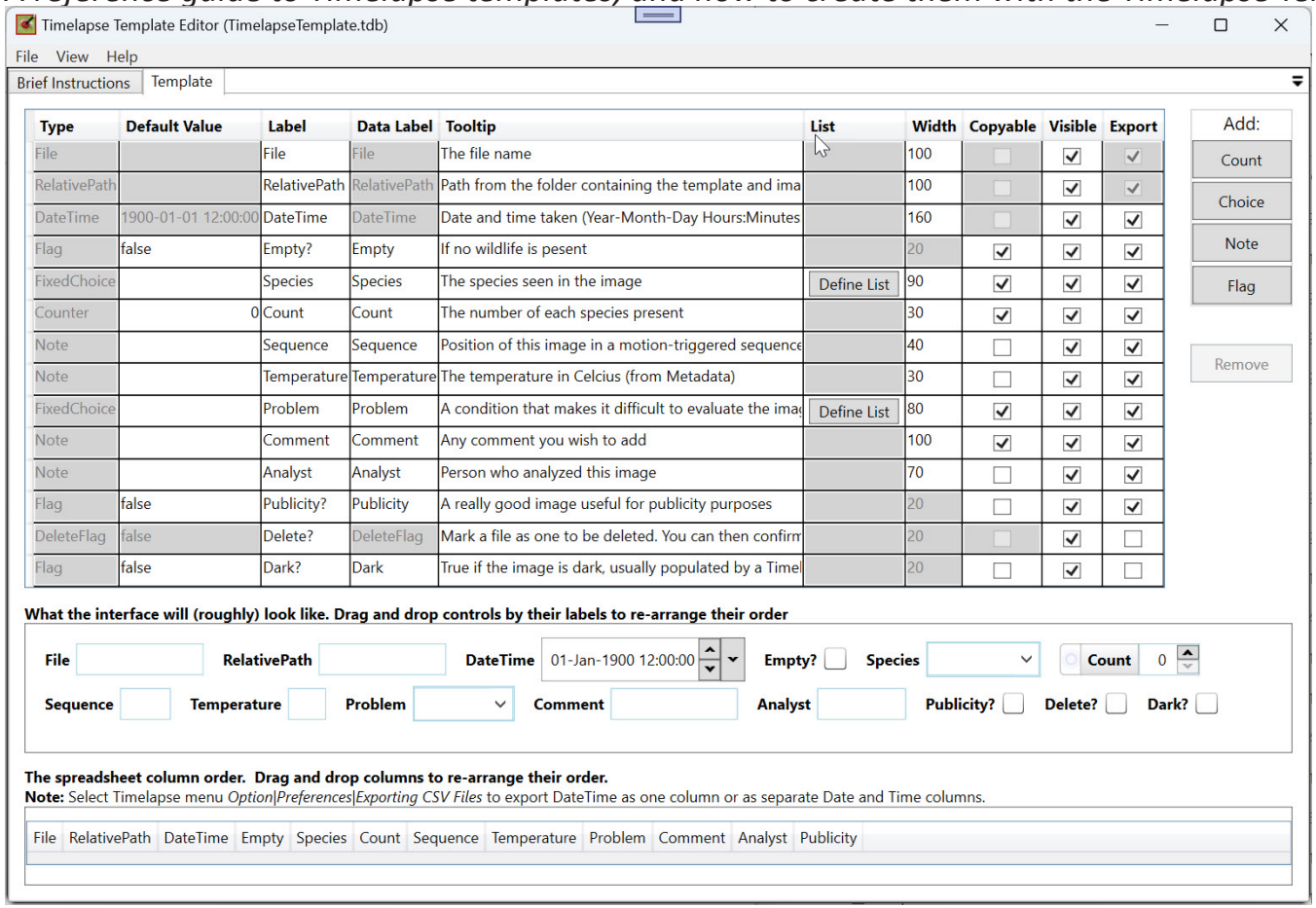
Timelapse Template Guide

A reference guide to Timelapse templates, and how to create them with the Timelapse Template Editor



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Timelapse Template Guide

A reference guide to Timelapse templates, and how to create them with the Timelapse Template Editor [1]

This guide assumes that you have first gone through the ***Timelapse QuickStart Guide***, which is Part I of this series. That guide provides basic information on how to use Timelapse, the role of templates, and the Timelapse Template Editor. This guide builds upon that, where it adds details.

The Timelapse Template Guide explains how to use the ***Timelapse Template Editor*** (included with the Timelapse Software). The Template Editor allows you to create a template (a file with the *.tdb* suffix) that specifies the tags you want to track. ***Timelapse*** then uses that template

- to create the data fields that appear at the top of the Timelapse window, which the analyst fills in with tagging data, and
- to structure the database columns that will hold your tag data, and
- to decide what fields to export to a CSV file

Creating and modifying templates is easy, as its mostly a matter of form filling once you decide upon the relevant tags for your project.

Finally, we recommend watching Video tutorial: The Timelapse Template Editor (available on the Timelapse web site videos page), which illustrates many of the functions described in this guide.

[1]What you see when you run Timelapse software may not exactly match the screen images in this guide, due to updates made in the software after these screen images were taken. These differences should not affect your general understanding.

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Introduction

The kinds of information and things that you or your organization want to track and count as tags will be specific to your domain, your project and its goals and purposes, the kinds of images you want to analyze, and even the particular data you want to get out of it. Across domains, tags will certainly differ. For example, a wildlife oriented ecology domain may want tags such as ***Species*** and ***Count***, while a fisheries domain may want tags such as ***#Anglers*** and ***#Boats***. Tags may even differ within a domain. One wildlife project may only be concerned with the presence of certain predacious species. Another wildlife project may want a broader set of tags specifying all species in the area, the sex and age of each entity, the presence of vehicles and people, and other factors such as weather and ground cover.

This is where the ***Timelapse Template Editor*** and the ***template file*** (a file with a *.tdb* suffix) come in. A project manager uses the Template Editor to specify the data fields the analysts will use to tag each image, which is saved as a template file. That template file is then deployed (copied) to the root folder of an image set. When Timelapse loads that template and image set, it uses the specification contained within the template to create the look and feel of the fill-in data fields that appear in the Timelapse window's interface, and to structure how tag data will be stored in the Timelapse database (*.ddb* file).

The Template Editor defines several mandatory data fields that must be included in all templates. Beyond that, any data field can be defined as long as it conforms to one of the four available data types: ***Notes*** for free text, ***Counts*** for integers, ***Flags*** for true/false, and ***Choices*** for displaying a limited set of choices as a menu. This means that Timelapse can be customized to a broad variety of domains and purposes. It also explains why Timelapse has been used for many different purposes: wildlife ecology, fisheries management, social studies, laboratory instrument monitoring, and more.

Internally, the template *.tdb* file is actually an SQLite database, where the data fields you specified is saved in a database table. However, you don't have to know anything about SQL or databases, as the Template Editor takes care of all the grotty technical details.

While there is some overlap between this guide and the Timelapse QuickStart Guide, this document goes into much more detail about the template and how the Template Editor works.

Creating the right template for your needs

You should give considerable thought to the information you want to capture as tags and how it is structured as data fields. When you craft a template, you are essentially creating a standard that specifies:

- what analysts should look for and tag when inspecting the images;
- how data fields are labeled in the Timelapse interface, where the labels and the tooltip help messages associated with them should be in the analyst's terms;
- how the tags entered by analysts are named and recorded in the Timelapse database (*.ddb*) file as data;
- which data should be exported to a *.CSV* file;
- the expected format of the data;
- what data will be available for statistical analysis;
- the expected number of tags the analyst must consider: the fewer the data fields for the analyst to fill in, the faster the tagging task.

Doing it right requires planning. We recommend you talking others in your organization to understand their needs. Test your templates, ideally with experienced analysts who can give you feedback, before deploying them widely. Tag a sample image set to collect some data, and see how amenable that collected data is to later analysis (e.g., statistics).

How to deploy templates

A project manager, or whoever is in charge, usually creates a master template, which is just the template *.tdb* file produced using the Template Editor. That template normally serves as the standard for how all images in that project should be analyzed and tagged.

The file can then be deployed in various ways. A common approach simply copies the template into the root folder of one or more image sets: how you decide to divide your images into images is, of course, up to you. When Timelapse loads the template in that image set, it will use the template found in the root folder to construct the Timelapse interface, and to create a Timelapse Data database *.ddb* file, which in turn will hold the tagging data for that image set.

There are many variations to the above, as it depends on how you plan to deploy Timelapse. The Timelapse FAQ web page includes an entry discussing various other deployment strategies.

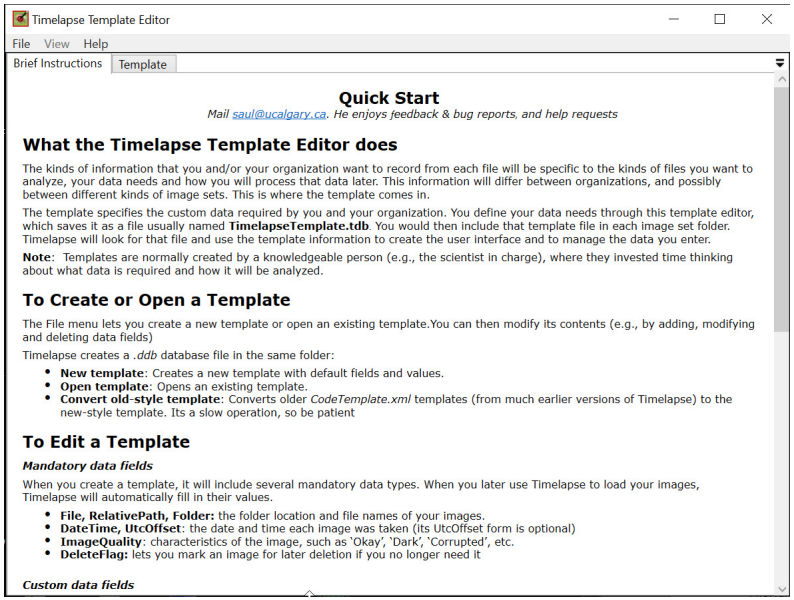
The minimal template

This section explains several Template Editor fundamentals by creating and deploying the minimum template required to use Timelapse.

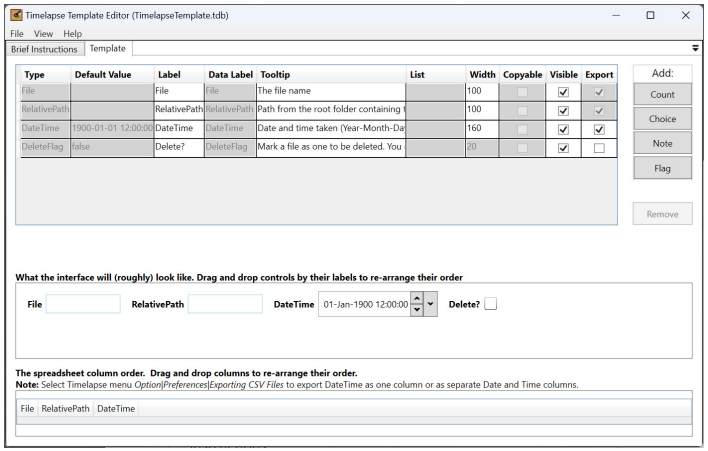
To follow along with this exercise, copy the *Station2* folder (which includes the *Fetched-2016-04* sub-folder) from the *PracticeImageSet* folder to a convenient location such as your desktop.

Creating the minimal template

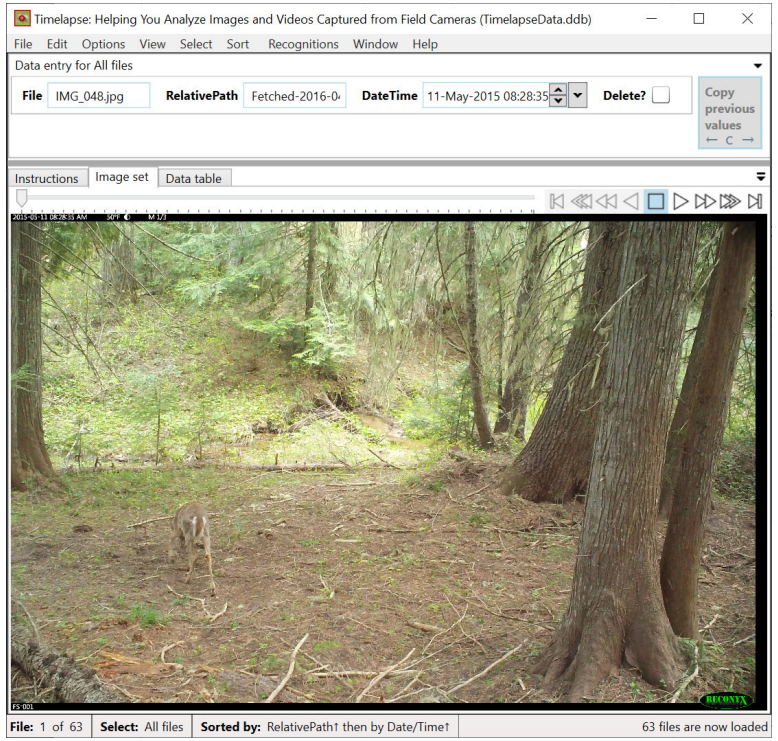
1. Start the ***TimelapseTemplateEditor***. A window appears displaying brief instructions.



2. Create a new template. Select ***File | New template...,*** navigate to your *Station2* folder and click ***Save***.
   - » The Template Editor window will display the required data fields.
   - » A new file titled *TimelapseTemplate.tdb* should appear in your *Station2* folder. The template includes the mandatory data fields required by Timelapse along with their default settings. Cells in grey are not editable, while cells in white are editable. These mandatory controls cannot be removed



3. Quit the editor. Start ***Timelapse***. Select ***File | Load template, images and video files...***. Navigate to the newly created *TimelapseTemplate.tdb* file in the *Station1* folder. This loads the template and all images in that folder.



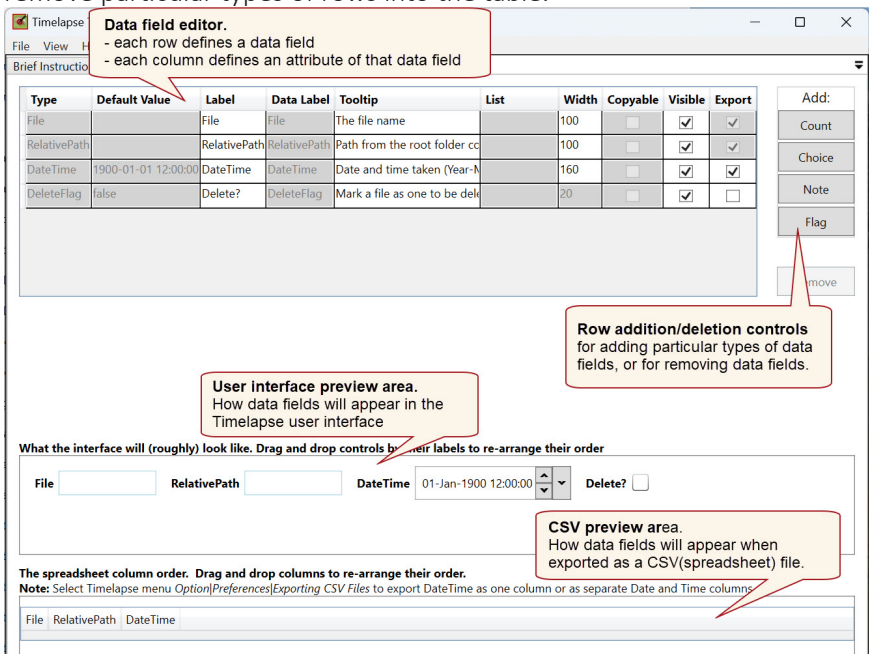
4. Compare the fields in the Template with the fields in the Timelapse Data Entry panel above. There is a one to one match.

Editor and minimal template explained

The Template Editor interface

The Timelapse Template Editor interface contains four main areas, as illustrated below.

- *Data field editor* (top). Each row in this area specifies a single data field item and its attributes.
- *User interface preview area* (lower middle) shows how the data will be displayed as fields in the Timelapse user interface.
- *CSV preview area* (bottom) shows the data column names and their order when data is exported to a *.CSV* file.
- *Row addition/deletion controls* (right) are buttons that let you add or remove particular types of rows into the table.



Mandatory fields

Every template includes four mandatory data fields, each displayed as a row in the table. Each row specifies a different data type as detailed in the ***Type*** column. For the first three mandatory fields below, Timelapse will automatically fill in the data when it loads your images.

- ***File***: name of the image file.
- ***RelativePath***: path from the root folder to the sub-folder containing the image, if any.
- ***DateTime***: date and time the image was taken, extracted from the file's metadata or file creation time.
- ***DeleteFlag***: allows the analyst to 'flag' particular images for later deletion

Four other data types are also available: ***Counters, Choices, Notes*** and ***Flags***. We will shortly show you how to use these to create custom data fields specific to your project.

Data field attributes

Each data field has several attributes, presented as columns in the data table.

- ***Default Value*** is the initial value of that data when images are first loaded into Timelapse. The value can be empty.
- ***Label*** is used to label the data field when it is displayed in the Timelapse user interface. Labels can comprise any text, and can be the same or different from the ***DataLabel*** attribute.
- ***DataLabel*** names the database column that stores the data in the Timelapse database *.ddb* file. The DataLabel also appears as the column name in the Timelapse ***Data Table*** tab, and the exported *.CSV* file. DataLabels must be unique, and its text can only comprise a mix of alphanumeric letters and '_'.
- ***Tooltip*** defines the text displayed in the Timelapse interface when the analyst hovers their mouse over a data field. Its purpose is to serve as a brief help message explaining what that data field is for.
- ***List*** applies only to ***Choice*** items. A list defines a textual list, whose values are used to create the ***Choice*** drop-down menu associated with each ***Choice***. This will be demonstrated shortly.

Note. The ***DefaultValue*** of a ***Choice*** row must be either empty, or must match an item in the Choice's List. Mismatches will result in a warning dialog.

- ***Width*** defines the width of the text box associated with data field. While the units are somewhat arcane, you can see the result of changing the width in the user interface preview area. Ideally, the width will be just wide enough to display expected values.
- ***Copyable*** defines whether that field is affected by the ***Copy previous values*** button in the Timelapse interface. When the ***Copy previous values*** button is pressed, only those fields marked as copyable will have its data copied from the previous image to the current image.
- ***Visible*** defines whether the field should be displayed in the Timelapse user interface. If marked as invisible, fields and their default values will still appear in the Timelapse data table and the exported *.CSV* file. Marking fields as invisible is useful for several reasons.
  - » Hiding fields not used or unneeded by the analyst reduces clutter in the Timelapse data entry panel.
  - » Fields can be filled in with a constant default value across all images, where there is no need for an analyst to see or change those values. As an example, each image may be tagged with the name of the organization that owns it, such as by creating a ***Note*** field labeled 'Organization', its ***DefaultValue*** set to that organization's name, and its ***Visible*** state to unchecked. While it won't appear in the Timelapse data entry panel, it will be included in the database and exported *.CSV* file.
- ***Export*** defines whether a field and its values should be exported to a *.CSV* file. This is useful to exclude unneeded fields from the exported data, such as those that will not be used for later analysis. For example:
  - » because the ***DeleteFlag*** is used internally to tag images that Timelapse should delete, its *Export* attribute is unchecked by default. This is why it is not included as a column in the spreadsheet preview area.
  - » because ***File*** and ***RelativePath*** are required by a CSV row to identify the name and location of the image or video file, its *Export* attribute is checked by default and cannot be edited.

You cannot delete mandatory data rows (i.e. those who are colored gray). However, you can edit some of their properties, as will be shown shortly. Editable fields are displayed in white, while non-editable fields are in gray.

Customizing the template

Aside from the mandatory data fields, you can create your own custom data fields specific to your project. The field can be one of four data types.

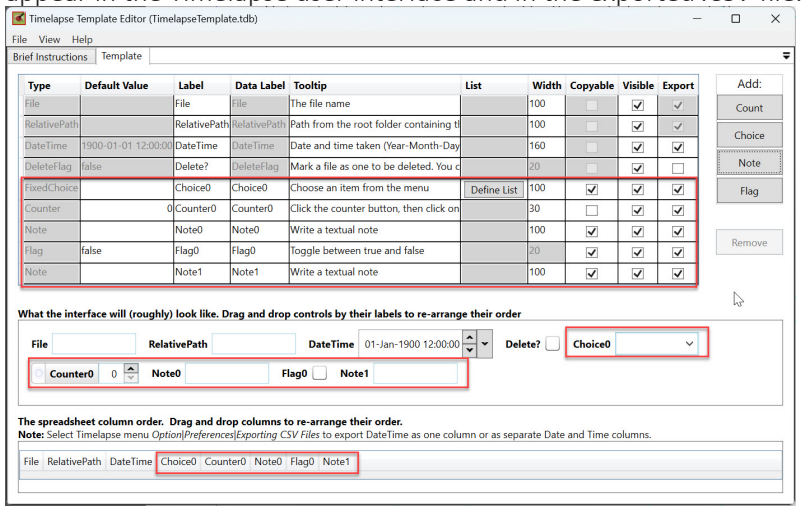
- ***Counters*** are restricted to blanks or positive integers. They are normally used for counting entities in an image, e.g., number of deer.
- ***Choices*** offer a fixed set of textual items presented in a drop-down menu. Choice values are restricted to text matching those items.
- ***Notes*** are for free-form text,and can include any values
- ***Flags*** are for setting true / false values. The checkbox control that appears for flags stores data as *true* when checked, or *false* when unchecked.

To explain, assume you would like your project to include the following tags.

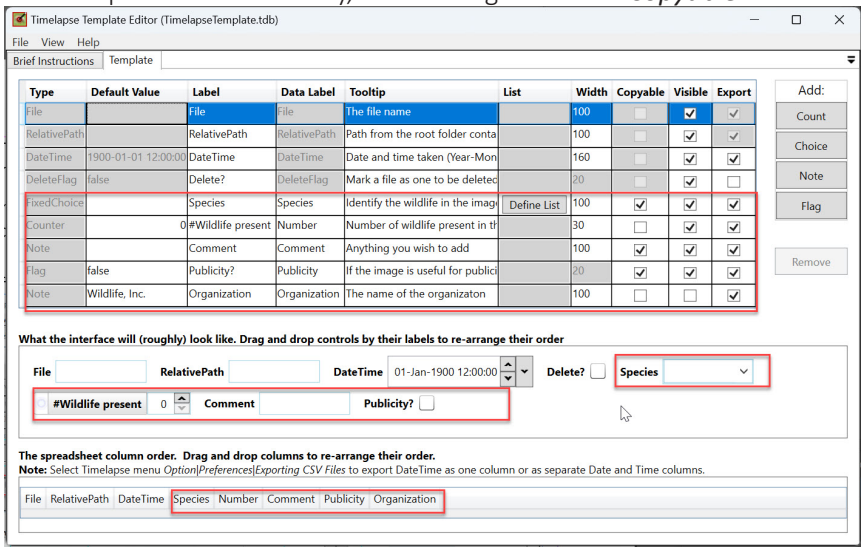
Data label	Type	Default value	Purpose	Choice items
Species	Choice		Identifies wildlife	Bear, Bobcat, Coyote, Wolf, Empty
Number	Count	0	# wildlife present	
Comment	Note		Any comment	
Publicity	Flag	false	A great photo	
Organization	Note	Wildlife, Inc.	Organization name	

Also assume you do not want the ***Organization*** fields to be visible in the Timelapse interface, because it will be automatically filled in (via its default), because the analyst will not be changing that field, and to reduce clutter.

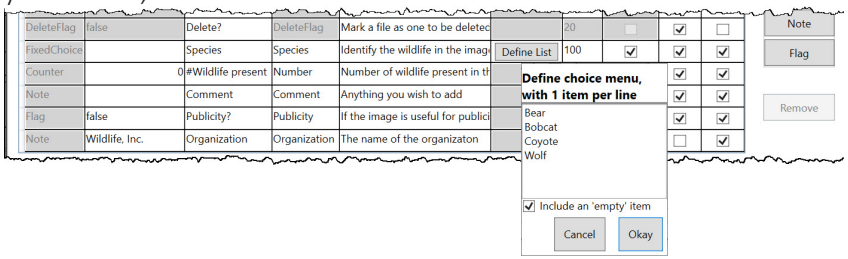
1. Click the ***Choice***, ***Count***, ***Note, Flag*** and then ***Note*** buttons to create five new rows of specific types. The preview areas show how they would appear in the Timelapse user interface and in the exported *.CSV* file.



2. Edit each row to set each field's attributes, which includes setting a more meaningful label to ***Number*** and ***Publicity***. At the same time, turn off the visibility for the ***Folder***, ***ImageQuality*** and ***Organization***: they will disappear from the user interface preview area, but are still present in the *.CSV* preview area. Finally, turn off Organization's ***Copyable*** attribute.

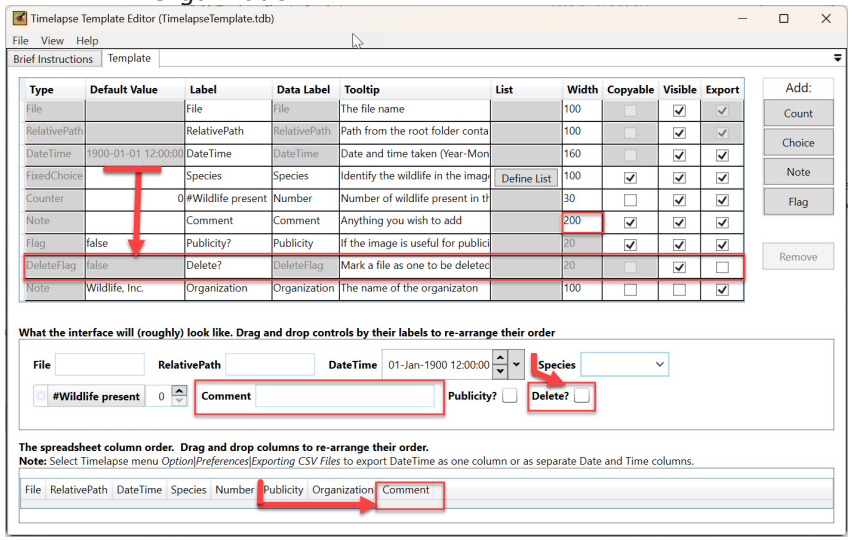


3. Add Items to the ***Species Choice*** List. Click the ***Define List button***, which raises a list editor. Type the species into the list, one per line. Because you also want the option to have this field set to empty, click the option ***Include and 'empty' item***. This will add a blank entry to the drop-down menu when it appears in Timelapse. If you want to set a default values for your choice, it must match one of the items in the list.

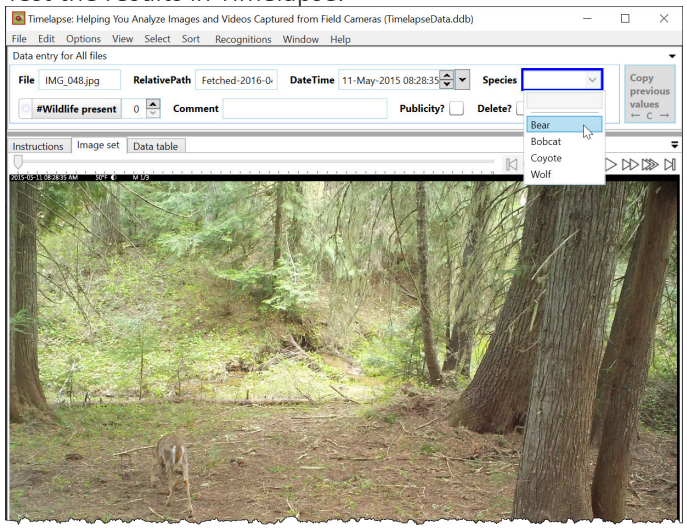


4. Adjust the user interface, if desired.
   - » Double the width of the ***Comment*** field by setting its ***Width*** to 200. You will see the results immediately in the user interface preview area.
   - » Move the ***Delete?*** field to the end of the user interface by clicking and dragging the ***Delete?*** label in the user interface preview area, and dropping it atop the last data field ***Publicity?***.

5. Rearrange the order of columns as they would be written to a *.CSV* file and displayed in a spreadsheet, if desired.
   - » In the *CSV* preview area drag the ***DeleteFlag*** field and drop it to just after the ***Organization*** field.



6. Test the results in Timelapse.



Other Template Editor Features

A few other features are available in the template editor, all accessed via the menu bar at its top.

The ***File*** menu is mostly self-explanatory, except for two things.

- There is no '***Save template...***' as everything is automatically saved to the template *.tdb* file while editing.
- ***Upgrade Timelapse files to latest version...*** is used to bulk-upgrade old selected Timelapse files (i.e., pre version 2.3) to the current version. Alternately, Timelapse will inform you if you are attempting to open an old file, and will raise the appropriate dialog to let you upgrade it. This menu item will disappear in the future.

The ***View*** menu is operational when editing a template.

- ***Inspect File Metadata...*** raises a dialog that allows you select a typical image set file, and inspect the metadata that file contains. Its purpose is to let you see if any file metadata is worth recording. If so, you can create a ***Note*** data field, where you can later have Timelapse automatically load each file's metadata value into that field. For example, if the file contained metadata for Ambient Temperature, you could create a data field called Temperature, where Timelapse will populate that field with each file's Ambient Temperature value.
- ***Show all columns...*** displays other non-editable data columns used by Timelapse. While useful for debugging, they are likely of little interest to most people.
  - » ***ID***: The internal database ID of each row
  - » ***Control order***: the sort order for displaying controls in the Timelapse user interface
  - » ***Spreadsheet order***: the sort order for the columns in the *.CSV* file.

The ***Help*** menu should be self-explanatory. You can use it to:

- quickly navigate to various pages on the Timelapse web site,
- view various video tutorials,
- join or send email to the Timelapse mailing list,
- find more about the Timelapse version you are running, including the ability to update to the latest version.

Modifying templates after they are used

There may be times when you want to change a template after its been deployed and used to tag images in an image set. For example:

- an analyst has an image set with a *TimelapseTemplate.tdb* in it and has begun analyzing those images.
- The analyst (or perhaps someone else) changes the template, perhaps to add or delete data fields, or to change the attributes of some data fields.
- The analyst then reopen the image set for further analysis using the modified template.

The good news is that Timelapse tries to accommodate changes to the template, where most modifications are easily managed. Timelapse always checks your template for changes, and will notify you (via a dialog box) of any implications that your modifications may have on your stored data, along with various choices to carry through or abort the operation.

Note: modifications involving changes to the ***DataLabel*** require special care, as the ***DataLabel*** defines how data is stored and retrieved in the Timelapse database.

Modifying a data field's appearance and order

Most modifications to a data field's attributes only alters how that field appears or is ordered as a control in the Timelapse interface. These modifications do not affect how your existing and future data is stored and used. Consequently, changes will be applied automatically when you reload an image set with a template whose fields are modified as follows.

- edit and alter the text in any field in a row EXCEPT ***Data Label***;
- change a field's ***Copyable, Export***, ***Visibility*** or ***Width***;
- change the position of data fields in the interface;
- change the position of data fields in the *.CSV* file;
- add items to the ***Choice*** menu.

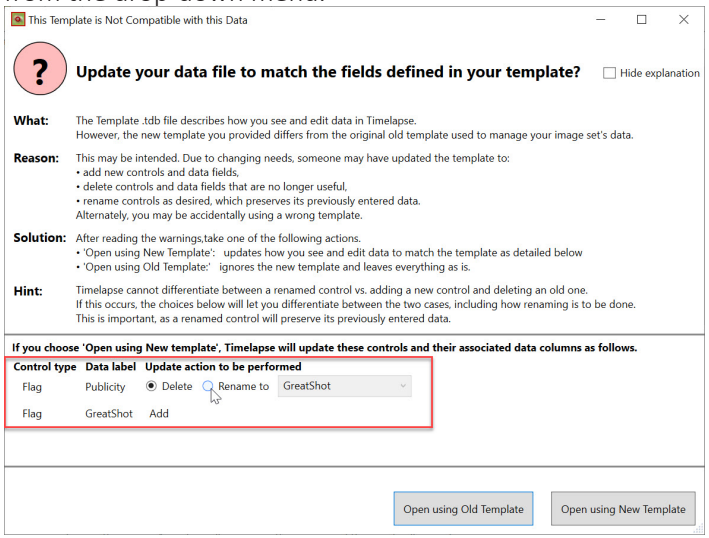
Adding and deleting rows or renaming data labels

Adding rows is safe. In contrast, deleting rows or renaming data labels have implications to the data already stored in a previously created image set, as these may affect the data label used to store your data.

- ***Adding a new data field*** defines a new control that will appear in the Timelapse interface, and a new data column in the database and .CSV file. This is a safe operation, as it does not affect any existing data.
- ***Deleting an existing data field*** indicates that you are no longer interested in that control or the data associated with it. The data field's control will no longer appear in the Timelapse interface. Importantly, any previously entered data associated with that data field will be deleted from the Timelapse database, and consequently not exported to the *.CSV* file.

  Note. If you want to keep the data, then just uncheck the control's visibility field instead of deleting it.
- ***Renaming a control by changing its data label*** leads to ambiguity when the template is opened in Timelapse. It can be interpreted as:
  - » deleting that row, and then adding a new row. This would delete the data associated with the original data label;
  - » renaming that row, which retains and associates the data with the new data label.

  As Timelapse cannot tell which possibility has occurred, it will raise a dialog box asking you to decide which action to take. For example, if you changed the ***DataLabel*** of *Publicity* to *GreatShot*, Timelapse will warn you and ask you what it should do. If you wanted to keep the data previously associated with *Publicity* you would click on ***Rename*** and select *GreatShot* from the drop-down menu.



Deleting and renaming items in a Choices' list

A *Choice* field's list is used to display a selectable menu of possible values for that field. Furthermore, *Choice* fields can only display text that match at least one of its menu items. Consequently, if you use the template to delete or change the name of an item in the *Choice* list, Timelapse will detect this and will warn you in a dialog. It will say that cannot display previously entered text that matches the missing item(s).

Even so, no data is deleted. While Timelapse cannot display that text in the data field if it differs, it still stores the original text in the data base.