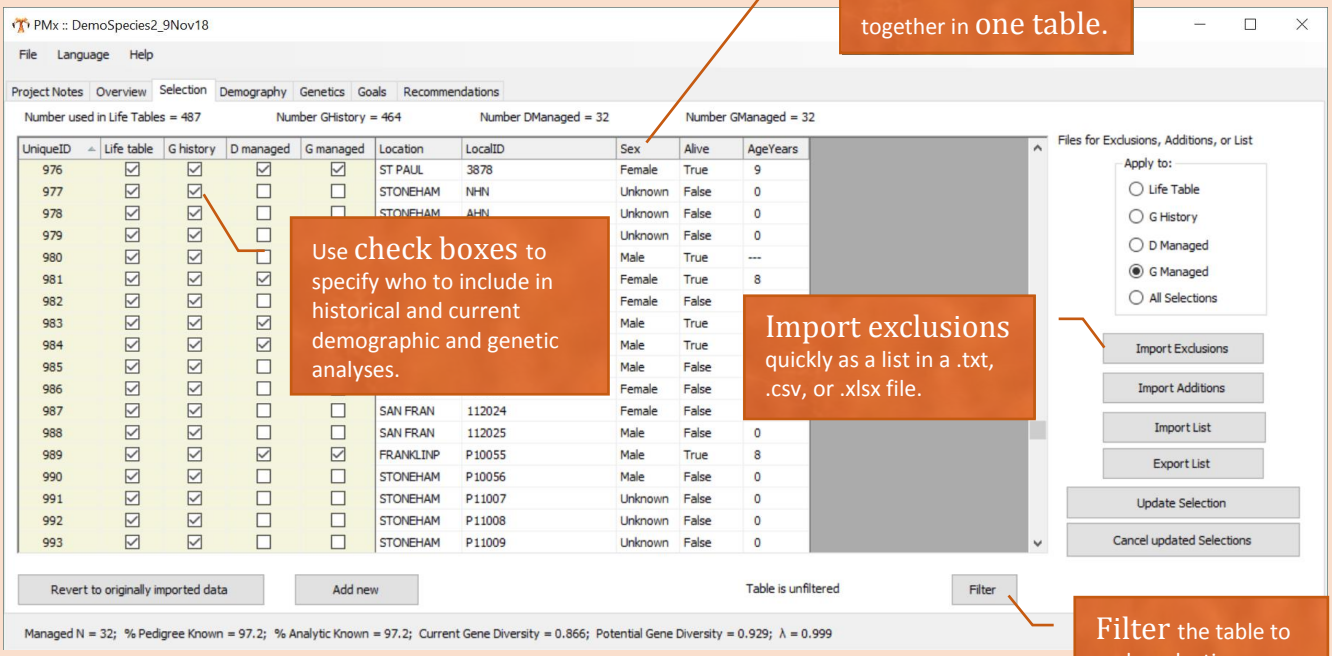
Using the Selection tab

A PMx Training Guide

The PMx **Selection tab** allows you to define fully which individuals are included in the current and historic demographic and genetic analyses. The SCTI team made substantial modifications to this tab in PMx version 1.5.20190111 (publicly released in January 2019). With these enhancements, using the Selection tab is more flexible and transparent than ever!

Check out these new features!



Ready to learn more?

Defining the *Life table*, *G history*, *D managed*, and *G managed* columns

When creating the PMx import files, you may have already filtered your data to specify which historic and living individuals should be used in PMx demographic and genetic analyses. However, you can use the Selection tab within PMx to make additional modifications, if needed. The Selection table displays rows for every individual in your Primary Input file (e.g., a *.ped, *.zims, or exchange.csv file), whether selected for analysis or not. Only those individuals with checked boxes in one or more of the *Life table*, *G history*, *D managed*, and *G managed* columns will be used in population analyses. You can easily add or remove individuals from the *Selected Population* by checking or unchecking boxes in the relevant column.

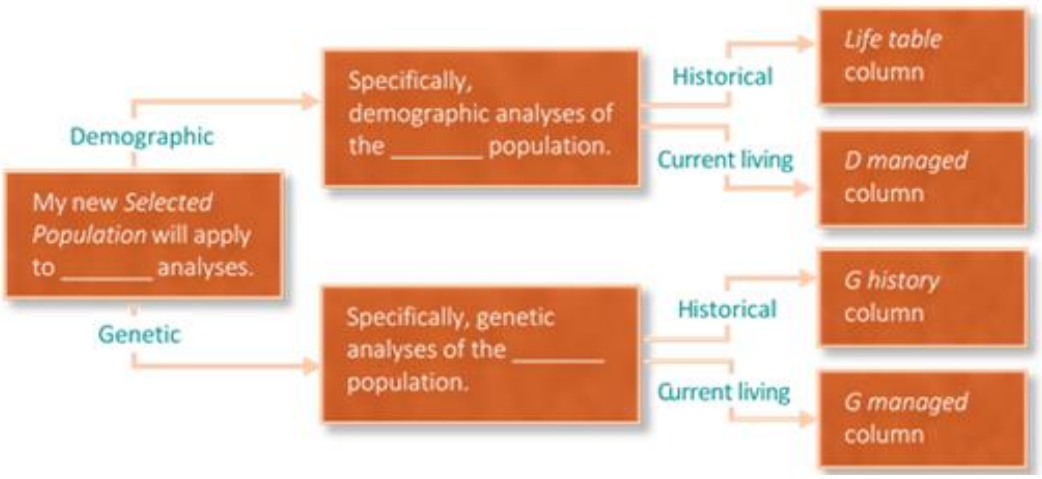
Selected Population - Those individuals that are included in a particular analysis. The Selected Population for genetic analyses may be the same or different as the Selected Population for demographic analyses.

Review the table below to learn how individuals selected in each column will be used in the historic and current demographic and genetic analyses.

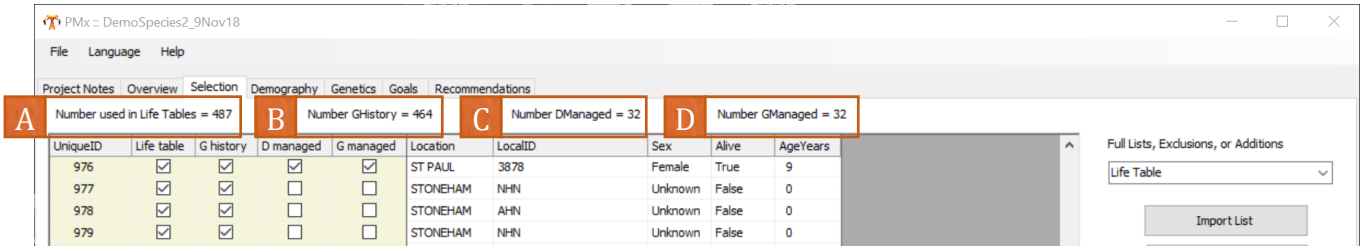
Column	**Selected Population (i.e. those individuals included in a particular analysis)**
Life table	Selected individuals will be included in the **historical demographic analyses** (e.g., life table and seasonality calculations).
G history	Selected individuals will be included in the **historical genetic analyses** (e.g., historic genetic statistics reported on the Genetics Overview tab, genetic population graphs).
D managed	Selected individuals will be included in the **current demographic analysis of the living, managed population** (e.g., age structure, reproductive planning, etc.).
G managed	Selected individuals will be included in the **current genetic analysis of the living, managed population** (e.g., pairings, culls, etc.).

Need more guidance?

- For an example of how to interpret each column correctly, see Box 1.
- To help you decide which column to apply your selection changes, use the decision tree below.
- For step-by-step instructions on modifying your selection using checkboxes, see page 4.



Box 1. Who is selected in each column, and how does this relate to my export filters*?*



In this example, the following filters were applied when exporting from a ZIMS for Studbooks database to PMx:

Demography: North America, 1980-01-01 to 2018-11-09
Genetics: AZA, 1980-01-01 to 2018-11-09

After importing these data into PMx and opening the newly created project, the unfiltered Selection table contains rows for all 671 individuals recorded in the studbook. However, only individuals with checked boxes in the *Life table*, *G history*, *D managed*, or *G managed* columns will be included in the corresponding population analyses. The number of individuals selected in each column is reported above the table and is updated each time you click the "Update Selection" button to the right of the table. In this example, 487 individuals are selected for historical demographic analyses, 464 for historical genetic analyses, and 32 for current demographic and genetic analyses of the living, managed population.

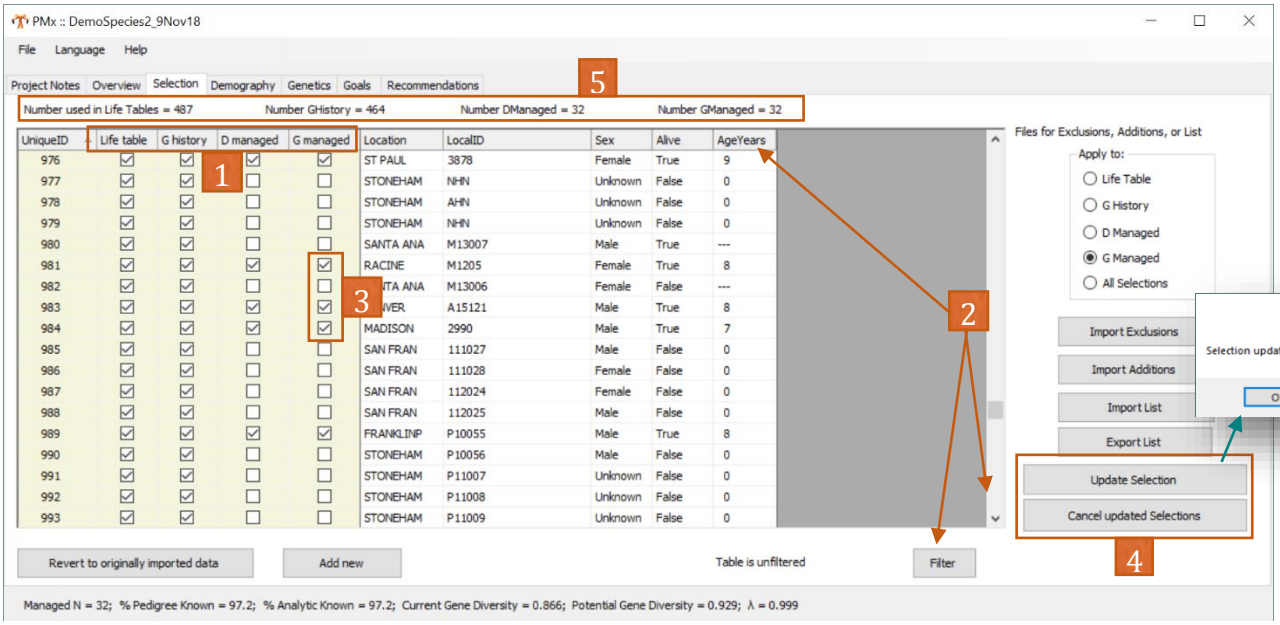
Continue reading to learn how the number of selected individuals in each column relates to the studbook export filters reported above.

A. ***Number used in Life Tables*:** 487 individuals alive at North American institutions at some point in time between 1980-01-01 and 2018-11-09 are selected in the *Life table* column and will be included in historical demographic analyses (i.e. life tables and seasonality calculations).
B. ***Number GHistory:*** 464 individuals alive at AZA institutions at some point in time between 1980-01-01 and 2018-11-09 are selected in the *G history* column and will be included in historical genetic analyses (e.g., historic genetic statistics reported on the Genetics Overview tab, genetic population graphs).
C. ***Number DManaged*:** 32 individuals alive at AZA institutions as of the analysis end date (2018-11-09) are selected in the *DManaged* column and will be included in current demographic analysis of the living, managed population (e.g., age structure, reproductive planning, etc.).
D. ***Number GManaged*:** 32 individuals alive at AZA institutions as of the analysis end date (2018-11-09) are selected in the *GManaged* column and will be included in current genetic analysis of the living, managed population (e.g., pairings, culls, etc.).

Why are *Number DManaged* and *Number GManaged* initially the same? In most cases, *Number DManaged* and *Number GManaged* will be the same when first opening a new PMx project. This is because PMx assumes that living individuals requiring genetic management also require demographic management. However, this may not always be the case, and the next section explains how you can use check boxes to modify who is selected in each column.

Modifying the selection using check boxes

Step-by-step instructions



1. **Determine if your selection changes should apply to the *Life table*, *G history*, *D managed*, or *G managed* columns.**
   See the decision tree on page 2 for a guidance. You can select or deselect an individual from multiple columns, if desired. Alternatively, you can apply different selections in a series (e.g., apply all changes to the *Life table* column, then all changes to *G history*, etc.)

2. **Scroll, sort, or filter the table to find the individuals that you would like to add or remove to the *Selected Population*.**
   As with other tables in PMx, you can sort the table by clicking on the column header, customize the table by right clicking on the header to add or remove columns, or change the width and order of the columns. Filtering is a new feature on this tab and will only affect the table view, not any calculations.

3. **Select (i.e. check) or deselect (i.e. uncheck) individuals in the appropriate column.**
   To highlight and apply changes to multiple individuals at once, use the *Shift* or *Ctrl* keys.

4. **Click "Update Selection" to accept all changes or "Cancel Selection" to reject all changes.**
   A dialogue box will appear notifying you that the selection was updated successfully. Click "OK" to continue. Be patient while waiting for the dialogue box to appear as it can take up to several minutes for PMx to recalculate with the new selection.

5. **Verify that the *Number used in Life Tables*, *Number GHistory*, *Number DManaged*, and *Number GManaged* reported above the Selection table are correct.**
   These values represent the number of individuals in each Selected Population (i.e. selected, or checked, in each column) and are updated with each successful selection update. In the example above, *N GManaged* would decrease from 32 to 29 individuals if 981, 983, and 984 were deselected from the *G managed* column and the selection were subsequently updated.

Modifying the selection by importing a list

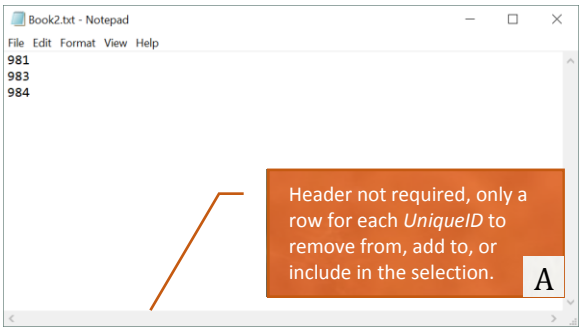
While making selection changes using check boxes in the *Life table*, *G history*, *D managed*, and *G managed* columns is relatively simple, it can be tedious if many changes are needed. As an alternative, PMx offers the ability to import lists of individuals to remove from, add to, or use as the Selected Population in each column.

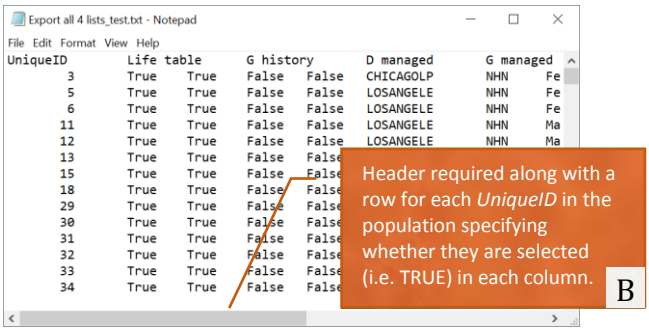
When to use each list

List	**When to use it**
Import Exclusions	To import a list of individuals to **exclude (i.e. uncheck) from** the Selected Population
Import Additions	To import a list of individuals to **add (i.e. check) to** the Selected Population
Import List	To import a complete list of individuals to **use as** the Selected Population (i.e. the individuals in the list will be used in the analysis)

File format

You must save your exclusion, addition, or complete Selected Population list as a *.txt, *.csv, or *.xlsx file in order for PMx to import and read it successfully. Additionally, your list must contain *UniqueIDs* for individuals already included in your PMx project. If you include a *UniqueID* for an individual that was not included in your original primary import file, PMx will ignore it. PMx can read imported lists in the following two formats:





Use format A to:

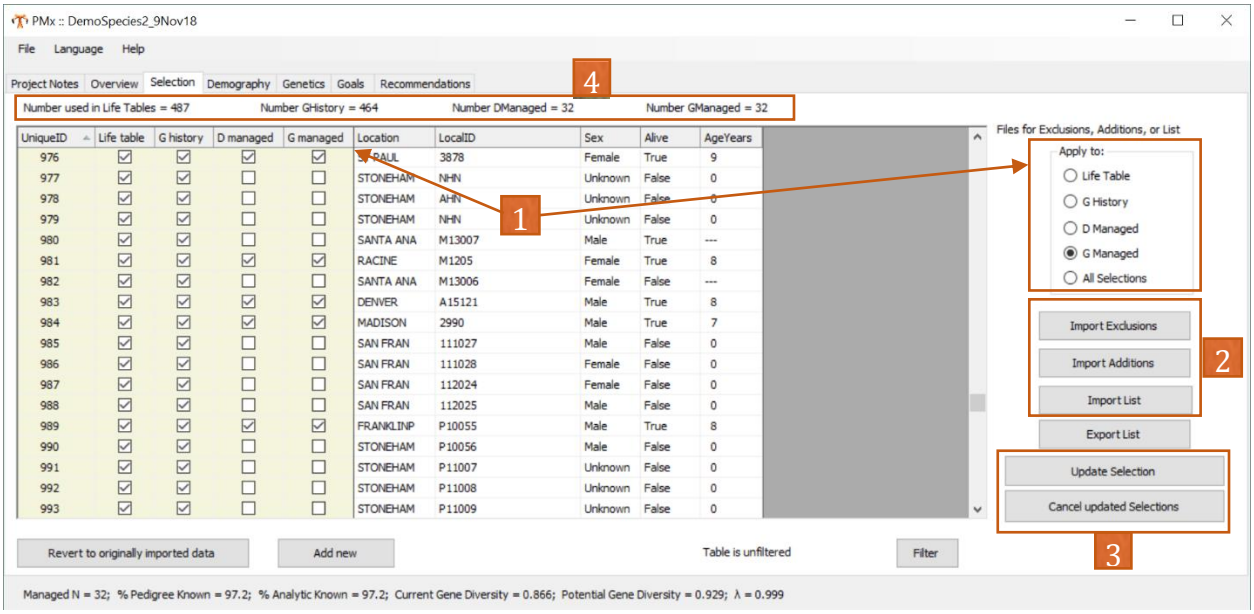
- "Import Exclusions"
- "Import Additions"
- "Import List" if:
  - Applying a complete list of selected individuals to one column
  - Applying a complete list of selected individuals to *All Selections* (i.e. the same individuals will be selected in each column)

Use format B to:

- "Import List" if:
  - Importing an earlier version of the Selection table that you previously exported and saved.
    - To update all four columns at once, choose *All Selections* under "Apply to" before importing.
    - To update a single column, select that column name under "Apply to" before importing (the other columns will not update).

Create an "Import List" by exporting from PMx! By clicking "Export List," you can export selection data from one or all columns, and this export file can be reimported later. If you choose to export data from a single column, PMx will create the export file in format A (above left). If you choose to export "All Selections," PMx will create the export file in format B (above right).

Step-by-step instructions for importing a list



1. **Specify whether your imported list should apply to *Life table*, *G history*, *D managed*, *G managed*, or *All Selections* (i.e. all columns)**
   See the decision tree on page 2 for guidance.

   Be careful when applying a list to "All Selections." For example, if file format A is imported, the same set of individuals will be applied to all four columns. If you want to apply different sets of exclusions or inclusions to each column, you can import files in a series (e.g., specify which column to apply the list and import the list, then specify which column to apply the next list and import that list, and so on). Alternatively, use "Import List" and file format B and apply to *All Selections* to import one file containing four complete population lists (one specific to each column).

2. **Click "Import Exclusions," "Import Additions," or "Import List" and upload your list.**
   Which button you choose will depend on whether you want to exclude (i.e. uncheck and deselect) or add (i.e. check and select) specific individuals to the Selected Population, or if you want to import a complete list of individuals to use as the Selected Population. Once the file is imported and read by PMx successfully, you should see the changes reflected in the relevant check boxes.

3. **Click "Update Selection" to accept all changes or "Cancel Selection" to reject all changes.**
   A dialogue box will appear notifying you that the selection was updated successfully. Click "OK" to continue. Be patient while waiting for the dialogue box to appear as it can take up to several minutes for PMx to recalculate with the new selection.

4. **Verify that the *Number used in Life Tables*, *Number GHistory*, *Number DManaged*, and *Number GManaged* reported above the Selection table are correct.**
   These values represent the number of individuals in each Selected Population (i.e. selected, or checked, in each column) and are updated with each successful selection update. For example, if *GManaged* was selected under "Apply to" and the selection was updated with an exclusion list of three individuals, *N GManaged* would subsequently decrease from 32 to 29 individuals.

Frequently Asked Questions

What is the difference between the *Life Table*, *G History*, *D Managed*, and *G Managed* columns?

To use PMx effectively, it is critical to understand how to use the check boxes in these columns correctly. Review page 2 for an in-depth explanation of how the columns determine who is included in the historic and current demographic and genetic analyses. See page 3 to walk through an example.

Why is the *Number DManaged* based on my genetic rather than demographic filters when initially opening a new PMx project?

Demographic filters applied during data export from a studbook database software (e.g., SPARKS, PopLink, ZIMS) define which individuals will be included in historical demographic analyses, specifically life table calculations. It is the genetic filters that define who is included in current analyses of the living, managed population. Initially, PMx assumes that currently living individuals that are available for genetic management also require demographic management. However, this may not always be the case, and you can modify who is included in the living demographically managed and genetically managed populations by using the *D managed* and *G managed* checkboxes, respectively. See page 4 to learn how to change the Selected Population using check boxes. See pages 5-6 to learn how to change the Selected Population by importing a list.

What is the difference between the PMx terms *Selected Population* and *Managed N*?

The *Selected Population* refers to the set of individuals that are included in a particular analysis. The demographically Selected Population may be the same or different than the genetically Selected Population. The *Managed N*, reported in the primary PMx footer, is the number of individuals within the genetically Selected Population who are alive as of the analysis end date and are available for management (i.e. have not been exported or lost from the defined geographic view as of the analysis date).

In nearly all cases, even after applying selection changes, the *Managed N* will always match the *Number GManaged*. When a PMx project is first created, the *Number GManaged* (and therefore the *Managed N*) will also match the *Number DManaged*. This is because PMx assumes that all living individuals available for genetic management also require demographic management. However, cases may arise where managers want to include different subsets of living individuals in the current demographic and genetic analyses. In these cases, where the *Number DManaged* and *Number GManaged* differ, the primary footer will display two values for *Managed N*. *Managed N(G)* represents the number of living individuals included in the current genetic analysis (e.g., kinship calculations). *Managed N(D)* represents the number of living individuals included in current demographic analysis (e.g., age structure, reproductive planning).

Should the *Number used in Life Tables* and the *Number GHistory* be the same since they both relate to historical analyses?

Not necessarily. The number of individuals selected for historical demographic analysis and historical genetic analysis will differ if different demographic and genetic filters were applied during data export to PMx. For example, a manager may choose to apply a wider geographic window or date span to demography in order to maximize life table sample sizes. See Box 1 on page 3 for an example.

How do the "Import Additions" and "Import List" buttons differ?

The "Import Additions" button allows you to import a list of specific individuals *to add to* the Selected Population, while the "Import List" button allows you to upload a complete list of individuals *to use as* the Selected Population. Using "Import List" may be the most efficient option if achieving your desired Selected Population requires many exclusions and additions. Another useful application of "Import List" is to reimport an earlier exported list. It is good practice, for example, to export your original selection when first opening a PMx project. It can be imported later if you wish to revert to your original selection without resetting other project modifications (e.g., pairs, culls, etc.). To learn more about importing a full list, see pages 5-6.

I imported a list of permanent non-breeders, but the *Number GManaged* did not change after updating the selection. Why?

A number of reasons could explain why this happened:

- Did you select *G Managed* under "Apply to" before clicking "Import Exclusions"?
- Did you click "Update Selection" to accept your changes?
- Are you sure the individuals in question were originally selected (i.e. checked)?
- Does your imported list contain an individual that does not exist in the PMx project?

What does the "Add New" button at the bottom of the screen do?

Clicking "Add New" opens a new input screen where you can create additional individuals to add to your population. Once you enter new individuals and click "Accept," PMx will automatically update the selection. These new individuals will become available in the PMx project but are NOT added to your original pedigree data input file. Please note the following when using this feature in PMx:

- Data format for dates is yyyy-mm-dd.
- PMx will not add the new individual if you have not entered a *UniqueID* for it.
- If you enter a *UniqueID* for a new individual but leave all other data fields blank, PMx will automatically assume the *Selected* and *Living* fields to be "False" and all other fields to be unknown.
- To include the new individual in current demographic and genetic analyses, enter "True" in the *Selected* and *Living* fields.
- To add another new individual or to edit an already added individual, click the "Add New" button again to reopen the input screen.

How can I return to my original selection after making updates?

You can do so by clicking the "Revert to originally imported data" button below the Selection table. **However, use this button with caution as it will not only reset the Selection table but also any pairs, culls, recommendations, or management sets that you have made.** A pop-up warning will appear to remind you of this. If you would still like to proceed, click "Yes," and PMx will update the selection.

Alternatively, you can export your original selection when first opening a PMx project so it can be reimported at a later time. Choose *All Selections* under "Apply to," click "Export List," and save the .txt file. To import this list, chose *All Selections* under "Apply to," click "Import List" to upload the saved file, and click "Update Selection" to accept all changes. This will restore your Selected Populations (i.e. checked individuals) in each of the *Life table*, *G history*, *D managed*, and *G managed* columns without resetting other project modifications (e.g., pairs, culls, etc.). To learn more about importing a full list, see pages 5-6.

How can I view only the living, genetically managed population in the Selection table?

1. Click the "Filter" button below the Selection table.
2. Select the second radio button labeled "Only show animals where," which will activate the corresponding boxes.
3. Click on the first box and select *GenManaged* from the drop-down menu.
4. Leave "=" as the default in the second box.
5. In the third box, type "TRUE."
6. Finally, click "OK" to apply your new filter.

Helpful Tip! Remember that filtering the table only subsets the individuals that are viewed and does not affect any calculations.

How do I add a column to the Selection table?

Right-clicking on the table header will open a list of variables that can be displayed. Clicking to check a variable name will cause that variable to be added to the table. Unchecking a variable will remove it from the table. (Most tables have some key variables that are always displayed, whether or not the variable is checked in the list.)

Helpful Tip! By selecting "Save PMx settings" in the *File* menu, the current table configuration can be saved so that it will be the default layout when new projects are created.