

SOP 2.1: Management of Discrete, Monthly Water Quality Data

This document provides guidelines for the management of discrete water quality data including data entry guidelines, data storage procedures, data import procedures for NPSTORET, and schedule of related activities.

For additional guidance regarding QAQC procedures for discrete water quality data, please refer to SOP 2.4 Quality Assurance and Control Procedures.

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I. Equipment

- Completed Field Data Sheets from Parks (if available)
- Park scanned PDFs of Paper Data Sheets
- Access to NPS Google Drive
 - Excel Data Entry template
 - Data Transfer Folder
- MIDN Computer
 - NPSTORET front end DB
 - NPSTORET back end DB
- Access to MIDN Server

II. Data Entry and Data Handling Guidelines

A. Data Collection

Mid-Atlantic Network (MIDN) personnel, park staff, or volunteers collect discrete water quality data on a monthly basis at the following parks: APCO, BOWA, FRSP, GETT/EISE, HOFU, PETE, and RICH. Data collection procedures and data sheet templates are provided in Site Visit Procedures for Collecting Discrete Water Quality Data (SOP 1.9).

No later than three business days following the conclusion of monthly field sampling, the protocol lead will obtain collected data sheets from all of the sampled parks (SOP 1.3) and complete the following data management procedures.

B. Discrete Water Quality Data Entry

MIDN employs a pre-formatted Excel template to guide the data entry of discrete water quality data into NPSTORET. All data is ultimately maintained in NPSTORET, a database developed by the Water Resources Division of the NPS. Refer to NPSTORET documentation for further information regarding the database (see section III below).

Excel templates are customized for each park within the MIDN, and are maintained in a park specific folder on Google Drive (SOP 1.3). Where necessary, field picklists are used to facilitate consistency of data entry. Each Park will have one template filled per monthly, discrete sampling event. Field Values are defined within NPSTORET, fields used in this protocol are provided in this SOP (Table 1). The Format column of this table lists either a sample response or a bulleted list of the picklist content for that Field Value.

Paper data sheets will be reviewed during data entry to check for out of range values (Table 2). If collected data do not meet post site visit sensor check error limits (SOP 1.4), the data will be censored and not entered into the data entry template (SOP 1.9). Any missing, censored, or out of range values must be noted on the paper data sheet and the note will be entered into the visit comment field of the import file regarding the reason for the missing field data.

Table 1. Discrete Water Quality Data Entry Template field values, their definitions, and sample response values.

Field Value	Definition	Format
StationID	Station Identification Code	APCO_01
Date	Date the Sample was collected	YYYY-MMM-DD
Visit Start Time	Start time of site visit	11:11:00 AM
Time Zone	Time Zone of the visit. EDT or EST	• EDT • EST
Contact Name	Name of the staff who collected the data	First Last
Visit Comment	Comments relating to the site visit. Can be blank	text
Water Temp	Water Temperature in degrees Celcius	23.4
Bar Pressure	Barometric Pressure measured in mmHg	747.9
DO (%)	Dissolved Oxygen percentage	103.5

DO (mg/l)	Dissolved Oxygen in milligrams per liter	9.62
SpC	Specific Conductance	105.5
pH	pH	7.25
Air Temp	Air temperature at the site in degrees Celsius	19.8
Wetted Width	Wetted Stream width at the time of sampling	1.75
M/ft	Wetted Stream width unit	• Meters • Feet
Depth	Wetted Stream depth at the time of sampling	15
cm/in	Wetted Stream depth unit	• Centimeters • Inches
Discharge	Qualitative water discharge level	• DRY • NO FLOW • INTERSTITIAL • LOW • NORMAL • ABOVE NORMAL • FLOOD
Turbidity	Qualitative turbidity level	• NONE • MILD • MODERATE • SERIOUS • EXTREME
Weather	Qualitative Weather evaluation	• Cloudless. • Cloudy or partly cloudy. • Overcast. • Drifting snow, or dust/sand storm. Visibility l.t. 1000 M. • Fog or dust. Visibility l.t. 1000 M. • Drizzle or light rain. • Rain. • Snow, sleet, or hail. • Rain showers. • Thunderstorms. Squalls. Rain, sleet, snow, or hail.
ProjectID	MIDN Park Code	APCO
Activity Type	NPStoret pick list; all MIDN discrete field data is Field Msr/Obs type	Field Msr/Obs

- (1) Review **Discrete Field Data Sheet** for data entry errors and out of range values
- Note any values outside of the expected range on the data sheet and enter these notes in the visit comment field (Table 2)

For each parameter observed there is a range of values for which it is unlikely to exceed in MIDN streams. If encountered, these values likely represent data entry errors. If observations are recorded outside of the given range for any parameter evaluation of the data point must occur and professional judgment should be used to include or censor the observation based on available information.

Table 2. Range of expected values for MIDN streams.

Parameter	Expected Range
Water Temperature (°C)	-1.0 - 35
Barometric Pressure (mm Hg)	700 - 800
DO (% Saturation)	0 - 200
DO (mg/l)	0 - 20
Sp. Conductance (µS/cm)	20 - 1000*
pH (pH units)	3 - 10
Air Temperature (°C)	-20 - 45
Stream Width (m)	0.25 - 25
Stream Depth (cm)	0 - 300

* can be higher in karst systems (e.g., VAFO)

- b. Check metadata fields for accuracy (e.g., Date, Contact, Park Code, etc.)
- (2) Make a copy of the field data sheet, calibration sheet, and sensor check sheet
 - a. Either scan or take a photo of the complete (front and back) data sheets
 - i. Name copy of field data sheet, calibration sheet, and sensor check sheet using the following convention:
 1. PARK_YYYY_MMM_DD_Field_Data_WQM_Scan.xxx
 2. PARK_YYYY_MMM_DD_Calibration_WQM_Scan.xxx
 3. PARK_YYYY_MMM_DD_Sensor_Check_WQM_Scan.xxx
 - b. Upload copy of the field data sheet to the appropriate park folder on Google Drive (e.g., MIDN Water Quality Data Transfer/APCO/APCO Scanned Data Sheets; SOP 1.3)
- (3) Download and open a blank copy of the park appropriate Excel discrete data import template maintained on Google Drive
 - a. Blank templates are maintained in the main park folder within the “MIDN Water Quality Data Transfer” Folder
- (4) Populate all fields of the data import template
 - a. If any fields are left blank or are censored record relevant notes on the paper data sheet as well as in the “Visit Comment” field of the data import template
 - b. Any English units must be converted to metric units prior to populating the data import template using the following formulas

Table 3. Conversion factors from English to Metric.

English		multiply by		Metric
inch (in)	x	2.540	=	centimeter (cm)
foot (ft)	x	0.3048	=	meter (m)

- (5) Complete 100% verification of data entered into the import template
 - a. Review each field for accuracy with paper field data sheets

- (6) Save the completed template on the local machine as an .xlsx file
 - a. Name the completed template using the following convention:
 - i. PARK_YYYY_MMM_DD_Field_Data_Raw.xlsx
- (7) Upload the saved file to the appropriate folder on Google Drive (e.g., MIDN Water Quality Data Transfer/BOWA/BOWA Excel Data Import Files)
- (8) Inform MIDN Aquatic Ecologist by email or Google Calendar when this has been completed (SOP 1.3)

III. Data Maintenance and Import Procedures

NPSTORET is a Microsoft Access based relational database system developed and supported by the Water Resources Division of the National Park Service (NPS) for entry and management of water quality data. NPSTORET allows users to document water quality monitoring projects in a manner consistent with the National Water Quality Monitoring Council's core water quality data elements. Additionally, it allows the user to export the data in the proper format for upload to the Environmental Protection Agency's STORET database.

NPSTORET allows for entry and maintenance of analysis and measurement results, as well as metadata, including site and project documentation. It also provides a means of data export, reports, and graphics. For additional information about NPSTORET, see <http://www.nature.nps.gov/water/vitalsigns/vitalsignsmgt.cfm>

MIDN application of the NPStoret database is maintained at the MIDN office and is therefore not distributed to the parks where field data is collected. All data must be transferred to MIDN staff and imported into NPSTORET.

Field observations cannot be imported to NPSTORET until the metadata for your sampling locations have been added to NPSTORET. During protocol development field sites and the associated metadata were entered into NPSTORET so that data can be imported. Procedures for documenting and establishing field sampling sites are described in SOP 1.1: Site Establishment and Documentation. For additional information on specific details of adding or editing site metadata to NPSTORET, refer to the guidance available at the NPSTORET link provided above.

A. Data Maintenance

After field data has been collected and has been transferred to MIDN personnel, several tasks must be accomplished prior to importing the data into NPSTORET. These tasks include storing raw data and converting .xlsx files so that the data can pass through the data import tool within NPSTORET.

- (1) Download and save all scanned data sheets (Field Data Sheets, Calibration Sheets, Sensor Check Sheets) to the MIDN server
 - a. Navigate to the Water Quality Data Folder on the MIDN server and save files in the appropriate folder (see Section IV. Data Storage below for folder locations)
 - i. For each park there are 7 folders for field related data:
 1. Scanned Field Data Sheets
 2. Scanned Calibration Sheets
 3. Scanned Sensor Check Sheets

4. Excel Field Data Import Files (raw)
 5. Excel Field Data Import Files (for NPSTORET)
 6. Excel Calibration_Log Files
 7. Excel Sensor_Check_Log Files
- (2) Navigate to appropriate park data import folder on MIDN Server
- a. Open Data Import File for appropriate park/sampling event
 - i. e.g., HOFU_2015_Apr_10_Field_Data_**Raw**.xlsx
- (3) Convert file to eliminate referenced picklists within the .xlsx file for data import and execute a "Save As"

NPStoret's import tool does not execute when certain functionalities in the latest version of Excel are used in .xlsx files (e.g., referenced pick lists). To mitigate this issue the contents of file are pasted as values into an .xlsx without associated formulas.

- a. Open a blank Excel file
- b. Copy all fields from Data Import File and paste as values into new file

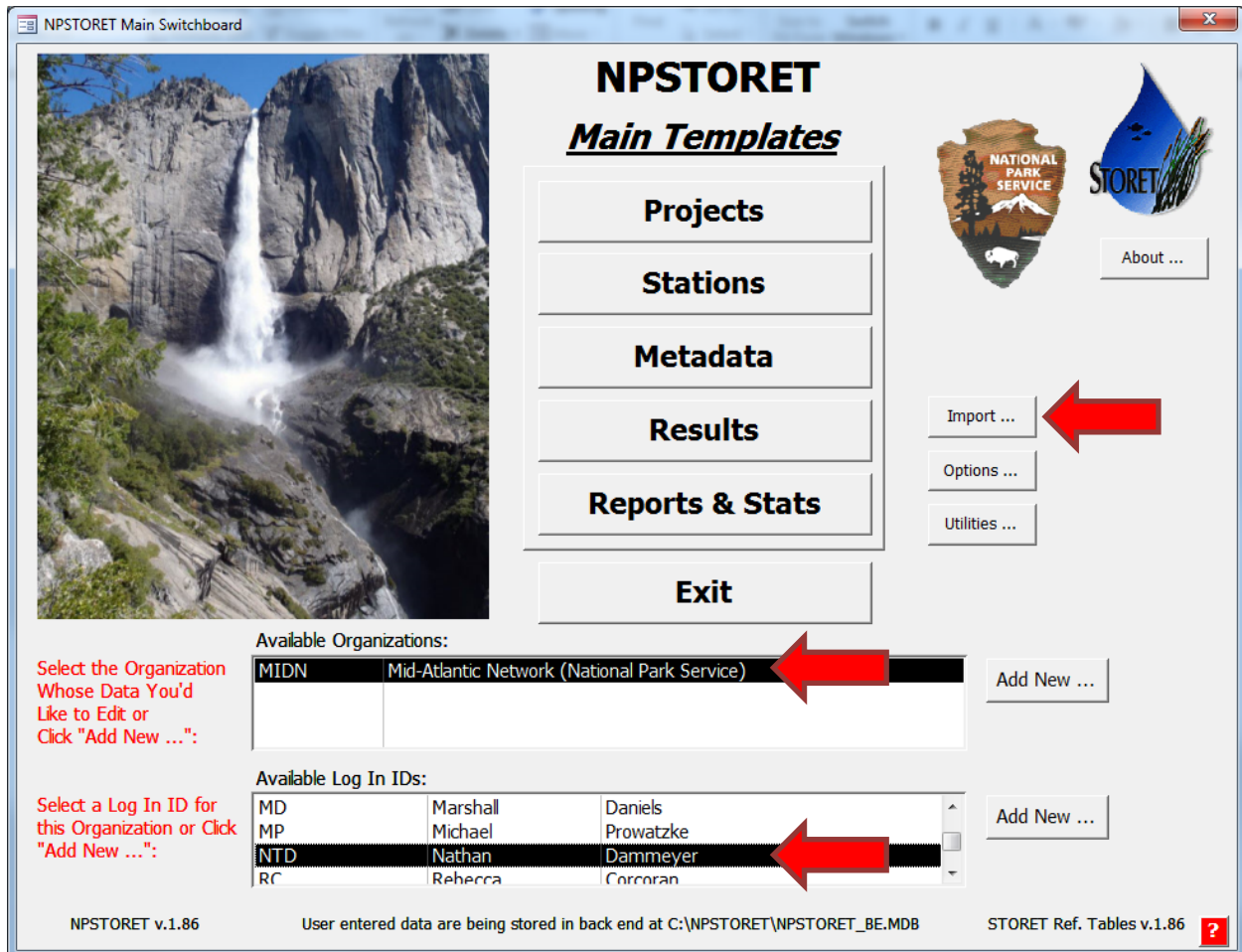
Prior to saving the import file, ensure that the selected field is not in the date column or in an empty row below the last row of data as this can result in errors during the data importing process.

- c. Under file menu in Excel use "Save As"
 - i. Navigate to appropriate park field data import folder on the MIDN server in the "Save As" window
 - ii. Change the file name using the following naming convention
 1. PARK_YYYY_MMM_DD_Field_Data_**Import**.xlsx
 - a. e.g., FRSP_2015_Jan_08_Field_Data_Import.xlsx
- (4) Populate Excel Calibration_Log
- a. Navigate to appropriate park folder and open Calibration log
 - b. Enter calibration data and save file back to server
- (5) Populate Excel Sensor_Check_Log
- a. Navigate to appropriate park folder and open Calibration log
 - b. Enter sensor check data and save file back to server

B. NPSTORET Data Import:

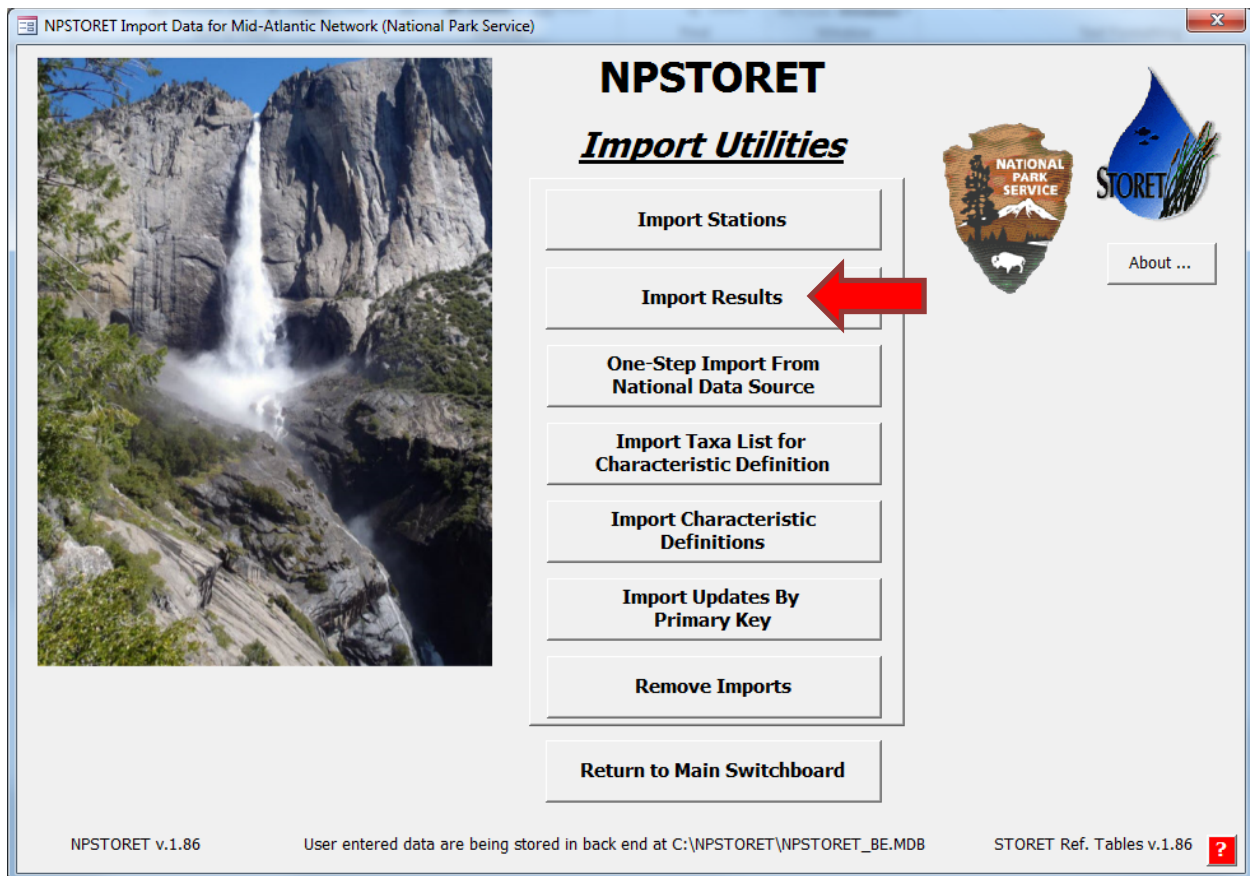
- (1) Launch NPSTORET Application on MIDN computer:
 - a. Select appropriate organization (i.e., MIDN) and Log In ID.
- (2) Click "Import..." button below the NPS Arrowhead logo (Fig. 1).

Figure 1: NPSTORET log in screen.



- (3) The Import Utilities dialog will open. Select the “Import Results” button second from the top (Fig. 2).

Figure 2. NPSTORET Import Utilities screen.



- (4) In the Result Import window make sure that File Contents, Source, and Type appear as below, then click the “Browse...” button and select the file you wish to import (Fig. 3).
 - a. All files for import were converted for import (see above) and reside on the MIDN server in the park specific subfolder of the “FieldDataImport” folder (see section IV.A below).
- (5) Click the “Next>” button.

Figure 3. NPSTORET Result Import screen.

The screenshot shows the 'NPSTORET Result Import' window. The title bar reads 'NPSTORET Result Import for Mid-Atlantic Network (National Park Service)'. The main area contains the following fields:

- File Contents:** A dropdown menu with 'Results Plus Station-Visits and Activities' selected. A red arrow points to this field.
- File Source:** A dropdown menu with 'Other' selected. A red arrow points to this field.
- File Type:** A dropdown menu with 'Excel 2007-10 (*.xlsx)' selected. A red arrow points to this field.
- File Name:** A text input field with a 'Browse...' button to its left. A red arrow points to the 'Browse...' button.
- A 'View Import File' button is located to the right of the 'File Name' field.

At the bottom of the window, there is a 'Reminder' text: 'Reminder: The project(s), station(s), characteristic(s), and metadata for the imported results must have been previously defined in NPSTORET.' Below this, there are three buttons: '< Back', 'Next >', and 'Cancel'. A small red question mark icon is in the bottom right corner.

- (6) In the resulting window, ensure the correct Excel Sheet is selected, and confirm your data is being displayed in the preview in the window (Fig. 4).
- (7) If correct, Click the “Next>” button.

Figure 4. Import Results dialog screen 1.

NPSTORE Result Import for Mid-Atlantic Network (National Park Service)

Import Results From 'Sheet1' In C:\AAAA_NTD\WQ Data and Docs\Discrete WQ Data\In-situ\FRSP\copy for import\FRSP 2015_01_30.xlsx

Your spreadsheet file contains more than one worksheet.
Which worksheet would you like?

Sheet1
Sheet2
Sheet3

Sample data for worksheet 'Sheet1'

StationID	Date	Visit Start Time	Time Zone	Contact Name	Visit Comments	Water Temp	Bar Pressure	DO (%)	DO (mg/l)	SpC	pH
FRSP_06	1/30/2015	0.60833333	EST	Nathan Damu		4.64	760.3	95.7	12.35	95	5.49
FRSP_08	1/30/2015	0.61527777	EST	Nathan Damu		4.08	762.8	103.3	13.51	218	6.54
FRSP_14	1/30/2015	0.64513888	EST	Nathan Damu		3.62	755.4	97.5	12.92	80	6.58
FRSP_16	1/30/2015	0.65208333	EST	Nathan Damu		4.78	757.3	101.8	13.07	158	6.9
FRSP_15	1/30/2015	0.65625	EST	Nathan Damu		3.89	756.8	103.5	13.6	74	6.82
FRSP_02	1/30/2015	0.67916666	EST	Nathan Damu		4.63	756.6	95.1	12.26	70	6.2
FRSP_01	1/30/2015	0.68472222	EST	Nathan Damu		2.75	757.2	99.8	13.52	67	6.47
FRSP_03	1/30/2015	0.69097222	EST	Nathan Damu		3.62	757.2	101.6	13.42	69	6.58
FRSP_04	1/30/2015	0.69583333	EST	Nathan Damu		4.02	757.4	101.4	13.29	55	6.48
FRSP_09	1/30/2015	0.70555555	EST	Nathan Damu		4.9	757	94.6	12.09	53	6.34
FRSP_10	1/30/2015	0.71180555	EST	Nathan Damu		3.77	757.1	97.3	12.81	44	6.33
FRSP_11	1/30/2015	0.71527777	EST	Nathan Damu		3.98	757.8	99	12.97	167	6.65
FRSP_18	1/30/2015	0.72083333	EST	Nathan Damu		3.43	758.2	100	13.3	130	6.77

< Back Next > Cancel

- (8) In the resulting window, make sure that the file format radio button is selected for “Column major”(Fig. 5).
- (9) Click the “Next >” button.

Figure 5. Import Results dialog screen 2.

NPSTORET Result Import for Mid-Atlantic Network (National Park Service)

Import Results From 'Sheet1' In C:\AAAAA_NTD\WQ Data and Docs\Discrete WQ Data\In-situ\FRSP\copy for import\FRSP 2015_01_30.xlsx

NPSTORET can use entries in the first row of worksheet 'Sheet1' as field/column headings. Does the first row contain field/column headings?

☒ First Row Contains Column Headings

File format is ...

☐ Row major. Each row is a separate characteristic result so it takes multiple rows to comprise the station visit/activity.

☒ Column major. Columns in row contain results for each characteristic measured during one station visit/activity.

Sample data for worksheet 'Sheet1'

StationID	Date	Visit Start Time	Time Zone	Contact Name	Visit Comments	Water Temp	Bar Pressure	DO (%)	DO (mg/l)	SpC	pH
FRSP_06	1/30/2015	0.60833333	EST	Nathan Damu		4.64	760.3	95.7	12.35	95	5.49
FRSP_08	1/30/2015	0.61527777	EST	Nathan Damu		4.08	762.8	103.3	13.51	218	6.54
FRSP_14	1/30/2015	0.64513888	EST	Nathan Damu		3.62	755.4	97.5	12.92	80	6.58
FRSP_16	1/30/2015	0.65208333	EST	Nathan Damu		4.78	757.3	101.8	13.07	158	6.9
FRSP_15	1/30/2015	0.65625	EST	Nathan Damu		3.89	756.8	103.5	13.6	74	6.82
FRSP_02	1/30/2015	0.67916666	EST	Nathan Damu		4.63	756.6	95.1	12.26	70	6.2
FRSP_01	1/30/2015	0.68472222	EST	Nathan Damu		2.75	757.2	99.8	13.52	67	6.47
FRSP_03	1/30/2015	0.69097222	EST	Nathan Damu		3.62	757.2	101.6	13.42	69	6.58
FRSP_04	1/30/2015	0.69583333	EST	Nathan Damu		4.02	757.4	101.4	13.29	55	6.48
FRSP_09	1/30/2015	0.70555555	EST	Nathan Damu		4.9	757	94.6	12.09	53	6.34
FRSP_10	1/30/2015	0.71180555	EST	Nathan Damu		3.77	757.1	97.3	12.81	44	6.33
FRSP_11	1/30/2015	0.71527777	EST	Nathan Damu		3.98	757.8	99	12.97	167	6.65
FRSP_18	1/30/2015	0.72083333	EST	Nathan Damu		3.43	758.2	100	13.3	130	6.77

< Back Next > Cancel

(10) Map import field names to NPSTORET Field names (Fig. 6.)

a. Click "Load Spec..." button.

Figure 6. NPSTORET Import Results dialog screen 3.

NPSTORET Result Import for Mid-Atlantic Network (National Park Service)

Import Results From 'Sheet1' In C:\AAAA_NTD\WQ Data and Docs\Discrete WQ Data\In-situ\FRSP\copy for import\FRSP 2015_01_30.xlsx

NPSTORET was not able to map all of your import file field names to NPSTORET field names. Please complete the specification.

Station Visit/Activity Info

NPSTORET Field Name	Data Type	Import File Field Name	OR	Constant Value
* ProjectID	Text (35)	ProjectID		
* StationID	Text (35)	StationID		
* Visit Start Date	Date/Time			
Visit Start Time	Date/Time	Visit Start Time		
Start Time Zone	Text (4)			
Visit End Date	Date/Time			
Visit End Time	Date/Time			
End Time Zone	Text (4)			
Visit Comment	Memo	Visit Comment		

Save Spec...

Load Spec...

NPSTORET Local Char Name	STORET Display Name	Result/Detection Condition Import File Field Name
Air_Temperature	Temperature, air	
Al_organic_Technicon_AAII	Aluminum, Organic Monomeric (reactive alumi	
Al_Total_Technicon_AAII	Aluminum, Organic + Inorganic Monomeric (r	
ANC_Metrohm_809	Acid Neutralizing Capacity (ANC)	
Anion/Cation ratio	Anion / Cation Ratio	
Anions_Sum	Anions, Sum of	
Bar_Presure_YSI_ProPlus	Barometric pressure	
Baro_Pres_YSI_6920	Barometric pressure	
Ca_Cations_Dissolved	Calcium	

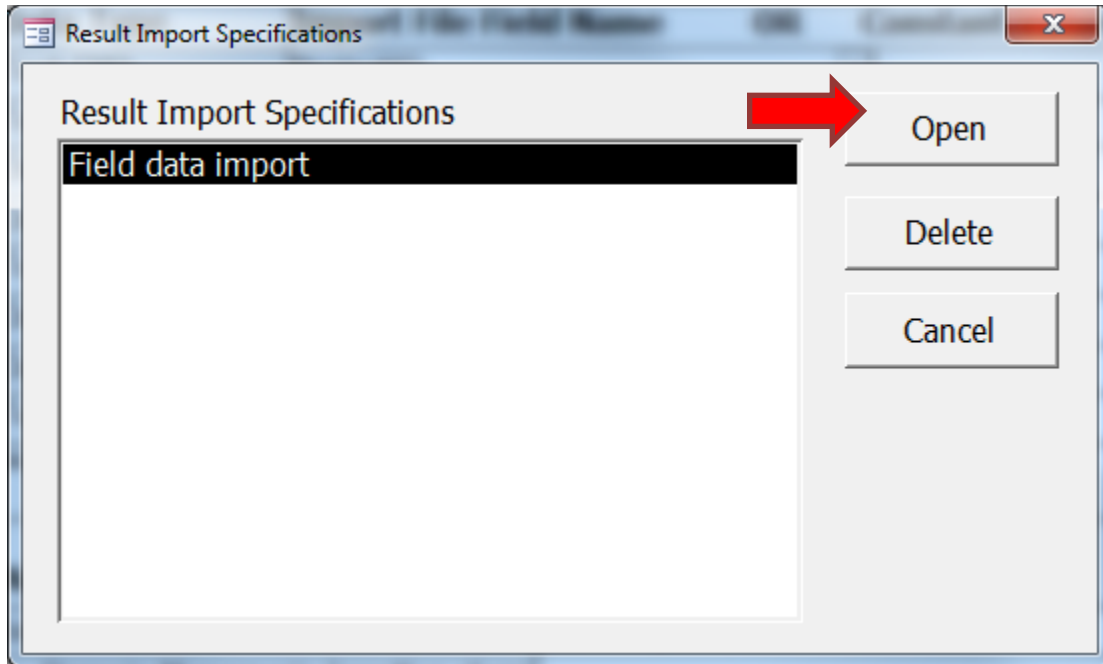
* indicates field required for STORET

< Back Next > Cancel

?

(11) In the resulting window, ensure that the specification named “Field data Import” is highlighted (Fig. 7). Click the “Open” button.

Figure 7. Result Import Specifications dialog screen.



(12) In the resulting window, you can see that additional fields not mapped by default are now mapped (Fig. 8). Click the “Next>” button.

Figure 8. Import Results dialog screen 4 showing additional fields now mapped.

NPSTORET Result Import for Mid-Atlantic Network (National Park Service)

Import Results From 'Sheet1' In C:\AAAA_NTD\WQ Data and Docs\Discrete WQ Data\In-situ\FRSP\copy for import\FRSP 2015_01_30.xlsx

NPSTORET was not able to map all of your import file field names to NPSTORET field names. Please complete the specification.

Station Visit/Activity Info

NPSTORET Field Name	Data Type	Import File Field Name	OR	Constant Value
* ProjectID	Text (35)	ProjectID		
* StationID	Text (35)	StationID		
* Visit Start Date	Date/Time	Date		
Visit Start Time	Date/Time	Visit Start Time		
Start Time Zone	Text (4)	Time Zone		
Visit End Date	Date/Time			
Visit End Time	Date/Time			
End Time Zone	Text (4)			
Visit Comment	Memo	Visit Comment		

Save Spec...

Load Spec...

NPSTORET Local Char Name	STORET Display Name	Result/Detection Condition Import File Field Name
Air_Temperature	Temperature, air	Air Temp
Al_organic_Technicon_AAII	Aluminum, Organic Monomeric (reactive alumi	
Al_Total_Technicon_AAII	Aluminum, Organic + Inorganic Monomeric (r	
ANC_Metrohm_809	Acid Neutralizing Capacity (ANC)	
Anion/Cation ratio	Anion / Cation Ratio	
Anions_Sum	Anions, Sum of	
Bar_Presure_YSI_ProPlus	Barometric pressure	Bar Pressure
Baro_Pres_YSI_6920	Barometric pressure	
Ca_Cations_Dissolved	Calcium	

* indicates field required for STORET

< Back Next > Cancel

?

- (13) In the resulting window, ensure that your selections shown match those in the screen shot below (Fig. 9). Pay particular attention to last radio button selected for “Update existing characteristic results. Append new characteristic results”, as this is not the default value.
- (14) Click the “Next >” button.

Figure 9. NPSTORET Import Results dialog showing how to update existing records.

NPSTORET Result Import for Mid-Atlantic Network (National Park Service)

Import Results From 'Sheet1' In C:\AAAA_NTD\WQ Data and Docs\Discrete WQ Data\In-situ\FRSP\copy for import\FRSP 2015_01_30.xlsx

When importing results ...

- ☐ Always create new station visits and activities to house the import data.
- ☒ Add the import data on existing station visits. Create new station visits if the station visits don't already exist.

To use an existing station visit, the imported record must uniquely match the following fields:

☒ Start Date ☒ Start Time ☐ End Date ☐ End Time

If the imported record uniquely matches an existing visit on the fields selected above, use that visit to house the results and...

- ☒ Keep the existing visit definition.
- ☐ Replace the existing visit definition in entirety with that in the imported record.
- ☐ Replace only blank values in the existing visit definition with values in the imported record.

If an activity matches one that already exists on station visit ...

- ☐ Replace entire visit activity and all of its results. This will delete any results that do not appear in import data.
- ☒ Update existing characteristic results. Append new characteristic results.
- ☐ Only update existing characteristic results if value was '*Not Reported'. Append new characteristic results.
- ☐ Generate a QC activity replicate and store the results there.
- ☐ Generate a new activity and store the results there.
- ☐ Don't import any information for that visit activity.

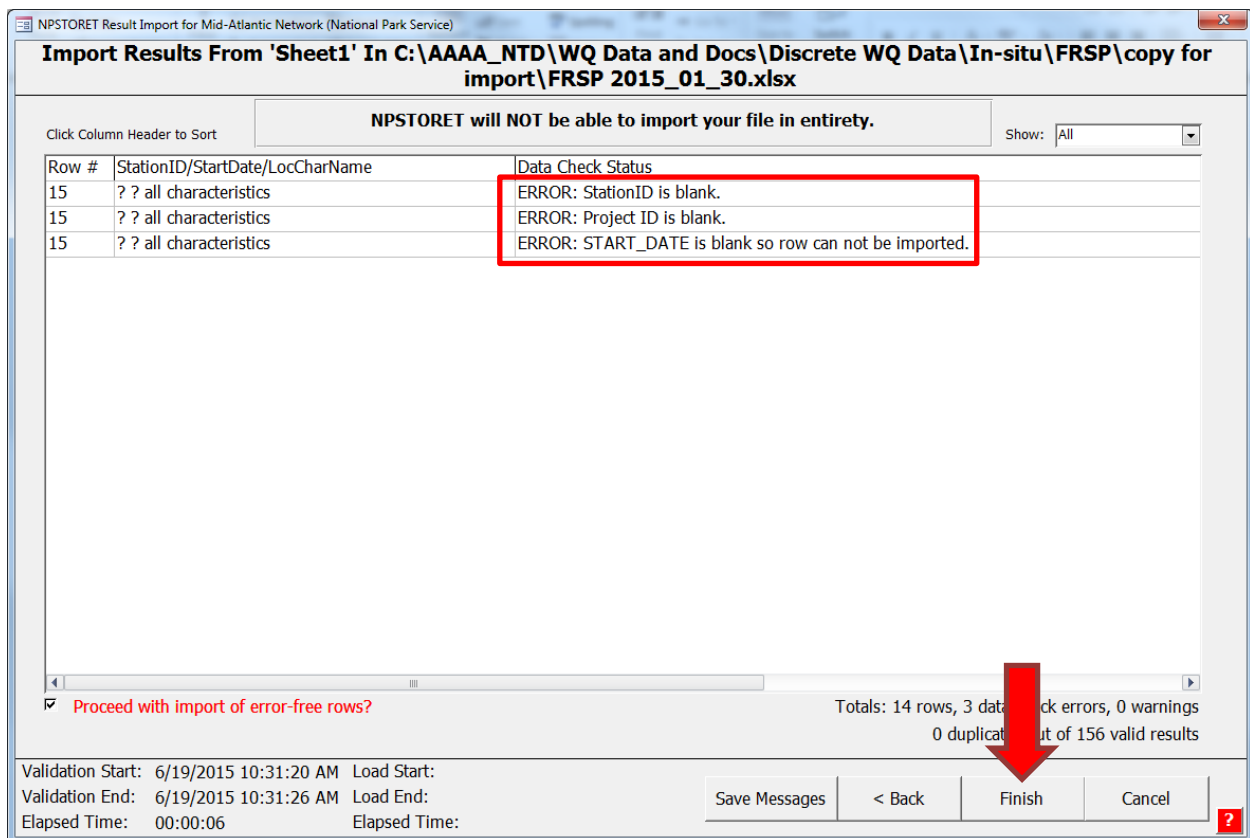
< Back Next > Cancel

- (15) In the resulting window, review any errors in the “Data Check Status” column (Fig. 10).
- If the errors are found, the import should be canceled.
 - Address any errors in your source file and re-import the data.

The errors in the screen shot below are a result of the selected field being located in an empty row when the import file was last saved. In this case, check the box next to “Proceed with import of error-free row?”. This was confirmed as there were 13 rows of data and one header row in the source file.

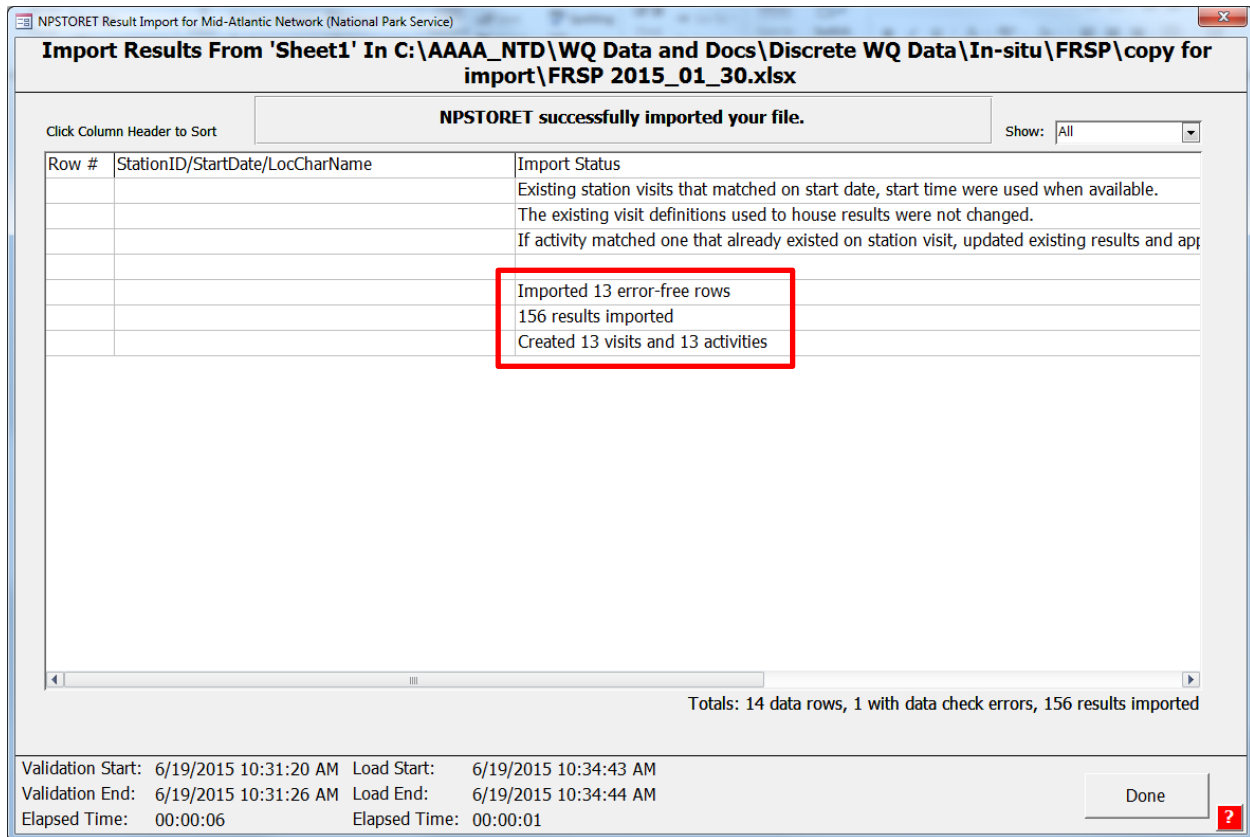
- (16) Click the “Finish” Button.

Figure 10. NPSTORET Import Results dialog showing import errors.



(17) In the resulting window, you can see the results of the import (Fig. 11). Check these to ensure that the correct number of rows you wish to import were added correctly. Click the “Done” button to complete the import process.

Figure 11. NPSTORET Import Results dialog showing import status and count of results imported.

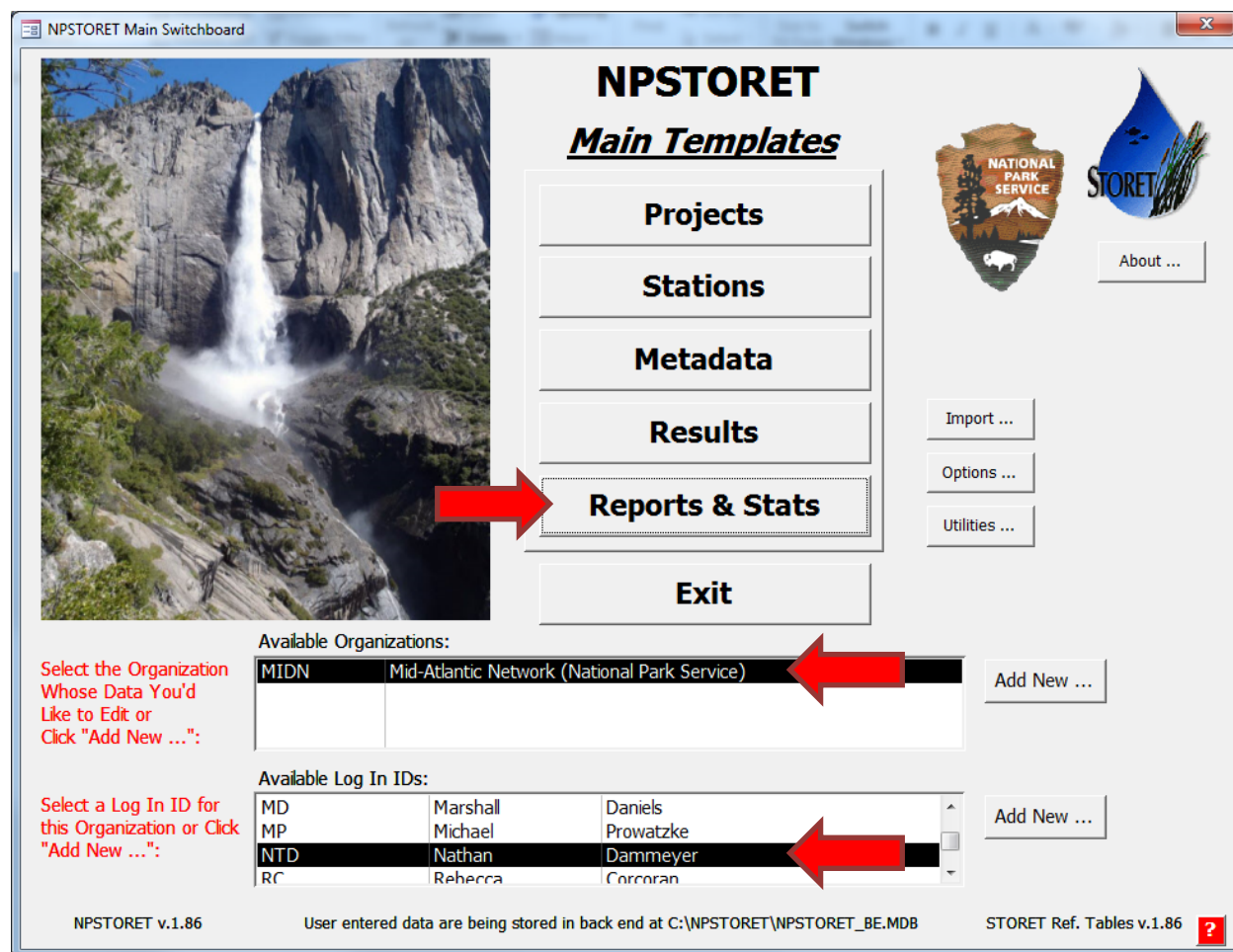


C. NPSTORET Data Evaluation:

Upon successful import of all monthly episodic sampling data, the project lead or designated staff will review the imported data in graphical format to look for outliers and overall data consistency. NPSTORET's "Reports and Statistics" features will be used to create the graphs for review.

- (1) Launch NPSTORET Application on MIDN computer (Fig. 12).
 - a. Select appropriate organization (i.e., MIDN) and Log In ID.
- (2) Select "Reports & Stats" button.

Figure 12. NPSTORET log in screen showing log in and "Reports & Stats" button.



- (3) In the resulting window, select the tab “3. Graphs” (Fig. 13).
 - a. Under “Available Graphs”, highlight Time Series.
 - b. For “X-axis” select Sample Date.
 - c. For “Plot for Each”, select Characteristic.
- (4) Click the “Browse...” button next to “File Name:” field.
 - a. Navigate to a temporary file location on the local machine.
 - i. e.g., Desktop/Temporary NPSTORET Graphics
 - b. Name the output file you wish to create.
 - i. e.g., PARK_Data_Import_Checker_Temp
- (5) Click “Load Filter” button next to Filter Options:

Figure 13. NPSTORET Reports and Statistics dialog showing graphing options.

Reports and Statistics for Mid-Atlantic Network (National Park Service)

NPSTORET Reports and Statistics

1. Reports
2. Statistics
3. Graphs
4. Export
5. Google Earth

Available Graphs:

- Time Series
- Box and Whiskers
- Box

File Name:
C:\Users\ndammeyer\Desktop Browse...

X-Axis:
Sample Date

Plot For Each:
Characteristic

Censored Data Handling: Substitution

Substitutions for Censored Data:

- ☐ Not Detected
- ☐ Present > QL
- ☐ Present < QL

Filter Load Filter Save Filter Analytical Groups Scroll down to access all filter options

Organizations: All

Projects: Subset

Selected Projects

FRSP: Fredericksburg & Spotsylvani

Stations: All Stations and Trip QC

Date Ranges: Subset

From 6/3/2013 ... to 6/19/2014 ...

OR From ... to ...

OR From ... to ...

OR From ... to ...

OR From ... to ...

Activities: All

Activity Types: All

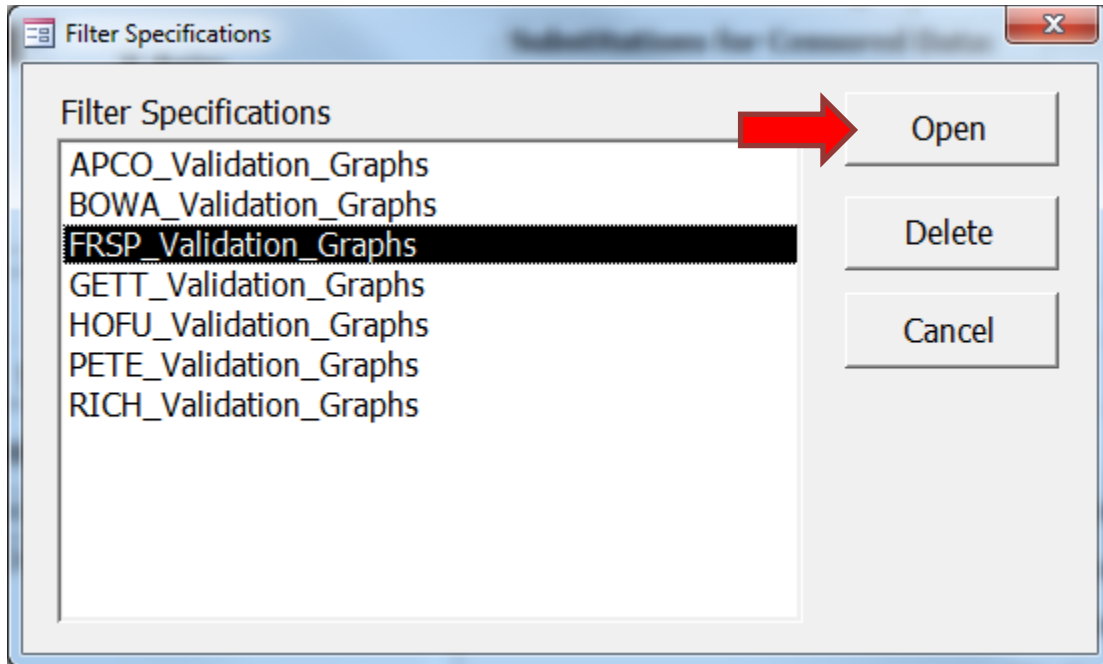
Detection Cond: All

Status: All

Generate Graphs
Export Analysis Data Set
Options ...
Close Reports & Statistics

- (6) Highlight appropriate Park Filter (Fig. 14).
- (7) Click “Open” button.

Figure 14. NPSTORET Reports and Statistics Load Filter dialog showing pre-loaded Park filters.



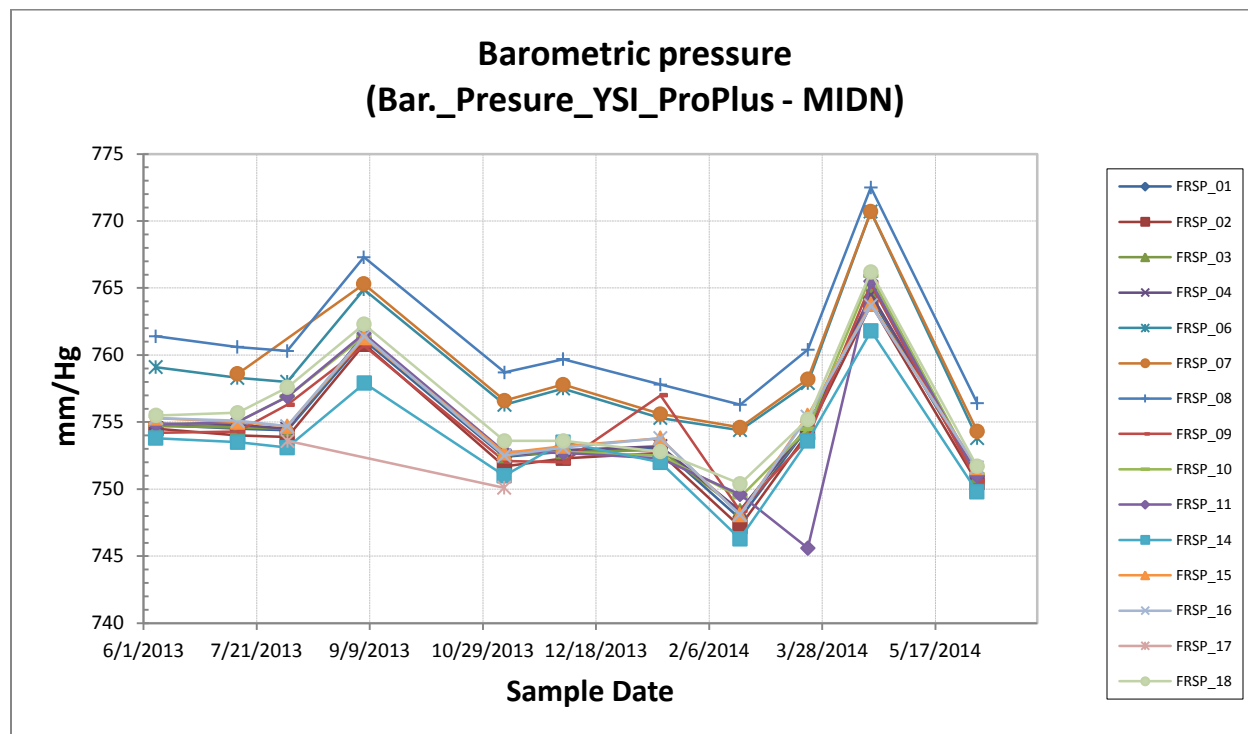
- (8) In the “Date Ranges:” pick list (Fig. 15):
 - a. select “Subset” from the “Date Ranges” drop down list.
 - b. Set range to display one year worth of data ending with the most current sampling event
- (9) Click “Generate Graphs” button.

Figure 15. NPSTORET Reports and Statistics dialog showing selected date ranges.

The image shows the 'NPSTORET Reports and Statistics' dialog box. At the top, there are five tabs: '1. Reports', '2. Statistics', '3. Graphs' (which is selected), '4. Export', and '5. Google Earth'. Below the tabs, the 'Available Graphs' section has a list with 'Time Series' selected. The 'File Name' field shows 'C:\Users\ndammeyer\Desktop' with a 'Browse...' button. The 'X-Axis' is set to 'Sample Date' and 'Plot For Each' is set to 'Characteristic'. The 'Censored Data Handling' is set to 'Substitution', and the 'Substitutions for Censored Data' section has three unchecked checkboxes: 'Not Detected', 'Present > QL', and 'Present < QL'. The 'Filter Options' section includes 'Load Filter', 'Save Filter', and 'Analytical Groups' buttons. Below these are several filter pick lists: 'Organizations' (All), 'Projects' (Subset), 'Stations' (All Stations and Trip QC), 'Date Ranges' (Subset), 'Activities' (All), 'Activity Types' (All), 'Detection Cond' (All), and 'Status' (All). The 'Date Ranges' section shows a date range from '6/3/2013' to '6/19/2014', which is highlighted with a red box. At the bottom, there are four buttons: 'Generate Graphs' (with a large red arrow pointing to it), 'Export Analysis Data Set', 'Options ...', and 'Close Reports & Statistics'.

- (10) Review the output for each Park and Characteristic (Fig. 16):
- Check for outliers (Table 2) and overall data consistency.
 - If any values are questionable, review:
 - Paper data sheets
 - Field Data Import Files
 - Correct any data entry errors:
 - Update and note in the "Visit Comment" Field of the Field Data Import Files.
 - Update and note the correction in NPSTORET.
 - If any values are determined to be questionable and cannot be corrected (e.g., erroneous value recorded on Field Data Sheet):
 - Update and note on the Field Data Sheet.
 - Update and note in the "Visit Comment" Field of the Field Data Import Files.
 - Update and note the correction in NPSTORET.
- (11) Populate "Accepted_Rejected_Log" Excel file
- This log file is used to track censored and missing data. This form is used in the data certification procedures carried out at the end of the reporting period on an annual basis (SOP 2.4).
- Enter sampling date, park code, and meter number
 - Select Yes in "Any Data Censored or Missing?" field if any data was excluded from the database
 - If data are missing or censored enter remarks indicating the reason for this
 - Enter any notes from the Field Data Sheet in the "General Remarks" field

Figure 16. Example NPStoret graphical output displaying barometric pressure at all FRSP sites.

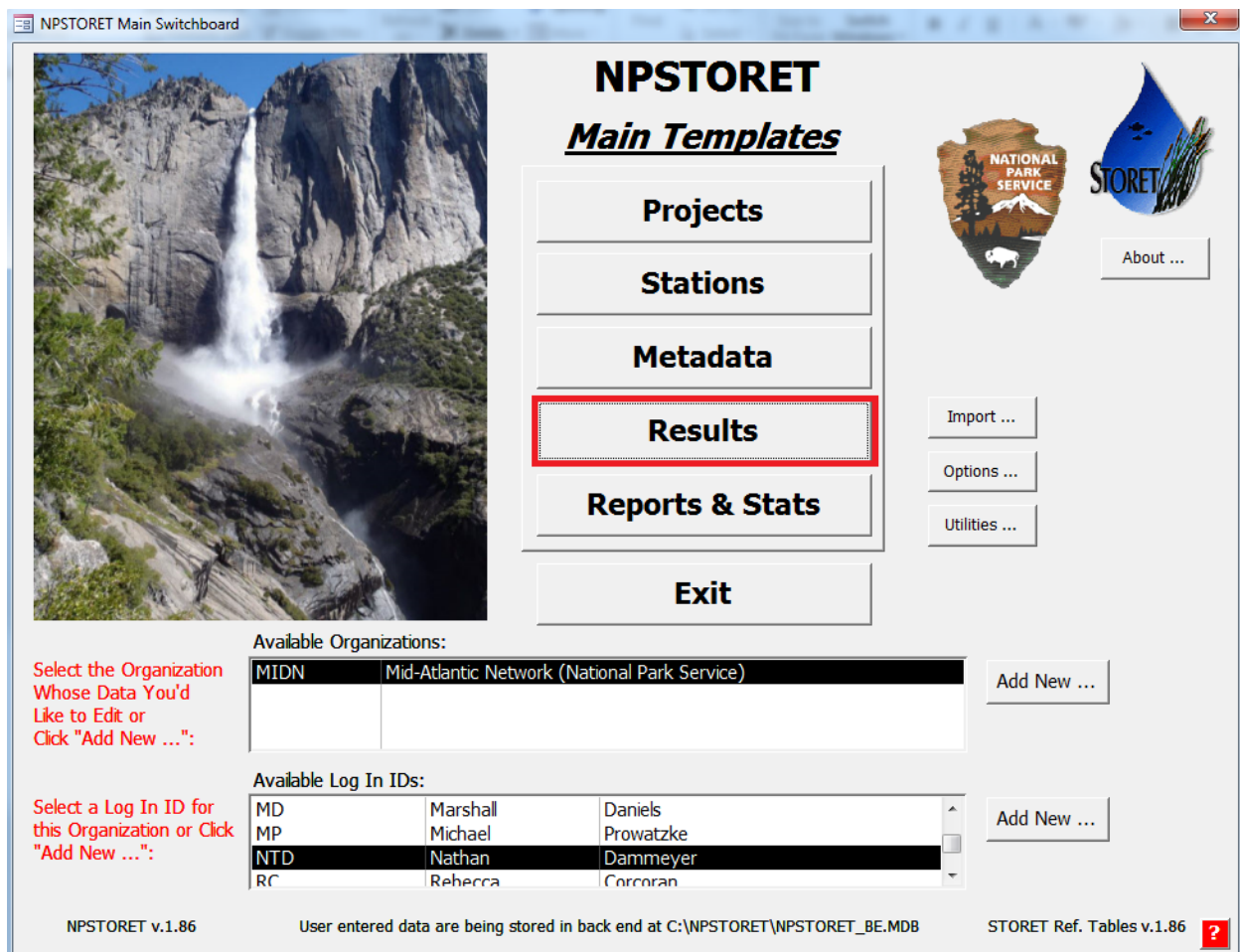


D. Data Finalization in NPSTORET

Data finalization occurs after all QA/QC procedures have been completed from field preparations through data management. Data finalization is the last step prior to accepting the data and indicates that the day is available for distribution to MIDN parks upon request. Data acceptance occurs after a final check of all QAQC procedures as presented in the Quality Assurance and Quality Control SOP (2.4).

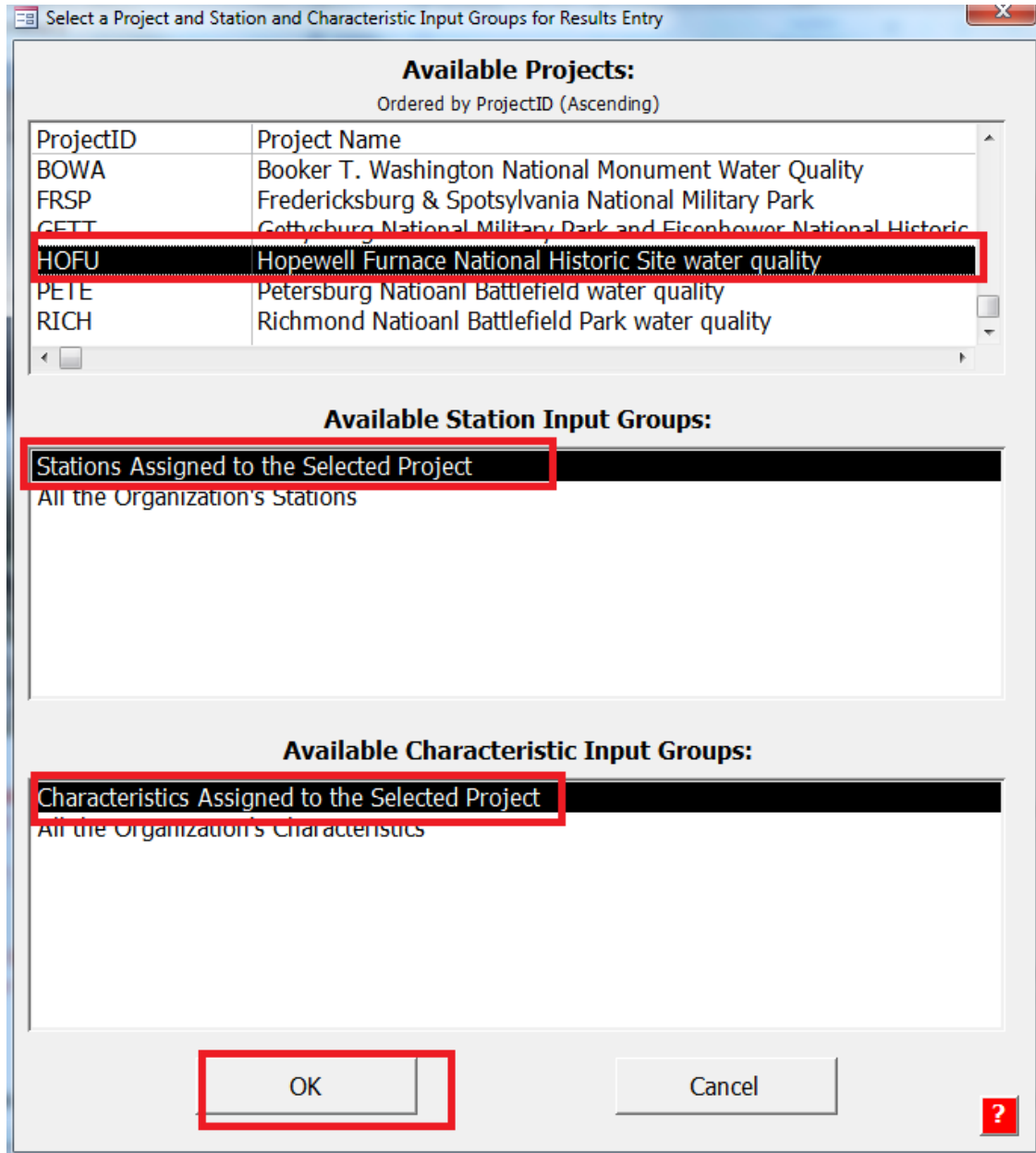
- (1) Change "Value Status" to "Final" in NPSTORET for all data which has passed QAQC procedures:
 - a. From the Main Switchboard of NPSTORET, click "Results" button (Fig. 17).

Figure 17. NPSTORET log in screen showing Results button.



- b. Select appropriate options for results update:
- Select appropriate park under the “Available Projects” section (Fig.18).
 - Select “Stations Assigned to the Selected Project” in the “Available Station Input Groups:” listbox.
 - Select “Characteristics Assigned to the Selected Project” in the “Available Characteristic Input Groups” listbox
 - Click “OK” button.

Figure 18. NPSTORET Available Projects dialog.



The dialog box is titled "Select a Project and Station and Characteristic Input Groups for Results Entry". It contains three main sections: "Available Projects:", "Available Station Input Groups:", and "Available Characteristic Input Groups:". Each section has a listbox with a red box highlighting the first option. At the bottom, there are "OK" and "Cancel" buttons, with the "OK" button highlighted by a red box. A help icon (?) is located in the bottom right corner.

ProjectID	Project Name
BOWA	Booker T. Washington National Monument Water Quality
FRSP	Fredericksburg & Spotsylvania National Military Park
GETT	Gettysburg National Military Park and Eisenhower National Historic Site
HOFU	Hopewell Furnace National Historic Site water quality
PETE	Petersburg National Battlefield water quality
RICH	Richmond National Battlefield Park water quality

Available Station Input Groups:

- Stations Assigned to the Selected Project
- All the Organization's Stations

Available Characteristic Input Groups:

- Characteristics Assigned to the Selected Project
- All the Organization's Characteristics

OK Cancel ?

- c. Change Value Status field to “Final” for all stations:
 - i. Use “Quick Filter for Visit Start Date” to filter to appropriate sampling event (Fig. 19).
 - ii. Use “Station ID:” to filter to appropriate stations for sampling event.
 - iii. Use “Change Status to all:” drop down list to update Value Status field from “Preliminary” to Final.
 - iv. Repeat steps c.ii - c.iii for each station where data has been reviewed and passed QAQC procedures.
- d. Click “Close Results” button to return to the main switchboard.

Figure 19. NPSTORET Result Entry Template dialog showing “Change Status to all:” drop down list.

Visits, Activities, and Results for Project: Fredericksburg & Spotsylvania National Military Park (FRSP)

NPSTORET Result Entry Template

Quick Filter for Station: Quick Filter for Visit Start Date:

Station ID: Station Name: North Branch of Deep Run at Lee Drive in Fredericksburg BF

Activity ID: Activity Type: QC:

Start Date: Start Time: Zone: Vis# 00001

End Date: End Time: Zone:

Visit Comment:

Activity Comment:

Depth: Units: Custody ID:

Relative Depth: Person(s):

Visit: of 14 (Filtered) Pictures: 0

Activity: of 1

Double-click a record to pop up an alternate data editing form

Change Status to all:

Local Name	Detection Condition	Result	Value	Units	Value Type	Statistic Type	Remark Code	Measure Qu
Water_Temp_YSI_ProPlus	Detected and Quantified	18.91	°C	P	Final			
Bar_Presure_YSI_ProPlus	Detected and Quantified	764.1	mm/Hg	P	Preliminary			
DO_YSI_ProPlus_%	Detected and Quantified	86.2	%	P	Accepted			
DO_YSI_ProPlus_mg/l	Detected and Quantified	8.01	mg/l	P	Verified			
SpC_YSI_ProPlus	Detected and Quantified	145	µS/cm	P	Validated			
pH_YSI_ProPlus	Detected and Quantified	5.91	None	P	Rejected			
Air_Temperature	Detected and Quantified	22.1	°C	P	Preliminary	Actual		
Width_wetted width	Detected and Quantified	1.5	m	P	Preliminary	Estimated		
Depth_stream	Detected and Quantified	15	cm	P	Preliminary	Estimated		
Discharge	Detected and Quantified	NORMAL		P	Preliminary	Estimated		
turbidity_categorical	Detected and Quantified	NONE		P	Preliminary	Estimated		
Weather	Detected and Quantified	0		P	Preliminary	Actual		
*	Detected and Quantified			P	Preliminary	Actual		

E. Data Transfer to WRD

On an annual basis after data has been finalized a copy of the MIDN NPSTORET back-end (local copy) is transferred to WRD following WRD provided guidance (see current guidance from WRD for appropriate procedures).

IV. Data Storage

Discrete water quality monitoring data is stored and backed up daily using MIDN's central server. The folder structure is outline below.

A. Folder Structure:

The folder structure below can be found on the server in the yearly monitoring folder at the following path Z:\Monitoring\WaterQuality\20XX. In each folder, excluding the NPStoret folders, each park's data will be maintained in a separate subfolder.

All data converted to an electronic format is maintained under the Database subfolder while all scanned data sheets are maintained under the Fieldforms subfolder.

- \ 03_Data – Stores all documentation of field data collection, electronic data, PDFs, photographs, and spatial data
 - \ Database – Stores all electronic documentation of the data collected during the field season.
 - \ Discrete
 - \ Excel
 - \ FieldData
 - \ FieldDataRow- Excel Field Data Import Files (raw)
 - \ FieldDataImport- Excel Field Data Import Files (for NPSTORET)
 - \ QAQC
 - \ Calibration_Log- Excel Calibration Files
 - \ Sensor_Check_Log- Excel Sensor Check Files
 - \ Accepted_Rejected_Log- Excel log files tracking censored data
 - \ NPStoret
 - \ FrontEnd – Front End version of NPSTORET
 - \ BackEnd – Back End version of NPSTORET
 - \ Annual_Reports
 - \ FieldForms – Stores PDF scanned copies of field data sheets
 - \ Discrete
 - \ FieldData- Scanned Field Data Sheets
 - \ Site_Documentation- Scanned Site Documentation Field Sheets
 - \ QAQC
 - \ CalibrationData- Scanned Calibration Data Sheets
 - \ SensorCheck- Scanned Sensor Check Sheets

V. Schedule of Tasks

Outlined below is the schedule of activities for management of discrete water quality data. Tasks are listed in chronological order and the target timeline for completion of each task

Table 4. Schedule of event related to discrete water quality data management.

Task	Timeline
For parks that utilize their own staff to collect data, scan paper data sheets and send electronic copies to the protocol lead	3 days after completion of data collection
For parks that utilize MIDN staff to collect data, the protocol lead, or designated staff, will gather all paper data sheets for data entry	3 days after completion of data collection
Enter field observations in the MIDN Data Entry Template	3 days after completion of data collection
Error check field observation values	Manually during data entry
Convert Excel version of MIDN Data Entry Template to import format, and import into NPSTORET	Within 1 day of completion of electronic data entry for all sampled parks
Perform Outlier Checks using NPSTORET	Within 1 day of completion of electronic data entry for all sampled parks
Enter needed data changes electronically	Immediately following completion of all data checks
Note any data changes or censored data on paper data sheets or Park PDFs	Immediately following completion of any changes made to the data
Scan paper sheets and place on server	Once all data checks have been performed and changes noted on paper data sheets
Transfer a copy of MIDN NPSTORET back-end (local copy) to WRD after data has been finalized	Annually