

Monroe, S. A., M. Dyer, S. Stumpf, C. Bliss, and C. Parker. 2016. Water quality monitoring protocol for streams and springs in the Southern Colorado Plateau Network. Natural Resource Report NPS/SCPN/NRR—2016/1298. National Park Service, Fort Collins, Colorado.

Standard Operating Procedure #14: Data Entry, Version SCPN_WATER_QUALITY_SOP14_20160901

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Standard Operating Procedure #14: Data Entry

Version SCPN_Water_Quality_SOP014_20160901				
Revision History Log				
Previous version number	Revision date	Section and paragraph	Change(s) made	Approved by

Only changes in this specific SOP will be logged here. Record the previous version number and date of revision; identify sections and paragraphs where changes were made, who approved the revision, and the new version number. More detailed descriptions of the changes made and the reason for the changes is provided at the end of this SOP.

This Standard Operating Procedure (SOP) describes the general procedures for entering field data from paper datasheets into the digital working project database.

1 Data entry overview

The primary goal of data entry is to transfer data from paper field sheets into the digital database with 100% accuracy. Ideally, data entry should occur as soon as possible after data collection is completed and before the next sets of observations occur. Data entry should be completed by the person(s) who collected the data, or someone who is familiar with the project and data collection methods. It is the shared responsibility of the project manager and the data manager to ensure that all data entry staff understand how to enter data. Those who enter data must be familiar with the field datasheets, the database, and any standard codes for data entry.

Whenever possible, each Access data entry form has built-in quality-assurance compo-

nents, such as pick lists and validation rules, to test for valid data values, missing data, or illogical combinations.

As data are entered, the person entering the data should ensure that the data on screen for each record match the datasheet values before moving to the next form for data entry. At the end of the field season, the data manager ensures that data entry verification occurs (see SOP #16) to check for completeness and to identify data entry errors.

2 Database instructions

2.1 Getting started

The Water Quality Monitoring Database structure is fully documented in Appendix D of this protocol. It consists of 3 parts: a front-end and two back-ends. The front-end is the user interface (referred to as the “application” in this SOP), and contains the data entry forms, queries, and look-up tables; the two back-ends contain data tables and con-

sist of the primary back-end, which contains all the actual water quality related data; and the secondary back-end, which contains shipping information for the samples sent to water quality labs. The working back-end databases both have “_BE_” as part of their names, and should be stored on the server in the project workspace (see SOP #13) so that others can enter data into the same back-end files. Section 2.3.4 (Connect data tables) describes how to connect the front-end with the back-ends. For enhanced performance, users should copy the front-end database onto their local workstation hard drives and open it there. This front-end copy may be considered “disposable” because it does not contain any data: it acts as an interface with data residing in the back-end working database.

When new versions of the front-end application are released, there is typically no need to move or alter the back-end file. Instead, the front-end file may be deleted and replaced with the new version, which will be named in a manner reflecting the update. When this occurs, the front-end application will prompt the user to update the links to the back-end database files. This update will only need to be done once for each new release of a front-end file.

2.1.1 General instructions.

Since these data were originally logged on paper data sheets by trained field personnel, detailed descriptions and instructions for each data field are not included here—only Access form-specific instructions are included in this SOP.

Here we present information and instructions that are applicable throughout the data entry process for water quality monitoring.

- Time is typically entered in 24-hour format.
- Certain fields will be filled in automatically by the application. In most cases, fields set to accept user input are in sunken boxes set to the default background color of the computer being

used. Fields that will be automatically populated are flat and typically set to the form background color.

- Depending on the version of Access used, form details may display slightly differently than those presented in this document. The form pictures in this SOP were created using Access 2013 with the default window background set to light green.

2.2 Startup form

The *Startup form* (Figure 14-1) is the entry point for the application. This form opens automatically when the application starts and has links to related websites; for example, double-clicking the network name at the top left of the form will open the web site for the Southern Colorado Plateau Network (science.nature.nps.gov/im/units/scpn), and double-clicking the NPS Arrowhead or the title “National Park Service” at the top right of the form will open the National Park Service web site (www.nps.gov).

A set of tabs are visible on this form: *Main menu*, *Defaults*, and *About tabs*. Each of these tabs is described in this SOP. At the bottom of the *Startup form* are boxes that display the current location of the back-end data files to which the application is linked.

At the top right of the form is the **Exit** button. This is the preferred method for closing the application if changes have been made to the data. When the application is closed with the **Exit** button, the operator will be given the option to back up the database (see section 2.4).

2.3 Main menu tab

The *Main menu tab* on the *Startup form* (Figure 14-1) presents the following four main function buttons:

- **Enter/edit data.** Click this button to enter, edit or view water quality monitoring data (see 2.3.1).
- **Manage shipping.** Click this button to enter, edit or view shipping information for water quality samples sent to

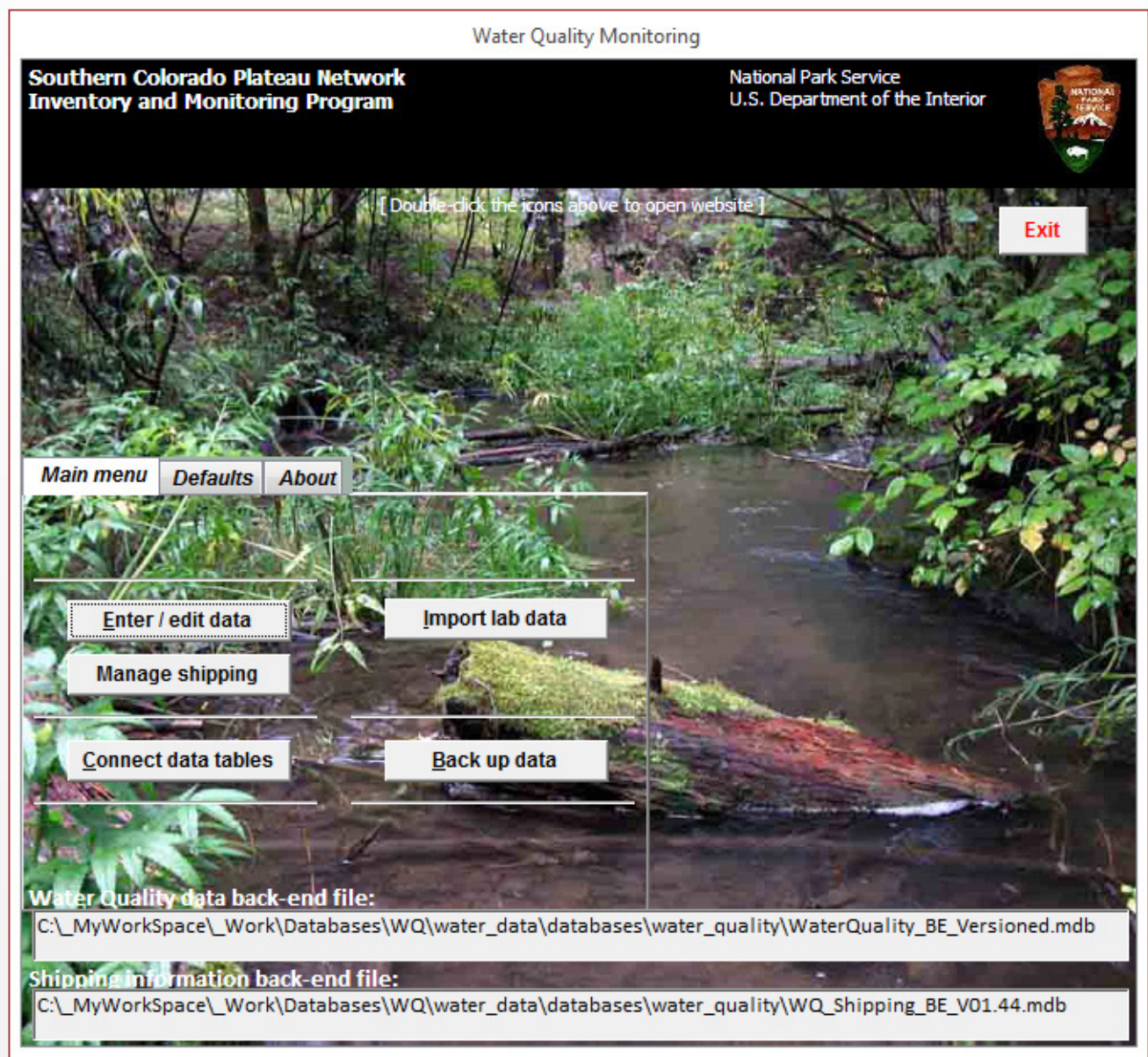


Figure 14-1. Water Quality database *Startup form* with **Main Menu tab** displayed.

the USGS National Water Quality Lab (NWQL) for analysis (see 2.3.2).

- **Import lab data.** Click this button to import USGS NWQL lab analysis results reports (see 2.3.3).
- **Connect data tables.** Click this button to change the back-end databases to which this front-end application is connected (see 2.3.4).
- **Back up data.** Click this button to create a date-and-time-stamped backup copy of the back-end database files (see 2.4.1).

2.3.1 Enter/edit data button of the Main menu tab.

To enter, edit or view water quality data, click the **Enter/edit data** button on the **Main menu tab** on the *Startup form*. This will cause the *Defaults values form* (Figure 14-34 on page 179) to appear (see Section 2.4). Review the information on this form, make any necessary changes and click the **OK** button. This will cause the *Data Gateway form* (Figure 14-2) to appear.

- The *Data Gateway form* provides two methods that help the user drill down to a desired record: sorting and filtering.

Data Gateway - List of data that have been entered

Double-click on a column label to change sort order.
Double-click on a Visit Date to open the Data Entry form for that record.

Add a new record Close

Filters Park: Stream: Year: Visit Date:
Station: Visit Time: **Filter Is Off**

Unit	Stream	Station ID	Year	Visit date	Visit time	Site Name
MEVE	Mancos River	MEVE_MAN01	2016	10 Jan 2016	11:15:00 AM	Mancos River downstream of North Park Boundary, Mesa Verde NP
BAND	Capulin Creek	BAND_CAP01	2015	06 Aug 2015	10:35:00 AM	Capulin Creek above Base Camp
BAND	Rito de los Frijoles	BAND_RIT01	2015	05 Aug 2015	10:00:00 AM	Rito de los Frijoles at the HQ Gauging Station
BAND	Rito de los Frijoles	BAND_RIT01	2015	19 Feb 2015	12:05:00 PM	Rito de los Frijoles at the HQ Gauging Station
BAND	Rito de los Frijoles	BAND_RIT02	2015	19 Feb 2015	9:26:00 AM	Rito de los Frijoles near Los Alamos, NM
BAND	Rito de los Frijoles	BAND_RIT02	2015	06 Aug 2015	4:18:00 PM	Rito de los Frijoles near Los Alamos, NM
BAND	Rito de los Frijoles	BAND_RIT03	2015	05 Aug 2015	5:00:00 PM	Rito de los Frijoles at Wilderness Boundary
BAND	Rito de los Frijoles	BAND_RIT03	2015	19 Feb 2015	3:07:00 PM	Rito de los Frijoles at Wilderness Boundary
CACH	Chinle Wash	CACH_CHI01	2015	17 Feb 2015	11:08:00 AM	Chinle Wash at Chinle, AZ
CACH	Chinle Wash	CACH_CHI01	2015	03 Aug 2015	12:57:00 PM	Chinle Wash at Chinle, AZ
CACH	Tsaille Creek	CACH_TSA01	2015	03 Aug 2015	5:45:00 PM	Tsaille Creek below Tsaille Lake
CACH	Tsaille Creek	CACH_TSA01	2015	17 Feb 2015	1:33:00 PM	Tsaille Creek below Tsaille Lake

Figure 14-2. Data Gateway form.

Data Entry - New

*Park code: *Stream: New Stream Edit Stream Protocol name: Water Quality Delete Record New Record Close

*Site code: Site description: *Start date: Start time: Initials of everyone present: Local time zone: MST

USGS ID: End date: End time:

Observers: Photos: Field calibration: Bacteria processed by: Bottles collected by:
Discharge: Turbidity: Bacteria read by: Samples processed by:

Site access notes, general observations, other sampling work done:

Precipitation during sampling: Precipitation 24 hrs prior to sampling:

Enter a Park, Stream, Site Code and Start Date to enable the rest of this form.

Figure 14-3. Data Entry form – new record mode.

- **Sort records.** Double-click on a column header to sort all records by that column value. The first double-click action causes the records to be sorted in ascending order, a second double-click action causes the records to be sorted in descending order. The column heading is changed to bold italic format to indicate the column used to sort the records.
- **Filter records.** Filters can be set for any column except **Site Name**. Filters are set by selecting from the drop-down lists in the **Filters** box at the top of the form, and are toggled on and off by clicking the **Filter** button. The label on the **Filter** button changes as the filters are toggled on or off, indicating the current status of the filters. Remove a filter by de-

Streams and Sites

Edit Stream
Note: Streams and sites can only be deleted from the back end, due to the high probability that they could be used by other events.
Close

NPS Unit: MEVE Stream Name: Mancos River

Sites:

☐	Site Name	MEVEMAN15	USGS ID:	
	Site Description	Walk thru site		
☐	Site Name	MEVE_MAN01	USGS ID:	371648108214500
	Site Description	Mancos River downstream of North Park Boundary, Mesa Verde NP		
☐	Site Name	MEVE_MAN02	USGS ID:	
	Site Description	Mancos River upstream of South park Boundary, Mesa Verde NP		
☐	Site Name	MEVEMAN12	USGS ID:	
	Site Description	Walk Thru site		
☒	Site Name		USGS ID:	
	Site Description			

Record: 1 of 4 No Filter Search

Figure 14-4. *Streams and Sites form* – edit mode.

- letting the text displayed in that filter control box.
 - Create a new record. Create a new record by clicking the **Add a new record** button at the upper right-hand corner of the *Data Gateway form* (Figure 14-2). This will open the *Data Entry form* in new mode (Figure 14-3).
 - Open an existing record. Open an existing record for review or editing by double clicking on the blue text in the **Visit date** field. This will open the *Data Entry form* in edit/view mode (Figure 14-4).
- **Data Entry form.** Event level information for water quality monitoring field trips is entered in the *Data Entry form* (Figure 14-3). This includes information about the trip as well as the data gathered during the trip. A set of tabs, corresponding to the Water Quality datasheet organization, are included on this form. Each of these tabs is explained in detail in the sections that follow.
 - Basic event location and date information must be entered before a new record can be saved to the back-end database. To enforce this, the form tabs are made invisible until this basic event level data have been entered (Figure 14-3).
 - Enter **Park, Stream, Site Code** and **Start Date** first, in that order. These fields have red asterisks next to them to alert the user to the primacy of these fields. If this form is exited before these fields are filled in, a warning box appears, warning that the record will not be saved without these required data.

As each item is entered, the options for the next level item are generated so only appropriately connected

Data Entry - Edit/View

* Park code: **MEVE** * Stream: **Mancos River** **New Stream** **Edit Stream** Protocol name: Water Quality **Delete Record** **New Record** **Close**

* Site code: **MEVE_MAN01** Site description: Mancos River downstream of North Park Boundary, Mesa Verde NP * Start date: **01/10/2016** Start time: **11:15** Initials of everyone present: **JD, BS, SC** Local time zone: **MST**
 USGS ID: 371648108214500 End date: **01/10/2016** End time: **15:35**

Observers: Photos: Field calibration: Turbidity: Bacteria processed by: Bacteria read by: Bottles collected by: Samples processed by:

Site access notes, general observations, other sampling work done: **Rained last night, but clear this morning.** Precipitation during sampling: **Rain** Precipitation 24 hrs prior to sampling: **Yes**

Stream Channel and Flow Temp Loggers Photo Documentation Discharge Sonde Measurements Turbidity Bacteria Sample Collection / Processing

Stream Channel

Channel: **Braided**

Substrate:
Select up to 10 unique values, then check one as dominant

Substrate	Dominant
☐ Cobble	☐
☐ Gravel	☒
☐ Silt	☐
☐ Sand	☐
☐ Vegetation	☐
☐ *	☐

Flow

Stream color: **Muddy** Ice cover: **0** %
 If "other" describe: Avg. ice thickness: **0** cm
 Flow mixing: **Good** Flow severity: **Normal** Hydrograph limb: **Falling**

Comments:

Flood Evidence

Select "None" or up to 7 unique values

☒ Fresh debris line in channel
☐ Grasses/shrubs laid over
☐ *

Figure 14-5. *Data Entry form*, showing **Stream Channel and Flow tab** in **edit/view existing record** mode. In the **new record** mode, the fields for each tab would not show up until basic event location and date information is entered, and the fields in the tabs would be blank.

- items can be selected.
 - Once a **Park** is selected, the **Stream** pick list is generated to contain only streams located within that park.
 - Once a stream is selected, the pick list for **Site code** is generated. To enter a new stream click the **New Stream** button. To add a new site to an existing stream, or to edit an existing site, click the **Edit Stream** button. Both the **New Stream** and **Edit Stream** buttons cause the *Streams and Sites form* (Figure 14-4) to be displayed. The mode ("new" or "edit") is displayed in the upper left-hand corner of the form. Fill out the
 - fields on this form as directed.
 - Once a **Site code** has been selected the **USGS ID** and **Site description** fields will be filled out automatically.
 - Click on the **Start Date** or **End Date** field of the *Data Entry form*. A small calendar is displayed to the right of the field. Date can either be entered manually (mm/dd/yyyy) or by clicking on the calendar. Since most field trips start and end on the same day, the **End Date** is automatically set to the **Start Date** when the **End Date** field is clicked in. **End Date** can be changed if necessary.
- Once **Start Date** has been entered

The screenshot shows the 'Temp Logger' tab in a software application. The top navigation bar includes tabs for 'Stream Channel and Flow', 'Temp Loggers', 'Photo Documentation', 'Discharge', 'Sonde Measurements', 'Turbidity', 'Bacteria', and 'Sample Collection / Processing'. The 'Temp Loggers' tab is active, showing two columns for 'Aquatic Temperature Logger' and 'Air Temperature Logger'. Each column contains fields for 'Current logger' and 'New or replacement logger', including manufacturer/model, download/removal time, and serial number. There are also text areas for notes and data download file names, and a 'Browse' button. At the bottom, there are fields for NIST- traceable thermometer model and serial number, and NIST- thermometer temp at time of download.

Figure 14-6. **Temp Logger tab** on the *Data Entry form*.

- the rest of the *Data Entry form* is made visible and accessible (Figure 14-5).
- Before moving on to these tabs, fill out the rest of the fields in the top portion of the *Data Entry form*.
 - The names in the **Observers** box are displayed automatically as observers are selected in each of the tabs.
- **Stream channel and Flow tab.** Enter data describing the stream channel and stream flow in this tab (Figure 14-5). Fill out the fields on this form as directed. Additional instructions are displayed on the form.
- **Temp Loggers tab.** Enter data from water and air temperature loggers. Fill out the fields on this tab as directed (Figure 14-6)
 - The current logger is the logger on-site when the field crew arrives. Data is downloaded from this logger. If this is the initial placement of the logger then the information for the logger being placed on the site is put into the **New or replacement logger** fields.
 - If the current logger needs to be replaced, then the time the current logger is removed is entered into the **Download or removal time** field, and the information for the replacement logger entered into the **New or replacement logger** fields. For more information on this process, see SOP #5.
 - To ensure the pathname for the downloaded data logger file is entered correctly, use the **Browse** button rather than entering the pathname manually. The **Browse** button will start navigation in the field_data\WQ_equipment_downloads folder within the folder structure described in the Project Workspace (SOP #13) and diagrammed in Figure 13-1. Navigate to the folder the file was placed in, select the file name and click **Open**.
- **Photo Documentation tab.** Enter information about photographs taken during

Data Entry - Edit/View

*Park code: MEVE		*Stream: Mancos River	New Stream	Edit Stream	Protocol name: Water Quality	Delete Record	New Record	Close
*Site code: MEVE_MAN01	Site description: Mancos River downstream of North Park Boundary, Mesa Verde NP		*Start date: 01/10/2016	Start time: 11:15	Initials of everyone present: JD, BS, SC	Local time zone: MST		
USGS ID: 371648108214500		End date: 01/10/2016	End time: 15:35					
Observers	Photos: John Doe	Field calibration: Turbidity:	Bacteria processed by:	Bacteria read by:	Bottles collected by:	Samples processed by:		
Site access notes, general observations, other sampling work done: Rained last night, but clear this morning.					Precipitation during sampling: Rain	Precipitation 24 hrs prior to sampling: Yes		

Stream Channel and Flow Temp Loggers **Photo Documentation** Discharge Sonde Measurements Turbidity Bacteria Sample Collection / Processing

Photographs Observer: John Doe

☒ Check here if photos were taken

If this box is checked it indicates photos were taken and can be found in the ThumbsPlus Database.






Figure 14-7. *Photo Documentation tab* on the *Data Entry form*.

a water quality monitoring field trip in this tab (Figure 14-7).

- If photographs were taken, select the name of the person who took the photographs from the **Observer** drop-down pick-list, and then click on the check box in the center of this form. The selected name will be placed in the **Observers** box at the top of the *Data Entry form*. The photographs are logged into the master ThumbsPlus database.
- To add/enter a new observer, click the **Add/Edit Observers** button. This causes the *Participants and Observers form* (Figure 14-8) to appear. Use the navigation bar at the bottom of the form to find the entry to edit. Move to the end of the list to input a new entry.
- *Discharge tab*. Enter data for stream discharge measurement in this tab (Figure 14-9). Due to the way the data are connected in the back-end database, the **Gaging Station Readings** and **Flo-Mate Current Meter** boxes are initially disabled. Enter data into the **Discharge measurement box** at the top. As data are entered, other fields and areas are enabled as appropriate. For example, when “Visual Estimate” is selected in the **Discharge measurement method** drop down menu, the **Visual est.** field is enabled so the user can enter the visual estimate value.
 - Select or enter an observer as for the *Photo documentation tab*.
 - Enter the pathname for the downloaded data logger file by using the **Browse** button rather than entering

the pathname manually. Navigate to the folder within the field_data\Hydro_Equipment_download folder (described in SOP #13 and diagrammed in Figure 13-1), where the data logger file was placed, select the appropriate file name and click **Open**.

- Select a flow meter from the **Flow meter make/model/SN** drop down box. When Marsh-McBirney FloMate is selected as flow meter, the **FloMate Current Meter** box is enabled (Figure 14-10).
- Enter data into the **FloMate Current Meter** box. Enter the number of points that were measured along the stream channel in the **Flomate Current Meter** box. Do not include the left edge of water (LEW) and right edge of water (REW) points. After entering the number of points, click the button in the center of the box to create the table as indicated.

Figure 14-8. *Participants and Observers form.*

The *FloMate data entry subform* will open (Figure 14-11). The edge of water values will be preset to zeroes.

Figure 14-9. **Discharge tab** on the *Data Entry form* - blank form with no data.

Flomate Discharge Readings

Close Form

Point	Meas. Depth		Metric				English			
			Location (m)	Depth (m)	Velocity 1 (m/s)	Velocity 2 (m/s)	Location (ft)	Depth (ft)	Velocity 1 (ft/s)	Velocity 2 (ft/s)
▶ LEW	0.6	▼	0.74	0	0		2.46	0	0	
1	0.6	▼	0.8	0.07	0.03		2.62	0.22	0.09	
2	0.6	▼	0.85	0.07	0.09		2.78	0.22	0.29	
3	0.6	▼	0.09	0.07	0.19		0.29	0.22	0.62	
4	0.6	▼	0.95	0.08	0.14		3.11	0.26	0.45	
5	0.6	▼	1	0.08	0.06		3.28	0.26	0.19	
6	0.6	▼	1.05	0.07	0.01		3.44	0.22	0.03	
REW	0.6	▼	1.15	0	0		3.77	0	0	
*		▼								

Figure 14-12. FloMate Discharge Readings form.

- Enter data in either metric or English units. Data entered in metric units will automatically be converted to English units and automatically entered in the appropriate field, and vice versa. Select measurement depth from the drop-down list provided. Options are a single measure at 0.6 meters, or two measures at 0.2 and 0.8 meters. The **Velocity 2** field is only enabled when the 0.2/0.8 two-measure method is selected. When more than 6 points are required, use the vertical scroll to view all the data. To view the whole table at one time, click the **Open Entire Table** button (Figure 14-12). The *FloMate Discharge Readings* form with the complete table will open.
- After all discharge reading data have been entered, click the **Calculate Total Discharge** button. The application will check for errors in the FloMate data and will report any errors to the user. If no errors are detected, the application will calculate the discharge from the FloMate data entered and place this value in the **Discharge Measurement** box of the *Discharge* tab. Because this value is calculated when FloMate is the selected current meter, the **Discharge** field cannot be modified by the user. To delete all FloMate readings and start over, select a different current meter, then reselect FloMate.
- Fill out the rest of the fields on this form as directed.
- **Sonde Measurements tab.** Enter core parameter data from the hydrolab sonde in this tab (Figure 14-13). When initially loaded, this form directs the user to enter or select the field calibration event associated with the hydrolab data. When more than one site is sampled on the same day, the same field calibration can be associated with multiple entries of hydrolab data.
 - If no calibration information is to be entered, fill in the **Calibration Notes** field of the *Sonde Measurement* tab with the reason why no calibration was performed, and/or why no calibration data has been entered.
 - To enter new calibration data, click the **Add New** button in the upper

Data Entry - Edit/View

*Park code: MEVE	*Stream: Mancos River	New Stream	Edit Stream	Protocol name: Water Quality	Delete Record	New Record	Close
*Site code: MEVE_MANO1	Site description: Mancos River downstream of North Park Boundary, Mesa Verde NP	*Start date: 01/10/2016	Start time: 11:15	Initials of everyone present: JD, BS, SC	Local time zone: MST		
USGS ID: 371648108214500		End date: 01/10/2016	End time: 15:35				
Observers: John Doe	Field calibration: Turbidity:	Bacteria processed by:	Bacteria read by:	Bottles collected by:	Samples processed by:		
Site access notes, general observations, other sampling work done: Rained last night, but clear this morning.				Precipitation during sampling: Rain	Precipitation 24 hrs prior to sampling: Yes		

Stream Channel and Flow | Temp Loggers | Photo Documentation | Discharge | **Sonde Measurements** | Turbidity | Bacteria | Sample Collection / Processing

Field Calibration of Water Quality Instrument

Field calibration of WQ instruments: Add New View/Edit

Select a WQ instrument field calibration to display the calibration information

OR

Enter a comment that explains why calibration data is not present.

Calibration Notes:

Water Quality Field Measurements

Hydrolab file to import: Browse Import

Selected records

Enter a core parameter sample time. Then either browse to and import a hydrolab file or click on the button below to enter core parameter data manually.

Enter Core Parameter Data

Multi-parameter sonde (deployed)

Start date: Start time:

Start battery % left: %

Sampling interval: minutes

End date: End time:

End battery % left: % Browse

Log file name:

Comments on water quality data collection:

Figure 14-13. *Sonde Measurements* tab on the *Data Entry* form - initial view with no data.

- right-hand corner of the **Field Calibration of Water Quality Instrument** box. The *Calibration of Water Quality Instrument* form (Figure 14-14) will display in add data mode.
- Enter calibration information, which pertains to all sites sampled on the same day. However, the dissolved oxygen calibration needs to be performed at each site, and so needs to be entered for each event.
- Select or enter an **Observer** as for the *Photo Documentation* tab above.
- To use calibration information previously entered, select the calibration

event from the **Field calibration of WQ instruments** drop-down list at the top of the **Field Calibration of Water Quality Instrument** box of the *Sonde Measurement* tab. If changes need to be made to these data, click the **View/Edit** button. This will cause the *Calibration of Water Quality Instrument* form to appear in edit mode (Figure 14-14).

- The calibration data are displayed in the upper half of the *Sonde Measurements* tab (Figure 14-15). Since dissolved oxygen is affected by local barometric pressure, these data need to be entered at each site and are en-

Calibration of Water Quality Instrument

Add New Water Quality Calibration Event Close

Calibration event name: Observer: Add/Edit Observers

Calibration location: WQ instrument make and model:

Calibration date: WQ instrument SCPN name:

Instrument set to local time: Stream water temp at time of calibration: °C

Parameter	Std. Value	Lot number	Pre-Calibration		Post Calibration	
			Reading	Temp (°C)	Reading	Temp (°C)
Specific Conductivity	100 µs/cm					
	1413 µs/cm					
	Other: µs/cm					
pH	7.00					
	10.00					

Figure 14-14. Calibration of Water Quality Instrument form in the add data mode. In the edit mode, the screen is the same but says "Edit New Water Quality Calibration Event" in the top left corner of the form.

Stream Channel and Flow
Temp Loggers
Photo Documentation
Discharge
Sonde Measurements
Turbidity
Bacteria
Sample Collection / Processing

Field Calibration of Water Quality Instrument

Field calibration of WQ instruments: Add New View/Edit

Observer: Sam Clark

Calibration location: MEVEMAN01

Calibration date: 01/10/2016 Calibration Time: 10:33

Instrument set to local time: Yes

WQ instrument make and model: Hach Hydrolab MS-5

WQ instrument SCPN name: Chalihutlicue

Stream water temp at time of calibration: 0.2 °C

Calibration Notes:

Parameter	Std. Value	Lot number	Pre-Calibration		Post Calibration	
			Reading	Temp (°C)	Reading	Temp (°C)
Specific Conductance	100 µs/cm	4062012	105	1.27	100	0.56
	1413 µs/cm	4082835	1392	0.88	1413	1.01
	Other: µs/cm					
pH	7.10	4072579	7.22	0.97	7.10	1.58
	10.26	4071596	10.30	0.48	10.26	0.76
Dissolved Oxygen	100% sat		101.6	99.9	19.8	19.17
Barometric Pressure			518	mm Hg		

Water Quality Field Measurements

Hydrolab file to import: Browse Import

Sample collection time:

Selected records

Enter a core parameter sample time. Then either browse to and import a hydrolab file or click on the button below to enter core parameter data manually.

Multi-parameter sonde (deployed)

Start date: Start time:

Start battery % left: %

Sampling interval: minutes

End date: End time:

End battery % left: %

Log file name: Browse

Comments on water quality data collection:

Figure 14-15. Sonde Measurements tab on the Data Entry form - calibration data view.

tered after the rest of the calibration data have been selected. Enter these at the bottom of the Field Calibration of Water Quality Instrument

- box.
- The water quality core parameter data for the Water Quality Field Measurements box may be imported from the

Stream Channel and Flow Temp Loggers Photo Documentation Discharge **Sonde Measurements** Turbidity Bacteria Sample Collection / Processing

Field Calibration of Water Quality Instrument

Field calibration of WQ instruments: MEVEMAN01 01/10/2016 Add New View/Edit

Observer: Sam Clark

Calibration location: MEVEMAN01

Calibration date: 01/10/2016 Calibration Time: 10:33

Instrument set to local time: Yes

WQ instrument make and model: Hach Hydrolab MS-5

WQ instrument SCPN name: Chalihutlicue

Stream water temp at time of calibration: 0.2 °C

Calibration Notes:

Parameter	Std. Value	Lot number	Pre-Calibration Reading	Temp (°C)	Post Calibration Reading	Temp (°C)
Specific Conductance	100 µS/cm	4062012	105	1.27	100	0.56
	1413 µS/cm	4082835	1392	0.88	1413	1.01
pH	7.10	4072579	7.22	0.97	7.10	1.58
	10.26	4071596	10.30	0.48	10.26	0.76
Dissolved Oxygen	100% sat		101.6	99.9	19.8	19.17
	Barometric Pressure	618 mm Hg				

Water Quality Field Measurements

Hydrolab file to import: water_data\field_data\WQ_equipment_downloads\Hydrolab\2013\20130131_MEVEMAN01.txt Browse Import

Sample collection time: 12:15

Selected records

Time	% Batt Left	Water Temp (C)	pH	Sp. Cond (µS/cm)	Dissolved O ₂ (mg/L)	Dissolved O ₂	BP	Selected
12:15:00 PM	66	-0.29	8.17	1969	11.1	95	608	☒
12:15:05 PM	66	-0.29	8.13	1968	11.1	94.9	608	☒
12:15:10 PM	66	-0.29	8.09	1971	11.11	95	608	☒
12:15:15 PM	66	-0.29	8.14	1969	11.12	95.1	608	☒
12:15:20 PM	66	-0.3	8.09	1971	11.12	95.1	608	☒
12:15:25 PM	66	-0.29	8.13	1969	11.1	95	608	☒
12:15:30 PM	66	-0.29	8.12	1971	11.1	95	608	☒
Median Values:		-0.29	8.13	1969	11.1	95		

Delete Core Param Data View Core Param Data

Scroll down to see graph of imported pH data.

Multi-parameter sonde (deployed)

Start date: Start time:

Start battery % left: %

Sampling interval: minutes

End date: End time:

End battery % left: %

Log file name: Browse

Comments on water quality data collection:

Figure 14-16. *Sonde Measurements* tab on the *Data Entry form* - hydrolab data imported view.

downloaded hydrolab data file, or entered manually (see below). Before any of these parameter data are entered, first enter the **sample time** the data were collected in the **Water Quality Field Measurements** box. This sample time must be the same sample time entered on the *Sample Collection / Processing* tab (See Figure 14-25 on page 172).

The application selects the seven entries closest to the sample collection time from the hydrolab data file and calculates the median. The application attempts to select the seven values that start at the sample collection time. If these times do not correlate (i.e.: if the time entered as sample collection time is not found in the range of times imported from the hydrolab) the application will select the first seven values. If less than seven values are imported, an error message will be displayed to the user.

- To import data, click the **Browse** button in the **Water Quality Field**

Measurements box and navigate to the folder the file was placed in; select the file name, and click **Open**. Navigate to the field_data\WQ_equipments_downloads folder within the folder structure described in SOP #13 and diagrammed in Figure 13-1. Once a file has been selected the **Import** button will become active.

- Click the **Import** button to import the data. The application will select and display the seven values in the **Water Quality Field Measurements** box and calculate the median values (Figure 14-16).
- To help the user to verify that the best values were automatically selected, the application provides a graphical display of the pH values imported. Use the scroll bar on the right-hand side of the *Data Entry form* to reach this pH display (Figure 14-17).

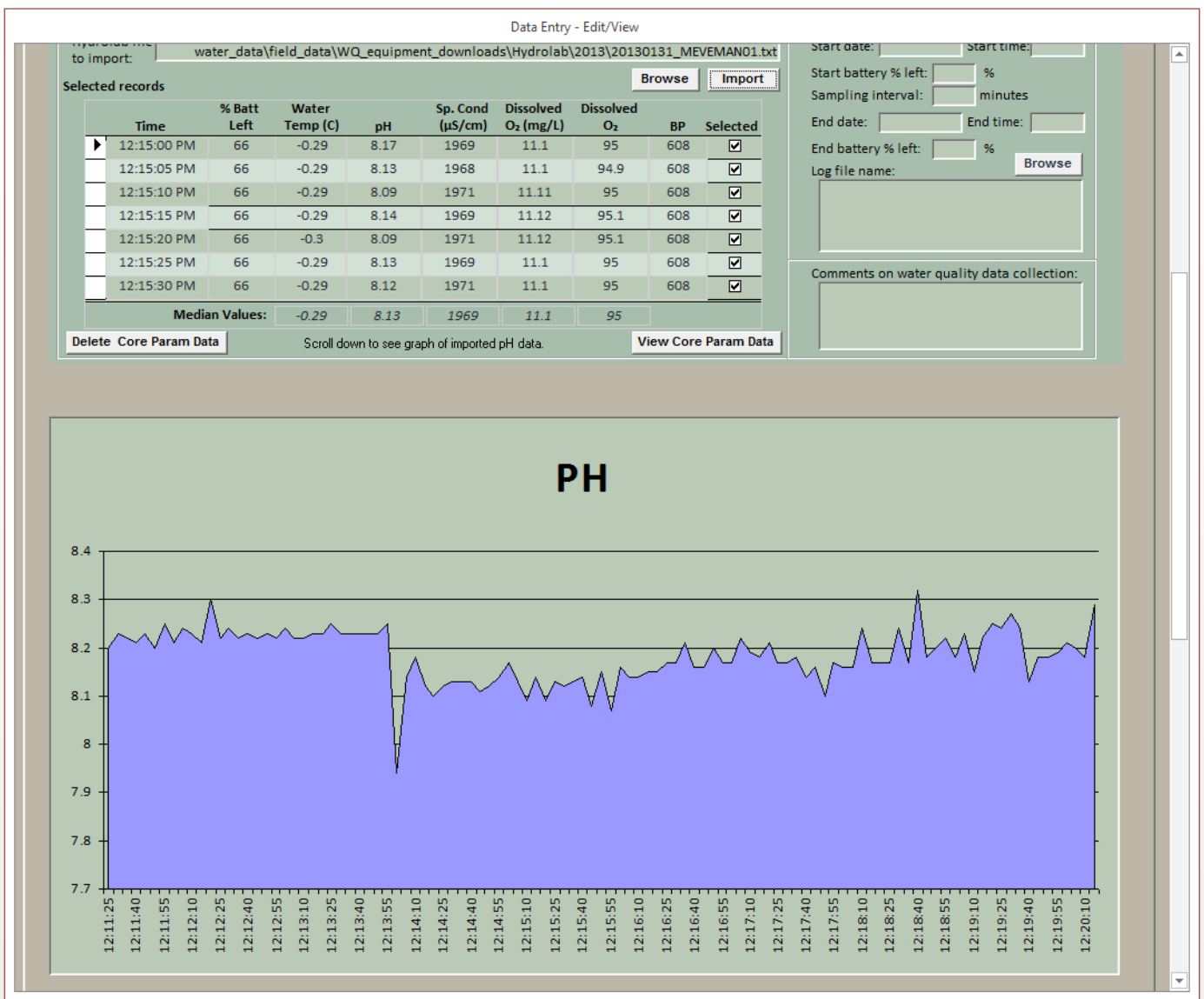


Figure 14-17. *Sonde Measurements* tab on the *Data Entry* form - pH graph view.

- To review all the imported hydrolab data, or to manually select different values, click the **View Core Param Data** button on the lower right-hand corner of the **Water Quality Field Measurements** box. This causes the *Core Parameter Data* form to appear (Figure 14-18). Scroll down to find the values selected by the application and change this selection as desired. Selecting different values will cause the application to recalculate the median values when the *Core Parameter Data* form is closed.
- To delete the imported hydrolab data, click the **Delete Core Param Data** button at the lower left-hand corner of the **Water Quality Field Measurements** box.
- Alternatively, to enter core parameter data manually click the **Enter Core Parameter Data** button in the center of the **Water Quality Field Measurements** box (Figure 14-15) as it appears prior to importing data. (Note: this option is obscured by imported hydrolab data, but can be returned to by deleting the imported data).

Core Parameter Data

Close

Time	Battery Left (%)	Water Temp (C)	pH	Sp. Cond	Dissolved Oxygen (mg/O ² /L)	Dissolved Oxygen (% Sat)	BP	Selected
12:13:35 PM	66	-0.29	8.23	1969	11.1	95	608	☐
12:13:40 PM	66	-0.3	8.23	1971	11.11	95	608	☐
12:13:45 PM	66	-0.29	8.23	1968	11.12	95.1	608	☐
12:13:50 PM	66	-0.29	8.23	1971	11.11	95	608	☐
12:13:55 PM	66	-0.29	8.25	1972	11.11	95	608	☐
12:14:00 PM	66	-0.29	7.94	1969	11.1	95	608	☐
12:14:05 PM	66	-0.29	8.14	1971	11.1	94.9	608	☐
12:14:10 PM	66	-0.29	8.18	1969	11.09	94.9	608	☐
12:14:15 PM	66	-0.29	8.12	1975	11.09	94.8	608	☐
12:14:20 PM	66	-0.29	8.1	1969	11.09	94.9	608	☐
12:14:25 PM	66	-0.29	8.12	1971	11.1	94.9	608	☐
12:14:30 PM	66	-0.29	8.13	1969	11.11	95	608	☐
12:14:35 PM	66	-0.28	8.13	1968	11.12	95.1	608	☐
12:14:40 PM	66	-0.29	8.13	1968	11.11	95.1	608	☐
12:14:45 PM	66	-0.29	8.11	1967	11.11	95	608	☐
12:14:50 PM	66	-0.29	8.12	1969	11.1	95	608	☐
12:14:55 PM	66	-0.29	8.14	1969	11.1	94.9	608	☐
12:15:00 PM	66	-0.29	8.17	1969	11.1	95	608	☒
12:15:05 PM	66	-0.29	8.13	1968	11.1	94.9	608	☒
12:15:10 PM	66	-0.29	8.09	1971	11.11	95	608	☒
12:15:15 PM	66	-0.29	8.14	1969	11.12	95.1	608	☒
12:15:20 PM	66	-0.3	8.09	1971	11.12	95.1	608	☒
12:15:25 PM	66	-0.29	8.13	1969	11.1	95	608	☒
12:15:30 PM	66	-0.29	8.12	1971	11.1	95	608	☒
12:15:35 PM	66	-0.29	8.13	1969	11.1	95	608	☐
12:15:40 PM	66	-0.3	8.14	1969	11.09	94.8	608	☐
12:15:45 PM	66	-0.3	8.08	1971	11.08	94.7	608	☐

Record: 14 53 of 107 Filtered Search

Figure 14-18. Imported hydrolab Core Parameter Data form.

Stream Channel and Flow Temp Loggers Photo Documentation Discharge Sonde Measurements Turbidity Bacteria Sample Collection / Processing

Field Calibration of Water Quality Instrument

Observer: Sam Clark
 Calibration location: MEVEMAN01
 Calibration date: 01/10/2016 Calibration Time: 10:33
 Instrument set to local time: Yes
 WQ instrument make and model: Hach Hydrolab MS-5
 WQ instrument SCPN name: Chalihtuticue
 Stream water temp at time of calibration: 0.2 °C
 Calibration Notes:

Field calibration of WQ instruments: MEVEMAN01 01/10/2016 Add New View/Edit

Parameter	Std. Value	Lot number	Pre-Calibration Reading	Temp (°C)	Post Calibration Reading	Temp (°C)
Specific Conductance	100 µS/cm	4062012	105	1.27	100	0.56
	1413 µS/cm	4082835	1392	0.88	1413	1.01
pH	7.10	4072579	7.22	0.97	7.10	1.58
	10.26	4071596	10.30	0.48	10.26	0.76
Dissolved Oxygen	100% sat		101.6	99.9	19.8	19.17
	Barometric Pressure		618	mm Hg		

Water Quality Field Measurements

Hydrolab file to import: Manually entered data Browse Import

Sample collection time: 12:15

Selected records

Time	% Batt Left	Water Temp (C)	pH	Sp. Cond (µS/cm)	Dissolved O ₂ (mg/L)	Dissolved O ₂	BP	Selected
12:15:00 PM	66	0.3	8.15	1968	11	95.3	608	☒
12:15:05 PM	66	0.31	8.16	1970	11.12	94.8	608	☒
12:15:10 PM	66	0.3	8.15	1969	11.1			☒
*								☐

Median Values: 0.3 815 1969 11.1 95.05

Delete Core Param Data View Core Param Data

Multi-parameter sonde (deployed)

Start date: Start time:
 Start battery % left: %
 Sampling interval: minutes
 End date: End time:
 End battery % left: %
 Log file name: Browse
 Comments on water quality data collection:

Figure 14-19. Sonde Measurements tab on the Data Entry form - manual data entry.

- For manually entered core parameter data (Figure 14-19) the application will automatically select the first seven records entered and will recalculate the median values.
- If the sonde was left in the stream for a long period of time, enter information into the fields in the **Multi-parameter sonde (deployed)** box. To ensure the pathname for the downloaded data logger file is entered correctly, use the **Browse** button rather than entering the pathname manually. Navigate to the correct file in the field_data\WQ_equipment_downloads folder within the folder structure described in SOP #13 and diagrammed in Figure 13-1. Click **Open**.
- **Turbidity tab.** Enter turbidity data in this tab (Figure 14-20).
 - Select a turbidimeter in the **Turbidity** box at the top of the tab. This will enable the other fields in the tab. Select an **Observer** from the drop-down list in the upper right-hand corner of the **Turbidity tab** (Figure 14-21). To modify the observer list, see instructions for the **Photo Documentation tab**.
 - Enter reading values into the **Reading** field in the **Sample Readings** box (Figure 14-21). The sample number will be added automatically. Click the **Calculate Median** button and the value will display in the **Median** field.
 - Information about equipment cali-

Data Entry - Edit/View

* Park code: MEVE * Stream: Mancos River New Stream Edit Stream Protocol name: Water Quality Delete Record New Record Close

* Site code: MEVE_MAN01 Site description: Mancos River downstream of North Park Boundary, Mesa Verde NP * Start date: 01/10/2016 Start time: 11:15 Initials of everyone present: JD, BS, SC Local time zone: MST
 USGS ID: 371648108214500 End date: 01/10/2016 End time: 15:35

Observers Photos: John Doe Discharge: Sam Clark Field calibration: Sam Clark Turbidity: Bacteria processed by: Bottles collected by: Bacteria read by: Samples processed by:

Site access notes, general observations, other sampling work done: Rained last night, but clear this morning. Precipitation during sampling: Rain Precipitation 24 hrs prior to sampling: Yes

Stream Channel and Flow Temp Loggers Photo Documentation Discharge Sonde Measurements Turbidity Bacteria Sample Collection / Processing

Turbidity

Turbidimeter make/model/serial number: Hach / 2100P / 06110C019647

Equipment Calibration

Date of calibration check: Add New View/Edit

Date of calibration check: Time:

Date of last calibration:

Assigned value	Acceptable range	Reading	% Difference	Calibration OK ?

Sample Readings

Enter a turbidimeter model to enable this area.

Comments

Figure 14-20. **Turbidity tab** on the *Data Entry form* - initial view with no data.

Turbidity

Observer: Betty Smythe Add/Edit Observers

Turbidimeter make/model/serial number: Hach / 2100P / 06110C019647

Equipment Calibration

Date of calibration check: 09/09/2015 2:19:00 PM Add New View/Edit

Date of calibration check: 09/09/2015 Time: 14:19

Date of last calibration: 09/09/2015

Assigned value	Acceptable range	Reading	% Difference	Calibraion OK ?
4.63	04.40- 04.86	5.03	08.64	No
49.5	47.03- 51.98	51.2	03.43	Yes
392	372.40- 411.60	393	00.26	Yes

Sample Readings

Sample #	Reading
1	134
2	156
3	147
4	154

Calculate Median

Median: 150.5

Comments

Figure 14-21. **Turbidity tab** on the *Data Entry form* - sample readings.

bration can be selected or entered in the **Equipment Calibration** box. To select calibration information from a previous calibration, select an option from the **Date of calibration check** drop-down list.

- To enter new calibration data, click the **Add New** button. The *Turbidimeter Calibration Check form* will display in **Add New Calibration Check** mode (Figure 14-22).

Turbidimeter Calibration Check

Add New Calibration Check Close

Calibration event name: 01/04/2016 10:45:00 AM

Date of calibration check: 01/04/2016 Time: 10:45

Last calibration date: 01/01/2016

Assigned Value	Acceptable Range	Reading	% Difference	Calibration OK ?
5.13	04.87- 05.39	5.17	00.78	Yes
51.2	48.64- 53.76	51.4	00.39	Yes
530	503.50- 556.50			

Figure 14-22. *Turbidimeter Calibration Check form*.

As **Assigned Value** and **Reading Values** are entered, the application will calculate the **Acceptable range**, the **Percent difference** between the **Acceptable range** and the **Reading Value**, and indicate whether the **Calibration is ok** (**Reading Value** is within the **Acceptable range**).

- To view, edit or delete the turbidimeter calibration data, click the **View/Edit** button. This will display the *Turbidimeter Calibration Check form* in edit mode (Figure 14-22). In edit mode, a **Delete** button is displayed in the lower left-hand corner.
- **Bacteria tab.** Enter bacteria testing data into this tab (Figure 14-23). Fill out the fields on this form as directed.
 - Select the name of the person who processed the bacteria, and the person who read the bacteria results, from the drop-down list in the upper right-hand corner of the **Bacteria tab**. The lists for both boxes are the same, and can be modified by clicking the **Add/Edit Observers** button.
 - Enter information about bacteria

Data Entry - Edit/View

*Park code: MEVE *Stream: Mancos River New Stream Edit Stream Protocol name: Water Quality Delete Record New Record Close

*Site code: MEVE_MAN01 Site description: Mancos River downstream of North Park Boundary, Mesa Verde NP *Start date: 01/10/2016 Start time: 11:15 Initials of everyone present: JD, BS, SC Local time zone: MST
 USGS ID: 371648108214500 End date: 01/10/2016 End time: 15:35

Observers: John Doe Photos: Sam Clark Field calibration: Sam Clark Bacteria processed by: Bottles collected by: Discharge: Sam Clark Turbidity: Betty Smythe Bacteria read by: Samples processed by:

Site access notes, general observations, other sampling work done: Rained last night, but clear this morning. Precipitation during sampling: Rain
 Precipitation 24 hrs prior to sampling: Yes

Stream Channel and Flow Temp Loggers Photo Documentation Discharge Sonde Measurements Turbidity Bacteria Sample Collection / Processing

Bacteria Sample Collection, Processing Incubation

Incubation start time: End time: Incubation end date: Processed by: Add/Edit Observers
 Read by:

Incubator make/model: Thermotote 24 portable incubator

Temp logged during incubation: Temp logger make: Logger serial number: Logger data file name: Browse

Item Name	Lot Number	Expiration Date
Idexx 120- mL Vessel		
Idexx Quanti- Tray 2000		
Idexx Colilert-24		

Incubator Temperature Monitoring Table

Event Occurred and/or Action Taken	Date	Time	Temp °C

Bacteria Tray Results Table

Tray: Replicate: Total Coliform: (yellow wells) Positive large wells Positive small wells Totals values
 E. Coli: (yellow florescent wells)

Look up total coliform values

Comments:

Figure 14-23. **Bacteria tab** on the *Data Entry form* - initial view.

Stream Channel and Flow Temp Loggers Photo Documentation Discharge Sonde Measurements Turbidity Bacteria Sample Collection / Processing

Bacteria Sample Collection, Processing Incubation

Incubation start time: 17:10 Incubation end date: 01/11/2016 End time: 18:35 Processed by: John Doe Add/Edit Observers
 Read by: Betty Smythe

Incubator make/model: Thermotote 24 portable incubator

Temp logged during incubation: No Temp logger make: Logger serial number: Logger data file name: Browse

Item Name	Lot Number	Expiration Date
Idexx 120- mL Vessel	KF001	06/28/2010
Idexx Quanti- Tray 2000	BH027	06/01/2012
Idexx Colilert-24	AF146	03/01/2011
* Idexx 120- mL Vessel		

Incubator Temperature Monitoring Table

Event Occurred and/or Action Taken	Date	Time	Temp °C
Power went out for 2 minutes at the very beginning of the period	01/10/2016	17:15	28.6
*			

Bacteria Tray Results Table

Tray	Replicate	Total Coliform: (yellow wells)	Positive large wells	Positive small wells	Totals values
1	Primary	49	48	48	>2419.6
		E. Coli: (yellow florescent wells)	49	38	980.4
2	Blank	0	0	0	<1
		E. Coli: (yellow florescent wells)	0	0	<1
*					

Look up total coliform values

Comments:

Figure 14-24. **Bacteria tab** on the *Data Entry form* - Total coliforms value lookup.

Data Entry - Edit/View

* Park code: MEVE		* Stream: Mancos River		New Stream Edit Stream		Protocol name: Water Quality		Delete Record		New Record		Close	
* Site code: MEVE_MAN01		Site description: Mancos River downstream of North Park Boundary, Mesa Verde NP				* Start date: 01/10/2016		Start time: 11:15		Initials of everyone present: JD, BS, SC		Local time zone: MST	
USGS ID: 371648108214500		End date: 01/10/2016		End time: 15:35									
Observers Photos: John Doe		Field calibration: Sam Clark		Bacteria processed by: John Doe		Bottles collected by:							
Discharge: Sam Clark		Turbidity: Betty Smythe		Bacteria read by: Betty Smythe		Samples processed by:							
Site access notes, general observations, other sampling work done: Rained last night, but clear this morning.								Precipitation during sampling: Rain					
								Precipitation 24 hrs prior to sampling: Yes					

Stream Channel and Flow Temp Loggers Photo Documentation Discharge Sonde Measurements Turbidity Bacteria **Sample Collection / Processing**

Sample Collection, Processing, and Shipment

All bottles collected by: Add/Edit Observers

NWQL samples processed by:

Sample Collection Time: 	Samples chilled: 	Filtration location:
Processing time: 	Pump make/serial number: Geopump C08001443	

Enter data into any of the visible fields on this tab to enable the rest of this tab.

Comments on sample collection, processing & shipment:

Figure 14-25. *Sample Collection/Processing tab* on the *Data Entry form* - initial view with no data.

- sample incubation (e.g. incubator model, start time, end date).
- To ensure the pathname for the downloaded data logger file is entered correctly in the **Logger data filename** field, use the **Browse** button rather than entering the pathname manually. Navigate to the QAQC_data\Idexx&Incubator folder within the folder structure described in SOP #13 and diagrammed in Figure 13-1. Navigate to the folder the file was placed in, select the correct file name and click **Open**.
- Enter **sample bottle**, **quantitray**, and **colilert** lot numbers and expiration date from the drop down menus in the table in the **Bacteria Sample Collection, Processing and Incubation** box (Figure 14-23).
- Enter information about any events that would affect either the incubation time or temperature in the **Incubation Temperature Monitoring Table**.
- Enter bacteria tray results into the table, and click the **Look up total coliform values** button. The application will use the positive small and large well values to look up the total coliform and *E. coli* values automatically (Figure 14-24).
- **Sample Collection / Processing tab.** Enter sample collecting and processing data into this tab (Figure 14-25). The

Data Entry - Edit/View

*Park code: MEVE *Stream: Mancos River New Stream Edit Stream Protocol name: Water Quality Delete Record New Record Close

*Site code: MEVE_MAN01 Site description: Mancos River downstream of North Park Boundary, Mesa Verde NP
 *Start date: 01/10/2016 Start time: 11:15 Initials of everyone present: JD, BS, SC Local time zone: MST
 End date: 01/10/2016 End time: 15:35

Observers Photos: John Doe Field calibration: Sam Clark Bacteria processed by: John Doe Bottles collected by: Sam Clark
 Discharge: Sam Clark Turbidity: Betty Smythe Bacteria read by: Betty Smythe Samples processed by: John Doe

Site access notes, general observations, other sampling work done: Rained last night, but clear this morning.
 Precipitation during sampling: Rain
 Precipitation 24 hrs prior to sampling: Yes

Stream Channel and Flow Temp Loggers Photo Documentation Discharge Sonde Measurements Turbidity Bacteria Sample Collection / Processing

Sample Collection, Processing, and Shipment

All bottles collected by: Sam Clark Add/Edit Observers

NWQL samples processed by: John Doe

Sample Collection Time: 12:15 Samples chilled: No Filtration location: On-site

Processing time: 16:50 Pump make/serial number: Geopump C08001443

Filter:

Filter make/model	Quan	Lot number
Pall Aquaprep 600	1	FR2295
*		

Shipping: Create New Shipping Event

1 Shipping Date: 01/11/2016

Lab name: NWQL

Drop date: 01/11/2016 Drop time: 10:20:00 AM

Shipping method: Ground

Tracking number(s): 403012345678901

Samples: After initial selection, click in Bottle Type field to generate correct drop-down lists.

Bottle or Acid type	Quant	Lot number	Treatment/other	Schedule # or Analysis	Ship num
Glass, 250mL	1	8-255-001	FAM	2278	1
Poly, Amber 125mL	1	6-164-001	FCC	101	1
Poly, Plain 250mL	2	0-242-001	FU, RU	2281	1
Poly, A/R 250mL	1	8-275-001	FA	2278, 2281	1

Comments on sample collection, processing & shipment:

Figure 14-26. *Sample Collection/Processing tab* on the *Data Entry form*.

data on this tab interact with the data in the secondary (Shipping) back-end.

- Select the name of the person who collected the water samples, and the person who processed the water samples, from the drop-down lists in the upper right-hand corner of the *Sample Collection / Processing tab*. The lists for both boxes are the same, and can be modified by clicking the **Add/Edit Observers** button.
- Enter information about the sample, including the **Sample collection time**, **Processing time**, **samples chilled**, **filtration location**, and **pump make / serial number**. The rest of the **Sample collection, processing and shipment** box will

appear (Figure 14-26).

- To track shipping, samples must be connected to a shipping event. If the shipping event exists, select that event from the drop-down list in the **Shipping** box on the *Sample Collection / Processing tab*. The shipping number is displayed in the upper left-hand corner of the **Shipping** box.
- Create a new shipping event by either clicking the **Create New Shipping Event** button on the *Sample Collection / Processing tab* (Figure 14-26), or by clicking the **Manage shipping** button on the *Start-up form* (Figure 14-1). Either path will cause the *Shipping Information form*

Shipping Gateway - List of shipping events

Double-click on the column label to change sort order.
Double-click on a Date Shipped to open the Shipping form for that record.

Add a new record Close

Filters Lab: Sample Year: 2013 Filter Is Off

Lab	Sample Date	Sample Year	Date Shipped	Tracking Number(s)
NWQL	17 Feb 2015	2015	23 Feb 2015	772970726741
NWQL	16 Jan 2015	2015	22 Jan 2015	772678206966
NWQL	24 Sep 2014	2014	09 Oct 2014	806446015392
NWQL	23 Jul 2014	2014	04 Aug 2014	
NWQL	25 Jul 2014	2014	01 Aug 2014	
NWQL	30 Mar 2014	2014	31 Mar 2014	
NWQL	24 Oct 2014	2014	06 Nov 2014	
NWQL	15 Oct 2014	2014	22 Oct 2014	771561530302
NWQL	24 Apr 2014	2014	28 Apr 2014	798679327687
NWQL	23 Jul 2014	2014	04 Aug 2014	770756506889
NWQL	09 Dec 2014	2014	15 Dec 2014	772239437701
NWQL	30 Mar 2014	2014	31 Mar 2014	
NWQL	23 Jul 2014	2014	04 Aug 2014	
NWQL	24 Jan 2014	2014	04 Feb 2014	arrived
NWQL	15 May 2014	2014	02 Jun 2014	797819276870
NWQL	05 May 2014	2014	07 May 2014	770163543753
NWQL	15 May 2014	2014	02 Jun 2014	798789275668
NWQL	05 Sep 2014	2014	08 Sep 2014	770163529017
USEPA R8 Lab	28 May 2014	2014	02 Jun 2014	
USEPA R8 Lab	16 Oct 2014	2014	20 Oct 2014	770107407292
USEPA R8 Lab	05 Sep 2014	2014	08 Sep 2014	771561434280
USEPA R8 Lab	22 May 2014	2014	27 May 2014	
USEPA R8 Lab	24 Apr 2014	2014	28 Apr 2014	770107407292
USEPA R8 Lab	24 Oct 2014	2014	30 Oct 2014	
USEPA R8 Lab	25 Jul 2014	2014	01 Aug 2014	771692511250
USEPA R8 Lab	24 Sep 2014	2014	25 Sep 2014	
USEPA R8 Lab	24 Oct 2014	2014	27 Oct 2014	
USEPA R8 Lab	05 May 2014	2014	07 May 2014	771635676460
NWQL	31 Jan 2013	2013	31 Jan 2013	
NWQL	26 Sep 2013	2013	17 Oct 2013	2135097219812704
NWQL	26 Sep 2013	2013	17 Oct 2013	796935304009
NWQL	11 Jan 2011	2011	14 Jan 2011	796935304009
NWQL	02 Dec 2009	2009	05 Dec 2009	794322824792
NWQL	02 Dec 2009	2009	09 Dec 2009	790688291550
NWQL	02 Dec 2009	2009	09 Dec 2009	779632210000155

Figure 14-27. Shipping Gateway form.

(Figure 14-28) to appear. Follow the instructions for the *Shipping Information form* in section 2.3.2 (Manage shipping).

- The mechanism used to connect water samples of an event in the primary back-end with shipping events in the secondary back-end is the Ship num field in the Sample box in the Sample Collection / Processing tab. Put the shipping number (displayed in the upper left hand corner of the selected shipping event in the Shipping box) in the Ship num field. If this field is left blank, then the sample bottles selected will not be reflected in the shipping event.

2.3.2 Manage shipping button of the Main menu tab.

To enter, edit or view information about the shipment of water samples to the USGS National Water Quality Lab (NWQL) (a shipping event), click the Manage shipping button on the Main menu tab of the Startup form (Figure 14-1). The Shipping Gateway form will open (Figure 14-27).

- *Shipping Gateway form.* This form (Figure 14-27) displays shipping and tracking information for shipping events entered into the Water Quality database. New shipping records can be entered through this form, or existing records may be viewed or edited. There are two ways to drill down to a desired record

Shipping Information

Create New Shipping Event
Close

Shipping Information

*Date shipped:

Time shipped:

Who shipped container:

Shipping company:

Method of shipping:

Type of container shipped:

Number containers shipped:

Location package was shipped from:

Tracking number(s):

Lab Information

*Lab sent to:

Date received by lab:

Field Information

*Sample start date:

Sample end date:

Field sampling information will be displayed here after this shipping event has been connected to field events.

Note: to make changes to the shipping information, return to the field event via the Main Switchboard.

Figure 14-28. *Shipping Information form – new shipping event.*

using this form: sorting and filtering.

- Sorting records: Double-click on a column header to sort all records by that column value. The first double-click action causes the records to be sorted in ascending order, a second double-click action causes the records to be sorted in descending order. The column heading is changed to bold italic format to indicate the column being sorted by used to sort the records.
- Filtering records. Select from the drop-down lists provided at the top of the form in the **Filters** box to filter for **Lab** or **Sample Year**. Filters are toggled by clicking the **Filter** button.

The label on the **Filter** button will change as the filters are toggled on or off indicating the current status of the filter. A filter can be removed by deleting the text that is displayed in that filter control box.

- Create a new record: Click the **Add a new record** button at the upper right-hand corner of the *Shipping Gateway form* (Figure 14-27). This will open the *Shipping Information form* in new mode (Figure 14-28).
- Open an existing record: Double click on the blue text in the **Date Shipped** field. This will open the Shipping Information form in edit/view mode (Figure 14-29).

Shipping Information

Track Shipping

Delete Record
New Record
Close

Shipping Information

* Date shipped: Time shipped:

Who shipped container:

Shipping company: Type of container shipped:

Method of shipping: Number containers shipped:

Location package was shipped from:

Tracking number(s):

Lab Information

* Lab sent to: Date received by lab:

Field Information

* Sample start date: Sample end date:

Parks Sampled			Schedule/Analysis	Treatments	Bottles
Unit Code	Stream Name	Site	Schedules	Treatments	Types
					Quantity

Note: to make changes to the shipping information, return to the field event via the Main Switchboard.

Figure 14-29. *Shipping Information form* – edit/view mode for an existing shipping event.

- *Shipping Information form.* Enter shipping information for water quality samples sent to the USGS NWQL in the *Shipping Information form* (Figure 14-28 and Figure 14-29). This form displays the data stored in the secondary (shipping) back-end database. These data are linked to the field sampling data in the primary back-end database but are solely used for shipment tracking purposes. These data are never included in any data analysis.
 - The required fields for this form, marked with a red asterisk, are **Date Shipped**, **Lab sent to** and **Sample start date**. If the user exits this form before entering these required fields, a warning box will remind the user that the record cannot be saved without these fields filled in. Fill out the rest of the fields as directed, in whatever manner is most useful for tracking the shipment.
 - The data on the *Shipping Information form* is linked to the information entered on the *Sample Collection / Processing tab* on the *Data Entry form*. The top of *Shipping Information form* can be filled out (Figure 14-29) in this tab. At this point, if desired, the shipping event can be deleted by clicking the **Delete Record** button at the top of the form.
 - To add information about the samples being shipped, return to the

Shipping Information

Track Shipping Delete Record New Record Close

Note: all field events must be disconnected before the shipping event can be deleted.

Shipping Information

* Date shipped: 01/11/2016 Time shipped: 10:20

Who shipped container: John Doe

Shipping company: FedEx Type of container shipped: cooler

Method of shipping: Ground Number containers shipped: 1

Location package was shipped from: S. Woodlands Dr.

Tracking number(s): 403012345678901

Lab Information

* Lab sent to: NWQL Date received by lab:

Field Information

* Sample start date: 01/10/2016 Sample end date: 01/10/2016

Parks Sampled	Schedule/Analysis	Treatments	Bottles																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Unit Code</th> <th>Stream Name</th> <th>Site</th> </tr> </thead> <tbody> <tr> <td>MEVE</td> <td>Mancos River</td> <td>MEVE_MAN01</td> </tr> </tbody> </table>	Unit Code	Stream Name	Site	MEVE	Mancos River	MEVE_MAN01	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Schedules</th> </tr> </thead> <tbody> <tr><td>101</td></tr> <tr><td>2278</td></tr> <tr><td>2278, 2281</td></tr> <tr><td>2281</td></tr> </tbody> </table>	Schedules	101	2278	2278, 2281	2281	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Treatments</th> </tr> </thead> <tbody> <tr><td>FA</td></tr> <tr><td>FAM</td></tr> <tr><td>FCC</td></tr> <tr><td>FU, RU</td></tr> </tbody> </table>	Treatments	FA	FAM	FCC	FU, RU	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Types</th> <th>Quantity</th> </tr> </thead> <tbody> <tr><td>Glass, 250mL</td><td>1</td></tr> <tr><td>Poly, A/R 250mL</td><td>1</td></tr> <tr><td>Poly, Amber 125mL</td><td>1</td></tr> <tr><td>Poly, Plain 250mL</td><td>2</td></tr> </tbody> </table>	Types	Quantity	Glass, 250mL	1	Poly, A/R 250mL	1	Poly, Amber 125mL	1	Poly, Plain 250mL	2
Unit Code	Stream Name	Site																											
MEVE	Mancos River	MEVE_MAN01																											
Schedules																													
101																													
2278																													
2278, 2281																													
2281																													
Treatments																													
FA																													
FAM																													
FCC																													
FU, RU																													
Types	Quantity																												
Glass, 250mL	1																												
Poly, A/R 250mL	1																												
Poly, Amber 125mL	1																												
Poly, Plain 250mL	2																												

Note: to make changes to the shipping information, return to the field event via the Main Switchboard.

Figure 14-30. *Shipping Information form* – existing shipping event with samples.

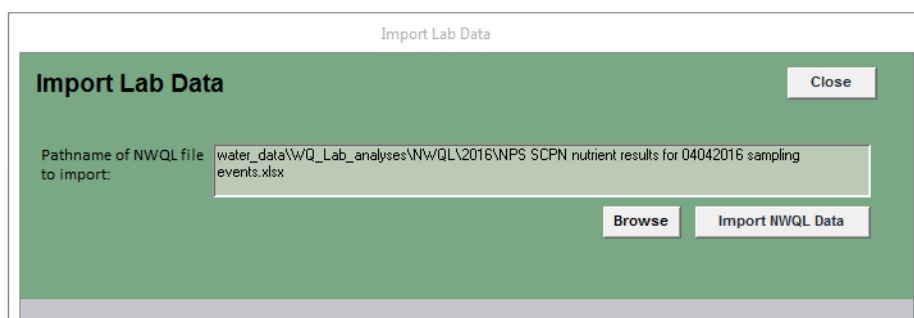
Sample Collection / Processing tab on the *Data Entry form*. Attaching samples on that tab to this shipping event will cause that sample information to be displayed on this form. Once samples have been added (Figure 14-30), the shipping event cannot be deleted until the samples from the field event have been deleted. This is done by deleting the number in the **Ship num** field in the **Sample box** in the *Sample Collection / Processing tab* on the *Data Entry form*.

- Click the **New Record** button at the top of the form to create a new shipping event. This will open a new *Shipping Information form* in **Create**

new shipping event mode (Figure 14-28).

2.3.3 Import lab data button on the Main menu tab.

- Click the **Import lab data** button to import lab results received in Excel format from the USGS National Water Quality Lab (NWQL) (Figure 14-1). *The Import Lab Data form* will open (Figure 14-31).
 - Click the **Browse** button and navigate to the folder containing the lab results in the WQ_Lab_analyses folder within the folder structure described in SOP #13. Select the file name, and click **Open**.
 - Once a file has been selected the **Import** button will be activated. Click



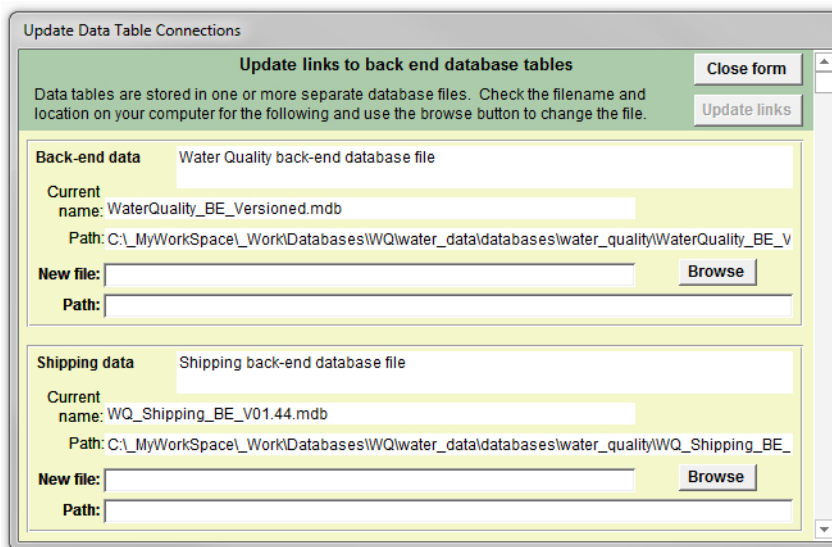
Import Lab Data

Close

Pathname of NWQL file to import: water_data\WQ_Lab_analyses\NWQL\2016\NPS SCPN nutrient results for 04042016 sampling events.xlsx

Browse Import NWQL Data

Figure 14-31. *Import Lab Data form.*



Update Data Table Connections

Update links to back end database tables

Close form

Update links

Data tables are stored in one or more separate database files. Check the filename and location on your computer for the following and use the browse button to change the file.

Back-end data Water Quality back-end database file

Current name: WaterQuality_BE_Versioned.mdb

Path: C:\MyWorkspace\Work\Databases\WQ\water_data\databases\water_quality\WaterQuality_BE_V

New file: Browse

Path:

Shipping data Shipping back-end database file

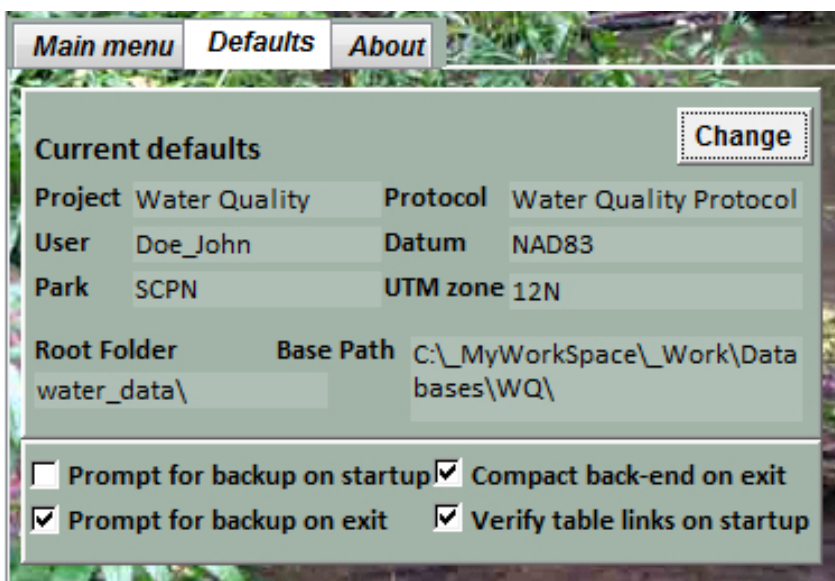
Current name: WQ_Shipping_BE_V01.44.mdb

Path: C:\MyWorkspace\Work\Databases\WQ\water_data\databases\water_quality\WQ_Shipping_BE_V

New file: Browse

Path:

Figure 14-32. *Update Data Table Connections form.*



Main menu Defaults About

Change

Current defaults

Project	Water Quality	Protocol	Water Quality Protocol
User	Doe_John	Datum	NAD83
Park	SCPN	UTM zone	12N
Root Folder	Base Path	C:_MyWorkspace_Work\Data bases\WQ\	

☐ Prompt for backup on startup
 ☒ Compact back-end on exit

☒ Prompt for backup on exit
 ☒ Verify table links on startup

Figure 14-33. *Defaults tab of the Startup form.*

the **Import NWQL Data** button to import the data.

- During import, each lab result record will be checked to ensure it includes the required information. If a problem is detected, a dialog box which includes the line number of the problem record and a summary of the required data, is displayed. (Note: the line number is the same as the Excel row number minus one, as the application does not include the Excel header row.) The user is prompted to continue or to terminate by clicking on a Yes or No button. If the user continues (clicks **Yes**), the record with the error will be excluded from the import and the processing will continue. Each record in the lab results is also matched to an event by USGS location ID and date and time. If records do not match on these criteria, they are excluded from import.
- All errors (excluded records) are compiled into a text file, and the location of this text file is displayed to the user in a final summary dialog box.

2.3.4 Connect data tables button on the Main menu tab.

The application has a front-end (this application, which is the user interface) and two back-ends (water quality data and shipping data tables). In order for the application to work properly, the front-end file must be connected to the correct back-end files.

- Click the **Connect data tables** button on the *Main menu tab* of the *Startup form* to open the *Update Data Table Connections form* (Figure 14-32), which is used to establish the link from the front-end to the back-ends.
- The file name and path for each current back-end file are displayed. To change the back-end file, click the **Browse** button for the back-end

that needs to be changed, navigate to the desired back-end file, and click the **Open** button. This will select the back-end file to be connected to, and will enable the Update links button.

- Click the **Update links** button to connect. If the connection is made, a message will be displayed indicating that the data bases have been successfully linked.

2.3.5 Back up data button on the Main menu tab.

Click this button to create a date-and-time-stamped backup copy of the back-end database files. The application will ask for the folder location into which the back-ups are to be put. This action will also cause a date and time-stamped version of the backup to be placed in the **Backups** folder (see Figure 13-1 in SOP 13). As each backup is created, a dialog box confirming successful creation will appear.

2.4 Defaults tab

The *Defaults tab* of the *Startup form* (Figure 14-33) displays current default values, and check-box options for automatic backups on startup or exit, data file compaction on exit, and link verification on startup.

- The current default values can be changed through the *Default Values*

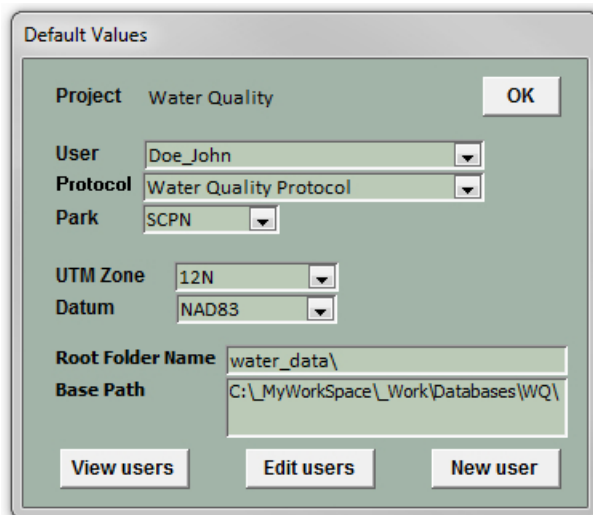


Figure 14-34. *Default values form.*

Figure 14-35. Edit default values for contact information form.

form (Figure 14-34), which is opened by clicking the **Change** button in the upper right-hand corner. The values of **Root Folder** and **Base Path** fields are critical to the proper functioning of this application, and are described in further detail in this section. The actions taken by the application upon startup or shutdown can be modified on this form by clicking the check-boxes displayed.

The *Default Values form* (Figure 14-34) allows the user to view or modify the system default values. Most values on this form are self-explanatory, and can be chosen from predefined values listed in the drop-down lists. Information for fields that require special instructions is included below.

The values entered in the **Root Folder Name** and **Base Path** fields are critical to data file organization and the proper functioning of the front-end application. These values relate to the folder structure described in SOP #13 and diagrammed in Figure 13-1. The **Root Folder Name** must be the same as the first folder depicted in Figure 13-1 (typically called `water_data`). The **Base Path** field must contain the complete com-

puter pathname that leads to the root folder, starting with the drive letter. The application creates the full root folder path by adding the base path to the root folder name, and expects this pathname to be absolute, not relative.

For example, the full pathname to the root folder in Figure 14-34 is:

`C:\_MyWorkspace\_Work\Databases\WQ\water_data\`

- To view, edit or add a user, use the buttons at the bottom of the form. Figure 14-35 shows the *Edit form*. The **New** and **View** forms are similar. The user list can be navigated by either clicking on the record navigation bar at the bottom of the form, or by selecting the **Filter by search** option and entering a name to filter on.
- **Prompt for backup at startup or exit** check box. Check this box to set the application to prompt for backups every time it is started and/or closed (using the **Exit** button on the main form). Making backups before and after data entry sessions is recommended, in case of data-

base corruption or data entry mistakes. Backups can also be run by clicking the Back up data button on the Main menu tab.

- In all cases, the application will create a backup of both back-ends, including a date and time stamp value in the name. These backups are automatically placed in the Backups folder (see Figure 13-1 in SOP 13). As each backup is created, a dialog box confirming successful creation will appear.
- **Compact back-end on exit check box.** Compaction causes allows Microsoft Access to optimize the organization of the file, making it smaller and faster at accessing data. Check this option to cause the application to compact the linked back-end when the application is closed using the Exit button on the main form.
- **Verify table links on startup check box.** The application is structured with a front-end (user interface) and a back-end (data tables). In order for the application to work properly, the front-end must be linked to the tables in the back-end. When this option is checked (recommended), the link to the back-end files will be verified when the application is started.

2.5 About tab

The **About tab** of the *Startup form* (Figure 14-36) provides information about the application, including version number, application author, author organization, and author email. Buttons for viewing release history and reporting bugs are also provided.

- **View release history button.** Clicking this button opens the *Application Releases form* (Figure 14-37). This form provides information about all of the different versions of the application that have been released. It is filled in by the application developer before the application is distributed and is therefore read-only.



Figure 14-34. **About tab.**

Figure 14-37. *Application releases form.*

- The *Application Releases form* provides specific release information (including version number, date, and known bugs) as well as author information.

2.5.2 Report a bug.

The Report a bug button on the **About tab** will prompt the user to contact the applica-

tion developer with the details of the bug. Developer contact information is located at the top of the *About tab*.

The following information is useful when reporting a bug:

- application name
- application version
- name of the form/report you were on when the bug happened
- action, if any, you took right before the bug occurred
- screen capture of any error messages

5 Revision history

Provide the following information for each revision made to SOP 14.

New version:

SCPN_Water_Quality_SOP14_YYYYMMDD

Date:

Author:

Sections affected:

Changes & reasons: