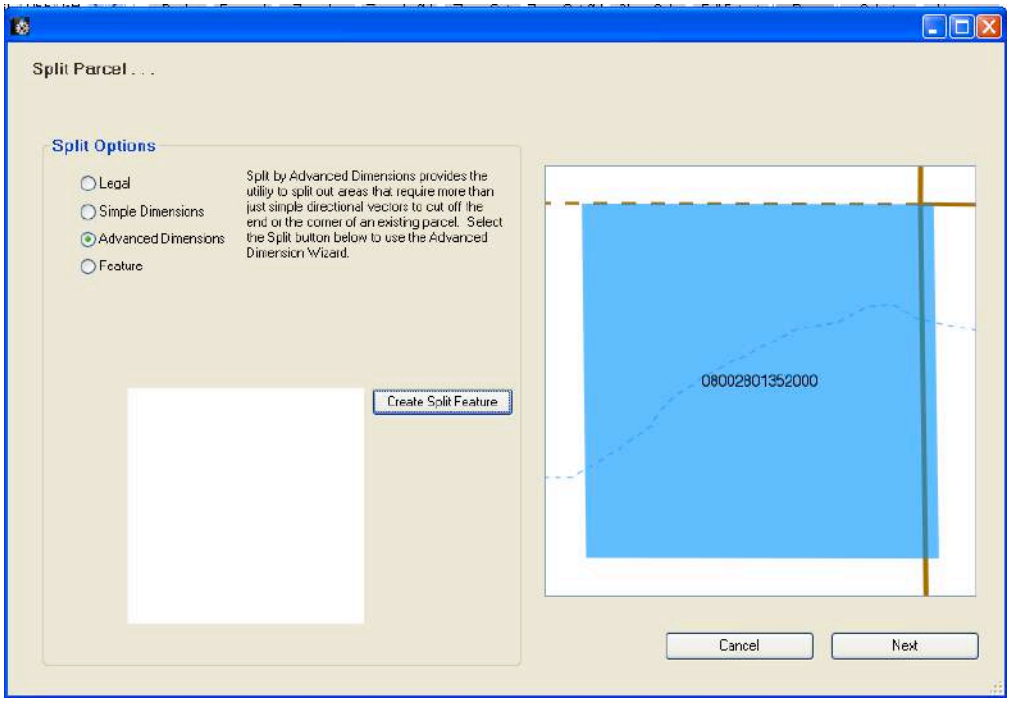


Once you have entered the appropriate dimensions, click on the Split button to review the resulting parcels.

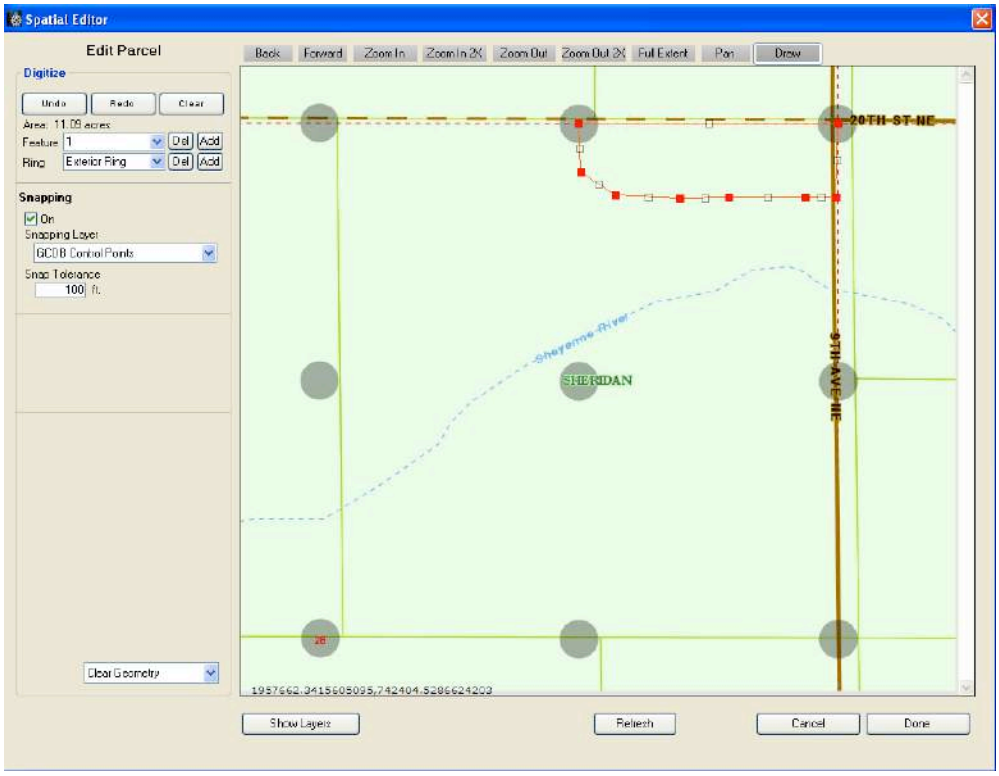


Split by Advanced Dimensions

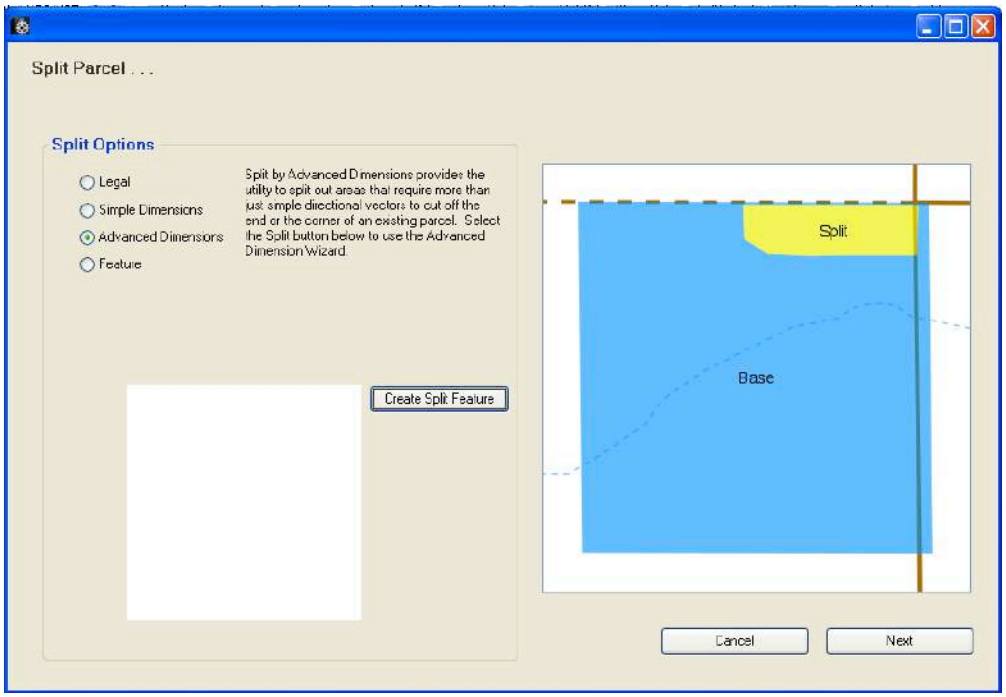
This will open the parcel editing interface and allow you to draw the new parcel that you want to split from the original parcel.



You can do this manually by using any of the editing tools available within the spatial editor.

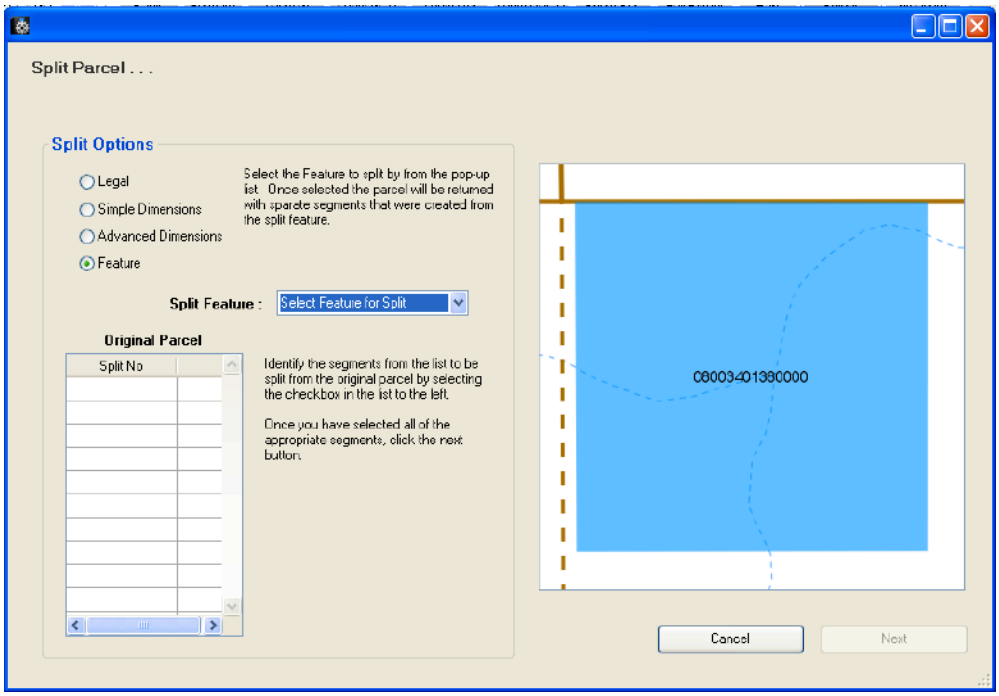


Once finished, click Done to return to the Split Parcel interface where you can review the resulting parcels and continue the split process.

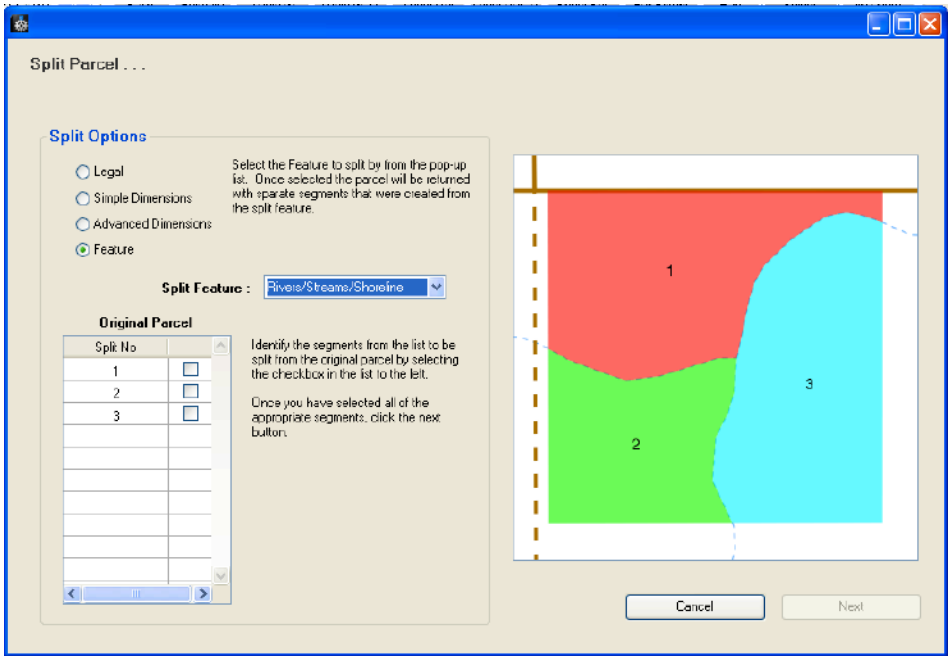


Split by Feature

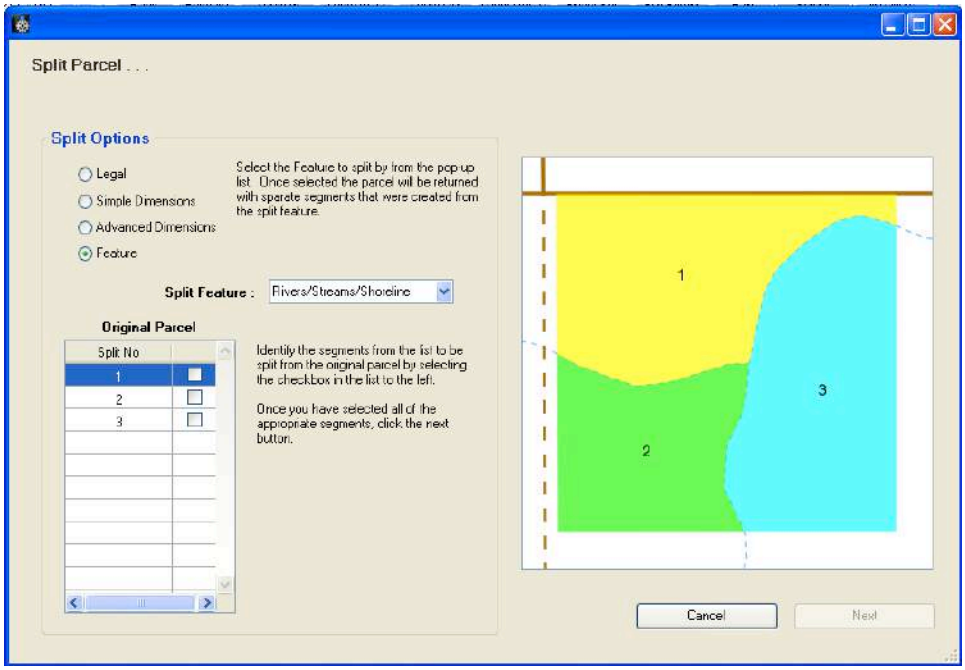
The Split by Feature provides utilities to split a parcel based upon common feature types. Currently, this option supports splitting by Railroads, Rivers / Streams, Roads - State and Federal, and Roads - County and local. If you try to split by any one of these features and they do not intersect with the selected parcel, and alert will be displayed indicating that the Parcel could not be split by the selected features.



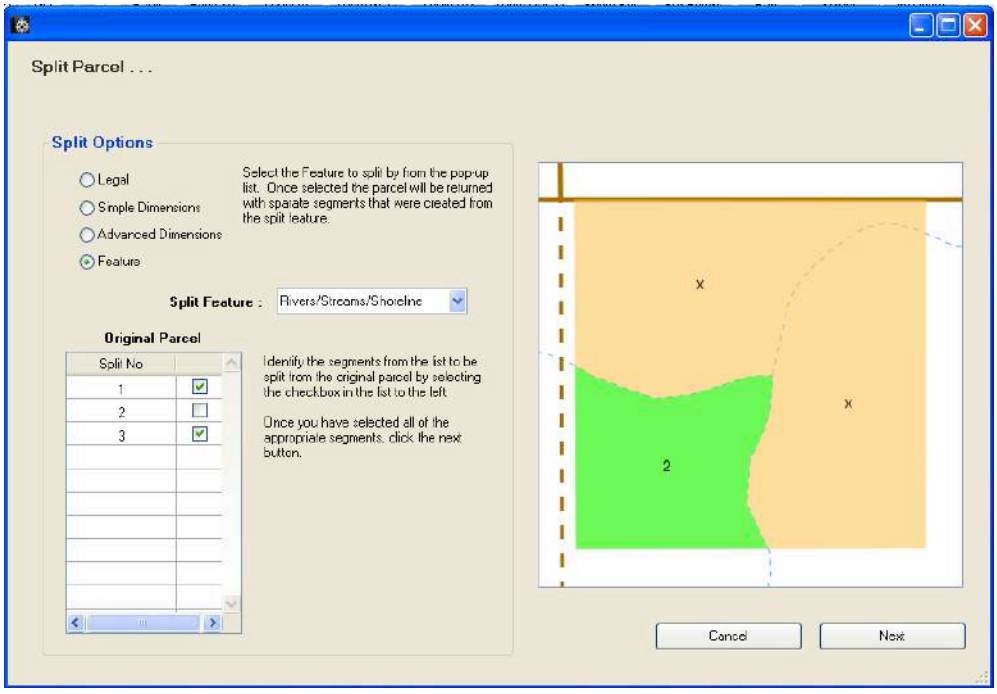
In order to split the parcel by feature, select the appropriate feature class from the pop-up menu option. The parcel will be split by the selected feature class and displayed in the parcel preview area with a number and unique color associated with each individual block that was separated.



In order to complete the split, you must now select each of the objects that are to be combined and split from the original parcel. As you select each Split component within the list, the respective component will be highlighted in yellow in the parcel preview. .



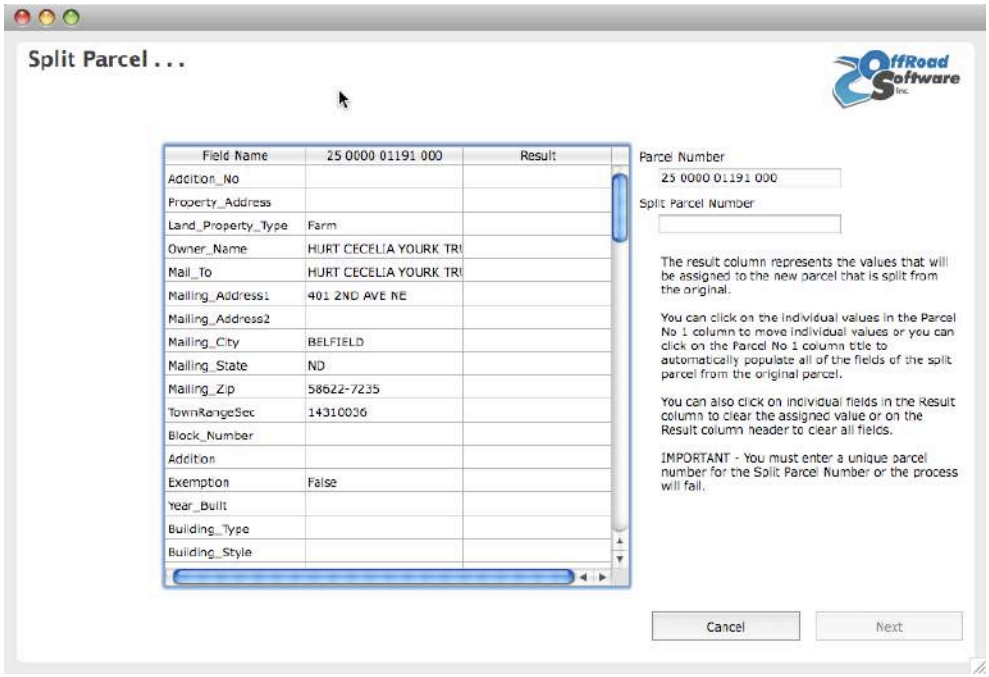
As you select the check box next to the parcel components that are to be split, the parcel preview is updated to display an (x) in the parcel component and the color is changed to a beige color



Once all of the components have been selected, click the Next button to split the parcel.

Defining Split Attributes

Once the split has been defined properly, select the Next button to proceed to the next step of the split process which allows you to define the attributes that are to be copied to the new parcel.

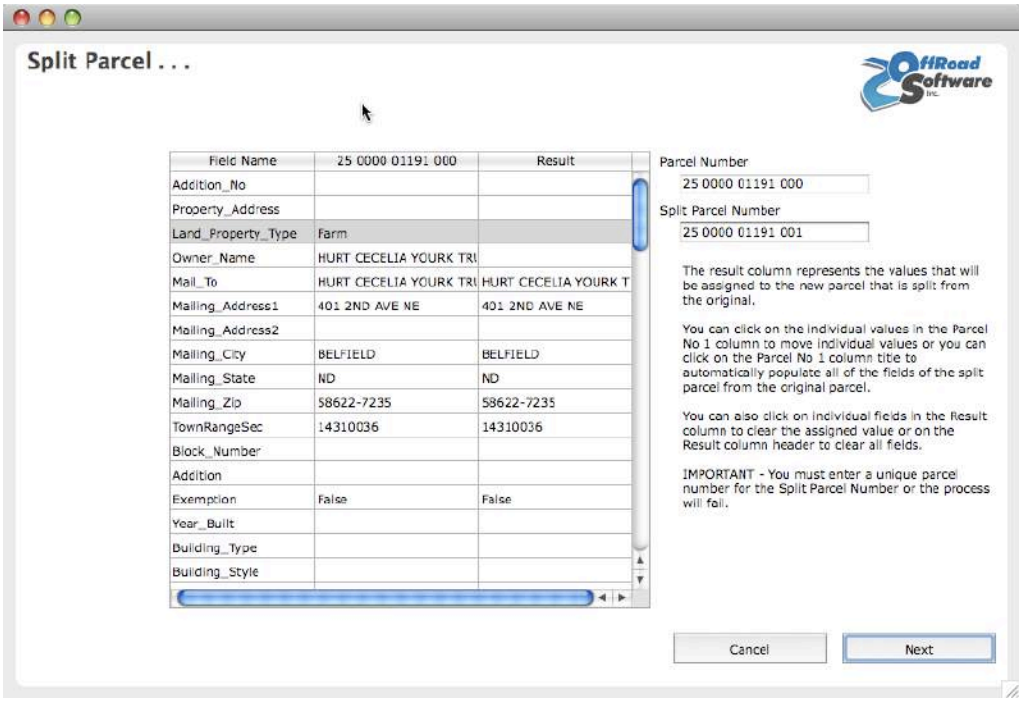


From the select attributes page, you can define the new parcel number as well as any or all of the fields that you want to be transferred to the new parcel. The parcel number must be unique in order to complete the split. While you can define which of the fields that are to be transferred, none of the fields from the original parcel are altered.

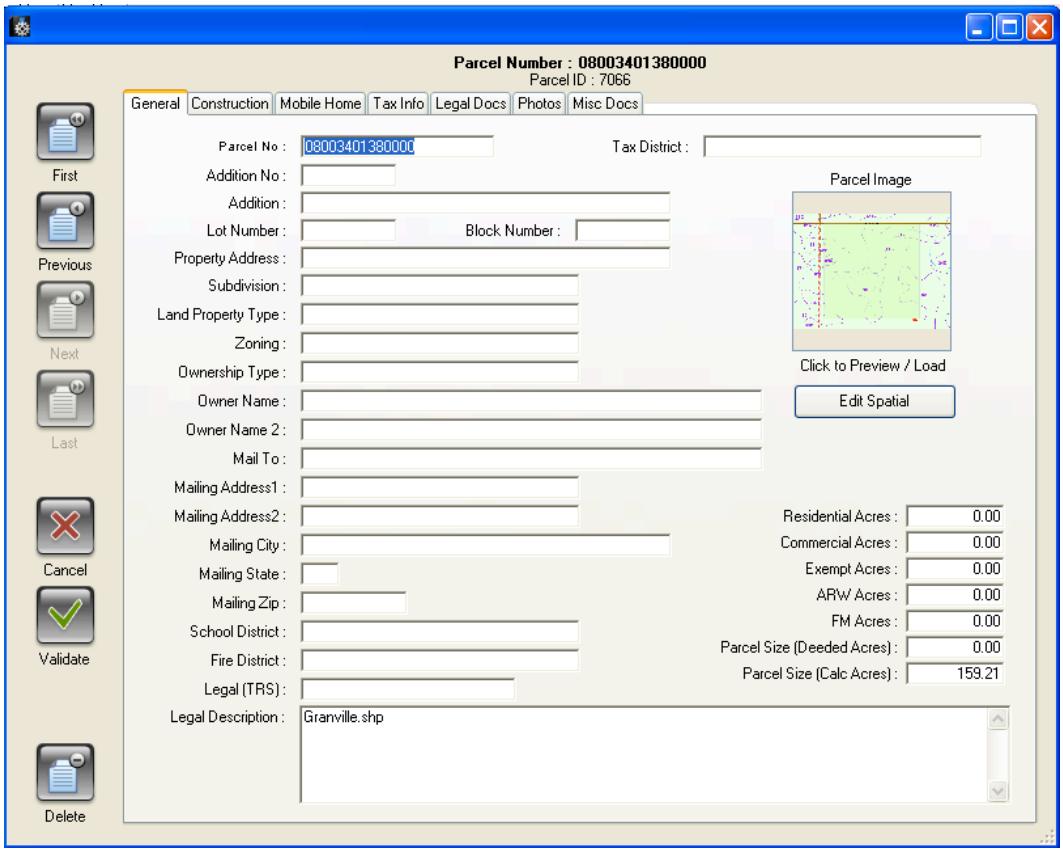
You can either elect to transfer the values in all of the fields or you can pick and choose the fields that you want to transfer. If you want to transfer all of the field values, click on the column title for the original parcel. This will automatically populate all of the fields in the Resulting parcel column with the values form the original parcel column. If on the other hand, you wish to transfer only a few selected fields, you can scroll through the list and click on the individual values that you want to transfer. This will automatically complete the associated field value in the Resulting parcel column for the field that was selected.

In the same manner that the Result column is populated, it can also be cleared. If you want to clear a single value, click on the associated value. If you want to clear all values, click on the Result column title.

Once the appropriate attributes and the Split Parcel Number have been defined, select the Next button to finish the split process. The Next button will not be available until after you tab or click out of the Split Parcel Number field.



After the Next button has been selected, the parcel will be split and the new parcel will be displayed in the parcel input form so that you can edit the appropriate fields to complete the split process.

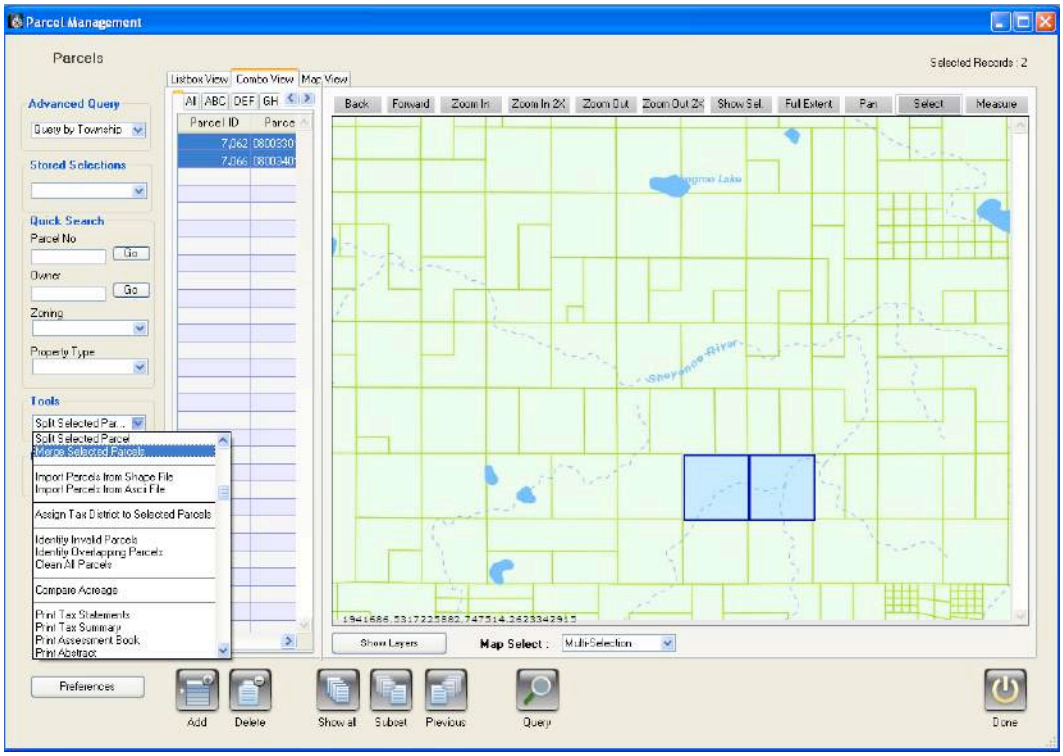


Note *When a parcel is split all images and any documents that are attached to the original parcel will remain with the original parcel. The split parcel will not include any of these attached records or documents.*

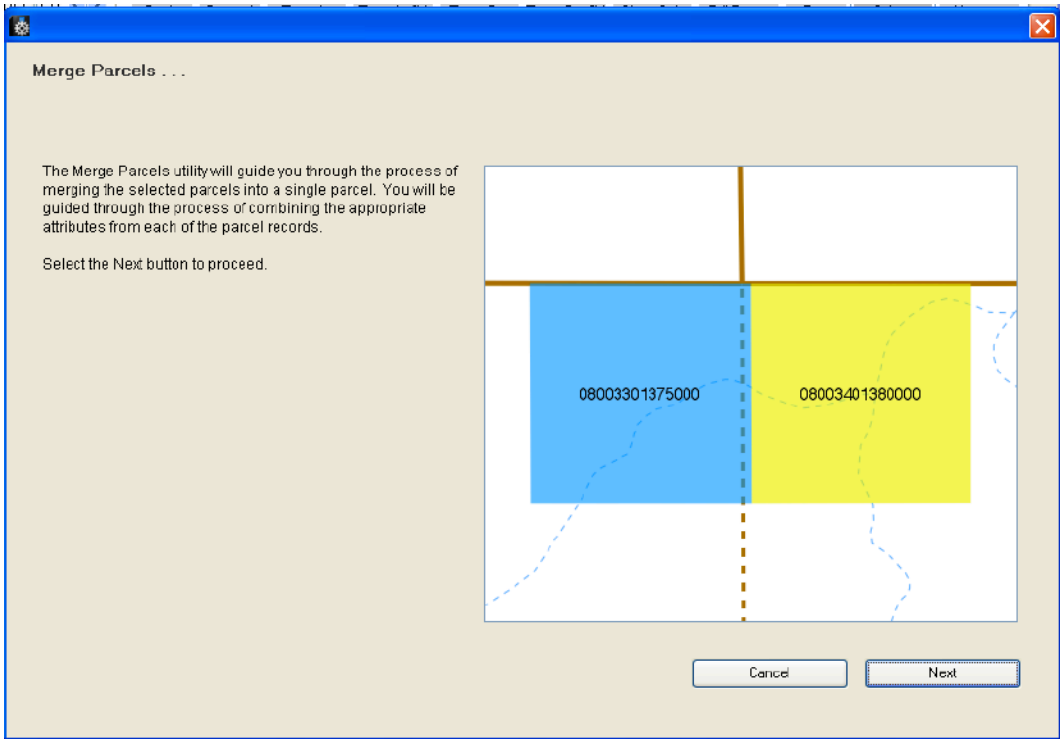
Merging Parcels

Offroad GIS provides basic tools to merge parcels which includes the geometry as well as the attributes. Before you can merge parcels, there are some basic requirements that must be met. For example, parcels must have an adjacent boundary (i.e. they must be contiguous). They must also have geometry, which means that you can't merge the attributes between a parcel that contains geometry and one that has no geometry.

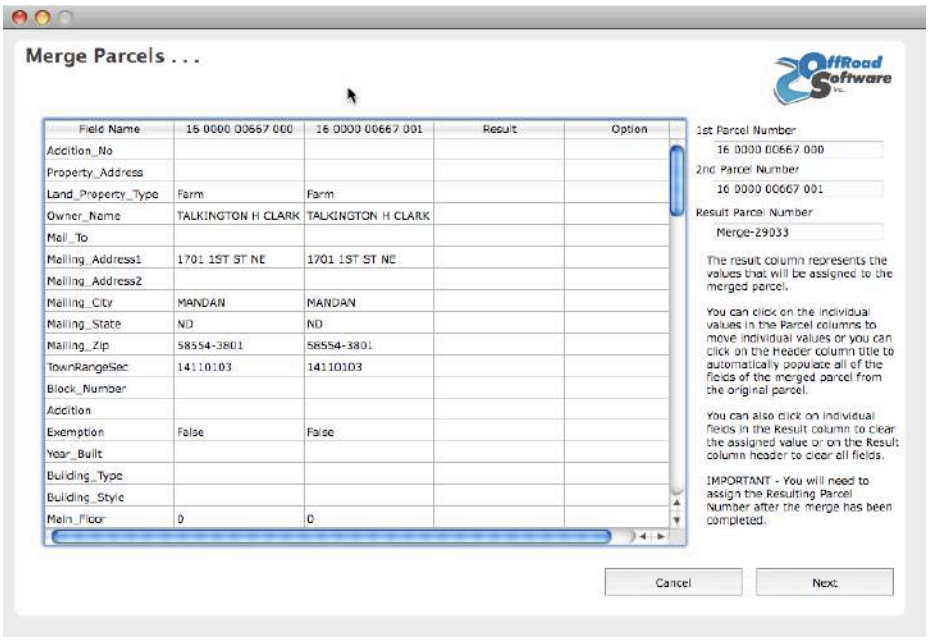
In order to merge two parcels, you must first select the two parcels in the record selection list. Once both the target parcels have been selected, select the Merge Selected Parcels option from the Tools pop-up menu.



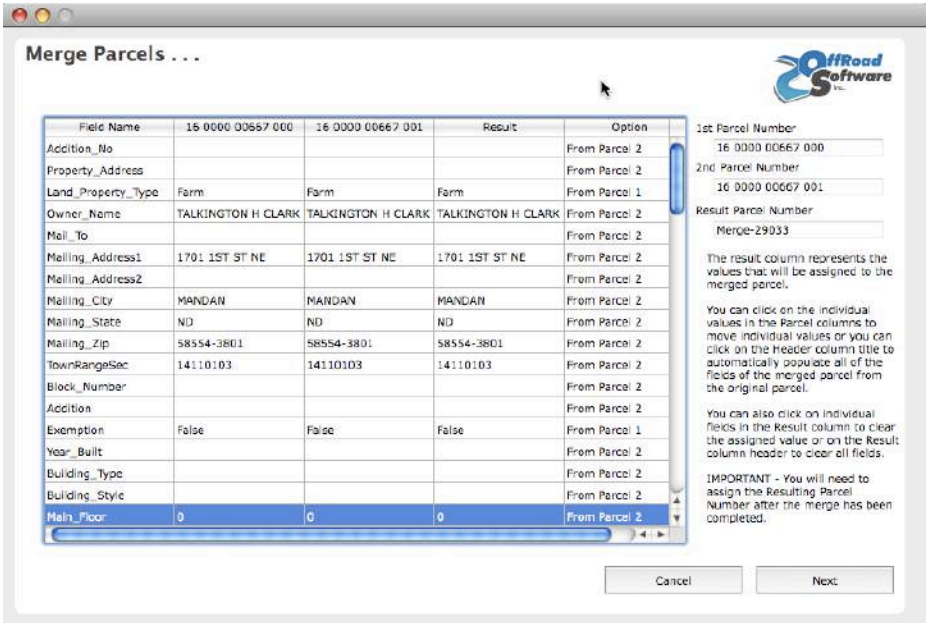
Once selected, the Merge Parcel Wizard will be displayed with a preview showing the target parcels with their associated parcel numbers.



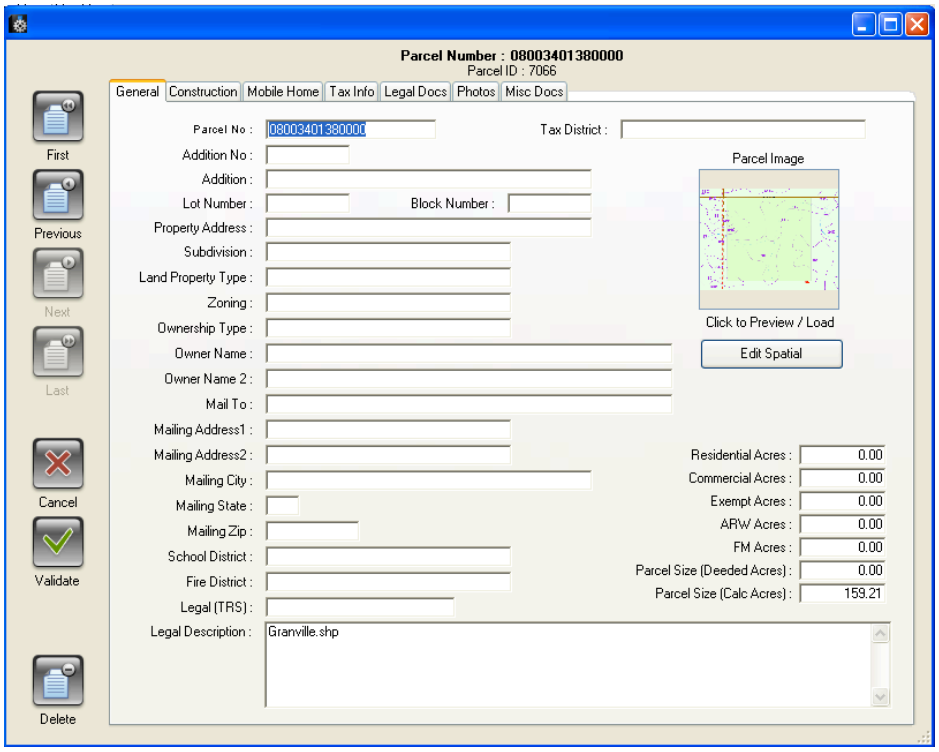
After selecting the Next button, the next step will be to identify which of the attributes that are to be moved to the resulting merged parcel.



Any combination can be used to set the attributes for the merged parcel. All of the attributes can come from the first parcel or the second parcel or a combination of attributes from both parent parcels. If you want to define the new attributes from either the first or the second parcel, click on the associated column title of the parent parcel from which to derive the attributes. In order to select individual values, click on the individual value in either of the columns for the parent parcels to set the Result column value for the respective field. The Option column will identify from which parent parcel the attribute in the Result column was derived. If you need to clear the Result parcel values, click on the Result column header.



Once the Attributes have been set, click on the Next button to merge the parcels and set the attributes of the resulting merged parcel. The merged parcel will be presented in the parcel input form.



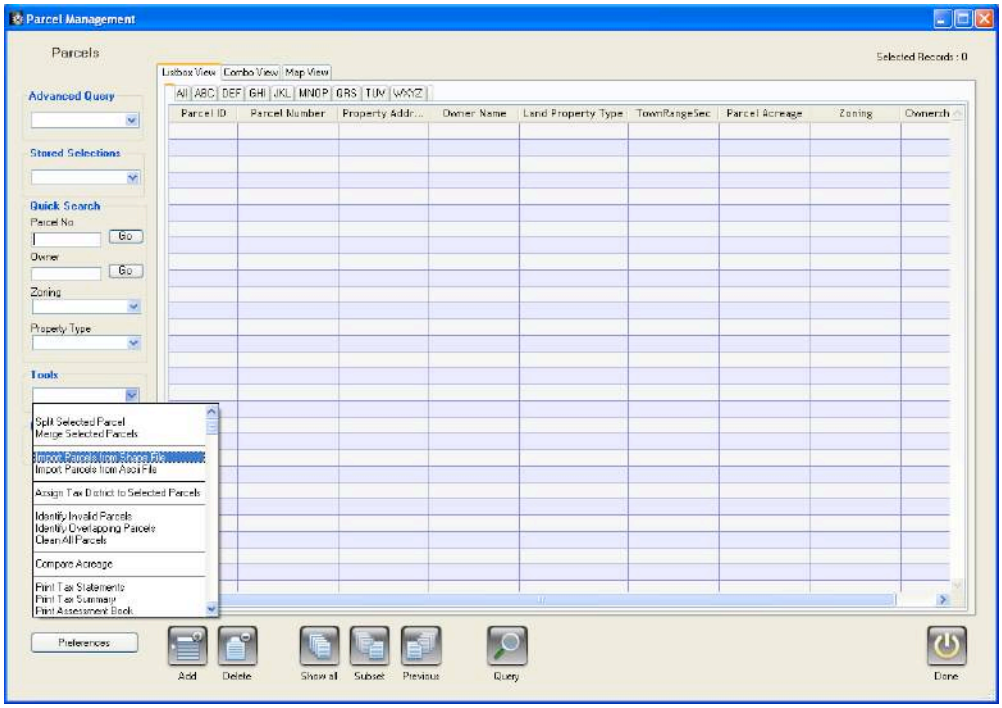
Once displayed, the parcel information can be edited as needed. It is important to note that the merged parcel has an artificial number that should now be set to the appropriate value for the new parcel.

Note *When parcels are merged, any photographs, plans, and historic documents that are attached to either parcel are moved to the resulting merged parcel.*

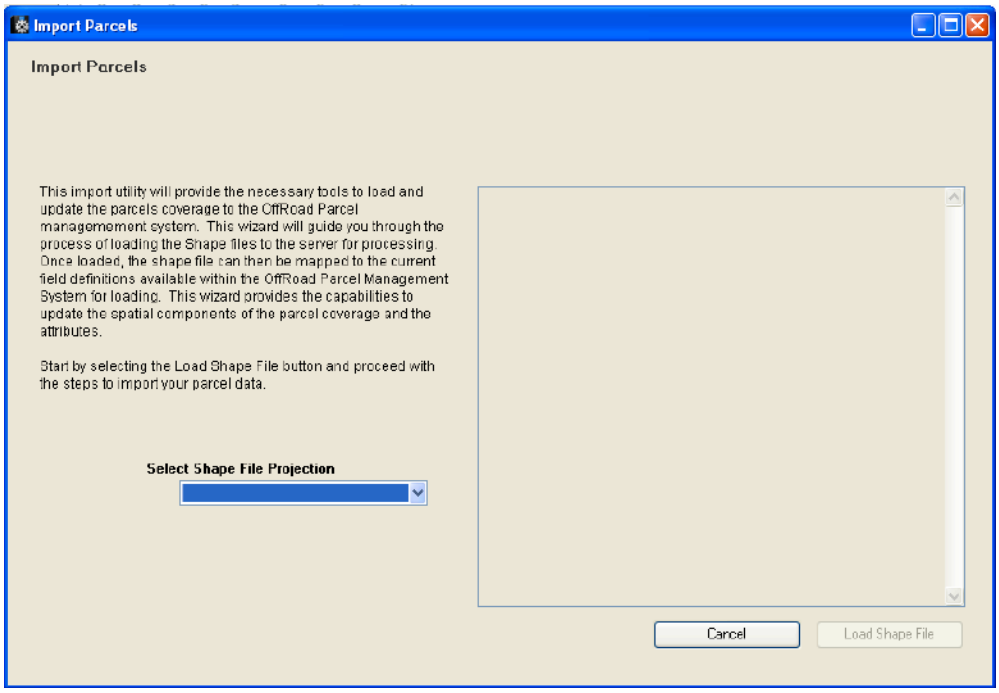
Importing Parcels from Shape Files

Offroad GIS provides full support for importing parcel data from Shape files. The import utilities support both the spatial component as well as the attributes tied to the Shape file. In addition to importing parcel data, the shape file import also provides a means of updating both the spatial and associated attribute data with existing parcels.

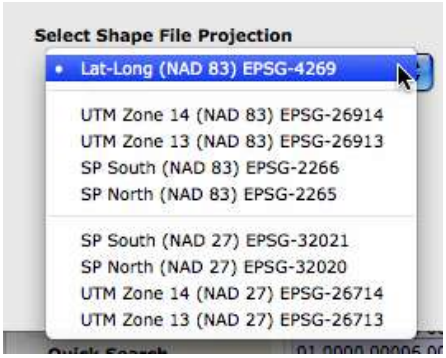
To access the Shape File import utility, select **Import Parcels from Shape File** from the Tools pop-up menu.



This function will display the Import Parcel Wizard.

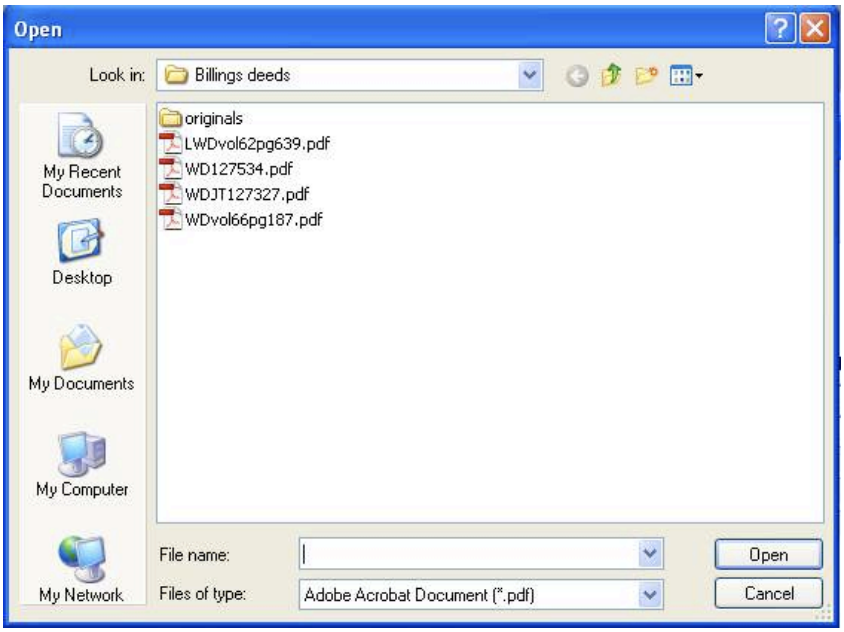


Before you can proceed, you must first select the Projection of the Shape File that is being imported. Offroad GIS currently supports common North Dakota projections including:



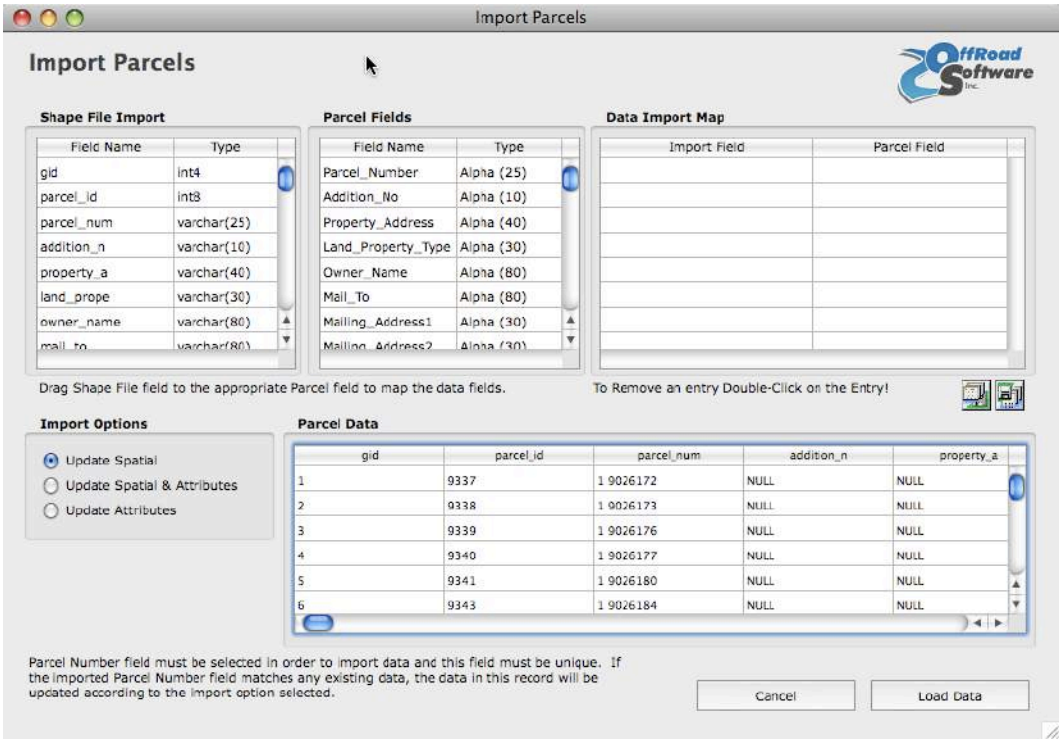
Once selected, the **Load Shape File** button will be enabled.

To upload the Shape file, click on the **Load Shape File** button. This will display the standard file selection dialog prompting you to select the shape file to import.

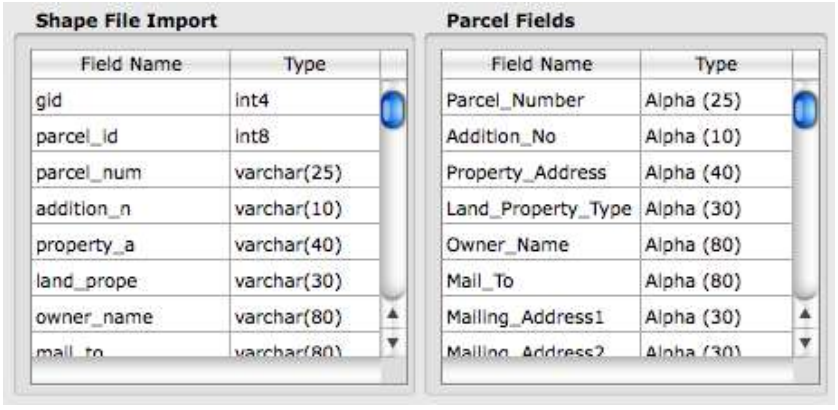


Once the shape file has been selected, a progress dialog will be displayed as each of the component files are loaded up to the spatial server.

After the files have been uploaded successfully, the Wizard will present data mapping options to set the appropriate fields that are to be loaded from the shape file as well as options for setting the import options to update spatial and attribute components from the incoming shape file.

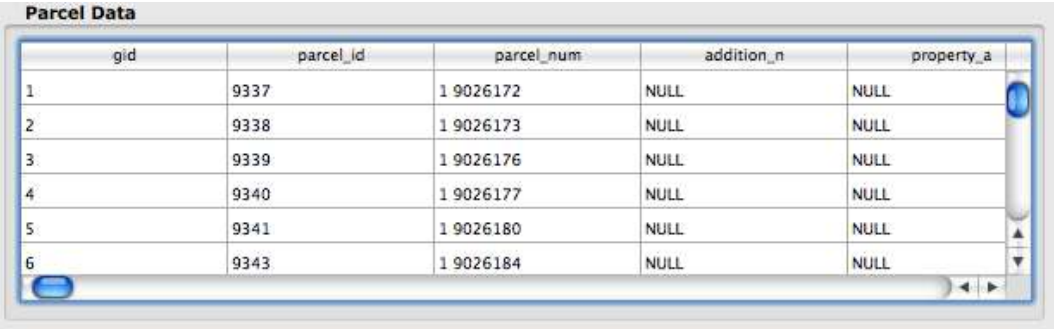


The data options page includes four separate areas that are used for different aspects of mapping data relationships. The first area includes the field definitions for the imported shape file and then the current field definitions for the parcel table within Offroad GIS.

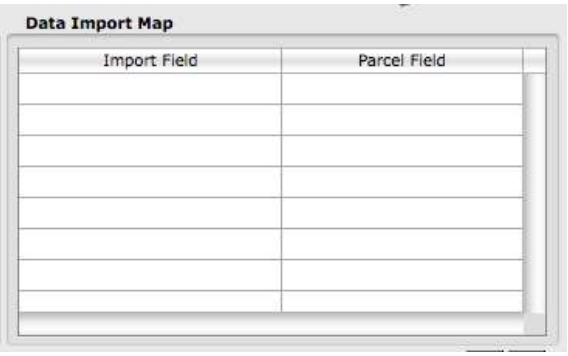


The second area includes the Import Options. This area is used to establish import options and the extent to which the data from the shape file is to be used for importing. Currently, the system supports using the shape file as a data source for updating either the spatial or attributes or both.

The third area is a Parcel Data preview area that allows you to review up to the first 100 rows of the imported shape file.

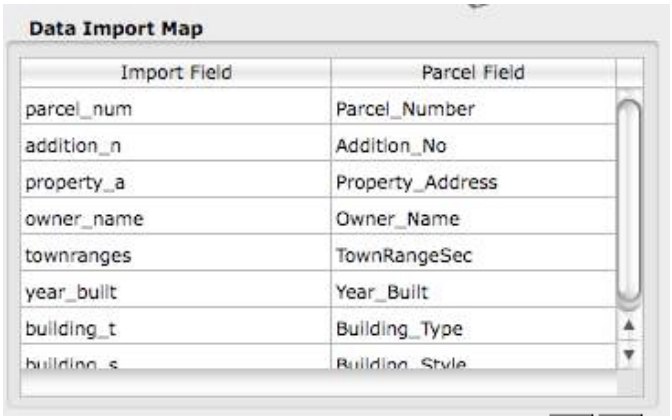


The fourth area includes the Data Import Map. This area is used to define the field mapping between the imported shape file and the internal parcel table.



In order to import parcel data, you must first map the import shape file fields to the internal parcel fields. This is accomplished by dragging the fields to be mapped from the Shape File Import list and dropping them on the appropriate field in the Parcel Fields list. The data type is important because the wizard will not let you mix data types. For example, it is not possible to drop an alpha or varchar field to a numeric (Longint, Real, or Integer field). When you drag the field to the appropriate target, the field pair will be added to the Data Import Map list. If you drag a field and it does not match the Parcel Field type, an error will be generated and displayed similar to the following dialog. When this occurs, the associated field pair will not be added to the Data Import Map list.

As you map individual field pairs they will be added to the Data Import Map as shown below. The order that the fields appear in the Data Import Map is not important.



If you have need to remove an entry from the Data Import Map, double-click on the row that you wish to delete and it will be removed.

While mapping the data is a simple point-and-click process, this process can become tedious if you need to import data frequently. Therefore, you can save the data map options to disk so that it can be restored for later use. The data map files are stored in a proprietary format so they will be unreadable from any other process or application.

Note *Using a stored data map will only be relevant if the attributes associated with the shape file from which the data map was created are the same as the shape file to be imported using the data map.*

Once the data map has been defined, select the appropriate Import Option. The import wizard provides three options.

- Update Spatial

- Update Spatial & Attributes

  and

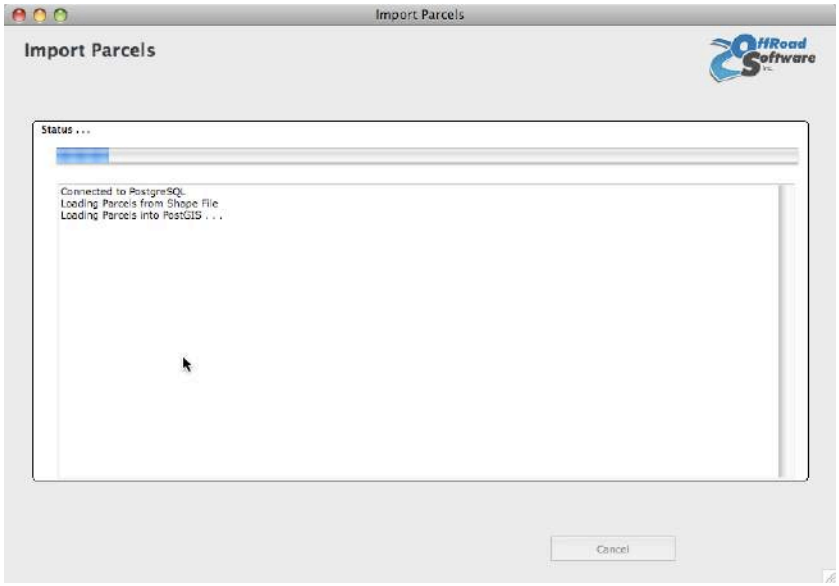
- Update Attributes

Regardless of the Import Option selected, Importing data from a shape file uses the parcel number as the primary key. If the parcel number is not mapped, you will be unable to import data from the shape file.

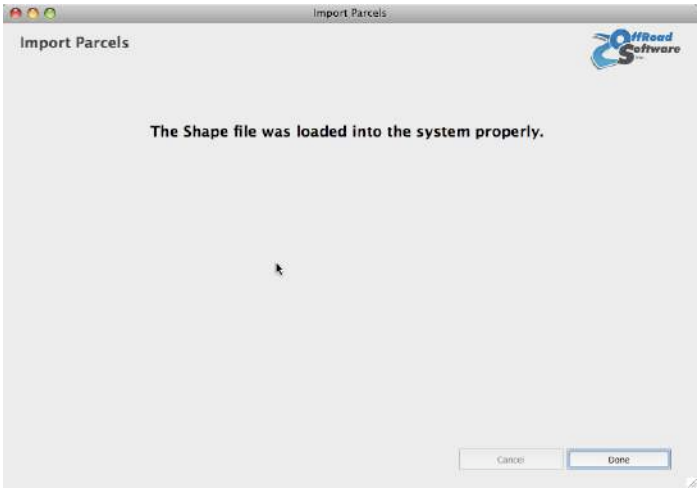
All of these options use a similar approach in that they will create the record if no existing record matches the import parcel number. However, if an existing parcel exists that matches the Import parcel number, the existing record will be updated to match the imported data. Only the mapped data attributes will be updated. This provides an effective means of updating selected fields. Likewise, if the Imported parcel represents a new record, only the fields that are mapped will be populated with the new record.

Note *If the Update Spatial option is selected, only the spatial data will be updated. This means that if you have mapped other fields in addition to the parcel number, they will be ignored.*

Once you have mapped the data fields and selected the import option, you are ready to load the parcel data. To load the parcel data, select the **Load Data** button to load the relevant data.



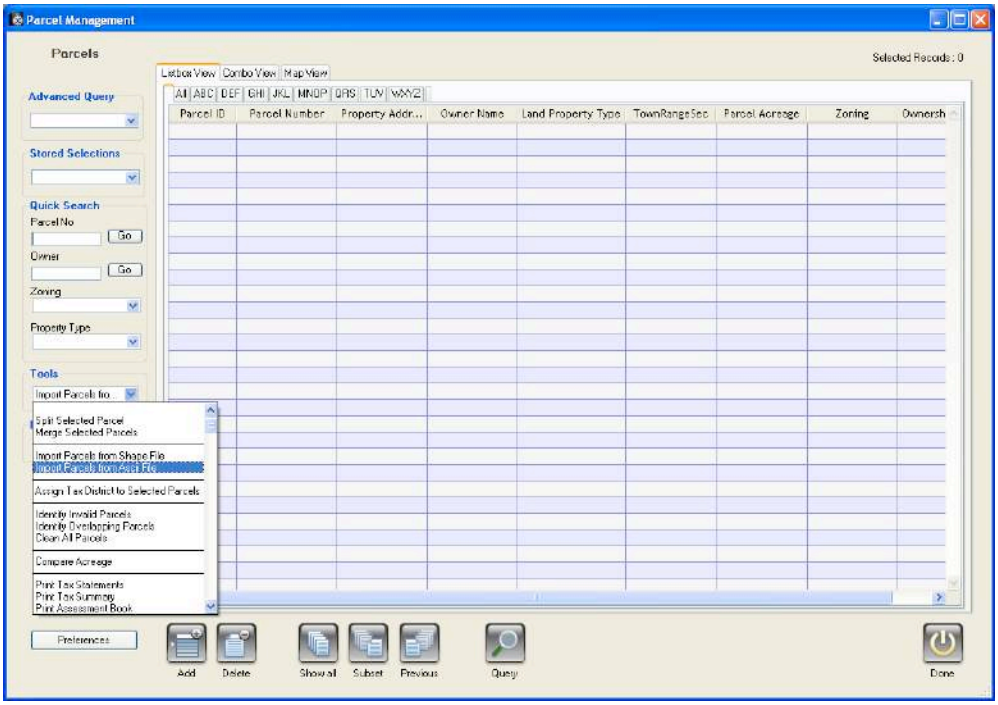
If the data is loaded successfully, the following dialog will be displayed. If it does not the resulting Error dialog will be displayed. A stored selection will be created from the imported parcels.



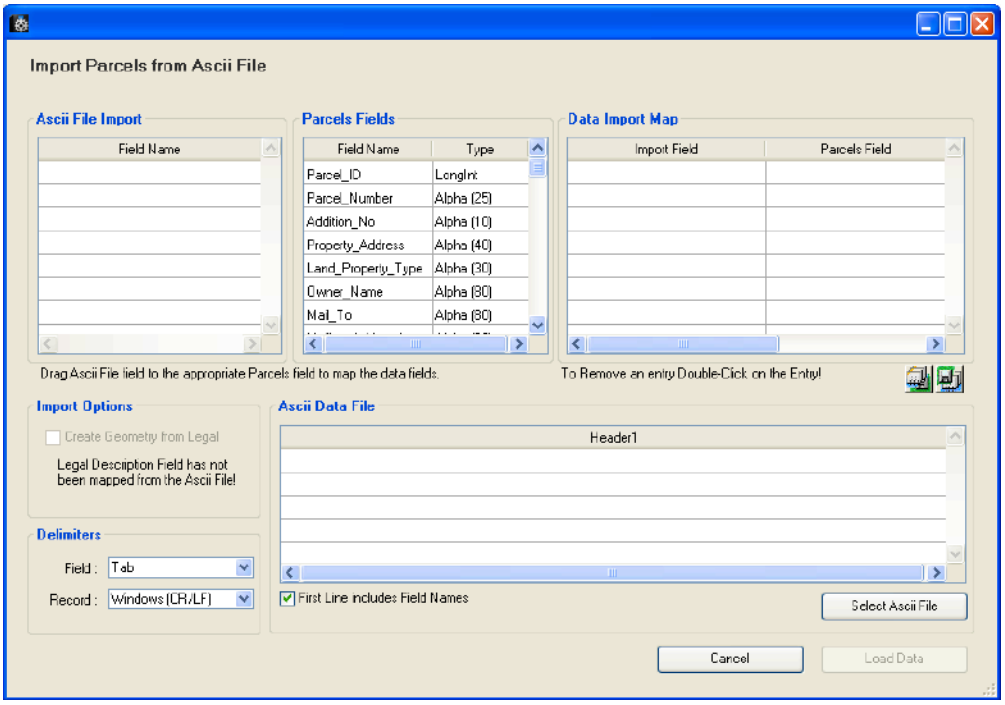
Importing Parcels from Ascii Files

Many counties manage parcel data in more traditional tabular management systems that lack any form of spatial data. In addition to supporting data import from shape files, Offroad GIS also supports importing data from standard ascii (text) files. This support includes the creation of spatial aspects of the data in the event that a proper legal description is included within the text file. While, Offroad GIS can create geometry from a legal description, this feature only supports simple legal descriptions.

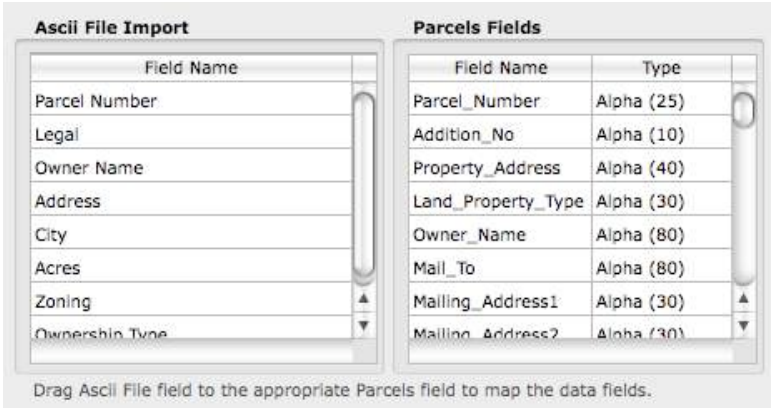
To import data from an ascii file, you must first select the **Import Parcels from Ascii File** option available under the **Tools** pop-up menu.



The Import from Ascii File wizard will be presented which will provide all of the tools necessary to define, field and record delimiters, field mapping, and spatial generation options for the imported data. The wizard includes four different areas that address different aspects of the import process.



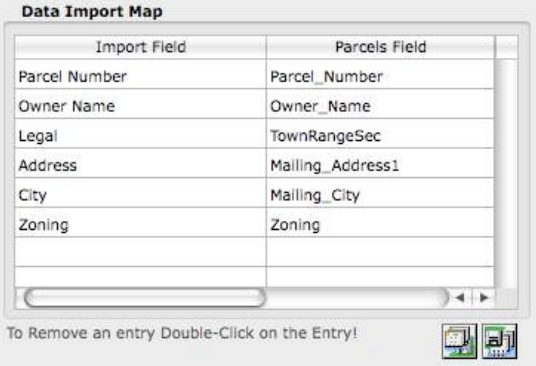
The first area includes the field mapping of the imported ascii file and the current field definitions of the existing parcel table in Offroad GiS.



The second area includes a preview area that presents the first 100 lines of the ascii file.

The third area allows you to specify whether or not to create geometry from the ascii file and to define both field and record delimiters.

The fourth area includes the defined Data Import Map for matching the fields from the imported ascii file to those of the internal parcel data table.



In order to import parcels:

- Set the Field and Record delimiters.
- Use the **Select Ascii File** button to select the Ascii file for importing. Selecting this button will present the standard open-file dialog from which you can locate and select the target ascii file.

  Once the file has been selected, the first 100 records contained in the ascii file will be displayed in the preview area. At this point, you can determine whether or not the ascii file contains a header line. If it does contain a header line, click

the **First Line includes Field Name** check box so the import process will not attempt to save the header information into a record.

- Map the ascii fields to the corresponding Fields of the parcel table.

  This is accomplished by dragging the field from the Ascii File Import List and dropping it onto the corresponding field in the list of Parcel fields.

  As fields are dragged and dropped onto their corresponding parcel fields, entries are added to the Data Import Map.

In order to delete an entry from the Data Import Map, simply double-click on the entry and it will be removed from the list.

Note *The order of the fields listed in the Data Import Map is not important to the import process.*

While mapping the data is a simple point-and-click process, this process can become tedious if you need to import data frequently. Therefore, you can save the data map options to disk so that it can be restored for later use. The data map files are stored in a proprietary format so they will be unreadable from any other process or application.

Note *Using a stored data map will only be relevant if the attributes associated with the ascii file from which the data map was created are the same as the ascii file to imported using the data map.*

Just as with importing parcels from a shape file, importing parcels from ascii files will attempt to match the imported parcel number with any matching parcel number currently in the database. If an existing parcel exists that matches the Import parcel number, the existing record will be updated to match the imported data. Only the mapped data attributes will be updated. This provides an effective means of updating selected fields. Likewise, if the Imported parcel represents a new record, only the fields that are mapped will be populated with the new record.

Creating Geometry from Imported Ascii data

Offroad GIS supports the creation of geometry from simple legal descriptions through the import from ascii file process. The import process supports this function only if an appropriately formatted field from the ascii file is mapped to the "*TownRangeSec*" field within the Parcel table. If this field is not

mapped for import, the **Create Geometry from Legal** check box located in the Import Options area is not enabled.

If a properly formatted field from the ascii field is mapped to the "*TownRangeSec*" field, you can click on the **Create Geometry from Legal** check box and Offroad GIS will attempt to interpret the simple legal description contained within this field and create the appropriate geometry. This process will not accommodate more advanced legal descriptions such as COGO, but does provide a very effective means of converting simple legal descriptions. In many respects this could easily provide between 60 and 70 percent of the initial parcels for counties that do not already have their county map base established.

Supported Legal Descriptions

In order for Offroad GIS to create parcels from simple legal descriptions, the legal description must be formatted specifically to accommodate this process. The following provides a detailed outline of the formatting necessary to generate geometry for parcel records.

Characters 1-3 describe the township (i.e. Township 125 North is specified as 125).

Characters 4-6 describe the range (i.e. Range 99 West is specified as 099 and must be appropriately padded by 0's in the event that the Range is less than 100).

Characters 7-8 describe the section (i.e. Section 25 is specified as 25 and must be appropriately padded by 0's in the event that the Section is less than 10).

The remaining characters are used to describe the quarter, quarter-quarter, quarter-quarter-quarter, etc. Each subdivision is comprised of 2 spaces. The supported descriptions are listed below:

NE - NE 1/4

SE - SE 1/4

SW - SW 1/4

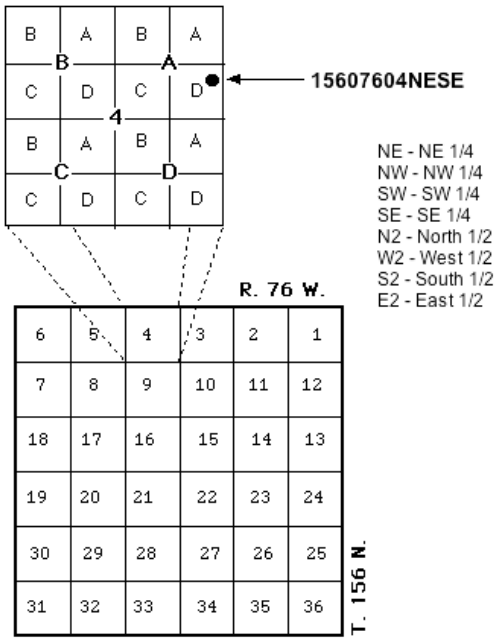
NW - NW 1/4

N2 - North Half

E2 - East Half

W2 - West Half

S2 - South Half



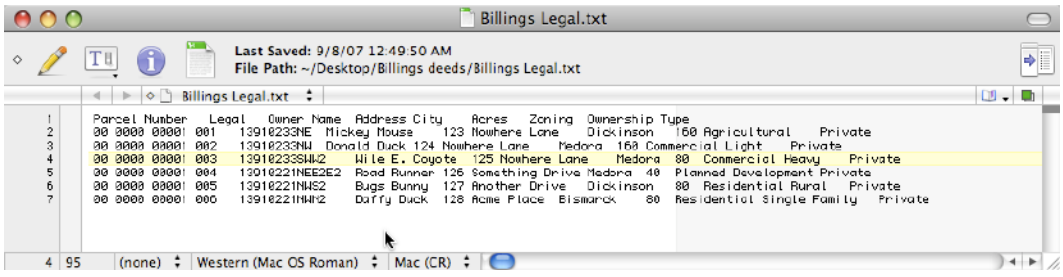
An example of a properly formed legal description follows:

15607612SWSENE represents the NE 1/4, of the SE 1/4, of the SW 1/4 of Section 12, Township 156 North, Range 76 West.

14510225NWS2 represents the South 1/2, of the NW 1/4 of Section 25, Township 145 North, Range 102 West.

Sample Text File

The following is a sample text file that can be used to import parcel data from an ascii source. In order to use a text file, the file must be a delimited ascii file. Common record delimiters include tabs or commas. Spaces can not be used as delimiters.

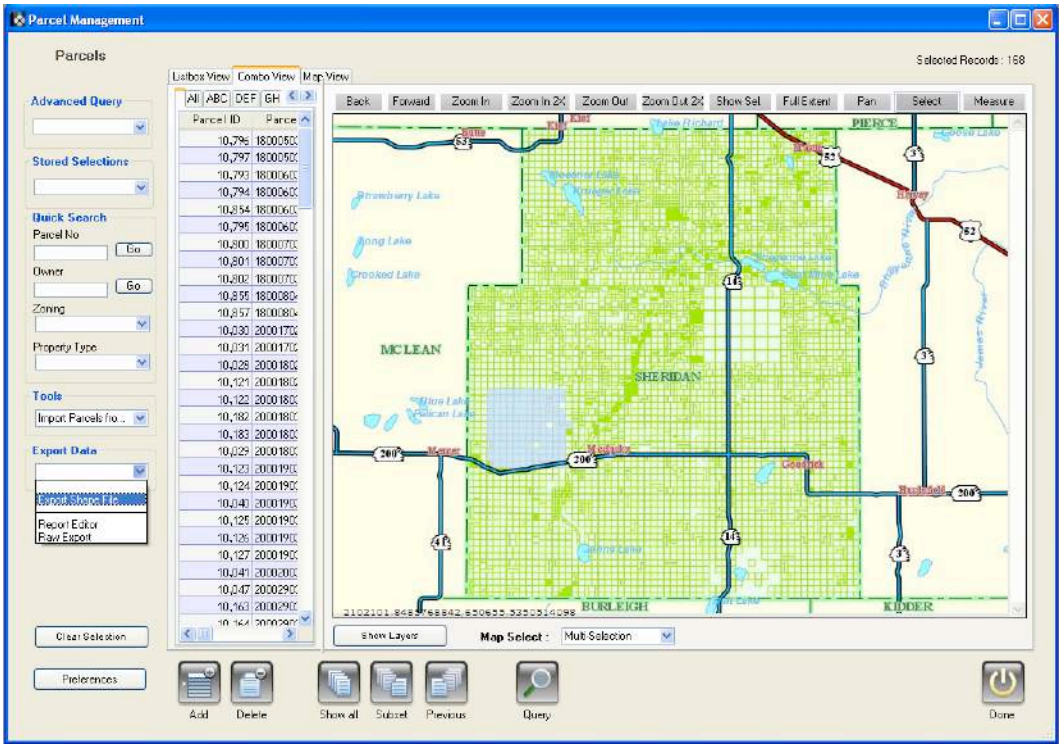


Exporting Parcels to Shape Files

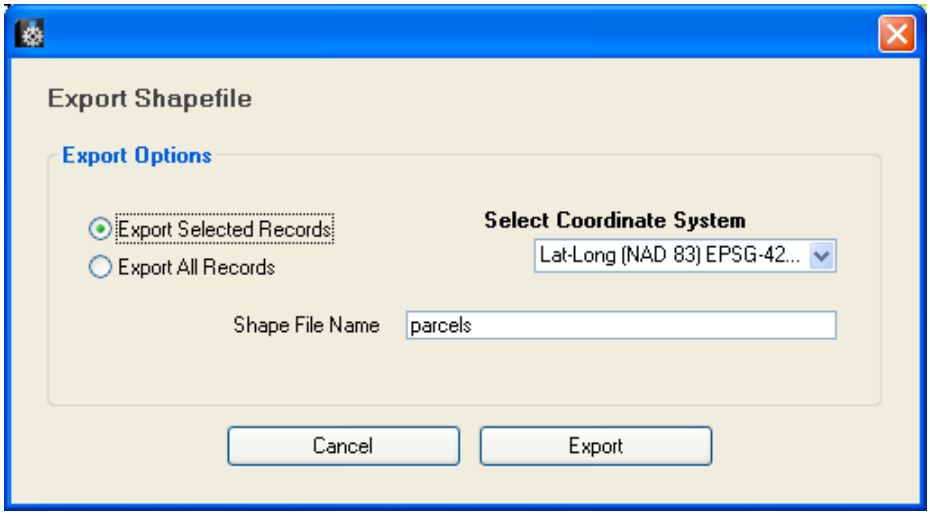
Offroad GIS provides the necessary utilities to export your parcel data to a standard shape file format. The export utilities allow you to export either a

user selection or the entire database. The utilities also support options to export the shape file into a variety of standard projections.

In order to export parcel records to a shape file, select the parcels that you wish to export in the record selection list. Then select the Export Shape File option under the Export Tools pop-up button.

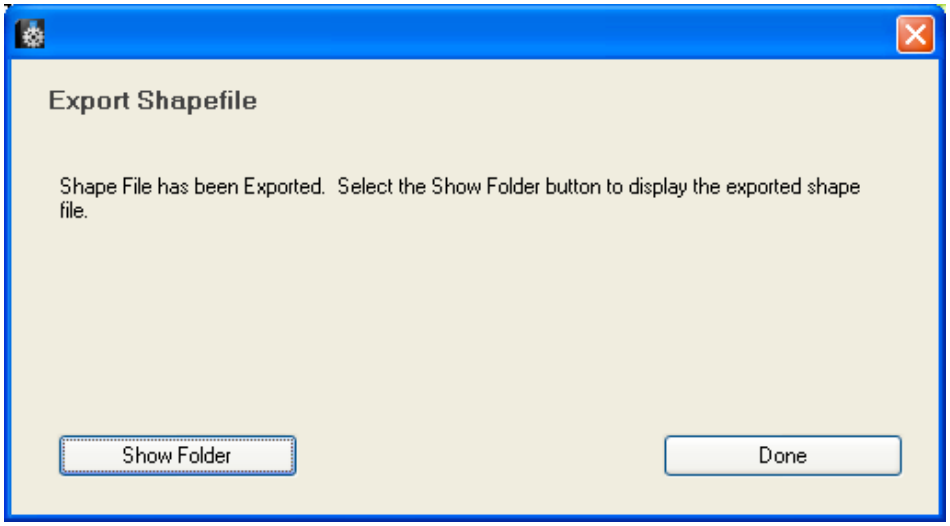


This will present the Export Shapefile dialog from which you can elect to either export the current selection of parcel records or all parcel records. This dialog also provides options to set the name of the export shape file and select the coordinate system and the associated projection or the export file.

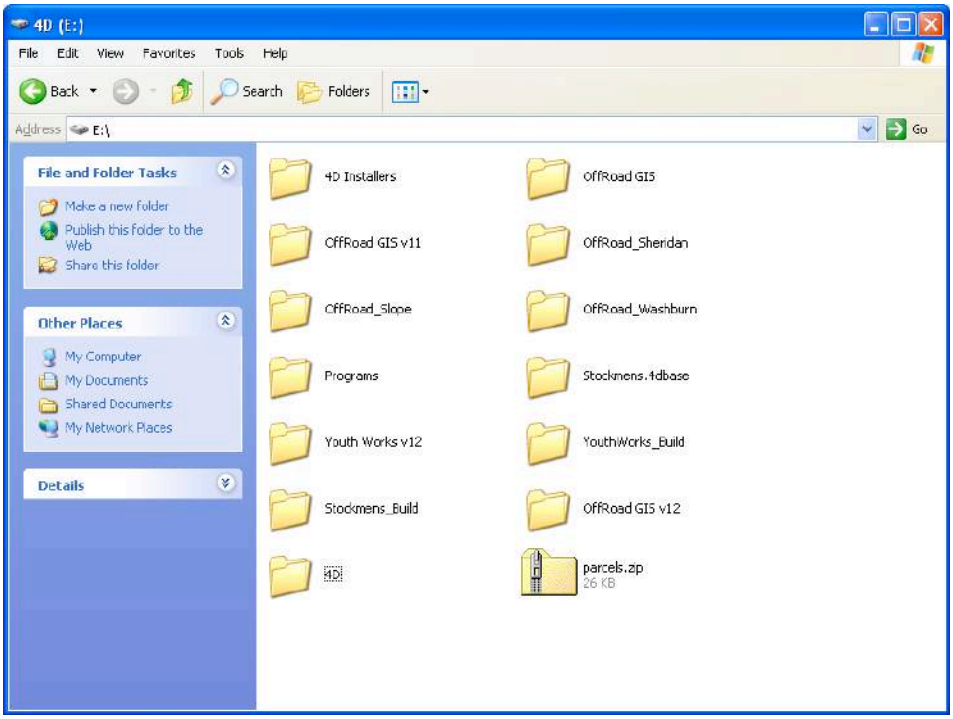


Once you have set the coordinate system parameters and the export file name, click on the Export button to export the data. The standard file directory will be presented from which you can select the directory that you want to target for the export file.

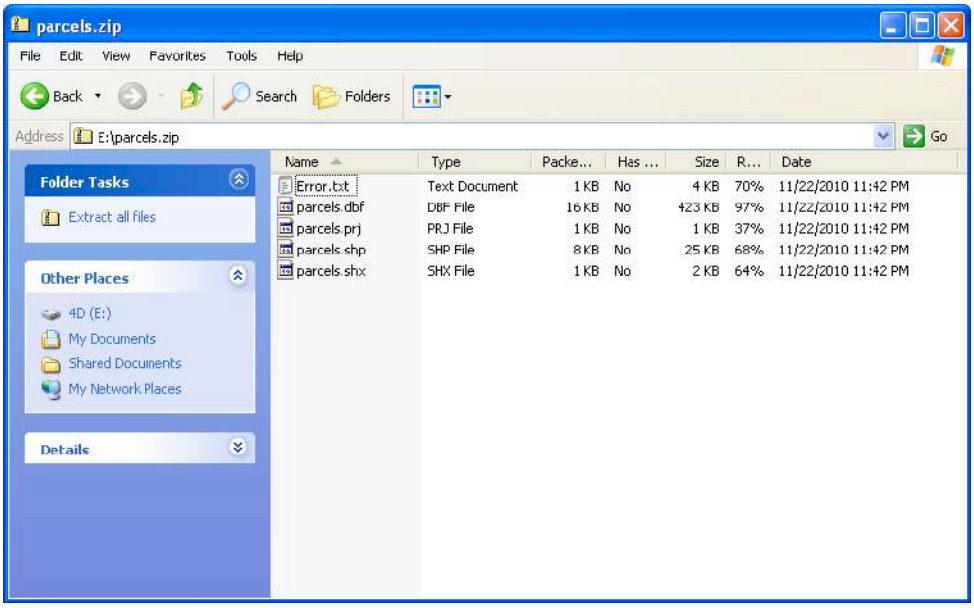
Select the OK button to proceed with the export process. A progress dialog will be displayed during the export process. Once the files have been created, an export status dialog will be displayed.



The Show Folder button can be used to make the destination folder that was selected using the folder selection dialog box active in the foreground. The shape file suite is exported in a zip archive.



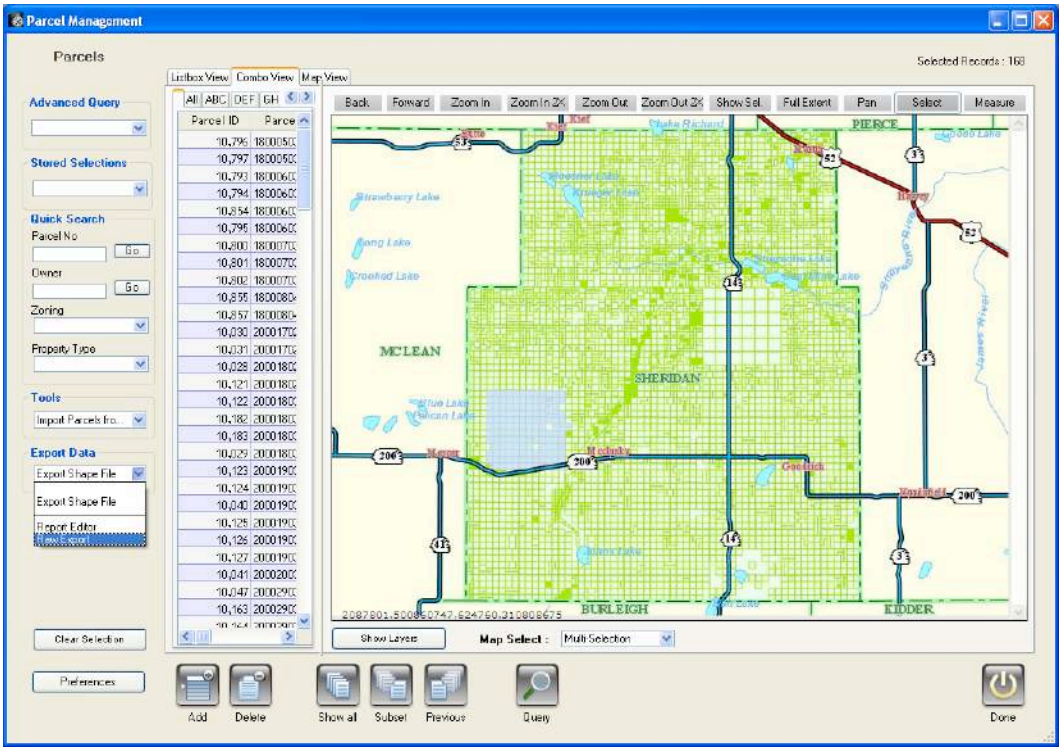
The zip archive contains the typical shape file component including the .dbf, .shp, .shx, and .prj files. In addition, an Error.txt file is included that will contain a log of any errors that were generated during the export process.



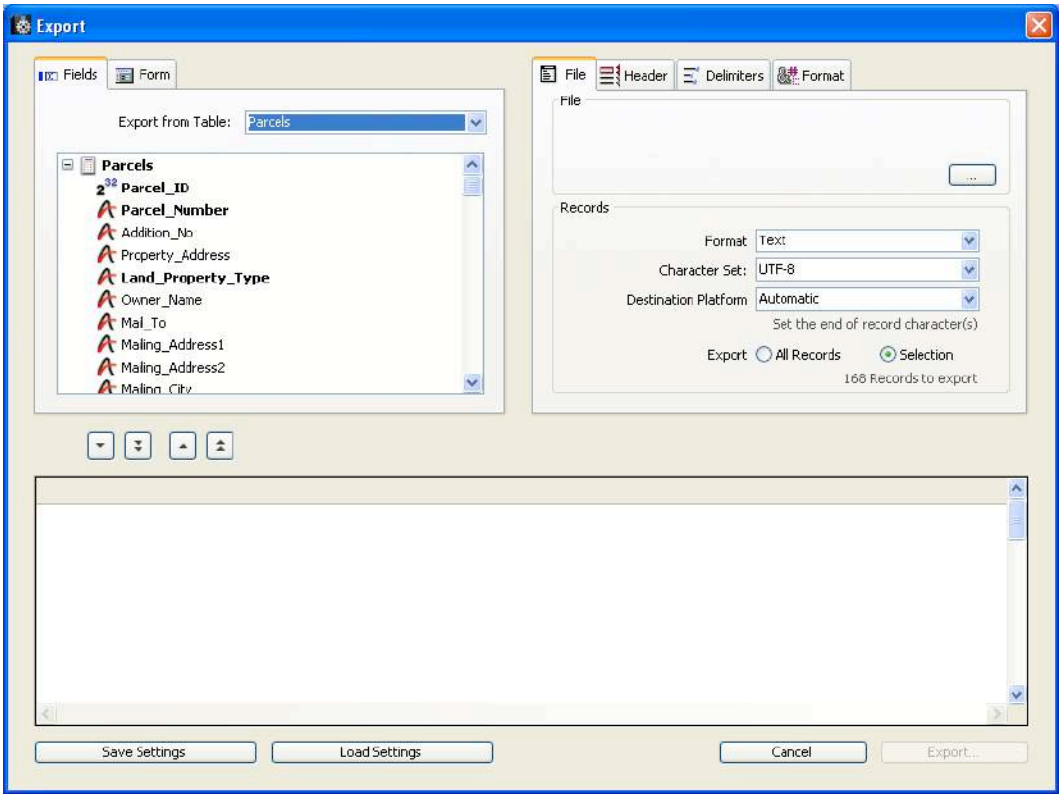
General Data Export

Offroad GIS supports a very flexible data export editor that is designed to provide simple point and click tools to export all of the parcel data or selected components of the data. This type of export primarily targets the attribute data and does not provide any spatially enabled export formats. Currently, Text, Fixed Length Text, DIFF, SYLK, DBF, 4D, and XML formats are supported for data export.

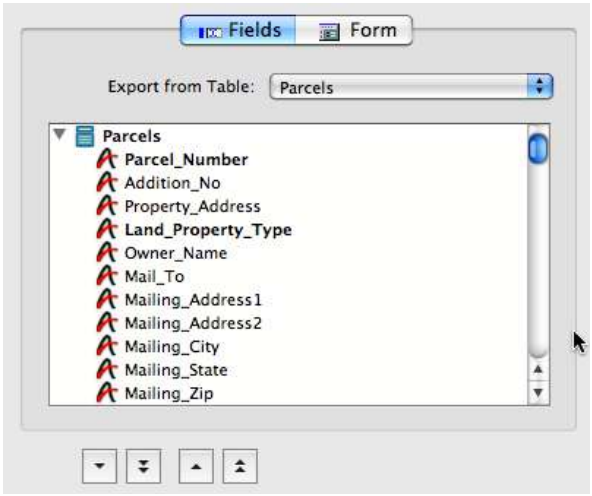
In order to export data using the data export wizard, select the Raw Export option of the Export Data pop-up menu.



This will present the data export wizard from which you can define the data, format, and the export file format for the selected data.



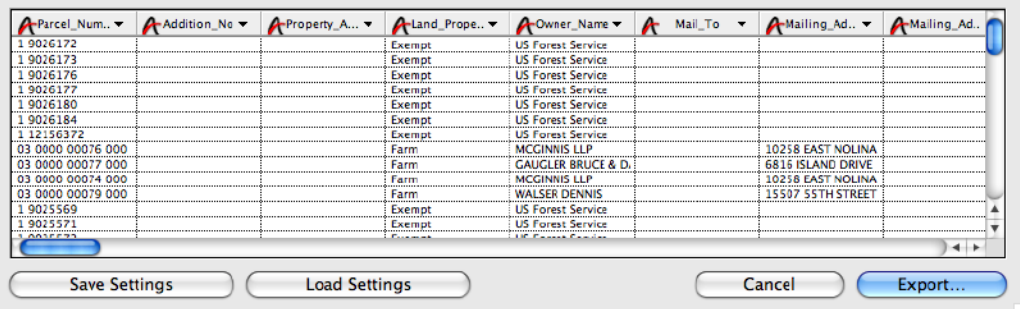
The data export wizard consists of three parts. The first part is the data source which allows you to select the table and its associated fields for data export.



Offroad GIS does not currently support the Form tab button, so the only available option is the Fields data tab. When selected this presents all of the fields for the selected table. You can select any table from which to export data, but you will likely only need to export data from the Parcels table. In order to select the fields that you want to export, click on the field and then

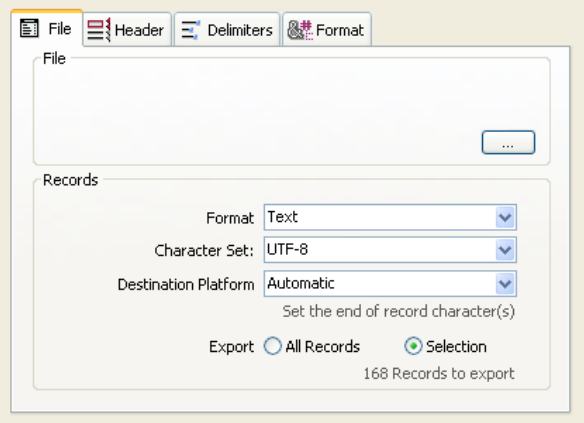
click on the single down arrow or double-click on the field. Either option will place the field in the data export table in the bottom half of the dialog. You can repeat this process for each field that you would like to include in the exported data. If you want to export all of the fields in their default order, click on the double-down arrow.

The second part of the data export dialog is the data table which is displayed in the lower half of the export dialog.

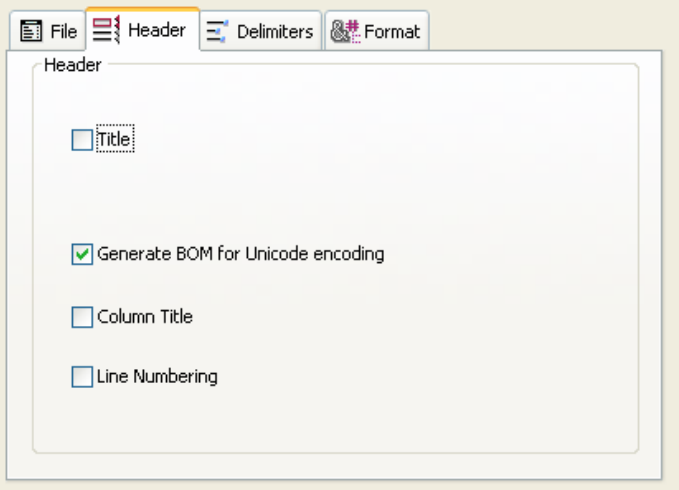


From the data table you can select each column to set the formatting, remove it from the field or change the source field. In order to remove a column, select the column and then click on the single up arrow button. If you wish to clear the data export table, click on the double-up arrow. In order to change the source field associated with a column, click on the down arrow located within the column title. This will present all of the available fields associated with the export table selected above.

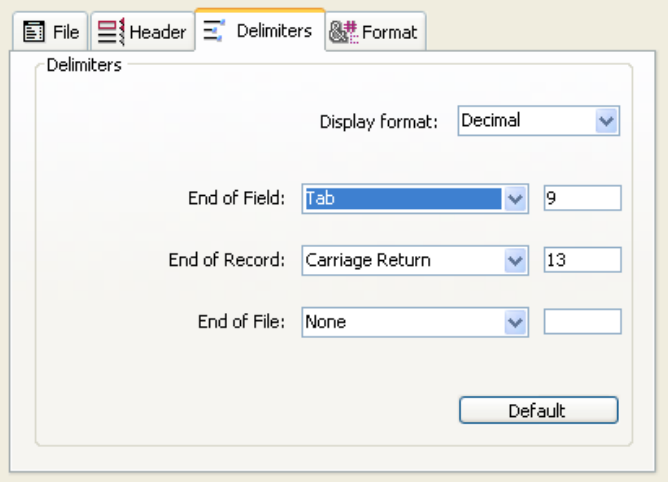
The third part of the export dialog contains the file definition and formatting instructions for the data export. The first tab includes the file information. From this tab, the file destination can be selected as well as the Format and Destination platform. This tab also provides the option to set the export to the current selection or to all records.



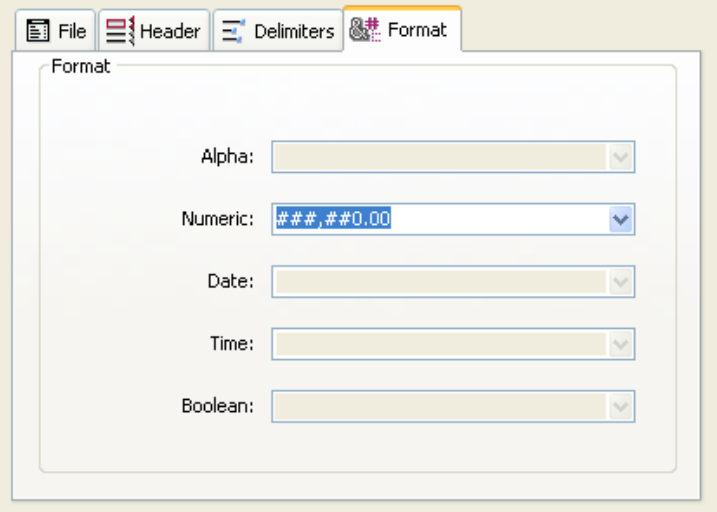
The second tab presents the tools to define the header information for the export file. This includes an overall Title line, individual column titles, and line numbering. Each of these are controlled by the respective check box.



The third tab presents the field, record, and file delimiters. The display format can also be selected which includes either character, decimal, or hexadecimal. For each of the delimiters, you can select relevant delimiters from the pop-up menu. If selected from here, the delimiter code will be updated. You can also type the delimiter into the delimiter field if you want to use one that is not available from the pop-up menu.



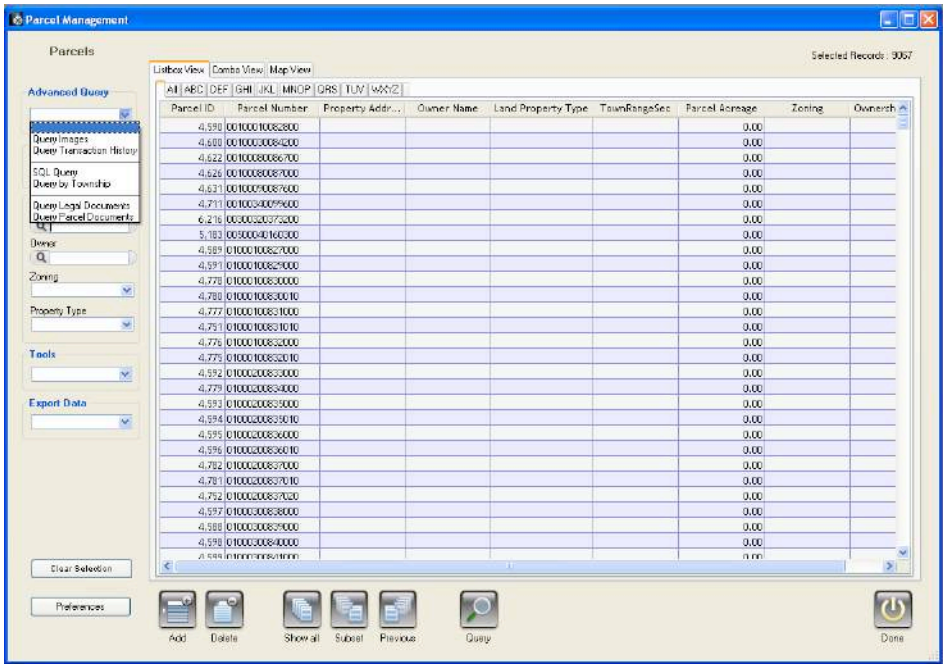
The fourth tab presents field formatting options. This tab displays formatting options available for every major field type. In order to apply the formatting, select the target field in the data export table. The appropriate formatting option will be enabled from which you can set the formatting for the selected field.



Once you have set all of the parameters for the data export, you can export the data by clicking on the Export button located at the bottom of the screen. However, setting up the data export can take some time. If you commonly export the parcel data using a particular format, you can save this format to a file and re-load it for future use. The Save Settings button allows you to save the current settings including field definitions, formatting, etc to a report format. This can then be restored at any time using the Load Settings button.

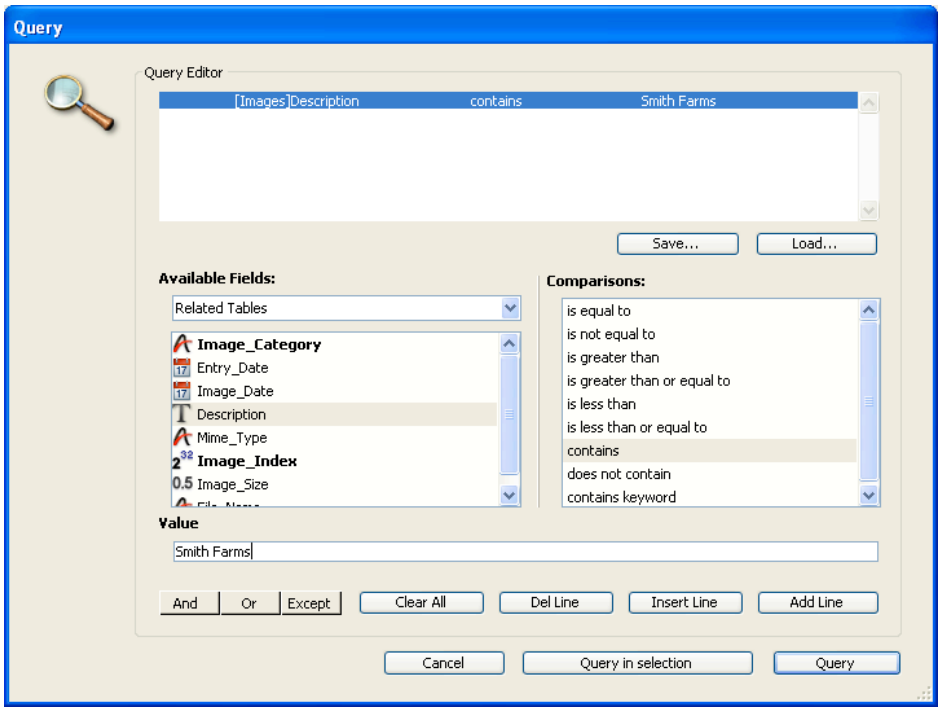
Advanced Queries

Advanced Queries include a number of complex query options that have been integrated into the Parcel Management console for purposes of enhancing the tools for building selections of parcel records. All of these options are available under the Advanced Query pop-up menu.



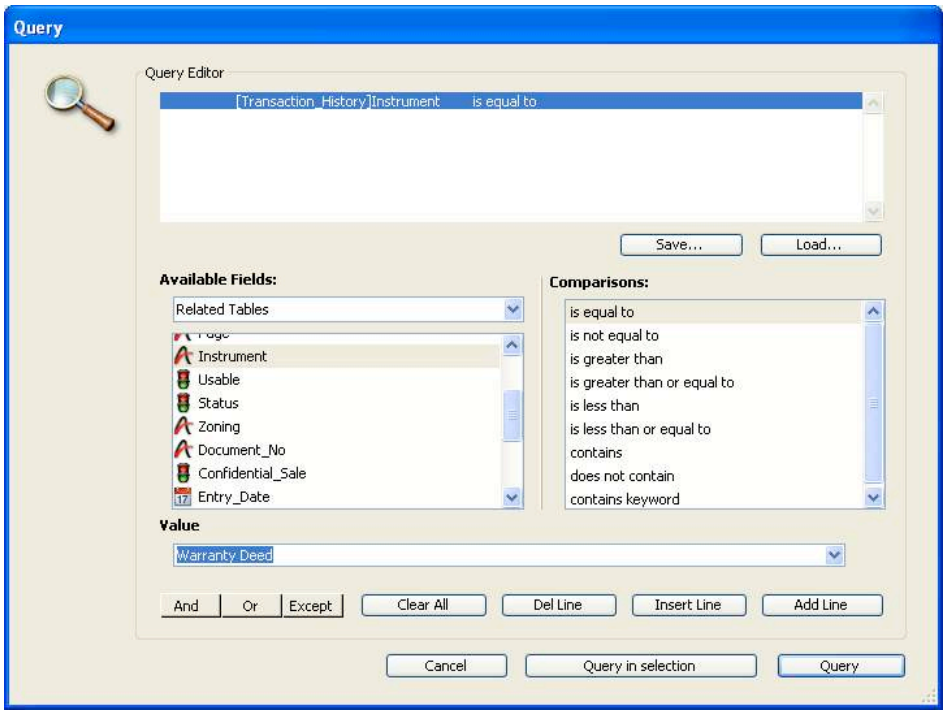
Query Images

The query images option presents the standard query editor. However, the focus of the query editor is the Images table. This query is performed on the Images table and then the resulting record selection in the Images table is related back to identify all of the related parcel records. This provides a mechanism that allows you to query the attributes associated with the image table including the original file name as well as the image description.



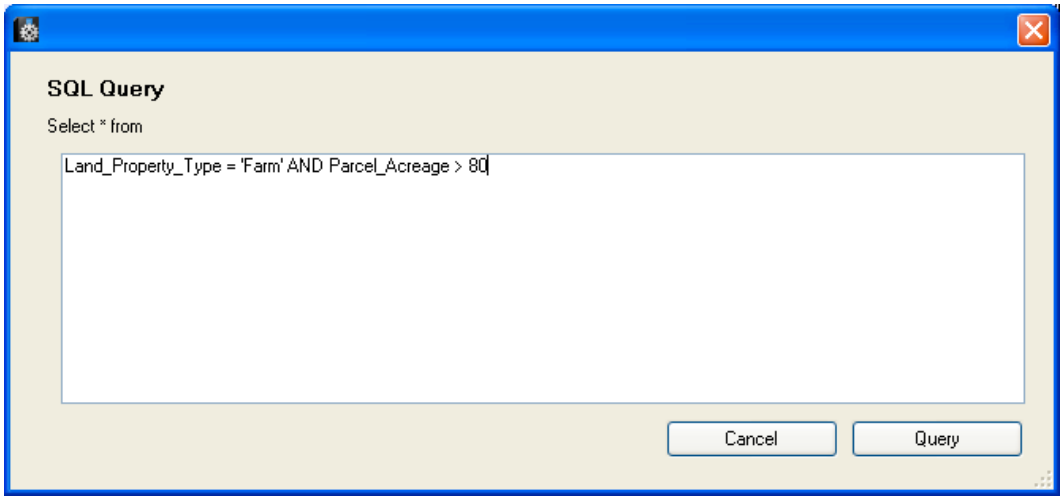
Query Transaction History

The Query Transaction History option presents the standard query editor. However, the focus of the query editor is the Transaction History table. This query is performed on the Transaction History table and then the resulting record selection is related back to identify all of the associated parcel records. This provides a mechanism that allows you to query the attributes associated with the Transaction History table including the Transaction Date, Book, Instrument as well as the Document Name.



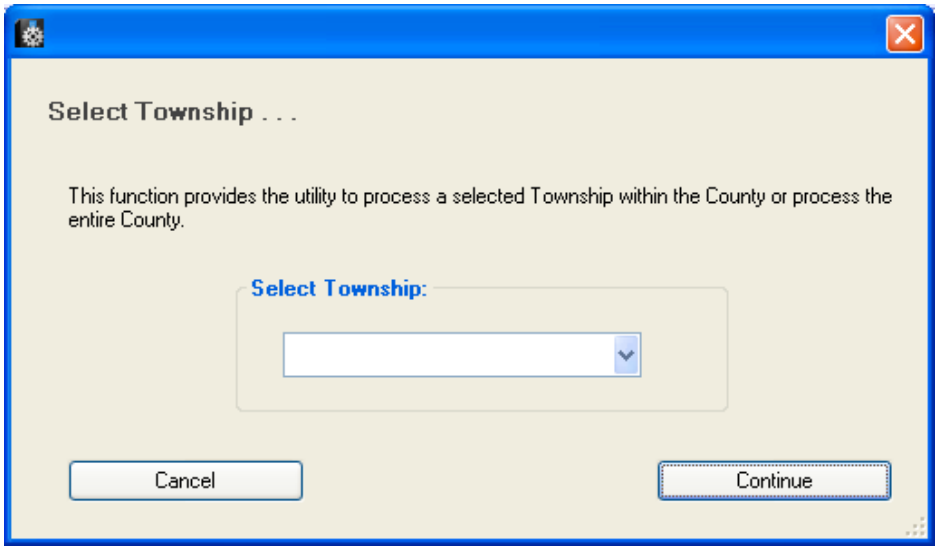
SQL Query

The SQL Query option provides the utility to develop more advanced SQL queries. The SQL Query dialog that is presented provides the utility to develop the where clause of a proper select statement. The where clause is the only aspect of the SQL select statement that is relevant because the other aspects of the select statement including the fields to be displayed and the from clause are embedded into the interface. SQL is a powerful query language and OffRoad GIS supports full ANSI 92 standards. Please refer to any SQL reference for the syntax required to develop a proper SQL where clause.

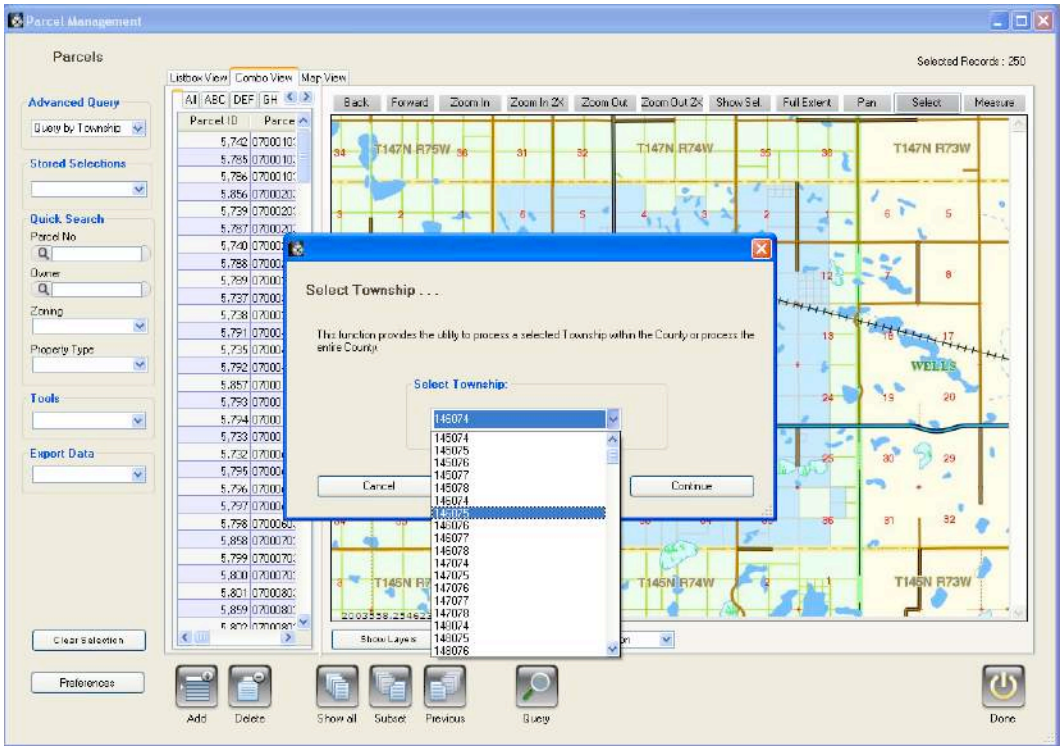


Query by Township

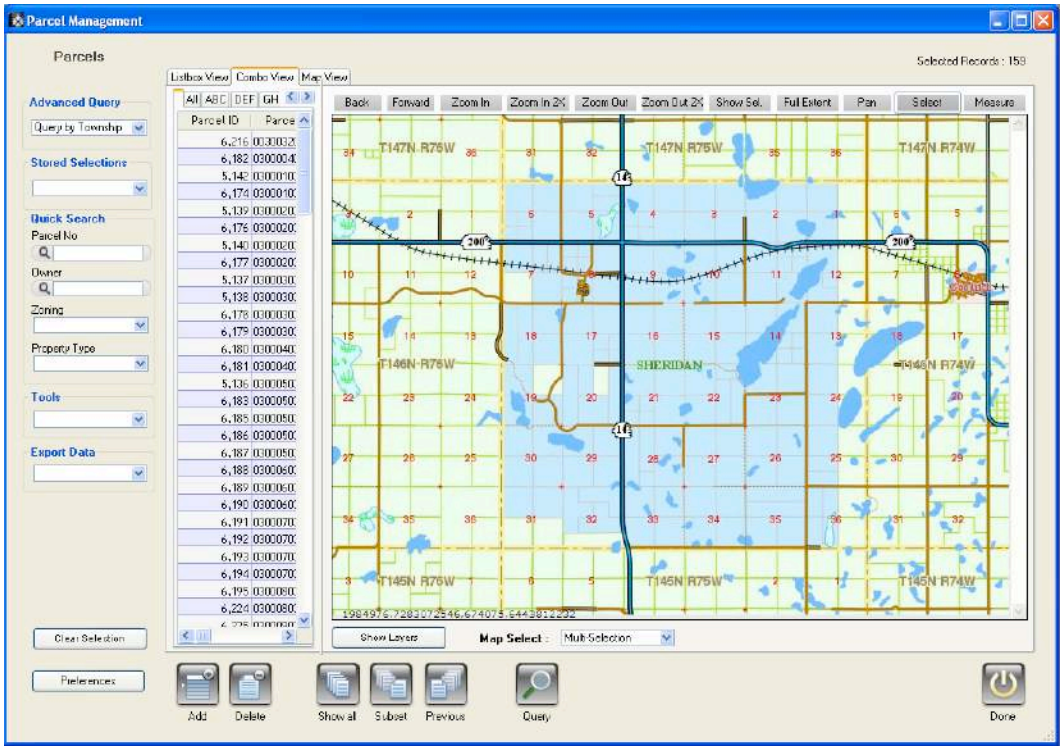
The Query by Township option provides a simple utility to query the parcels by the townships in your county. When selected, the Select Township dialog provides a pop-up list that includes all of the townships within your county. In order to perform the query, OffRoad GIS performs a spatial join between the selected township and the parcels. The query will return all parcel polygons that intersect the township polygon.



To perform the township query, select the appropriate township from the Select Township pop-up button. Then click on the Continue button.



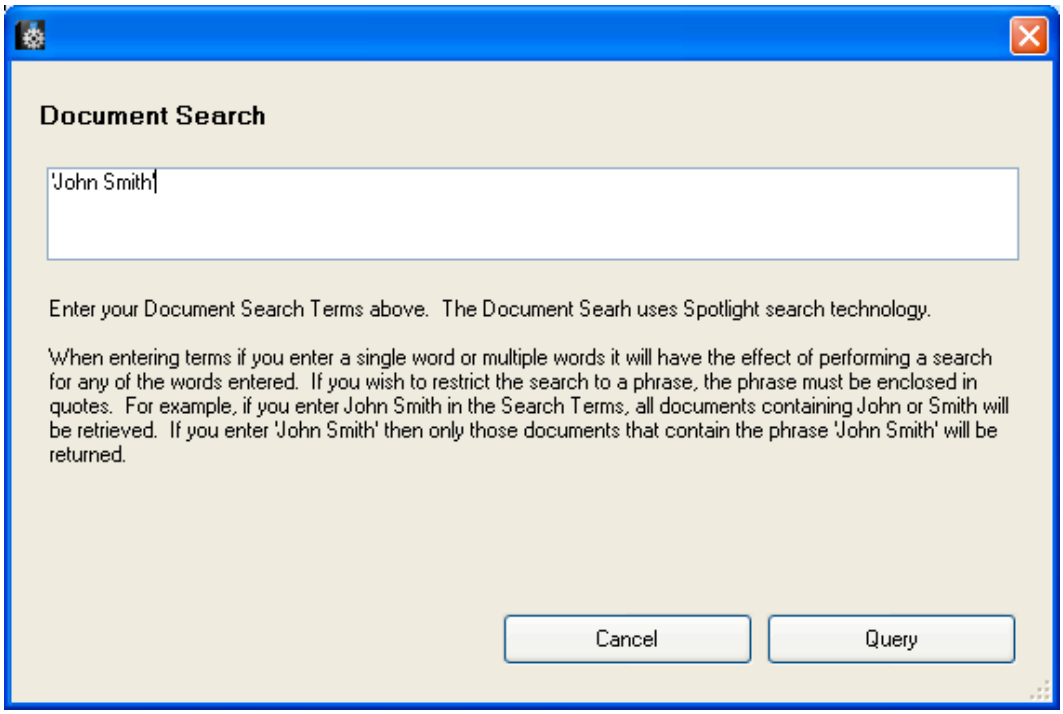
All parcels that intersect the selected township will be displayed in the selection listbox as well as the map interface if it is displayed.



Query Legal Documents / Parcel Documents

Both the Query Legal Documents and Query Parcel Documents perform the same type of function. As the name implies, the Query Legal Documents targets the Legal Documents and the Parcel Documents targets the Parcel Documents. In either case, the query performs a context search on the documents for the search string. Once the query is performed the documents that are found are cross-referenced back to the parcel records and the selection is presented in the Parcel Management Console.

Note - If the Documents loaded into the system have been OCR'd, the query will find the terms and the resulting document. However, if the documents were not OCR'd, they can not be searched.



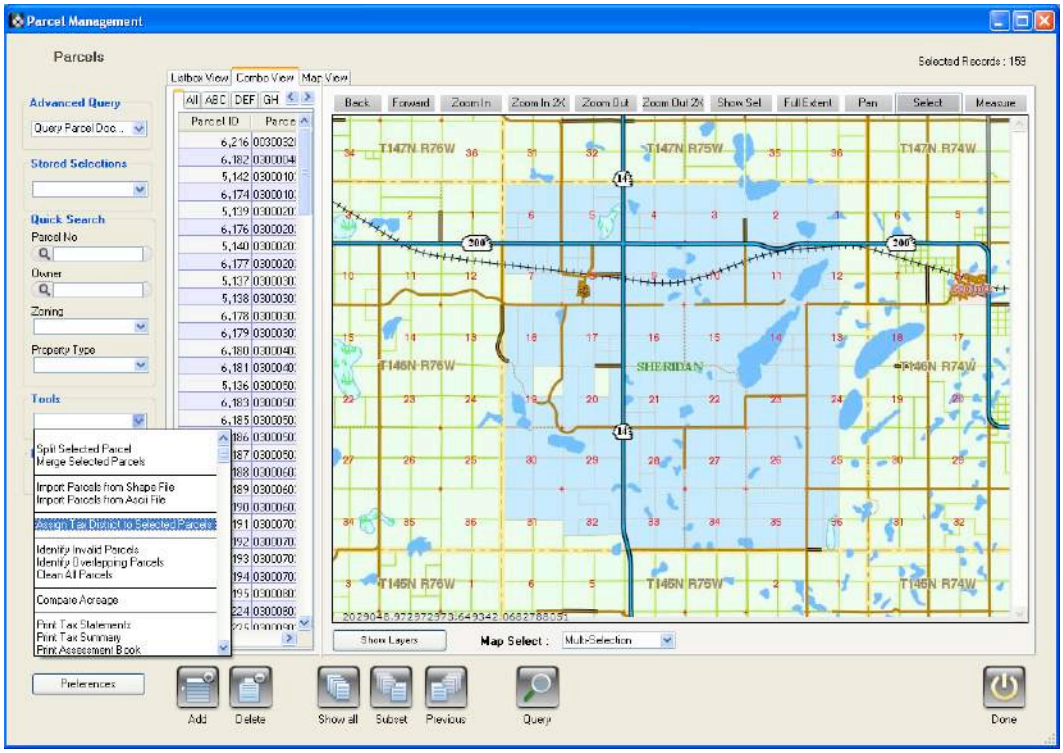
By default, the document query performs and AND search. This means that program looks for files containing all of the words that are typed. For instance, if John Smith is entered, the document search will find all occurrences of the word John and the word Smith. The search can be narrowed down by using quotation marks. In this case if "John Smith" is entered surrounded by double quotes, the search will only look for the occurrence of the exact term "John Smith".

Boolean Operators - Boolean operators can be introduced to enhance the document query. If a query is entered as "John Smith" OR "Bill Smith", any occurrence of either term will be returned. To find any files that contain

"John Smith" but not "Bill Smith", the terms would be entered as "John Smith" NOT "Bill Smith".

Advanced Tools

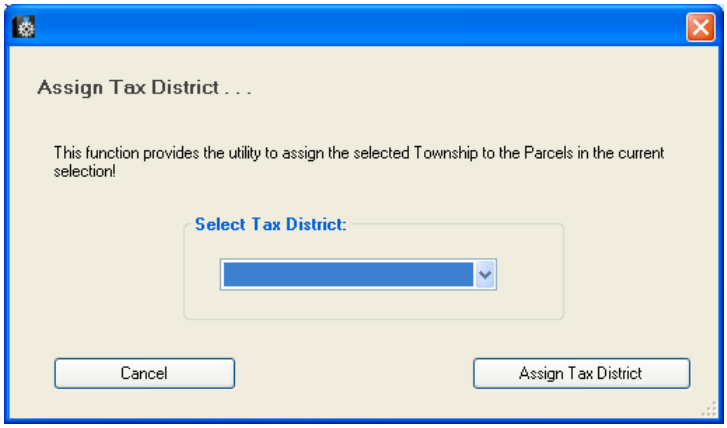
In addition to the tools available for splitting parcels, merging parcels, and importing parcels, there are additional tools that are available under the Tools pop-up menu of the Parcel Management Console. Each of these will be discussed in more detail in this section.



Assign Tax District to Selected Parcels

The Assign Tax District to Selected Parcels option under the Tools pop-up menu provides a simple method for assigning the tax district to a large selection of parcels. Each parcel can be edited individually, but this tool makes it easy to set the tax district for any parcels that are part of the current selection.

In order to set the Tax District, first select the appropriate parcels either from the map interface or by using any of the query options. Once the desired parcels are selected, click on the Assign Tax District to Selected Parcels from the Tools pop-up menu. This will display the Assign Tax District dialog.



From this dialog, select the appropriate Tax District from the Select Tax District pop-up menu. Then click the Assign Tax District button. The tax districts that are presented in the pop-up menu are managed through the System Preferences under the Administration menu.

Identify Invalid Parcels

The Identify Invalid Parcels option under the Tools pop-up menu performs a simple integrity test of the parcels in the system to determine if the geometry is valid. If the geometry of any of the parcels is found to be invalid, it is included in the resulting query and presented in the current selection for further review. Examples of invalid parcels would include parcels with lines that cross without an intersecting node or parcels with multiple nodes at the same point.

Identify Overlapping Parcels

The Identify Overlapping Parcels option under the Tools pop-up menu performs a simple integrity test to determine if geometry of any of the parcels overlap. Any overlapping parcels are included in the resulting query and presented in the current selection for further review. When selected, the Select Township dialog is presented from which the target parcels can be tested.

From the Select Township pop-up button, any of the townships within the county can be selected. The entire county can also be selected from the pop-up list.

Clean All Parcels

The Clean All Parcels option under the Tools pop-up menu provides a means of performing a clean operation on all of the parcels. The clean functions make every attempt to first snap the parcels to the GCDB control points if present, and then build the proper integrity within the parcel nodes to conform to adjacent parcels. This process is by no means perfect, and it should never be considered as a solution to sloppy data development. There is no substitute for good data development, and for best results, it is recommended that the parcels be built by utilizing the development tools within OffRoad GIS and taking advantage of the snapping tools to ensure data integrity. However, even when proper methods are applied there are times when errors will be introduced and the clean operations can be used to address some of these types of errors.

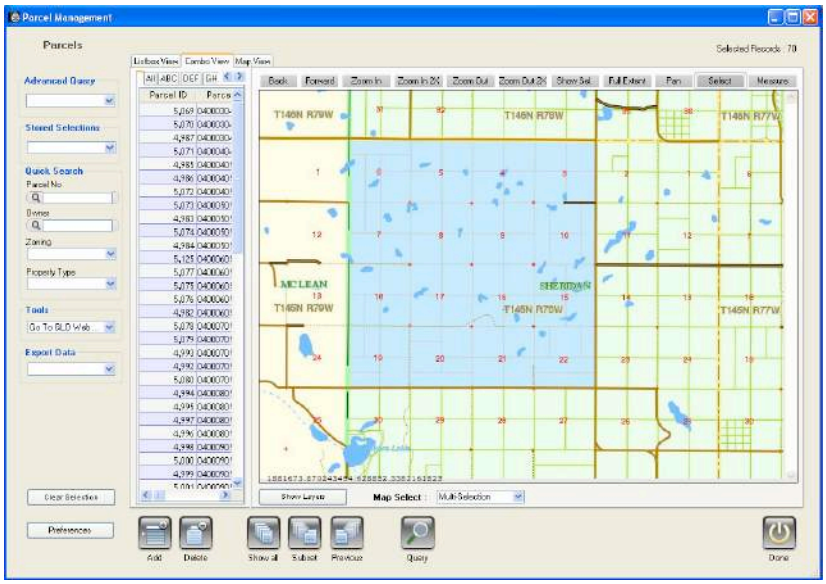
Once selected, the Clean All Parcels operation will present a dialog requesting the snap tolerance to be used for the clean operation. By default, OffRoad GIS uses 15 feet as the snap tolerance. The snap tolerance identifies the distance to be considered acceptable for purposes of snapping nodes for a parcel.

Note - Cleaning parcels is an automated process. It can result in the introduction of significant data errors in the event that snap tolerances are set incorrectly.

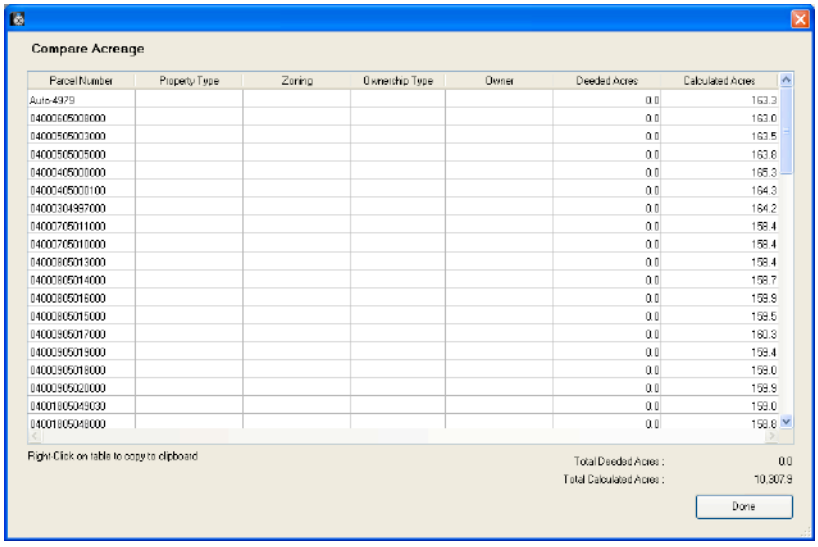
When cleaning the parcels, it is important to use a fairly small tolerance. Using a small tolerance will minimize the distance that parcel nodes can moved. This becomes more important when working with parcels with very dense nodes such as parcels along river boundaries, railroads, and other natural features. When cleaning parcels, it is recommended that a small tolerance be used initially. Once executed with a small tolerance, the integrity of the parcels can be tested again using the validity test and the test for overlapping parcels.

Compare Acreage

The Compare Acreage option under the Tools pop-up menu provides a means of quickly comparing the deeded acres and the actual acreage calculated from the geometry. Under most circumstances these acres will not be identical. However, it is often useful to compare the two to determine if there are any major anomalies between the deeded acres for the parcel and the acreage determined from the geometry.

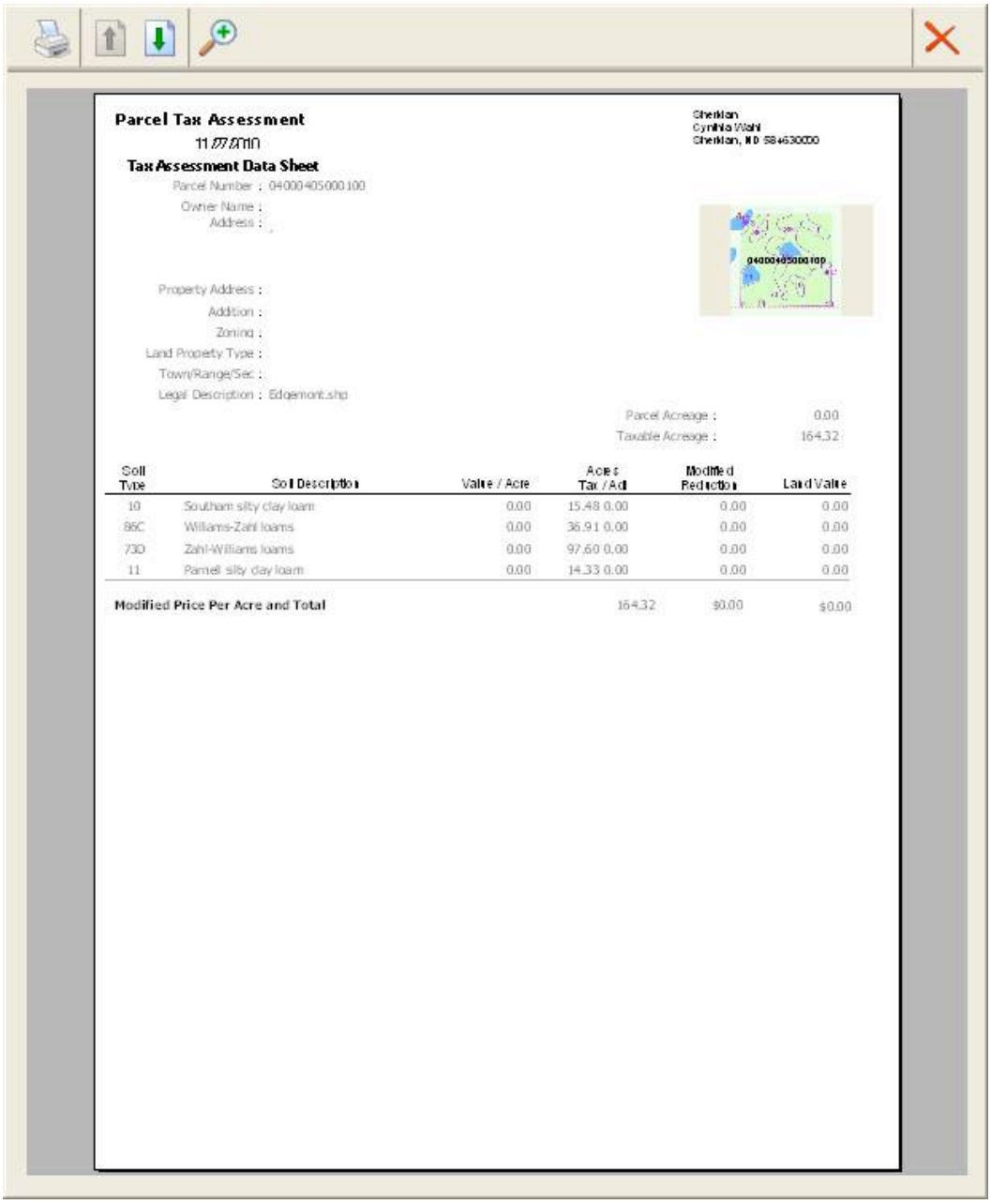


To compare the deeded acres with the GIS acres, select the parcels for which you want to make the comparison. Then select the Compare Acreage under the Tools pop-up menu. This will present the parcel information for the selected parcels. In order to preserve the data presented in the Compare Acreage dialog, you can right-click on the listbox and copy it from the Compare Acreage dialog to a spreadsheet.



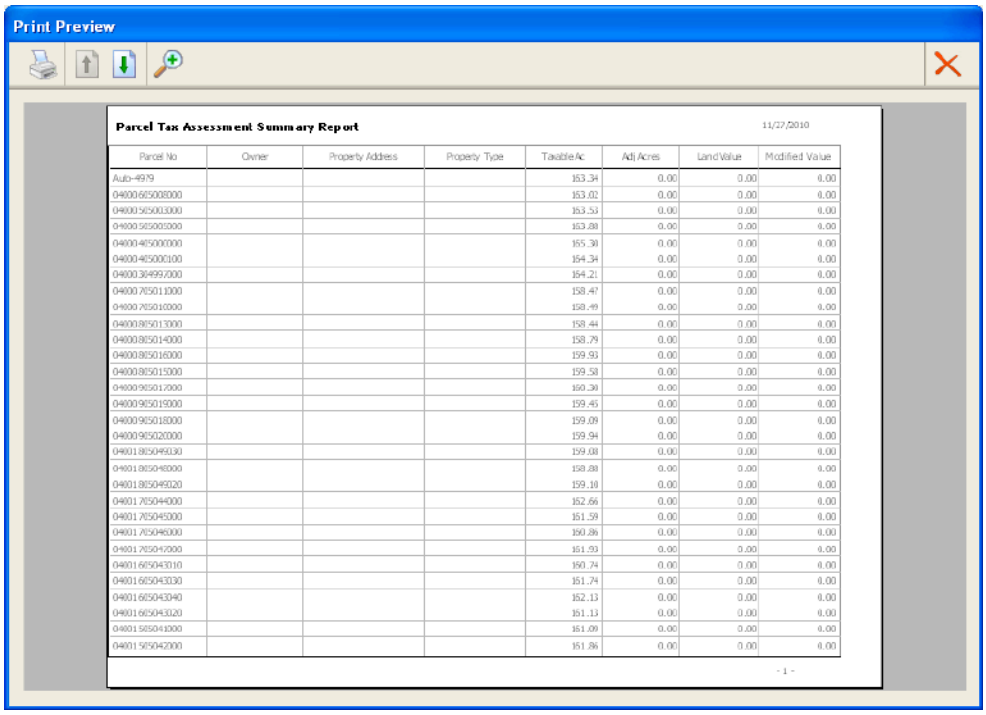
Print Tax Assessment

The Print Tax Assessment option under the Tools pop-up menu provides a means of quickly printing the tax assessment for a selection of records. The tax assessment that is printed is the same as is printed for an individual parcel under the Tax Info tab. In order to print the Tax Assessments for a selection of records, first make the necessary record selection. Once the necessary records are displayed in the current selection, select the Print Tax Assessment option under the Tools pop-up menu and the resulting print job will contain the individual Tax Assessment reports for each parcel in the selection.



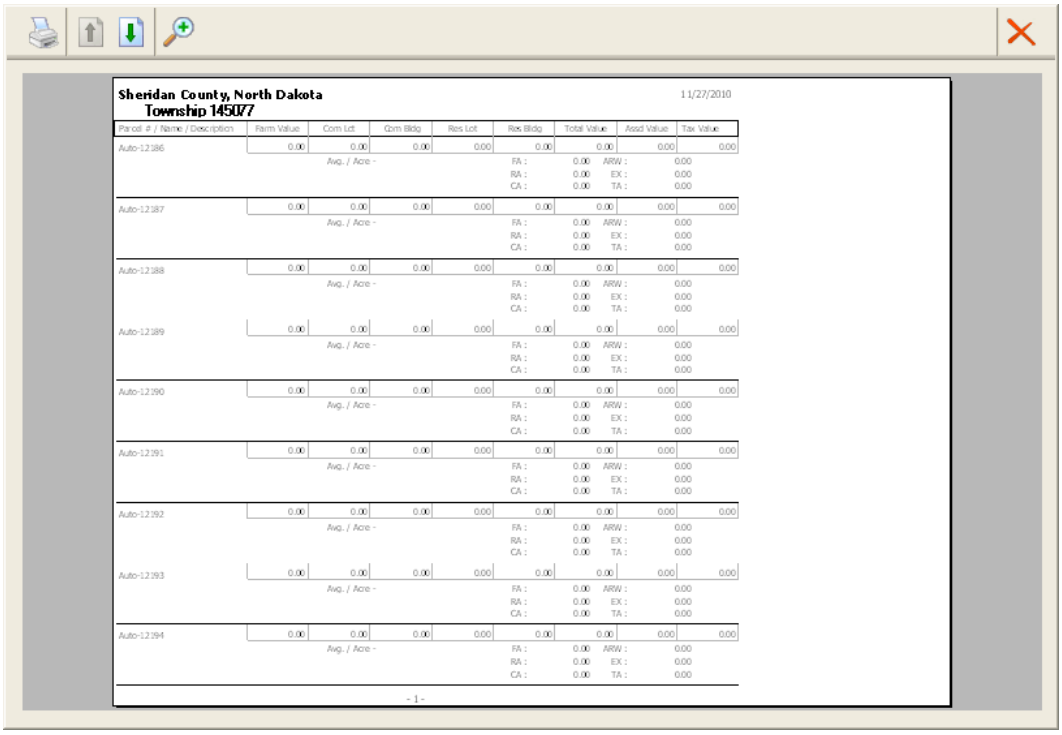
Print Tax Summary

The Print Tax Summary option under the Tools pop-up menu provides the utility to print the Tax Summary report. This report is printed for all parcels in the system regardless of the selection.



Print Assessment Book

The Print Assessment Book option under the Tools pop-up menu provides the utility to print the Assessment Book. After selecting the Print Assessment Book under the Tools pop-up menu, the Select Township dialog is presented. From this you can elect to print the Assessment Book for an individual Township or for the entire County.



Sheridan County, North Dakota
Township 145077

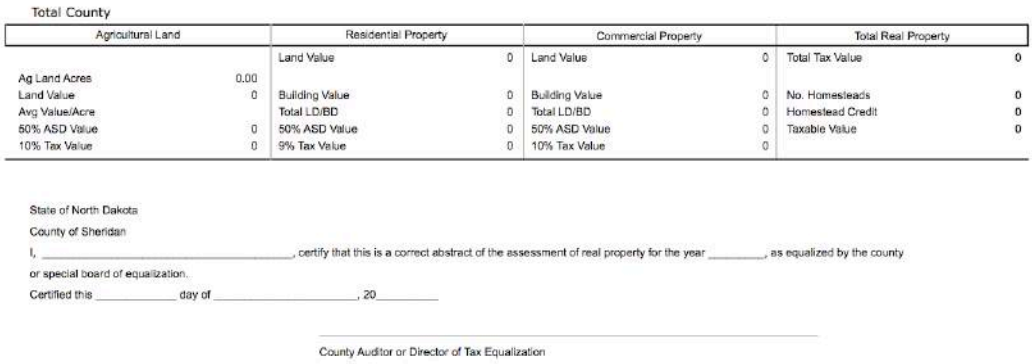
11/27/2010

Parcel # / Name / Description	Farm Value	Com Lot	Com Bldg	Res Lot	Res Bldg	Total Value	Assd Value	Tax Value
Auto-12386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12387	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12388	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12389	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12390	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12391	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12392	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12393	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		
Auto-12394	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Avg. / Acre -			FA : 0.00	ARW : 0.00		
					RA : 0.00	EX : 0.00		
					CA : 0.00	TA : 0.00		

- 1 -

Print Abstract

The Print Abstract option under the Tools pop-up menu provides the utility to print the County Abstract. This report is printed for all parcels in the system regardless of the selection.



Total County

Agricultural Land		Residential Property		Commercial Property		Total Real Property	
		Land Value	0	Land Value	0	Total Tax Value	0
Ag Land Acres	0.00						
Land Value	0	Building Value	0	Building Value	0	No. Homesteads	0
Avg Value/Acre		Total LD/BD	0	Total LD/BD	0	Homestead Credit	0
50% ASD Value	0	50% ASD Value	0	50% ASD Value	0	Taxable Value	0
10% Tax Value	0	9% Tax Value	0	10% Tax Value	0		

State of North Dakota

County of Sheridan

I, _____, certify that this is a correct abstract of the assessment of real property for the year _____, as equalized by the county or special board of equalization.

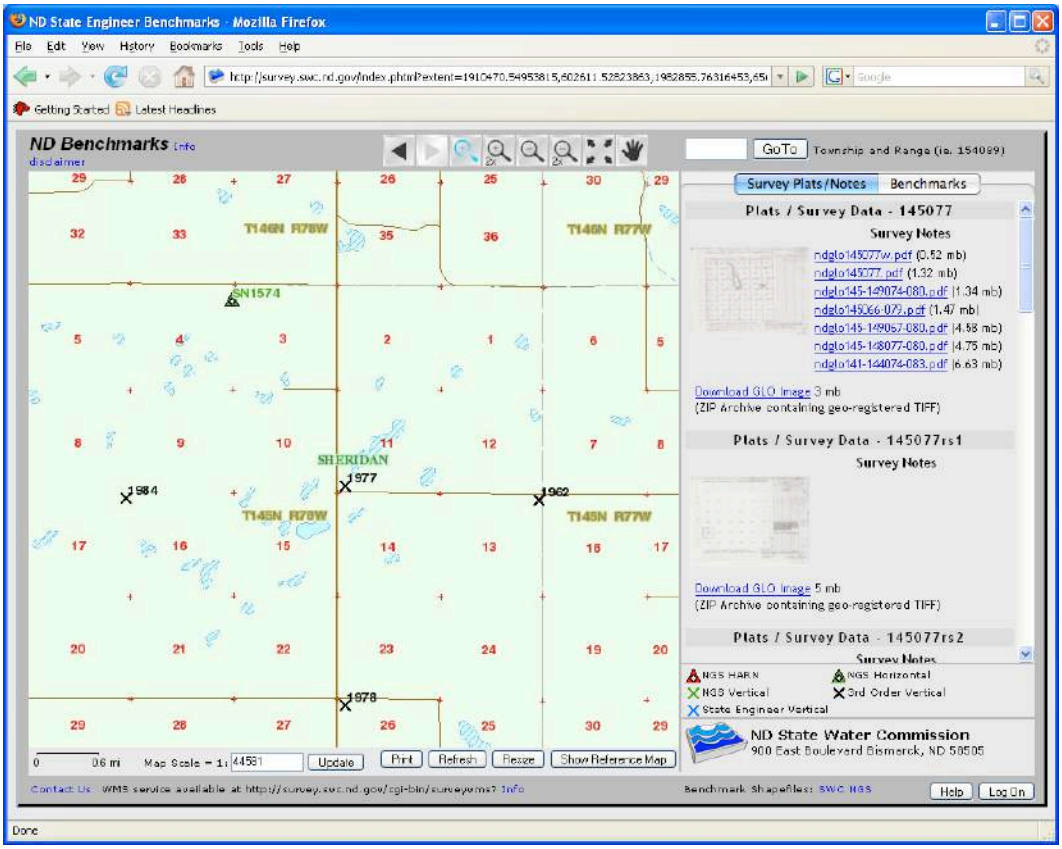
Certified this _____ day of _____, 20_____

_____

County Auditor or Director of Tax Equalization

Go to GLO Web Service

The GLO and Survey web service maintained by the State of North Dakota is a common source for the original Government Land Office (GLO) plats and survey and benchmark data. The purpose of this tool is to simply launch a web browser targeting this site with the same map extent as that defined in the map area of the Parcel Management Console. This provides direct access to the survey and GLO information for the area defined in the Map Window.



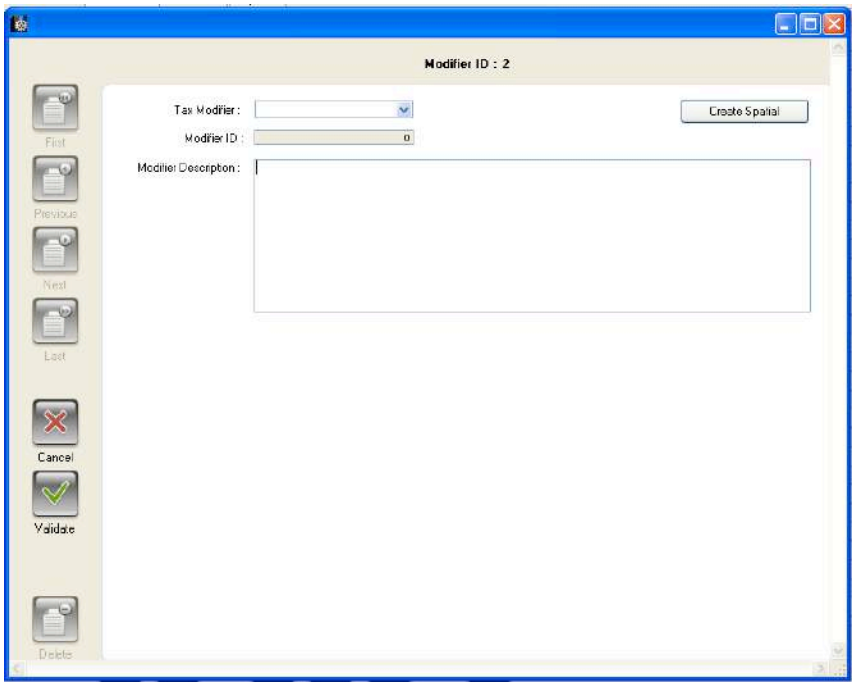
Chapter 7 - Tax Modifiers

Offroad GIS provides a complete solution to address the management and maintenance of Tax Modifiers. Tax Modifiers are used in conjunction with the assessment of agricultural parcels. OffRoad GIS is unique in that it provides a separate management focus for the Tax Modifiers that is separate and distinct from the Parcel management. The Tax Modifiers are then joined with the Parcels and soils to perform the agricultural parcels assessment. By separating the Tax Modifiers, OffRoad GIS provides the methodology for managing the Tax Modifiers based upon the features that dictate the need to modify the parcel assessment.

The Tax Modifier Management console is the primary focus for managing modifier data within the Offroad GIS system. The modifier management console includes numerous tools that provide access to your records through simple point-and-click processes. These tools include the preset query features that allow you to drill down into the data by selecting a single entry from a pop-up list. Everything about the management console has been designed to make accessing modifier data consistent, fast, and efficient.

Editing Tax Modifier Records

Editing modifier records can be accomplished either by double-clicking on the record displayed in the record selection or by selecting the Edit Selection option of the Map Select pop-up button and then clicking on the modifier feature displayed in the map interface. Either approach will present the modifier input form which provides access to edit the modifier data.

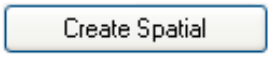


The modifier input form is a fairly simple input form with only 3 input fields.

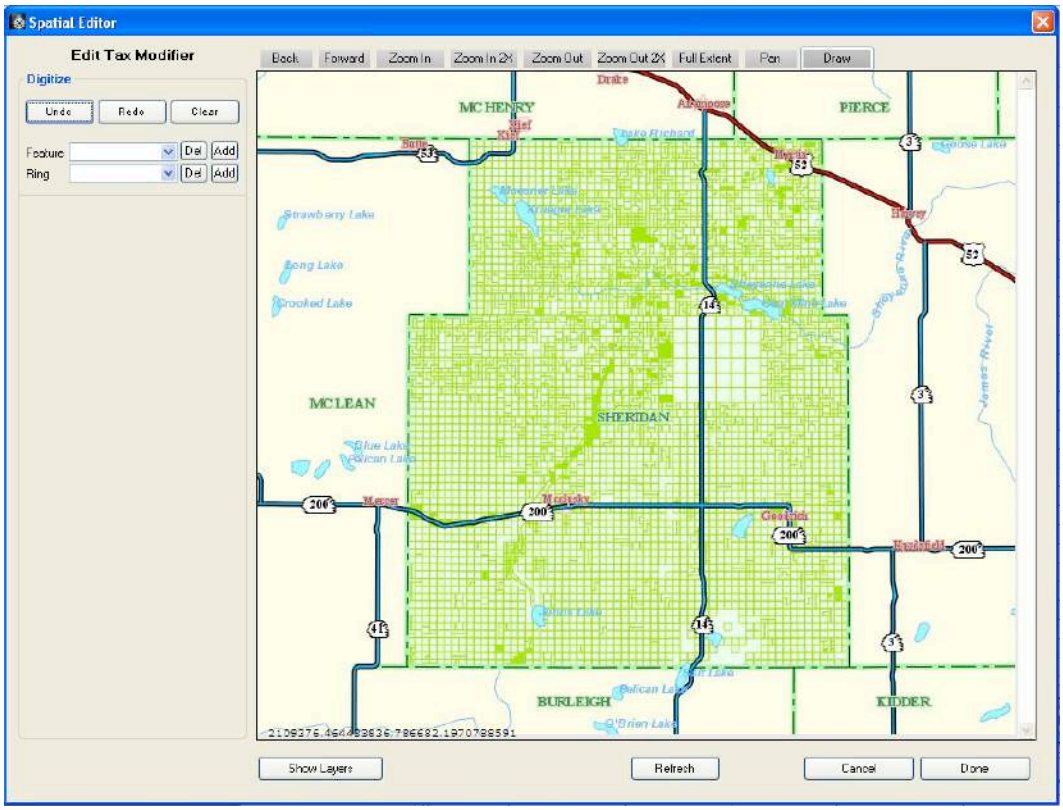
- **Tax Modifier** - The Tax Modifier is a pop-up menu that allows you to select the modifier based upon the Modifiers that have already been defined under the Tools area in the Modifiers Management Console.
- **Modifier ID** - The Modifier ID is not enterable. It is defined based upon the Tax Modifier that is selected from the Tax Modifier pop-up menu.
- **Modifier Description** - The Modifier Description is simply used to provide documentation for the Modifier record. It is not used in the parcel assessment process.

Creating Modifier Geometry

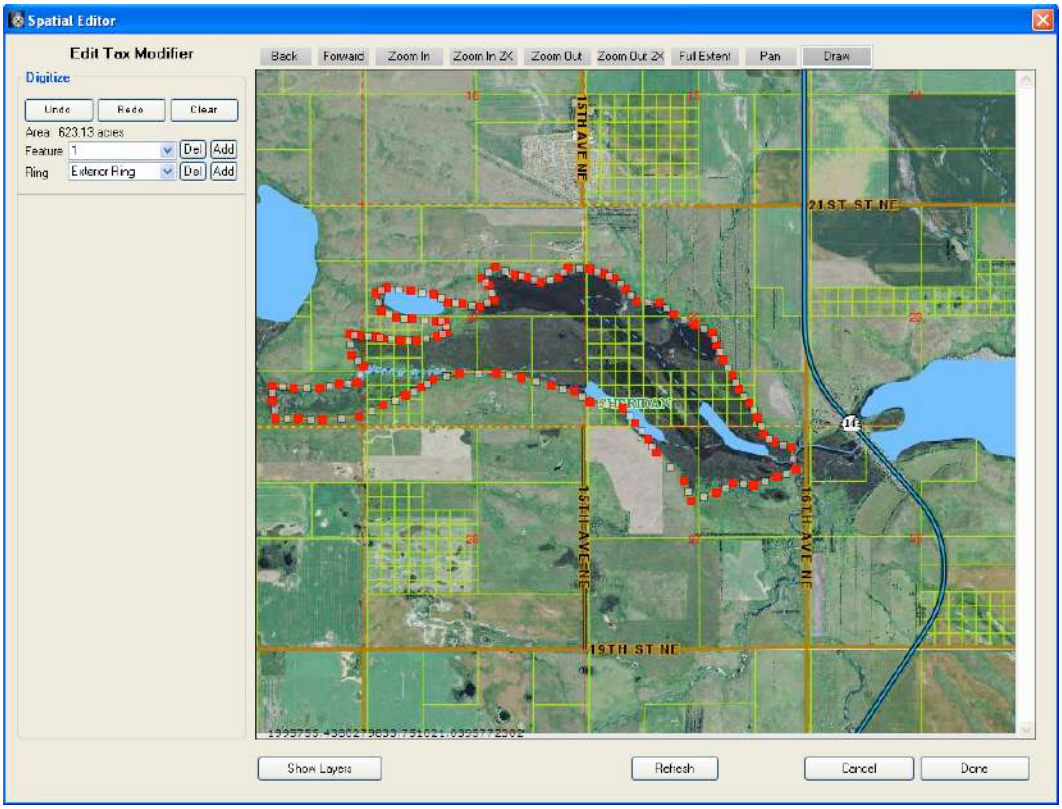
When a modifier is initially created it is created without geometry. In order to create the geometry for a modifier, click on the Create Spatial button.



The Spatial Editor will be presented with the default spatial options for creating the modifier. By default since no geometry exists, the editor zooms to the default county extent. If you edit an existing modifier, the Spatial Editor will display the map to the extent of the existing geometry.



To create the Tax Modifier, zoom the map to the correct location. Then click on the Draw button and begin digitizing the Tax Modifier. For this example, the Spatial Editor was zoomed to the extent of a marshy area with common inundation problems. To aid in identification and digitizing, the NAIP photography was displayed and the area that is commonly inundated was digitized.

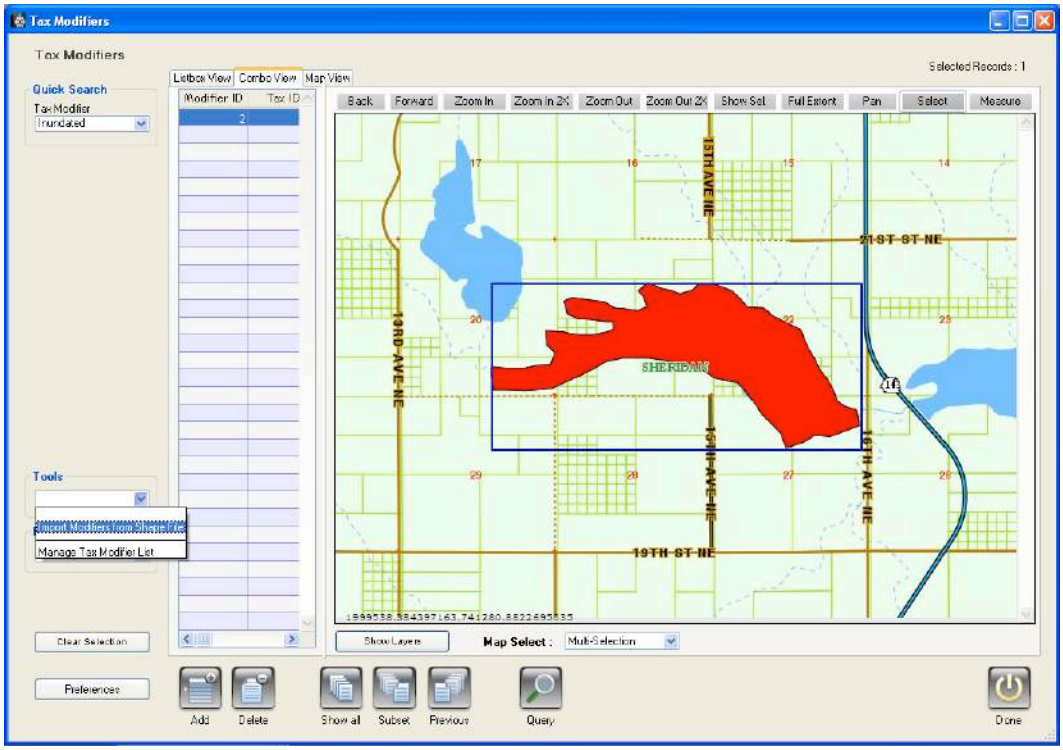


Once created, click the Done button to save the geometry. Complete the associated attributes in the input form, and then save the record.

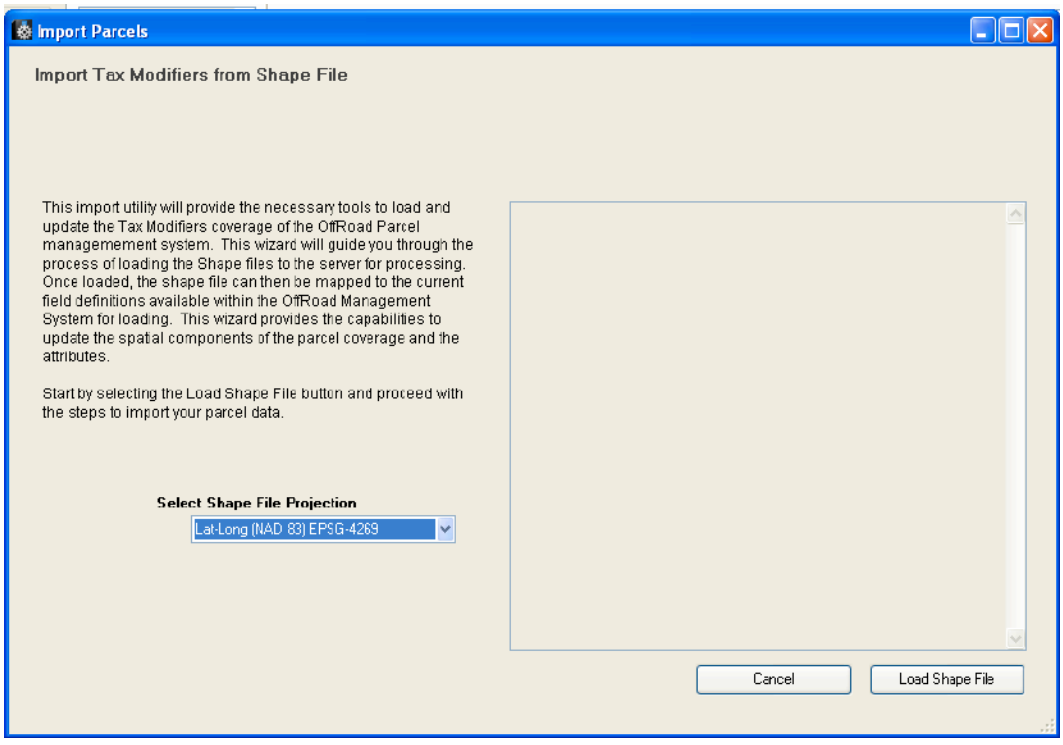
Import Modifiers from Shape File

Offroad GIS provides full support for importing modifier data from Shape files. The import utilities support both the spatial component as well as the attributes tied to the Shape file. In addition to importing modifier data, the shape file import also provides a means of updating both the spatial and associated attribute data with existing modifiers.

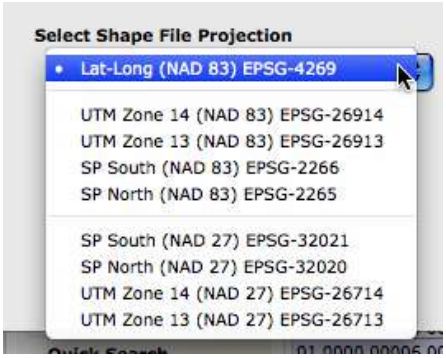
To access the Shape File import utility, select **Import Modifiers from Shape File** from the Tools pop-up menu.



This function will display the Import Tax Modifiers Wizard.

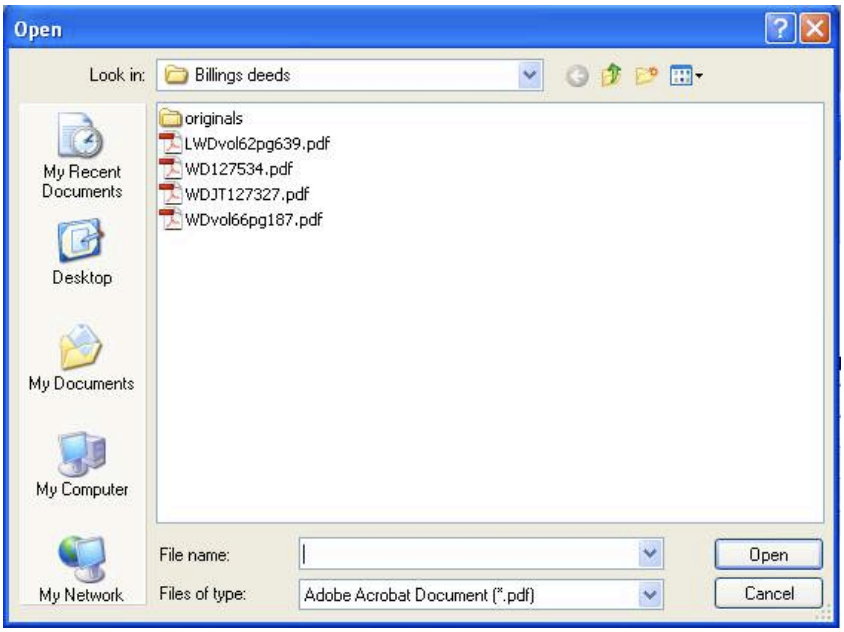


Before you can proceed, you must first select the Projection of the Shape File that is being imported. Offroad GIS currently supports common North Dakota projections including:



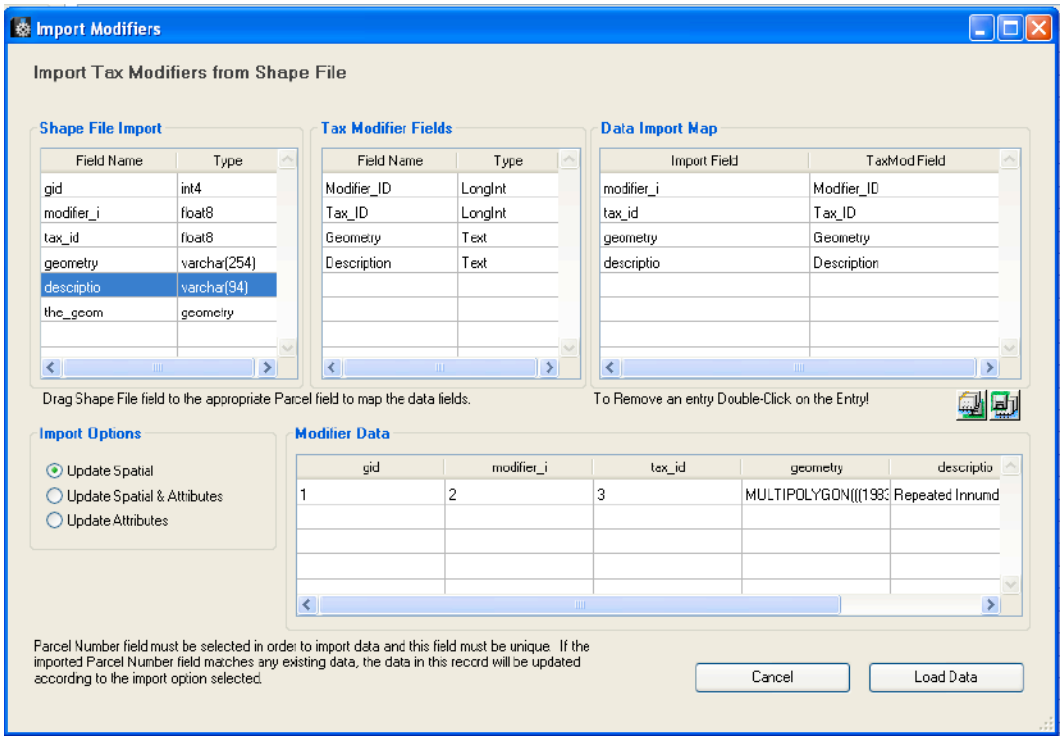
Once selected, the **Load Shape File** button will be enabled.

To upload the Shape file, click on the **Load Shape File** button. This will display the standard file selection dialog prompting you to select the shape file to import.

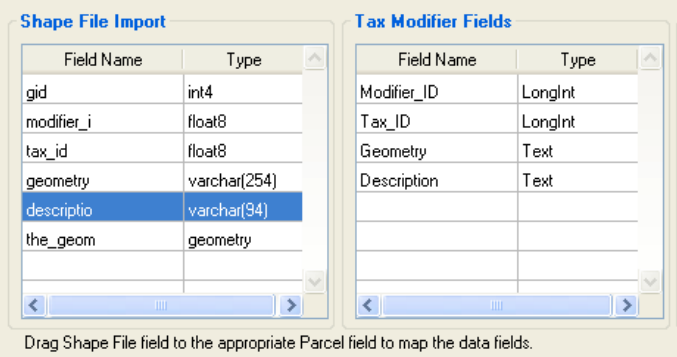


Once the shape file has been selected, a progress dialog will be displayed as each of the component files are loaded up to the spatial server.

After the files have been uploaded successfully, the Wizard will present data mapping options to set the appropriate fields that are to be loaded from the shape file as well as options for setting the import options to update spatial and attribute components from the incoming shape file.

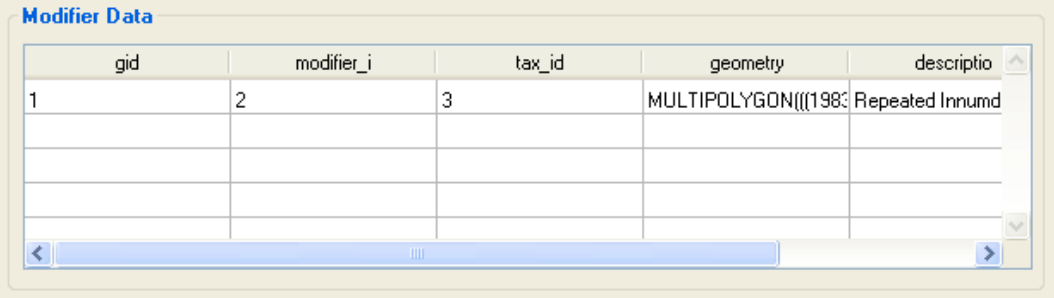


The data options page includes four separate areas that are used for different aspects of mapping data relationships. The first area includes the field definitions for the imported shape file and then the current field definitions for the modifiers table within Offroad GIS.

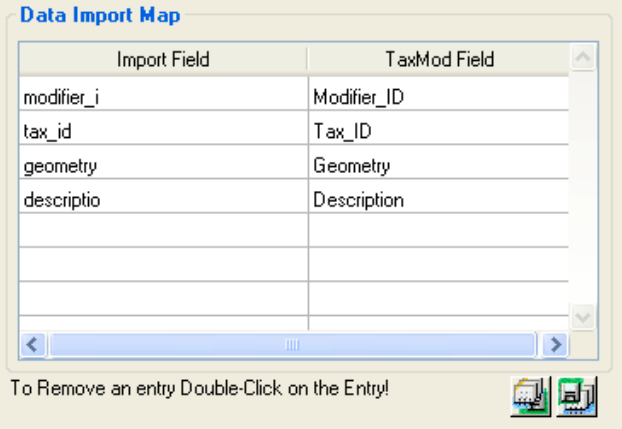


The second area includes the Import Options. This area is used to establish import options and the extent to which the data from the shape file is to be used for importing. Currently, the system supports using the shape file as a data source for updating either the spatial or attributes or both.

The third area is a Modifier Data preview area that allows you to review up to the first 100 rows of the imported shape file.



The fourth area includes the Data Import Map. This area is used to define the field mapping between the imported shape file and the internal modifier table.



In order to import modifier data, you must first map the import shape file fields to the internal modifier fields. This is accomplished by dragging the fields to be mapped from the Shape File Import list and dropping them on the appropriate field in the Tax Modifiers Fields list. The data type is important because the wizard will not let you mix data types. For example, it is not possible to drop an alpha or varchar field to a numeric (Longint, Real, or Integer field). When you drag the field to the appropriate target, the field pair will be added to the Data Import Map list. If you drag a field and it does not match the Modifier Field type, an error will be generated and displayed similar to the following dialog. When this occurs, the associated field pair will not be added to the Data Import Map list.

As you map individual field pairs they will be added to the Data Import Map. The order that the fields appear in the Data Import Map is not important.

If you have need to remove an entry from the Data Import Map, double-click on the row that you wish to delete, and it will be removed.

While mapping the data is a simple point-and-click process, this process can become tedious if you need to import data frequently. Therefore, you can save the data map options to disk so that it can be restored for later use. The data map files are stored in a proprietary format so they will be unreadable from any other process or application.

Note *Using a stored data map will only be relevant if the attributes associated with the shape file from which the data map was created are the same as the shape file to be imported using the data map.*

Once the data map has been defined, select the appropriate Import Option. The import wizard provides three options.

- Update Spatial
- Update Spatial & Attributes

  and

- Update Attributes

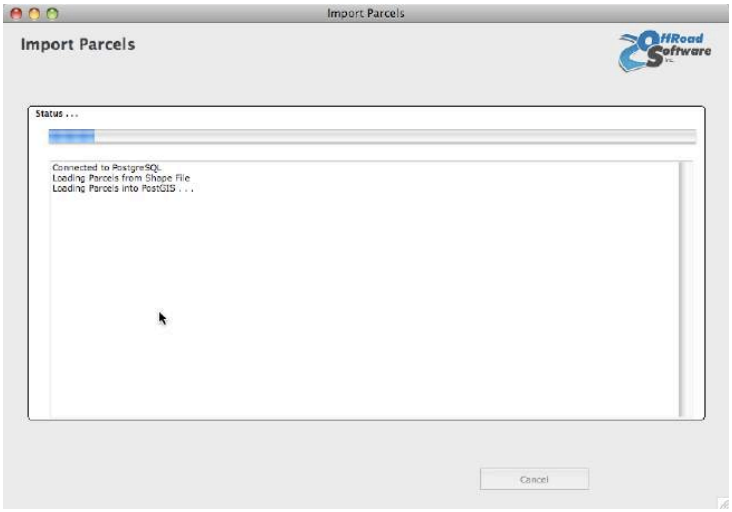
Regardless of the Import Option selected, Importing data from a shape file uses the Modifier_ID as the primary key. If the Modifier_ID is not mapped, you will be unable to import data from the shape file.

All of these options use a similar approach in that they will create the record if no existing record matches the import Modifier_ID. However, if an existing modifier exists that matches the Import Modifier_ID, the existing record will be updated to match the imported data. Only the mapped data attributes will be

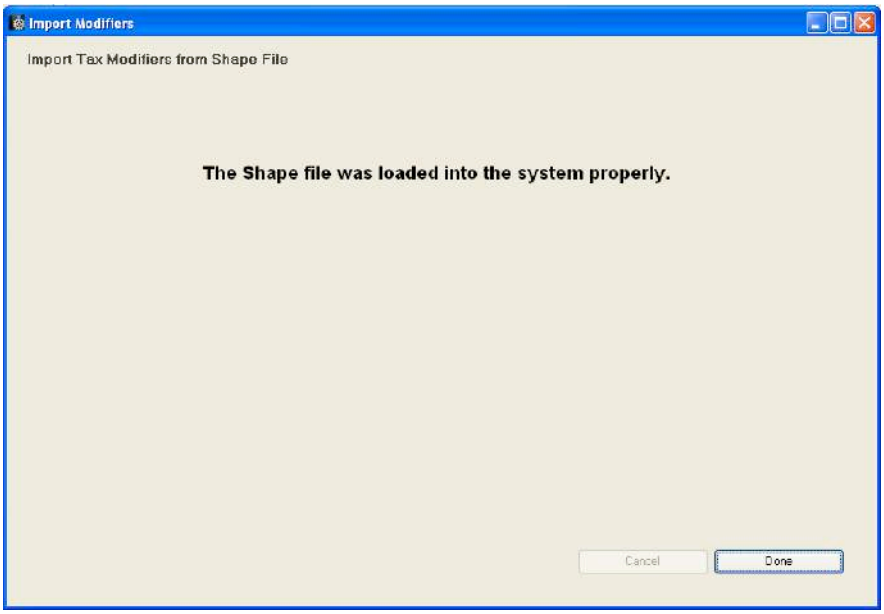
updated. This provides an effective means of updating selected fields. Likewise, if the Imported modifier represents a new record, only the fields that are mapped will be populated with the new record.

Note *If the Update Spatial option is selected, only the spatial data will be updated. This means that if you have mapped other fields in addition to the Modifer_ID they will be ignored.*

Once you have mapped the data fields and selected the import option, you are ready to load the modifier data. To load the modifier data, select the **Load Data** button to load the relevant data.

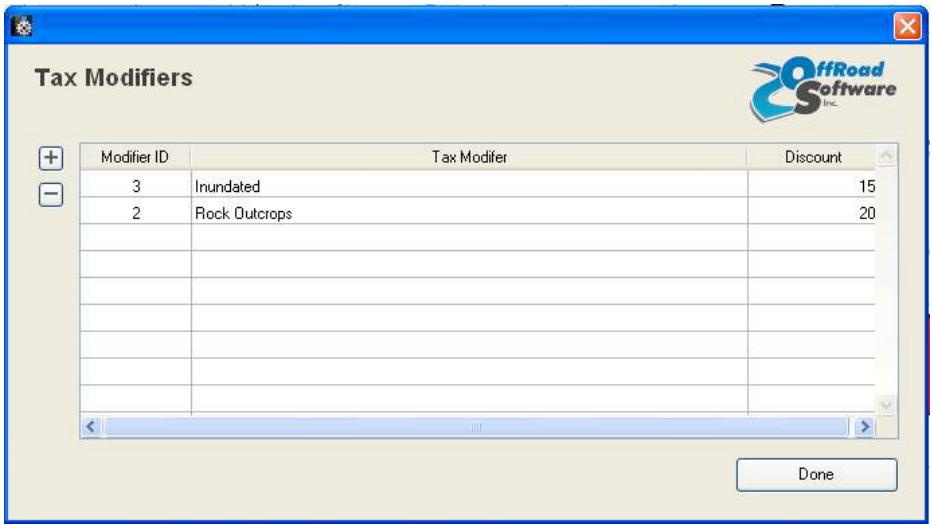


If the data is loaded successfully, the following dialog will be displayed. If it does not the resulting Error dialog will be displayed.

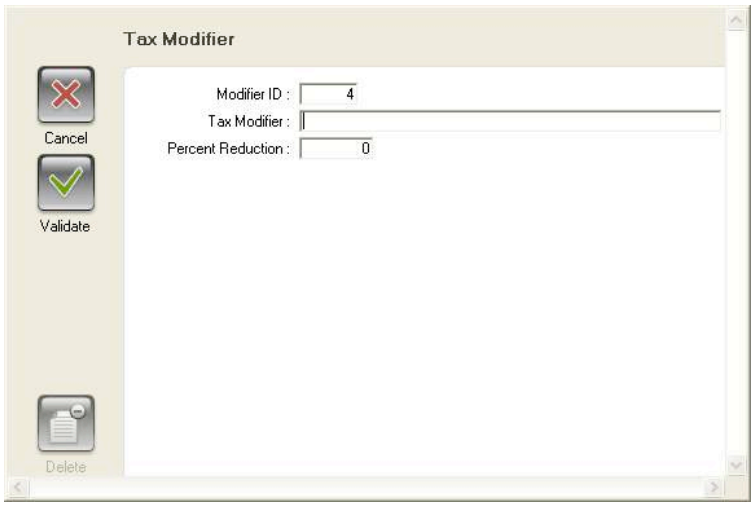


Manage Tax Modifiers List

Tax Modifiers provide a systematic approach to applying modifications to the valuation of parcels based upon external conditions, such as inundation, rock outcroppings, and other conditions. Each type of modification is assigned a modification percentage, which is used when the assigned modifiers are intersected with the parcels. In this way, each soil type within a parcel is modified based upon the percentage assigned to each modifier. The Tax Modifiers list is maintained within the Tax Modifiers Management Console, and it is accessed by selecting the Manage Tax Modifiers List from the Tools pop-up menu.



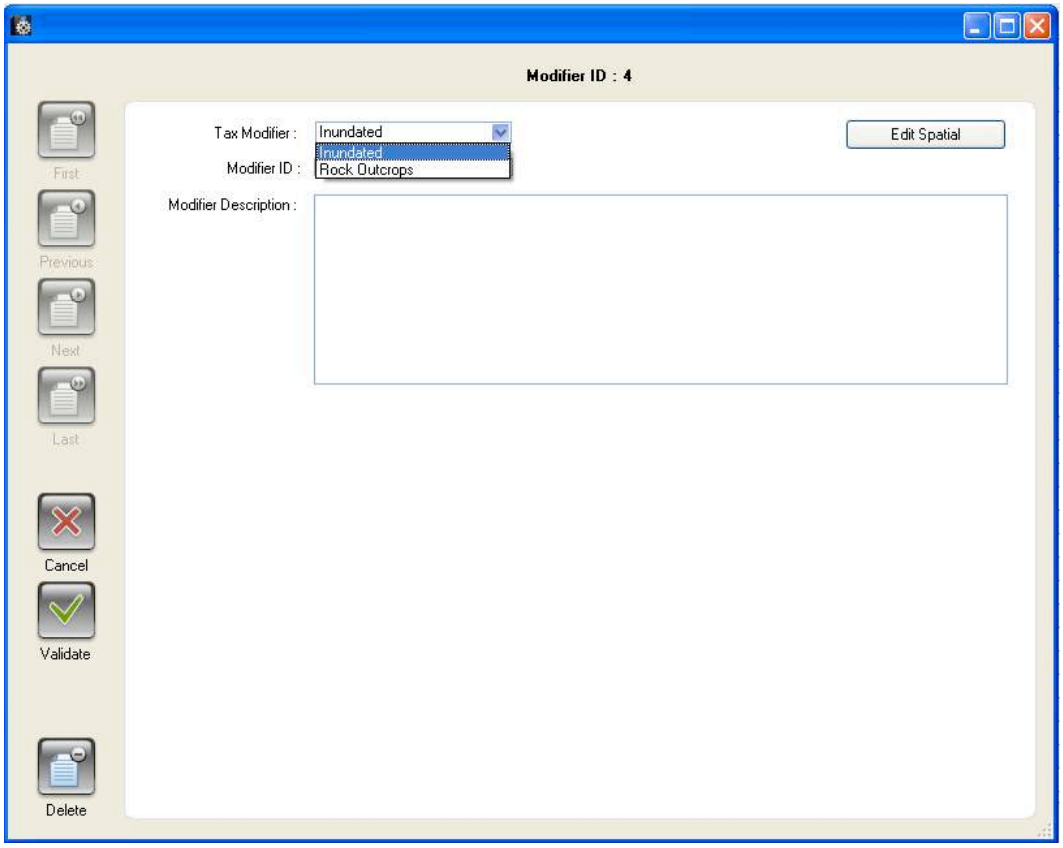
To add a Tax Modifier Entry, click on the (+) button. This will display the Tax Modifier List input form. The Modifier ID is assigned by default. The Tax Modifier field provides a description of the Modifier to be used when assigning a modifier type to each Tax Modifier record. The Percent Reduction is used to define the reduction that is to be applied for these types of modifiers.



To delete an existing modifier, select the target modifier from the list, and click on the (-) button.

To modify an existing record, simply double-click on the entry in the list.

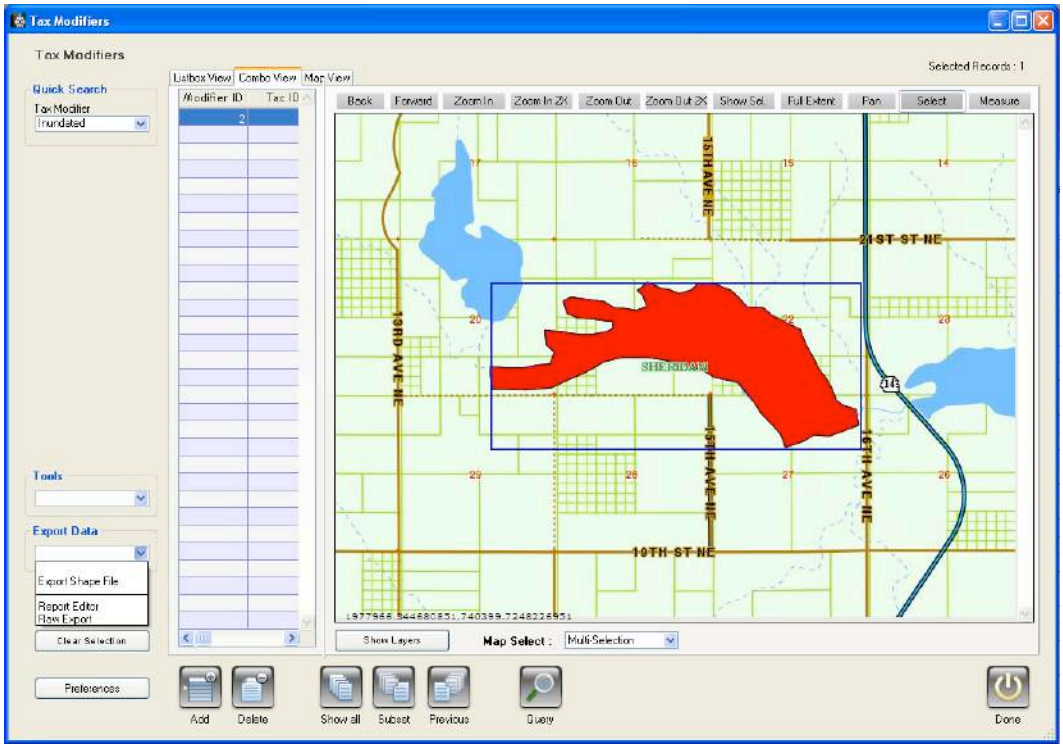
The tax modifiers that are developed as part of the tax modifier list are available through the pop-up men from within the Tax Modifier records as they are created.



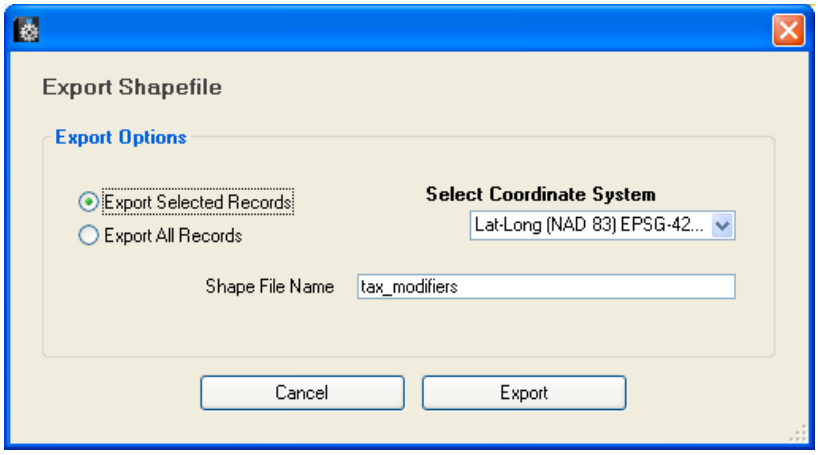
Exporting Modifies to Shapefiles

Offroad GIS provides the necessary utilities to export your modifier data to a standard shape file format. The export utilities allow you to export either a user selection or the entire database. The utilities also support options to export the shape file into a variety of standard projections.

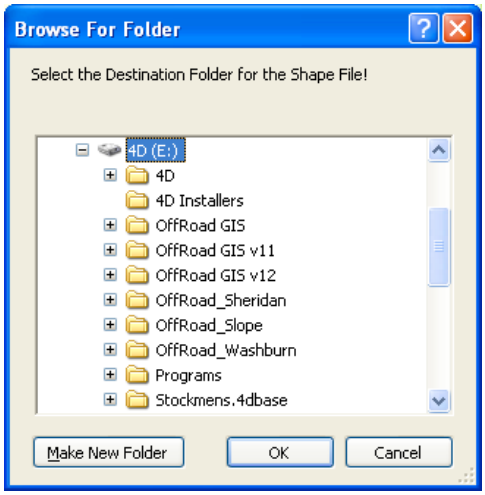
In order to export modifier records to a shape file, select the modifiers that you wish to export in the record selection list. Then select the Export Shape File option under the Export Tools pop-up button.



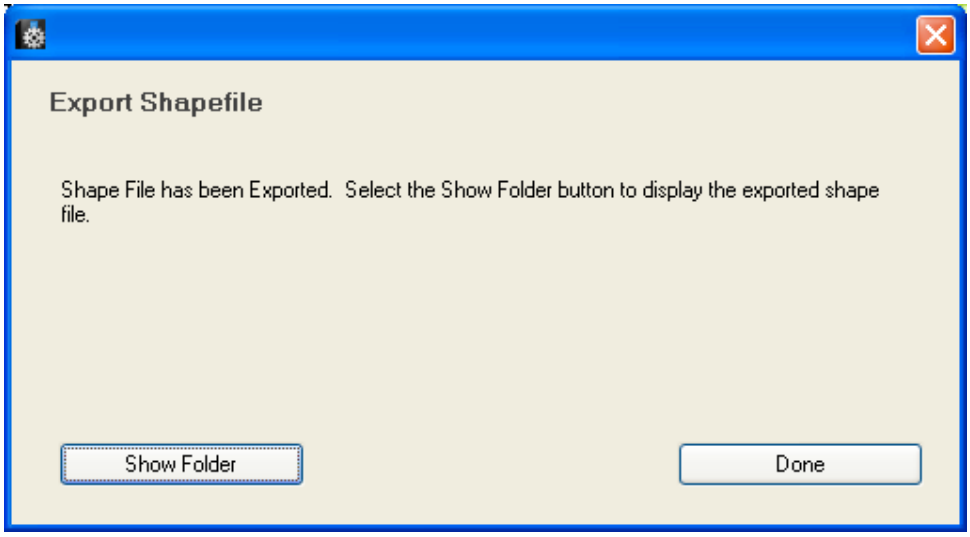
This will present the Export Shapefile dialog from which you can elect to either export the current selection of modifier records or all modifier records. This dialog also provides options to set the name of the export shape file and select the coordinate system and the associated projection or the export file.



Once you have set the coordinate system parameters and the export file name, click on the Export button to export the data. The standard file directory will be presented from which you can select the directory that you want to target for the export file.

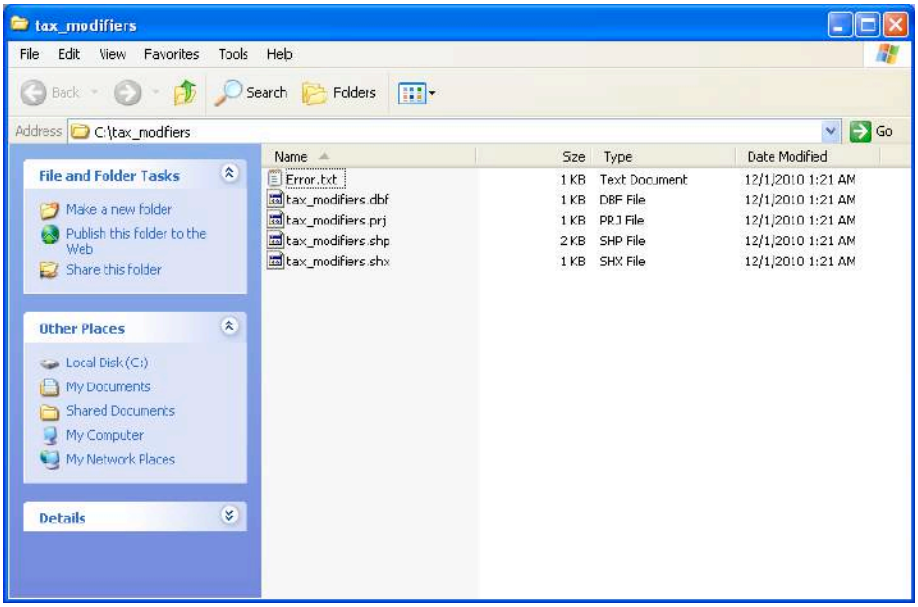


Select the OK button to proceed with the export process. A progress dialog will be displayed during the export process. Once the files have been created, an export status dialog will be displayed.



The Show Folder button can be used to make the destination folder that was selected using the folder selection dialog box active in the foreground. The shape file suite is exported in a zip archive.

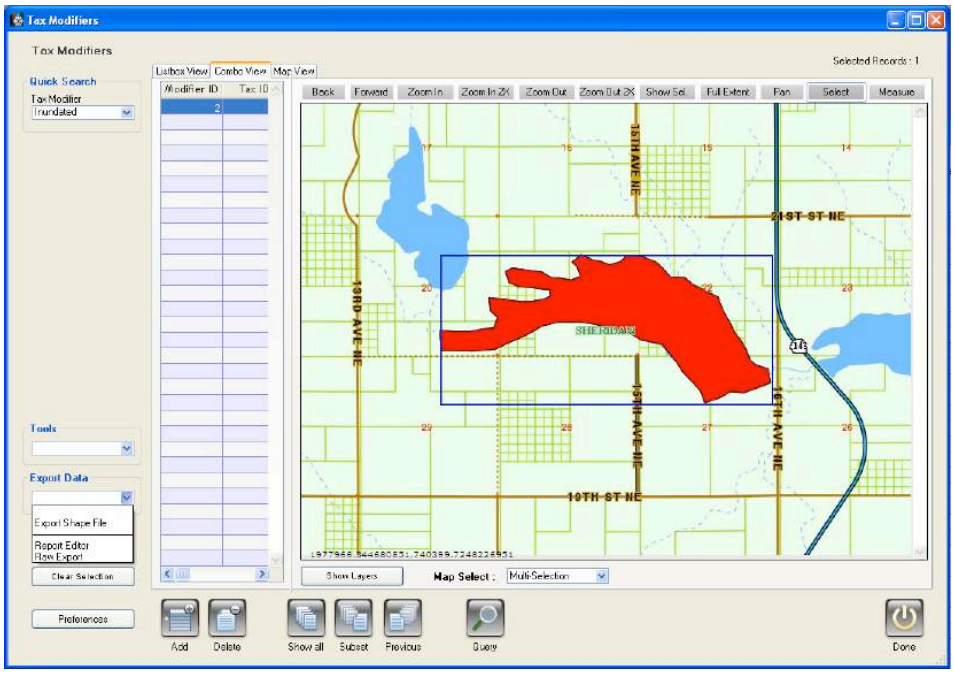
The zip archive contains the typical shape file component including the .dbf, .shp, .shx, and .prj files. In addition, an Error.txt file is included that will contain a log of any errors that were generated during the export process.



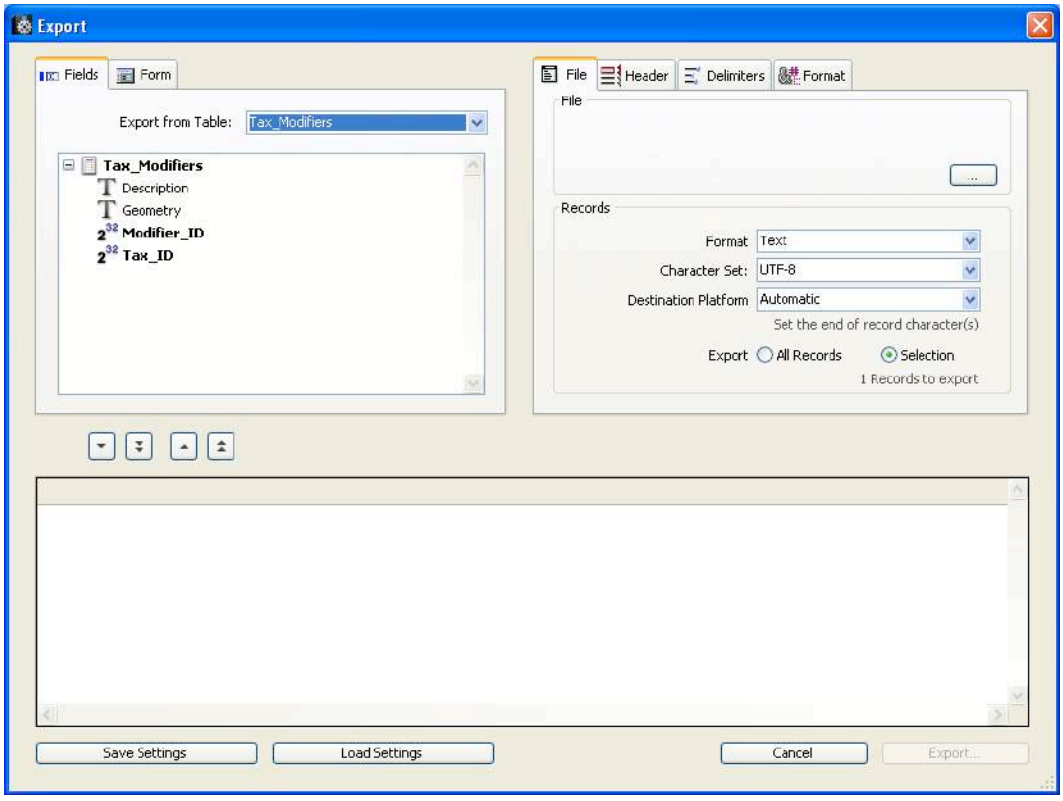
General Data Export

Offroad GIS supports a very flexible data export editor that is designed to provide simple point and click tools to export all of the modifier data or selected components of the data. This type of export primarily targets the attribute data and does not provide any spatially enabled export formats. Currently, Text, Fixed Length Text, DIFF, SYLK, DBF, 4D, and XML formats are supported for data export.

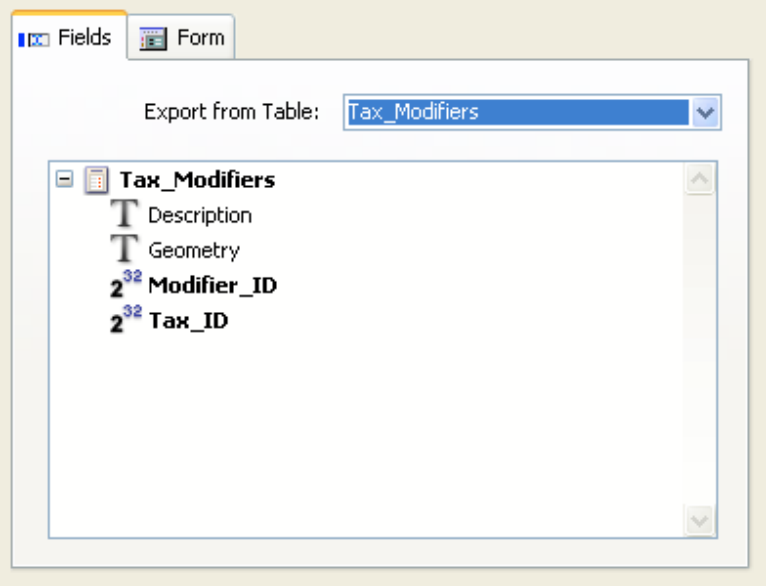
In order to export data using the data export wizard, select the Raw Export option of the Export Data pop-up menu.



This will present the data export wizard from which you can define the data, format, and the export file format for the selected data.

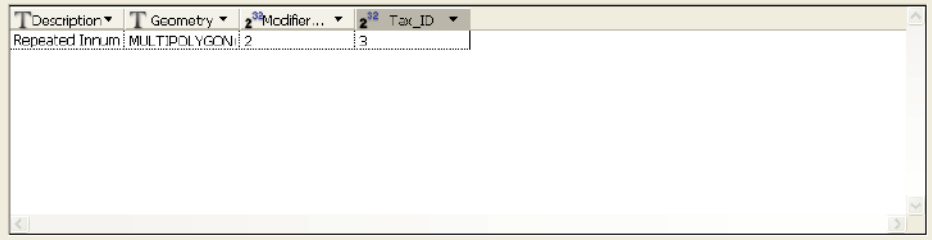


The data export wizard consists of three parts. The first part is the data source which allows you to select the table and its associated fields for data export.



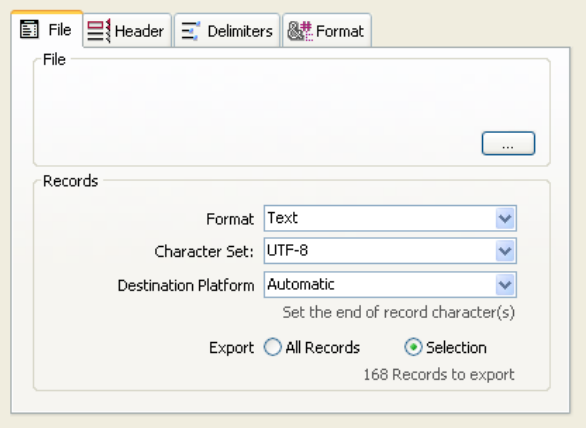
Offroad GIS does not currently support the Form tab button, so the only available option is the Fields data tab. When selected this presents all of the fields for the selected table. You can select any table from which to export data, but you will likely only need to export data from the Tax_Modifiers table. In order to select the fields that you want to export, click on the field and then click on the single down arrow or double-click on the field. Either option will place the field in the data export table in the bottom half of the dialog. You can repeat this process for each field that you would like to include in the exported data. If you want to export all of the fields in their default order, click on the double-down arrow.

The second part of the data export dialog is the data table which is displayed in the lower half of the export dialog.

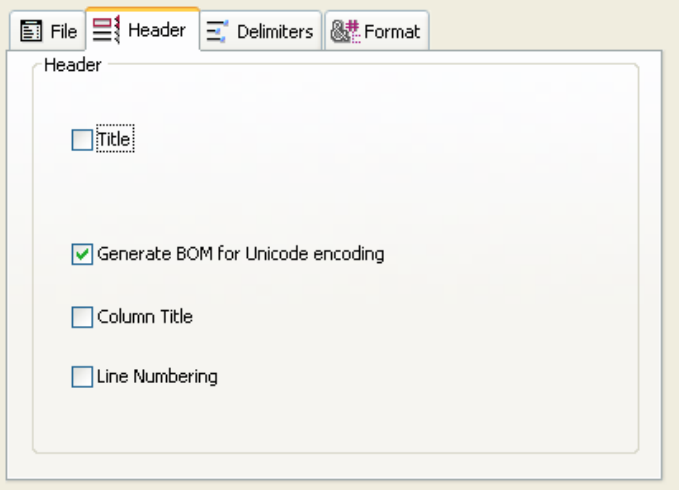


From the data table you can select each column to set the formatting, remove it from the field or change the source field. In order to remove a column, select the column and then click on the single up arrow button. If you wish to clear the data export table, click on the double-up arrow. In order to change the source field associated with a column, click on the down arrow located within the column title. This will present all of the available fields associated with the export table selected above.

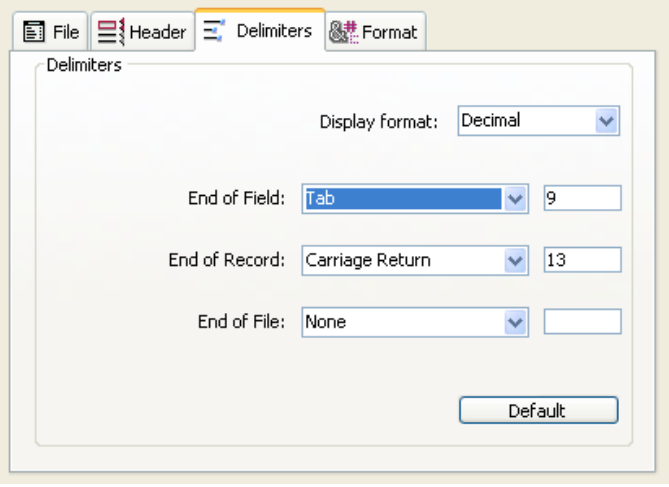
The third part of the export dialog contains the file definition and formatting instructions for the data export. The first tab includes the file information. From this tab, the file destination can be selected as well as the Format and Destination platform. This tab also provides the option to set the export to the current selection or to all records.



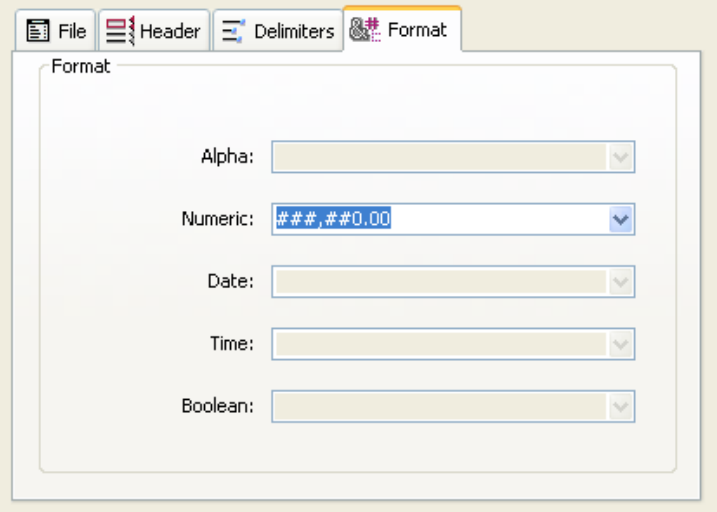
The second tab presents the tools to define the header information for the export file. This includes an overall Title line, individual column titles, and line numbering. Each of these are controlled by the respective check box.



The third tab presents the field, record, and file delimiters. The display format can also be selected which includes either character, decimal, or hexadecimal. For each of the delimiters, you can select relevant delimiters from the pop-up menu. If selected from here, the delimiter code will be updated. You can also type the delimiter into the delimiter field if you want to use one that is not available from the pop-up menu.



The fourth tab presents field formatting options. This tab displays formatting options available for every major field type. In order to apply the formatting, select the target field in the data export table. The appropriate formatting option will be enabled from which you can set the formatting for the selected field.



Once you have set all of the parameters for the data export, you can export the data by clicking on the Export button located at the bottom of the screen. However, setting up the data export can take some time. If you commonly export the parcel data using a particular format, you can save this format to a file and re-load it for future use. The Save Settings button allows you to save the current settings including field definitions, formatting, etc to a report format. This can then be restored at any time using the Load Settings button.

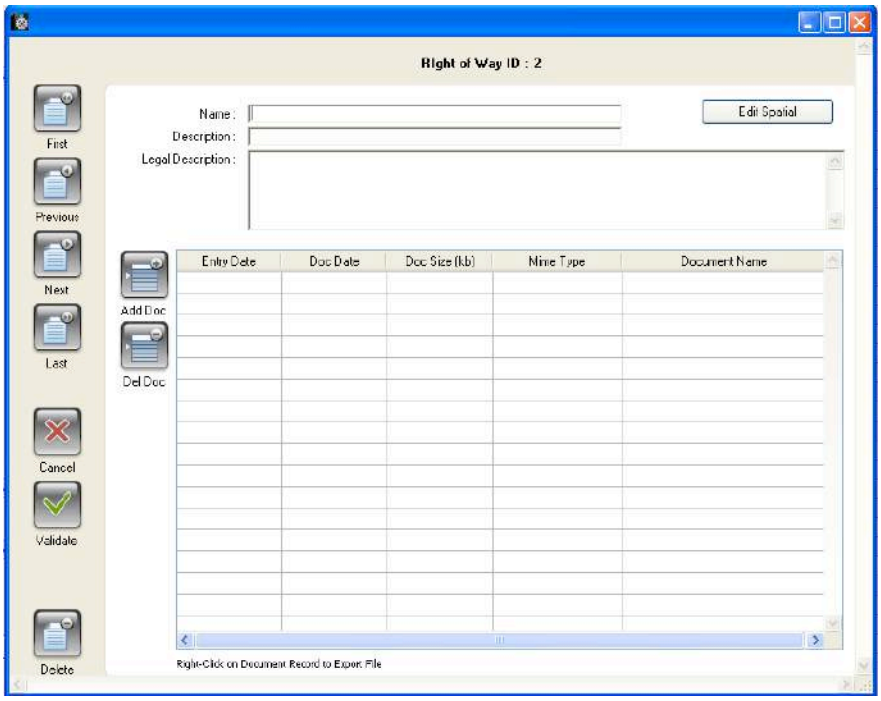
Chapter 8 - Right of Ways

Offroad GIS provides a complete solution to address the management and maintenance of Right of Ways. Right of Ways are used in conjunction with the assessment of agricultural parcels. OffRoad GIS is unique in that it provides a separate management focus for the Right of Ways that is separate and distinct from the Parcel management. The Right of Ways are then joined with the Parcels and soils to perform the agricultural parcels assessment. By separating the Right of Ways, OffRoad GIS provides the methodology for managing the Right of Ways based upon the roads and relevant features. This separate focus on the Right of Ways also provides the means to store and maintain documentation relevant to individual right of ways.

The Right of Way (ROW) Management console is the primary focus for managing right of way data within the Offroad GIS system. The ROW management console includes numerous tools that provide access to the right of way data through simple point-and-click processes. These tools also include the ability to query within the right of way documents to find relevant right of way records.

Editing Right of Way Records

Editing right of way records can be accomplished either by double-clicking on the record displayed in the record selection or by selecting the Edit Selection option of the Map Select pop-up button and then clicking on the right of way feature displayed in the map interface. Either approach will present the right of way input form which provides access to edit the right of way data.

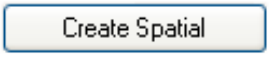


The right of way input form is a fairly simple input form with only 3 input fields.

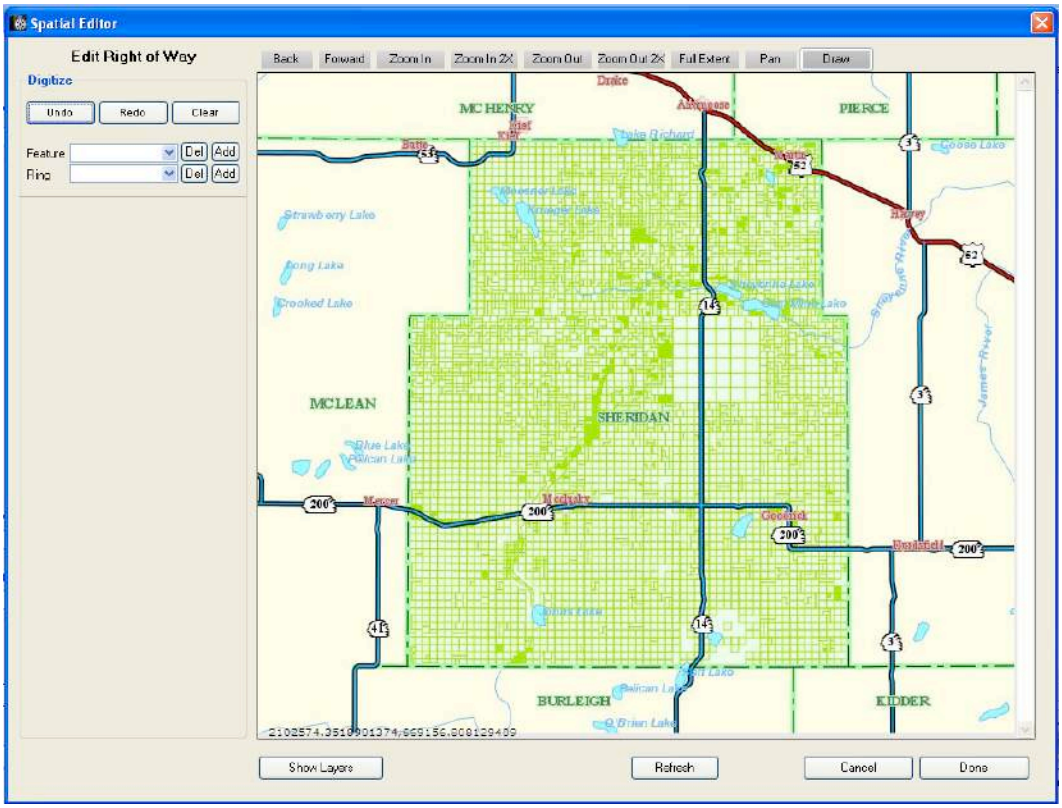
- **Name** - The Name field is used to define a simple short name for the Right of Way record.
- **Description** - The Description field provides an area to enter additional narrative to describe the right of way.
- **Legal Description** - The Legal Description is simply used to include the legal description of the right of way or possibly the COGO if available.

Creating Right of Way Geometry

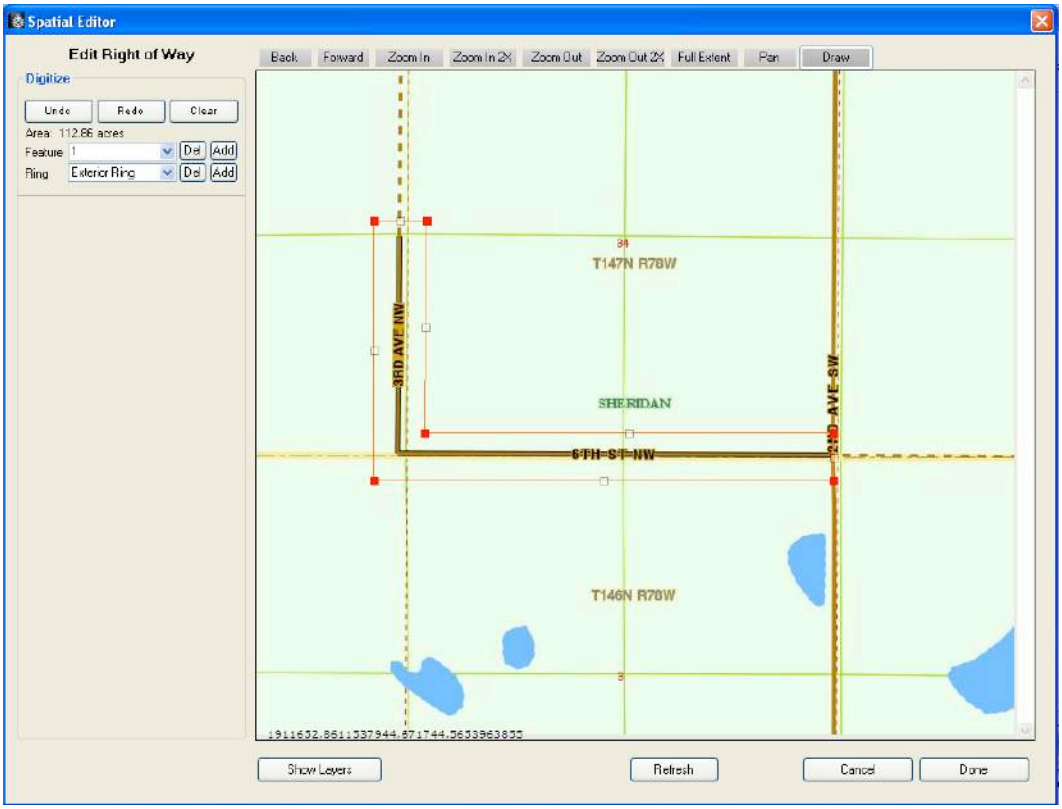
When a Right of Way is initially created it is created without geometry. In order to create the geometry for a right of way, click on the Create Spatial button.



The Spatial Editor will be presented with the default spatial options for creating the right of way. By default since no geometry exists, the editor zooms to the default county extent. If you edit an existing right of way, the Spatial Editor will display the map to the extent of the existing geometry.



To create the Right of Way, zoom the map to the correct location. Then click on the Draw button and begin digitizing the Right of Way.

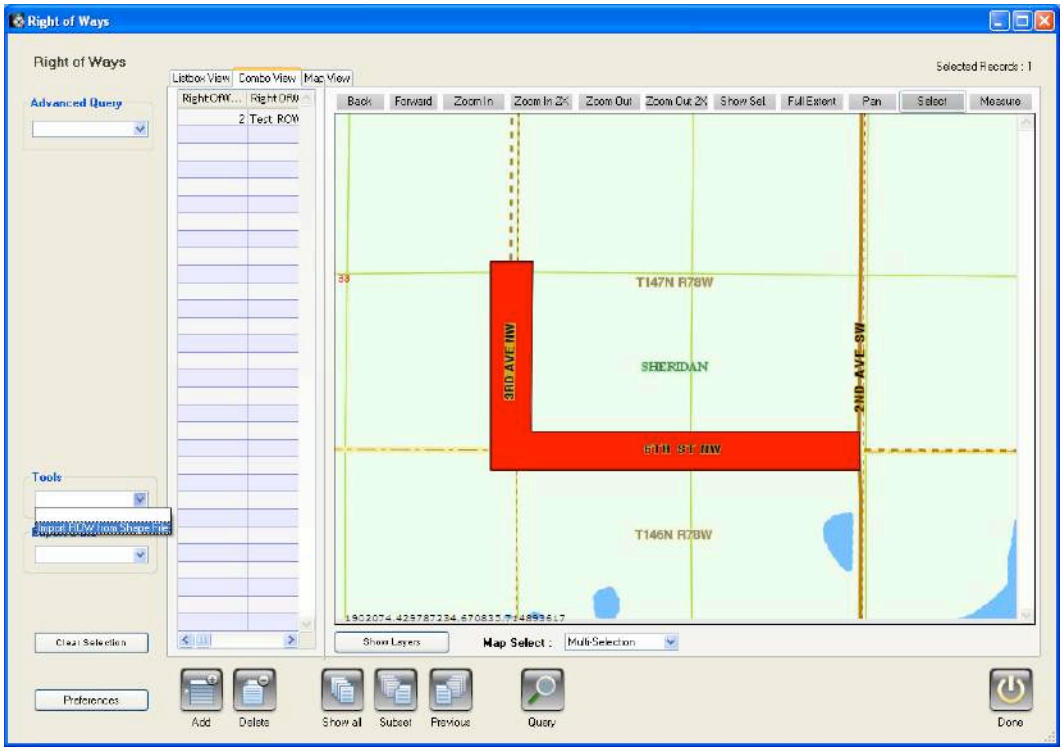


Once created, click the Done button to save the geometry. Complete the associated attributes in the input form, and then save the record.

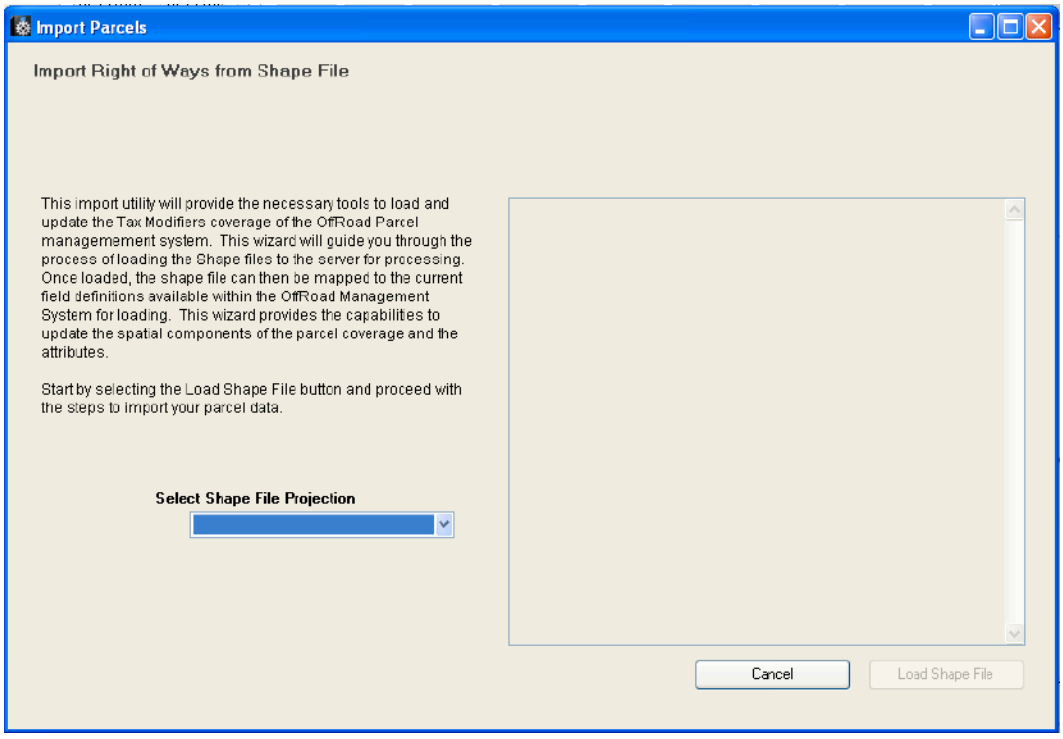
Import ROW from Shape File

Offroad GIS provides full support for importing right of way data from Shape files. The import utilities support both the spatial component as well as the attributes tied to the Shape file. In addition to importing right of way data, the shape file import also provides a means of updating both the spatial and associated attribute data with existing right of ways.

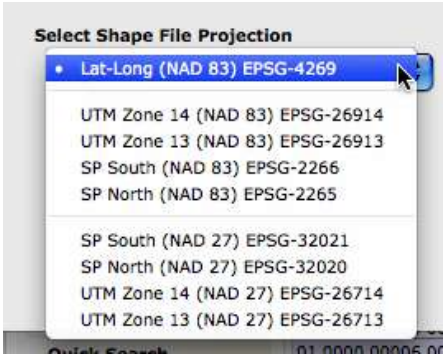
To access the Shape File import utility, select **Import ROW from Shape File** from the Tools pop-up menu.



This function will display the Import Right of Way Wizard.

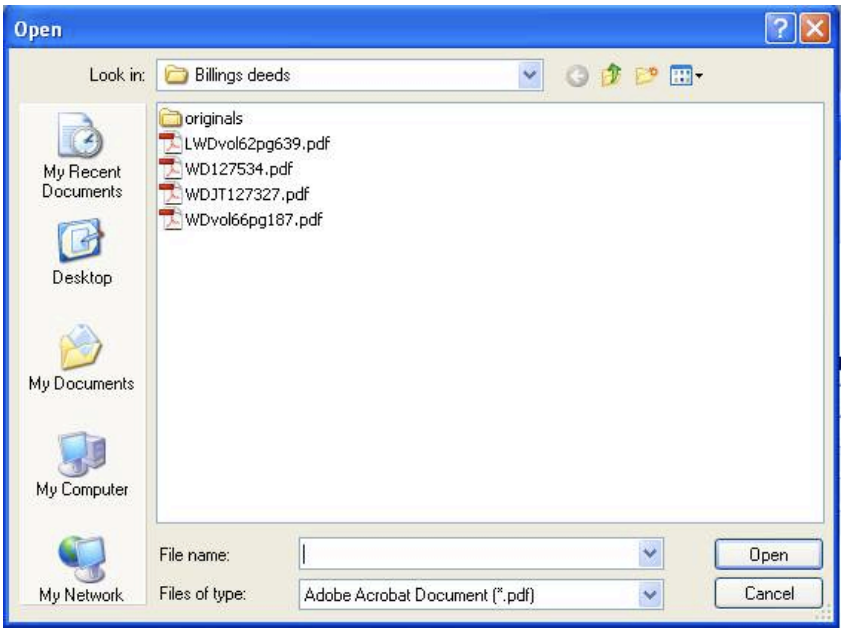


Before you can proceed, you must first select the Projection of the Shape File that is being imported. Offroad GIS currently supports common North Dakota projections including:



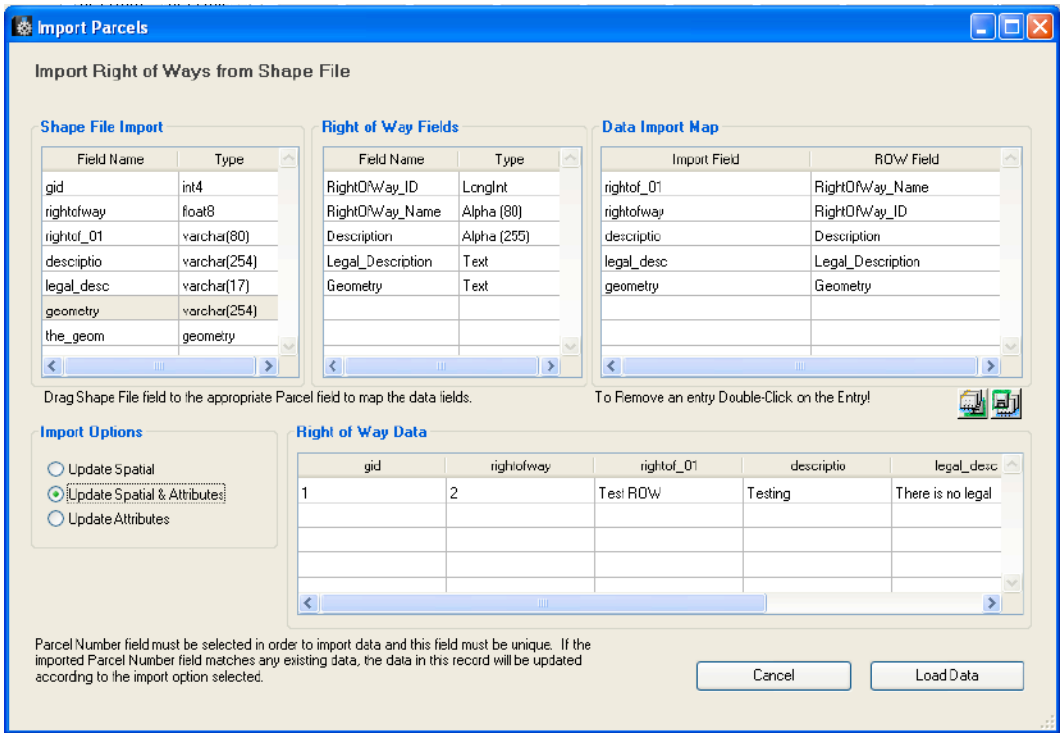
Once selected, the **Load Shape File** button will be enabled.

To upload the Shape file, click on the **Load Shape File** button. This will display the standard file selection dialog prompting you to select the shape file to import.

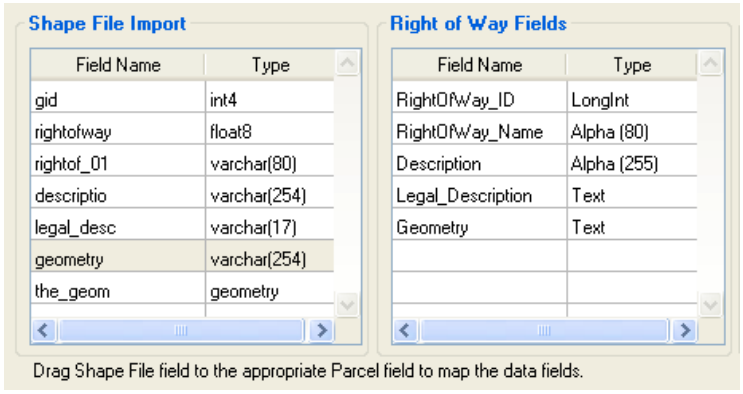


Once the shape file has been selected, a progress dialog will be displayed as each of the component files are loaded up to the spatial server.

After the files have been uploaded successfully, the Wizard will present data mapping options to set the appropriate fields that are to be loaded from the shape file as well as options for setting the import options to update spatial and attribute components from the incoming shape file.

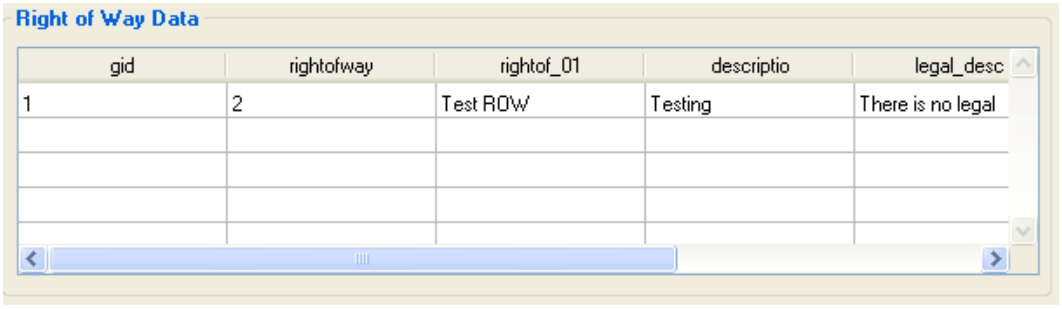


The data options page includes four separate areas that are used for different aspects of mapping data relationships. The first area includes the field definitions for the imported shape file and then the current field definitions for the modifiers table within Offroad GIS.

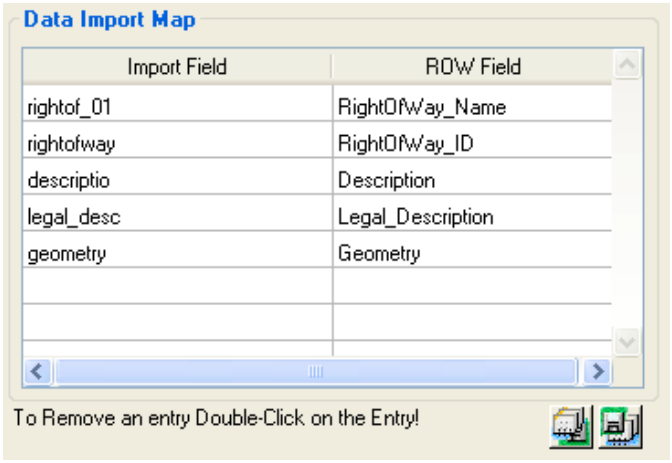


The second area includes the Import Options. This area is used to establish import options and the extent to which the data from the shape file is to be used for importing. Currently, the system supports using the shape file as a data source for updating either the spatial or attributes or both.

The third area is a Data preview area that allows you to review up to the first 100 rows of the imported shape file.



The fourth area includes the Data Import Map. This area is used to define the field mapping between the imported shape file and the internal modifier table.



In order to import right of way data, you must first map the import shape file fields to the internal right of way fields. This is accomplished by dragging the fields to be mapped from the Shape File Import list and dropping them on the appropriate field in the Right of Way Fields list. The data type is important because the wizard will not let you mix data types. For example, it is not possible to drop an alpha or varchar field to a numeric (Longint, Real, or Integer field). When you drag the field to the appropriate target, the field pair will be added to the Data Import Map list. If you drag a field and it does not match the Right of Way Field type, an error will be generated and displayed similar to the following dialog. When this occurs, the associated field pair will not be added to the Data Import Map list.

As you map individual field pairs they will be added to the Data Import Map. The order that the fields appear in the Data Import Map is not important.

If you have need to remove an entry from the Data Import Map, double-click on the row that you wish to delete, and it will be removed.

While mapping the data is a simple point-and-click process, this process can become tedious if you need to import data frequently. Therefore, you can save the data map options to disk so that it can be restored for later use. The data map files are stored in a proprietary format so they will be unreadable from any other process or application.

Note *Using a stored data map will only be relevant if the attributes associated with the shape file from which the data map was created are the same as the shape file to be imported using the data map.*

Once the data map has been defined, select the appropriate Import Option. The import wizard provides three options.

- Update Spatial
- Update Spatial & Attributes

  and

- Update Attributes

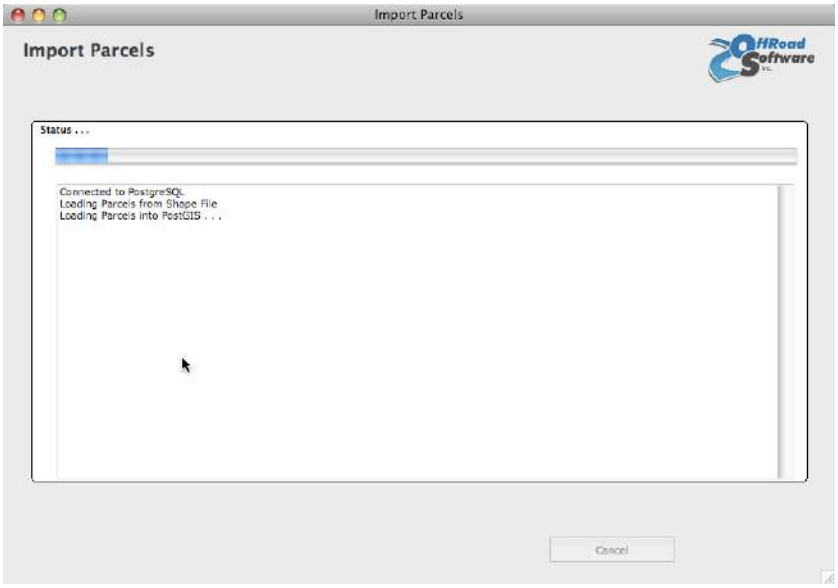
Regardless of the Import Option selected, Importing data from a shape file uses the RightOfWay_ID as the primary key. If the RightOfWay_ID is not mapped, you will be unable to import data from the shape file.

All of these options use a similar approach in that they will create the record if no existing record matches the import RightOfWay_ID. However, if an existing modifier exists that matches the Import RightOfWay_ID, the existing record will be updated to match the imported data. Only the mapped data attributes will

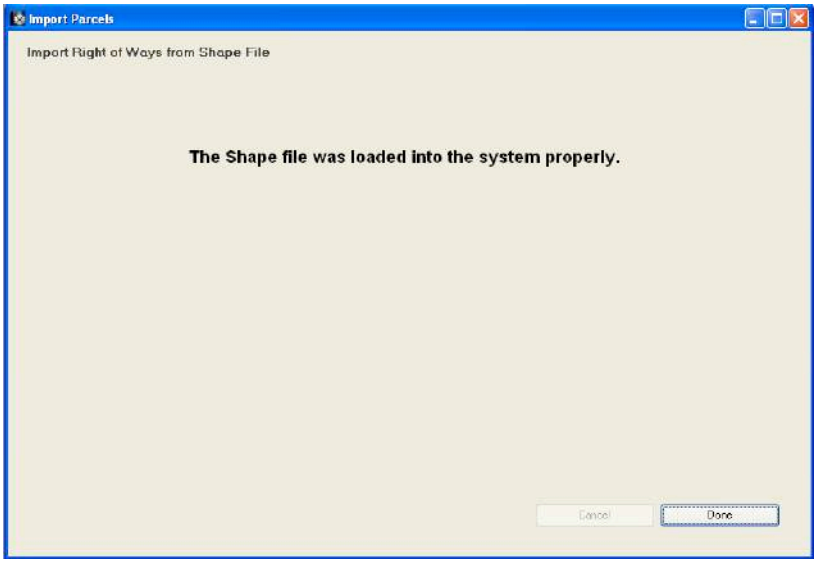
be updated. This provides an effective means of updating selected fields. Likewise, if the Imported modifier represents a new record, only the fields that are mapped will be populated with the new record.

Note *If the Update Spatial option is selected, only the spatial data will be updated. This means that if you have mapped other fields in addition to the* RightOfWay_ID *they will be ignored.*

Once you have mapped the data fields and selected the import option, you are ready to load the modifier data. To load the modifier data, select the **Load Data** button to load the relevant data.



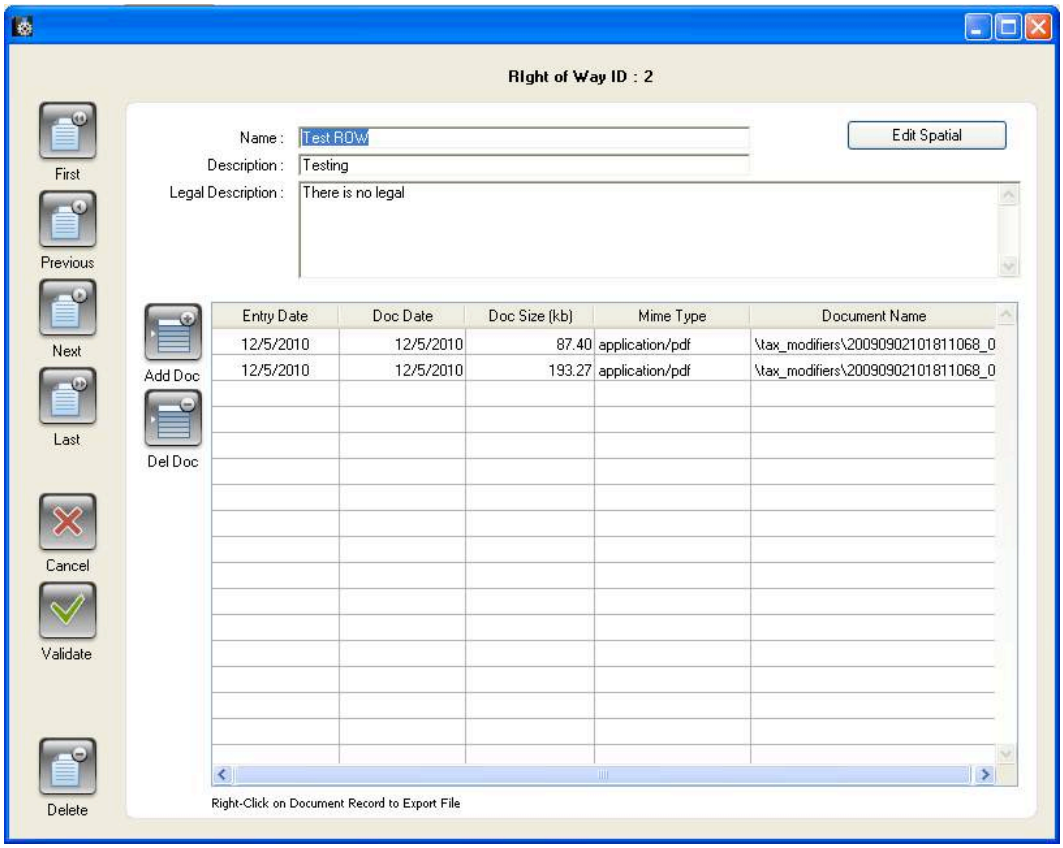
If the data is loaded successfully, the following dialog will be displayed. If it does not the resulting Error dialog will be displayed.



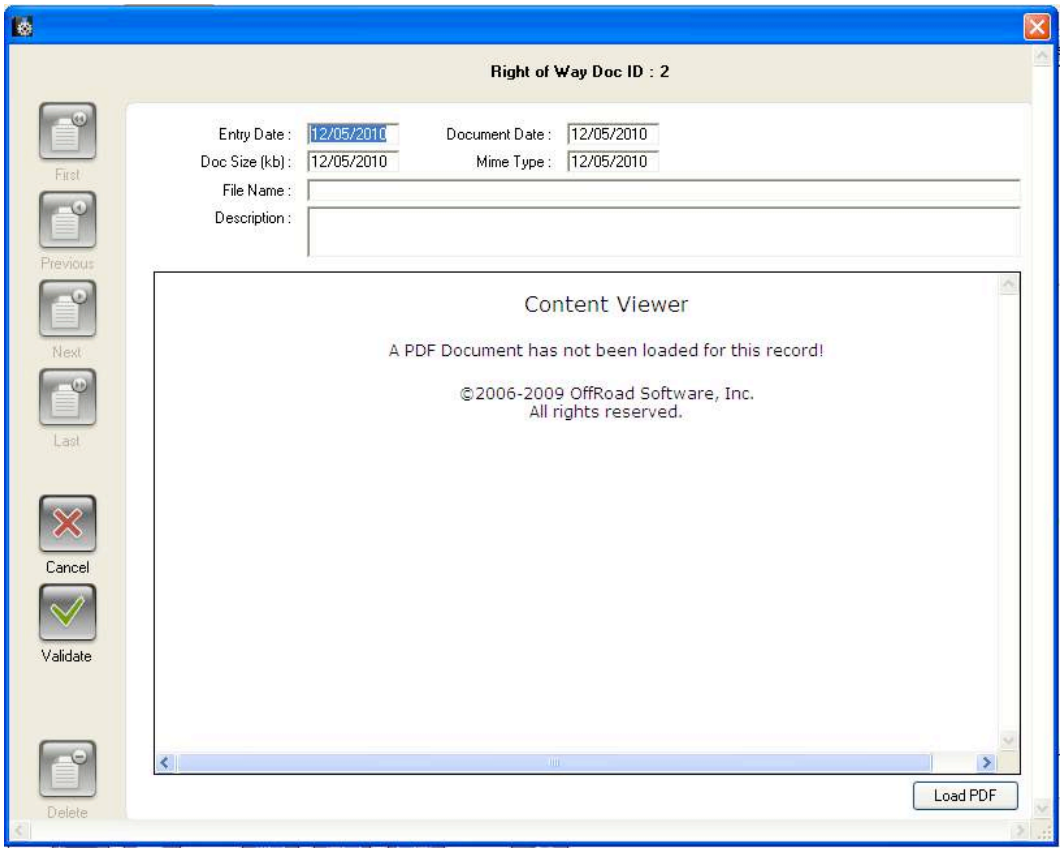
Manage Right of Way Documents

Offroad GIS provides integrated tools to manage any documents that may be associated with a Right of Way. By integrating the right of ways and associated document management, Offroad GIS eliminates redundant management functions and delivers seamless capabilities to deliver these documents over the web. Currently, Offroad GIS only provides support for Adobe's PDF format and implements the Adobe Acrobat plugin for purposes of displaying the documents. There are no limitations imposed relative to the size of the documents or the number of documents that can be stored. As a result, Offroad GIS is capable of providing a complete historic reference of any documents filed for each parcel.

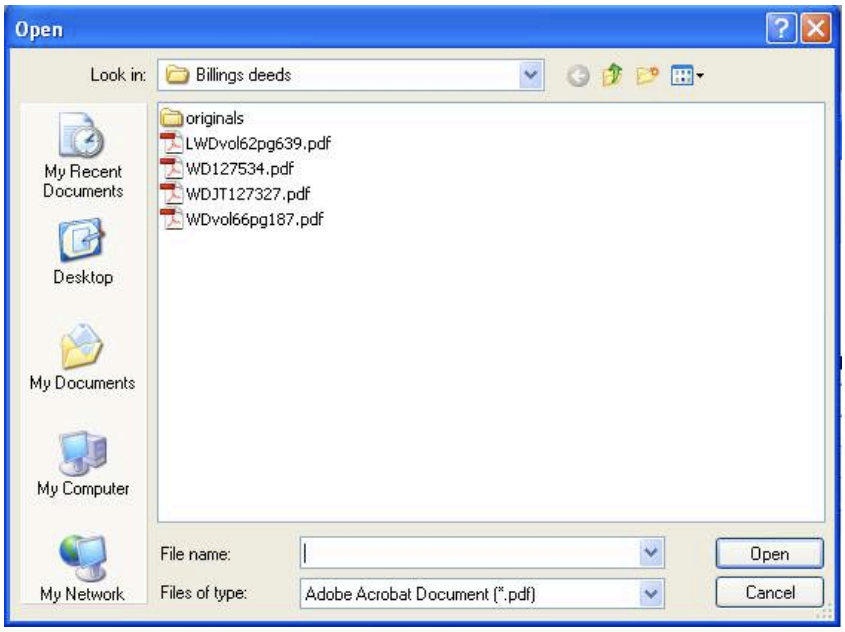
The right of way document management is accessed through the Right of Way input form. The available document records are sorted by date with the newest documents displayed at the top of the list.



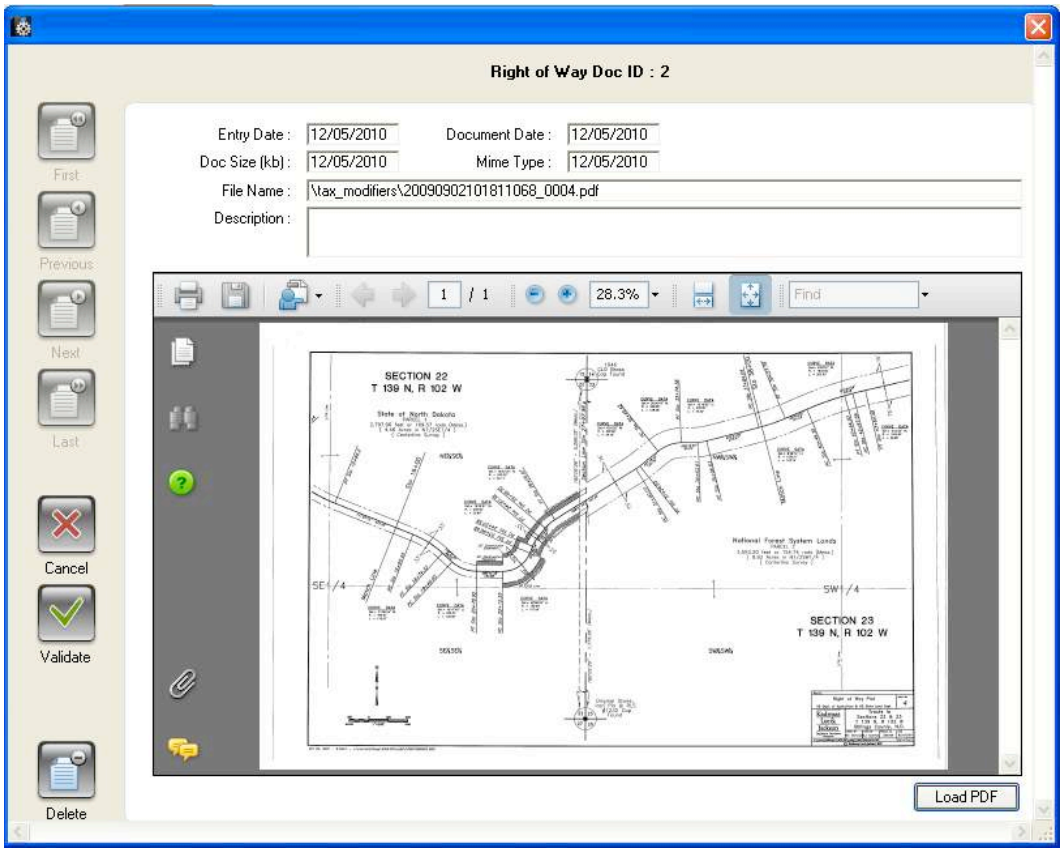
In order to add a Right of Way Document record click on the Add Doc button. This will create a new Right of Way Document record upon which the PDF file can be loaded.



When creating a new record the Content Viewer displays the blank document notice. In order to load a PDF document for the transaction record, click on the Load button. This will present the standard file selection dialog from which the PDF document can be selected.



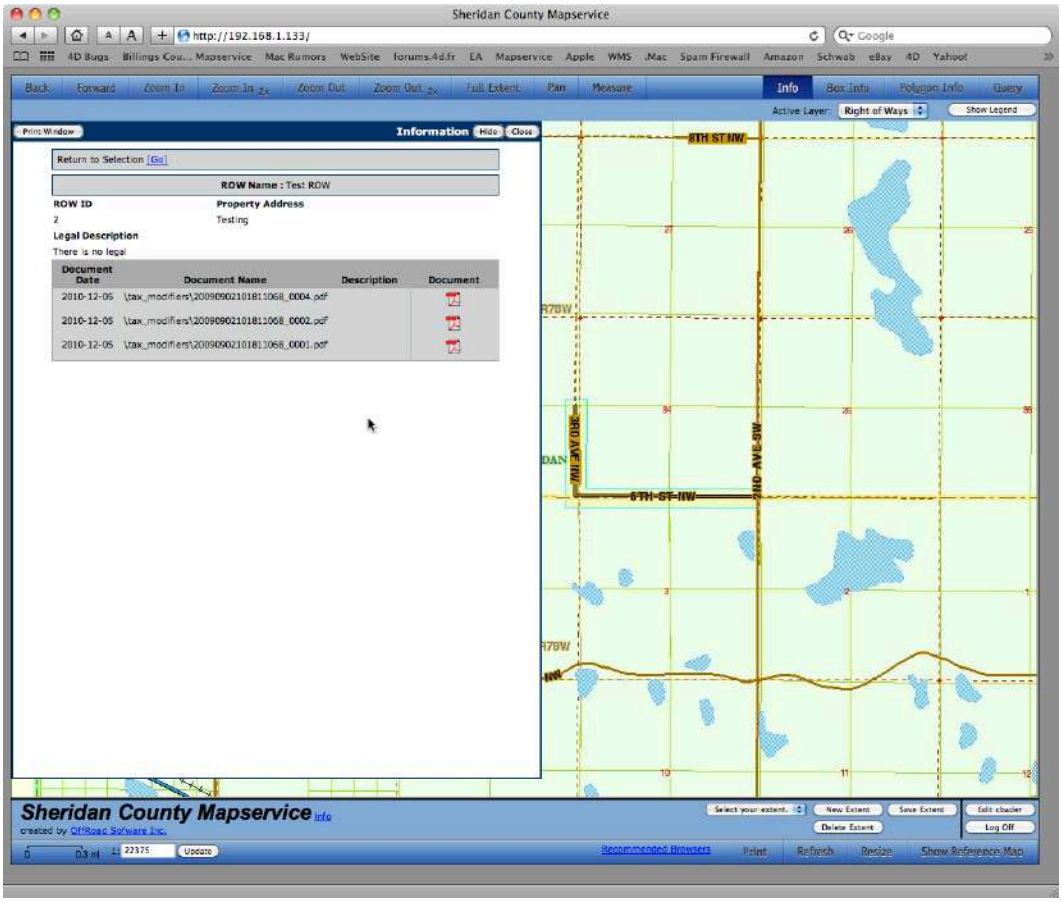
Select the appropriate PDF document and then click on the Open button. The PDF document will then be loaded and displayed in the Right of Way Document record form.



The PDF document is displayed with an Acrobat plug-in area very similar to what would be displayed inside of a web browser. From this plug-in the PDF can be printed, saved, exported, or e-mailed. In addition, the scroll bars allow navigation within the plug-in area to scroll through the enclosed PDF document. The PDF area also scales with the form so that it will grow or shrink as the form is resized.

In order to delete the PDF document, you will need to click on the Delete record button, which will delete the Right of Way Document record and the enclosed PDF document.

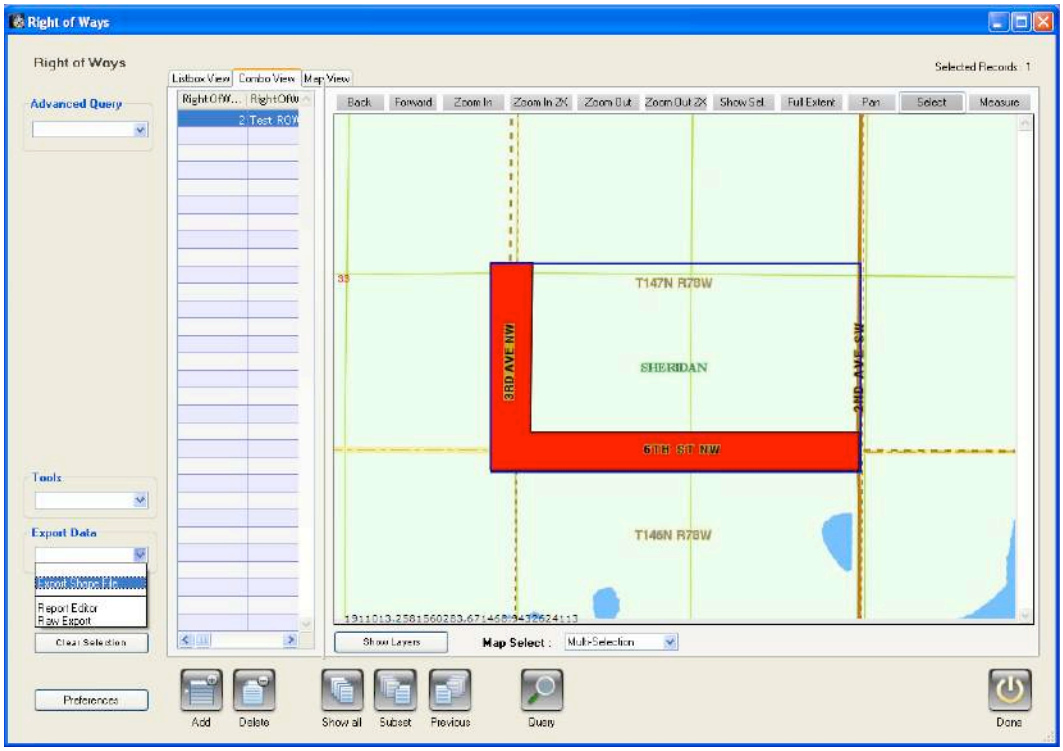
The attached PDF documents are also available to any web users with Restricted or Internal permissions.



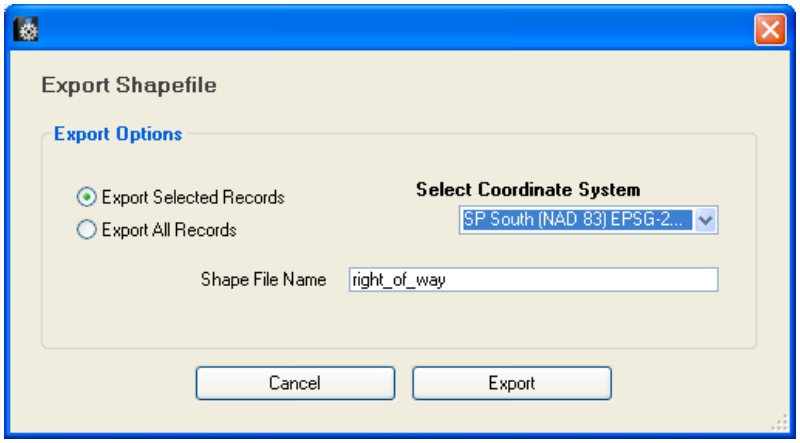
Exporting Right of Ways to Shapefiles

Offroad GIS provides the necessary utilities to export your right of way data to a standard shape file format. The export utilities allow you to export either a user selection or the entire database. The utilities also support options to export the shape file into a variety of standard projections.

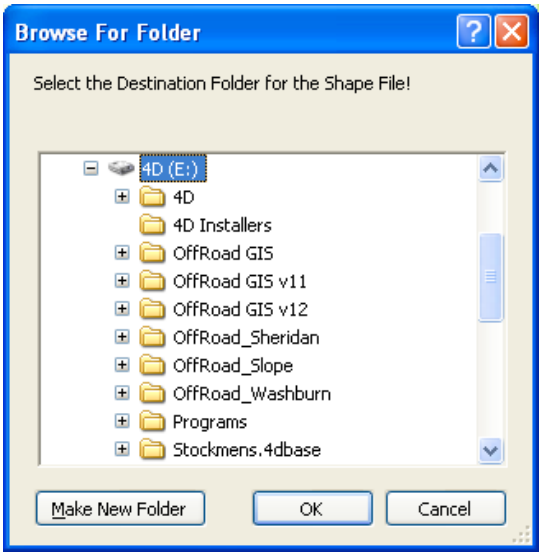
In order to export right of way records to a shape file, select the modifiers that you wish to export in the record selection list. Then select the Export Shape File option under the Export Tools pop-up button.



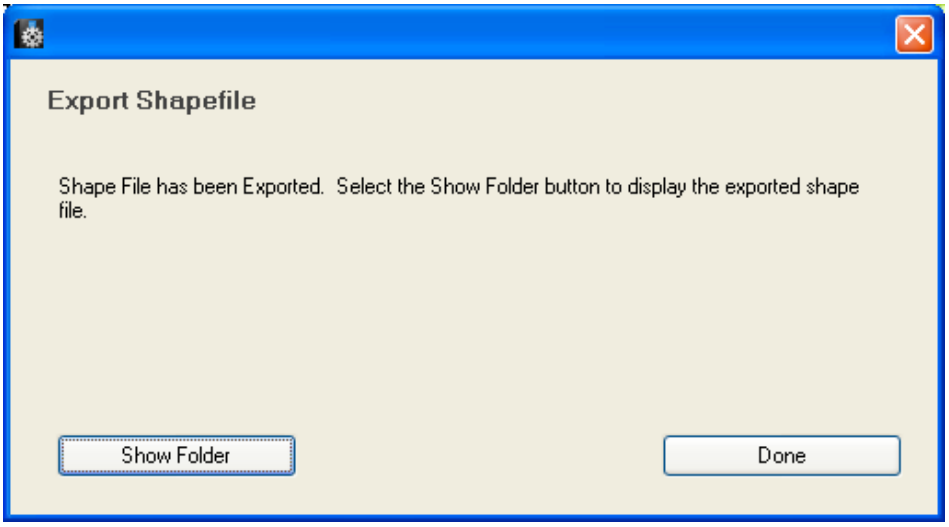
This will present the Export Shapefile dialog from which you can elect to either export the current selection of right of way records or all right of way records. This dialog also provides options to set the name of the export shape file and select the coordinate system and the associated projection or the export file.



Once you have set the coordinate system parameters and the export file name, click on the Export button to export the data. The standard file directory will be presented from which you can select the directory that you want to target for the export file.

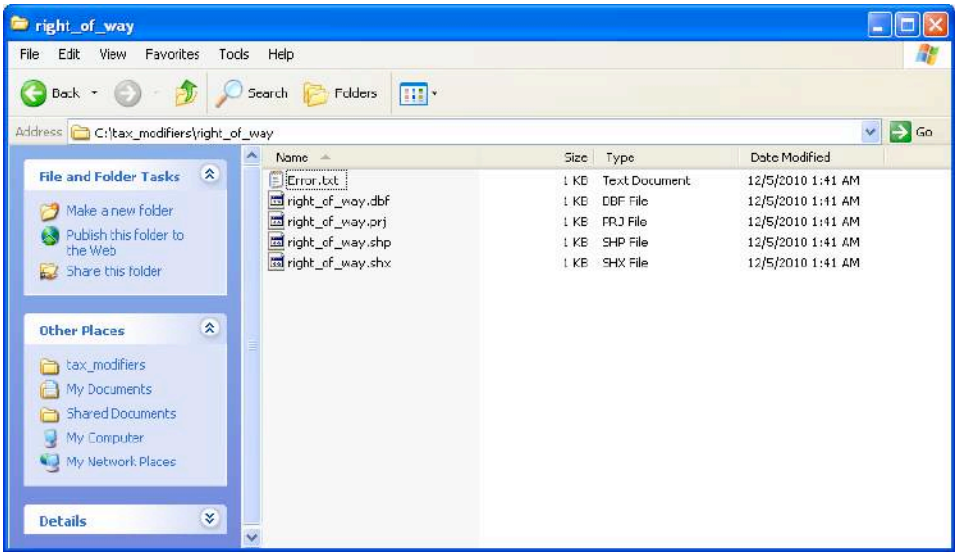


Select the OK button to proceed with the export process. A progress dialog will be displayed during the export process. Once the files have been created, an export status dialog will be displayed.



The Show Folder button can be used to make the destination folder that was selected using the folder selection dialog box active in the foreground. The shape file suite is exported in a zip archive.

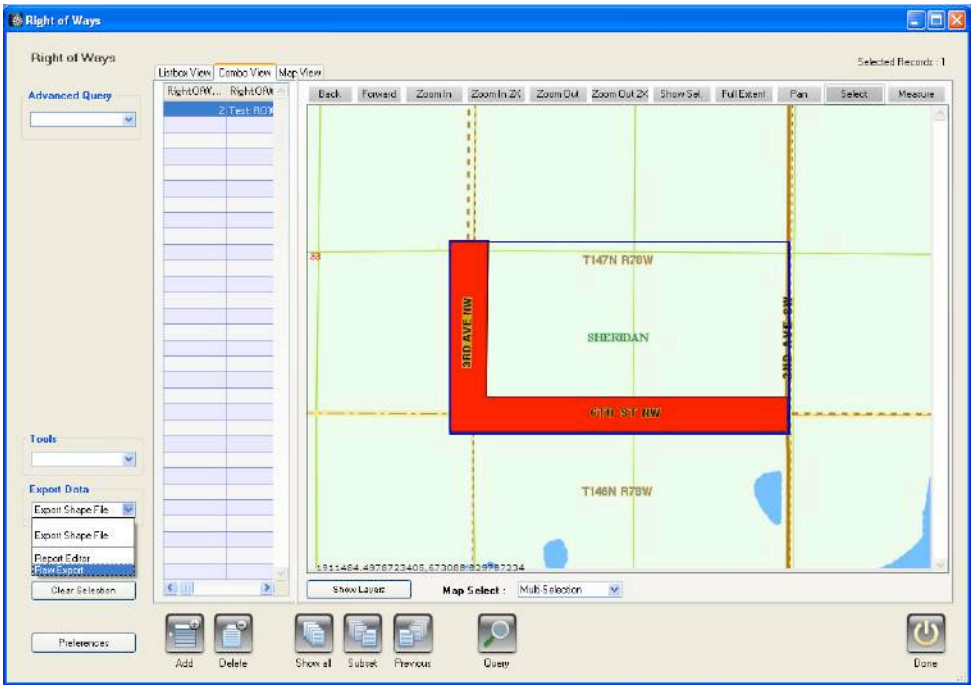
The zip archive contains the typical shape file component including the .dbf, .shp, .shx, and .prj files. In addition, an Error.txt file is included that will contain a log of any errors that were generated during the export process.



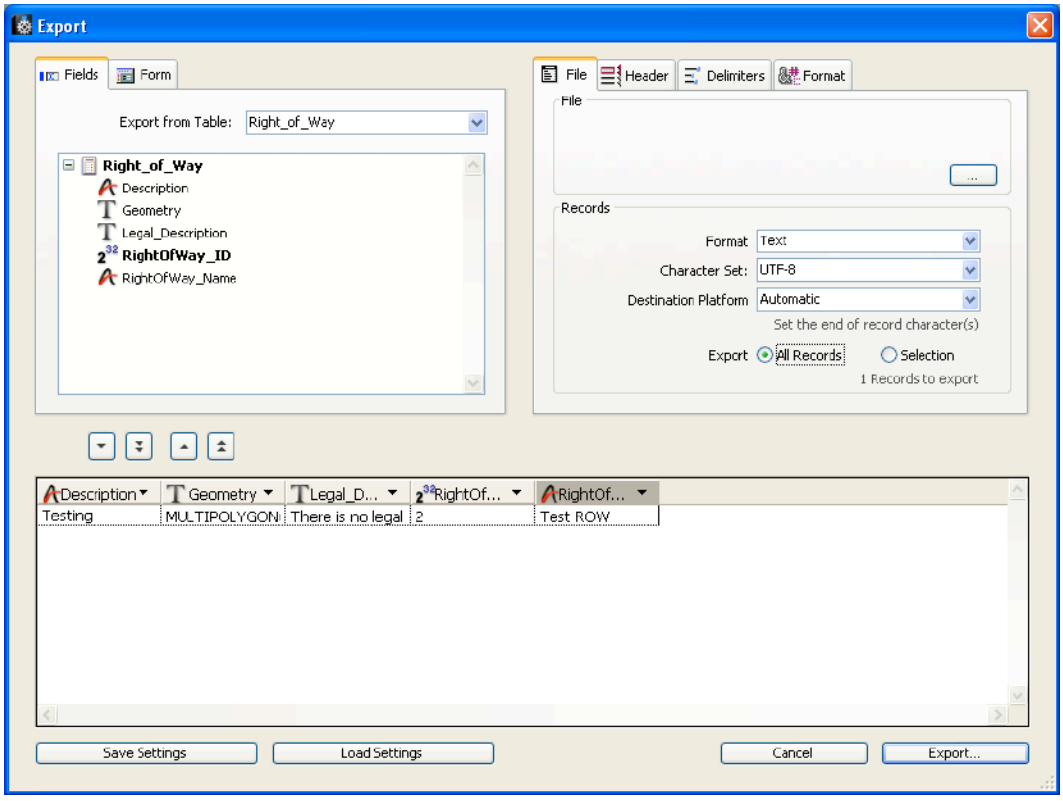
General Data Export

Offroad GIS supports a very flexible data export editor that is designed to provide simple point and click tools to export all of the right of way data or selected components of the data. This type of export primarily targets the attribute data and does not provide any spatially enabled export formats. Currently, Text, Fixed Length Text, DIFF, SYLK, DBF, 4D, and XML formats are supported for data export.

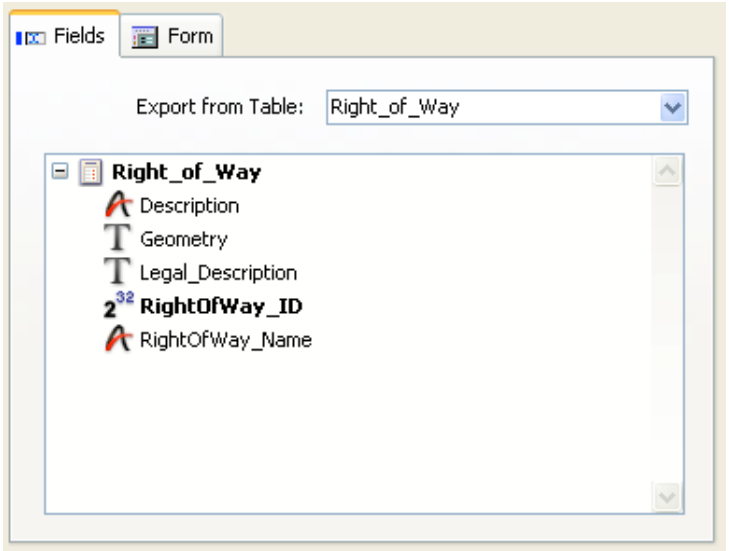
In order to export data using the data export wizard, select the Raw Export option of the Export Data pop-up menu.



This will present the data export wizard from which you can define the data, format, and the export file format for the selected data.

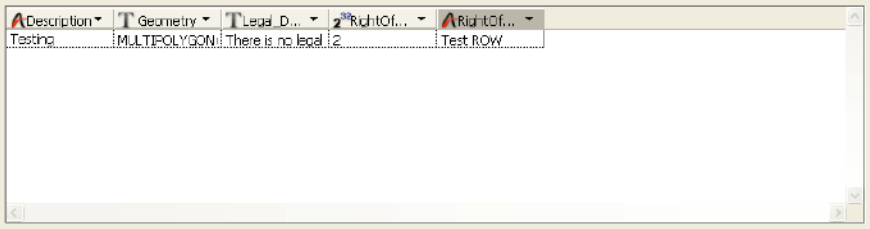


The data export wizard consists of three parts. The first part is the data source which allows you to select the table and its associated fields for data export.



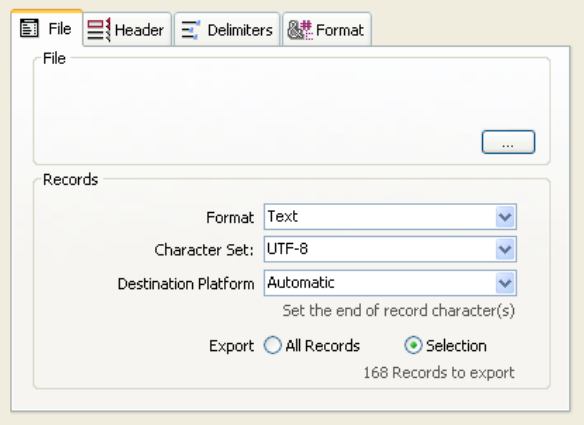
Offroad GIS does not currently support the Form tab button, so the only available option is the Fields data tab. When selected this presents all of the fields for the selected table. You can select any table from which to export data, but you will likely only need to export data from the Right of Way table. In order to select the fields that you want to export, click on the field and then click on the single down arrow or double-click on the field. Either option will place the field in the data export table in the bottom half of the dialog. You can repeat this process for each field that you would like to include in the exported data. If you want to export all of the fields in their default order, click on the double-down arrow.

The second part of the data export dialog is the data table which is displayed in the lower half of the export dialog.

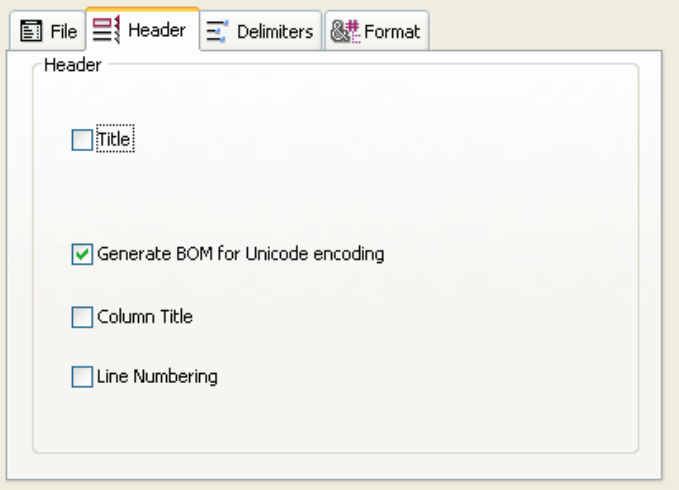


From the data table you can select each column to set the formatting, remove it from the field or change the source field. In order to remove a column, select the column and then click on the single up arrow button. If you wish to clear the data export table, click on the double-up arrow. In order to change the source field associated with a column, click on the down arrow located within the column title. This will present all of the available fields associated with the export table selected above.

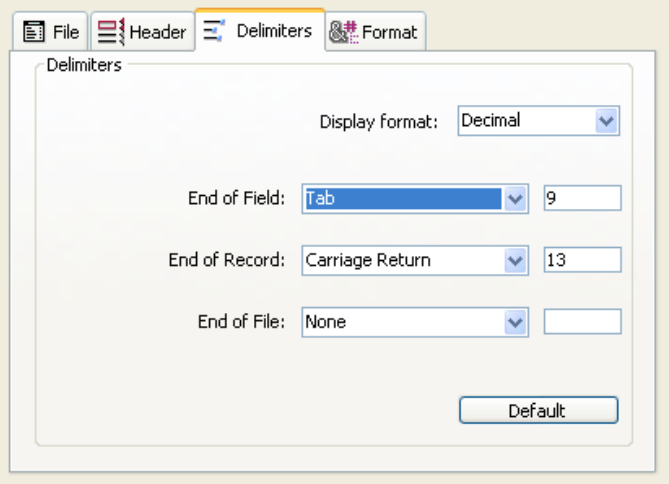
The third part of the export dialog contains the file definition and formatting instructions for the data export. The first tab includes the file information. From this tab, the file destination can be selected as well as the Format and Destination platform. This tab also provides the option to set the export to the current selection or to all records.



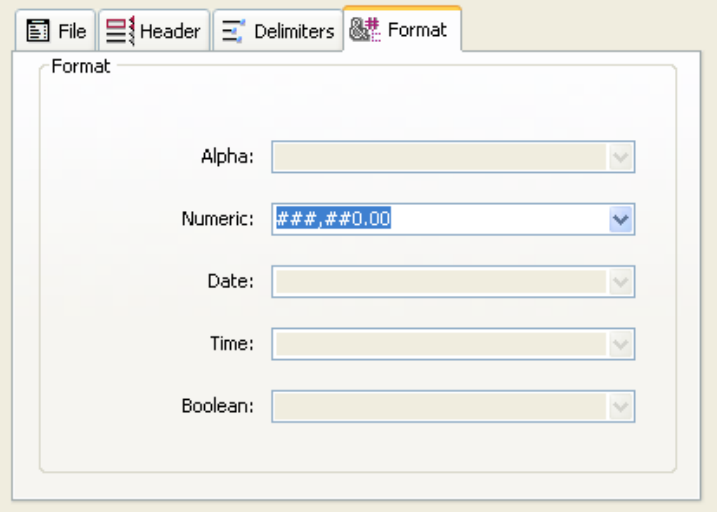
The second tab presents the tools to define the header information for the export file. This includes an overall Title line, individual column titles, and line numbering. Each of these are controlled by the respective check box.



The third tab presents the field, record, and file delimiters. The display format can also be selected which includes either character, decimal, or hexadecimal. For each of the delimiters, you can select relevant delimiters from the pop-up menu. If selected from here, the delimiter code will be updated. You can also type the delimiter into the delimiter field if you want to use one that is not available from the pop-up menu.



The fourth tab presents field formatting options. This tab displays formatting options available for every major field type. In order to apply the formatting, select the target field in the data export table. The appropriate formatting option will be enabled from which you can set the formatting for the selected field.

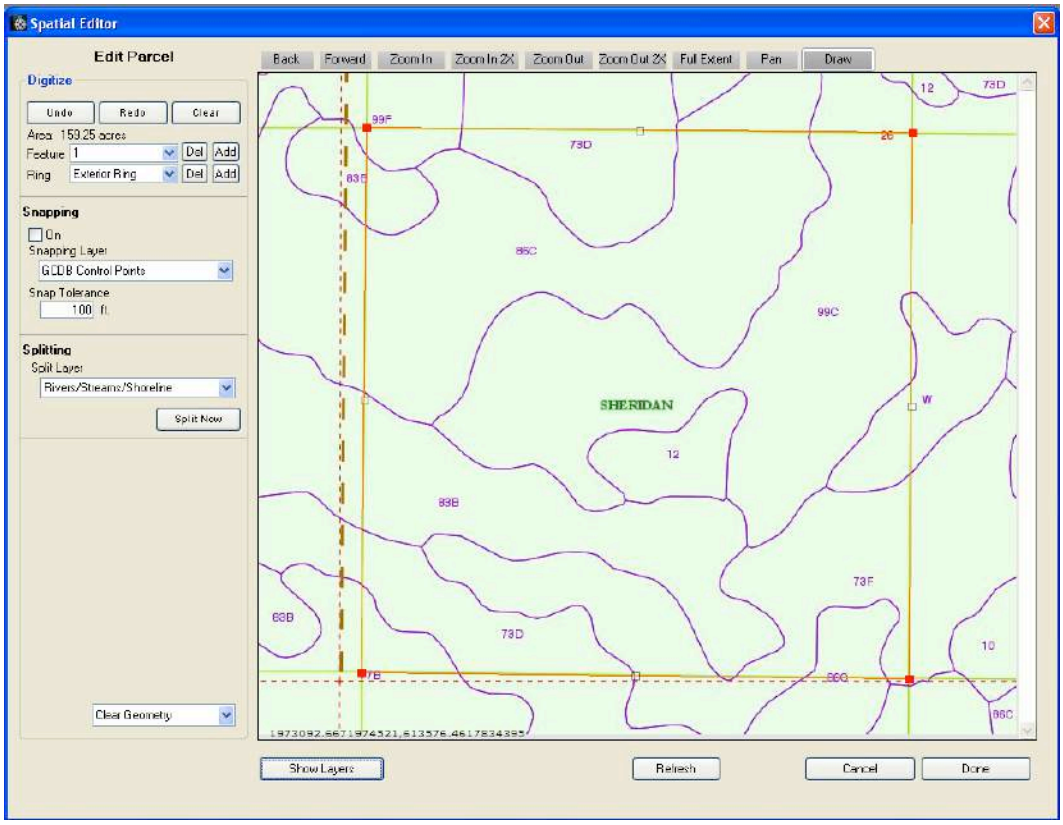


Once you have set all of the parameters for the data export, you can export the data by clicking on the Export button located at the bottom of the screen. However, setting up the data export can take some time. If you commonly export the parcel data using a particular format, you can save this format to a file and re-load it for future use. The Save Settings button allows you to save the current settings including field definitions, formatting, etc to a report format. This can then be restored at any time using the Load Settings button.

Chapter 9 - Spatial Editor

OffRoad GIS includes spatial editing capabilities for Parcels, Right of Ways, Homestead areas, and Tax Modifiers. Regardless of which of the spatial features that are targeted for editing, OffRoad GIS utilizes similar spatial editing tools.

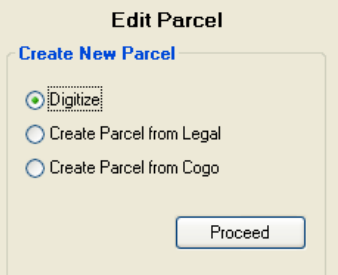
The Spatial Editor provides all of the tools necessary to digitize or otherwise create both simple and complex geometry. The Spatial Editor includes all of the standard navigation buttons as well as a variety of additional tools designed specifically for the challenges associated with developing and maintaining the geometry for the targeted spatial records.



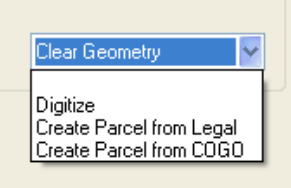
The spatial editor dialog includes the map display area on the right, which includes all of the standard map navigation tools, and the editing tools located on the left side of the screen. When an existing record is loaded, the spatial editor is loaded with the spatial feature selected with the standard digitizing tools displayed in the left hand column.

When initially creating geometry for a feature the default creation options are displayed that provide three options for creating the initial geometry. This will vary depending upon which feature is to be edited. The Parcel editor supports Digitize, Create Polygon from Legal, and Create from COGO, while the Tax Modifiers, Right of Ways, and Homestead Areas only support the Digitize option.

Regardless of which option is selected, once the initial geometry is created, the spatial editor will return the standard digitizing tools after it is created.



Even after the initial geometry has been created, the parcel spatial editor provides the option to clear the geometry and start over with one of these three options. In order to clear the geometry and re-create the geometry, click on the Clear Geometry pop-up list displayed at the bottom of the Editing column. For all other spatial data types, simply select the Clear button to clear the geometry and begin digitizing from scratch.



Digitzing Mode

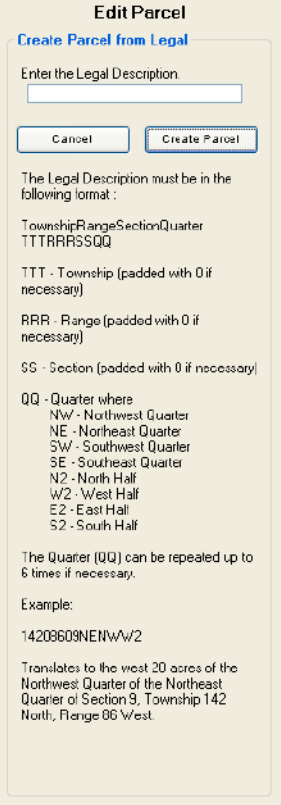
Whether selecting the Digitize option from the Clear Geometry pop-up list or selecting the Digitize option when creating the initial geometry, the spatial editor simply places you into the standard editing mode with no geometry. Even if you use the Create Parcel from Legal or Create Parcel from COGO, once the initial geometry is created, the spatial editor will present the feature in the Digitizing mode as this is the standard editing mode.

This interface provides a number of tools that have been specifically designed to address the editing process required to develop and maintain the spatial integrity of your geometry. This includes options to create, edit, and delete polygons, complex polygons, and cutouts. This interface also includes tools to provide snapping to GCDB Control points, Parcels, and other features related to parcel boundaries. For the parcels, this interface also includes tools to split simple polygons based upon other coincident features such as Rivers and Streams.

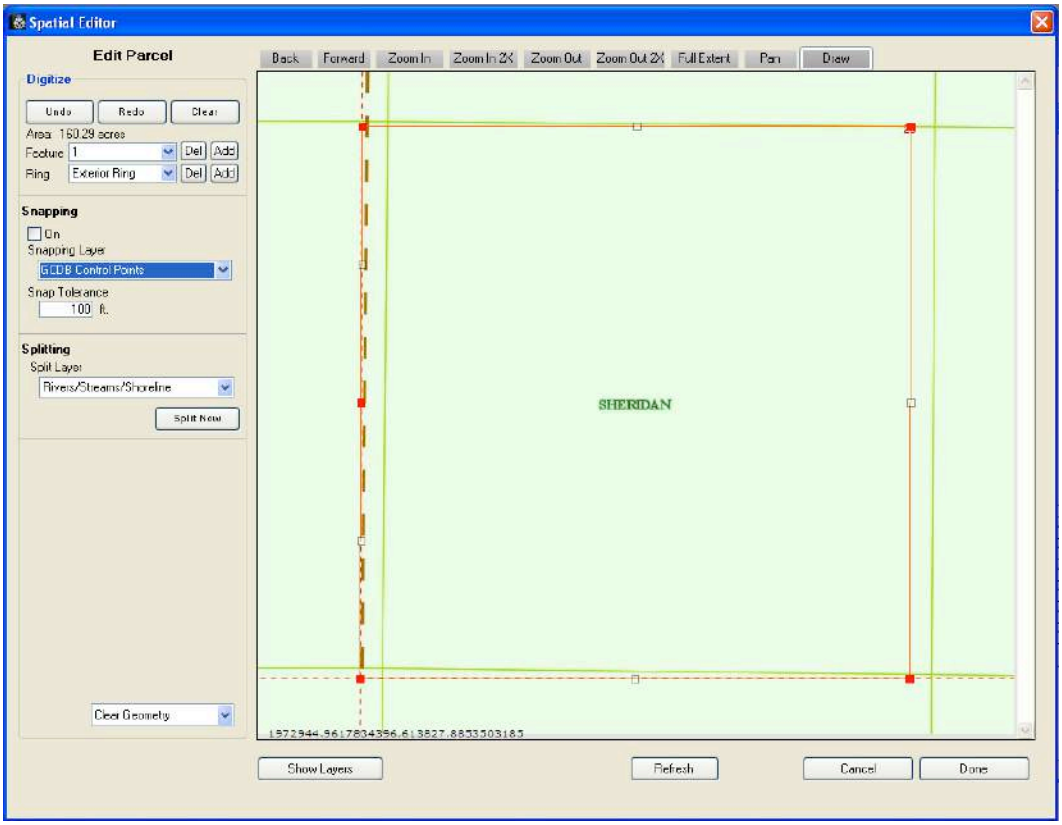
While editing geometry, you can elect not to use the snapping or split features, but these tools are provided to insure the integrity of the geometry with coincident features such as other parcels. If proper care is taken while the spatial data is created, the integrity of the resulting data set will lend itself well to other spatial functions such as the tax assessment.

Create Parcel from Legal

When selecting Create Parcel from Legal, the editing functions in the right hand column are replaced with the Create Parcel from Legal wizard.



Enter the legal description in the appropriate field and then click the Create Parcel button to proceed. To return to the standard spatial editor simply select the Cancel button. Follow the directions in the wizard for the proper format for the legal description. If entered properly, the parcel will be created and the spatial editor will display the feature centered in the editor. In the example below, a legal description of 14507626SW was entered. The quarter section was used to create the parcel and the spatial editor includes the parcel with the area displayed in the Digitize group box under the editing column.



Create Parcel from COGO

When selecting Create Parcel from COGO, the editing functions in the right hand column are replaced with the Create Parcel from COGO wizard. The COGO wizard allows you to create parcels from the COGO descriptions that are typically found in deeds or other legal documents. The COGO text can be typed or pasted directly into the input box or you can use the wizard to create the COGO text from the description. Keep in mind that the COGO is created based on a flat surface and therefore may not be exactly what was surveyed, but it should give you an approximate shape.

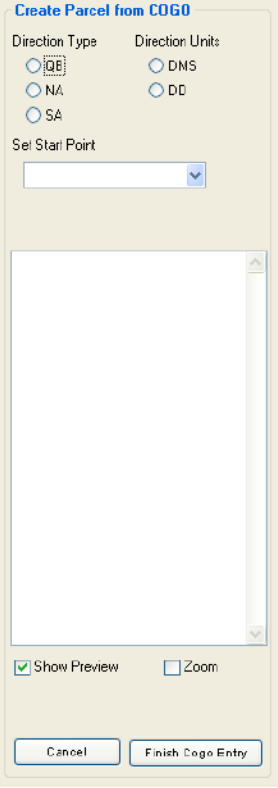
To create a parcel with the wizard.

- Select the Direction Type. QB is quadrant based, NA is North azimuth and SA is South azimuth.
- Select the Direction Units. DMS is degrees-minutes-seconds, DD is decimal degrees.
- Set the Start Point (SP) by selecting From Map or From Location from the pop-up list.
    - *If you choose From Map, you will be prompted to click on the map at your starting point. You may turn on the snapping so your start point matches a point on your snapping layer of choice. Once you have the point drawn on*

the map at the location that you want, you will select the Get Start Point button to populate the input text box with the point's coordinates.

- *If you choose From Location, you can enter in a legal description, ie. 15408902 and choose which corner you want the start point to coincide with.*

- Add a course using the pop-up list. The first course can only be a Direction Distance or Non-Tangent curve since they don't depend on the previous course's information.
- Add the second course using the pop-up list. After the second course is added, the parcel will be drawn if you have the Show Preview checkbox checked. You can force the map to zoom to the drawing by checking the Zoom check box. If you leave the Zoom checkbox checked, the map will zoom to the extent of the current drawing after each course is added.
- Continue adding courses until the drawing is finished. You can delete courses by deleting the corresponding line from the text box.
- Click on the Finish COGO Entry button to complete the drawing. From here you will be taken to the digitizing interface where you can continue editing the parcel if needed.

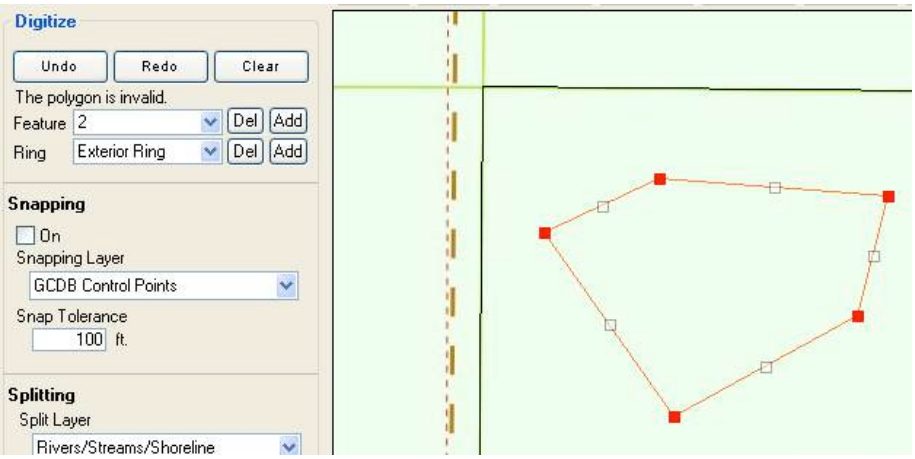


Digitizing Functions

The Digitizing functions include all the tools that you will need to create and modify the geometry.

In most cases, the geometry will consist of a simple geometry with a single polygon. However, there are times when a simple geometry will not adequately represent the record. The tools in this area provide the necessary tools to Add, Modify, and Delete polygon features as well as Rings. By default a simple polygon contains a single feature and a single ring. The Feature pop-up allows you to select the respective feature for editing. Likewise the Ring pop-up allows you to select the respective ring for editing.

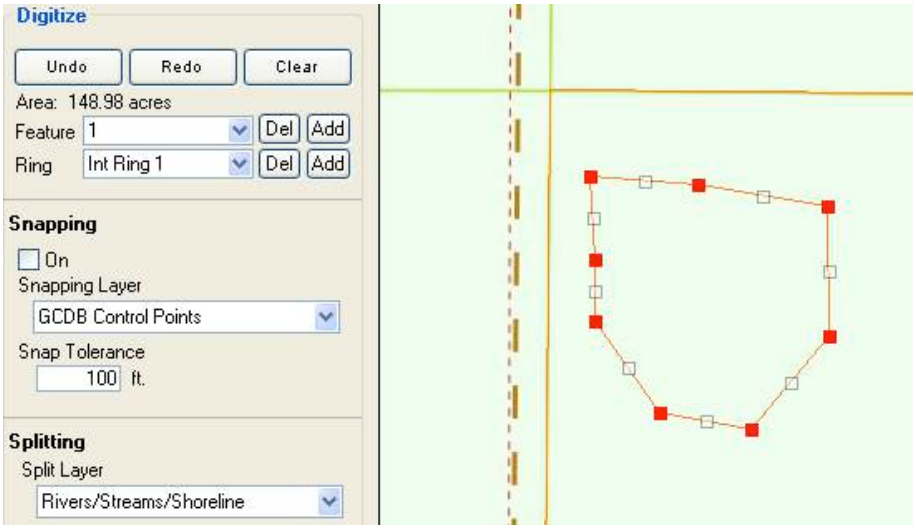
Adding a Feature - click on the Add button next to the Feature pop-up to create a new feature. This will allow you to begin digitizing a new feature. To begin, simply start by clicking on the map where you want to start the feature. Continue capturing points by clicking where you want subsequent points to be located. The polygon will auto complete once you have created at least three points.



Only a single feature can be edited at a time. To toggle between the features, simply select the appropriate feature from the Feature pop-up menu.

Deleting a Feature - To delete a feature. Select it from the Feature pop-up menu, and then click the Del button.

Adding a Ring - click on the Add button next to the Ring pop-up to create a new Ring. This will allow you to begin digitizing a new Ring.



Deleting a Ring - To delete a Ring. Select it from the Ring pop-up menu, and then click the Del button adjacent to the selected Ring.

Regardless of which feature is selected for editing, the polygon associated with the feature will be displayed with its current nodes presented as small red boxes (handles). In addition, small clear boxes (handles) are displayed between each of the node handles. These clear handles are used to display the mid-point between two adjacent nodes.

Modifying a Node - simply select the node handle and drag it to a new position. To do this move your cursor over the node, it will change from a pointer to a cross-hair with directional arrows to indicate that you can drag the node in any combination of directions. You must click and drag the node handle in a single action. If you simply click on the node handle, it will be deleted.

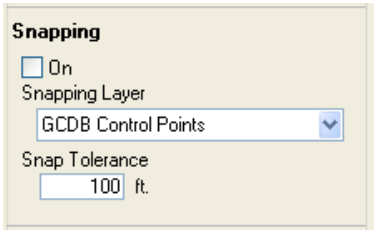
Deleting a Node - simply single click on the node handle to delete it. When you click on a node and release the mouse button, if the node has not been moved, it will be deleted.

Inserting a Node - to insert a node, click on the mid-point handle and drag it to the correct location. If you simply click on the mid-point handle, nothing will be changed and no additional nodes will be added. However, if you click on the mid-point handle and drag it to the desired location, a new node will be created wherever the mouse button is released.

Using these very simple actions, very complex geometries can be created. When used in conjunction with the snapping tools, geometries can be created that are accurate and conform to the GCDB control points and adjacent features.

Snapping

The spatial editor support snapping features and allows you to snap nodes to existing features within selected layers. In order to enable snapping, click on the On button in the Snapping control area.

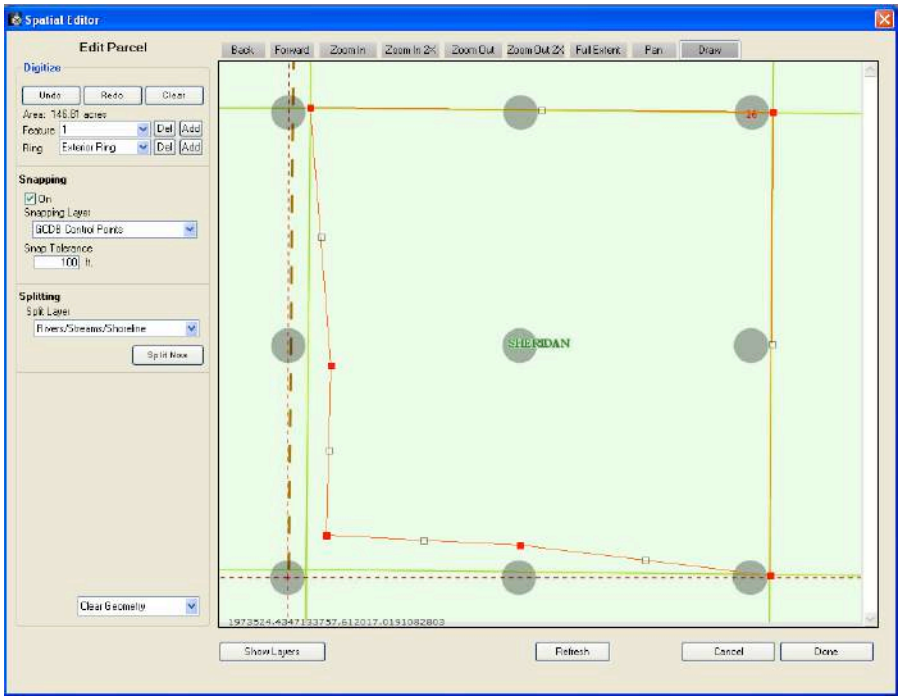


This will display the nodes for the layer that is displayed in the Snapping Layer pop-up menu. You may need to zoom in on the map if the nodes are not displayed.

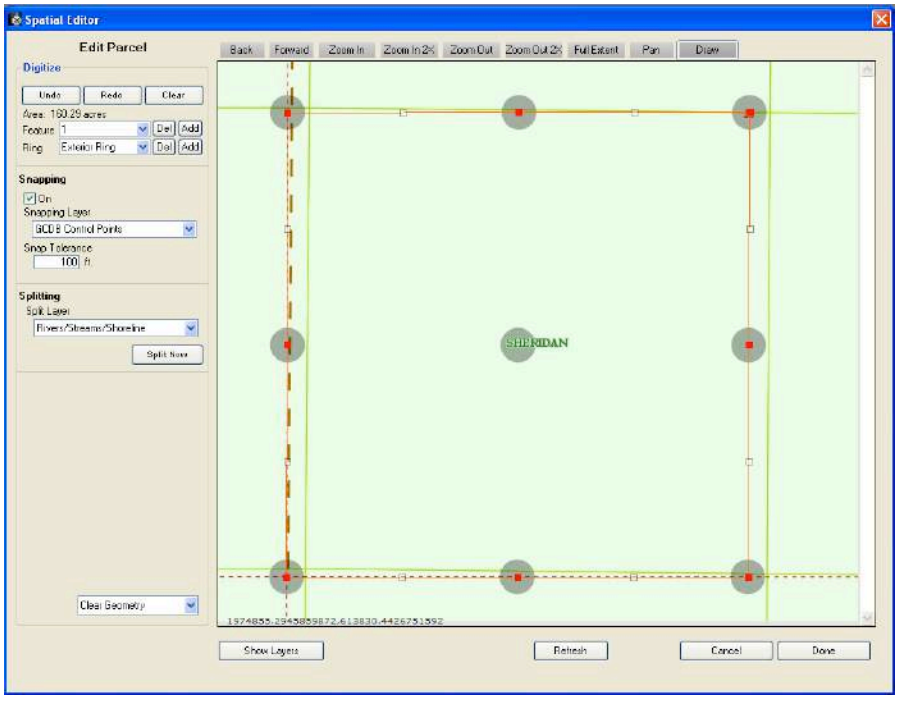
Snapping Layer pop-up menu - includes relevant layers to be used as snap layers. To change the snap layer, simply select the target layer from the pop-up menu. The snap layer can be changed at any time during the editing session.

Snap Tolerance - The snap tolerance sets the proximity required to effectively snap to the selected feature layer. The snap tolerance is set in pixels and the system automatically maps this to the appropriate map units in feet. The nodes of the snap layer are displayed as gray circles that represent the snap perimeter around the node.

Once the snap layer has been set, node handles can be snapped to the target snap nodes, by dragging the node handle within the proximity circle of the target node and releasing the mouse. The node will automatically be set to the same coordinates as the target node.

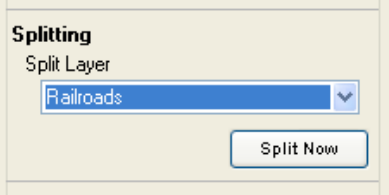


If you snap the nodes in the example displayed above, you can ensure that the nodes coincide with the GDCB nodes, by dragging the target nodes within the proximity circle of the appropriate GCDB nodes. Likewise, the mid-point handles can also be used to create nodes to coincide with all of the GCDB nodes that are present (as displayed in the example below).



Splitting Features

Splitting Features is currently only supported when editing parcel data. The spatial editor supports splitting parcels by other features. At this point, Offroad GIS supports using Rivers and Streams, Railroads, State and Federal Roads, and Local Road as split features.



To split the existing geometry by one of these features, select the target feature from the Split Layer pop-up menu. Then click on the Split Now button. This will split the existing geometry into two features. When splitting by other features, the resulting parcel features will include all of the coincident nodes from the split feature to insure the integrity of the geometry.

Once the parcel has been split, the resulting features can be selected from the Feature pop-up menu. To eliminate the component of the parcel that is to be split off, select it from the Feature pop-up menu and click the Del button adjacent to the Feature pop-up menu.

Note - if any of the navigation tools are used for purposes of panning, zooming the map interface, it will be necessary to select the Draw button to return to the editing mode.

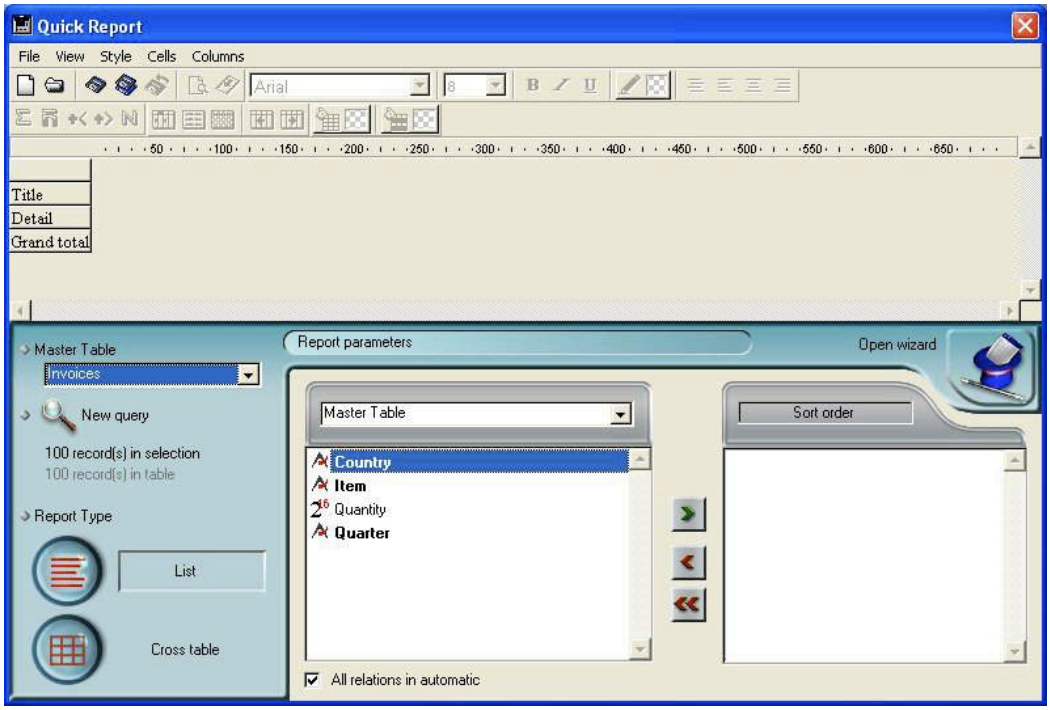
Chapter 10 - Quick Reports

One of the most important tasks in data management is report generation. The Quick Report Editor provides the utilities to design and create ad-hoc reports. Using the Quick Report Editor you can create:

- Produce lists of records.
- Create break areas.
- Produce cross-table reports.
- Compute summary calculations.
- Modify fonts and styles in the report.
- Define borders and background colors on a cell basis.
- Save and open quick report designs to disk.
- Select different output types such direct printing, HTML, or text files.

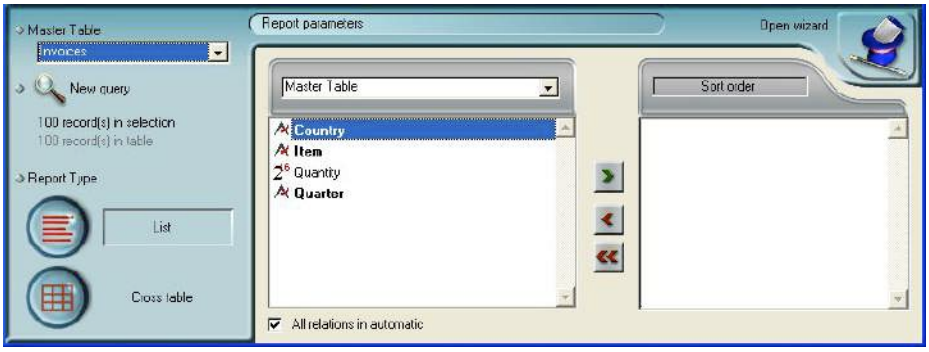
Overview of the Editor

The Quick Report Editor appears as follows:



It consists of two main areas:

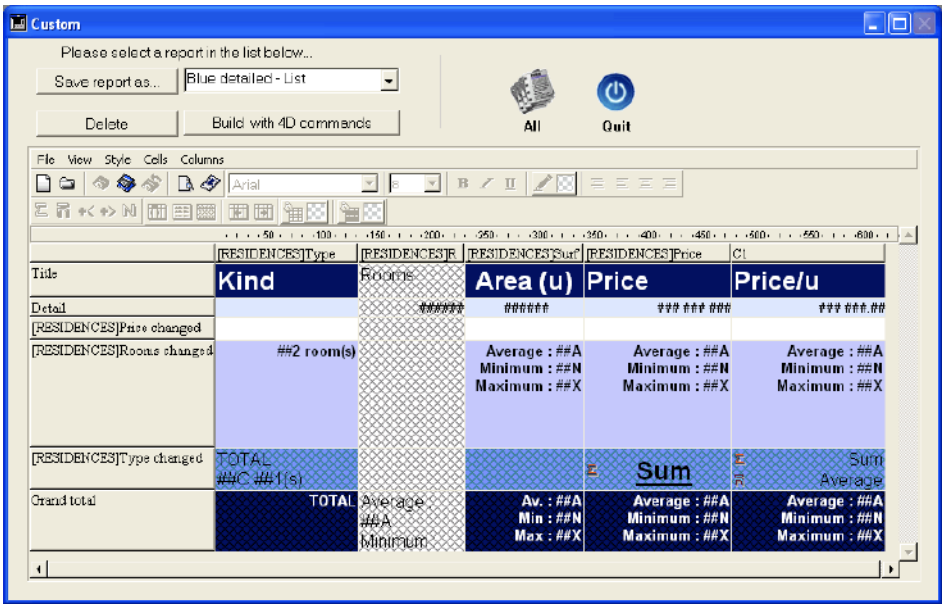
- The Report data area that is used to specify the type of report to be built and the data to be integrated; it also can be used to access the Report Wizard:



- The actual Report area:

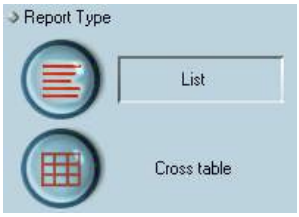
  This shows the area as it appears when a Report area is inserted in a form. This is where actual column and row contents are created, where sort orders are defined, etc. Also, this area includes various toolbars, its own menu bar and contextual menus.

  For example, this area could be placed in a form as depicted below:



List Mode and Cross-table Mode

In the Report editor there are two operation modes available which generate two specific types of reports: **List** and **Cross table.**



- List mode

This is the default mode. In this mode, reports would typically display records as a list with break levels where sums would be performed. The following is a typical List report.

First Name	Last Name	Department Name	Salary
Biff	Davis	Accounting	43780
Smeldorf	Garbando		19610
Alan	Hull		41460
Bryan	Pfaff		26440
Shirley	Ransome		36040
Marlys	Wilson		36500
		Sum for Department : Accounting	203830
Kathy	Forbes	Engineering	18840
Dennis	Hanson		40520
Mary	Smith		55000
Andy	Venable		43520
Lance	Wolfram		27300
		Sum for Department : Engineering	185180

- Cross-table mode

  This mode allows you to display your report as a two-dimensional table. This is useful when you want to display data from a data source broken down into categories that are actually a function of two other data sources.

  For example, a cross-table form would let you display in a table how many of each product type was sold in each quarter. The following is a typical Cross-table Report.

	AV Preamplifier	Power module	Remote control	Line Total
Q1	34	29	39	102 10526316
Q4	48	64	21	133 66666667
Q3	49	68	40	157 48148148
Q2	64	74	47	185 66666667
Grand total	195 5.90909090909 1	235 5.875 1	147 5.4444444444 1	577 5.77 1

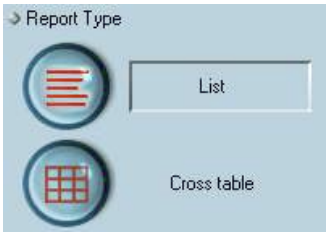
Creating a New Report

In order to design a report:

- Choose the Report Editor from the Export Data pop-up menu.

  Offroad GIS displays the Report editor. If a previous report has been defined, it appears in the window. To erase the contents of the window, choose **New** from the **File** menu or click the New icon in the standard toolbar of the editor to begin a new Report design.

- Choose the type of report to be generated by clicking on either the **List** or **Cross table** button, located at the bottom left corner of the Report editor:



The List type is generally selected by default. The Report area is modified according to the type selected.

Loading and Saving a Report Design

You can save a report design as a file that you can open from the Report editor. The report design includes all of your specifications for the report, but not the data. By saving report designs, you can maintain a library of report designs that you can use according to your needs.

Note *If you do not save your design, it is displayed the next time you open the Report editor but only during the same work-session.*

In order to save a report design:

- Choose **Save as** from the **File** menu

  OR

  Click the Save as icon in the file management toolbar.

  Offroad GIS displays a create-file dialog box in which you can name the report design.

Note *Report files for Windows are denoted by the file extension .4QR.*

- Enter a filename for the report and click OK

  Offroad GIS saves the report as a file that you can open with the Report editor. You can save the file on your hard disk. If you modify the parameters of the report subsequently and want to save them again, you just need to choose the **Save** command in the **File** menu.

  The new file will replace the previous one on the disk, without the standard save file dialog box appearing.

When the Report editor is open you can load a saved design and use it to print a new report. You can use the same report design repeatedly to print different selections of records.

In order to load a report design:

- Choose **Open** from the **File** menu.

OR

Click the Open Icon in the file management toolbar.

An open-file dialog box displaying a list of available report designs is displayed.

- Double-click a filename or select a filename from the list and click OK.

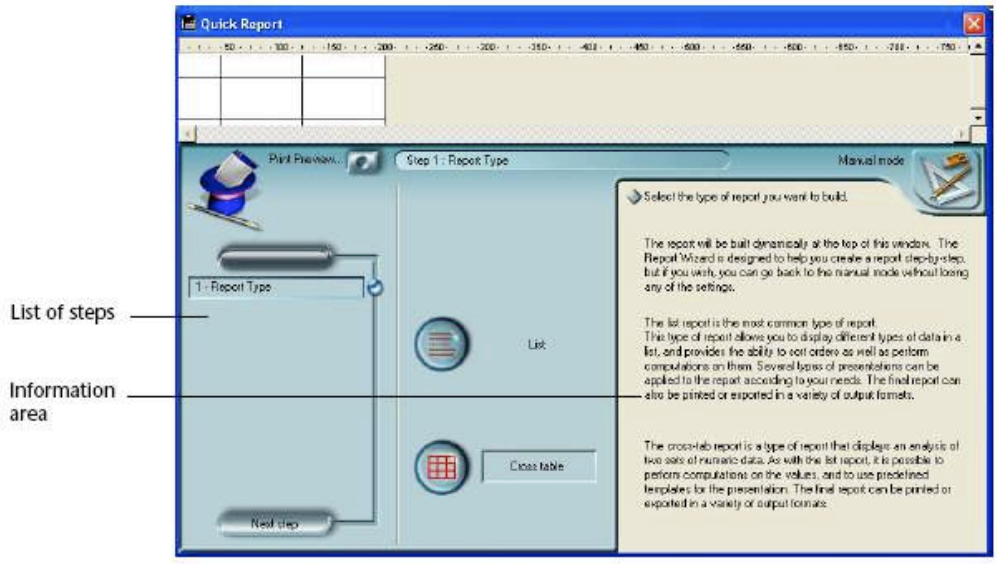
The current design will be replaced with the design you opened.

The Report Wizard

When creating a report, you can use the Report Wizard to guide you through the creation of the report.

To start the wizard, click the **Open wizard** button in the Report editor:

The pages of the wizard then replace the data area in the window of the Report editor:



The construction of the report is then carried out through detailed steps with comments appearing in the right-hand part of the window. To create a Report using the wizard, follow the instructions displayed on the screen.

When you have finished constructing the report, the wizard offers you the possibility of generating the corresponding report code.

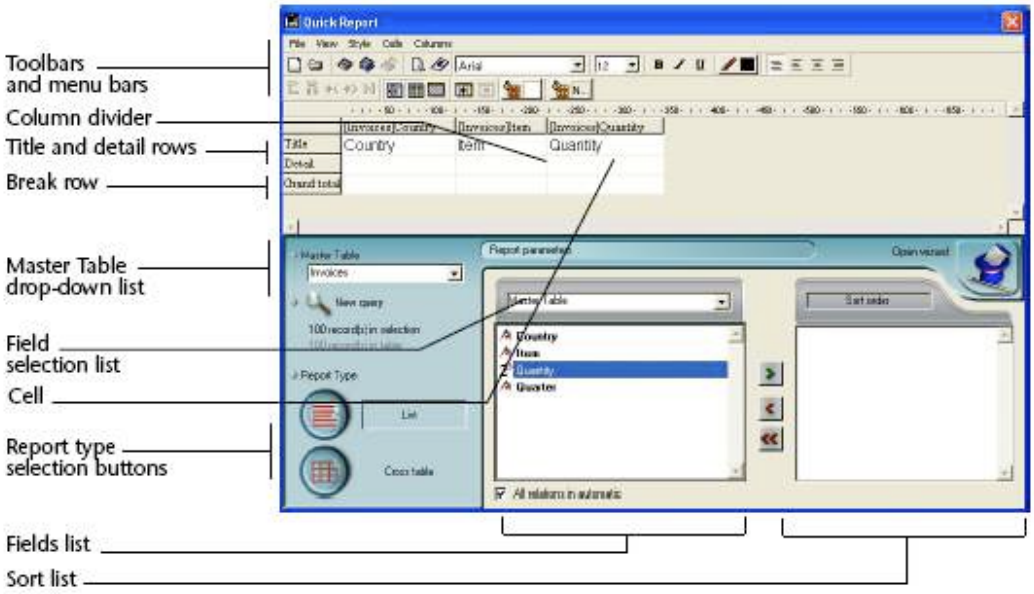
To exit the wizard, click on the button to return to Manual mode:

Using the Quick Report Editor

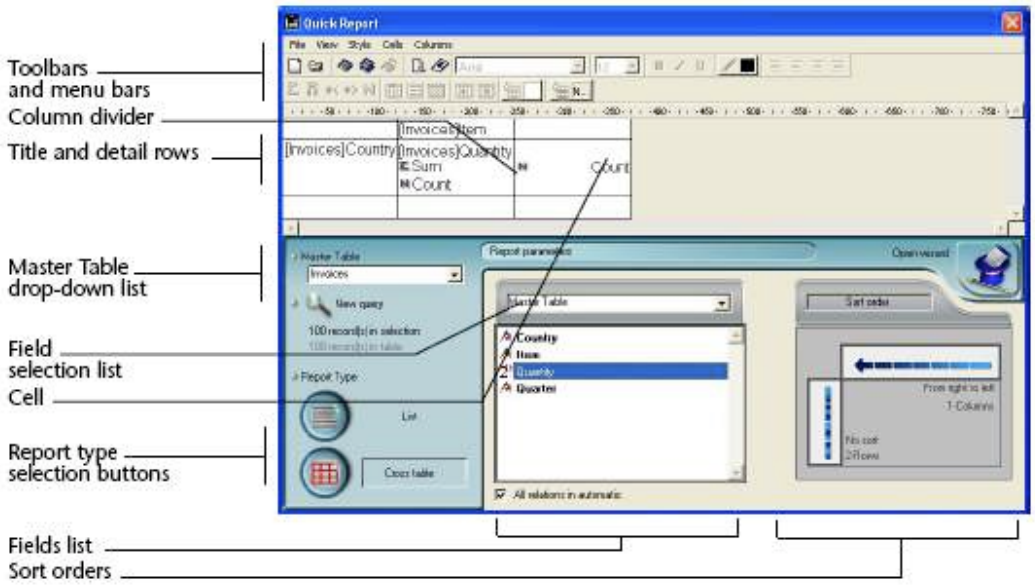
When you create a quick report, you can specify the following:

- Columns that display fields or formulas, either from the current table or from related tables,
- Sort levels and order (list mode),
- Summary calculations,
- Display format,
- Text for labels,
- Formats for numeric and Boolean data,
- Font, font size, style, and justification for labels, summary calculations, and data,
- Background colors on a cell column or row basis,
- Borders,
- Page headers and footers.

LIst Mode:



Cross-table mode:



The Quick Report Editor contains the following elements:

- **Master Table drop-down list:** This menu is used to specify the master table that will be used as a basis for generating the report. The fields of this table are displayed in the Fields list and the related fields will be displayed in relation to this table.
- **Fields List:** This list lets you select the fields to be inserted into the report by double-clicking or by drag and drop. It displays either the list of fields found in the master table, the hierarchical list of tables and related fields, or the hierarchical list of all the tables and fields of the database. You choose the type of display in the Field selection list located just above the area.

  Indexed fields appear in bold. You can also display and select the fields of related tables.
- **All relations in automatic:** This option is used to specify the way in which the Quick Report editor will make use of the relations between the different tables of the database.

  On principle, the editor can only use automatic relations. By default, the option is not checked and only automatic relations can be used by the editor.

  If the **All relations in automatic** option is checked, the Quick Report editor considers the manual relations of the database as automatic relations and will enable access to all the data related to the database.
- **Column dividers:** These lines indicate the boundaries between columns of the report. They can be moved manually in order to enlarge or reduce

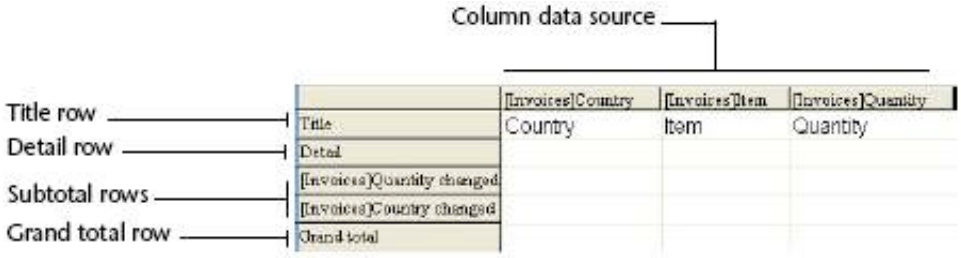
the size of each column. Manual resizing deselects the **Automatic Width** option if it has been activated for the column concerned.

- **Cells:** A cell is the intersection of a row and a column.
- **Scroll bars:** You use the scroll bars to view parts of the quick report design that extend beyond the area of the quick report form.
- **Sort list / Sort order display area:**

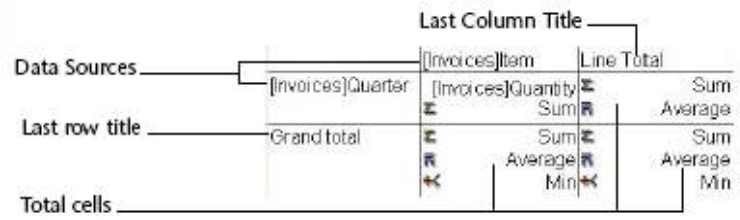
  In list mode, this list displays the fields of the report on which the sort will be carried out, as well as the sort order and whether it will be ascending or descending. Each field inserted into this list causes a sub-total row to be added in the Quick Report area.

  In Cross-table mode, this area displays the sort order for each data source.

- **Quick Report area:** This area lets you build your report by inserting fields using drag and drop, double-clicking or via the contextual menu; you can also adjust the width of the columns added, or delete breaks or formulas, define the colors and borders of cells, etc.



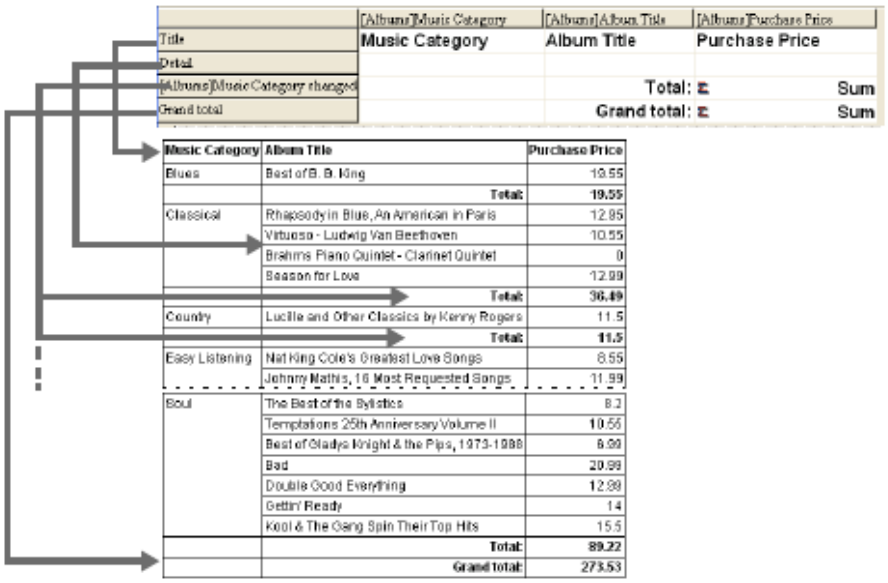
- **Title Row:** This row displays the names of fields or formulas that have been inserted into the report. It is repeated for each page of the report. The Quick Report editor inserts field names by default, but you can modify the contents.
- **Detail Row:** This row contains information drawn from each record and is repeated in the report for each record. You can associate a display format with it, depending on the type of the data represented.
- **Subtotal Rows:** These rows display intermediate calculations as well as the wording that is associated with them. A row is created for each sort order.
- **Column Data Sources:** These titles indicate the source of the data for each column.



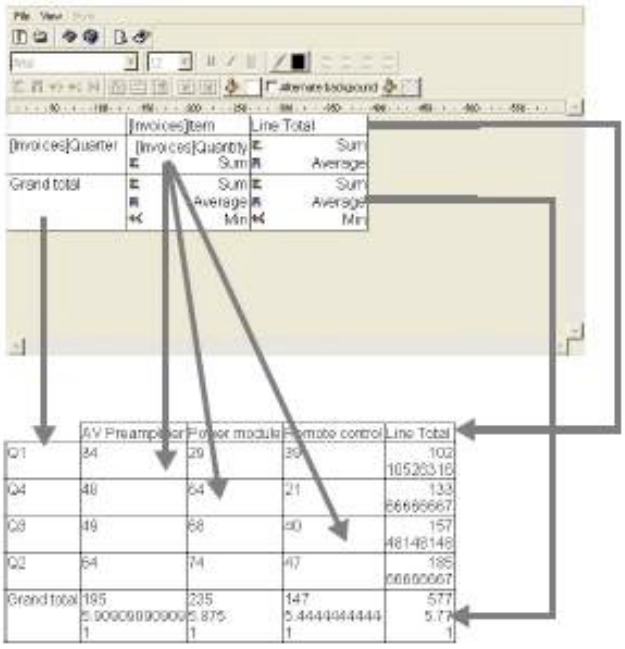
- **Data Sources:** These two cells will house fields that will be used for the two categories of the array. The center cell can also accept field sources and calculations at the same time.
- **Total Cells:** These cells are designed to house calculations on the column's contents.
- **Title Cells:** These cells house the titles for the last column or the last row. Their contents can be modified.

The following figures show completed quick report designs and the relationship between the specifications in the design and the printed output:

List Report



Cross-Table Report



Contextual Menus

The Quick Report Editor has contextual menus that make it easy to access certain row, column, and cell operations. Instead of making menu selections or working with the Cell or Column properties areas, you can perform certain operations by displaying a Quick Report contextual menu.

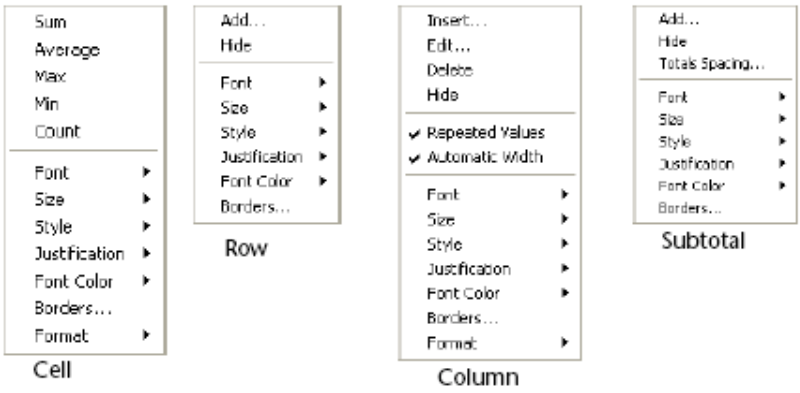
These are separate contextual menus for row, column, and cell operations.

In order to use a contextual menu:

- Click with the right mouse button on a cell, row title, or a column heading.

  A contextual menu appears. The commands in the contextual menu depend on where you click (column heading, cell, row or subtotal row title). In addition, menu commands that are not appropriate for the specific row, column, or cell are disabled.

- Choose the desired menu command:



As with any contextual menu, this menu's contents vary depending on which cell type is highlighted. Items available break down into five main types:

Font attributes, display formats, standard calculations, column or row management items, and cell borders.

Font Attributes

These items appear in the contextual menu when a cell, column, or row is selected. Selecting a font attribute will apply it to the current selection (cell, row, or column). The Font attribute items appear as follows:

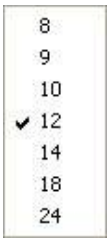
- **Font**

  Selecting this item displays the list of fonts installed on your machine from which you can select the font that will be applied to the items selected in the report area.

  Once an item in the list is selected, a check mark is displayed next to it.

- **Size**

  Selecting this item displays the list of font sizes from which you can select the font size that will be applied to the items selected in the report area.



  Once an item in the list is selected, a check mark is displayed next to it.

- **Style**

  Selecting this item displays the font styles (Plain, Bold, Italic, and Underline) from which you can select the font style that will be applied to the items selected in the report area.

  Once an item in the list is selected, a check mark is displayed next to it.

- **Justification**

  Selecting this item displays the list of justification attributes (Default, Left justified, Centered, and Right justified).

Note *Default is the default justification for this data type (left for numbers or, otherwise, right).*

  Once an item in the list is selected, a check mark is displayed next to it.

- **Font Color**

  Selecting this item displays a palette of colors.

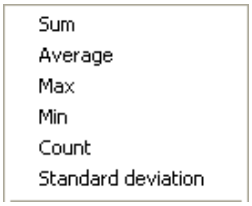

The color shown indicates the color selected. The default color is black.

Display Formats

These items appear in the contextual menu when either a cell or a column is highlighted. From the menu, you can select one of the default formats that match the data type of the column. Once selected the format applies to the entire column, regardless of whether the current selection is a cell or a column.

Summary Calculations

These commands appear in the contextual menu when the current highlighted cell belongs to either the Grand total row or to the Subtotal row.



Selecting an item will insert the corresponding calculation in the highlighted cell (See the “Adding Summary Calculations” paragraph later is this chapter). Once an item in the lists is selected for a cell, a check mark is placed next to it. It is possible to select several calculations successively.

Column and Row Management Items

There are several items that are dedicated to column or row management:

- **Hide**

  Selecting this item hides the current column or row. Once it is hidden, a check mark is displayed next to the item, and the row or column is crossed out.

- **Add...**

This item is displayed when a row is highlighted or nothing is high-lighted. Selecting this item displays the formula editor to allow you to define the data source for a new column. Once this is done, the new column is added to the right of the right-most existing column

- **Totals Spacing…**

  This item is displayed when you click on the title area of a subtotal row. It displays the Subtotals Properties dialog box. The options found in this dialog box are described in the "Subtotal Spacing" paragraph later is this chapter.

- **Insert…**

  This item is displayed only when a column is highlighted in list mode. Selecting this item displays the formula editor to allow you to define the data source for a new column. Once this is done, the new column is added to the left of the current highlighted column.

- **Delete**

  This item is displayed only when a column is highlighted in list mode. Selecting this item deletes the current highlighted column.

- **Edit…**

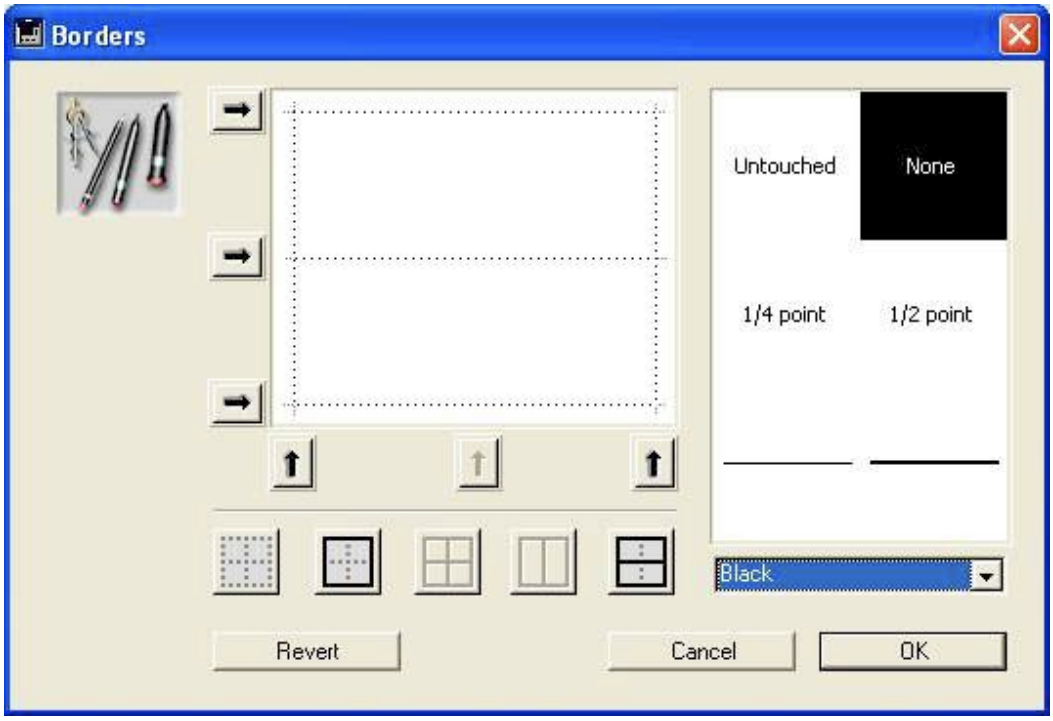
  This item is displayed only when a column is highlighted in list mode or when a cell is highlighted in cross-table mode. Selecting this item displays the formula editor to allow you to edit the data source for the current column (list mode) or for the current cell (cross-table mode).

- **Automatic Width**

  This item is displayed only when a column is highlighted in list mode, or when any cell is highlighted in cross-table mode. You can use this item to select or deselect the automatic width. When Automatic Width is selected, the database will try to match the column size to the data so that the data fits on one line.

Borders

These items appear in the contextual menu when a cell, column, or row is selected. Selecting Borders displays the Borders dialog box:



For more information about this dialog box, refer to the “Setting Borders” paragraph later in this chapter.

Once defined, the border format is applied to the current selection (cell, row, or column).

Selecting Rows, Columns, and Cells

When designing a List quick report, you need to select rows, columns, and cells in the quick report form. A cell is the intersection of a row and a column.

In order to select a row:

- Click on the Title, Detail, Subtotal, or Grand total cells in the row label area.

In order to select a column:

- Click the Header row of a column

In order to select a cell:

- Click on the cell.

Adding and Modifying Text

You can add or modify text in the quick report form to label parts of the report. For example, if you requested summary calculations, you can label them by adding text to other cells in the Subtotal and Grand total rows.

You can add and modify text as follows:

- Edit the text that the database automatically adds to the Title row of the report,
- Insert text in empty cells of the Subtotal and Totals rows,
- Insert the value of a Subtotal field in the Subtotal rows,
- Specify the font, font size, justification, and style for any text that appears in the report.

Adding Text

To add text in a report cell:

- Click twice on an empty cell in the quick report form.

  A text insertion point appears in the cell.

  If you are entering a label for a summary calculation, select a cell in the same row as the cell containing the calculation icons. You cannot enter text into the same cell that contains summary calculations.

- Type the text in the cell

Modifying Text

To modify text in a cell:

- Double-click in a cell to get an Insertion point and drag across the text in the cell you want to modify.

  The database highlights the selected text.

- Type the new text in the cell.

Adding Columns

In List mode, you create columns by dragging field names from the Fields list into the quick report area. If you want to add a field from a related table, expand the foreign key field in the hierarchical list of fields to display the fields in the related tables (if you have selected **Related Tables** or **All Tables** in the drop-down menu located just above the list).

You can add fields from related tables, provided that the relationship is automatic. If you want to be able to use manual relations, check the **All**

relations In automatic option: in this case, the editor changes all of the relations of the database to automatic.

Note *You cannot add or edit a column in cross-table mode, since the report comes with all of the columns needed.*

To add a field:

- Drag the name of a field to the right of existing columns in the Quick Report area and release the mouse button

  OR

  Double-click on the name of a field in the Fields list.

Note *If you drag and drop a field onto an existing column, it will be replaced by the new column.*

The database creates a column for the field and places the field name in both the column header and the cell in the Header row.

By default, the database prints the field names as column heads at the top of each page in the quick report.

To add a column using a menu command:

- Select the **Add…** command in the **Columns** menu of the editor

  OR

  Right-click over an unused area of the Quick Report area, then select the **Add…** command.

The standard formula editor is displayed, allowing you to specify the data source of the new column (field or formula).

Inserting Columns

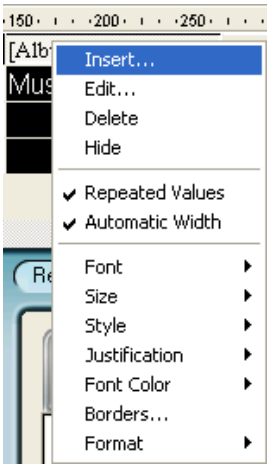
In List mode, you can insert an empty column into a quick report. After you insert the column, you can assign a field or a formula to it.

To insert a column

- Select a column
- Choose **Insert…** from the **Columns** menu.

OR

Right-click to display the Quick Report contextual menu and choose **Insert**.



The standard formula editor is displayed, allowing you to specify the data source of the new column (field and formulas).

Deleting Columns

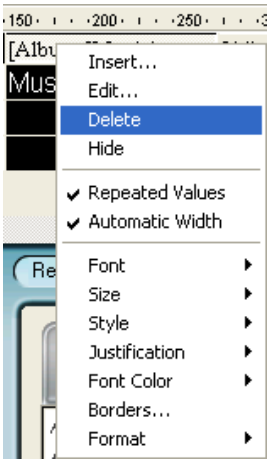
In List mode, as you specify fields for your quick report, you may want to remove some columns to place them elsewhere. Or, you might want to delete the column from the report.

To delete a column using the Quick Report menu bar.

- Select the column you want to delete
- Choose **Delete** from the **Columns** menu.

  OR

  Right-click on the header of the column to be deleted, then select the **Delete** command from the contextual menu.



The selected column is removed from the report.

Replacing Columns

In List mode, you can replace a column in the quick report by dragging another field over it. You can also replace a field with a formula and vice versa.

To replace a column by a field:

- Drag a field from the Fields list to the column you want to replace.

  The replacement is instantaneous. If the previous field was designated as the sort level, the field that replaces it will also be substituted in the sort order list.

To replace a column using the formula editor:

- Select the column you want to replace and choose **Edit…** from the **Columns** menu.

  OR

  Right-click on the header of the column to be replaced, then select the **Edit…** command in the contextual menu.

  The standard formula editor appears, allowing you to designate the new data source of the column (field or formula).

  When you print the quick report, the database will print the results of the formula for each record that appears in the Detail row.

Sizing Columns

By default, the Quick Report editor sizes columns automatically, as reflected in the **Automatic Width** button. It sizes each column based on the maximum length of data displayed in the column and any labels typed into the column. The Quick Report editor sizes the columns when the report is printed.

This operation is enabled for a column when the **Automatic Width** attribute has been associated with it. You can set and view the activation of this option

in the **Columns** menu, in the contextual menu of the columns or using the corresponding button in the Columns toolbar:

To view the widths of each column, preview the report on the screen. See the “Generating a Quick Report” section on page 200 for more information about previewing a report.

Because selecting the **Automatic Width** button or contextual menu item changes the width of a column based on the maximum width of data in the records being printed, selecting different records can change the size of the columns.

You can resize a column manually, which automatically causes the deselection of the **Automatic Width** option (where applicable). When a column is set manually, text in the column wraps within the specified area.

To manually resize a column:

- Select the column you want to resize.
- Move the pointer over the column divider in the quick report to change the pointer into a column width cursor.
- Drag the column divider to the left or right to resize the column.

Moving Columns

In List mode, as you specify fields for your quick report, you may want to move some columns to place them elsewhere.

To move a column using the Quick Report toolbar:

- Select the column you want to move.
- Click the move icon to move it to the right or to the left:

  OR

- Select **Move right** or **Move left** from the **Columns** menu to move the column as desired.

  The selected column will be moved.

Associating Formulas with a Quick Report

You can add a formula to a column in a quick report. For example, you can add a formula that computes employees’ monthly salaries from an Annual Salary field.

To associate a formula with a column:

- Insert an empty column

  OR

  Click an existing column and choose **Edit…** from the **Columns** menu

  OR

  Double-click an existing column's header.

  OR

  Right-click on an existing column header to display the Quick Report contextual menu and choose **Edit.**

  The formula editor will be displayed from which you can build a formula. If you selected an existing column, the formula you create will replace the previous contents of the column.

- Build the formula by selecting the fields, operators, commands, and / or methods, then enter the desired values in the editing area.

  OR
  Click the **Load…** button to retrieve an existing formula from disk.

  If you click the **Load…** button, the open-file dialog is displayed asking you to select a file. When you load a file, it replaces any formula that currently appears in the Formula editor. After you load a formula, you can modify it in the editing area.

  To save the formula as a file that you can retrieve and use in another column or in another report, click the **Save…** button and enter a filename in the dialog box.

- Click **OK** to assign the formula to the column.

  The database adds a new label to the column that identifies it as a formula. You can relabel the column by typing a label into the header cell from that column. The formulas are labelled C1 to Cn. These labels are the name of the variables containing the current value of the column. You can use these variables in other formulas.

Modifying the Graphic Attributes of a Report

You can modify the graphic appearance of a quick report. The Quick Report editor lets you set the following attributes:

- the character font, as well as its size, justification, style, and color,
- the background color of the cells,
- the cell borders.

In addition, the Database provides a set of predefined report templates that you can modify as desired.

Note *Appearance specifications are only taken into account for the "Printer" and "HTML File" output destinations (colors only). With other types of output, the formatting of reports must be carried out after the report is generated, using the receiving applications.*

Specifying Character Font, Size, Justification, Style and Color Attributes

While designing your quick report, you can specify different fonts, font sizes, justification, styles, and colors. You can then apply these specifications to text, data, and summary calculations within rows, columns, or cells in the quick report.

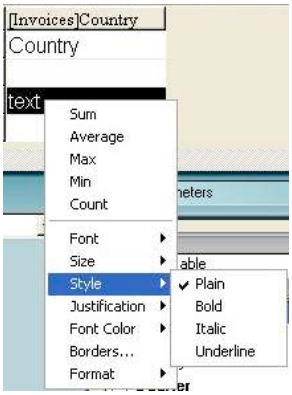
If you assign specifications to the Detail row of the report, you will not see the results until you preview or print the report.

You can specify font attributes using either the Quick Report menu commands or the Quick Report contextual menu.

To specify a character font, font size, style, justification, or color:

- Right-click on the row label, column header, or cell to which you want to apply the font attributes.

  A contextual menu appears.



- Use the Font, Size, Style, Justification, or Font Color submenus to change the font attributes as desired.

  OR

- In the report, select the column, row or cell that you want to configure.
- Choose a font in the drop-down font list and a size in the drop-down size list; then choose a style, justification, and color in the **Style** toolbar:

Note *You can also assign a style and justification using the **Style** menu.*

The database applies the parameters to the text, data or calculations included in the selected area.

Specifying the Background Color of Cells

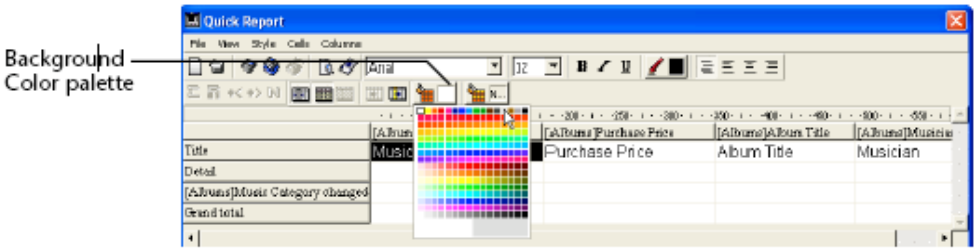
The Quick Report editor allows you to set a background color for each cell. You can set either a single color or two alternating colors, which provides better readability for tables.

It is possible to set background colors for both List and Cross-table reports.

Background colors are used with the “Print” and “HTML File” output destinations.

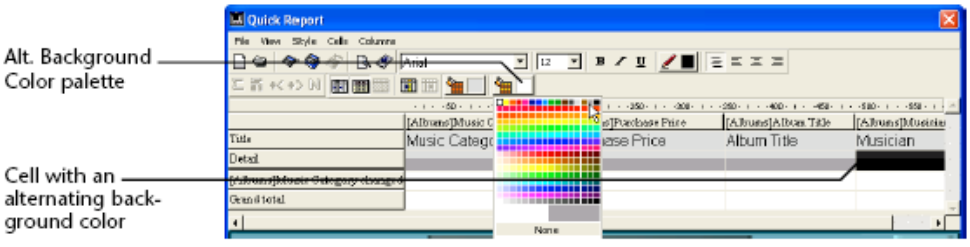
To set a background color:

- Select a cell, column, or row, then choose the main color in the “Background Color” palette of the toolbar:



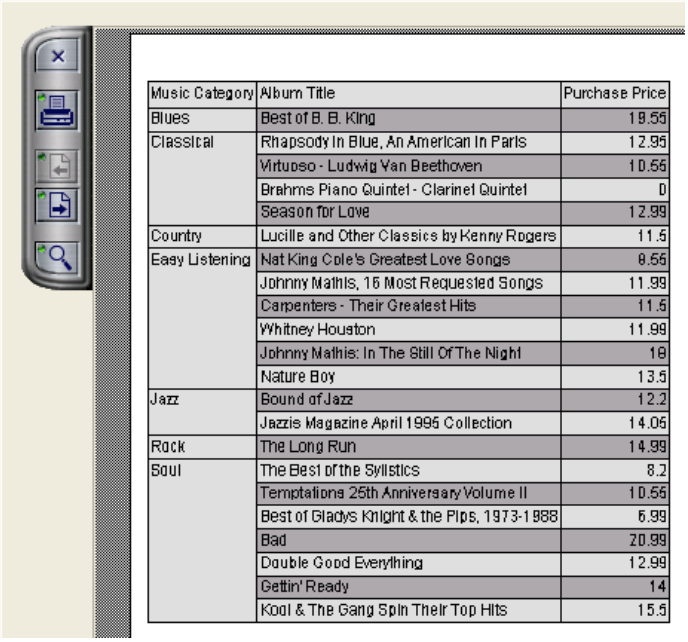
You can assign any color combination that you want to the rows, cells, and columns.

- (Optional) If you want to use an alternating background color, choose it using the “Alt. Background Color” palette:



The cells which have been assigned two alternating background colors will display both of them in the Quick Report editor.

Here is an example of a generated report in List mode (preview) that has alternating background colors:



Music Category	Album Title	Purchase Price
Blues	Best of B. B. King	19.55
Classical	Rhapsody In Blue, An American In Paris	12.95
	Virtuoso - Ludwig Van Beethoven	10.55
	Brahms Piano Quintet - Clarinet Quintet	0
	Season for Love	12.99
Country	Lucille and Other Classics by Kenny Rogers	11.5
Easy Listening	Nat King Cole's Greatest Love Songs	8.55
	Johnny Mathis, 16 Most Requested Songs	11.99
	Carpenters - Their Greatest Hits	11.5
	Whitney Houston	11.99
	Johnny Mathis: In The Still Of The Night	18
	Nature Boy	13.5
Jazz	Sound of Jazz	12.2
	Jazzis Magazine April 1995 Collection	14.05
Rock	The Long Run	14.99
Soul	The Best of the Sylistics	8.2
	Temptations 25th Anniversary Volume II	10.55
	Best of Gladys Knight & the Pips, 1973-1988	6.99
	Bad	20.99
	Double Good Everything	12.99
	Gettin' Ready	14
	Kool & The Gang Spin Their Top Hits	15.5

Background colors are also taken into account in reports generated in HTML format:

Album Title	Musician	Purchase Price
Rhapsody in Blue, An American in Paris	George Gershwin	12.95
Sound of Jazz	Lionel Hampton	12.2
Nat King Cole's Greatest Love Songs	Nat King Cole	8.55
The Best of the Sylistics	Stylistics, The	8.2
Johnny Mathis, 16 Most Requested Songs	Johnny Mathis	11.99
Best of B. B. King	B. B. King	19.55
Carpenters - Their Greatest Hits	Carpenters, The	11.5
Jazzis Magazine April 1995 Collection	Various	14.05
Virtuoso - Ludwig Van Beethoven	Berliner Philharmoniker	10.55
Temptations 25th Anniversary Volume II	Temptations, The	10.55
Brahms Piano Quintet - Clarinet Quintet	Benda Musicians, The	0
Best of Gladys Knight & the Pips, 1973-1988	Gladys Knight & the Pips	6.99
Bad	Michael Jackson	20.99
Double Good Everything	Smokey Robinson	12.99
Gettin' Ready	Temptations	14
The Long Run	Eagles	14.99
Kool & The Gang Spin Their Top Hits	Kool & The Gang	15.5
Lucille and Other Classics by Kenny Rogers	Kenny Rogers	11.5
Whitney Houston	Whitney Houston	11.99
Season for Love	London Symphony Orchestra	12.99
Johnny Mathis: In The Still Of The Night	Johnny Mathis	18
Nature Boy	Nat King Cole	13.5

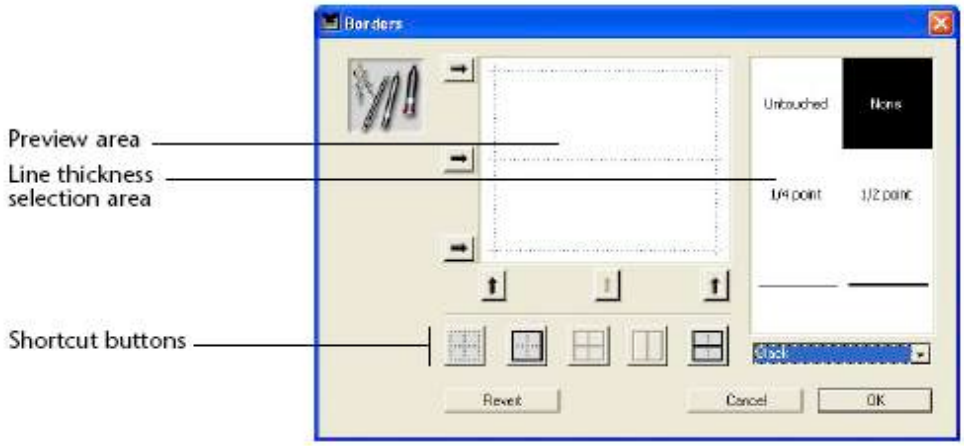
Setting Borders

You can set the borders for cells in both cross-table and list reports.

To set the borders for a cell, a column, or a row:

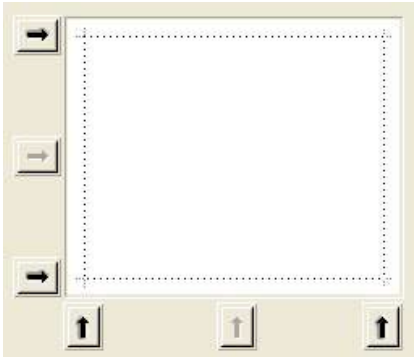
- Highlight a cell, column, or row, and either select **Borders…** in the contextual menu or from the **Style** menu.

The “Borders” dialog box is displayed:

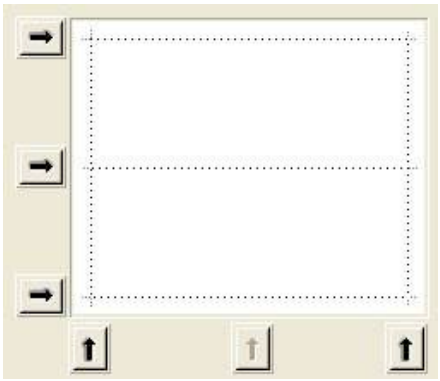


The preview area varies dynamically depending on the type of the selection: cell, column, or row, but also whether a cell is in a list or cross-table type report. For example, the behavior of the center cell in a cross-table report is different from the behavior of a detail cell in a list report. The center cell is repeated both horizontally and vertically for a cross-table report, whereas the detail cell in a list report is going to be repeated only vertically. Also, other cells may not be repeated at all (titles, for instance).

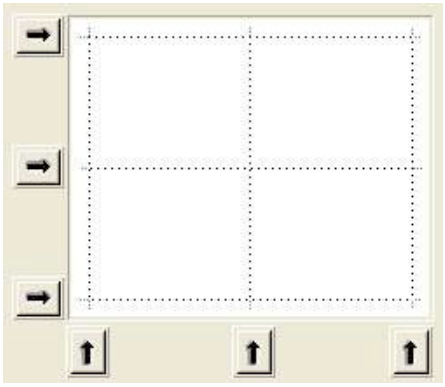
If the selected cell is a title cell (which is not repeated), the outer lines represent the outer lines of the cell:



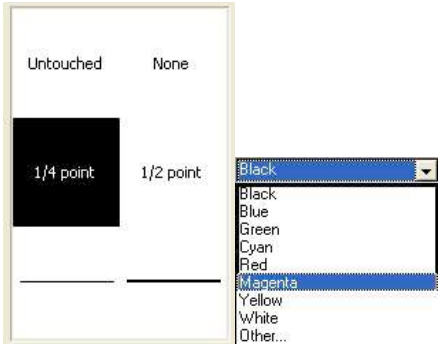
If the selected cell is a detail cell in a List report (which is repeated vertically), the outer lines represent the outer lines of the cell repetition, and the inner horizontal line represents the border between two cells in the sequence:



If the selected cell is the center cell in a cross-table report (which is therefore repeated both horizontally and vertically), the outer lines represent the outer lines of the repetition of cells, and the inner lines represent the borders between each cell generated from the center cell:



- Select the line thickness and color to use



You can use different colors for different borders.

- Select the borders using either the arrows or the shortcut buttons.

  You will notice that some shortcut buttons are disabled to match the type of the cell you are editing.

- Repeat these steps for each border to be configured.
- Click **OK** to validate the changes

OR

Click **Revert** to revert to the original border settings

OR

Click **Cancel** to discard the changes and close the dialog box.

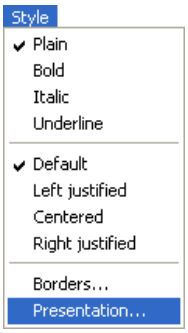
Using a Predefined Report Template

The Quick Report editor contains a set of predefined templates providing various graphic approaches for the production of printed or HTML reports. You can use all of the templates as is or you can use them as a basis for constructing your own reports. A template can be applied at any time.

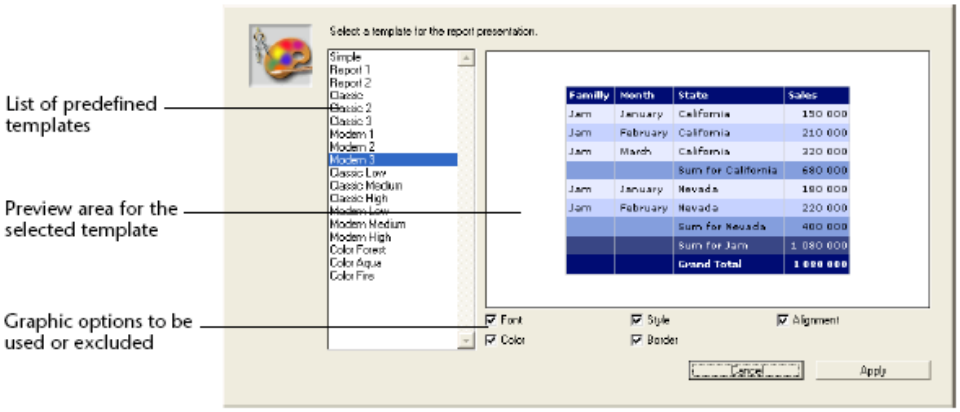
A report template combines a set of graphic characters: font, colors, style, borders, and justification. You can use either all or part of the template characteristics.

To use a predefined template:

- Choose the **Presentation...** command in the **Style** menu.



The template selection dialog box appears:



- In the list of predefined templates, click on the one that you want to use.

You can preview each template in the right-hand area of the dialog box. Choose the template that best corresponds to your needs, keeping in mind that you can always modify your report subsequently.

- If you do not want to use all the graphic options set by the template, you can uncheck each option that you do not want to be taken into account.

  By default, all the options are selected. If, for example, you uncheck the "Border" option, the borders defined by the template will not be applied to your report.

Note *Only the "Color" option will be taken into account for reports whose output destination is an HTML file.*

- Click on Apply.

  The selected characteristics are immediately applied to your report. If any graphic attributes were set previously, they will be replaced. Keep in mind that certain characteristics will be only visible once the report has been generated.

Sorting Records

An important feature of the Quick Report editor is the ability to sort the records in your report. You sort records for two reasons:

- To view records in a particular order,
- To create groups of records and subtotal areas in the report for the purpose of reporting summary calculations for groups.

Specifying a Sort Order for a List Report

You can specify a sort order at any time; simply drag and drop a column into the Sort order list.

For example, if you wanted to sort the records of salespeople by the Sales Region field, you would drag and drop the Sales Region column into the Sort order area.

You can also sort based on a formula by selecting the column that contains the formula and placing it in the Sort order list.

You can sort a report on several levels. The order in which the fields and formulas appear in the Sort order list indicates the sort level.

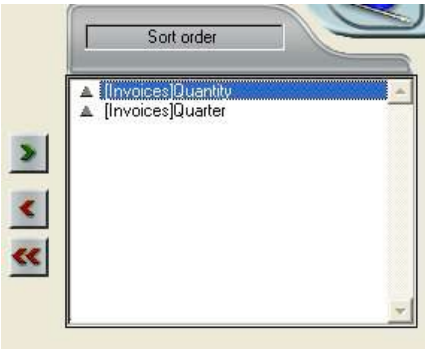
To specify the sort order using the field list:

- Drag the Field you want to set as the sort level from the Fields list in the Sort order list.

  OR

Highlight the field from the Field lists and click on the field insertion button:

The field is then added to the Sort order list.



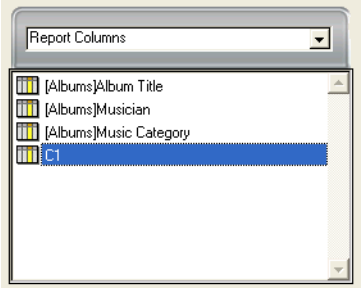
By default, sorts are carried out in increasing order (A -> Z). You can reverse the direction of the sort by clicking on the triangle next to the field in the Sort order list.

Note *If the sorted field has not already been inserted into a report column, an additional column is automatically created in the Quick Report area.*

To specify a sort for a column (field or formula):

- Select Report Columns from the table selection drop-down list.

The list then displays the headers of the columns presented in the report:



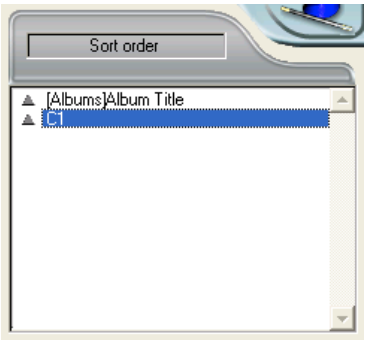
- Drag the column that you want to set as the sort level and drop it in the "Sort order" list.

  OR

  Highlight the field from the Field lists and click on the field insertion button:

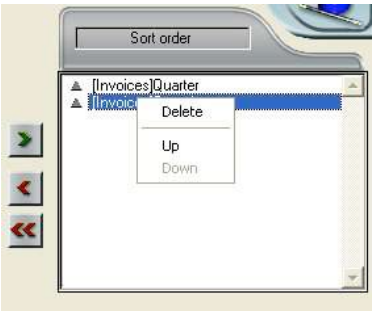
  The database then displays the name of the column in the Sort order list:

Changing the Sort Level

To change the level of a sort:

- Right-click on the field in the Sort order list in order to display the contextual menu:

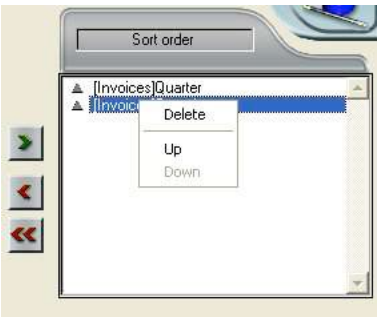
- Select **Up** or **Down** to move the field up or down (respectively) in the sort levels.

Deleting a Field or Formula from the Sort List

You can delete any field or formula from the Sort list.

To remove a field or formula from the Sort order:

- Select the field or formula to be deleted in the sort list and display the contextual menu using a right-click:



- Select Delete.

  The level is then removed.

Note *The associated column is not removed from the report. On the other hand, the associated subtotal row disappears.*

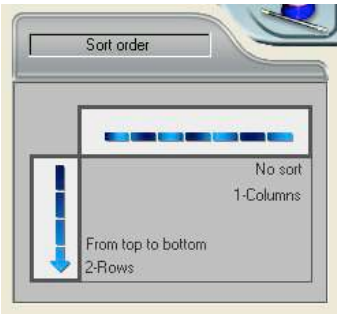
Sorting the Cross-table Values

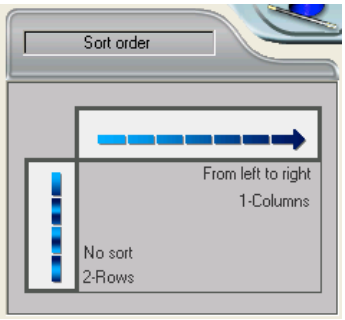
In a Cross-table report, the only values that can be sorted are the horizontal and vertical data sources (the two data sources that are used as categories in the final table).

To sort the categories in a cross-table report:

- Click the sort indicators in the Sort order area.

  An arrow indicates the sort order specified:





  To modify or delete the sort order of a data source, click on it again. The different possible reports appear successively.

  When no arrow is displayed, no sort order is selected, in this case, values will be displayed in the order they appear in the selection.

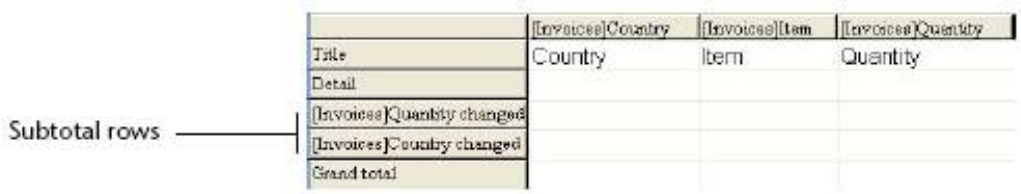
Subtotal Levels

In a quick report, you set break levels to separate or “break” records into groups according to values in one or more sort fields. A break area is printed at each break level. You can print summary calculations in the break area. The

summary calculations — sum, average, minimum, maximum, count, and standard deviation — are calculated for each group of records.

Break levels are determined by the sort levels and Break rows. For example, if you sort records by Sales Region, 4th Dimension inserts a break between each group of records that have the same sales region. These rows are automatically inserted when a sort is defined.

After you add a subtotal row to the quick report, you can request summary calculations on each break. For example, you can insert a summary calculation in a subtotal row to display subtotals for sales from each state in a marketing region. Refer to the “Adding Summary Calculations” section on page 189 for more information about adding summary calculations to Subtotal and Total rows.



The label of a subtotal row indicates which change in value triggers the break.

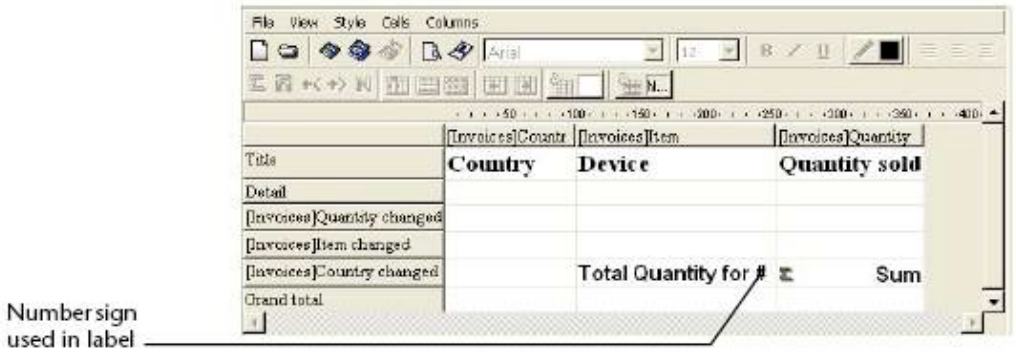
Using the Values of Break Fields in Labels

You can improve the appearance and clarity of your reports by labeling each Subtotal row using the value of the Break field.

To request that the value of a Break field be printed in a label placed in the Break area, use the number sign (#) in the label. For example, the text “Total salaries for # department” will insert the department name (in this case, the value of the Department field) in place of the number sign when the report is printed.

The number sign does not need to be placed in the same column as the Break field. It will display the value of the Break field in any cell in the Subtotal row.

The following figure illustrates the use of the number sign in a label in the Subtotal row:



Subtotal Spacing

It is possible to configure subtotal rows in order to control the page layout and appearance of the quick report. For example, you can generate a page break after each subtotal.

The subtotal page layout options can be used to visually set apart the different parts of the report.

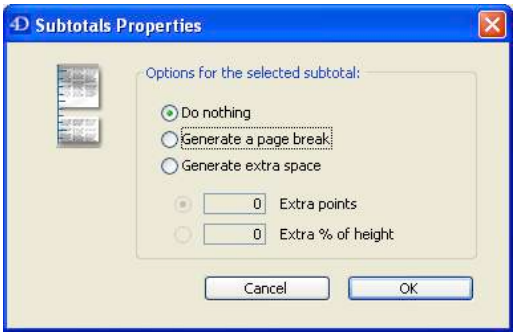
To set the spacing for a subtotal row:

- Select a subtotal row and choose the Totals Spacing command from the File menu of the editor.

  OR

  Right-click on the subtotal row title and choose the Totals Spacing command:

The “Subtotals Properties” dialog box appears:



- Choose one of the three following options

  Do Nothing (option selected by default): No specific property is applied to the subtotal row; it has the same characteristics as the other rows of the report.

  Generate a page break: A page break is generated after each subtotal row in the report.

  Generate extra space: A specific amount of space is added below each subtotal row in the report.

  An additional option can be used to set the spacing mode:

  - ***Extra points**: You set a specific height of extra space in points.*
  - ***Extra % of height**: You set the amount of extra space to be added as a percentage of the standard row height of the report. For example, to generate extra space corresponding to two empty rows, pass the value 200.*

Adding Summary Calculations

You can add summary calculations on the contents of fields and formulas to each Subtotal row and to the Totals row. In a cross-table report, calculations can be inserted in the center row.

The calculation buttons in the toolbars of the Quick Report editor identify the summary calculation options available for quick reports.

The following summary calculations are available:

- Sum: Totals the values in the report or break.

- Average: Calculates the average of the values in the report or break.

- Minimum: Displays the lowest value in the report or break.

- Maximum: Displays the highest value in the report or break.

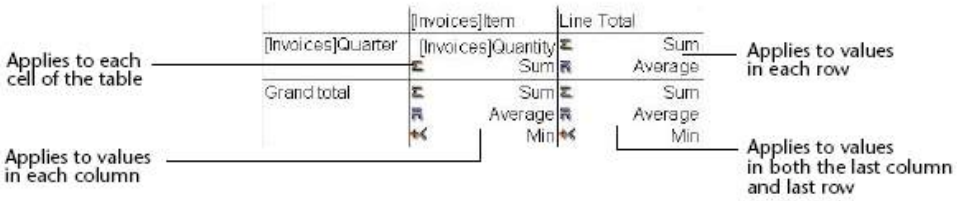
  

- Count: Calculates the number of records in the report or break.

- Standard deviation: Displays the square root of the variance of the report or break (the variance is a dispersion value around the average).

These options also appear in the Quick Report contextual menu for cells in the Subtotal and Total rows or, for a cross-table report, in the total cells and the center cell.

- ***List Reports*** *- When you place a summary calculation in the Totals row, the calculation is done for all records in the report. If you place the summary calculation in a subtotal row, separate calculations are done for the records in each break.*
- ***Cross-table Reports*** *- Summary calculations will apply as follows*



To add a summary calculation:

- Select a cell where you want to insert the summary calculation.

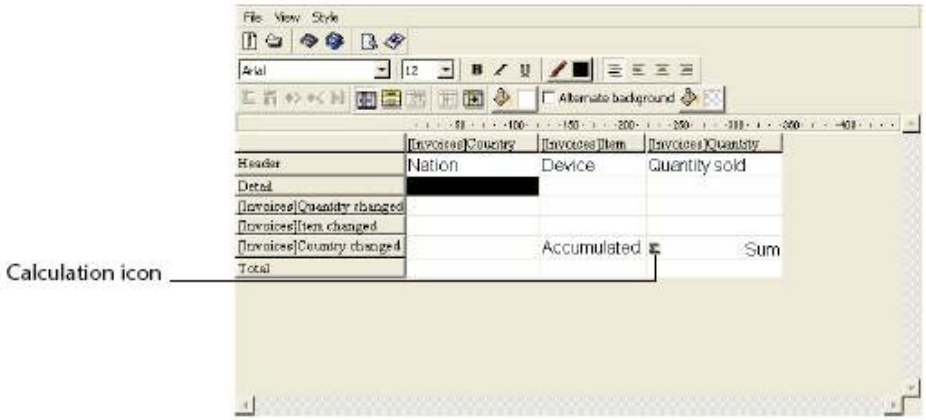
  The Sum, Minimum, Maximum, and Average calculations work only on a numeric field or formula.

- Click as many summary calculation buttons as you like.

  OR

  From the contextual menu, choose the desired summary calculations.

  The report editor displays a calculation icon in the selected cell for each type of summary calculation you request. The following figure shows a Sum calculation icon in a Subtotal row:



If you add more than one summary calculation to a cell, the report editor stacks the calculation icons on top of each other.

Using Calculations and Column Values in Labels

You can insert summary calculations using the following codes.

- ##S will be replaced by the sum in the sub-total or total row.
- ##A will be replaced by the average.
- ##C will be replaced by the count.
- ##X will be replaced by the max.
- ##N will be replaced by the min.
- ##D will be replaced by the standard deviation.
- ##xx, where xx is a column number. This will be replaced by that column's value, using its formatting. If this column does not exist, then it will not be replaced.

These codes can be useful when you want to mix labels and data in a cell.

Displaying Repeated Values for Break Columns

In a report with subtotals, the columns which are used to group records so that summary calculations can be done are called Break columns. In the report shown below, the Department field is a Break column since the records in the report are grouped by department.

When a report like this is printed, the values for the Break column are printed only once per break. In other words, a department name is printed only for the first record in the group and is not repeated until the department changes.

First Name	Last Name	Department Name	Salary
Biff	Davis	Accounting	43780
Smeldorf	Garbando		19610
Alan	Hull		41460
Bryan	Pfaff		26440
Shirley	Ransome		36040
Marlys	Wilson		36500
		Sum for Department : Accounting	203830
Kathy	Forbes	Engineering	18840
Dennis	Hanson		40520
Mary	Smith		55000
Andy	Venable		43520
Lance	Wolfram		27300
		Sum for Department : Engineering	185180

In some cases, you may want to repeat the values for the Break columns so that they appear for every record in the Break area. You do so by selecting the **Repeated Values** column property. This can be done either by clicking the **Repeated Values** button in the toolbars, by choosing the **Repeated Values** menu command in the Quick Reports contextual menu for that column, or by selecting Repeated Values from the Columns menu.

To display repeated values for fields in a column:

- Select the column by clicking the header row for that column and choosing the Repeated Values command in the Columns menu or clicking the Repeated Values button in the “Columns” toolbar.

  OR

  From the contextual menu for that column, choose Repeated Values.

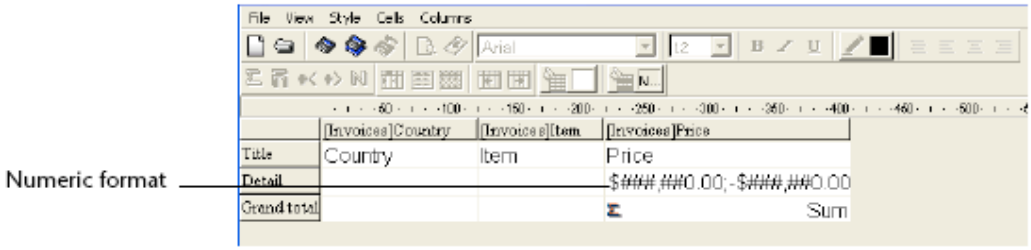
The following figure shows the previous report after the **Repeated Values** check box has been checked for the Department Name column.

First Name	Last Name	Department Name	Salary
Biff	Davis	Accounting	43780
Smeldorf	Garbando	Accounting	19610
Alan	Hull	Accounting	41460
Bryan	Pfaff	Accounting	26440
Shirley	Ransome	Accounting	36040
Marlys	Wilson	Accounting	36500
		Sum for Department : Accounting	203830
Kathy	Forbes	Engineering	18840
Dennis	Hanson	Engineering	40520
Mary	Smith	Engineering	55000
Andy	Venable	Engineering	43520
Lance	Wolfram	Engineering	27300
		Sum for Department : Engineering	185180

Setting Display Formats

You can specify display formats for columns that contain numeric (integer, longint, real), alphanumeric (alpha), date, time, and picture data.

For example, if you are displaying prices in a column, you can add a numeric format to the Detail cell for the Price field. The $###,##0.00;- $###,##0.00 format places a dollar sign ($) to the left of the number and can display dollar amounts from -$999,999.99 to $999,999.99:



If your report includes Alpha fields such as a telephone number or Social Security number, you can use an Alpha format. If your report displays dates, times, or pictures, you can also assign display formats to them.

The database provides different default display formats.

Assigning the Display Format

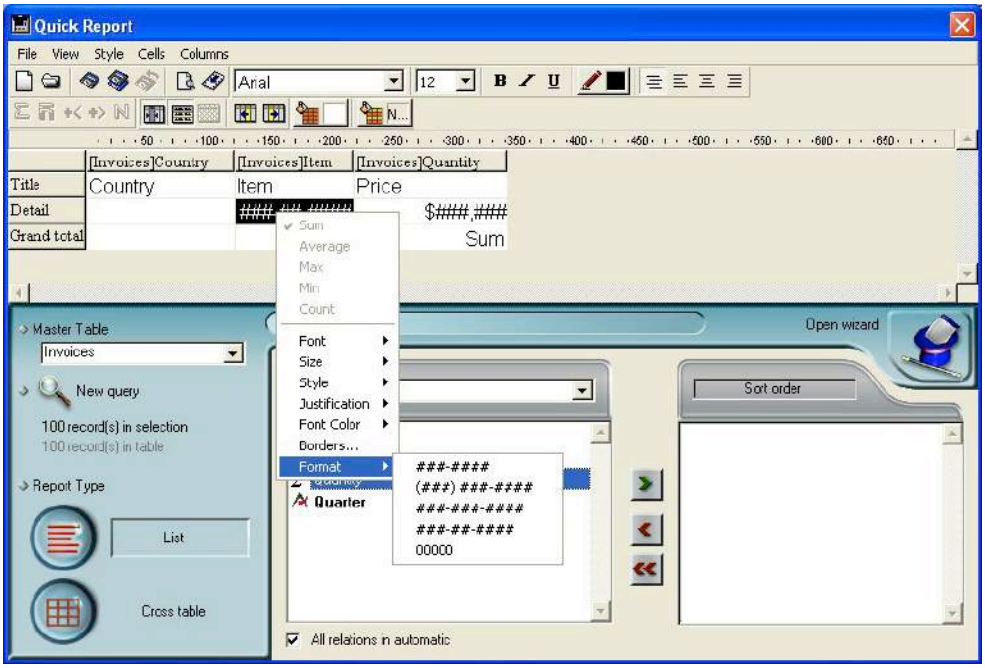
You can associate a display format with a cell by selecting it in the contextual menu or by entering it directly in the cell.

To assign a display format to a numeric, alpha, date, time, or picture field:

- Right-click on a cell of the column with which you want to associate a style.

  The contextual menu of the editor appears.

- Select the desired display format from the **Format** submenu:



The contents of the submenu vary according to the type of data contained in the column: numeric, alphanumeric, date, time, or picture. If the report column contains data that cannot be formatted, the Format command does not appear in the contextual menu.

The format is entered in the Detail cell. If you have also requested summary calculations for the column, the format specified in the Detail cell will automatically be applied to the summary calculations. The only exception is the “Count” calculation which is always displayed as an integer and does not accept any formatting symbols such as the dollar sign.

You can also enter the formats to be applied manually by clicking twice in the cell and entering the elements of the format using the keyboard.

Different formats can be applied to different columns in the report.

Hiding and Showing Rows and Columns

The Report Editor lets you hide rows or columns in a quick report in List mode. If desired, you can show a hidden column or row.

Hiding rows is useful when you want the report to include only summary calculations. For example, hide the Detail row if you want to display only the summary calculations that appear in the Totals and Subtotal rows. You can also use this feature to hide a Subtotal row or the Totals row.

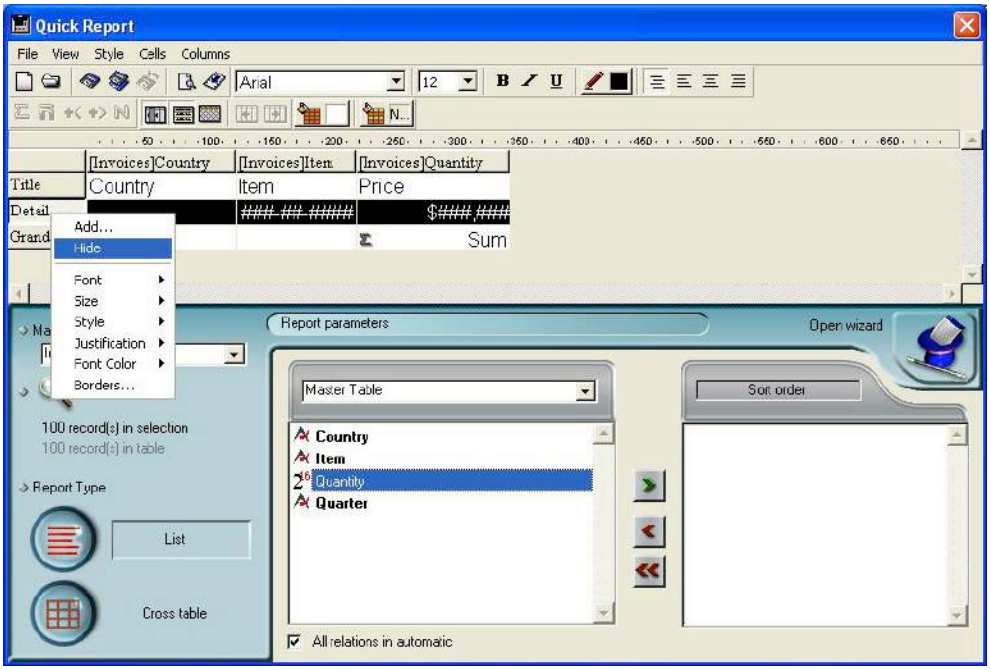
You can hide a column if you need to use the column as a sort column, but do not want the report to display it.

You can hide/display a row or column using either the Quick Report contextual menu, the Columns menu or the “Columns” toolbar.

Note *You cannot hide a row or column in a cross-table report.*

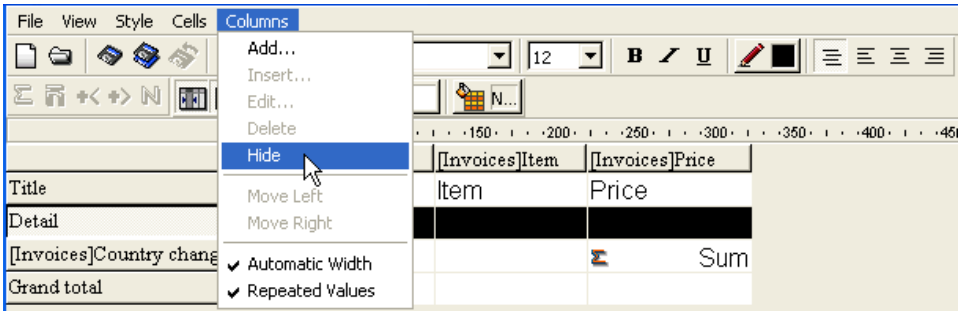
To hide a row or column:

- Select the row or column you want to hide by clicking on its header.
- Right-click on the header of the row or column to be hidden, then choose **Hide** in the contextual menu:



OR

Choose the **Hide** command in the **Columns** menu of the Quick Report editor.



OR

Click on the Hide button of the “Columns” toolbar.

The Report Editor displays the column in gray to remind you that the row will not appear when you print or preview the quick report.

Showing a Hidden Row or Column

When a row or column is hidden, a check mark (√) is displayed next to the **Hide** menu command in the **Columns** or contextual menu. In addition, the corresponding button of the "Columns" toolbar is pressed in.

You can display a hidden row or column by choosing **Hide** again from either the **Columns** or contextual menu, or by pressing the corresponding button in the "Columns" toolbar again. When you do so, the row or column is displayed normally in the Quick Report area.

Adding Page Headers and Footers

Before printing a quick report, you can add page headers and footers. You specify page headers and footers in the Headers and Footers dialog box. Use this dialog box to do the following:

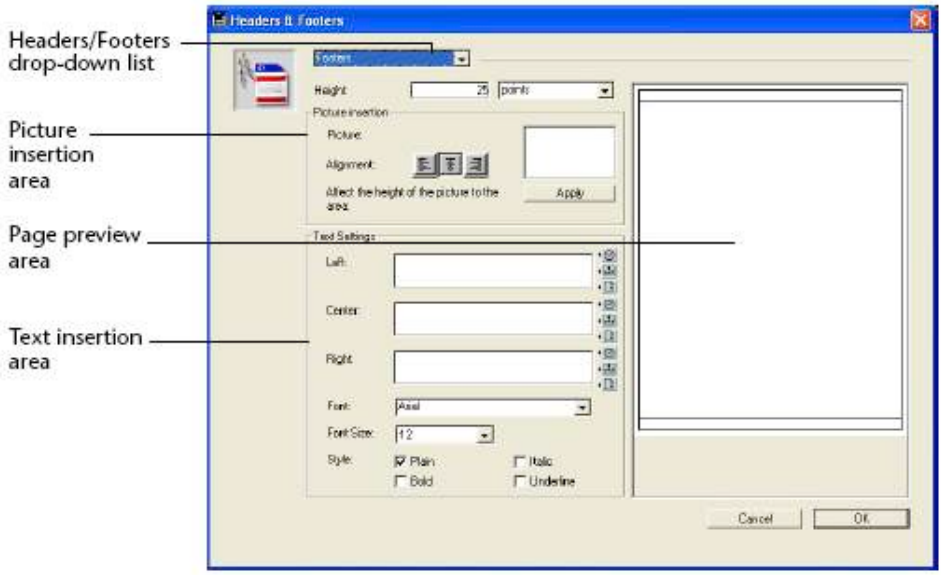
- Add page header and footer text or pictures,
- Specify the size of the page header and footer areas,
- Use separate text for left, center, and right parts of the header and footer,
- Specify fonts, font sizes, and font styles for page header and footer text,
- Insert codes that add page numbers and the date and time to your reports.

You can only specify page headers and footers when printing to a printer. However, once they are defined, they are kept with the report, even if the destination is modified.

To add page headers and footers:

- Choose Header and **Footer...** from the **File** menu.

  The Headers and Footers dialog box appears.



Note *The preview area takes the print format configuration into account.*

The Headers and Footers dialog box lets you specify both headers and footers using the same screen. Use the Headers/Footers drop-down list to indicate the one you currently want to define.

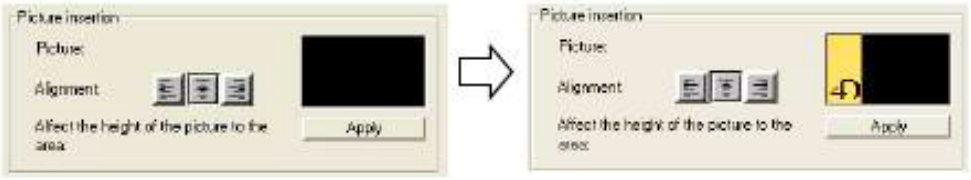
- Choose **Headers** or **Footers** from the selection menu.

- Enter the header or footer height in the Height area.

  When you first enter the dialog box, the header and footer heights are set to 25 points each. You can not only change these values, but can change the measurement scale to enter values in inches or centimeters as well.

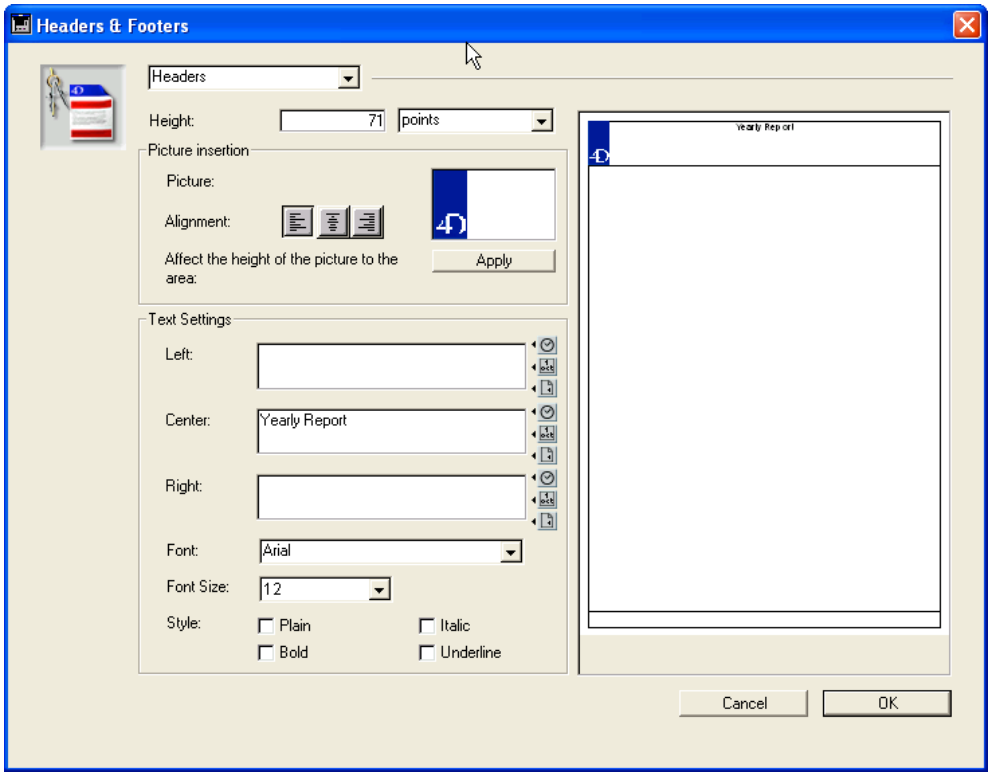
  As you enter the header and footer height, the lines on the page preview area change to indicate the size of the header and footer as they will appear in the printed report.

- If you want to use a picture, paste it in the picture area (using standard copy-paste commands):

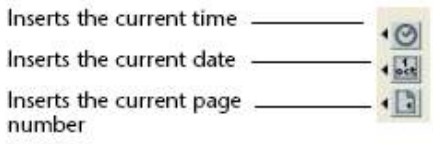


- Select its alignment by clicking on the alignment icons:
- If you want the height of the picture to become the height of the header/footer, click the Apply button:

- Select an entry area and type the header or footer text.



To the right of each entry area, there are three buttons that let you enter variables into the entry area.



You can insert the current page number, time of execution, or date of execution.

You can also use the code for the variables directly: #H for the time, #D for the date and #P for the page number.

- Assign the font attributes for the header/footer.

- Click **OK** to validate the changes.

Generating a Quick Report

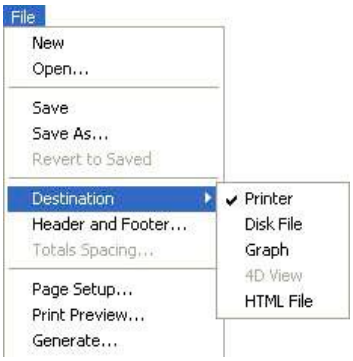
After you have completed your report design, you can “print” the quick report. You can print a quick report to a variety of output types:

- On the standard printer selected,
- To disk, in a Text file,
- To a graph,
- To a 4D View document,
- To an HTML document.

To select an output destination:

- Choose **Destination** from the **File** menu.

The Destination submenu contains five items.



Printer

This option uses the printer you have chosen in your current print settings. If you are printing to a printer, you can preview the report before printing it.

To print to a printer:

- In the **File** menu, choose **Printer** from the Destination submenu.

  This option is selected by default.

- If necessary, select Page Setup from the File menu and specify your print parameters.

Note *This command is only available when the Printer destination is selected.*

- If you want to preview your report, select Print Preview... in the File menu.

Note *This command is only available when the Printer destination is selected.*

The print preview dialog box appears, containing the report that you have defined with the current data of the database.

- Select **Generate...** in the **File** menu.
- Choose the settings that are appropriate for your report and click the **OK** button.

Disk File

This option sends your quick report to a disk file that you can open and modify with other applications, including text editors and spreadsheets. This option exports the records in the quick report to a text file.

When you use this option, 4th Dimension automatically uses the column headings as the first “record” that is exported.

To generate the report in a Text file:

- In the **File** menu, choose **Disk File** from the **Destination** submenu.
- Choose **Generate...** from the **File** menu.

  The Report Editor displays a standard create-file dialog box and asks you to enter a filename.

- Enter a filename and click OK.

  The Report Editor displays a dialog box that keeps you informed of the progress of the operation.

  After the report is printed to a file, 4th Dimension returns you to the Quick Report editor. Remember to change the output device if you want to resume sending a quick report to a standard printer.

Print to Graph

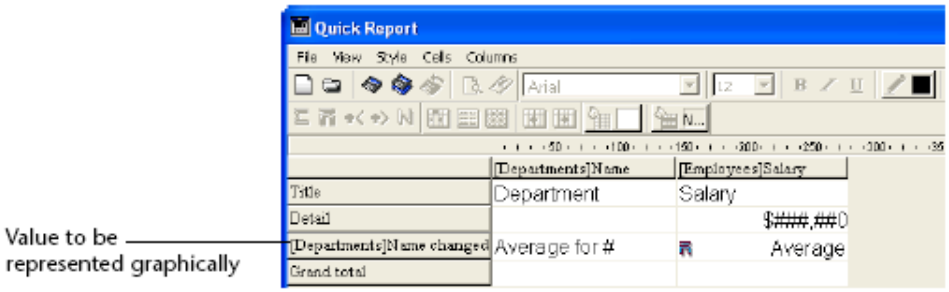
This option directs the report to 4D Chart, 4th Dimension’s plug-in for plotting data. When you choose the Graph item in the Destination submenu, your report

is presented as a graph rather than in table form. Your graph can then be printed using 4D Chart.

In list mode, 4D Chart uses only the summary calculations and labels in the Subtotal row. It uses the leftmost non-numeric column for the Categories axis (the horizontal axis). To use the Graph feature, your report should:

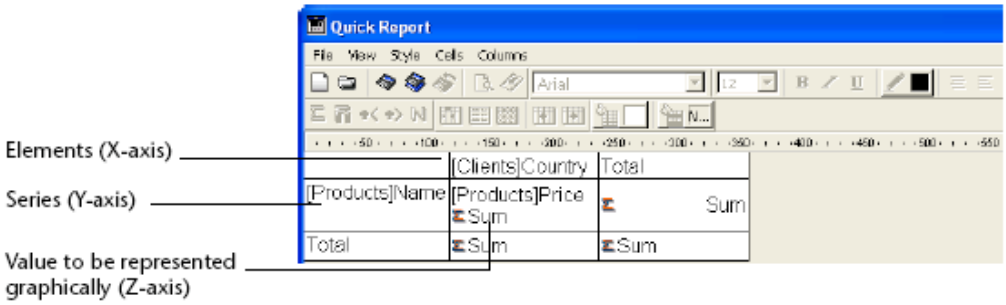
- Include from one to five numeric fields or formulas. These columns will be assigned to the values axis in the graph.
- Use one type of summary calculation per numeric field.

  For example, if you want to graph the average salary by department, you should create a quick report with two columns, Department Name and Salary as well as a Subtotal row consisting of the Average summary calculation for Salary:



In cross-table mode, 4D Chart uses two data sources and the value cell. The last row and column are ignored.

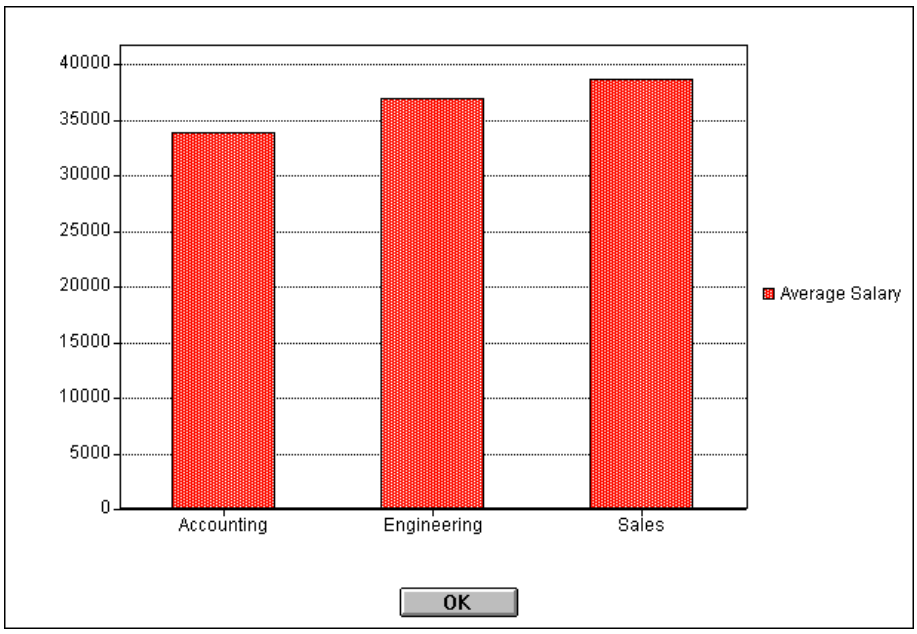
For example, if you want to show the amount of sales per country for a set of products, you can define the following report:



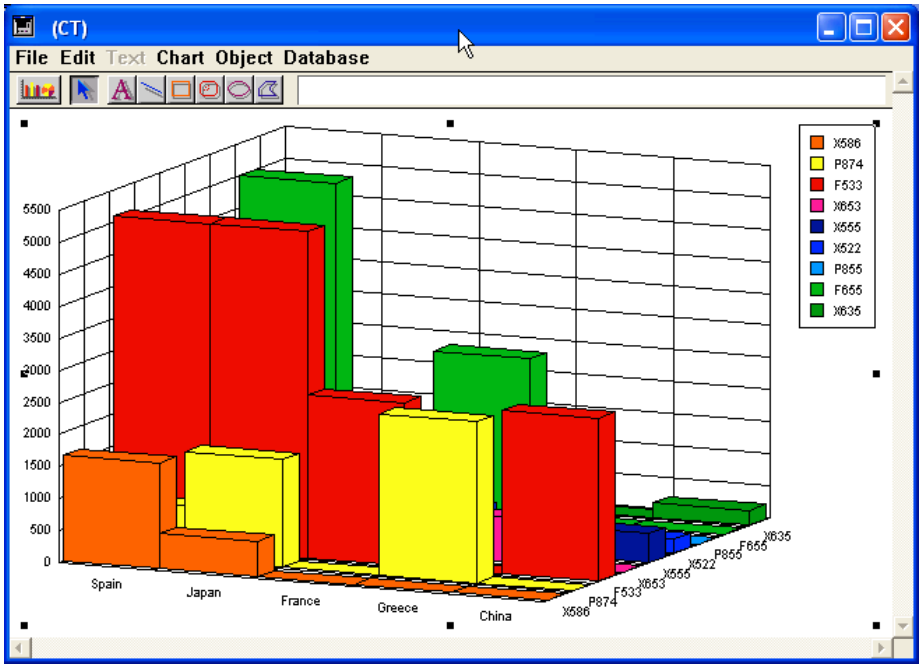
To print to a graph:

- In the **File** menu, choose **Graph** from the **Destination** submenu.
- Choose **Generate...** from the **File** menu.

  For list reports, 4th Dimension graphs your data as a 2D column graph.



For cross-table reports, 4th Dimension graphs the data as a 3D column graph:



You can use 4D Chart to select another graph type or print the graph.

Printing to an HTML Document

This option sends your quick report to an HTML file. When you choose this option, it uses the default HTML template unless it was changed programmatically.

When you use this option, 4th Dimension automatically uses the column headings as the first “record” that is exported.

To print to an HTML file:

- In the **File** menu, choose **HTML File** from the **Destination** submenu.
- Choose **Generate...** from the **File** menu.

  The Report Editor displays a standard create-file dialog box and asks you to enter a filename.

- Enter a filename and click **OK**.

  The Report Editor displays a dialog box that keeps you informed of the progress of the operation.

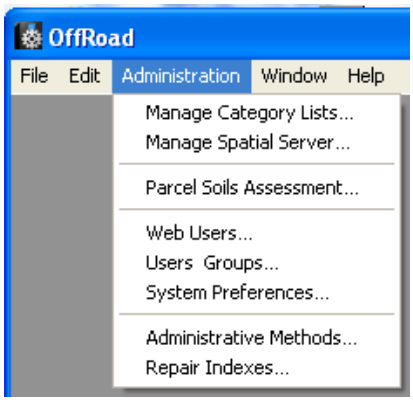
  After the report is printed to an HTML file, you will be returned to the Quick Report editor. Remember to change the output device if you want to resume sending a quick report to a standard printer.

Chapter 11 - User Management

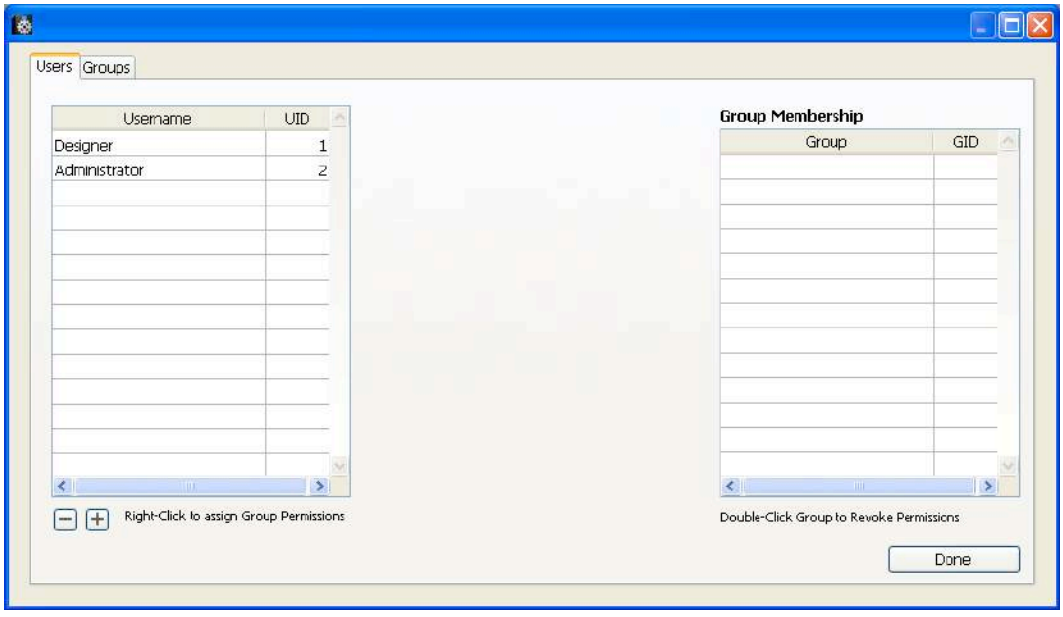
Offroad GIS supports both internal users as well as external web based users. As a result of the different focus for both user groups, the user management is separated into two completely separate management systems. The separation of the two different user groups provides additional security that eliminates any potential for external users to gain access into any of the internal components of the system.

Internal User Management

Internal Users consist of users that have direct access to the Offroad GIS application. Management of Internal Users is accessed through the **Users & Groups** option under the **Administration** menu.



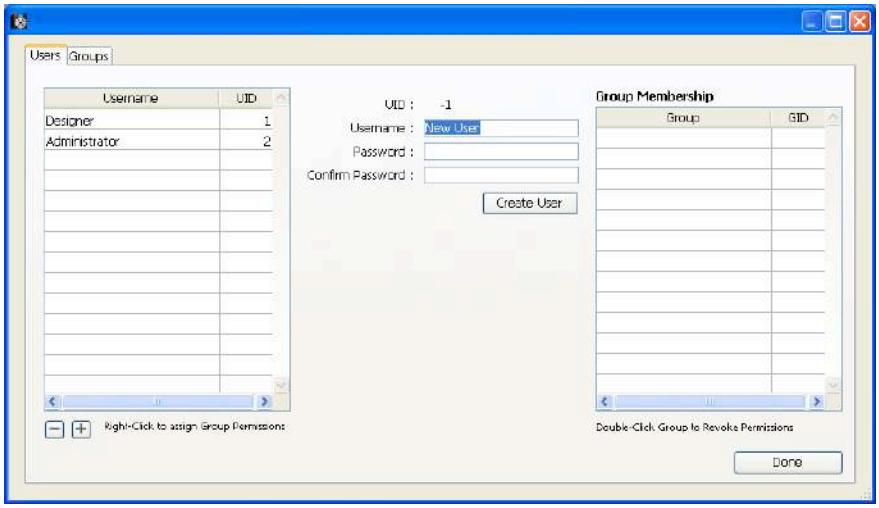
Selecting the **Users & Groups** menu option displays the Users and Groups toolbox from which you can establish new users and groups and set group privileges.



To switch between Users and Groups, select the Users or the Groups tab.

To add a user:

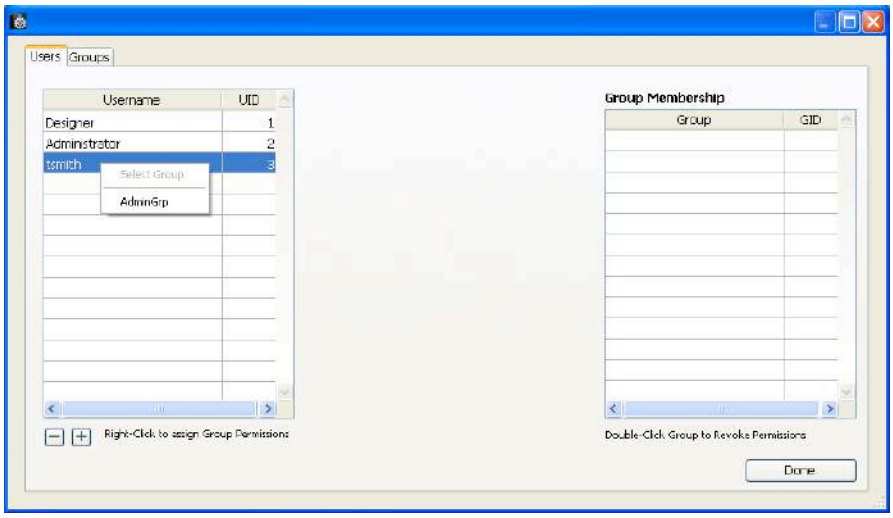
- Click on the (+) button.
- Type in the Username.
- Type in the Password and then the Confirm Password.
- Click the Create User button.



To delete a user, select the user and then click the (-) button.

To edit a user or change their password, double-click on the username.

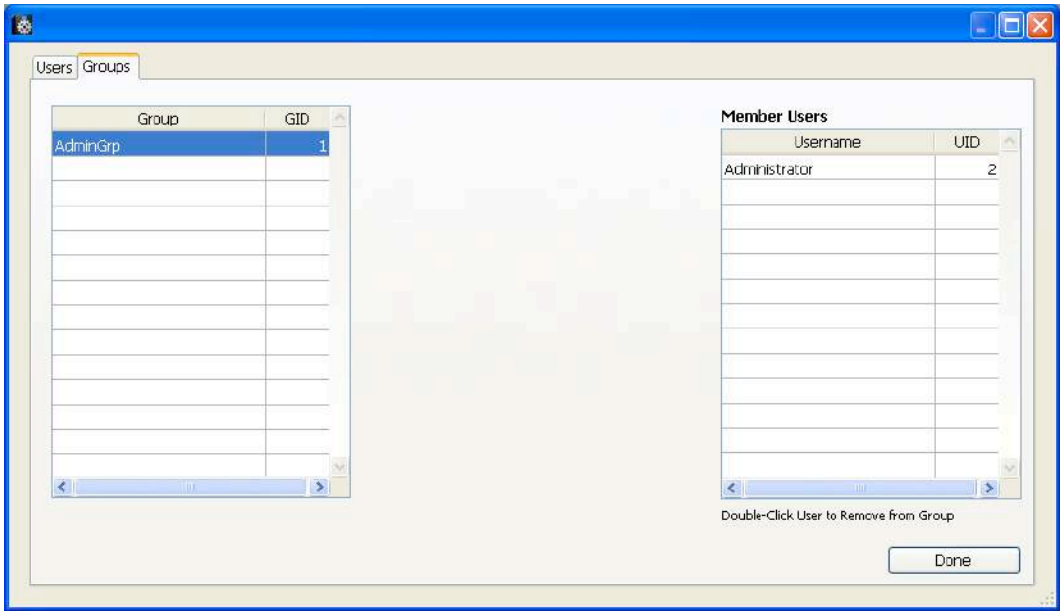
To assign Group permissions, Right-Click on the Username in the list. This will display the Groups pop-up menu. The first item, which is grayed out, is the menu name. If the Group name is displayed in gray, the user is already a member of that group. Click on the Group name to assign the user to the respected Group.



You can view the group membership for a particular user, by clicking on the username. The Groups to which they belong will be displayed in the Group Membership listbox to the right.

To remove a user from a particular Group, click on the Username. Once the Groups are displayed in the Group Membership listbox, double-click on the Group for which you wish to remove the user.

To review the entire membership for a Group, click on the Groups tab. Then click on the Group name in the Groups listbox. All the members that belong to the selected Group will be displayed in the Member Users listbox to the right. You can remove users from the selected Group by double-clicking on the username in the Member Users listbox.



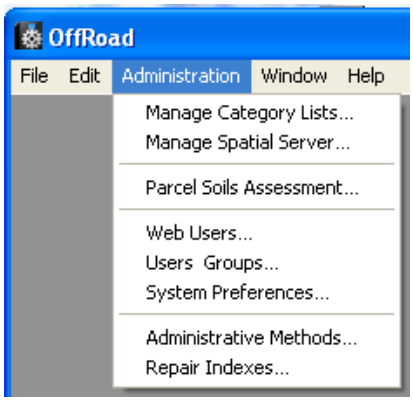
OffRoad GIS includes a single Group at this time, and it is not possible for additional groups to be added. The AdminGrp is the primary group used for administrative purposes. Users with this group membership will have access to all of the administrative functions within the database. Users that do not have membership in the AdminGrp can manage and edit Parcel records, Tax Modifiers, and Right of Ways, but can not access other areas of the database that are associated with administrative privileges. For example, users that do not have membership in the AdminGrp will not be able to access any of the functions under the Administration menu. In addition there are selected functions, within the Parcel dialog where they will be restricted as well.

Web User Management

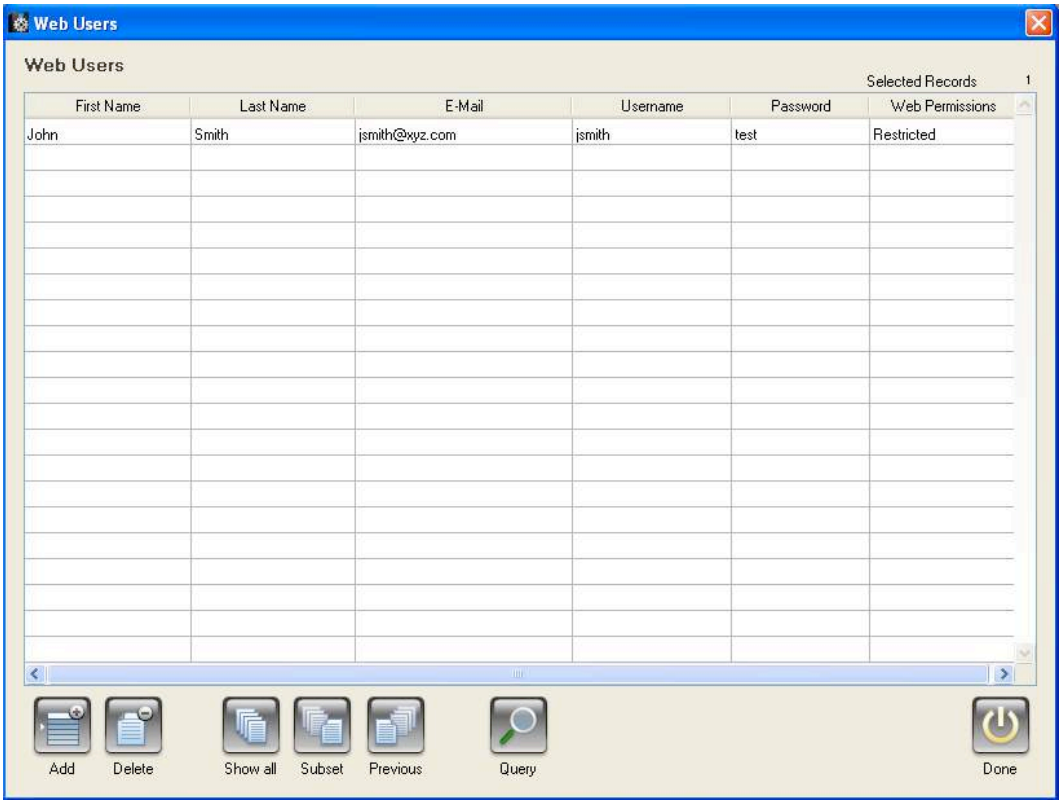
Offroad GIS supports a tiered access system for web users. There are currently three different levels of user access from the web and they include:

- **Public** - Public access represents the lowest level of access where only minimal property information is made available through the web interface. The Public access represents the base level of access. Public access would generally not require setting up a username and password with the exception that a username and password are required to store user web extents and map selections.
- **Restricted** - Restricted access provides access to additional parcel attributes as well as deeds and related documents. The restricted access level is considered an intermediate level of access and could easily be used as a commercial service for real estate agents and other commercial land agents.
- **Internal** - Internal access is generally reserved for internal county staff or for county contractors that may need access to all relevant parcel data. This level of access provides access to all of the attributes as well as any associated documents and deeds.

Management of Web Users is accessed through the **Web Users** option under the **Administration** menu.

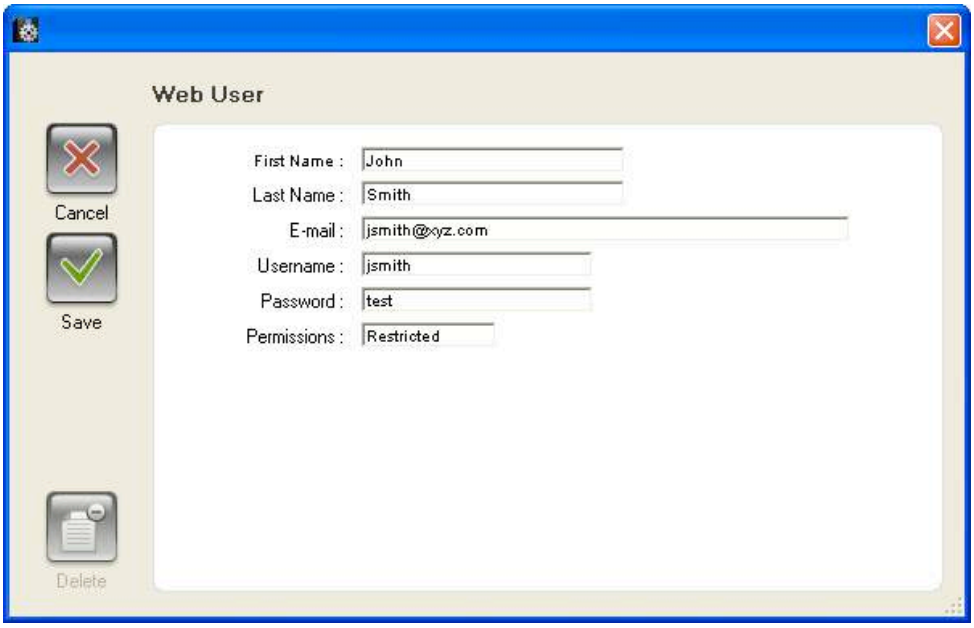


Selecting the **Web Users** menu option displays the Web Users toolbox from which you can establish new web users and set user privileges.



Web users can establish their own account by creating an account from your map service web site. If an account is created in this manner, it will automatically be assigned the public web permissions.

In order to modify an existing account, double-click on the account in the list. This will display the user account in the appropriate input form.



From this dialog, you can elect to change any of the user information including the password, and the permissions. You may also elect to delete the account by clicking on the **Delete** button.

In order to create an account, click on the **Add** button.

This will display a blank web user input form where you can enter the appropriate user information.

Complete the appropriate information and then click the **Save** button to create the record.

The user will be added to the list, and these credentials can now be used to log-in through the Internet based map services.

Chapter 12 - Tax Assessment and Equalization

The application and development of an effective valuation of agricultural lands using soil surveys is an issue facing all North Dakota counties.

> *"During the 2007 legislative session the North Dakota Legislature approved, and the Governor signed, House Bill 1303, which changes the provisions of North Dakota law dealing with the valuation and assessment of agricultural lands. The changes became effective January 1, 2007."*
>
> *"The changes made by the 2007 mandate essentially require each county to assess the value of their agricultural land by assigning a fixed value to soil types contained within each land parcel, applying approved price modifiers where necessary, and, lastly, accounting for the actual use of the land. Counties that fail to implement this valuation method for any taxable year after 2009 will lose 5% of their state aid distribution each month until those counties have fully implemented the soil valuation process." . . . Source ND Association of Counties*

The intent of this legislation was clearly to provide a more uniform valuation methodology for agricultural land in North Dakota. While the intent is to provide a fair and equitable tax structure for North Dakota's agricultural lands, this legislation has placed significant burden on County government to achieve these goals. On the surface, producing a soils based valuation of agricultural lands may not appear to be terribly difficult. However, in order to accomplish these goals, most counties will have to make significant investments in the development of key data resources and the supporting technology to process these data.

The County GIS application service developed by OffRoad Software provides a very simple tool base designed to address the soils valuation process within a straightforward point-and-click structure. Although the County GIS service greatly simplifies the process of developing your county wide soils assessment, there are still numerous steps involved. The purpose of this guide is to provide a fundamental understanding of the tools that OffRoad GIS provides to address the assessment of agricultural lands. This guide illustrates a simple step by step process that can be used to help you prepare for the assessment of the agricultural parcels in your county.

What it does . . .

OffRoad GIS is capable of addressing the following items when processing your agricultural parcels. OffRoad GIS provides tools to address the soils assessment for the selected parcels. It is capable of incorporating tax modifiers that are defined separately, homestead areas, and right of ways.

What you will need . . .

Parcels - In order to process and develop a soils based assessment for your parcels, it will be necessary to develop the spatial component of your parcels that can be used in a GIS. OffRoad GIS supports both the internal development of a parcel layer as well as tools to import your parcels from an external data source.

Homestead Areas - generally include the area surrounding the homestead (i.e. the farm buildings, etc.). While it may be acceptable to exclude as much as 5 acres within a parcel, the location of these acres are important so that the appropriate soil type and associated area are excluded from the soils valuation for the remainder of the parcel. OffRoad GIS supports the implementation of the homestead areas as part of the parcel development.

Tax Modifiers - are used to define areas that may impact the productivity of the soils in a particular area. OffRoad GIS supports the use of modifiers and can accommodate the use of multiple overlapping modifiers to identify individual modifier features. For example, it may be necessary to identify rock outcrops that may overlap with an inundated area. If the rock outcrops is defined as an independent feature and likewise the inundated area is defined, the resulting modifiers may include the cumulative modified value of both types of modifiers in the areas where the modifiers overlap. OffRoad GIS supports modifiers as a separate GIS layer.

Right of Ways - OffRoad GIS accommodates right-of-ways as a separate GIS layer. OffRoad GIS currently provides minimal tools for the development of Right of Ways, but it also provides tools to import Right-of-Ways from an external data source. Right-of-Ways are automatically excluded from the soils assessment for individual parcels.

Soils - OffRoad GIS is capable of using any soils coverage that is available. Currently, OffRoad Software maintains the most current soils coverage available from the NRCS and delivers this as part of the spatial engine provided with the OffRoad GIS solution. As changes are made available, they can easily be integrated into the spatial engine used for the soils valuation.

Here is how it works . . .

While the process that is used to develop the integration of the soils with the parcels to derive the soils for the parcels involves numerous steps and may appear to be quite complicated, it is actually a fairly straight forward set of procedures. The following documentation outlines the step by step process that is used by OffRoad GIS and ultimately this process would be very similar for any GIS solution. The difference between OffRoad GIS and other solutions is that these processes have been designed and built into the software to provide a simple point-and-click solution:

- *the parcels are selected for the target area (i.e. the township or county, property type, ownership, etc.)*

- *the homestead areas are then removed from the selected parcels*
- *the right of ways are then removed from the selected parcels*
- *the remaining parcel geometry is then intersected with the soils to determine the area of each soil type within each parcel*
- *the resulting soil-parcel geometry is then intersected with the tax modifiers to identify the area for each soil type and the associated modifier assigned to define the total modified values for each soil type and the associated area*
- *The resulting parcel-soil layer that is developed includes the area for each soil type with the associated PI (productivity index) and tax rate.*
- *From this layer a summary table is developed that includes the area of each soil type within each parcel and the associated modifier reductions for each soil type. The modifier reductions are based upon the area that intersects with each soil type and the value assigned to each modifier type.*

That's all there is to it . . .

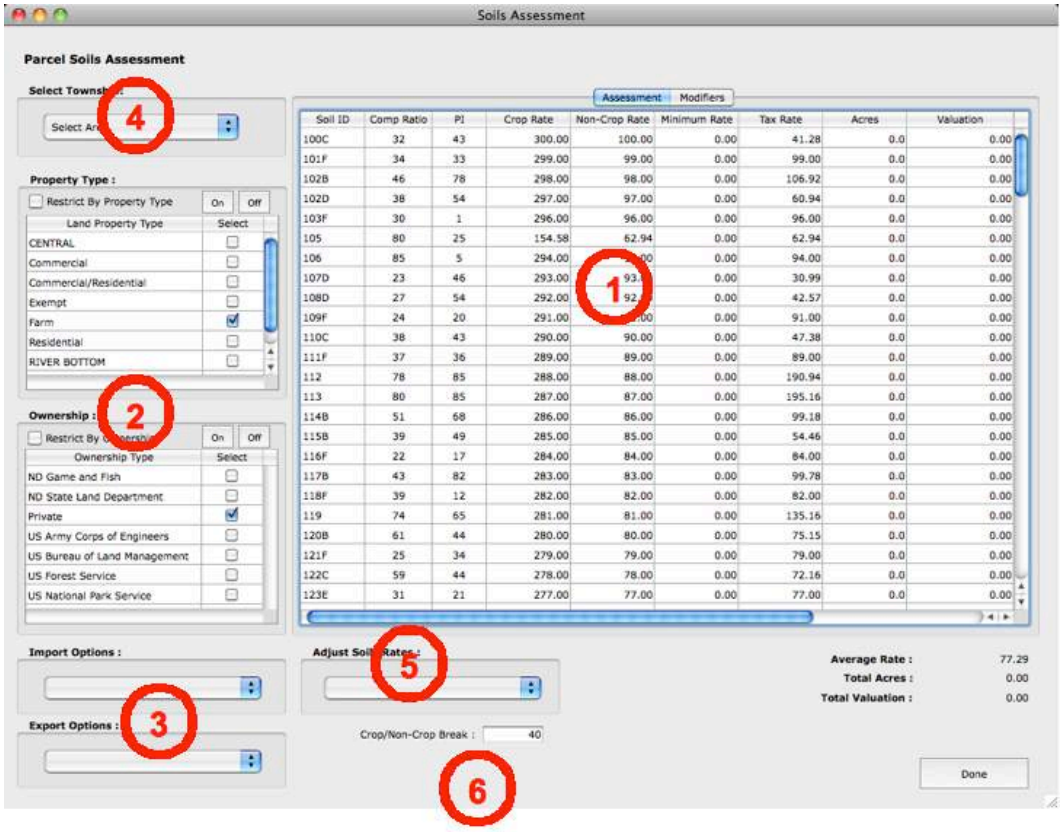
While it appears to be a fairly simple process, there are still a couple of things that need to be done before you can begin the soils based parcel assessment for you county. If this process is to be applied, it will first be necessary to establish a crop and non-crop rate for each soil as well as the composite index that defines the break point between applying the crop and non-crop rates to each soil type. In addition, in most cases, it will be an iterative process to determine the appropriate crop and non-crop rates as well as the appropriate break point for the index because these rates must be adjusted to hit revenue targets defined for the county. The NRCS can be consulted to determine the initial crop, non-crop rates, and crop/non-crop break points.

Testing and adjusting crop and non-crop rates is one of the primary functions that the OffRoad GIS Tax Wizard was designed to address. Using the Tax Wizard you can repeatedly process individual townships or the entire county while making adjustments to both the crop and non-crop rates to determine the impacts the changes will have on your final tax assessment. This process makes it very easy to sit down with your soils committee and work through the process of establishing the appropriate rates for your county without the delays of working through a GIS consultant or the difficulty of manually applying all of the GIS transformations required to make these adjustments.

After this process has been completed for the individual townships and ultimately for the entire county, both crop and non-cropland rates can be developed for each. Once developed, the derived tax rates can now be used to develop the valuation for the parcels for the entire county. The resulting parcel-soils table is then available to be exported.

OffRoad GIS Tax Wizard

Ultimately, the creation of the tax assessment for your parcels is a simple point-and-click operation. The real work involved with the development of your soils based assessment lies in the process of developing the crop rates, non-crop rates and the composite index to determine at which point to apply the rates. This is the process that the Ag tax wizard was developed to address. Essentially, OffRoad GIS delivers a simple set of point-and-click tools to accomplish this task well.



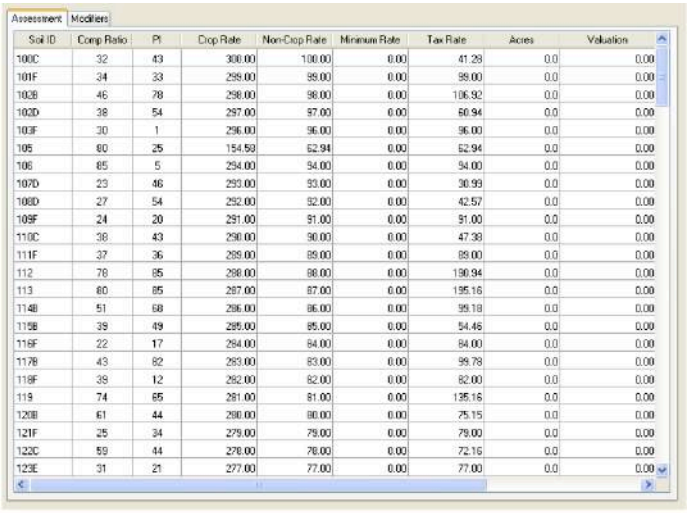
Tax Wizard Components . . .

The Soils Assessment Wizard includes several areas

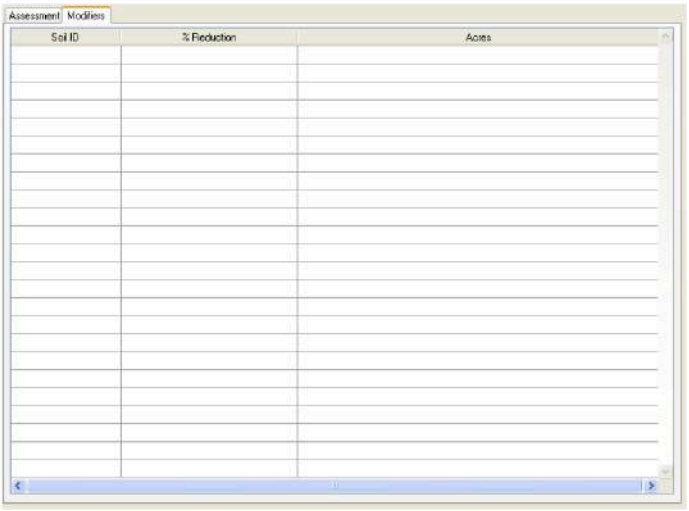
1) - Soils and Modifiers. This area is a tab area which includes the soils and related information to be used for purposes of developing the soils valuation for the selected area. The soils listed include all of the soils for your respective county. The Modifiers tab includes a list of all of the modifiers for the selected parcels. When initially loaded the soils are loaded in their default format without any acres or valuation as no parcels are selected by default. Likewise the Modifiers tab does not include any information as no

parcels have yet been selected.

Soils List



Modifiers List



2) - Parcel Selection. This area provides tools to limit the parcels that are included in the assessment. Property Type and Ownership can both be used for purposes of limiting the soils assessment to parcels of the selected property type and/or land ownership. This provides simple methods to remove federal lands and non agricultural parcels from the soils analysis for the selected township or the entire county.

3) - Import / Export Options provide tools for importing and exporting soils tax rates, printing the results of individual assessments, and importing soils types from the spatial engine.

4) - Select Township / County creates the query based upon the selected township or the entire county combined with the property types and land ownership criteria defined, and then selects the appropriate parcels to be used for the soils analysis.

5) - Adjust Soils Rates provides the necessary tools to globally adjust the various crop rates including the cropland rate, non-cropland rate, minimum tax rate, and the Crop/Non-Crop break point. In addition, these tools allow you to restore the default rates or commit the established rates as the defaults to be used for final tax assessment.

6) - Crop/Non-Crop Break - provides a means of setting the break point for the productivity index that is used for purposes of assigning a cropland or non-cropland tax rate to each soil type. The initial value for this is retrieved from the Preferences. Once the correct value has been established for your county, it can be committed back to the preferences for general use.

Let's Begin . . .

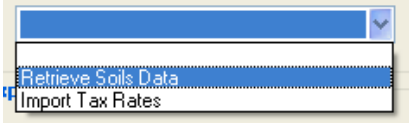
Before we can proceed to process the soils and develop the appropriate tax rates there are a couple of things that will need to be completed first. First, the parcels, tax modifiers, homestead areas, and right of ways must be developed and integrated within the system. OffRoad GIS provides the necessary tools to develop each of these layers. OffRoad GIS also provides the necessary tools to import any of these layers as shape files. These tools are covered in more detail in the OffRoad GIS users manual.

Once these layers have been addressed, it would be a good idea to check the validity of the parcels. Whether the parcel layer was developed within OffRoad GIS or imported from an external source. OffRoad GIS provides a fairly extensive toolset to properly snap the parcels to the GCDB control points and address the majority of slivers and overlaps that may exist between individual parcels. While these tools have been developed to address and resolve the majority of problems that may be encountered, they are no substitute for developing good data. Refer to the OffRoad GIS Users Manual for details related to developing and cleaning parcels.

In addition to these prerequisites, it is also necessary to import soils components unique to your county from the spatial server. The appropriate soils data has already been loaded into your spatial server, but the Productivity Index, Crop Rates, and Non-Crop Rates need to be loaded into OffRoad GIS in order to perform the soils analysis.

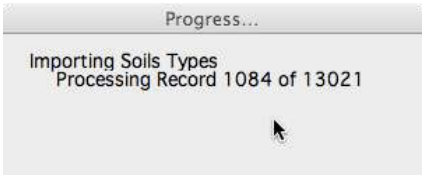
Load the soils data

Select Retrieve Soils from the Import Options pop-up dialog. This only needs to be done if the Soils coverage is modified or if you are working with the Tax Wizard for the first time.



The following Confirmation Dialog will be displayed. Click Update to continue to load or update the soils data.

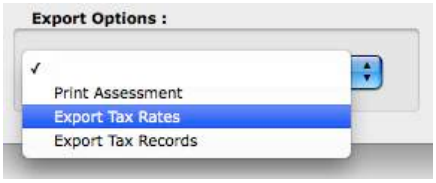
A dialog will be displayed showing the progress of loading the soils.



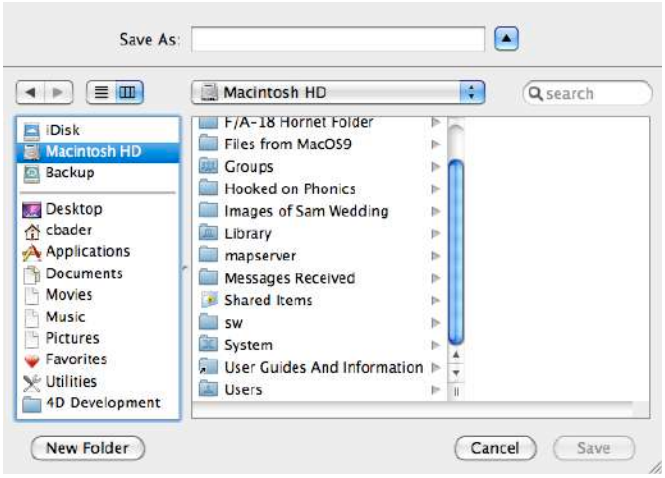
Develop the Tax Rates

The next step will be to develop an initial value for Cropland, Non-Cropland, and Minimum tax rates. These can be imported or manually entered. Once entered, the Tax Wizard provides tools to adjust these rates. They can also be exported for purposes of developing this list externally using any spreadsheet. You can then re-import the rates that you have modified or an initial set of rates back into the tax wizard.

To Export the Tax Rates, select Export Tax Rates from the Export Options pop-up button. This will create a tab-delimited ascii file that can be opened using any spreadsheet.

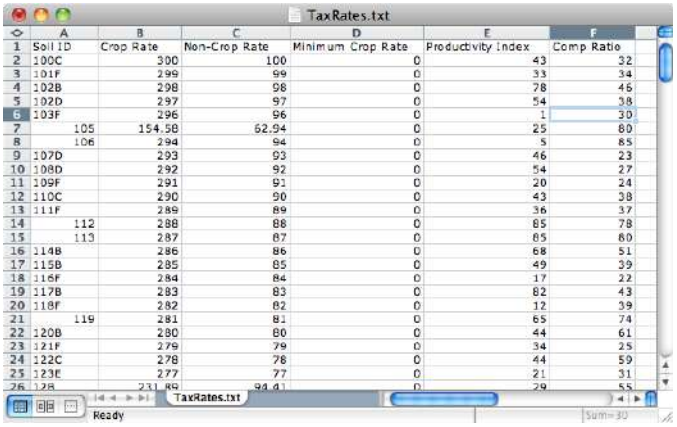


You will be presented with a standard create file dialog.



Once the tax rate file has been created, OffRoad GIS will display the folder window that was targeted for saving the file.

The tax rate file that was created contains the Soil ID, Crop Rate, Non-Crop Rate, Min Crop Rate, and PI. Simply open the file with any text editor or spreadsheet application. Do not edit the Soil ID as this is used to tie the rates back to the soils when the data is imported.



Once you have adjusted the soils rates appropriately, you can update the current values in the system.

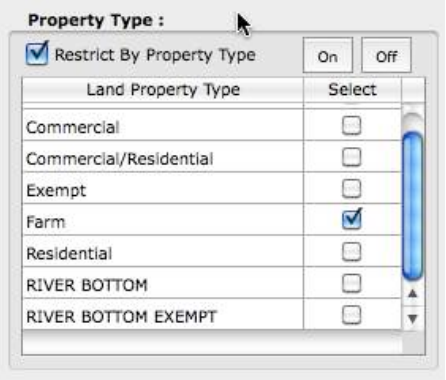
To update the soils rates from an external ascii file. Select Import Tax Rates from the Import Options pop-up menu. This will present the standard open file dialog box.

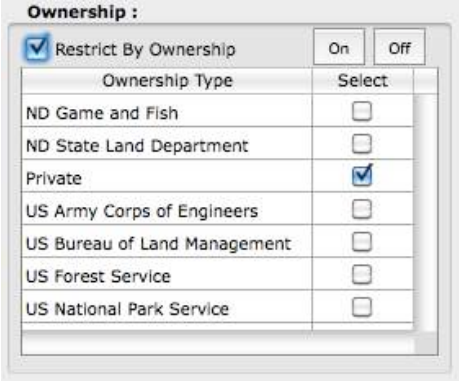
Navigate to the location of the file and open the appropriate file. Make certain that the file was saved as a tab-delimited ascii file. OffRoad GIS can not open proprietary file formats created by many spreadsheets.

Select Property Type and Ownership Restrictions

Before we proceed to analyze the soils based upon their agricultural potential, it will be necessary to limit the parcels that are analyzed to relevant agricultural based parcels. This is achieved through the Property Type and Ownership areas. In order to use either of these to select parcels, you must first select the relevant check box related to each data class. If selected, the parcels that are analyzed will be limited to those types that are selected in the respective list.

For example, if you want to restrict the soils assessment to parcels with a property type of Farm that are privately owned, it will be necessary to select the Restrict by Property Type check box and the Restrict by Ownership check box. Then the Farm property type check box will need to be selected under the Property Type list and the Private ownership type will need to be selected under the Ownership list. Once set, any assessment that is performed for either an individual township or for the county as a whole will be limited to those parcels identified within these lists.

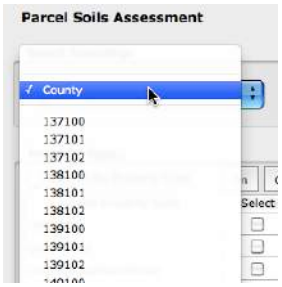




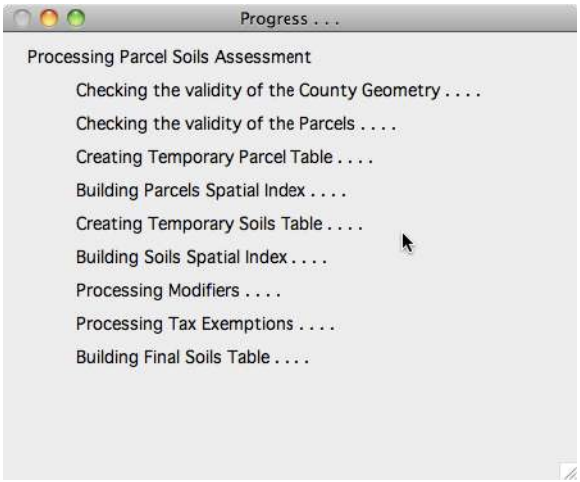
The On and Off buttons provide a means of setting all of the respective types either in the selected state or in the unselected state.

Once we have the Property Type and Ownership categories selected, we are ready to begin evaluating the parcels. It is entirely a matter of preference whether we initially process the County or individual townships first, as this will be an iterative process. It would probably make sense to begin by looking at the County first to determine the degree to which initial analysis match the target set for tax collection within your county.

To begin, select County from the Select Township pop-up menu.

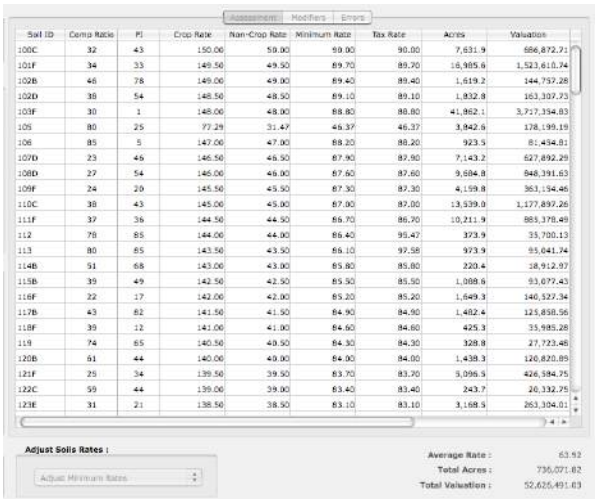


A dialog will be displayed that will show the progress as the Tax Wizard steps through the soils evaluation for the selected parameters. It will look something like this.



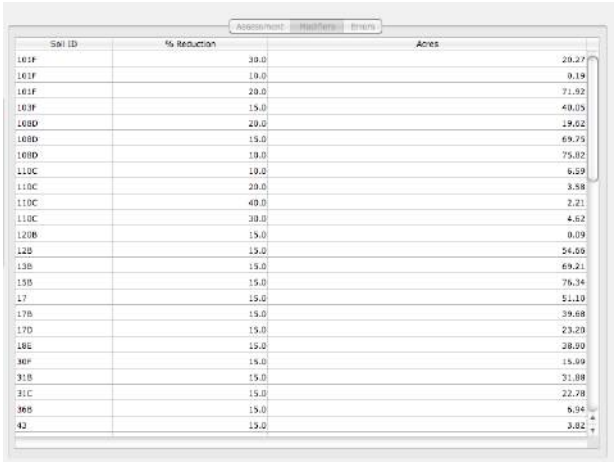
Once the analysis has been completed, the Tax Wizard will warn you if any errors were encountered during the process.

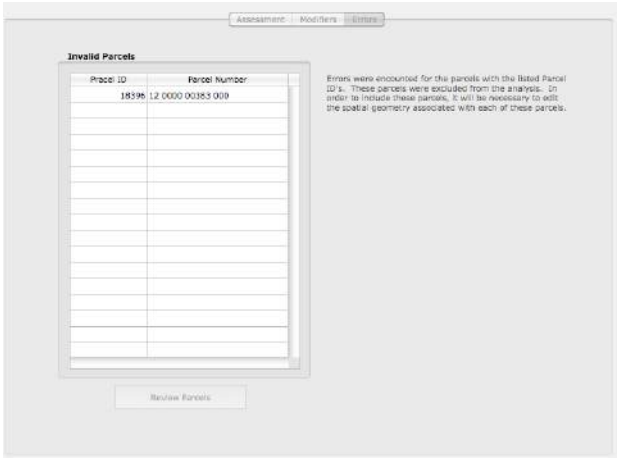
You can review the results including the Assessment values, relevant Modifiers, and Errors from the soils and modifiers listbox area.



The Assessment area is displayed by default and it includes the total acreage and the valuation for each soils type and the total acres and total valuation presented below the listbox area.

To review the modifiers, click on the Modifiers tab, and likewise to review the parcels with errors, click on the Errors tab.





Note - Keep in mind that parcels with spatial errors detected during the analysis are excluded from the analysis so for best results, the errors should be resolved before you proceed with your analysis.

Adjusting Rates

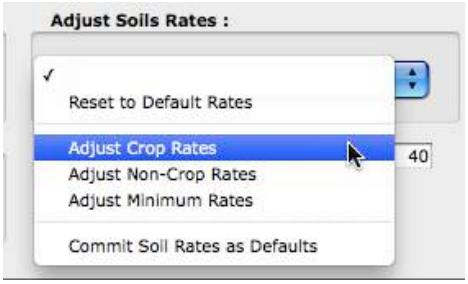
For the sample dataset that we used for this white paper, the total acres of the selected parcels was determined to be 736,072 and the initial soils valuation was determined to be $52,626,491. Let's assume for demonstration purposes, that this county has a target tax base of $42,000,000. This means that the soils rates that we have developed are generally too high, and we will need to reduce them to hit the tax target.

There are a number of ways in which we can proceed. We can adjust any or all of the rates, i.e. Crop Rate, Non-Crop Rate or the Minimum Rate, for each soil type independently by selecting the target soil type and the associated rate. We can also perform global adjustments on each of the Crop, Non-Crop, and Minimum rates as percentages. Global adjustments would generally be more appropriate when large adjustments are required to reduce the delta between your target valuation and your current valuation, just as in the sample case presented here. However, adjustments to individual rates are more appropriate when attempting to fine tune the valuation to accommodate differences between different soil types as you are completing the analysis.

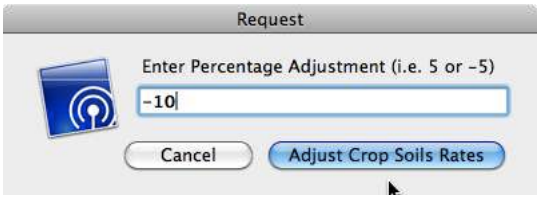
In the sample dataset that we presented we are faced with a 10 million dollar delta, so some significant changes will need to be made to the rates that had been developed from any pre-conceived assumptions when the rates were initially set up. For this example, we are looking at more than a 10 percent reduction that will be required to hit our target so we will begin by reducing our Crop Rate and the Non-Crop Rate by 10 percent.

Let's start adjusting the Crop Rates by reducing them by 10 percent.

Select Adjust Crop Rates from the Adjust Soils Rates pop-up menu.

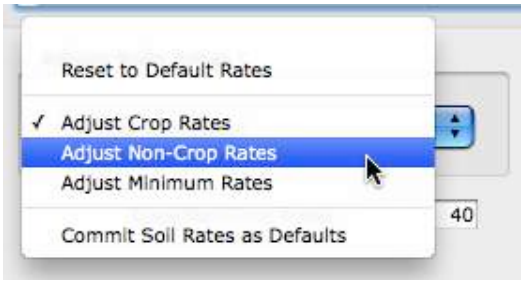


This will present a dialog prompting you for the adjustment.

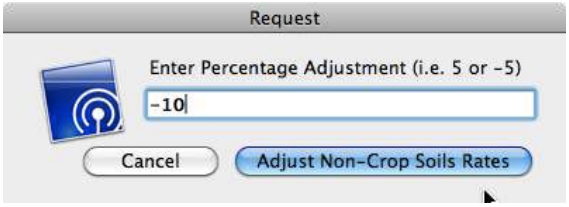


Enter -10 to reduce the Crop rate by 10 percent and then click the Adjust Crop Soils Rates button. This will adjust the Crop rates down by 10 percent and re-calculate the valuation.

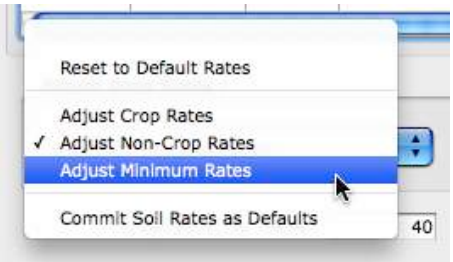
Now do the same for the Non-Crop rate: Select Adjust Non-Crop Rates from the Adjust Soils Rates pop-up menu.



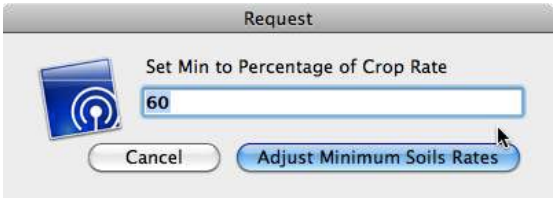
This will present a dialog prompting for the adjustment. Enter -10 as the adjustment and click on the Adjust Non-Crop Soils Rates button.



The Minimum Rate is somewhat different in that it is adjusted as a percentage of the Crop-Rate. Initially, in our dataset, the minimum rates are not set. In order to adjust the Minimum Rate: Select Adjust Minimum Rates from the Adjust Soils Rates pop-up menu.



This will present a dialog prompting for the adjustment. In this case, we will enter 60 to set the minimum rate at 60 percent of the Crop Rates for each soil type.



The adjustments that have been made have reduced the overall assessment to just over 47 million so some additional adjustments will be required.

At this point, we can continue to adjust the Crop and Non-Crop rates, but we can also adjust the Crop/Non Crop break point. However, before we make any additional adjustments, we can also review the current Tax Rate that is being applied for each soil type to see whether the tax rate that is being applied is the Crop, Non-Crop, or the Minimum rate. The column titled Tax Rate displays the value that was selected for each soil type.

In our sample dataset, we can see that the majority of the tax rates being used are the minimum tax rates. This information should help you to isolate whether adjustments to the Crop Rate, Non-Crop Rate or the Minimum Rate will have the greatest impact on the resulting valuation.

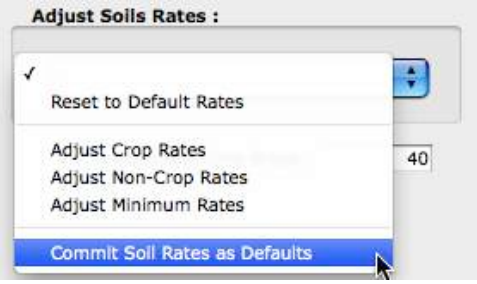
Crop Rate	Non-Crop Rate	Minimum Rate	Tax Rate
135.00	45.00	81.00	81.00
134.55	44.55	80.73	80.73
134.10	44.10	80.46	80.46
133.65	43.65	80.19	80.19
133.20	43.20	79.92	79.92
69.56	28.32	41.73	41.73
132.30	42.30	79.38	79.38
131.85	41.85	79.11	79.11
131.40	41.40	78.84	78.84
130.95	40.95	78.57	78.57
130.50	40.50	78.30	78.30
130.05	40.05	78.03	78.03
129.60	39.60	77.76	85.92
129.15	39.15	77.49	87.82
128.70	38.70	77.22	77.22
128.25	38.25	76.95	76.95
127.80	37.80	76.68	76.68
127.35	37.35	76.41	76.41
126.90	36.90	76.14	76.14
126.45	36.45	75.87	75.87
126.00	36.00	75.60	75.60
125.55	35.55	75.33	75.33
125.10	35.10	75.06	75.06
124.65	34.65	74.79	74.79

After applying some additional reductions to the Crop and Non-Crop rates and the Minimum rate, we have arrived at an overall valuation of just over 41 million. At this point, we are within 1 million of our target valuation so it may be more advantageous to review the rates for individual soils to see if individual adjustments are warranted.

Adjusting individual rates is accomplished much as you would edit a spreadsheet. Simply locate the appropriate cell and click on the cell to convert the cursor to the insertion point, then hi-light the current value and replace it with the target value. Any changes will immediately be reflected in the valuation.

Saving Tax Rates

Once the necessary adjustments have been made to hit the target, the adjustments that have been made to the crop, non-crop rates, and the minimum rates will need to be saved to the system so that they can be used in future valuations. In order to commit the rates that have been developed, select the Commit Soils Rates as Defaults from the Adjust Soils Rates pop-up menu.

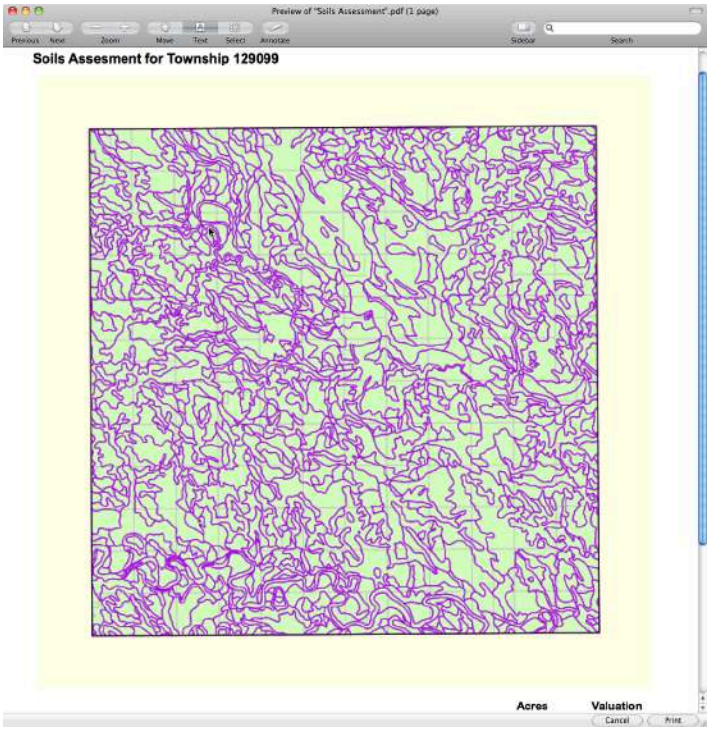


This will prompt you for confirmation to commit the soils rates. Once the soils rates have been committed, a confirmation dialog will be displayed.

Printing your results

While preparing the appropriate tax rates, the Tax Assessment Wizard provides tools to print township maps outlining the soils that were included with a detailed table of each soil type along with the area and valuation for each respective township. In order to print a valuation for a township, select the township from the Select Township pop-up menu. Allow the tax wizard to complete the analysis for the selected township, and then select the Print Assessment option from the Export Options pop-up menu.

This will provide the following printed output.



Soils Assesment for Township 129099 11/2/10

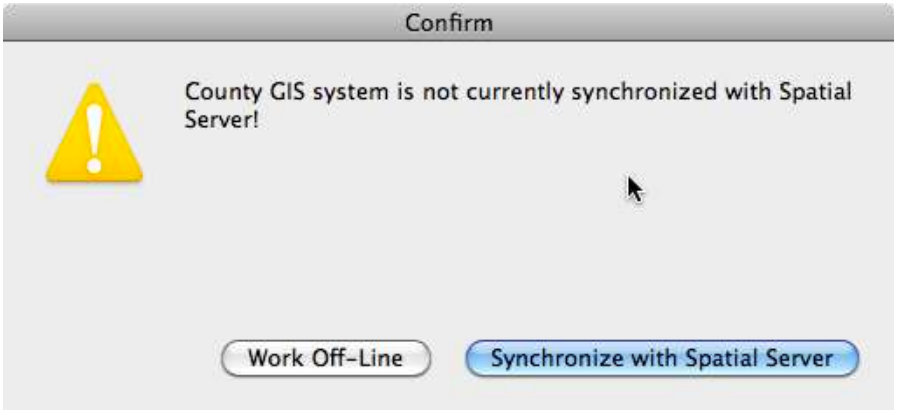
Soil ID	Comp R	PI	Crop Rate	Non-Crop Rate	Min Rate	Tax Rate	Acres	Valuation	Modifiers	Total
Ae	80	25	75.77	23.19	0.00	23.19	94.7	2,196.57	0.00	2,196.57
Ag	80	61	205.86	62.93	0.00	205.86	941.3	193,591.45	0.00	193,591.45
AlD	60	46	137.10	41.96	0.00	137.10	71.4	9,802.51	0.00	9,802.51
AmA	60	80	292.25	89.43	0.00	292.25	899.3	262,843.22	0.00	262,843.22
AmB	65	76	270.59	82.81	0.00	270.59	2,988.4	808,631.96	0.00	808,631.96
ArA	80	100	335.54	102.66	0.00	335.54	241.8	81,156.06	0.00	81,156.06
ArB	80	95	321.11	98.27	0.00	321.11	24.1	7,748.70	0.00	7,748.70
BeA	80	75	266.99	81.70	0.00	266.99	190.4	50,847.17	0.00	50,847.17
BeB	80	71	252.56	77.29	0.00	252.56	93.6	23,652.24	0.00	23,652.24
BfA	80	75	274.21	83.91	0.00	274.21	427.7	117,297.44	0.00	117,297.44
BfB	80	71	256.17	78.39	0.00	256.17	4.6	1,203.23	0.00	1,203.23
CaC	60	30	151.53	46.37	0.00	46.37	209.6	9,723.09	0.00	9,723.09
CaE	65	16	82.98	25.39	0.00	25.39	1,117.3	28,369.11	0.00	28,369.11
CbC	45	30	187.81	57.41	0.00	57.41	620.9	35,648.62	0.00	35,648.62
CbD	45	23	122.67	37.53	0.00	37.53	593.4	22,272.59	0.00	22,272.59
Cd	50	11	68.55	20.98	0.00	20.98	183.5	3,851.71	0.00	3,851.71
Ce	42	2	75.77	23.19	0.00	23.19	28.7	665.55	0.00	665.55
CmA	42	70	274.21	83.91	0.00	274.21	129.8	35,593.00	0.00	35,593.00
CmB	42	67	252.56	77.29	0.00	252.56	1,018.7	257,283.37	0.00	257,283.37
CnC	28	23	169.57	51.89	0.00	51.89	264.4	13,721.11	0.00	13,721.11
CrB	80	71	248.95	76.18	0.00	248.95	2.9	724.44	0.00	724.44
EdB	60	39	151.53	46.37	0.00	46.37	54.3	2,519.00	0.00	2,519.00
ElC	45	30	101.02	30.91	0.00	30.91	5.4	167.00	0.00	167.00
FeE	60	10	54.12	16.57	0.00	16.57	43.7	725.68	0.00	725.68
FhD	40	14	97.42	29.81	0.00	29.81	699.0	20,838.82	0.00	20,838.82
Fm	42	6	97.42	29.81	0.00	29.81	6.8	202.73	0.00	202.73
GdA	85	65	227.30	69.56	0.00	227.30	14.5	3,310.85	0.00	3,310.85
							23,036.6	4,761,453.86	0.00	4,761,453.86

Chapter 13 - Spatial Server Management

Offroad GIS is composed of many different components, this includes the Offroad Application Server, the Spatial Server, and Web Services Server. The Offroad GIS Application Server includes all of the end-user application components and the majority of this manual is dedicated to the application component of Offroad GIS. The Spatial Server, as the name implies, provides the spatial engine and all of the related spatial services required to deliver the GIS functionality to the Offroad GIS service. For the most part, the spatial server runs behind the scenes and will require little attention. However, there are some administrative functions that need to be performed in the event that any errors occur when Offroad GIS interacts with the spatial engine.

In order to function properly, the Offroad Application Server must be synchronized with the Spatial Server. This generally occurs at the record level. As each record is added, modified, or deleted, within the Application Server, these changes are propagated down to the Spatial Server. If any errors occur, the synchronization state will be stopped. When this occurs, it is no longer possible to make any changes to any of the spatial aspects of the Parcels, Right of Ways, or Tax Modifiers. You can still make changes to the attributes, documents, or any other aspect of the application data that does not pertain to the spatial engine. If the synchronization is interrupted for any reason, the Application Server maintains a running record of all changes that will need to be made to bring the Spatial server back into synchronization.

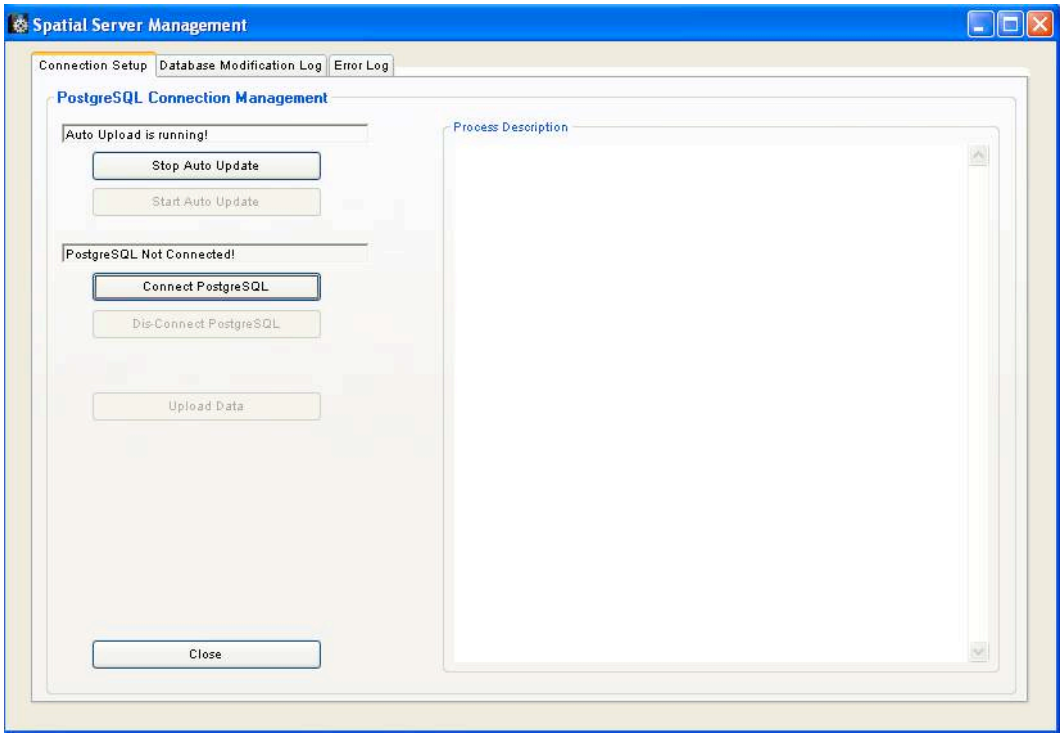
If the Spatial Server is not currently synchronized with the Application Server, the following notification will be displayed after a successful log-in.



If the Work Off-Line button is clicked, the system will allow you to work with the data, but none of the spatial functions will be available during the session. If the Synchronize with Spatial Server button is clicked, the Application Server will attempt to synchronize the data with the Spatial Server. If the Synchronization is performed successfully, the system will operate as expected with full spatial services. If the attempt to synchronize the data is

unsuccessful, the system will still operate without the benefit of the spatial tools.

If the Spatial Server can not be synchronized at log-in, the Spatial Server Management Console provides a comprehensive management environment to resolve any problems that may exist between the Application Server and the Spatial Server. The Spatial Server Management Console is available from the Manage Spatial Server option under the Administration Menu.

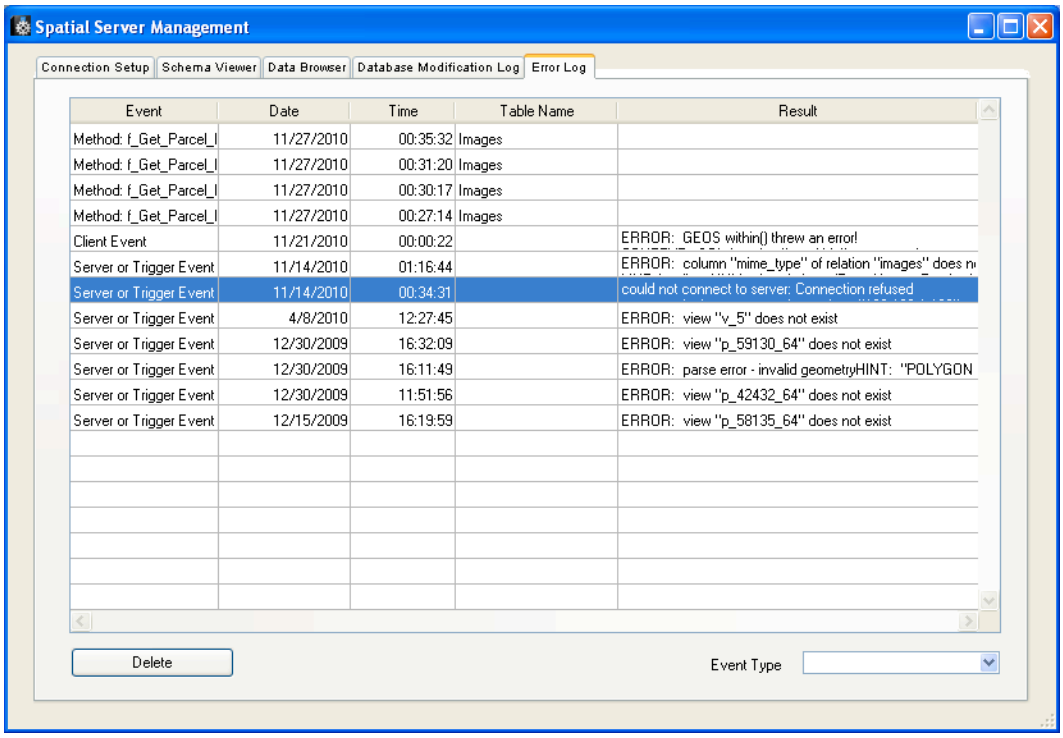


The Spatial Server Management Console provides a comprehensive set of tools for managing the Spatial Server, which includes the necessary tools to start or stop synchronization, load and re-load data to the spatial engine, and review both the Database Modification Log, and the current Error Log.

When initially displayed, the Spatial Management Console includes three tabs; Connection Setup, Database Modification Log, and Error Log.

Error Log

The Error Log contains a list of all of the Errors that can be logged within the system. If the Spatial Server is not currently being synchronized, the Error log should be reviewed as it will likely provides some insight into the problem that caused the synchronization to fail. This log is never flushed and periodically, it should be reviewed and then Deleted using the Delete button.

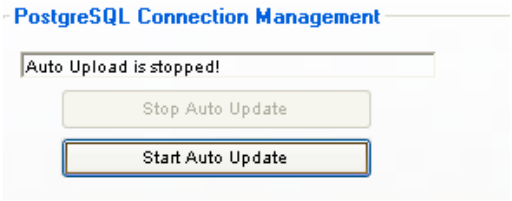


Database Modification Log

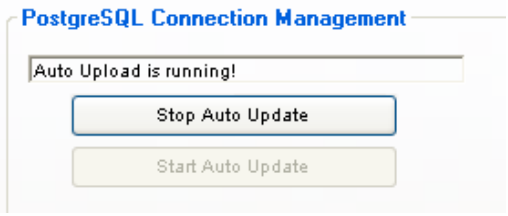
The Database Modification Log tab presents the database modification transaction log for the Application Server. If the Application Server and the Spatial Server are synchronized, the Database Modification Log will be empty. If not synchronized, the records that have been added, modified, or deleted since the synchronization failed will be displayed in the log. It is possible to Delete one or more of these entires, but if any of the entries are manually deleted, the state between the Application Server and Spatial Server will be compromised. There are times when it may be necessary to delete one or more entries to get the Application Server to synchronize with the Spatial Server, but it is probably more appropriate in almost all cases to simply re-load the table that is causing the synchronization to fail.

Synchronization

Generally, if there are problems that have caused synchronization between the Application Server and the Spatial Server to fail, the problems can be resolved simply by clicking on the Start Auto Update button. This will initiate a full synchronization of the Application Server and attempt to resolve and synchronize the record event listed in the Database Modification Log.

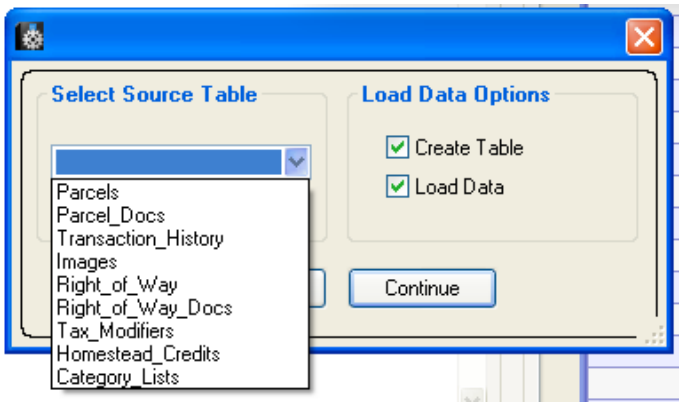


If successful, the status will be changed to reflect the current synchronization state and the Start Auto Update button will become disabled while the Stop Auto Update button will be enabled.



Re-Loading Data

If the synchronization fails, the table that is causing the problems may need to be re-loaded to the Spatial Server. In order to ascertain which table is causing the problems, review the Database Modification Logs. Once the problem table has been identified, click on the Connect PostgreSQL button to initiate a connection with the Spatial Server. If the connection is successful, the Connection status will be updated to reflect the successful connection along with the Connection ID. In addition, two additional tabs will be displayed which includes the Schema Viewer, and the Data Browser. Also, the Upload Data button will be enabled. In order to upload the table and its associated data, click on the Upload Data button. This will display the Source Table dialog from which the appropriate source table can be selected and the load options can be set.

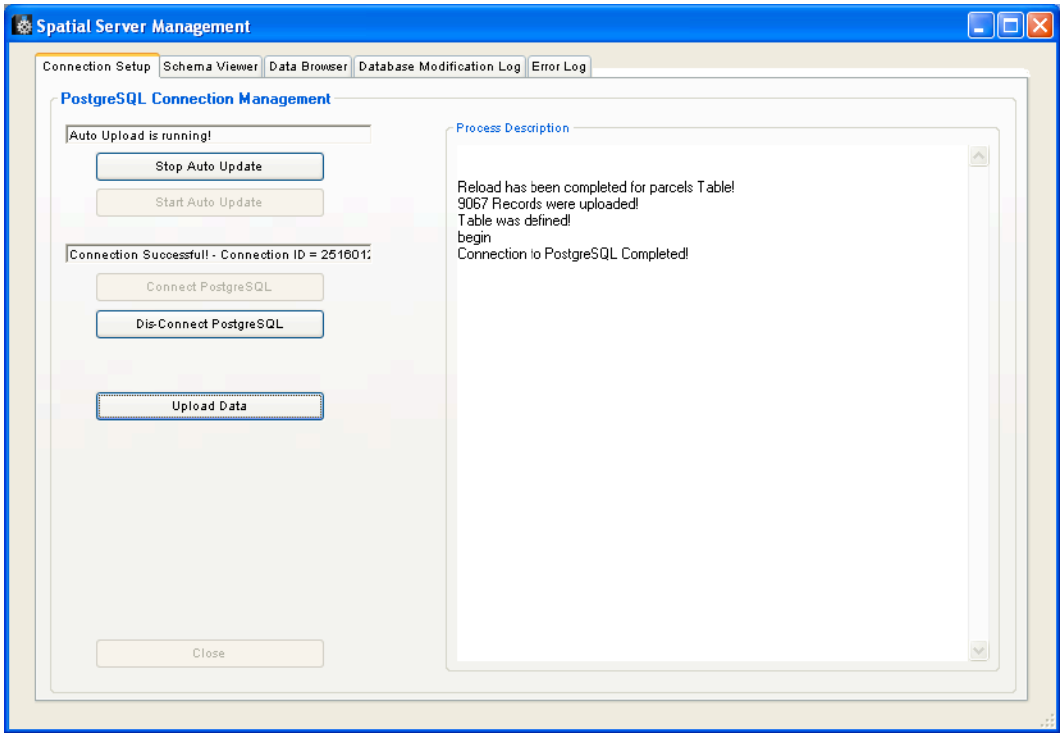


By default, both the Create Table and Load Data check boxes are checked. In almost all cases, both checkboxes should be checked when loading the data. The Create Table check boxes simply causes the process to drop and re-create

the table. This is ensures that there are no problems with the table and eliminates any potential corruption that may have occurred to the table. The Load Data check box simply ensures that the data from the Application Server table will be loaded into the Spatial Server. If this is not checked, the Spatial Server will not be updated and future synchronization will fail.

In order to upload the target table, select the table from the Select Source Table pop-up menu. Then click the Continue button. A progress window will be displayed with the status of the upload process.

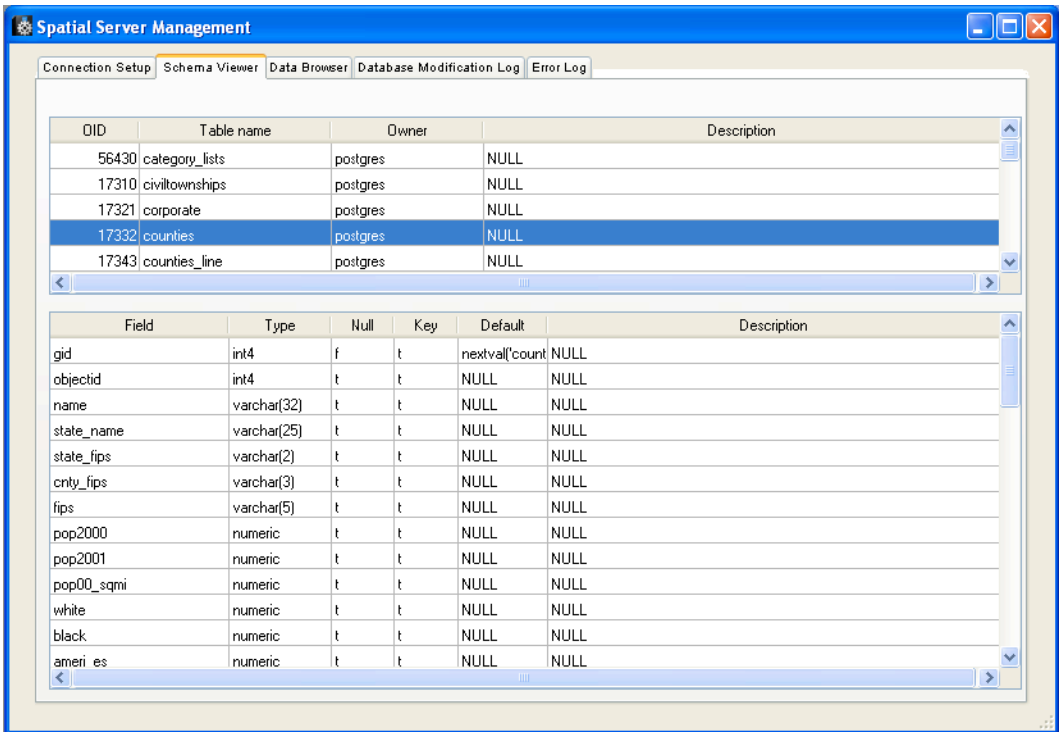
Once the upload process has been completed for the target table, the Process Description area will be updated to reflect the results of the upload. In addition, if the upload was completed successfully, all entries for the target table will be deleted from the Database Modifications Log as the table is now completely synchronized.



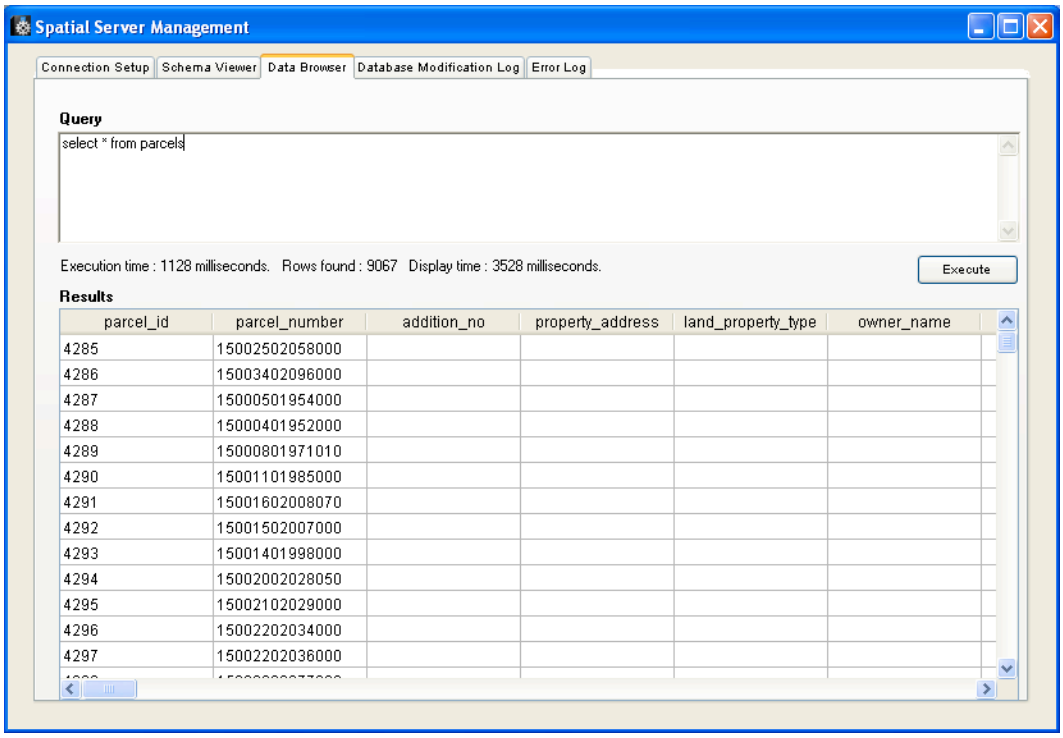
If there are additional entries in the Database Modifications Log, it may be necessary to try again to Start the Auto Update. If this doesn't work, it may be necessary to re-load additional tables until the problem is resolved.

Schema Viewer and Data Browser

The Schema Viewer Tab and the Data Browser Tab provide simple tools to review the architecture and data that is loaded into the Spatial Server. From the Schema Viewer, all of the Tables available in the Spatial Server are displayed in the upper listbox area. To review the structure for each of the Schema, simply click on the Schema in the upper listbox. The lower listbox will be updated to show the field definitions in the lower listbox.



The Data Browser provides a simple SQL interface that can be used to review any of the actual data loaded into the Spatial Server. The following dialog demonstrates a simple SQL select statement for the parcels table.



The Spatial Server Management Console can only be closed if a connection does not exist to the Spatial Server. In order to close the dialog, click on the Dis-Connect PostgreSQL button and then click the Close button.

Chapter 14 - Backup Services

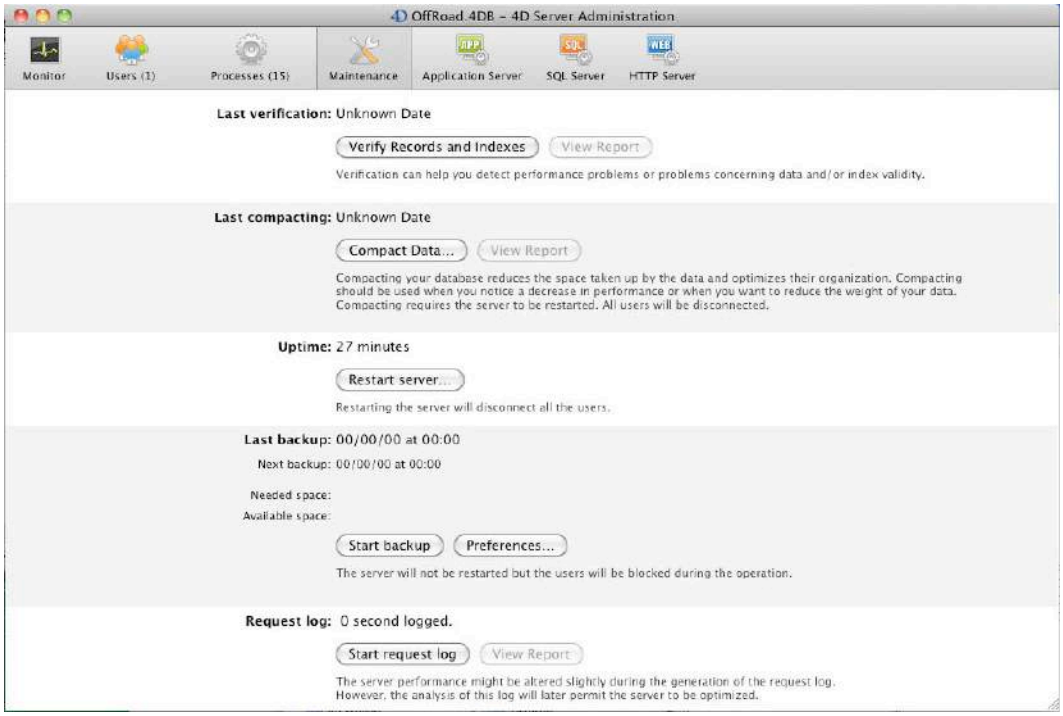
The OffRoad GIS system includes a fairly sophisticated backup and recovery system. This includes utilities to setup scheduled backups that can be run daily or even hourly if needed. In addition, the backup system has been augmented to include specific components of the OffRoad spatial server to ensure that all relevant data is backed up. In addition to the integrated backup services in OffRoad GIS, the OffRoad GIS server is also set up with two identical hard drives with full replication to maintain internal redundancy with full boot capabilities to ensure minimal down time due to hardware failure.

When initially shipped, the backup scheduler for the OffRoad GIS system is setup to provide an optimal backup solution given the nature and type of data currently being edited. While this initial configuration can be modified to suit individual needs, care and consideration should be applied before changing the default backup configuration.

Note - As with any backup solution, the backup configuration deployed with OffRoad GIS should be checked periodically to confirm that the backup is being performed properly.

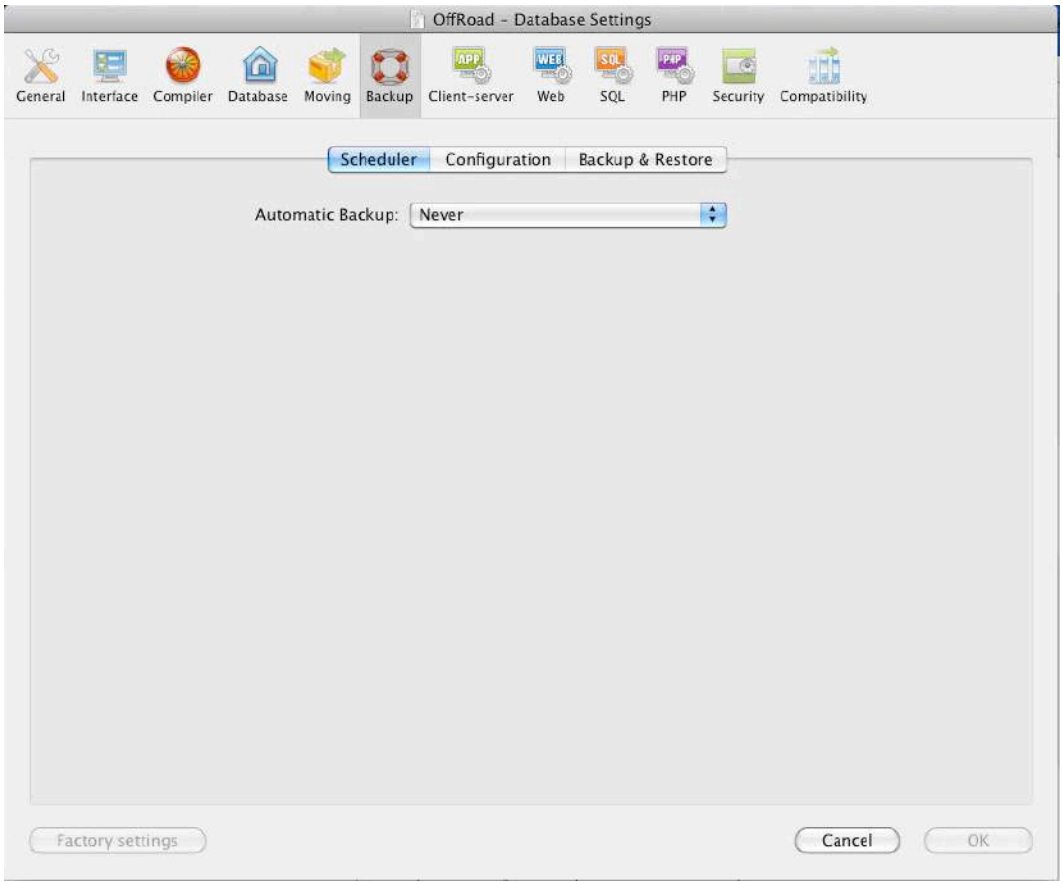
OffRoad GIS Backup

The backup services for OffRoad GIS are available from the server monitor window under the Maintenance Tab.

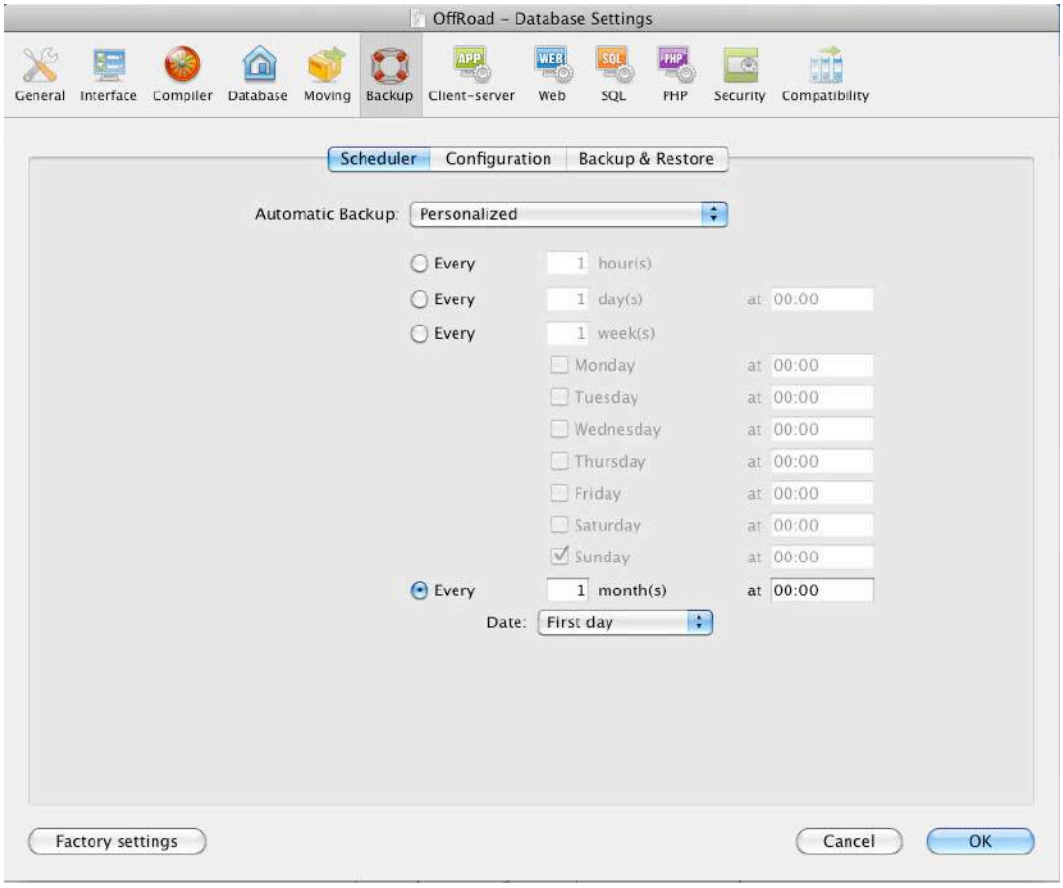


From this pane, a new backup can be initiated by clicking the Start Backup button. The backup will use the configuration that is established under the associated Preferences button.

When the Preferences button is selected, the Database Preferences dialog is displayed with the focus placed on the Backup pane. There are three tabs available under the Backup pane which includes Scheduler, Configuration, and Backup & Restore.

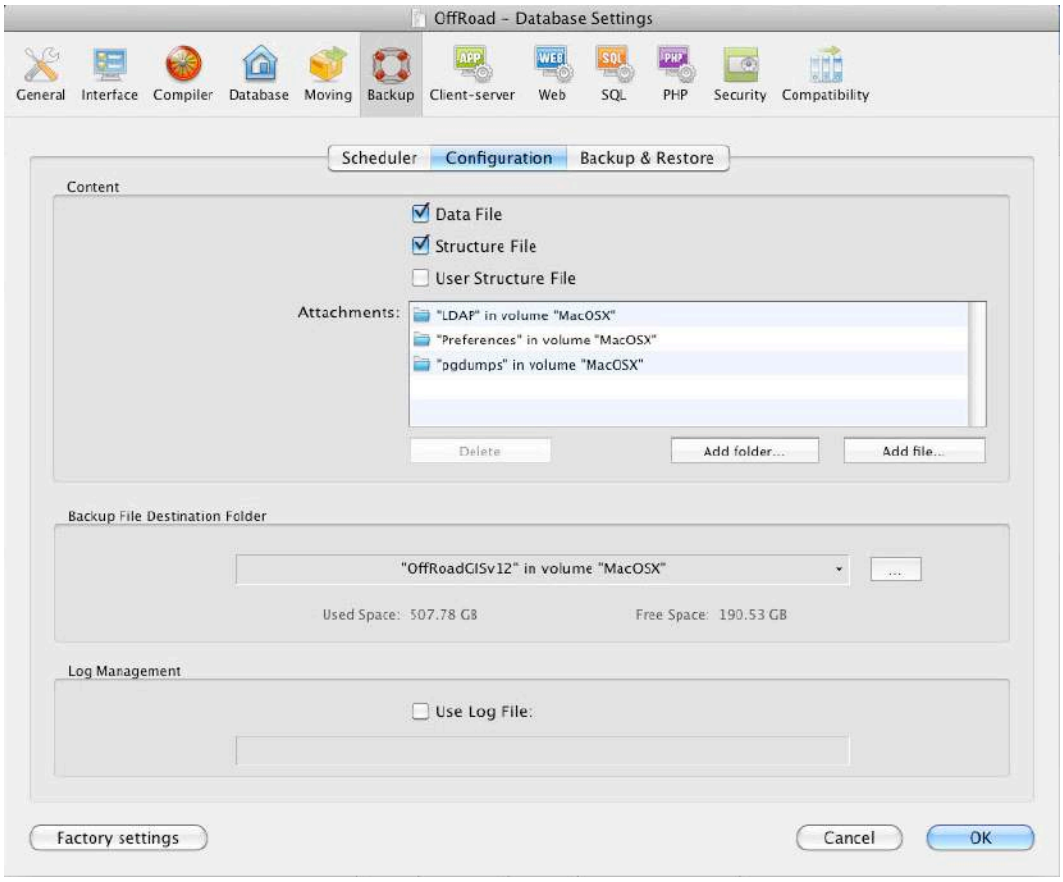


The Scheduler tab provides access to various canned schedule options, or to a Personalized options where the backup schedule can be adjusted to fit almost any schedule.



By default, OffRoad GIS is configured to execute a daily backup scheduled to run after normal working hours.

The Configuration tab provides access to define the source files to be included in the backup as well as the target destination of the backup. This includes check boxes to identify the inclusion of the Data File, Structure File, and User Structure File. By default, OffRoad GIS is configured to include the Data File and the Structure File. OffRoad GIS does not include a User Structure File so this is irrelevant for this particular application.



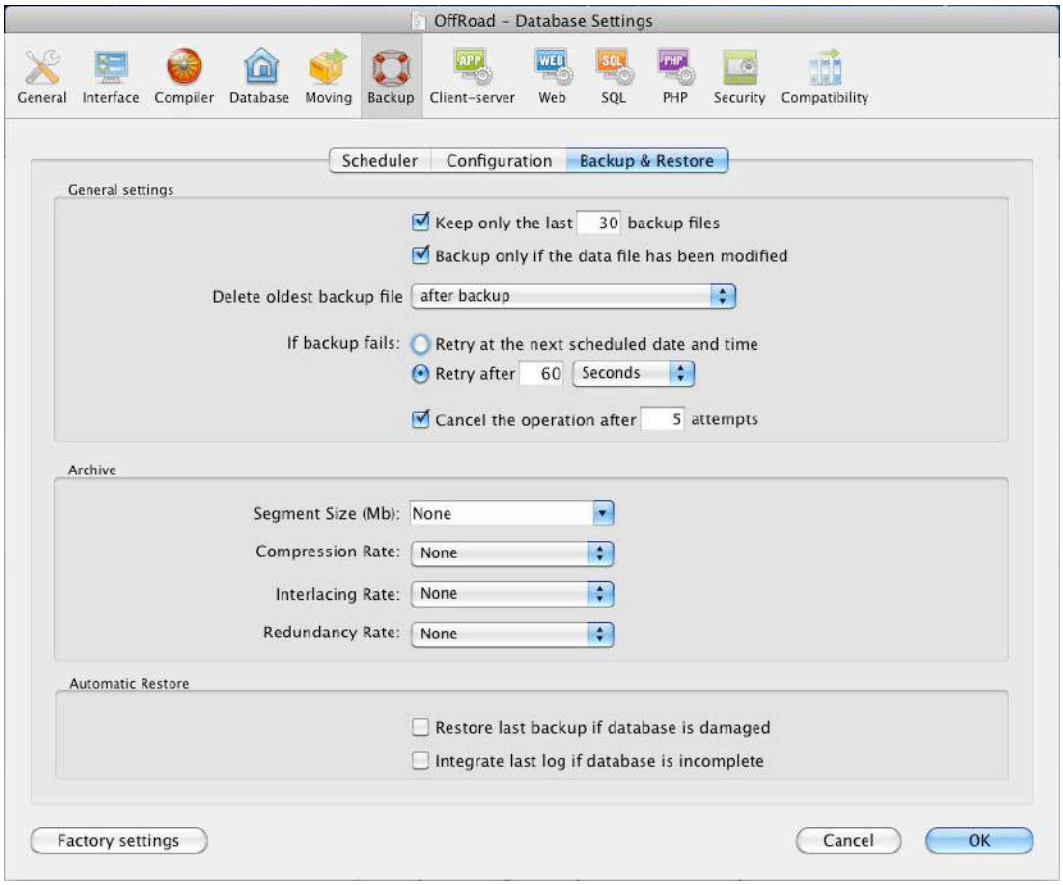
In addition to the standard Data File and Structure File, attachments can be included in the Attachments List. By default, the LDAP folder, the Preferences folder, and the pgdumps folder are included in the backup. This include the User definitions file and the overall database preference settings. The pgdumps folder is a special folder that houses the results of a spatial server dump that is performed by OffRoad GIS before the backup is executed and packaged in the backup archive. Other folders or individual files can be included by clicking either the Add Folder… button or the Add File… button. In both cases, a standard file selection dialog box will be presented from which the desired folder or file can be included.

The destination for the backup is predefined when the system is set up. However, the initial destination can be replaced by selecting the "…" button within the Backup File Destination Folder group box. Again, selecting this button will display the standard file selection dialog from which a new destination can be selected.

The Log Management option is not initially set up for the OffRoad GIS system. However, it can be turned on if needed. By clicking the Use Log File, the backup system logs individual transactions and the restore option can utilize this log to restore the database up to a particular transaction. This option introduces significant overhead and complexity. Also, for OffRoad GIS, it is

difficult to implement this level of detail to the backup system because OffRoad GIS synchronizes transactions down to the spatial server. The Log Management functions do not extend to this external system, and if used will result in synchronization problems between the OffRoad GIS Application server and the underlying OffRoad GIS Spatial server. Therefore, it is recommended that the Log Management features should not be deployed.

The Backup and Restore tab contains the remainder of the settings that control the OffRoad GIS backup services. This includes the number of copies to maintain in the backup destination, rules governing the backup such as when to delete the oldest backup and whether or not to execute the backup if no changes have been made.



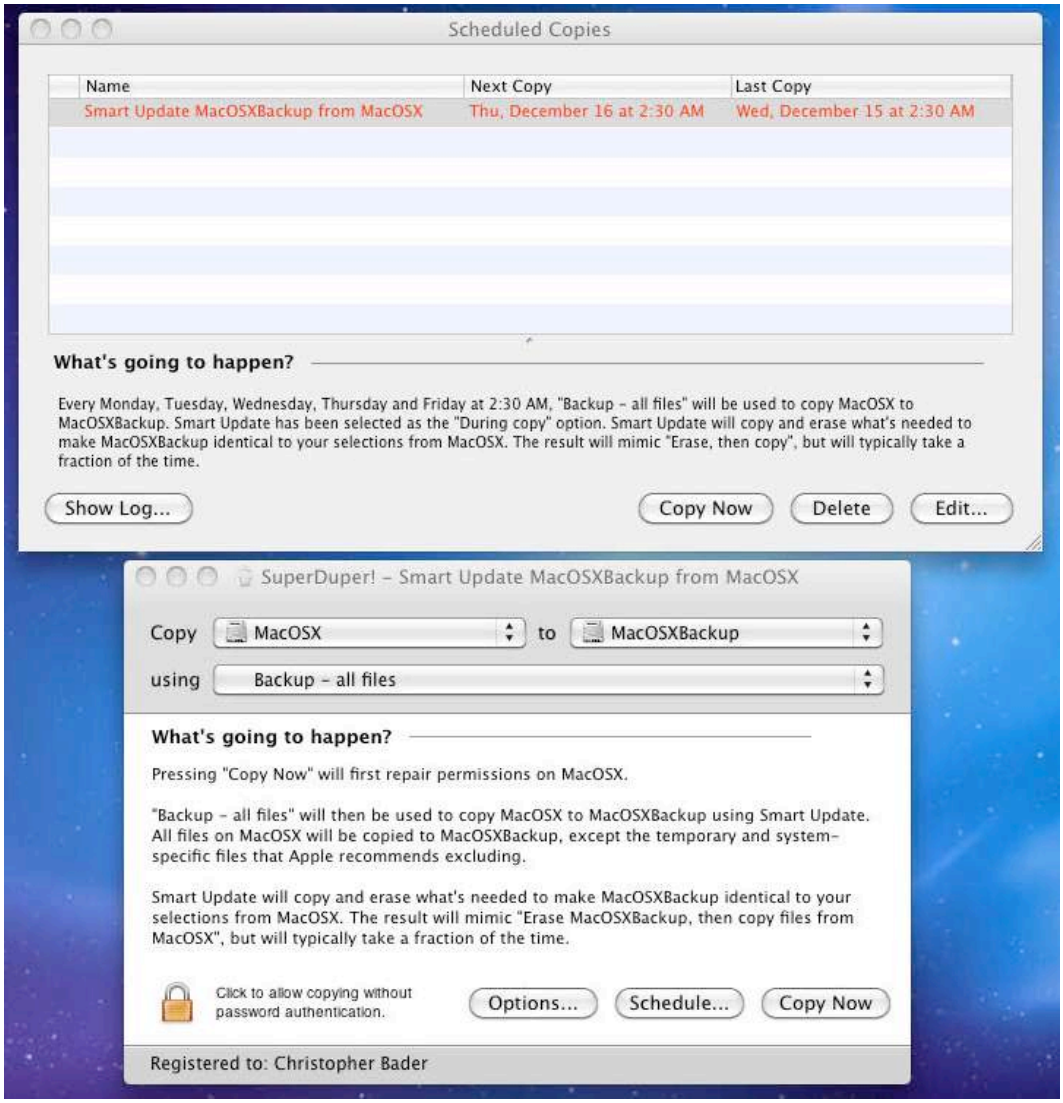
By default, OffRoad GIS is set up to maintain a minimum of 30 backup files. The backup is configured to delete the oldest backup file after a successful backup and only execute the backup in the event that the data file has been changed. The backup is set up to retry the backup after 60 seconds in the event of a backup failure, but this is limited to a total of 5 attempts. In this manner the backup system will not continue making attempts if it consistently fails which could ultimately cause the backup to overwhelm the system. Again, it is recommended that the backup be checked periodically to confirm that the backup is running as expected.

The remainder of the settings are generally not set with the initial default configuration. However, each of these can be adjusted to refine the backup to fit individual needs.

Server Replication

The server that is shipped with the OffRoad GIS service is configured with two hard drives for purposes of building redundancy into the server. This is accomplished using third party software that is set up to replicate the primary operational drive to the backup drive. The replication is scheduled to run daily. By replicating the drive, the backup drive contains a fully functional boot drive that can be enabled at any point if the primary operational drive becomes damaged or non-functional for any reason. Through replication the OffRoad GIS server provides a degree of redundancy to help minimize any downtime and mitigate hardware failures.

The application that provides the ability to replicate the primary operational drive is “Super Duper”. The Super Duper application is added to the application Dock by default but can also be found in the MacOSX/Applications directory. Super Duper is configured with a pre-backup script that shuts down the spatial server to ensure that it can be replicated without corruption. It is also configured to re-launch the spatial engine upon completion to return the server to normal operations.



For more complete details on using Super Duper, please review the information provided by the producer of Super Duper at http://www.shirt-pocket.com/SuperDuper/SuperDuperDescription.html.