Pro-curo WormFlow v.1

Manual

September 2018

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About WormFlow

WormFlow combines a dedicated sample inventory system with the ability to track associated laboratory workflows. WormFlow is not designed to replace but rather complement the user's lab notebook.

By creating links from initial building blocks, such as oligonucleotides or PCR products, through construction products, such as plasmids, fosmids, etc, to final transgenic worm strains, WormFlow users are able to interrogate current and historical hierarchical workflows. This capability provides assurance to PIs and other users that potentially key information needed, for example, for planning future experiments or writing manuscripts or grant proposals is centrally available and readily interpretable.

At the core of WormFlow is a proven sample tracking and inventory system enabling users to store and locate samples in user-designed container types distributed between different freezers or liquid N2 Dewar flasks to provide secure sample labelling, storage and tracking.

Definitions and access

This section covers definitions of terms used in WormFlow, logging on, logging off and exiting (closing) the software.

Definitions

Active. An active record, whether of an entity or a sample of an entity, is a record that still exists, i.e. a record in active use.

Container. Any device, for example a box, plate or straw, in which one or more samples can be placed and stored in a fridge, freezer or liquid N_2 (LN2) vessel.

Disposed. A disposed record, whether of an entity or one or more samples of an entity, is a record that has been removed as an active record in the database.

Entity. An entity is the term used for a discrete reagent or product type that is bought in, obtained from another lab' or created 'in-house'. In WormFlow the entities include oligonucleotides (Oligo), Vector, Plasmid, PCR Product, DNA, Glycerol stock, Bacteria and Worm.

Location. In WormFlow a location can be either a physical place, such as a building, room or freezer, a container, such as a box or plate, or the individual space within a container into which a sample is placed for storage.

Project. A project is a discrete focus of activity. A project could be a defined laboratory or a research project within that laboratory.

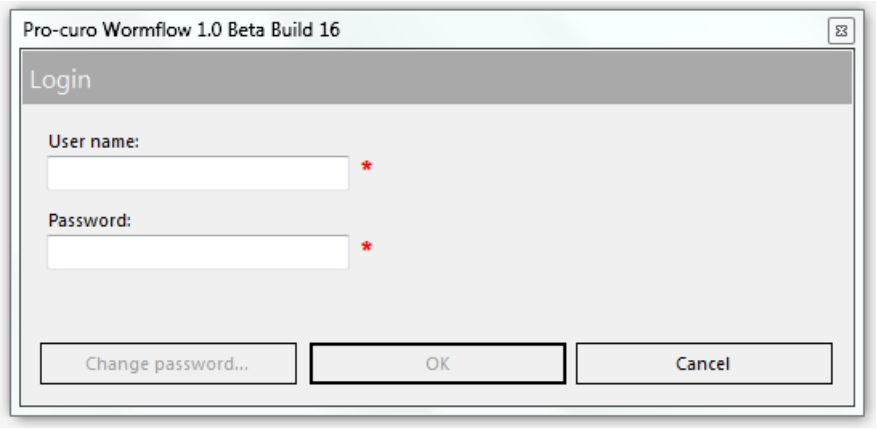
Sample. A sample is an aliquot of an entity, either in a microtube or a well in a microtitre plate, and stored in a container, such as a box, plate or straw.

User. A user is an individual who has been provided with access to WormFlow by the database administrator. The user will have a specific set of access permissions depending on their seniority.

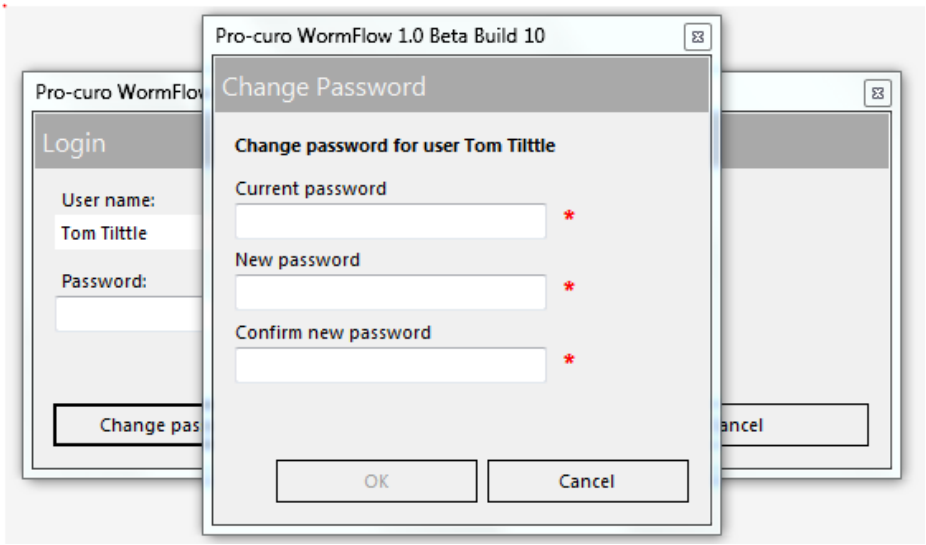
User group. A group of users based on, for example, seniority such as PIs, post-docs, etc.

Logging on, logging off and exiting

Every user must log on to WormFlow using their unique username supplied to you by the WormFlow administrator. You log on to WormFlow by typing your username into the 'User name:' field. When you log on to WormFlow for the first time, your password will be set to *'password'*. The system will prompt you to change this immediately. If your administrator has chosen to use advanced security, your password will need to contain at least 6 characters, one of which must be numerical and be changed every 90 days, otherwise you can choose any length and combination of password and it will not expire.



You can change your password at any time by clicking the 'Change password' button on the logon screen. You will then be required to enter your current password, your new password and then to confirm your new password again. Clicking the 'OK' button confirms the change.



You can log off WormFlow by clicking on the database icon located to the right of the icons in the top left corner. A confirmation box will appear and, if you choose 'Yes', you will be logged off but WormFlow will remain open enabling another user to log on via the now visible Login dialog box.

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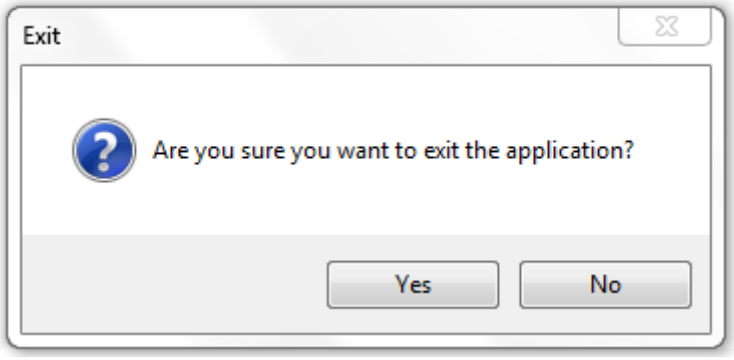
You exit (close) WormFlow either by:

1. Clicking on the Pro-curo logo located to the left of the icons in the top left corner and choosing ‘Close’ from the drop-down list.

2. Clicking on the ‘Exit’ logo located in the centre of the icons in the top left corner.

3. Clicking on the ‘Exit’ logo located to the right of the icons in the top right corner.

In all cases a confirmation box will appear.



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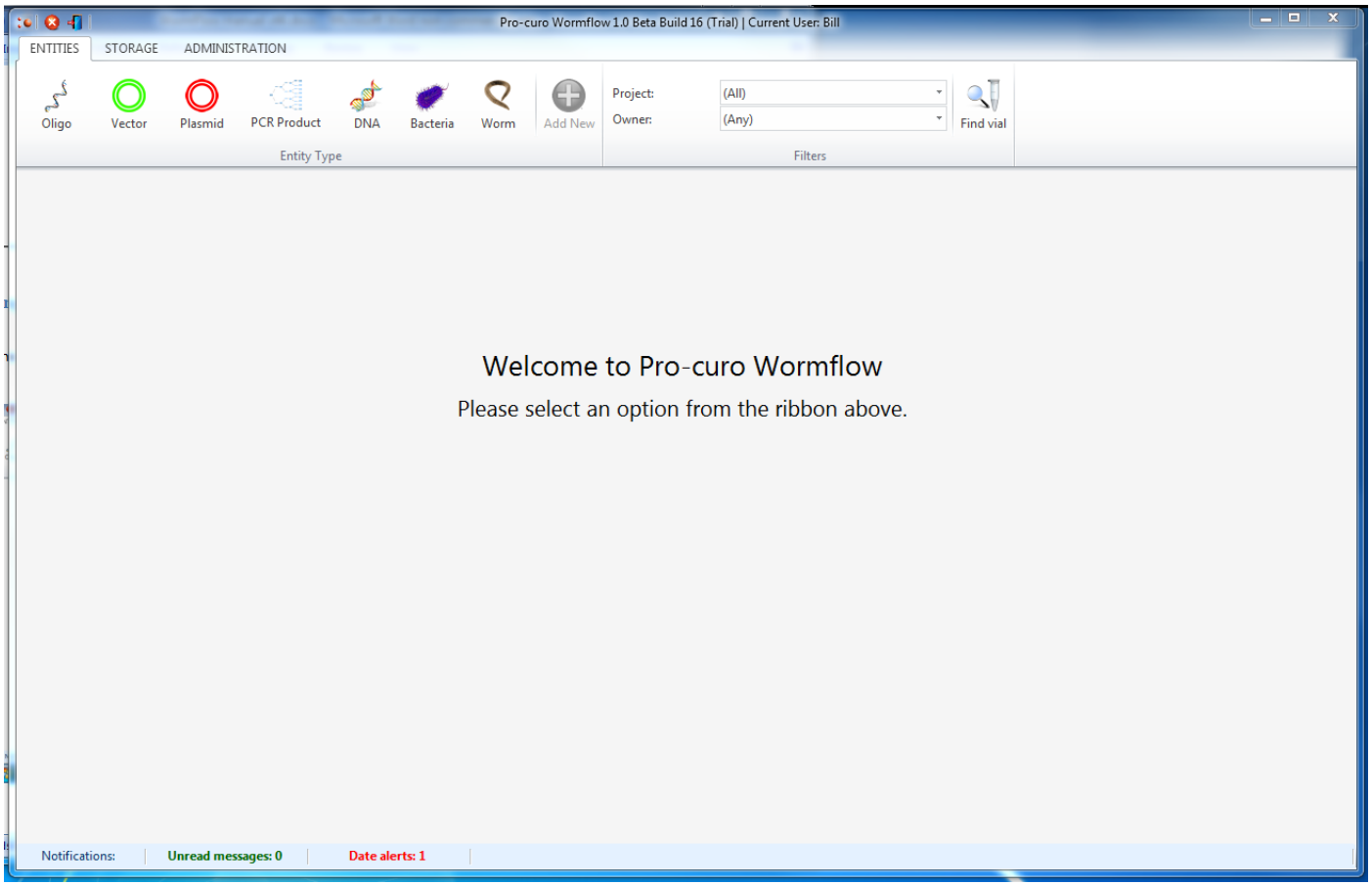
Opening screen

This is the screen you will see immediately after you log on to WormFlow.

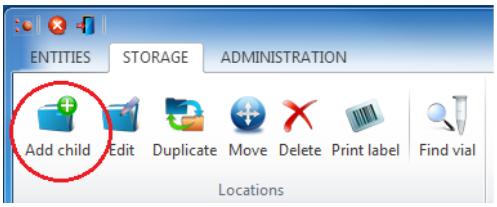


At the top are three tabs ‘ENTITIES’, ‘STORAGE’ and ‘ADMINISTRATION’. On logging on the ‘ENTITIES’ tab is forward by default. Each tab has a dedicated ribbon underneath containing icons, drop-down menus, etc. Underneath the ribbon is an area that displays, respectively, details on the chosen entity or the storage hierarchy. Note there is no equivalent display area when the ‘ADMINISTRATION’ tab is forward as all administrative activity is performed within pop-up dialog boxes.

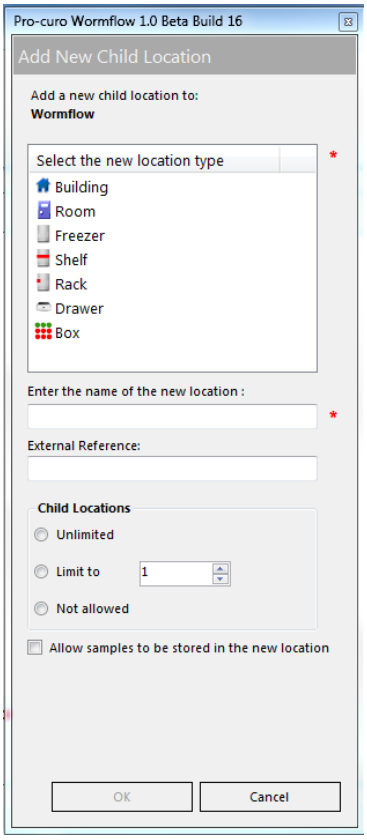
Depending on the access rights your administrator has given you the menu bars and icons you see may be different from this screenshot.

Storage

Setting up the location hierarchy

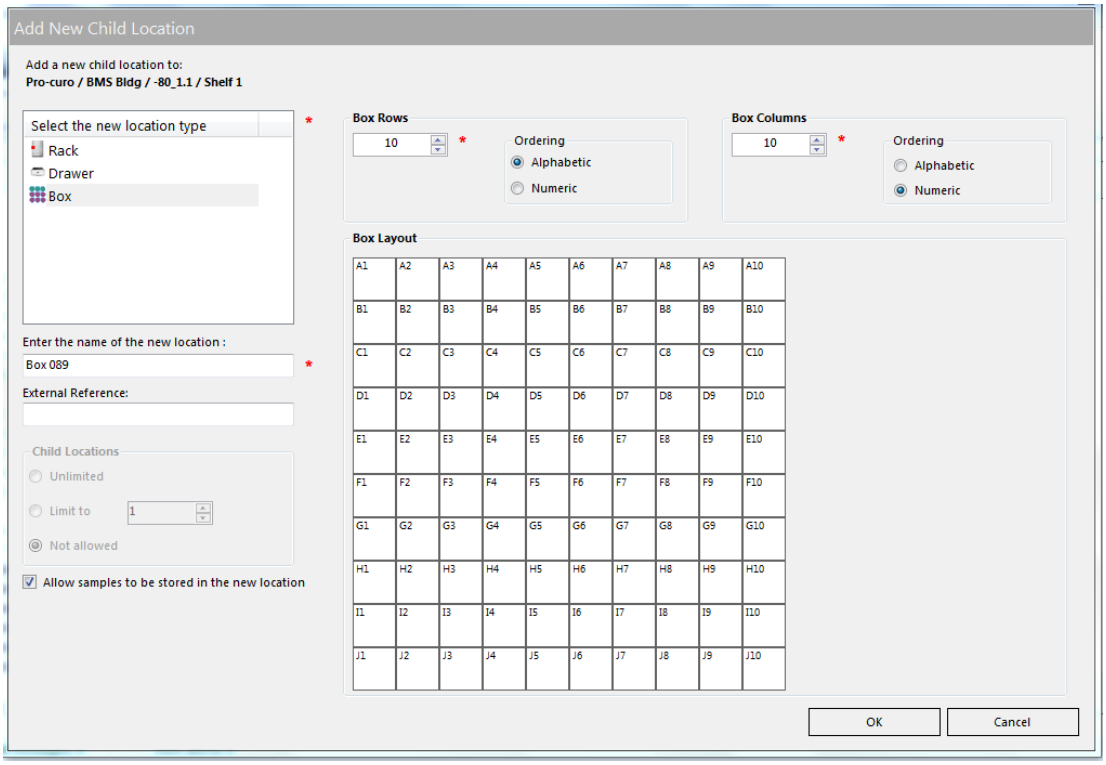


Before individual or groups of samples can be stored within a container, such as a box, the location hierarchy first needs to be created. The location hierarchy is usually set-up and edited by the administrator although this function can also be granted to one or more users.



The locations hierarchy can be a combination of buildings, rooms, freezers, LN2 Dewars, shelves, racks, draws, canisters, and finally containers, such as boxes, plates or straws. You do not need to always have the full hierarchy of locations, for example you can have a building with a freezer and then boxes. To set up the location hierarchy, or add a new child location to an existing location, click the 'STORAGE' tab then click on and highlight the location you wish to add a new child location to (when you first set up the location hierarchy this will be the root WormFlow location) and then click the 'Add child' icon in the ribbon above. You will then be shown a list of locations in a pop-up dialog box, click on your chosen location type and name the location something relevant to your institute, for example a room and a freezer could be called, respectively, 'Lab 1.1' and '-80 F001'. At the bottom of the box is a checkbox titled 'Allow samples to be stored in the new location'. Check this if the location chosen is a container, such as a box, plate or straw, in which samples can be stored.

Once you select and name a final storage container, such as a box or straw, you then set out the layout of that particular container. WormFlow allows maximum flexibility here the only caveat being that the container has to be square or rectangular. Individual container locations can be identified numerically, alphabetically or alphanumerically. In the screen shot a 10 x 10 box has been created, named Box 089 and the sample locations identified alphanumerically. Note that the 'Allow samples to be stored in the new location' check box is checked to allow samples to be stored.

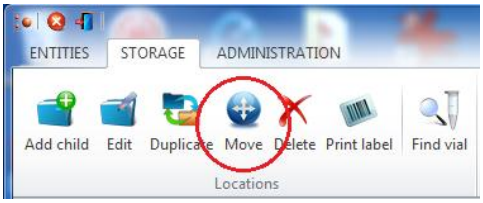


Duplicate location

The duplicate option will allow you to copy freezers, shelves, racks, boxes, etc enabling you to quickly and efficiently build the location hierarchy. Open the STORAGE tab, click on the location you wish to duplicate and either right-click for the quick access locations menu or click on the Duplicate icon and then add the new location name in the pop-up window and save. This duplication function is particularly helpful when you have a freezer that has been organised with a standard layout, for example if your freezer has five shelves, with four racks, four draws and five boxes, you only need to create the freezer, shelf one, rack one, draw one and fives boxes, then you can duplicate the draw location four times (each draw will be created with five boxes), then duplicate the rack four times and duplicate the shelf five times, if needed you can then rename sections of the freezer structure.

Note: If you duplicate locations that already contain samples, these samples will NOT be duplicated only the location structure will be affected.

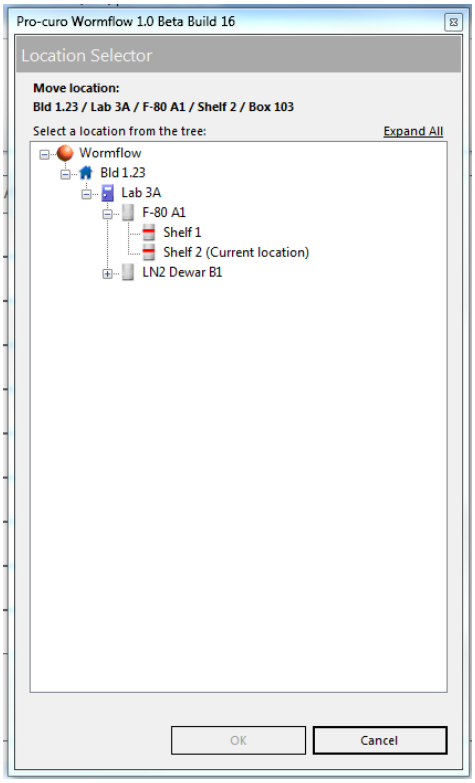
Move location



Any location you have created can be moved, however it is not possible to move locations outside of the given hierarchy, for example you cannot move a room location to under a freezer location, but you can move a box location to be under a building location.

To move a location first open the STORAGE tab then click on the location you wish to move and either click on the Move icon or right-click for the quick access locations menu. When you click a location list will pop-up allowing you to highlight the new position for your selected location.

Note: if samples exist within the location you're moving, all sample history records will be updated to reflect the change in the location.



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Edit (rename) location

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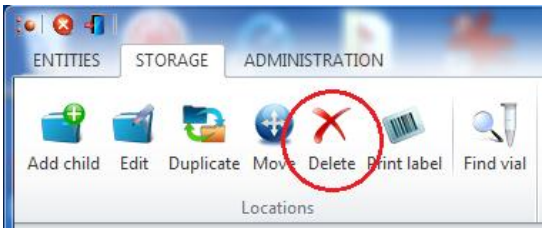
To rename a location first move your mouse to the 'Location Tree' panel, click on the location you wish to rename and either click on the Edit icon or right-click for the quick access locations menu. You then rename the location in the pop-up window.

Note: if samples exist within the location you're renaming, all sample history records will be updated to reflect the change in the location name.

Delete location

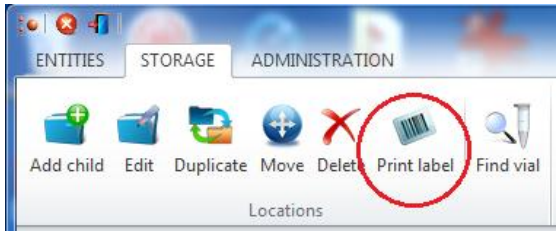


Any location you have created can be deleted unless it has sub-locations or contains samples that will first need to be deleted and/or disposed of.

Note: A location may appear to be empty if you are not approved to have access to all available projects.

To delete a location first open the STORAGE tab then click on the location you wish to delete and either click on the Delete icon or right-click for the quick access locations menu.

Print location label



WormFlow will allow you to print location labels to stick on containers, etc. These labels are designed in the 'Label Designer' and can contain barcodes representing specified field data.

To print a location label first move your mouse to the locations panel, click on the location for which you want to print a label, then either click on the 'Print label' icon within the 'Storage' ribbon or right-click for the quick access locations menu. When you click on the 'Print label 'icon you will be presented with the 'Select Label' dialog box, here you need to select the printer, the number of labels required and the label template.

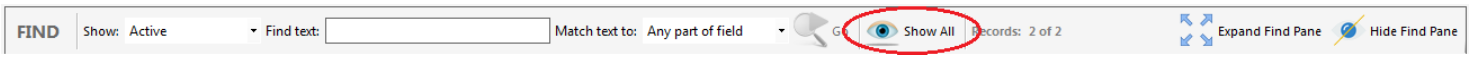
Entities

Working with and filtering entity records

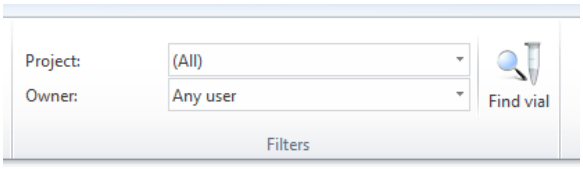
Entity records are viewed by clicking the ENTITIES tab and the appropriate icon in the ribbon below.

Note: the 'Glycerol stock' entity lacks a tab as these records are viewed within the related 'Vector', 'Plasmid' or 'Bacteria' entity record.

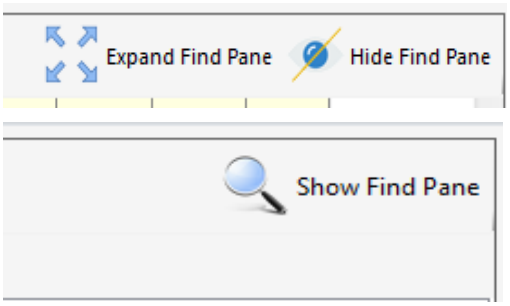
The layout for each entity is structured in the same way and comprises, in an upper FIND pane, a list view of entity records. After an individual record in the list is chosen, by clicking the left hand 'Name' column, an additional detail view of that record is shown in a lower pane. By default, after first logging in and clicking an entity no records are visible. To view the records click the 'Show All' icon in the menu bar of the FIND pane.



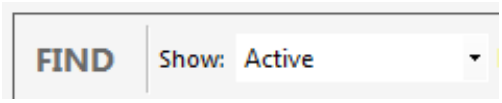
To filter records by project and/or owner click the 'Project:' and/or 'Owner:' drop-downs, located in the entities ribbon bar, and choose the appropriate filter(s) from the list. By default, after first logging in the filters are set, respectively, to '(All)' and '(Any)'.



The FIND pane can be expanded or hidden using the 'Expand Find Pane' and 'Hide Find Pane' buttons in the menu bar of the FIND pane. If a detail record pane is open when the FIND pane is expanded or hidden the detail pane will, respectively, be hidden or expanded. In the latter case the Find pane with the record list can be retrieved by clicking the 'Show Find Pane' button in the menu bar of the detail view pane.

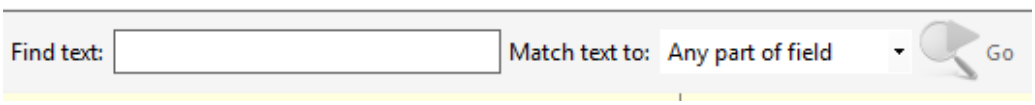


The FIND pane records can also be filtered to see either 'Active' or 'Disposed' records via the 'Show:' drop-down list in the menu bar of the FIND pane.



Performing a find

Records can also be searched for via the 'Find text:' field in the menu bar of the FIND pane. Finds can be performed with text strings that match either any part of a field, the default, or a whole field. After entering the search string and selecting from the 'Match text to:' drop-down the search is done by clicking the 'Go' button. After a search clicking 'Show All' will reveal all records.

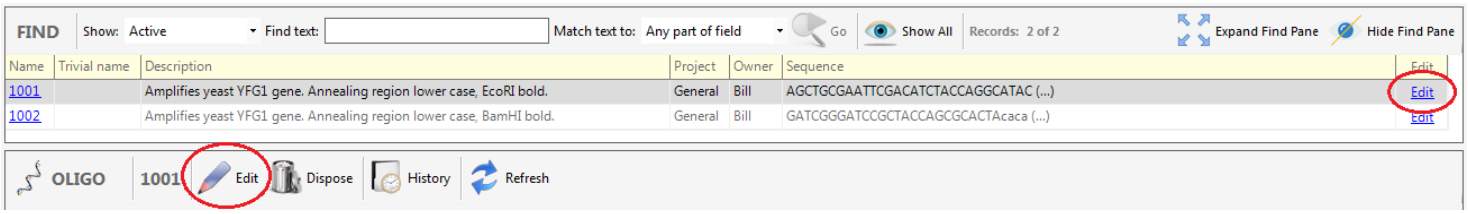


Detail view pane: viewing and editing individual records

For all entities the details for an individual record are viewed by clicking the blue, underlined 'Name' of the record in the leftmost column of the entity record row in the FIND pane. This opens a lower pane containing detailed information on the selected record and reduces the height of the upper FIND pane. The relative heights of the panes can be changed via the double-headed arrow that appears when the mouse is moved over the horizontal divider. Alternatively, clicking the 'Hide Find Pane' button will close the upper FIND pane and expand the detail pane.

For all entities the detail pane ribbon contains the same set of 'Edit', 'Dispose', History' and 'Refresh' functions.

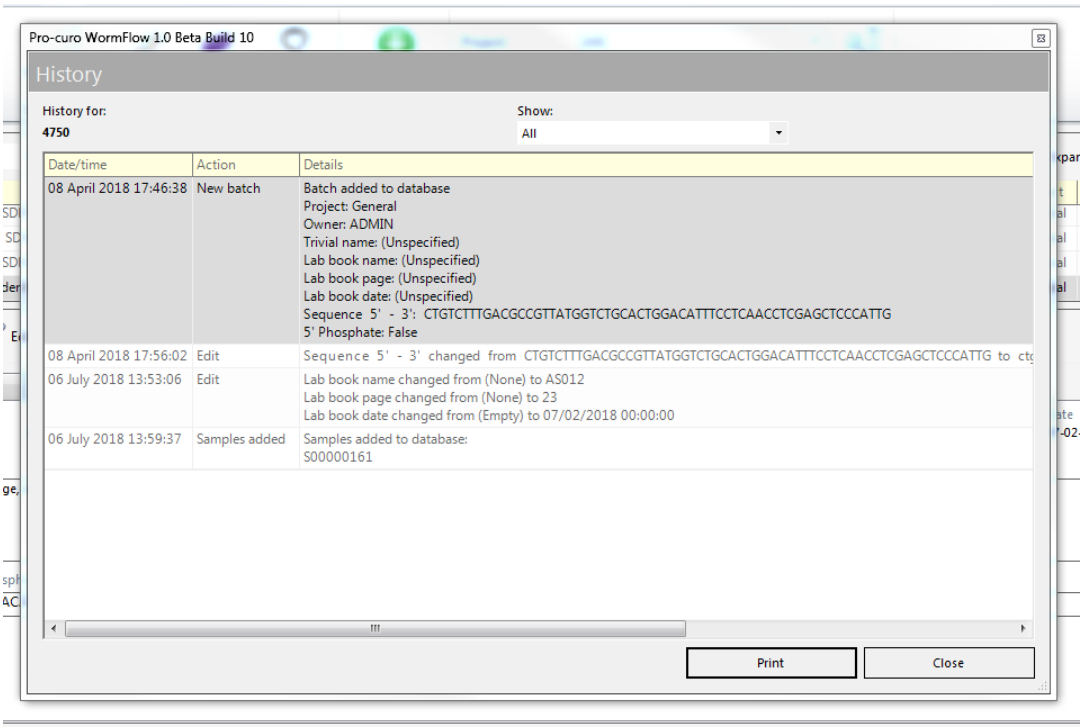
Edit record



An entity record is edited via a pop-up window that is opened by clicking either the 'Edit' icon in the detail pane ribbon or the blue, underlined 'Edit' in the rightmost column of the entity record row in the FIND pane. In the example below Oligo 4750 can be edited by clicking one of the indicated icons and then editing details in the pop-up 'Edit Oligo' window. You will be prompted to save any changes made.

Dispose record

An entity record can be disposed of by clicking the 'Dispose' icon in the detail pane ribbon. If the record has one or more dependencies then a 'Dispose Check' box will open warning the user that the record cannot be disposed of.



Record history

All edits to an entity record are captured and preserved in an audit chain and can be viewed in a pop-up window by clicking the 'History' icon in the detail pane ribbon. The edit history can be filtered via a drop-down list (defaults to All) and can also be printed.

Record refresh

Occasionally a refresh may be required when changes or updates are made to a record. Click the 'Refresh' icon in the detail pane ribbon to perform such a refresh.

Records

Adding records

A new entity record is added to WormFlow by clicking the 'Add New' icon and entering data in the pop-up window. First, an associated project associated with the new record is chosen from the drop-down list. A name for the entity record is then entered into the 'Name' field. For any specific entity it is good practice that the style of this name follows an agreed format. For example, for oligos a simple increasing serial number should be sufficient, vectors will commonly have an accepted name and plasmids are often prefixed with a lower case p followed by the constructor's initials and a serial number. Where a user has their own style for naming an entity this name for the new record can be entered in the 'Trivial Name' field. By default a 'None' populates the 'Trivial Name' field. A description of the record can be entered into the 'Description' field. Again a 'None' populates this field if no description is entered.

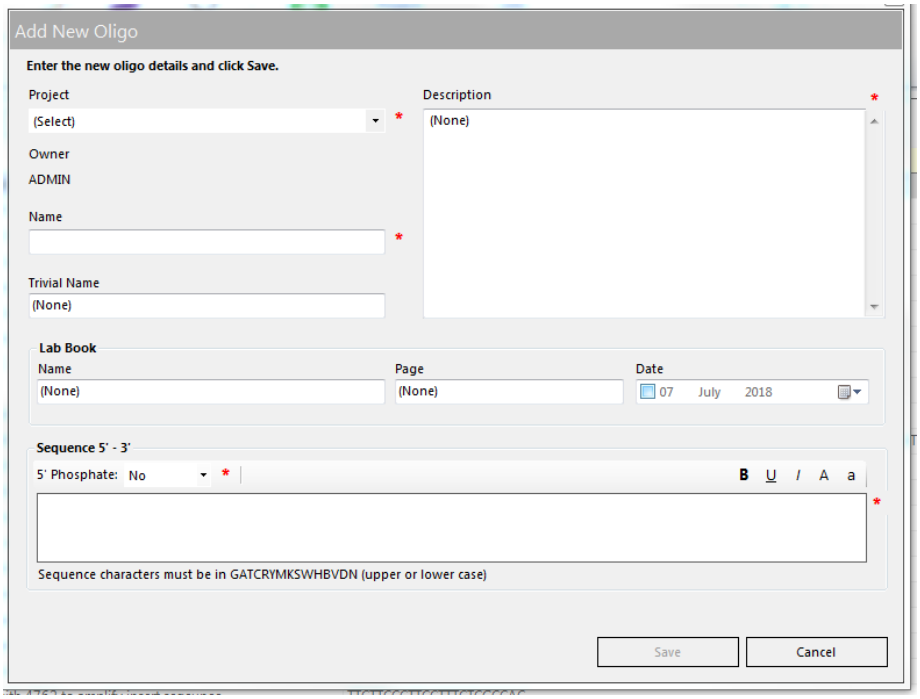
Information on whether data on the record being entered is also present in the user's lab book can be entered into the 'Lab Book', 'Page' and 'Date' fields.

Further entity-specific data are entered into additional fields located below the above fields (see below).

When all data has been entered commit the record by clicking 'Save'. A red asterisk indicates a required field.

Oligonucleotide (oligo)

First enter data to fields common to all entities as described above under 'Adding Records'.

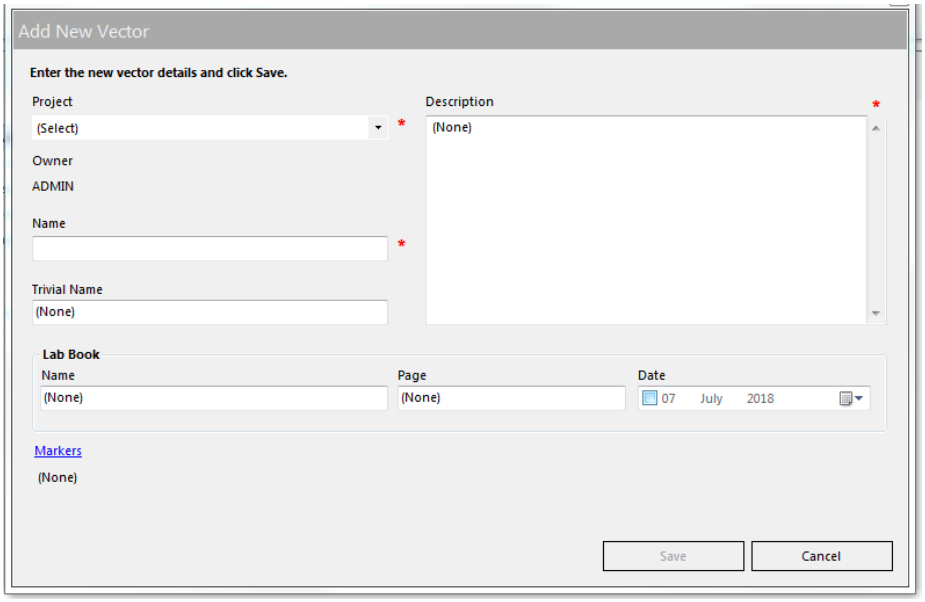


The oligo sequence, in the 5'-3' direction, is entered, often by copying and pasting, into the 'Sequence 5'-3'' field. IUPAC DNA letter codes in upper or lower case are accepted. If the sequence contains a 5' phosphate select 'Yes' in the drop-down. In addition to upper and lower case letters the sequence can be further annotated to illustrate significant features, such as restriction enzyme sites, mismatching bases, template-annealing region, etc. To do this select the sequence and then click one of the text formatting icons.

When all required fields have been populated close the window by clicking the 'Save' button.

Vector

First enter data to fields common to all entities as described above under ‘Adding Records’.

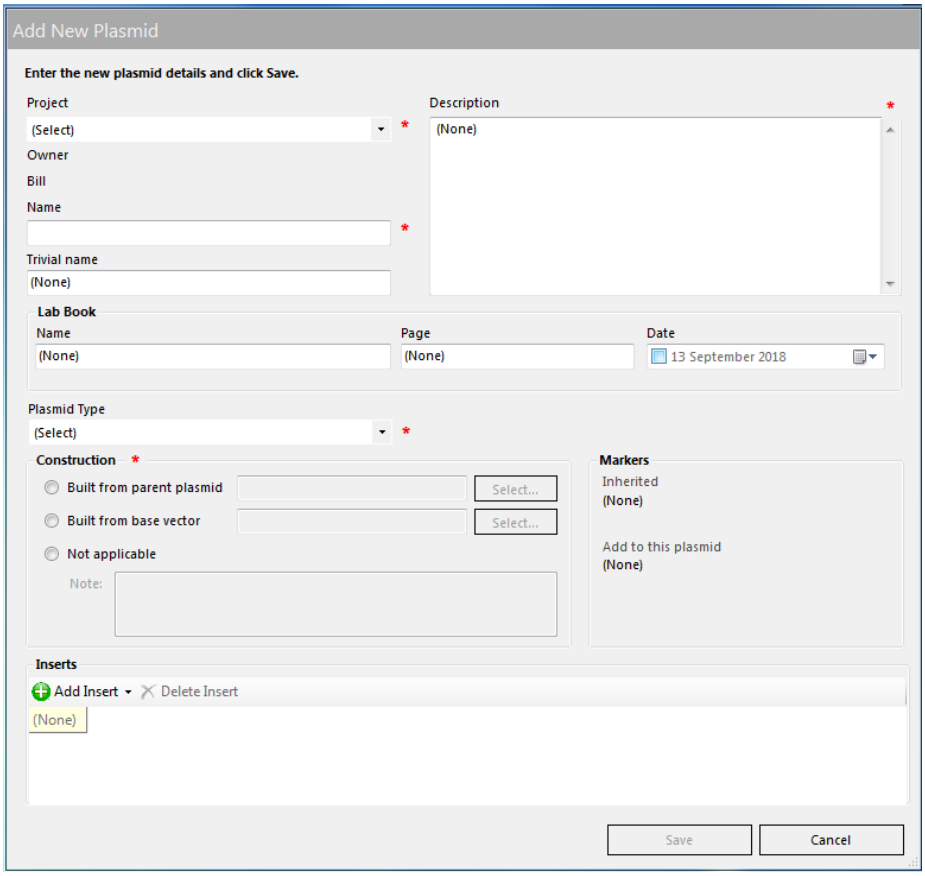


Add antibiotic resistance marker genes present in the vector by clicking the blue, underlined ‘Markers’ link that will open a pop-up ‘Marker Selector’ window displaying a list of available markers and check boxes. Check the boxes next to the markers present in the vector and click OK. The administrator can modify this list of markers (see ‘Administration: Lookup Data’).

When all required fields have been populated close the window by clicking the ‘Save’ button.

Plasmid

First enter data to fields common to all entities as described above under ‘Adding Records’.



From the drop-down ‘Plasmid Type’ field choose a type to describe the construct, e.g. plasmid, fosmid, BAC, etc. The administrator can modify this list of types (see ‘Administration: Lookup Data’).

The plasmid ‘Construction’ field has three checkbox options:

- Built from Parent Plasmid
- Built from Base Vector
- Not applicable

If you choose 'Built from Parent Plasmid’ or ‘Built from Base Vector’ click the appropriate ‘Select’ button, select the parent plasmid or base vector in the pop-up selection window and click OK. If the record for the parent plasmid or base vector is not present you will need to cancel the selection and enter the parent plasmid or base vector record into WormFlow. However, if you can’t add the parent plasmid or base vector record, perhaps because you have insufficient information on it, check the “Not applicable’ checkbox and, if appropriate, add some text to the ‘Note:’ field to describe the construction, source, etc, of the new plasmid record.

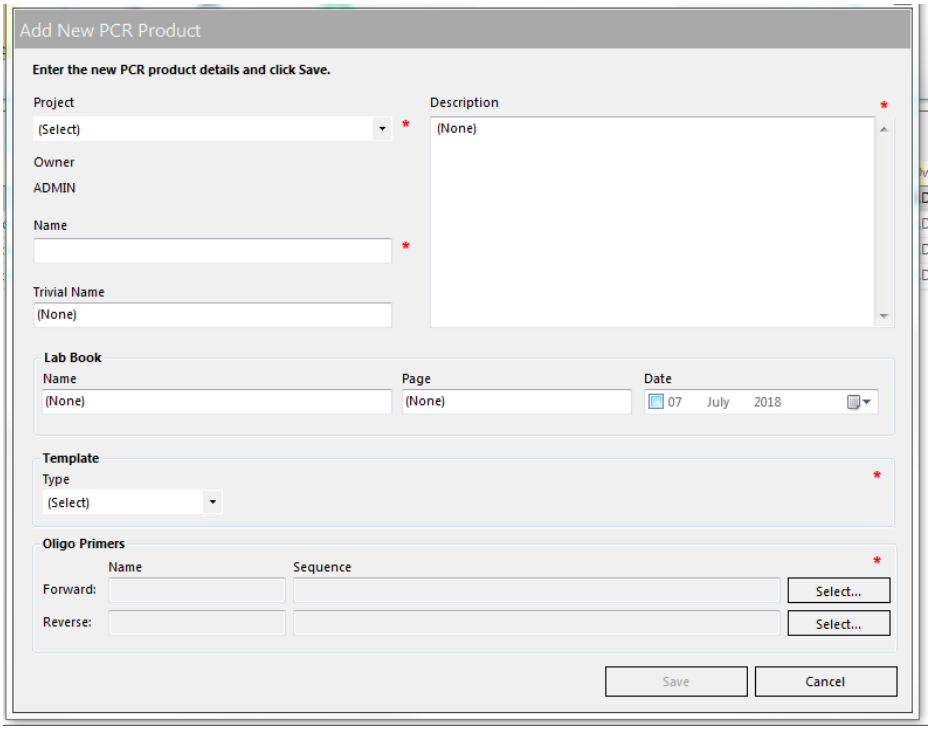
When you choose a parent plasmid or base vector the marker(s) present in the DNA backbone will appear under the 'Inherited' subsection of the 'Markers' field. Clicking on the 'Inherited' link brings up a 'Marker Selector' pop-up window where, if required, the inherited marker(s) can be removed by deselecting the appropriate checkbox. Similarly, additional markers can be added to the new plasmid record by clicking on the 'Add to this plasmid' link and selecting appropriate checkboxes in the 'Marker Selector' pop-up window. In this way you build up the correct markers for the construct being added.

To add one or more inserts to the new record click the 'Add Insert' button, and select one of 'Oligo', 'Vector', 'PCR', 'Plasmid' or 'Other' from the drop-down list. Choosing anything apart from 'Other' will bring up a selection window where the source molecule of the insert is selected by clicking on the record row and clicking OK. Any number of inserts can be added although a source molecule, e.g. a plasmid record, can only be chosen once. Details of the insert(s) sequence, etc can be included in the plasmid description. If the record for the insert source molecule is not present you will need to cancel and enter the relevant record into WormFlow or, if you cannot enter a record for the source, you can choose 'Other' and add a description as appropriate in the 'Add Insert - Other Description' pop-up window.

When all required fields have been populated close the window by clicking the 'Save' button.

PCR product

First enter data to fields common to all entities as described above under 'Adding Records'.



To select the template used in the PCR click the arrow next to the 'Template' field and select one of 'Vector', 'Plasmid', 'PCR Product', 'DNA' or 'Other' from the drop-down list. If you have chosen a template apart than 'Other' click on the 'Select' button, choose the template record from the selection window and click OK.

If the template source record is not in the selection window list you will need to cancel the selection and enter the source record into WormFlow via the respective 'Add New' button on the appropriate entity page. However, if you can't add the record, perhaps because you have insufficient information on it, select 'Other' from the drop-down template type list and enter the name of the template source in the 'Type Name' field. Add additional information on the template in the description field for the PCR product as appropriate.

Choose the "Forward' and 'Reverse' oligo primers from the lists in the respective selection windows opened by clicking on the 'Select' buttons.

When all required fields have been populated close the window by clicking the 'Save' button.

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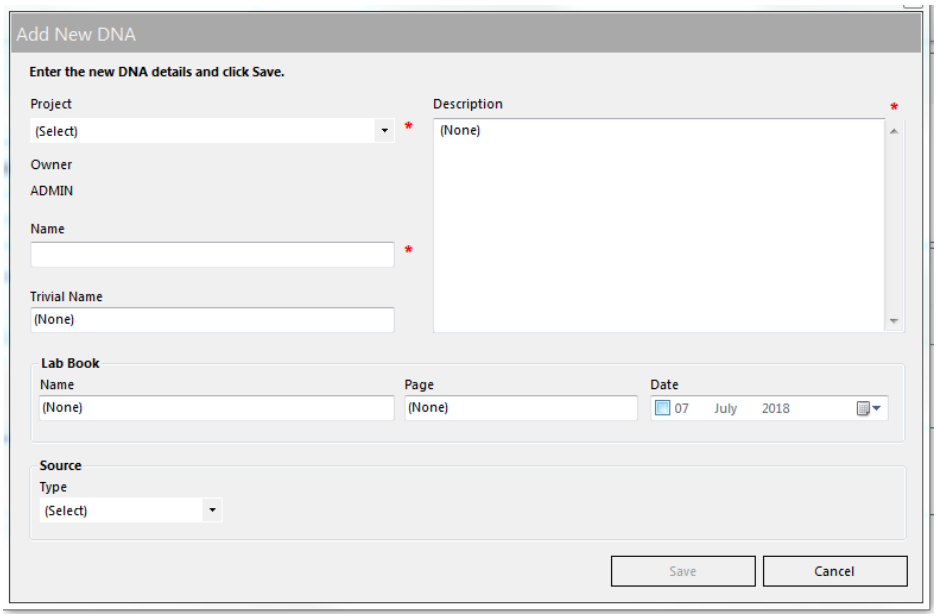
DNA

First enter data to fields common to all entities as described above under 'Adding Records'.



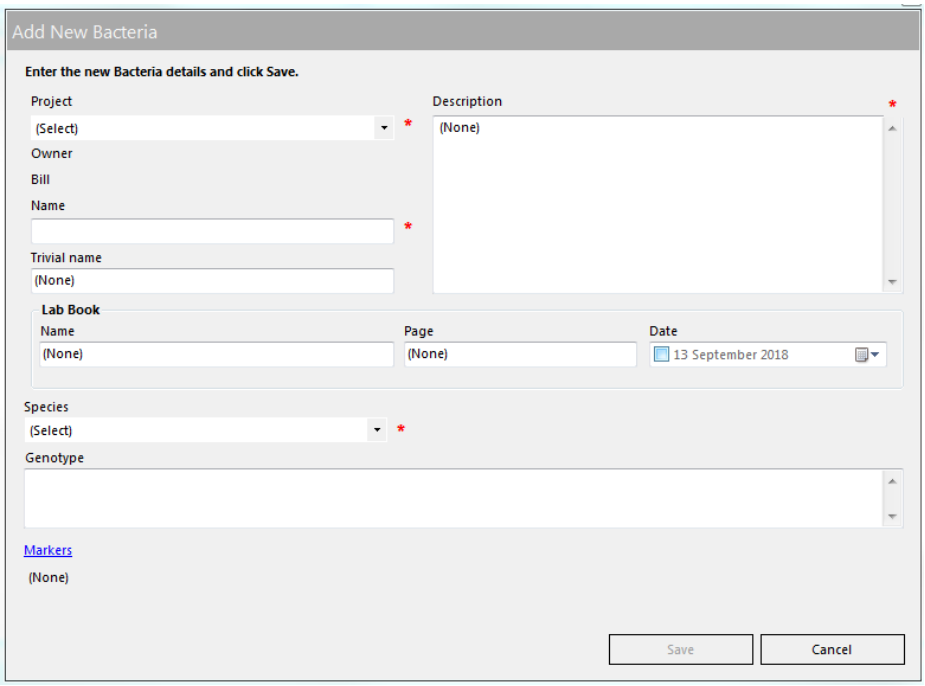
To select the type for the source of genomic DNA click the arrow in the 'Source' field and select one of 'Bacteria', 'Worm' or 'Other' from the drop-down list. If the source of the genomic DNA is not listed the administrator can add it to the drop-down list (see 'Administration: Lookup Data').

If you have chosen 'Bacteria' or 'Worm' then click the 'Select' button and choose the appropriate record from the pop-up selection window. If the 'Bacteria' or 'Worm' record for the genomic DNA source is not in the selection list you will need to cancel and enter the source record into WormFlow via the 'Add New' button on the appropriate 'Bacteria' or 'Worm' entity page. However, if you cannot add the record, perhaps because you have insufficient information on it, select 'Other' from the drop-down template type list, add the name of the genomic DNA source in the 'Type Name' field and add additional information in the description field for the genomic DNA.

When all required fields have been populated close the window by clicking the 'Save' button.

Bacteria

First enter data to fields common to all entities as described above under 'Adding Records'.



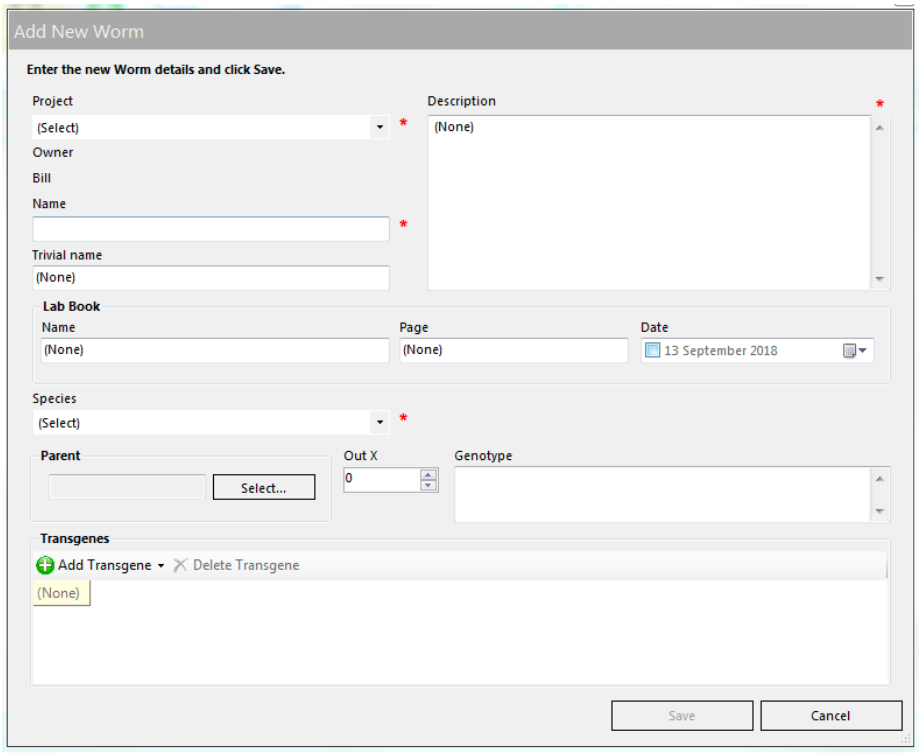
From the drop-down 'Species' field choose the species. The administrator can modify this list (see 'Administration: Lookup Data'). Type or copy/paste the genotype in the 'Genotype' field if known.

Add any antibiotic resistance markers present in the bacteria, if any, by clicking the 'Markers' link and select the box(es) next to the relevant marker(s) and click OK. The administrator can modify this list of markers (see 'Administration: Lookup Data').

When all required fields have been populated close the window by clicking the 'Save' button.

Worm

First enter data to fields common to all entities as described above under ‘Adding Records’.



From the drop-down ‘Species’ field choose the species. The administrator can modify this list (see ‘Administration: Lookup Data’).

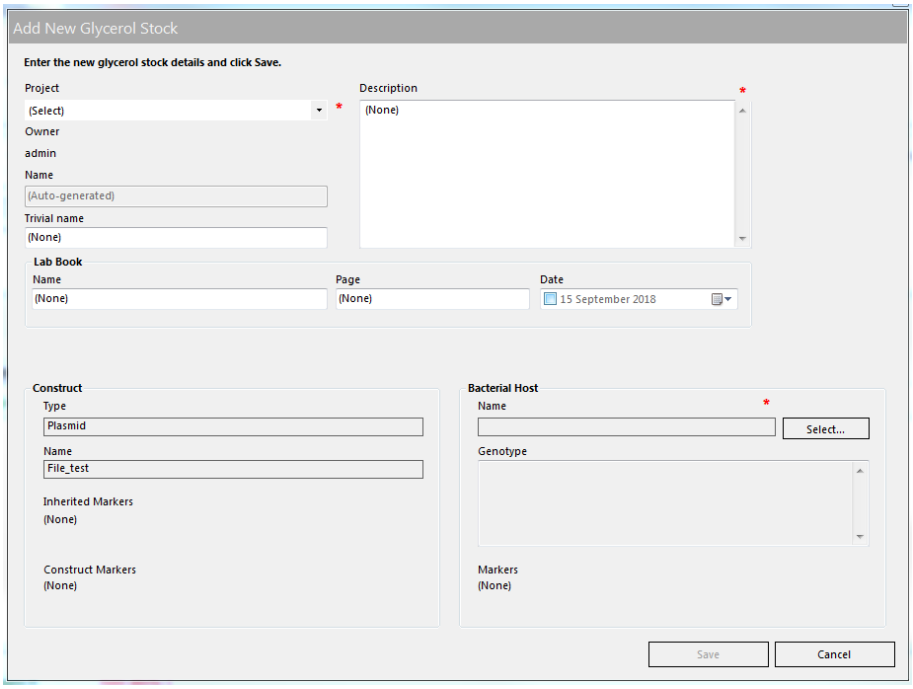
If the worm record being added has a parent strain click the ‘Select’ button, choose the appropriate strain from the pop-up ‘Select Parent Strain’ window and click ‘OK’. If the record for the parent is not in the selection list you will need to cancel the selection and enter the parent record into WormFlow.

If the strain has been out-crossed set the number in the ‘Out X’ field. Type or copy/paste the genotype in the ‘Genotype’ field if known. If the strain has one or more transgenes, whether extra-chromosomal or integrated, then click the ‘Transgene’ drop-down, select whether the source molecule is a plasmid or PCR product, choose the appropriate record from the pop-up selection window and click OK. If the record for the transgene is not in the selection list you will need to cancel the selection and enter the record for the transgene source into WormFlow. If the record cannot be added or the transgene is neither plasmid nor PCR product you can choose ‘Other’ and add a description as appropriate in the ‘Add Transgene - Other Description’ pop-up window. Any number of transgenes can be added to a record.

When all required fields have been populated close the window by clicking the ‘Save’ button.

Glycerol stock

Glycerol stocks can be created for vector and plasmid records. To create a glycerol stock click the 'Glycerol Stocks' tab in the detail view pane, click the 'Add New' green button, choose 'Glycerol stock' for the drop-down list and enter data to fields common to all entities as described above under 'Adding Records'.



To add the bacterial host click the 'Select' button next to the 'Bacterial Host" field, choose the appropriate host from the pop-up 'Select Glycerol Stock Host' selection window and click 'OK'. If the record for the host is not in the selection list you will need to cancel the selection and enter the bacteria record into WormFlow. If the host strain for the glycerol stock is not known a new bacteria record, with name 'Unknown', could be generated and choosen.

Note: the antibiotic resistance markers for the construct and the chosen host are given at the bottom of the bottom of the selection window.

When all required fields have been populated close the window by clicking the 'Save' button.

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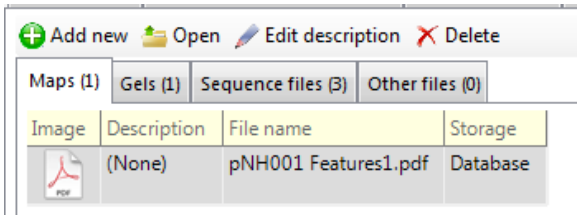
Files

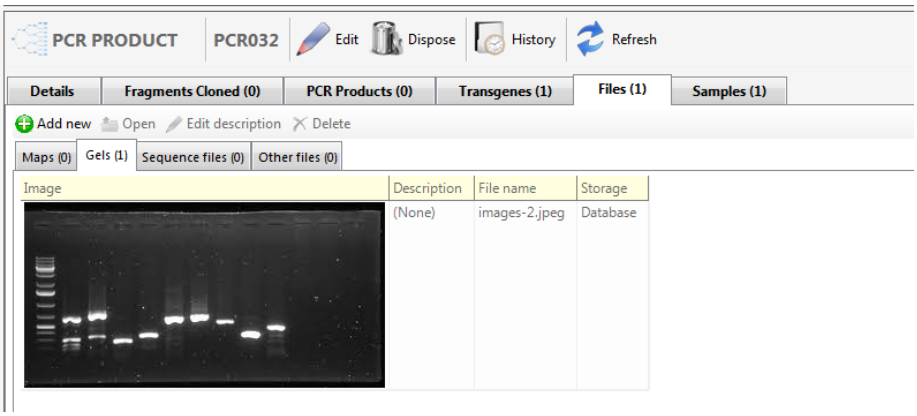
File storage and types



Files of various types can be attached to an individual entity record either stored in the database or as a file reference. Accepted file types include jpg, png, bmp, pdf, tif, pdf, doc(x), xls(x), txt and ab1 DNA sequence chromatogram files.

Adding a file to a record

All files are added to a record by first opening the detail view pane of the record and clicking the 'Files' tab. When the entity has additional sub-tabs for different file content, e.g. 'Maps', Gels', 'Sequence Files' and 'Other Files' as in a plasmid record, also click the appropriate sub-tab. To add a file click the 'Add new' button, click the 'Browse' button to find the file to be uploaded, choose the appropriate storage method by clicking one of the two radio buttons, add a description of the file in the 'Attachment description:' field and finally click 'Save'.



Viewing files

To view a file single-click the appropriate row to highlight the file and click the 'Open' button. This will open a stand-alone file viewer, such as PDF Viewer or Windows Photo Viewer for PDF or JPG graphic files, respectively. The free sequence chromatogram viewer Chromas (https://technelysium.com.au/wp/chromas/) can be used to open and view ab1 DNA sequence files.

Editing and deleting files

File descriptions can be edited in a pop-up window opened by highlighting the appropriate row and clicking the 'Edit description' button. Delete a file by highlighting the appropriate row, clicking the 'Delete' button and confirming in the pop-up "Delete Attachments' confirmation window.

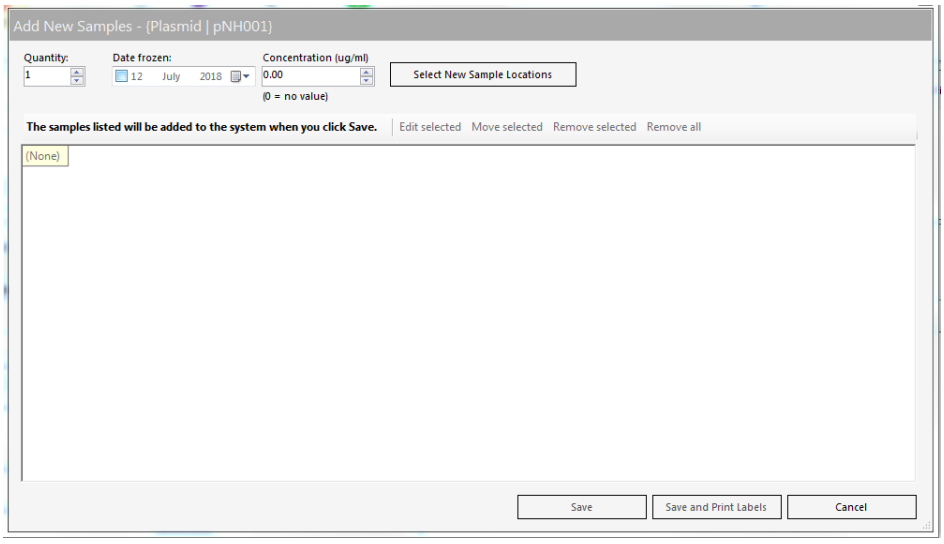
Samples

Working with samples

A sample is an aliquot of an entity record contained, typically, within either 0.5, 1.5 or 2.0ml microtubes or in a microtiter well and stored in a container, such as a box, LN2 straw or microtiter plate. Any number of samples of an individual entity record can be stored distributed in different containers in different LN2 dewar flasks, freezers, etc. Conversely, an individual record may have no physical sample(s) stored but is still entered in WormFlow for example, to allow, relational links to be created with other entity records.

Adding samples

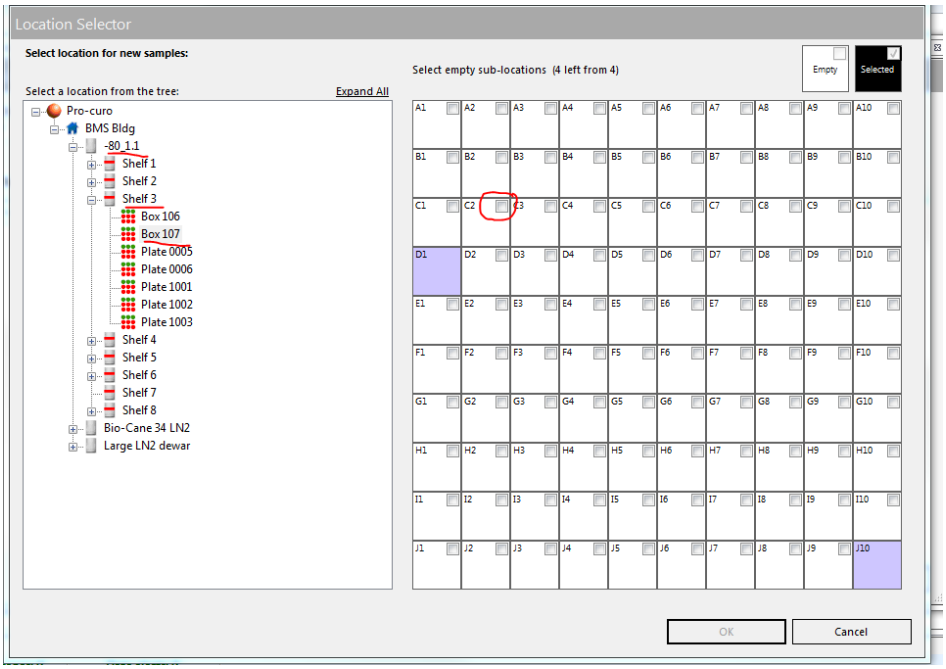
To add one or more samples to a record open the record in the detail view pane, click the 'Samples' tab and click the 'Add New' button to open the 'Add New Samples' pop-up window. Enter the number of samples, i.e. the number of tubes and/or microtiter plate wells, in the 'Quantity:' field. If all these samples are frozen at the same time select the appropriate date in the drop-down calendar 'Date frozen:' field and check the checkbox. If the samples were frozen on different dates leave the 'Date frozen:' field unchecked as the individual sample frozen dates can be entered later via the 'Edit' feature. Similarly, if the concentration of all the samples is the same enter the concentration in the 'Concentration' field. Again, do not enter a concentration if the samples have different concentrations as these values can be entered individually later.

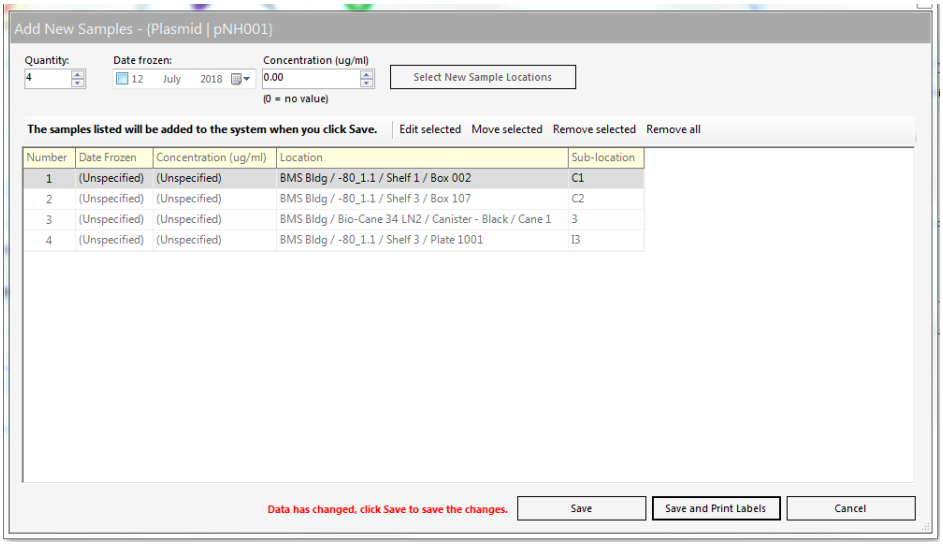


Click the 'Select New Sample Locations…' button to open the 'Location Selector' pop-up window. Selecting the appropriate storage container opens a graphical representation of the container. To select a location in the container check the checkbox in the upper right corner of the appropriate location. Continue checking these checkboxes to select locations in the same container for any further samples. If samples are to be stored in more than one container then the 'OK' button needs to be clicked after each container and the 'Select New Sample Locations…' button re-clicked to choose a new container.

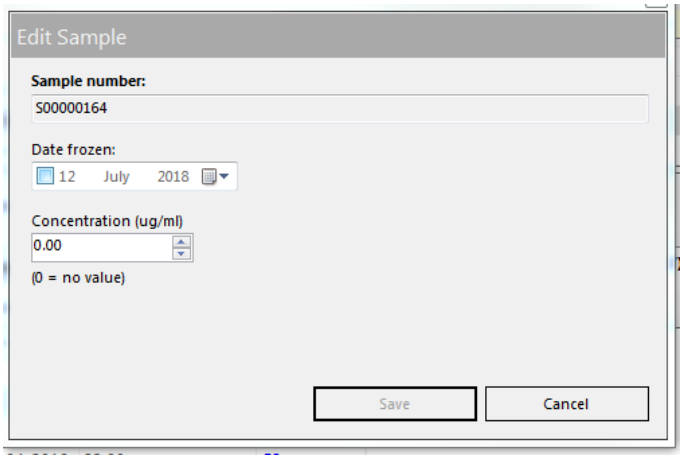
When all the samples have been assigned to one or more containers the 'Select empty sub-locations (x out of y`)' above the container graphic will indicate all samples have been assigned and the 'OK' button should be clicked.

Clicking 'OK' will bring up the original 'Add New Samples' pop-up window that now lists the samples and their respective locations. If the sample locations are correct either click 'Save' or 'Save and Print Labels' and click 'Yes' in the small 'Add New Samples' pop-up to commit the sample locations to WormFlow. Clicking 'Save and Print Labels' both commits the sample locations to WormFlow and opens the 'Print Sample Label – Sample' pop-up window in which labels, designed in the 'Label Designer' feature, can be printed.





Editing samples



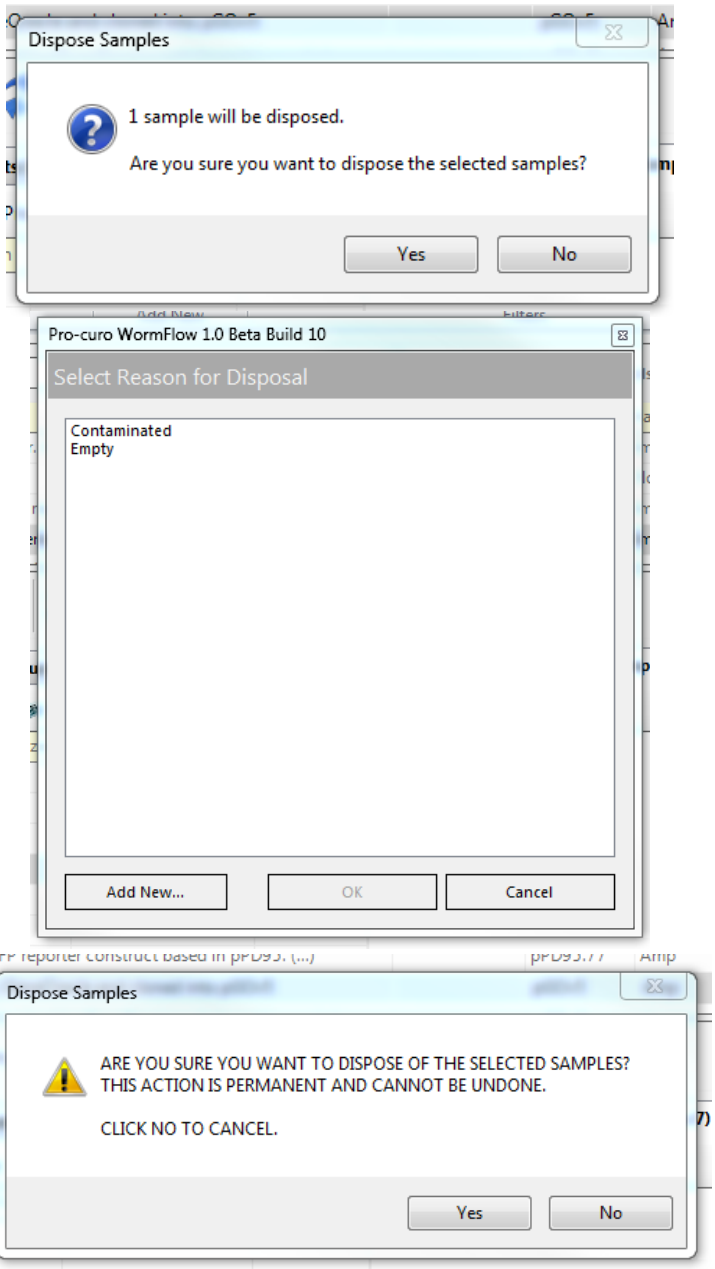
To edit a sample highlight the individual sample in the 'Samples' window and open the 'Edit Samples' window either by clicking the 'Edit' button in the samples ribbon or right-clicking the mouse button for the quick access menu. Edit the date frozen and/or concentration values as necessary and click 'Save'.

Moving samples

To move a sample highlight the individual sample in the 'Samples' window and open the 'Location Selector' window either by clicking the 'Move' button in the samples ribbon or right-clicking the mouse button for the quick access menu. Select the new location for the sample, click 'OK' and finally click 'Yes' in the 'Move Samples' confirmation pop-up.

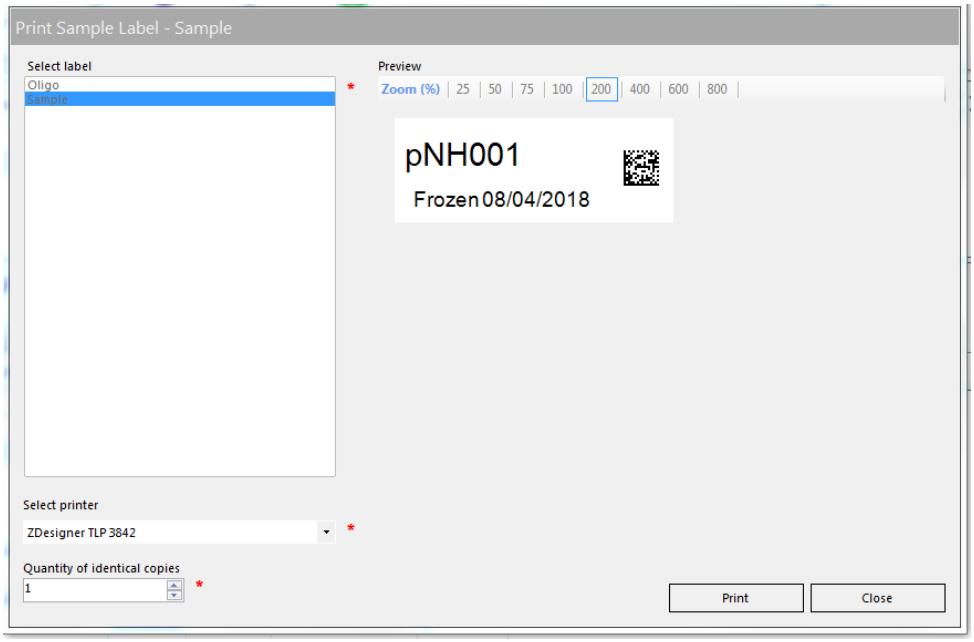
Disposing samples

To dispose of a sample highlight the individual sample in the 'Samples' window and open the 'Dispose Samples' confirmation window either by clicking the 'Dispose' button in the samples ribbon or right-clicking the mouse button for the quick access menu. Clicking 'Yes' in the 'Dispose Samples' pop-up confirmation window will bring up the 'Select Reason for Disposal' window. Choose the reason in the list for disposal, e.g., 'Sample empty', and click 'OK' or click the 'Add New…' button to add a new reason, choose this reason from the list and click 'OK'. Finally click 'Yes' in the 'Dispose Samples' confirmation window.

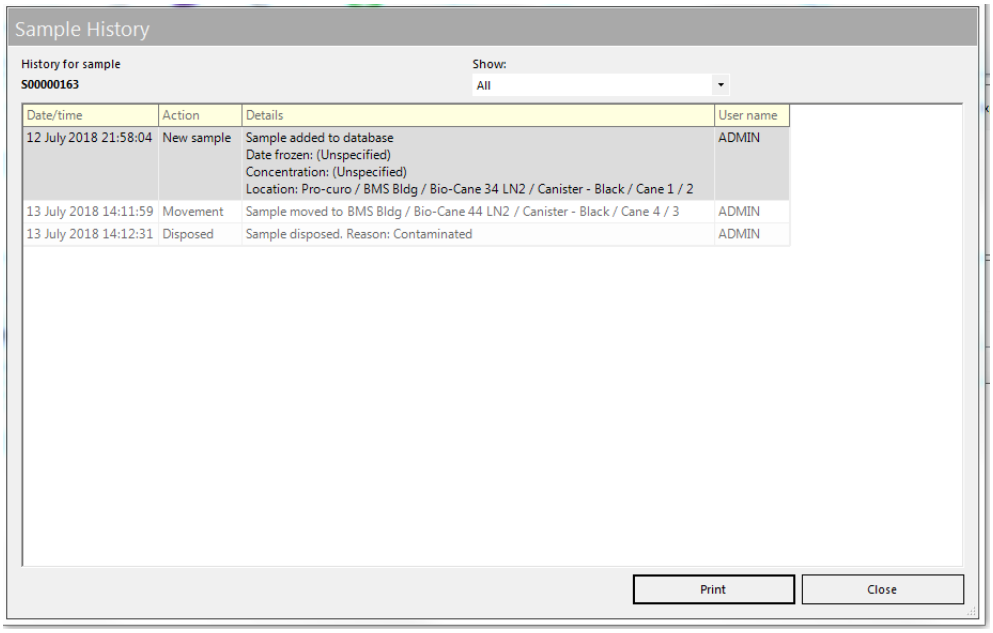


Print label

To print one or more labels to stick for a sample highlight the individual sample in the 'Samples' window and open the 'Print Sample Label – Sample' window either by clicking the 'Print label' button in the samples ribbon or right-clicking the mouse button for the quick access menu. Select the label type from the 'Select label' list, confirm the label is correct in the 'Preview' pane, set the required number of labels (defaults to one) in the 'Quantity of identical copies' field, select the printer in the 'Select printer' drop-down and click 'Print' or close the window.



Sample history

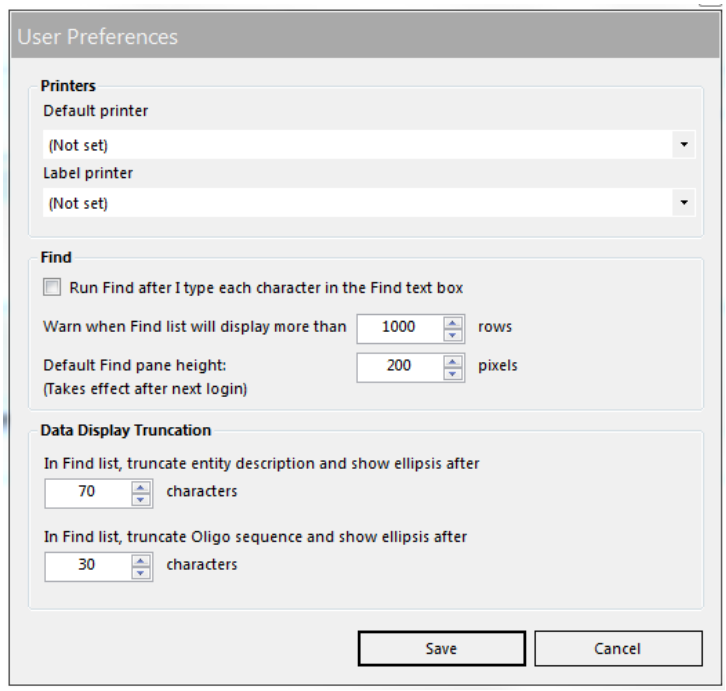


The creation, editing, for example changing the concentration, subsequent moves and final disposal of a sample is captured and preserved in an audit chain and can be viewed in a pop-up 'Sample History' window by either clicking the 'History' icon in the detail pane ribbon or right-clicking the mouse button for the quick access menu. The sample history can be filtered via a drop-down list (defaults to All) and can also be printed.

User settings

User settings

Along with system settings that apply to all users and all areas of WormFlow there is also a small set of 'look and feel' preferences controlled by each WormFlow user. To open the 'User Preferences' window click the 'ADMINISTRATION' tab and then click the 'User Preferences' icon.



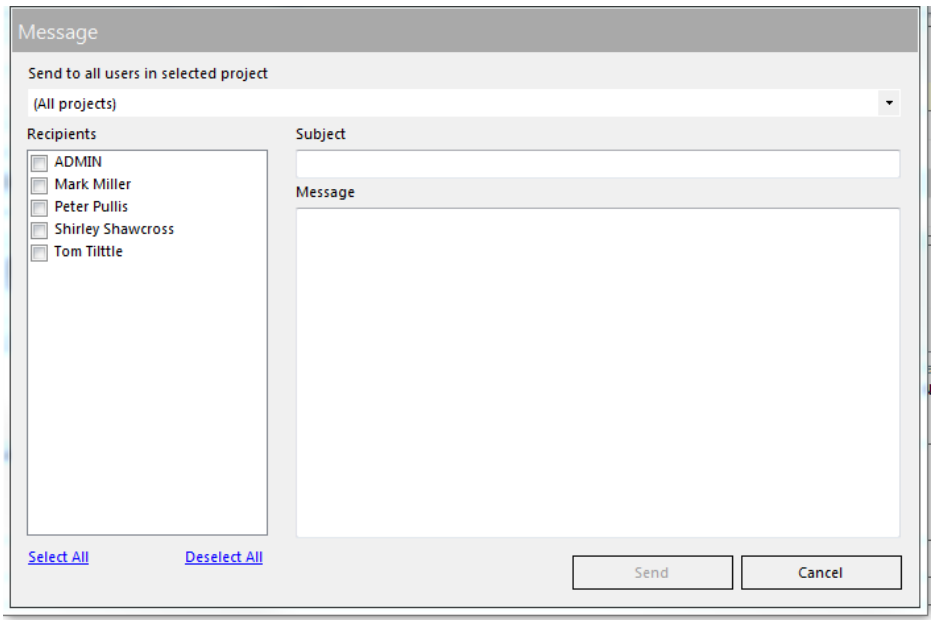
"Default printer" - select your default printer for history reports. The dropdown list will show all printers installed on the current workstation.

"Label printer" - select your default printer to print sample and location labels. The dropdown list will show all printers installed on the current workstation.

To enable dynamic "filter as you type" finds check the 'Run Find after I type each character in the Find text box' checkbox.

In the 'User Preferences' window you can also set a warning if the number of rows in the FIND pane is larger than the set number and set the default FIND pane height. Truncation lengths of entity record descriptions and Oligo record sequences are also set in this window.

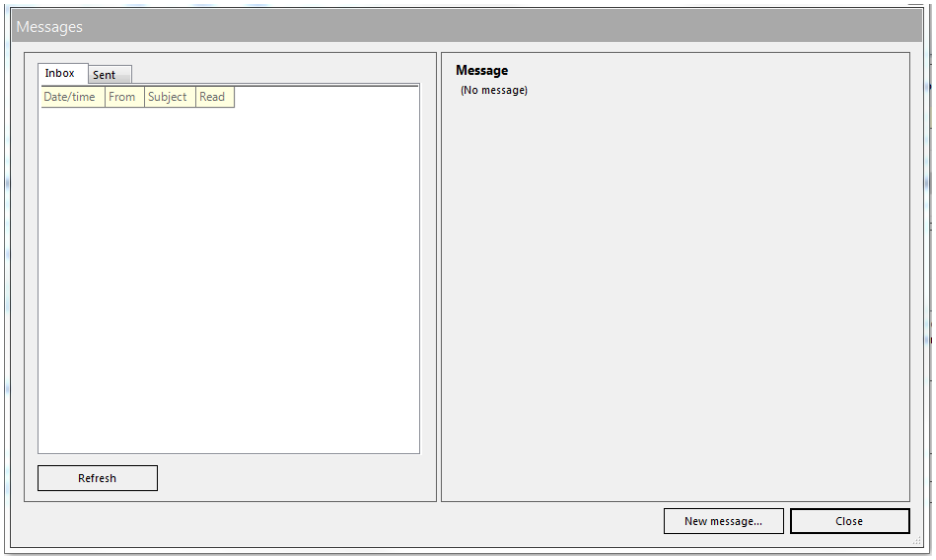
Messages



Internal messaging

Within WormFlow you have the ability to send messages from one WormFlow user to another. This function is useful if you want to leave your colleague(s) a message about an experiment and/or process that you have started but not finished. It can also be used to alert users that samples need to be reviewed and/or amendments to data need to be made. This function can also be used by administrators to advise users of updated access rights or approved project status.

To open the Messaging windows click the 'ADMINISTRATION' tab where you will see both the 'New message' and 'View messages' icons in the administration ribbon. To send a new message, click the 'New message' icon, check the box(es) against the user(s) you would like to send the message to, type your message and click 'Send'.



To work with your messages click the 'View messages' icon, you will be presented with the messages screen, here you can select your 'In Box' or 'Sent' messages tab, both will show you a list of messages in the list view below. To open a message, select the message from the list and click the open button. A new window will appear showing the sender's name, the date sent and the details of the message. To reply click the 'Reply…' button, type your message and click send. To delete a message select the message from the list and click the delete button.

When you first logon to WormFlow the 'Notification Bar' will show if you have messages. This is done by the text "Unread messages:x" turning red and the X will show the number of messages. Clicking the notification will take you to the 'View messages' window.

Help & Information

Help

Clicking the 'Help' icon opens a window with information on how to find the WormFlow manual, training videos and technical support.

About

Clicking the 'About' icon opens a window with information on the WormFlow build and version numbers and contact details.

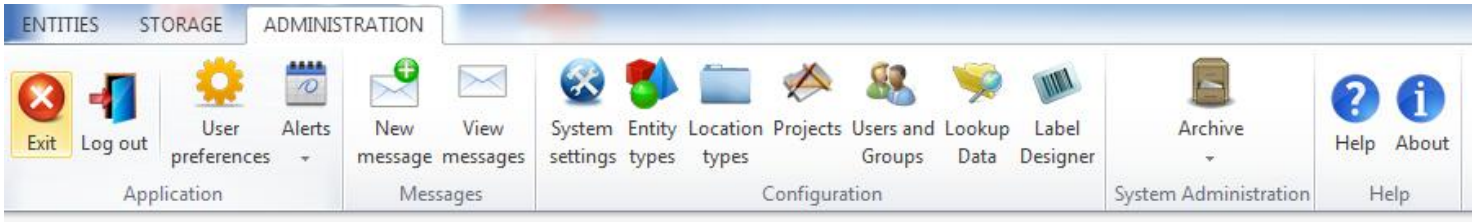
Administration

WormFlow has been designed to keep administration and configuration as simple as possible. Some configuration, as shown in the next section, will speed up sample data entry and improve the users overall experience of WormFlow.

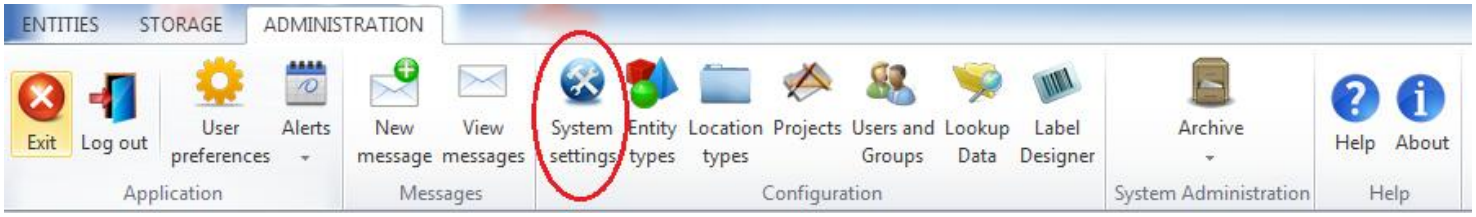
Although access to all the administrative features of WormFlow is restricted to the single overall systems administrator individual users, for example a senior user such as a PI or lab head, can also be assigned permissions to enable them to configure certain discrete aspects of the system. It is indicated below if permissions can be assigned to a user by the administrator.

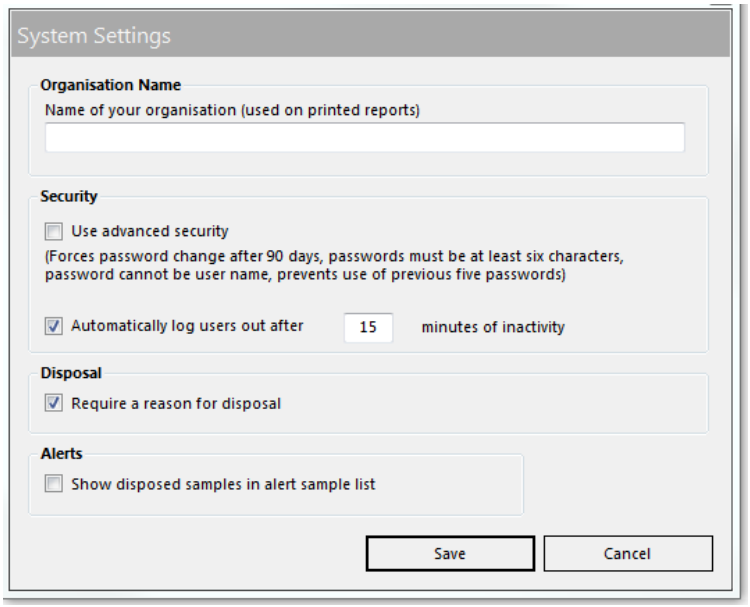
The administrator ribbon

The systems administrator sees the ribbon below when the 'ADMINISTRATION' tab is clicked. Depending on the permissions granted an individual user may see a subset of these icons in their 'ADMINISTRATION' ribbon.



System settings





WormFlow has a small number of system settings that can be turned on and off. These settings affect all users, projects and samples. To open the 'System Settings' window click the 'ADMINISTRATION' tab and click the 'System Settings' icon.

Security

If the 'Use advanced security' checkbox is checked user passwords will be forced to conform to strict security settings. Users can also be automatically logged off after a set number of minutes of inactivity via the 'Automatically log users after' checkbox and setting the length of inactivity.

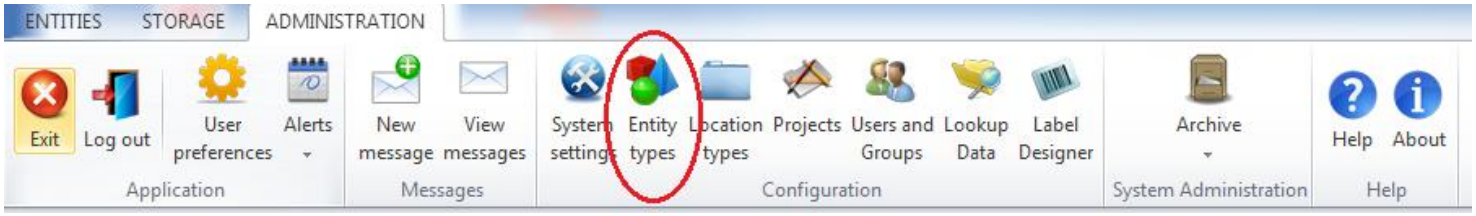
Disposal

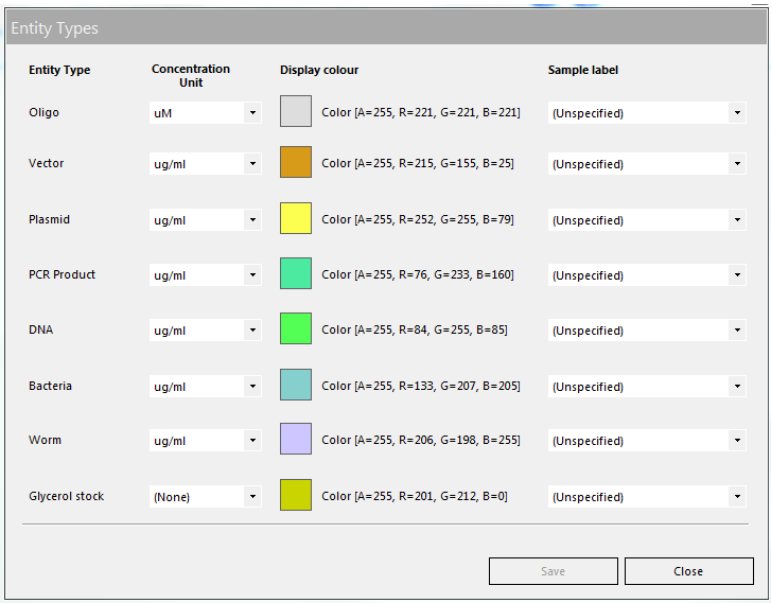
By selecting this checkbox users will need to enter a reason for disposing an entity or sample.

Alerts

Checking the checkbox enables disposed samples to be shown in the alert sample list.

Entity Types





For each WormFlow entity the administrator can modify three associated parameters. Managing entity types is usually limited to the administrator although this function can also be granted to one or more users.

Concentration Unit

A concentration unit appropriate for each entity can be set using the drop-down list. This unit will be used by all users and applied to all samples. Additional units can be added to this list via the 'Lookup Data' feature.

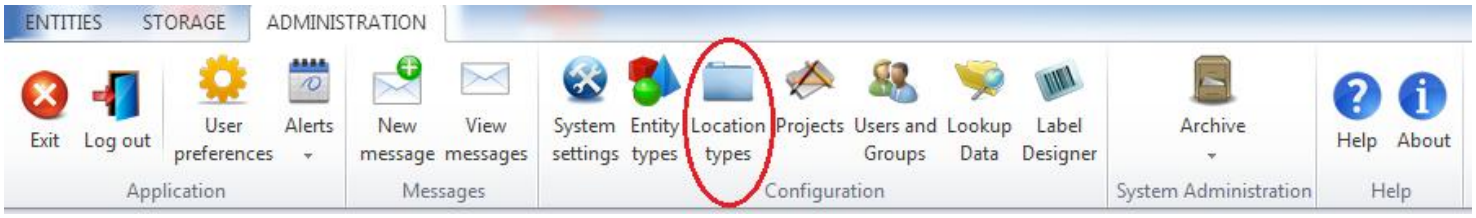
Display colour

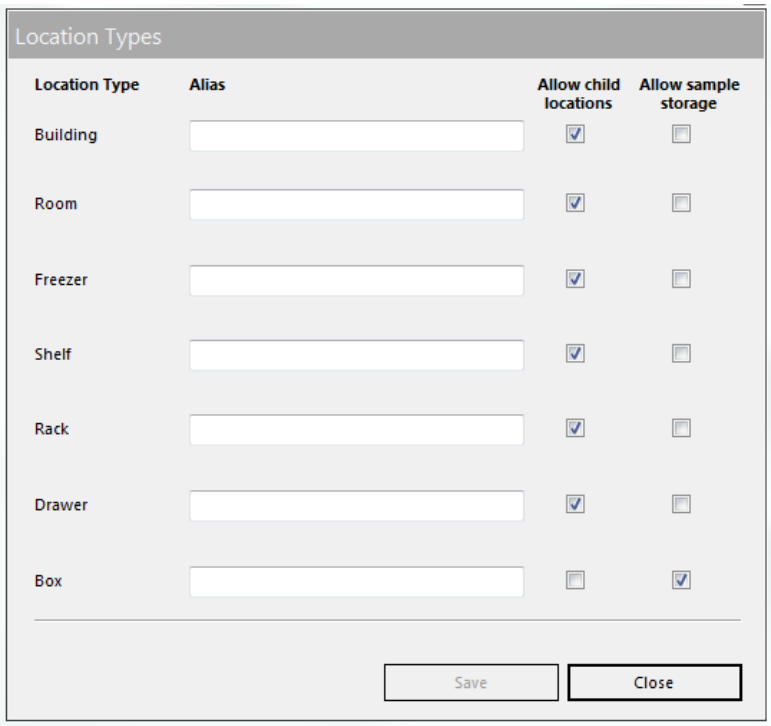
The colour associated with each entity can also be changed. These colours are used to indicate a filled location in a container. To change an entity colour click on the colour square and choose a new colour form the pop-up 'Colour' choose palette.

Sample label

The default sample label for an entity can be set using the drop-down list. When additional sample labels are designed and saved in the 'Label Designer' feature these are added to the list of available labels.

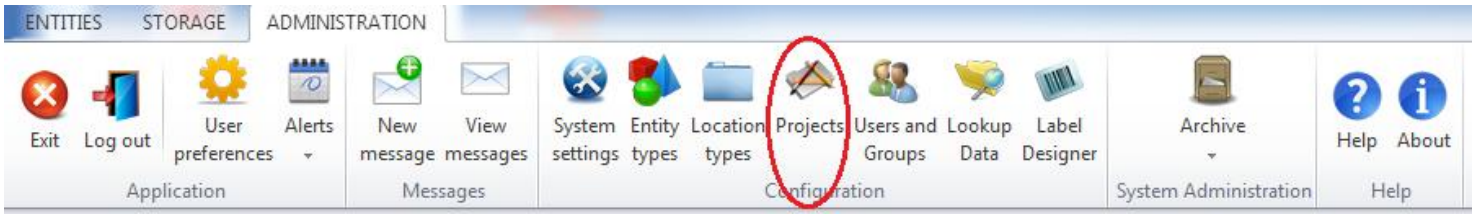
Location types





The systems administrator can change the default settings and types for any or all of the location hierarchy. For example it may be more appropriate to rename all 'racks' as 'sections'.

Projects

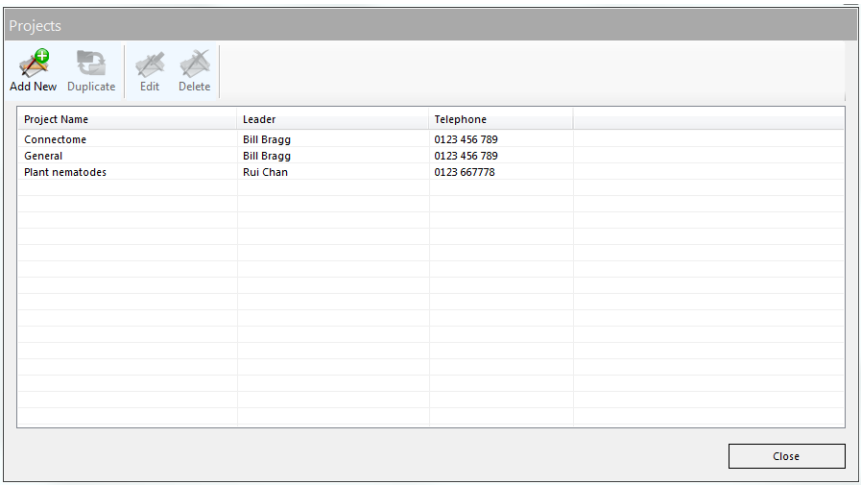


Projects are a vital component of WormFlow offering traceability and controlling how samples are created and used. A project may represent either a group of researchers, for example in the same lab, or perhaps members working on the same research project. You can use projects in whichever way your organisation needs them. For example although WormFlow may be made available to a number of researchers each project group may want to keep their sample

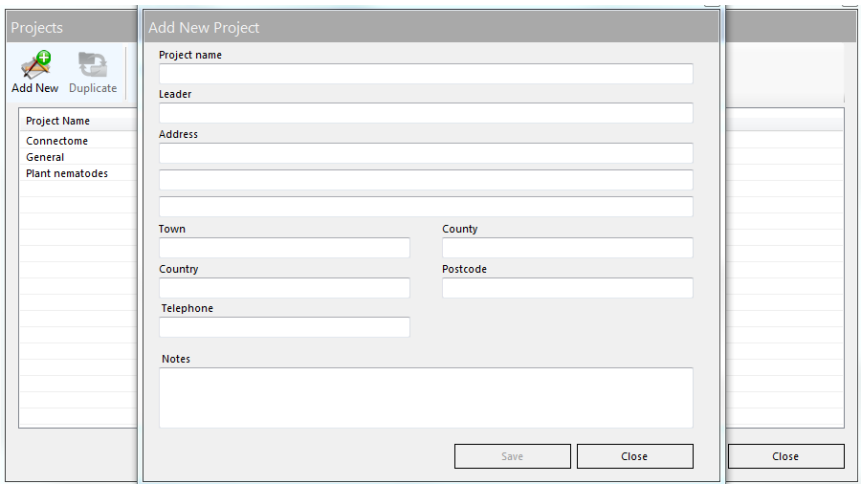
information separate from others. All samples in WormFlow are allocated to a project so at least one project needs to be added before you can add any samples.

Project creation is usually limited to the administrator although this function can also be granted to one or more users.

Adding projects



To add a new project, click the 'Projects' icon in the Configuration ribbon, click 'Add New' in the pop-up 'Projects' window, enter the relevant data into the fields of the pop-up 'Add New Project' window and click 'Save'. The new project will appear in the 'Projects' window list.



Duplicating projects

An existing project can be duplicated by clicking the 'Duplicate' icon in the Configuration ribbon, adding the relevant data into the fields of the pop-up 'Edit Project' window and clicking 'Save'.

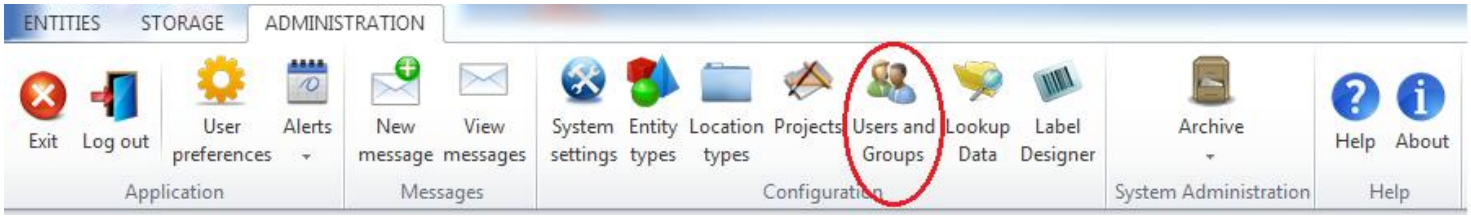
Editing projects

A project can be edited by clicking the 'Edit' icon in the Configuration ribbon, editing the data in the pop-up 'Edit Project' window and clicking 'Save'.

Deleting projects

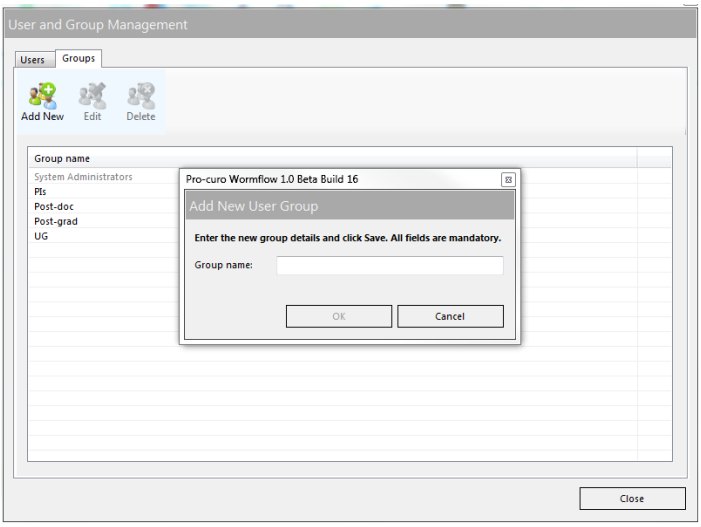
To delete a project highlight the project, click the 'Delete' icon and click 'Yes' in the pop-up 'Delete Project' window. A project can only be deleted when all samples associated with the project have been disposed.

Users and Groups



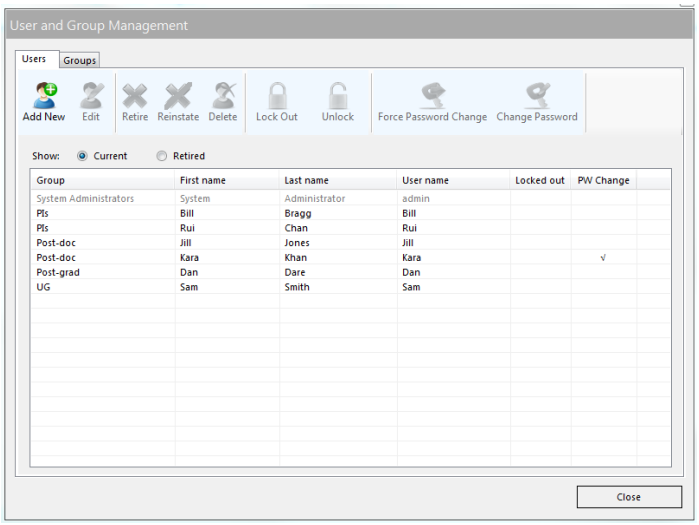
A user group can represent a collection of users perhaps of equivalent seniority, for example all PIs, post-docs, post-grads, etc. At user creation the administrator will assign the user to a specific group.

A user is anyone who accesses WormFlow. Each user must have a login name and password as it is recorded within the sample history for any action performed within WormFlow. User creation is usually limited to the administrator although this function can also be granted to one or more users.



Adding a user group

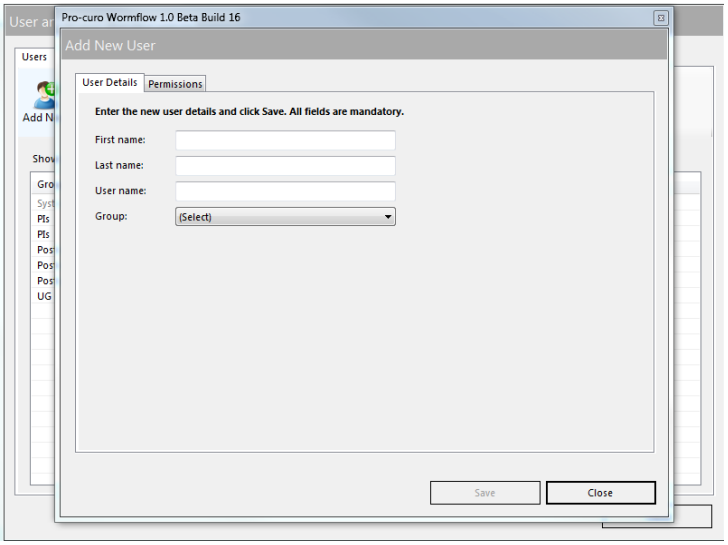
To add a user group, click the 'Users and Groups' icon in the Configuration ribbon, click the 'Groups' tab, click 'Add New' in the pop-up 'User and Group Management' window, enter the new group name and click OK.

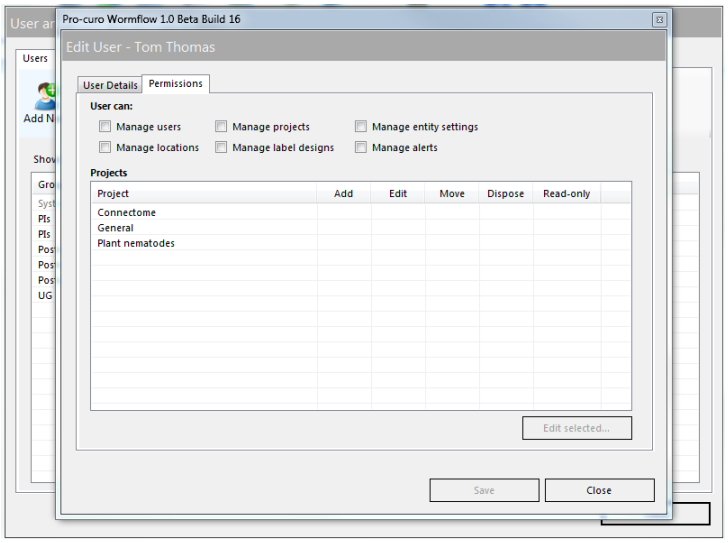


Adding a user and assigning permissions

To add a user, click the 'Users and Groups' icon in the Configuration ribbon, click the 'Users' tab and click 'Add New' in the pop-up 'User and Group Management' window. In the pop-up 'Add New User' window add the user's first, last and user names and select the user group from the drop-down list.

To assign permissions click the 'Permissions' tab and select the appropriate check boxes to provide the appropriate system-wide access. The degree of system-wide access will depend on the seniority of the user. For example, you will likely want to enable PIs/lab heads to manage locations and label designs and perhaps also set up alerts. A post-doc may be able to manage locations and label designs only. More junior lab members may not be given any system-wide access. Finally, for each project for which the new user will need access highlight the project name in the Projects pane, click the 'Edit selected...' box and select the permission checkboxes relevant to the user before clicking 'Save'.





Editing a user

To edit a user's first, last or user names or user group click the 'Users' icon, click the 'Edit' icon, enter the new data and click 'Save'.

Retiring, reinstating and deleting a user

If a user is to be absent from the lab for a period of time they can be temporarily 'retired' and their name removed from the current user list in the 'User Management' window. When the use returns and wishes to access WormFlow again they can be reinstated as a current, active user. Conversely, if the user does not return the administrator can delete the user from WormFlow. Note that the user has first to be retired before they can be reinstated or deleted. To retire a user highlight the user's name in the 'User and Group Management' window and click the 'Retire' icon and click 'Yes' in the 'Retire User' confirmation pop-up. Their name will now only be visible in the Users list of the 'User and Group Management' window when the 'Retired' radio-button is active. To reinstate or delete the retired user highlight their name in the retired Users list of the 'User and Group Management' window, click the 'Reinstate' or 'Delete' icon and confirm by then clicking 'Yes' in the respective 'Reinstate' or 'Delete' pop-up window.

Locking out and unlocking a user

The administrator can temporarily lock out a user from logging on to WormFlow. To lock a user out follow the procedure above for retiring a user but click the 'Lock Out' icon instead. To unlock a locked out user highlight the user's name and click the 'Unlock' icon.

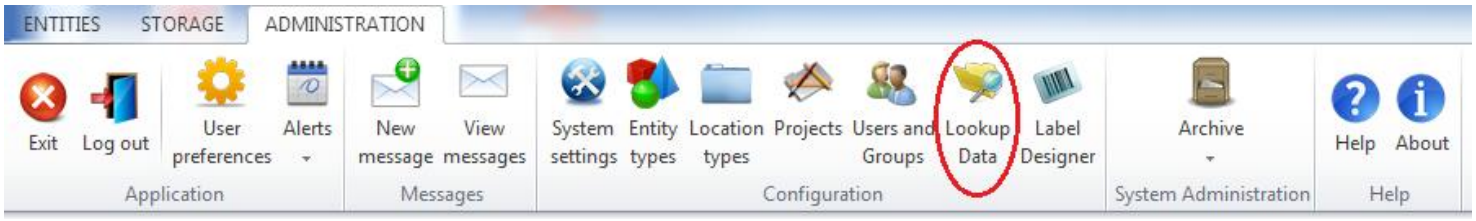
Force password change

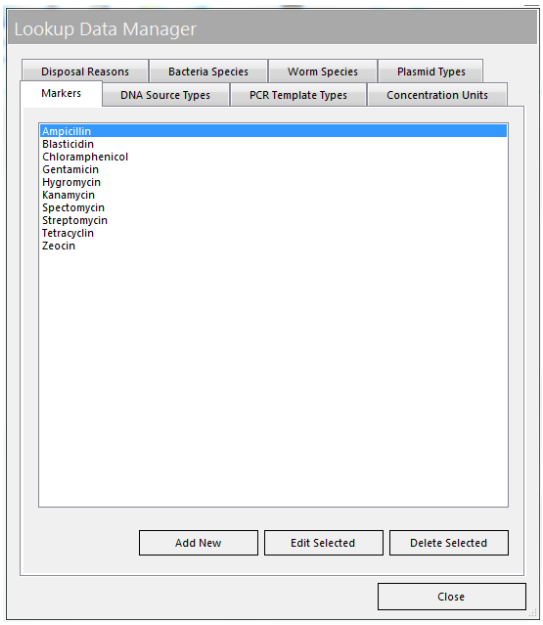
The administrator can force a password change on a user via this feature. Highlighting a user name in the 'User Management' window and clicking the 'Force Password Change' icon will default the user password back to "password" and prompt them to change this at their next log on.

Change password

The administrator can change a user's password with this feature.

Lookup Data





Lookup data lists store optional data used throughout WormFlow and are managed by the administrator. Some of these lists present optional data to the user, such as markers, or are used to set default values, such a concentration units. To modify a list of data click the 'Lookup Data' icon, click the data list tab in the 'Lookup Data Manager' window and click the 'Add New', 'Edit Selected' or 'Delete Selected' button to make the appropriate change.

Markers

Add, edit or delete a marker as required.

DNA Source Types

A genomic DNA source can be derived from one of the WormFlow entities or a new non-WormFlow entity source can be added in the 'Other Entity Type' pane. The latter sources can be edited and deleted. By default, only 'Bacteria' and 'Worm' are checked as being sources of genomic DNA from the current WormFlow entities.

PCR Template Types

Similarly to assigning a source of genomic DNA a PCR template can be derived from one of the WormFlow entities or a new non-WormFlow entity for a PCR template can be added in the 'Other Entity Type' pane. The latter sources can be edited and deleted.

Concentration Units

Add, edit or delete a concentration unit as required.

Disposal Reasons

Reasons for disposing of entity records and samples are added or deleted here. To add a new reason click the 'Add New' button, type the reason in the 'Add Disposal Reason' pop-up window and click 'OK'.

Bacteria Species

Add bacterial species here, e.g. E. coli, S. pyogenes.

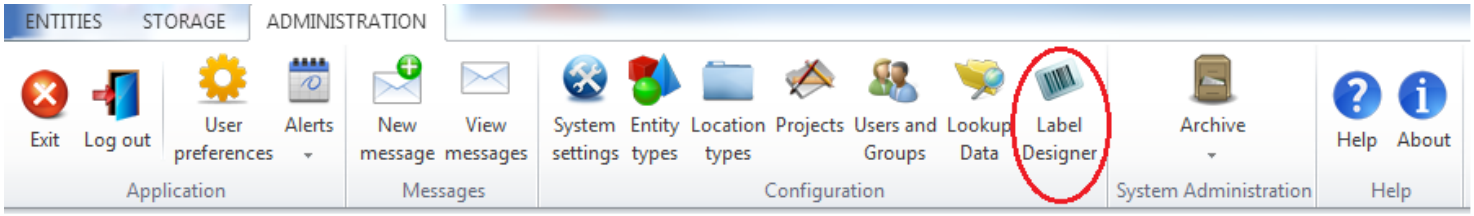
Worm Species

Add worm species here, e.g. C. elegans, C. briggsae, B. malayi, etc.

Plasmid Types

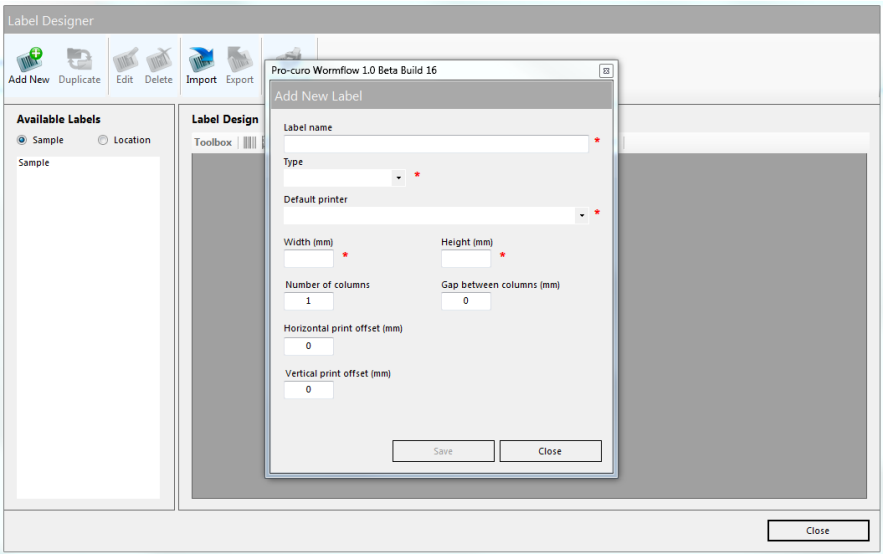
Add different types of extra-chromosomal DNAs here, e.g. plasmid, fosmid, BAC, etc.

Label Designer



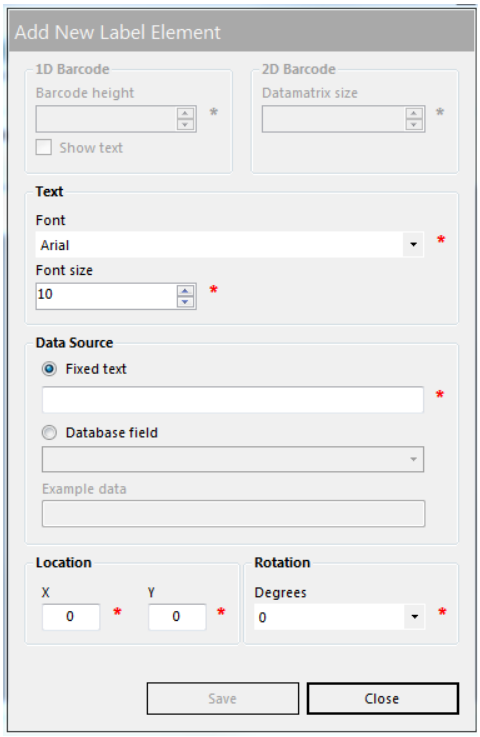
The 'Label Designer' is used to design and edit both sample and location labels. Managing labels designs is usually limited to the administrator although this function can also be granted to one or more users. To open the 'Label Designer' click the 'Administration' tab and then click the 'Label Designer' icon to open the 'Label Designer' window. Available labels are shown in the left hand pane. Clicking the 'Sample' or 'Location' radio button reveals the available respective labels. The right hand Label Design pane is where new labels are designed.

Add new label



To add and design a label click the 'Add New' icon, enter data into the required fields of the 'Add New Label' window including the label name, whether the label is for a sample or a location, the width and height of the label and the printer. Additional fields may need to be completed to further refine the label dimensions. Click 'Save' when all the necessary fields are complete.

Label Design



Highlighting the label name in the left of the 'Label Designer' pane results in a graphical representation in the 'Label Design' pane. Use the 'Zoom' buttons to change the magnification of the label to facilitate label design. The set of 'Toolbox' buttons allow addition of linear (1D) or Datamatrix (2D) barcodes and/or text/database field data to the new label.

To add a linear barcode click the 'Linear barcode' button to open the 'Add New Label Element' and enter the height of the barcode, in the 'Barcode height' field, and then assign the data field the barcode should encode. This is most commonly the default unique sample ID. Further 'Location' and 'Rotation' fields allow the barcode element to be precisely located and rotated on the label. A Datamatrix (2D) barcode can be added to the label by clicking the '2D barcode' button and designing and locating in the same way.

To add a fixed text element or database field data entry to the label click the '**Aa**' icon to open the 'Add New Label Element' window, enter the font, font size, and check either the 'Fixed text' or 'Database field' radio button. If the 'Fixed text' radio button is checked type the text element into the 'Fixed text' field. Alternatively, if the 'Database field' radio button is checked select the database field data to display from the drop-down list and type some example data in the 'Example data' field. 'Location' and 'Rotation' fields allow the fixed text or database field data element to be precisely located or rotated on the label.

Moving, editing and deleting a label element

Once the barcode, text or field data element is visible on the label template it can be moved to the desired location on the label by clicking and dragging. Clicking on the element and then the pencil icon opens the 'Edit Label Element' window in which changes can be made and saved. Clicking on the element and then the cross (delete) icon deletes the element.

Duplicating a label

Highlighting a label and clicking the 'Duplicate' icon in the 'Label Designer' ribbon opens a 'Duplicate Label' icon in which a new label name can be typed and further edits made if necessary.

Editing a label

Highlighting a label and clicking the 'Edit' icon in the 'Label Designer' ribbon opens the 'Add New Label' window enabling edits to be made as necessary.

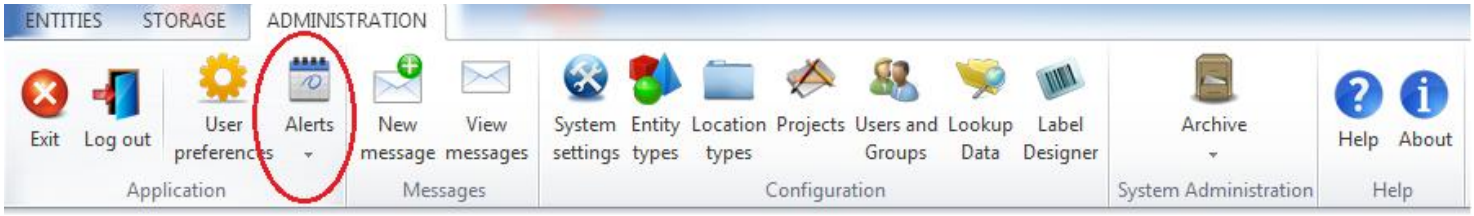
Deleting a label

Highlighting a label, clicking the 'Delete' icon in the 'Label Designer' ribbon and clicking 'Yes' in the 'Delete Label' confirmation pop-up window deletes the label.

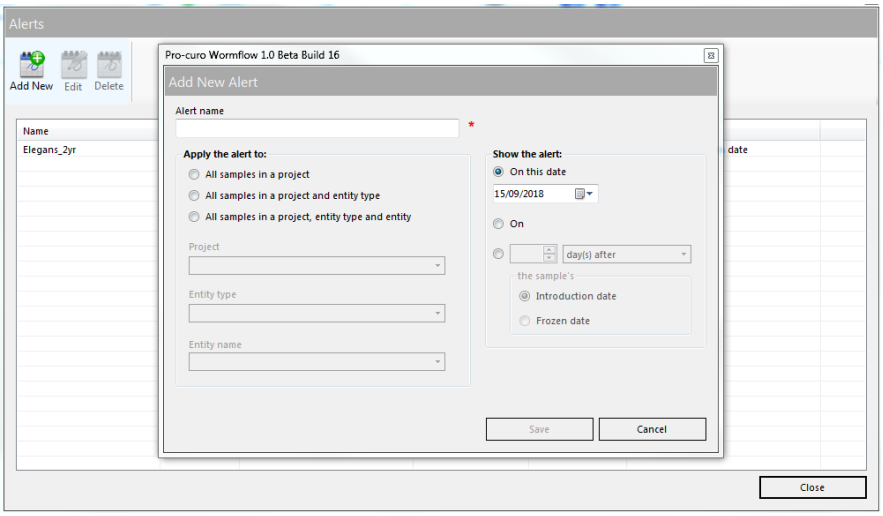
Test print a label

Highlighting a label and clicking the 'Test Print' icon in the 'Label Designer' ribbon opens a 'Print Test Label' window enabling the label to be printed for testing.

Alerts



WormFlow has a powerful date checking function which can be used to alert users when samples, from a single to a group of samples, have been stored for a specified time period. Date alerts can be set up for samples based upon either a specific date or for a specified length of time after either the sample freeze or introduction date. Setting such dates can be very useful if, for example, frozen worm strains need to be routinely recovered and refrozen after a period of time.



Add a date alert

To create your date alerts click the 'ADMINISTRATION' tab, click the 'Alerts' icon, click on the 'Manage' option from the drop-down and then click the 'Add New' icon in the 'Alerts' window. Give your alert a name, then select the samples to apply the alert to – all samples in a project, all samples in a project and entity type or all samples in a project, entity type and entity name. Next choose when to show the alert, either on a certain date which you select (from the calendar view) or on a given time range of days, months and years after either the freeze or introduction date.

Click save and the alert will be shown in the 'Alerts' pane. When there are multiple alerts you are able to select each one and 'Edit' or 'Delete' them via the relevant icons.

Checking for date alerts

Once a date alert has been set up you will be prompted on the 'Notifications Bar' if any of the samples have caused a date alert to be generated. This is done by the text "Date Alerts:x" turning red with the X showing the number of samples affected. Clicking this notification will open the 'ALERTS' pane with those alerts requiring attention highlighted in red text. Clicking the "+" next to the alert name will expand the information details for that alert and produce a list of the affected samples in the panel on the right.