

sprinkler irrigated) specific to the producer created in [Section III](#). Change the *County* name on RunitID #1 and #2 to match a county name entered in the COUNTIES table. Change the *State* name on each run unit to be consistent with the State name entered previously in the LOCATION and COUNTIES table. Enter the latitude degrees (*latde*), latitude minutes (*latmi*), latitude seconds (*latse*), longitude degrees (*longed*), longitude minutes (*longmi*) and longitude seconds (*longse*) for any particular location (farm) within the area of interest. The same values should be used for both run units. Make changes to the latitude (*latsign*) and longitude (*longsign*) signage accordingly. Enter the latitude (*YLT*) in decimal degrees. Enter the elevation (*ELEV*) in meters. The “YLT” and “ELEV” values should be the same for each of the run units. Later, if changes need to be made to these run units, edits can be made through the interface.

V. CREATING WEATHER STATIONS

To create weather files, using Weather Import (downloadable at <http://epicapex.tamu.edu/downloads/model-executables/weather-import/> is recommended.

The user can use the Weather Import to download and filter (format data into WinEPIC/CroPMan/WinAPEX usable format (.DLY)) weather data from select websites, or weather data can be formatted in Excel and filtered using the Excel worksheet filter in Weather Import.

If weather is downloaded from one of the websites provided through Weather Import, follow the directions for downloading the weather data provided for each weather site. Use the weather filter associated with each weather website (gray button in the lower left corner of screen) to format the weather data into a *.DLY. From this point continue with creating a wind station in [Section V.B](#).

The second method (formatting data in Excel) should be used if the user retrieves weather data from a source other than the websites made available through Weather Import. Weather data must be organized in the following specific order: YEAR, MONTH, DAY, SOLAR RADIATION, MAXIMUM TEMPERATURE, MINIMUM TEMPERATURE, PRECIPITATION, RELATIVE HUMIDITY, and WIND SPEED. See Figure 2 for an example. Only the underlined abovementioned weather variables are required. If the remaining variables are not available, a blank column should be left. **It is also very important to make certain that all of the data is only carried out to 2 or fewer decimal places.**

Figure 2. Example Excel weather file.

| YEAR | MONTH | DAY | RAD | TMAX | TMIN | RAIN | RHD | WV |
|------|-------|-----|------|------|------|------|------|-----|
| 2002 | 3 | 1 | 24.3 | 65 | 46 | 0 | 0.65 | 2.3 |
| 2002 | 3 | 2 | 22.5 | 66 | 45 | 0 | 0.65 | 1.4 |
| 2002 | 3 | 3 | 24.6 | 65 | 46 | 0 | 0.52 | 3.1 |
| 2002 | 3 | 4 | 24.3 | 52 | 46 | 0 | 0.5 | 2.5 |
| 2002 | 3 | 5 | 23.9 | 56 | 42 | 0 | 0.75 | 1.9 |
| 2002 | 3 | 6 | 23.8 | 58 | 48 | 0 | 0.72 | 1.8 |
| 2002 | 3 | 7 | 24.3 | 63 | 49 | 0 | 0.66 | 2.1 |
| 2002 | 3 | 8 | 22.5 | 67 | 50 | 0 | 0.63 | 2.4 |
| 2002 | 3 | 9 | 19.5 | 69 | 51 | 0.5 | 0.95 | 2.6 |
| 2002 | 3 | 10 | 20.5 | 75 | 51 | 0.65 | 0.97 | 2.9 |
| 2002 | 3 | 11 | 24.3 | 68 | 52 | 0 | 0.8 | 2.3 |
| 2002 | 3 | 12 | 22.5 | 76 | 54 | 0 | 0.76 | 1.4 |
| 2002 | 3 | 13 | 24.6 | 77 | 54 | 0 | 0.65 | 3.1 |
| 2002 | 3 | 14 | 24.3 | 76 | 53 | 0 | 0.65 | 2.5 |
| 2002 | 3 | 15 | 23.9 | 76 | 55 | 0 | 0.52 | 1.9 |
| 2002 | 3 | 16 | 23.8 | 75 | 55 | 0 | 0.5 | 1.8 |
| 2002 | 3 | 17 | 24.3 | 74 | 55 | 0 | 0.75 | 2.1 |
| 2002 | 3 | 18 | 23.5 | 74 | 51 | 0 | 0.72 | 2.4 |
| 2002 | 3 | 19 | 20.7 | 70 | 56 | 1.2 | 0.99 | 2.6 |
| 2002 | 3 | 20 | 24.7 | 70 | 58 | 0 | 0.75 | 2.9 |
| 2002 | 3 | 21 | 24.5 | 71 | 55 | 0 | 0.72 | 1.8 |

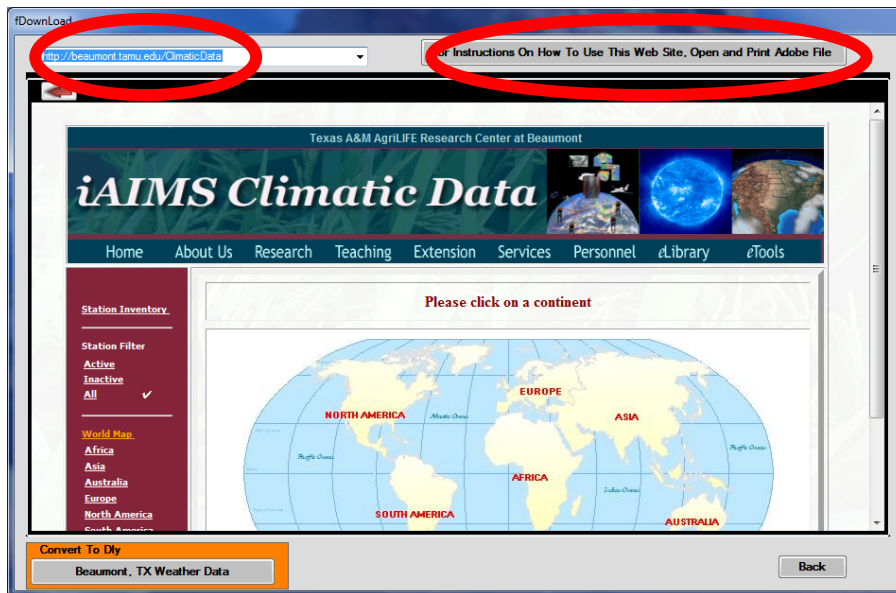
- YEAR should be a four-digit number.
- MONTH and DAY can be one- or two-digit numbers.
- SOLAR RADIATION units can be either MJ/m² or langleys.
- MAXIMUM and MINIMUM TEMPERATURE units can be either °F or °C.
- PRECIPITATION units can be either inches or millimeters
- RELATIVE HUMIDITY should be expressed as a fraction.
- WIND SPEED units must be in meters per second.

Once the data has been formatted as specified, it should be saved as a *tab-delimited text file*.

A. CREATING A WEATHER FILE (.DLY)

If the user is accessing one of the websites already programmed into Weather Import (Figure 3), they need to simply follow the instructions that can be downloaded in PDF format by clicking the “For Instructions...” button.

Figure 3. Weather websites download screen.



To convert the tab-delimited text file into a WinEPIC/CroPMan/WinAPEX usable format containing weather data obtained from a source other than the provided websites, it must be filtered using the **EXCEL CROPMAN WEATHER (TAB DELIMITED)** filter. To access this filter click the **EXCEL CROPMAN WEATHER (TAB DELIMITED)** button (Figure 4).

Figure 4. Main screen.



Select the text file to be converted to a *.DLY file (Figure 5). Next indicate whether the temperature data in the text file was in Fahrenheit or Centigrade, whether the precipitation data was in inches or millimeters, and whether to create a new file or to append/update an existing file (Figure 6).

Figure 5. Selecting file to be converted to *.DLY

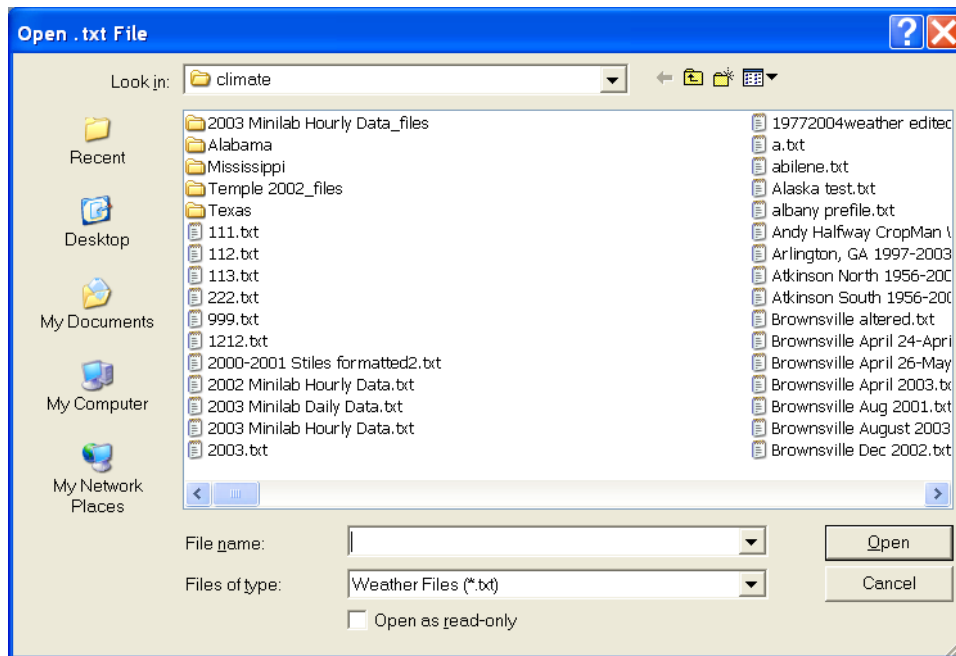
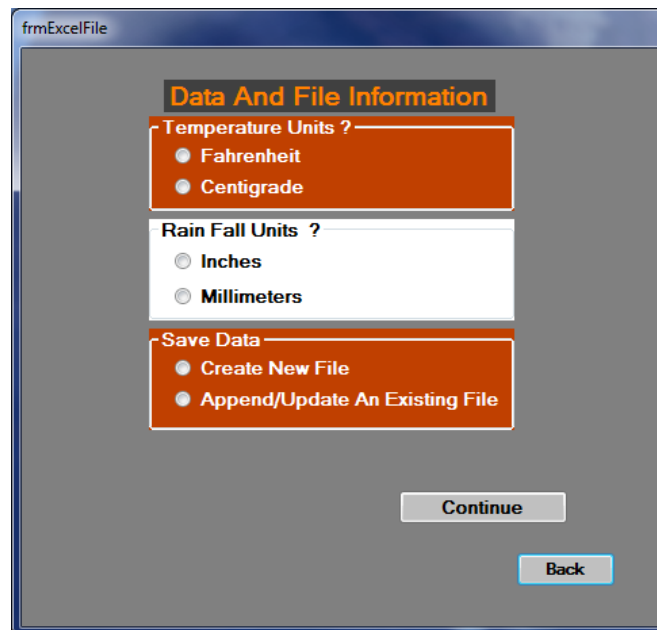
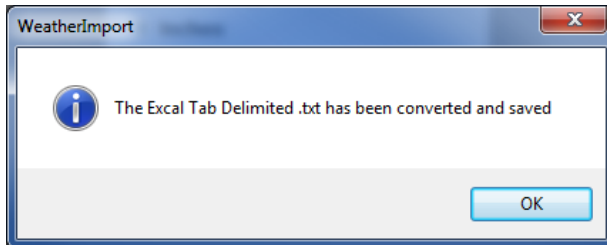


Figure 6. Data and File screen.



If “Create New File” was chosen, enter a file name to save the file as and click **SAVE**. If the file was successfully imported and converted the following message will appear (Figure 7).

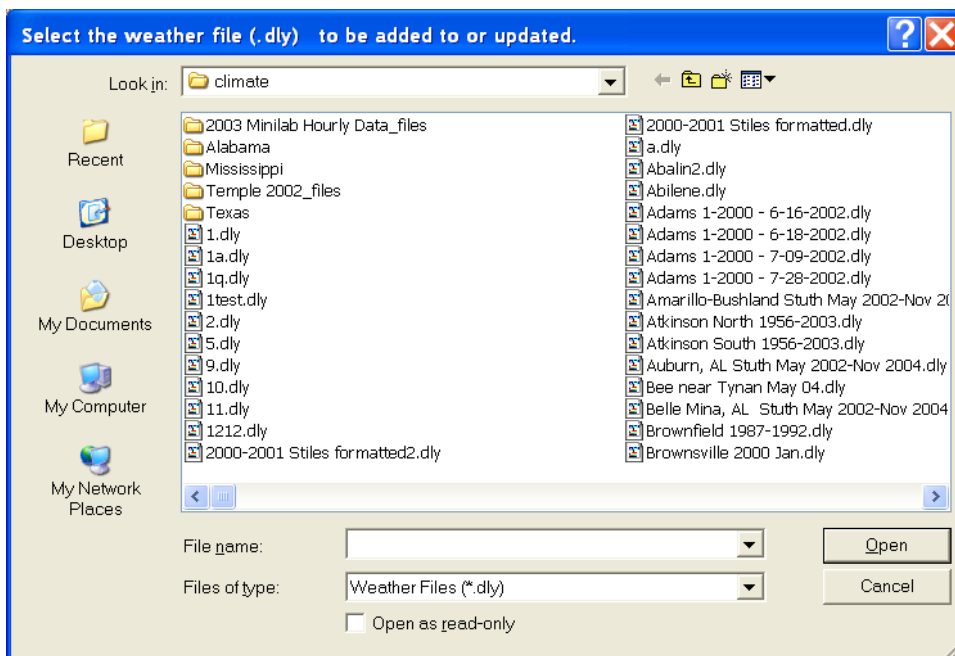
Figure 7. Successful import message



“Append/Update An Existing File” allows the user to add new weather data to an existing weather data file. For example, a previously filtered file containing January through December 2007 weather data could be combined with January through April 2008 data creating only one file with weather data from January 2007 through April 2008 instead of two separate files.

If the “Append/Update An Existing File” option was chosen, the user will be asked to choose the weather file to which the new weather data will be added (Figure 8).

Figure 8. Selecting weather file to add or update with new weather data.



If the weather data was successfully combined, the following message will appear (Figure 9).

Figure 9. Successful import and update message



B. CREATING A WIND STATION

To create a weather station, a wind station is required. The wind station consists of average monthly wind speeds and average directional wind frequencies for sixteen directions. One wind station can be used for numerous weather stations as applicable. To create a wind station, open the WIND DATA table. The table consists of a *recnum*, *Lookup*, *Month*, *UAVM* and *D1* through *D16* columns. The *recnum* number will automatically be added as new records are added to the end of the table. The *Lookup* name is the wind station ID. Each time this name is used along with a weather station, it must be entered exactly as it is here. *UAVM* is the average monthly wind speed in meters per second. *D1* through *D16* are the directional wind frequencies. The following table indicates the wind direction for each ID.

| ID | Wind Direction | ID | Wind Direction |
|----|-----------------|-----|-----------------|
| D1 | North | D9 | South |
| D2 | North Northeast | D10 | South Southwest |
| D3 | Northeast | D11 | Southwest |
| D4 | East Northeast | D12 | West Southwest |
| D5 | East | D13 | West |
| D6 | East Southeast | D14 | West Northwest |
| D7 | Southeast | D15 | Northwest |
| D8 | South Southeast | D16 | North Northwest |

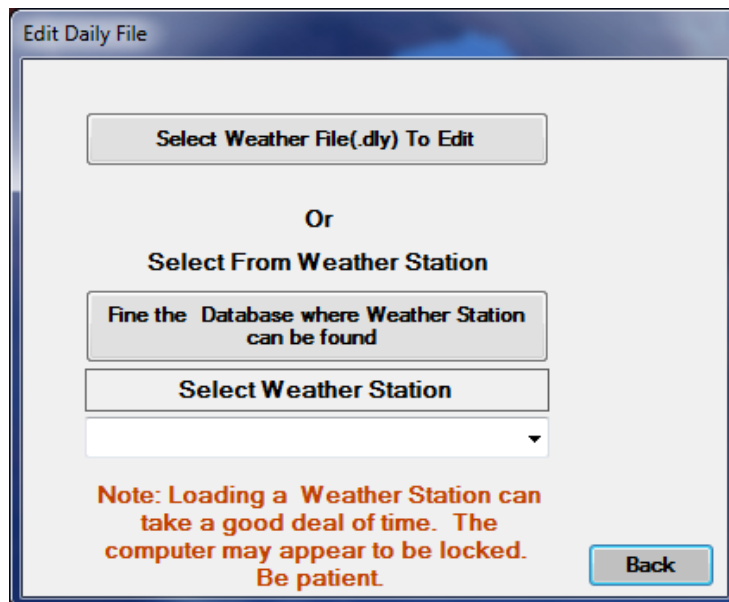
Each wind station requires this information to be filled in. If directional frequencies are not available, zero may be entered in these cells. *Lookup*, *Month* and *UAVM* are required for the model to run. After data has been added for all wind stations, the original wind stations (wind stations provided with the TEXAS CENTRAL database) may be deleted by highlighting the corresponding rows and pressing the DELETE key.

Next open the WIND LIST table. This table contains a listing of all wind stations available for use with weather stations. In this table *Lookup*, *EPIC_wind_name*, *State* and *Station* are the only required information. The other columns may be filled in with "Unknown", "0" or "unk" in accordance with the values used for the original wind stations. Values for *Lookup* should be entered exactly as they were in WIND DATA. It is recommended that the Lookup name be copied directly from the WIND DATA table and pasted in the WIND LIST table to avoid typing errors. The *EPIC_wind_name* should be identical to the Lookup name. *State* can be any two-character identifier. This identifier will be used in other tables within the database, so it must remain consistent throughout all the tables. *Station* should also be identical to the Lookup name. Once all of the wind stations created in the WIND DATA table have been added to the WIND LIST table, the original wind station data can be deleted.

C. CREATING A WEATHER STATION AND MONTHLY WEATHER DATA

Before making the weather station and monthly file, it is wise to use the **EDIT/CHECK WEATHER DATA** feature in Weather Import to check the data for missing days and/or out-of-range data. Click on **EDIT/CHECK WEATHER DATA** button (see Figure 4). Click the **SELECT WEATHER FILE (DLY) TO EDIT** button (Figure 10). Navigate to your weather file, highlight the file name and click **OPEN**.

Figure 10. Select weather file to edit.



The file will be displayed in the form of a worksheet (Figure 11). First, you will need to check for missing days. Click on the *Check For Missing Days*. The program will search your data and indicate any missing days in red (Figure 12).

Figure 11. Weather file worksheet.

| Year | Mo. | Day | Sol. Rad. | Max. Temp. | Min. Temp. | Precipitation | Rel. Hum. |
|------|-----|-----|-----------|------------|------------|---------------|-----------|
| 2010 | 10 | 24 | 0 | 155.48 | 109.04 | 25374 | 0 |
| 2010 | 10 | 25 | 0 | 155.66 | 109.22 | 25374 | 0 |
| 2010 | 10 | 26 | 0 | 155.84 | 108.86 | 25374 | 0 |
| 2010 | 10 | 27 | 0 | 155.3 | 107.96 | 25374 | 0 |
| 2010 | 10 | 28 | 0 | 154.22 | 107.24 | 25374 | 0 |
| 2010 | 10 | 29 | 0 | 153.5 | 106.7 | 25374 | 0 |
| 2010 | 10 | 30 | 0 | 152.24 | 105.62 | 25374 | 0 |
| 2010 | 10 | 31 | 0 | 150.44 | 104.72 | 25374 | 0 |
| 2010 | 11 | 1 | 0 | 161.6 | 102.2 | 0 | 0 |
| 2010 | 11 | 2 | 0 | 161.6 | 107.6 | 0 | 0 |
| 2010 | 11 | 3 | 0 | 156.2 | 116.6 | 0 | 0 |
| 2010 | 11 | 4 | 0 | 138.2 | 116.6 | 16.76 | 0 |

Change to English Add A Day Check For Missing Days Rewrite dly and Back

Missing Date Out Of Range Max Temp < Min Temp Back without rewrite dly

Figure 12. Missing Day/Out of Range/Temperature Data

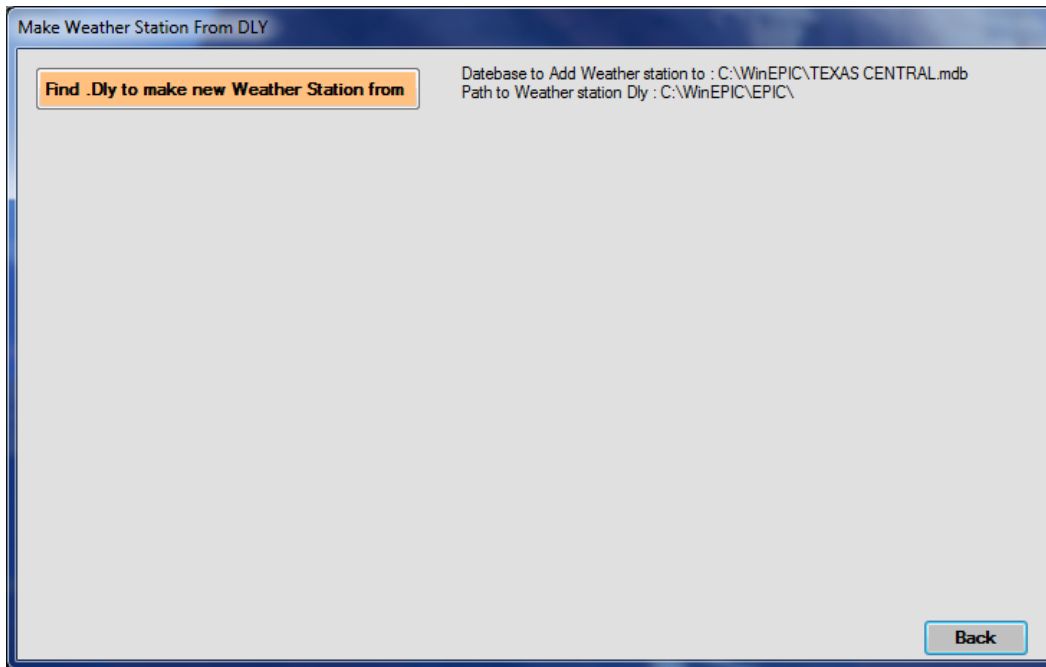
| YEAR | DAY | Sol. Rad. | | Maximum Temp. | | Minimum Temp. | | Precipitation | Rel. Hum. | | WIND Speed | | CO2 | | | |
|------|-----|-----------|-----|---------------|-----|---------------|-----|---------------|-----------|------|------------|-------|---------|-----|---------|-----|
| | | MJ | New | Fahr. | New | Fahr. | New | | Inches | New | Fraction | New | Current | New | Current | New |
| 1972 | 1 | 0 | | 999 | | 999 | | 999 | | 0 | | 0 | | 0 | | 0 |
| 1972 | 2 | 0 | | 999 | | 999 | | 999 | | 0 | | 0 | | 0 | | 0 |
| 1972 | 3 | 0 | | 999 | | 999 | | 999 | | 0 | | 0 | | 0 | | 0 |
| 1972 | 4 | 0 | | 999 | | 999 | | 999 | | 0 | | 0 | | 0 | | 0 |
| 1972 | 5 | 0 | | 999 | | 999 | | 999 | | 0 | | 0 | | 0 | | 0 |
| 1972 | 6 | 0 | | 999 | | 999 | | 999 | | 0 | | 0 | | 0 | | 0 |
| 1972 | 7 | 2 | | 32 | | 5 | | 0.02 | | 0.75 | | 14.74 | | 0 | | 0 |
| 1972 | 8 | 0 | | 10.04 | | 17 | | 0 | | 0.53 | | 9.22 | | 0 | | 0 |
| 1972 | 9 | 1 | | 37.04 | | -0.94 | | 0 | | 0.69 | | 14.92 | | 0 | | 0 |
| 1972 | 10 | 7 | | 39.02 | | 30.02 | | 0 | | 0.7 | | 9.19 | | 0 | | 0 |
| 1972 | 11 | 6 | | 39.92 | | 21.02 | | 0 | | 0.66 | | 8.05 | | 0 | | 0 |
| 1972 | 12 | 7 | | 35.06 | | 19.94 | | 0 | | 0.6 | | 7.56 | | 0 | | 0 |
| 1972 | 13 | 4 | | 46.94 | | 26.96 | | 0.2 | | 0.68 | | 14.14 | | 0 | | 0 |
| 1972 | 14 | 8 | | 17.06 | | 1.04 | | 0 | | 0.6 | | 11.39 | | 0 | | 0 |
| 1972 | 15 | 7 | | 6.08 | | 3.92 | | 0 | | 59 | 59 | 11.18 | | 0 | | 0 |
| 1972 | 16 | 8 | | 8.96 | | -18.94 | | 0.33 | | 0.53 | | 8.59 | | 0 | | 0 |
| 1972 | 17 | 3 | | 26.96 | | -14.08 | | 0.03 | | 0.68 | | 11.88 | | 0 | | 0 |
| 1972 | 18 | 2 | | 42.98 | | 17.06 | | 0.02 | | 0.64 | | 12.64 | | 0 | | 0 |
| 1972 | 19 | 7 | | 39.02 | | 26.96 | | 0 | | 0.62 | | 16.91 | | 0 | | 0 |
| 1972 | 20 | 3 | | 12.92 | | 8.06 | | 0.21 | | 0.64 | | 10.31 | | 0 | | 0 |
| 1972 | 21 | 9 | | 6.08 | | -5.08 | | 0 | | 0.59 | | 7.54 | | 0 | | 0 |
| 1972 | 22 | 3 | | 41 | | -5.98 | | 0.14 | | 0.7 | | 10.56 | | 0 | | 0 |
| 1972 | 23 | 2 | | 37.94 | | 15.98 | | 0 | | 0.68 | | 11.05 | | 0 | | 0 |
| 1972 | 24 | 9 | | 42.98 | | 10.94 | | 0.12 | | 0.58 | | 9.15 | | 0 | | 0 |
| 1972 | 25 | 4 | | 35.06 | | 12.02 | | 0 | | 0.55 | | 26.53 | | 0 | | 0 |
| 1972 | 26 | 10 | | 6.08 | | -5.98 | | 0 | | 0.4 | | 12.89 | | 0 | | 0 |

If data is available for the missing days, it can be entered at this point. Otherwise, if it is left as “999”, the model will generate weather data for those days. Data which is out of range will be highlighted in yellow (Figure 12). This data must be corrected before this file can be used to create a weather station and monthly file. If the maximum temperature is less than the minimum temperature, it will be highlighted in bright pink. This data must also be corrected in order for this file to be used to create a weather station and monthly file. Once all data has been corrected, click the **REWRITE DLY AND BACK** button. The weather file can now be used to create a weather station and monthly weather file.

Weather Import will be used to create the weather stations and monthly weather data. Two tables in the database will automatically be updated with the appropriate data. The WEATHER DATA table corresponds to the monthly weather data and the WEATHER LIST table is a listing of all the weather stations. To create the weather stations, click on **CREATE USER WEATHER STATION AND MONTHLY FILE FROM .DLY** (Figure 4).

First, the interface will ask you to select a database to write the new data to. This should be the TEXAS CENTRAL database or a similar database. Then the DLY that will be used to create the weather files must be selected (Figure 13). Click on **FIND .DLY TO MAKE NEW WEATHER STATION FROM**. Locate the file on the computer, highlight the file name and click OPEN.

Figure 13. Locating .DLY to create weather station from



A new screen will appear (Figure 14). You may select a nearby weather station from the list which will be used to fill in missing data; this is optional. Select the County and Wind Station for the new station. Enter a name for the new weather station. Enter a DLY name (8 characters or less). Enter the latitude and longitude in degrees. Make certain to also include the correct sign (+) or (-) in front of the latitude and longitude values. Enter the elevation in **meters** of the weather station. Click ADD NEW STATION.

Figure 14. Adding a new weather station

Make Weather Station From DLY

Find .Dly to make new Weather Station from

Database to Add Weather station to : C:\WinEPIC\TEXAS CENTRAL.mdb
Path to Weather station Dly : C:\WinEPIC\EPIC\
DLY file to make Weather staion from : C:\WinEPIC\import\test.Dly

Select a existing Weather Station to fill Fields TX BROWNWOOD 2ENE

| | |
|--------------------------------|----------------|
| Select County | Brown |
| Select Wind Station | TX GOLDTHWAITE |
| Enter New Weather Station Name | TEST2 |
| Enter New Dly Name | TEST2 |
| LATITUDE (degrees) | 31.738 |
| LONGITUDE (degrees) | -98.946 |
| ELEVATION in (mm) | 426.7 |

8 characters or less
In the Northern Hemisphere Latitude is a + No.
In the Western Hemisphere Longitude is a - No.

Find Latitude and Longitude using Web Site Map

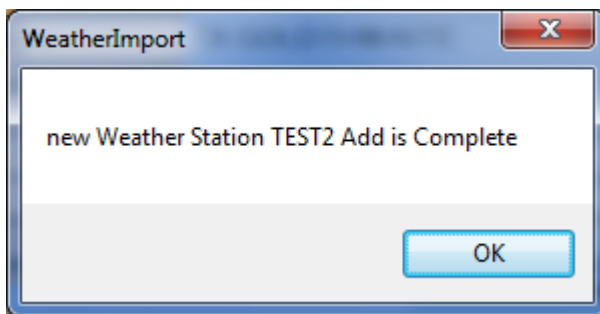
Add New Station

Back

- 1. To find latitude and longitude of a point, click on Find Latitude and Longitude using Web Site Map
- 2. Enter the Address of location in address box and click GO or zoom in on location
- 3. Write down Latitude and Longitude

If the station was successfully added, a message such as Figure 15 will appear.

Figure 15. Successful added weather station message

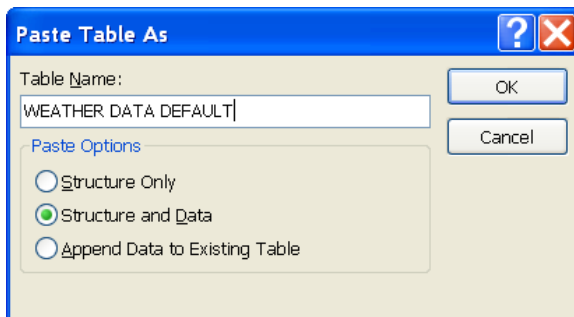


To add additional weather stations repeat steps described above beginning at selecting the .DLY to make the new weather station from.

Once all of the weather stations have been added, the original weather station data can be deleted. This is optional. To do this, open the new database. Open the WEATHER DATA table; highlight all the original weather station data making certain NOT to highlight the “MISSING LINE” row. Press the DELETE button. Close the WEATHER DATA table.

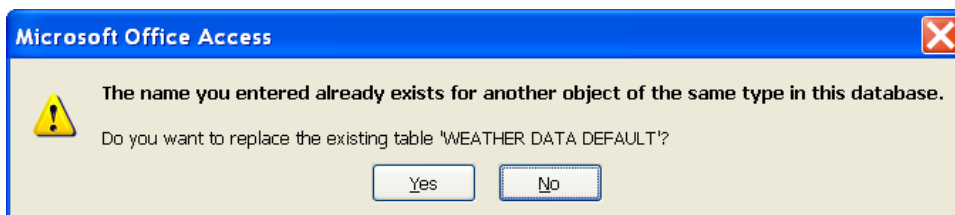
The WEATHER DATA DEFAULT table must then be updated with the new weather data. Highlight the WEATHER DATA table name in the list of tables. Right click, copy and paste the table. Make certain “Structure and Data” is selected (Figure 18). In the “Table Name” area type “WEATHER DATA DEFAULT” just as it is in the database table list and click **OK**.

Figure 18. Paste table as message



If the table name was entered correctly, the following message should appear (Figure 19). Click **YES**.

Figure 19. Name already exists message



Next, open the WEATHER LIST table. Highlight the original weather stations and delete.