



San Francisco Bay Area Network Inventory and Monitoring Program

Stream Discharge Database Draft Documentation

Prepared by:

David Press
Golden Gate National Recreation Area
Fort Mason, Bldg 201
San Francisco, CA 94123

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The purpose of this document is to describe the Microsoft Access database used to store field measurements and discharge calculations associated with the San Francisco Area Network's freshwater dynamics monitoring program. The documentation contained here has been excerpted from the stream flow monitoring protocol's draft Data Management Standard Operating Procedure (Fong and Press 2007).

SFAN Stream Discharge Database Documentation

1.0. SFAN Stream Discharge Database Description

The SFAN staff has developed a relational Microsoft (MS) Access XP database for the program's field streamflow measurements (See SOP 1) compliant with the Natural Resource Database Template (NRDT) Version 3.1, an application developed by the National Park Service's (NPS) Natural Resource Inventory and Monitoring Program (I&M). The data are organized around sampling events at the nine streamflow stations, which are described and geographically defined in a locations table. Besides actual event, stream flow, and stream condition data, the database is used to maintain records of data history, field personnel, photo points, and streamflow meter metadata. Table relationships are displayed in Figure 1 and a

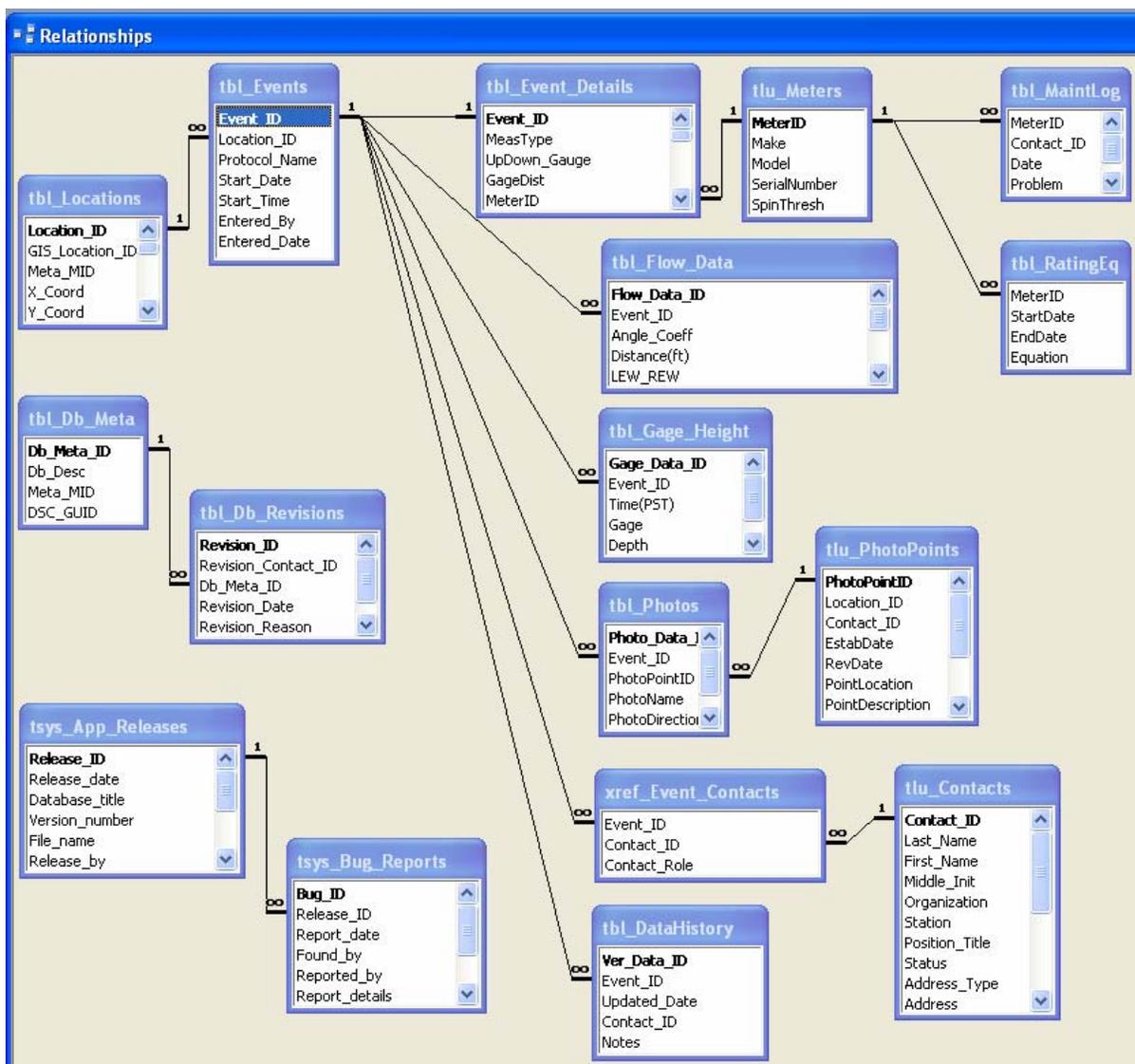


Figure 1. Table relationships in the SFAN Stream Discharge Database.

complete data dictionary is included as Appendix 1. The user interface for the database is modeled after the NRDT Front-end Application Builder (FAB) Version 1.0, an MS Access user-interface template designed by the NPS Natural Resource GIS Program. The SFAN Stream Discharge Database strays from the NRDT FAB in that it includes the tables with the forms in a single database format, whereas the NRDT FAB is designed for a front-end / back-end database model. All database elements of the NRDT FAB used to link to and manage back-end tables have therefore been removed from the SFAN Stream Discharge Database.

The primary streamflow measurement events table, `tbl_Events`, is linked to `tbl_Event_Details` in a one-to-one relationship via an EventID Globally Unique Identifier (GUID) (Figure 1). Whereas, `tbl_Events` is a standardized table that simply stores event location, date, and time values, `tbl_Event_Details` stores data values specific to the streamflow sampling events, such as weather details and stream conditions. `tbl_Events` is linked to five tables by one-to-many relationships (Figure 1). `tbl_Gage_Height` can store several stream gage heights recorded during a single streamflow measurement event. When digital photos are taken during measurement events, details of the photos, file names, and locations on the server are stored in `tbl_Photos`. Actual stream depth and flow measurements taken along a cross section of the stream are entered into `tbl_Flow_Data`. `tbl_DataHistory` records any data verification, validation, or editing procedures associated with the streamflow event and related data. Finally, `xref_Event_Contacts` is a cross-reference table linked to `tbl_Contacts` which documents the field personnel present during data collection and their role in the sampling event.

Each of the streamflow measurement devices used in the freshwater dynamics monitoring program is identified with a unique name. The name of the device used in the field during sampling events is entered into the database with the remainder of the event data. A relationship between `tbl_Events` and `tbl_Meters` links the event data with metadata pertaining to the streamflow meter used in the field (Figure 1). Associated with `tbl_Meters` are `tbl_MaintLog` and `tbl_RatingEq`, which respectively store maintenance records for the streamflow meters and associated rating equations (Figure 1).

Digital photos taken in the field will often be taken from fixed, defined photo points, which are cataloged in `tbl_PhotoPoints`. When applicable the PhotoPointID is entered in `tbl_Photos` so that the photos can be linked to the associated photo point metadata in `tbl_PhotoPoints` (Figure 1).

Use of the database is facilitated by a complete user interface adopted from the NRDT Front-End Application Builder Version 1.0. The user interface is designed to aid with data entry, data extraction, and database documentation. Command buttons and code driven text boxes are used to navigate to forms, add data records, locate and edit data records, and query the data. Where possible, default values are set and combo boxes with fixed values are used to reduce data entry errors. For example, all fields that identify project personnel are set as combo boxes which link to the look-up table `tbl_Contacts`. The user interface includes the following key features:

frm_Switchboard

A start-up or welcome form which allows the user to navigate to data entry forms, set user default values, and view database release history (Figure 2). The start-up form is displayed automatically when the database is opened.

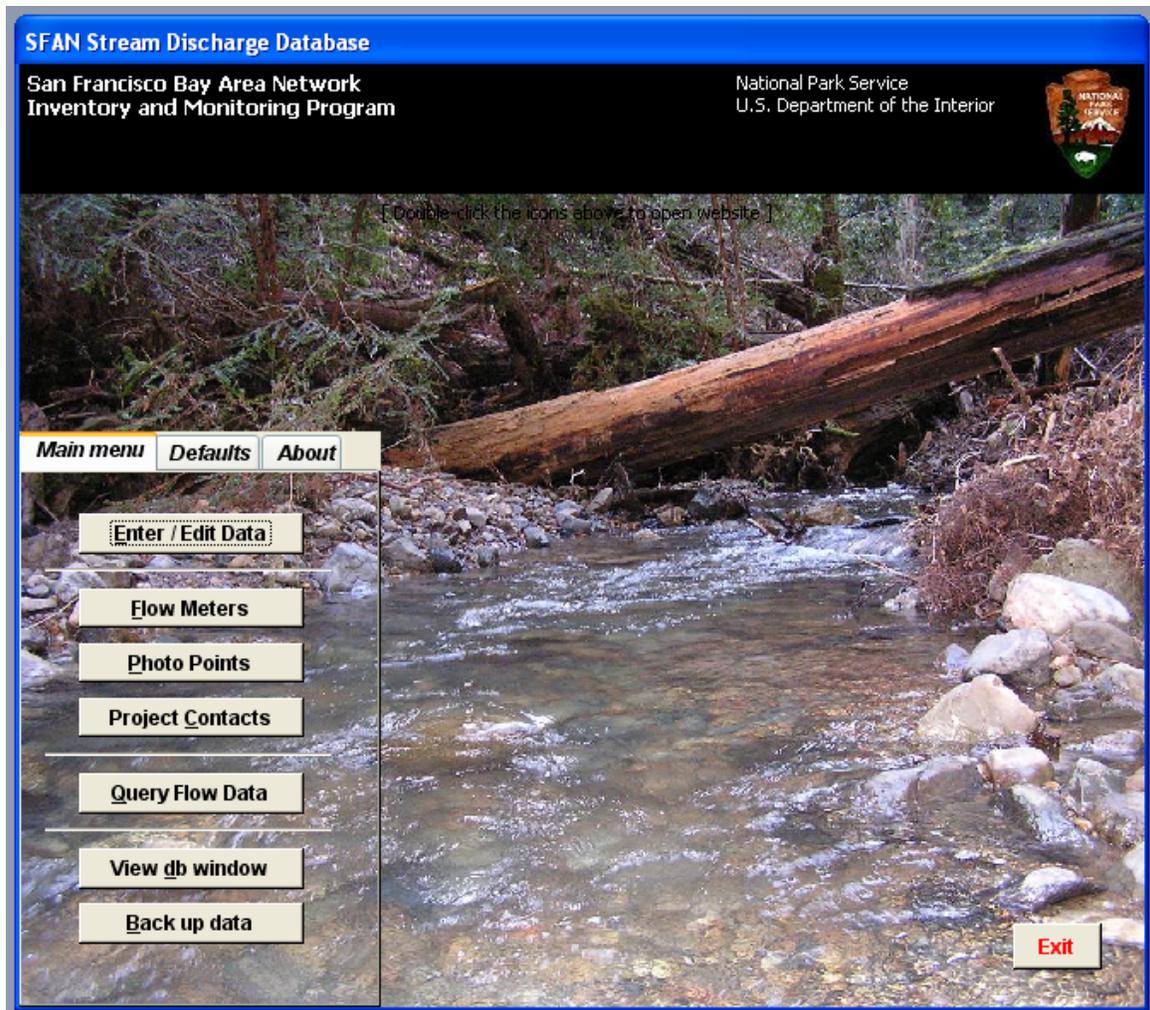


Figure 2. Database switchboard - main screen of the user interface, viewed at startup.

frm_Set_Defaults

Prior to entering or editing streamflow data, user default settings must be set or verified. Frm_Set_Defaults allows the user to specify their name, park, datum, and UTM zone. The values are then used as defaults in the data entry gateway and data entry form. Frm_Set_Defaults can be accessed by clicking the “Enter / Edit Data” button on the “Main Menu” tab of frm_Switchboard or by clicking the “Change” button on the “Defaults” tab of frm_Switchboard. The control source for frm_Set_Defaults is the hidden systems table `tsys_App_Defaults`.

frm_Data_Gateway

A form that serves as a gateway to the streamflow event data entry form (Figure 3). The form allows the user to continue forward to add a new record or to browse and select from data that has already been entered. Listings for already entered data records are automatically filtered when the form opens based on the user default settings. The form opens after navigating to enter data from frm_Switchboard and entering the user default settings in frm_Set_Defaults. The control source is the query `qfrm_Data_Gateway`.

Data Gateway - List of data that have been entered

* Double-click on the field label to change sort order. Double-click on a Location Name to open the Locations form for that record or a Visit Date to open the Data Entry form for that record.

Add a new record **Close**

Filters

Park: PORE Location Name: Year: Visit Date: **Filter Is On**

Unit*	Location Name*	Stream Name*	Location Type*	Year*	Visit date*	Entered/Updated
PORE	OLM 1	John West Fork	WQ Station	2007	03 Apr 2007	4/16/2007 10:46:52 AM
PORE	OLM 10B	Olema Creek Mainstem	WQ Station	2007	03 Apr 2007	4/13/2007 11:48:17 AM
PORE	OLM 11	Olema Creek Mainstem	Gaging and WQ Station	2007	03 Apr 2007	4/11/2007 3:42:01 PM
PORE	OLM 14	Olema Creek Mainstem	WQ Station	2007	03 Apr 2007	4/11/2007 3:42:01 PM
PORE	LAG 1	Bear Valley Creek	WQ Station			
PORE	OLM 18	Olema Creek Mainstem	WQ Station			
PORE	OLM 2	Giacomini Creek	WQ Station			
PORE	OLM 4	Quarry Gulch	WQ Station			
PORE	OLM 6A	Davis Boucher Creek	WQ Station			
PORE	PNG 1	Pine Gulch Creek Mainstem	Gaging Station			
PORE	PNG 2	Pine Gulch Creek Mainstem	WQ Station			
PORE	PNG 3	Pine Gulch Creek Mainstem	WQ Station			

Figure 3. Gateway to the data entry screens, for browsing and selecting from data that have already been entered.

frm_Data_Entry

The streamflow sampling event data entry form with subforms nested within separate tabs at the bottom of the form (Figure 4). The control source is the query qfrm_DataEntry. Frm_Data_Entry is accessed from frm_Data_Gateway. The subforms include:

fsub_GageHeight

The gage height data entry subform (Figure 4). The control source is tbl_GageHeight.

Data Entry Form - Filter by sampling event

Location: OLM 10B [Add New] [Edit] Contact: Carson, Rob [All] [Role]

X/Y: 516882 X: 4212695 Y: [Unit Code] PORE

Protocol Name: Freshwater Dynamics Monitoring

Start Date: 4/3/2007 Start Time: 12:00

[Delete record] [New record] [Close] [Add a person]

Meter/Flume: Swoffer [Type: Wading] [Location:] [Distance (ft):] Spin: 184 [Before/After: 184]

Weather: Air Temperature: Warm [Precipitation: Dry] [Wind: Breeze] [Cloud Cover: Pt Cloudy] [Last Rainfall: 7]

High Water Mark: bankfull height [Gage Ht (no flow): 0.76] [Crest Height: 1.02]

Flow Severity: Normal [Flow Description: Laminar] [Meter Height:]

Cross Section: small cobble & sand; no obstructions

Control Description: riffle and LWD jam at 50 ft downstream

Comments: [Replicate Measurement?

Calculated Flow

Q (cfs) 5.070

Q (cms) 0.144

Gage Readings | Flow Measurements | Flow Output | Photos | Data History

Gage Height Readings

	Time(PST)	Gage	Other	BedLevel
▶	12:05	0.89		0.22
	12:50	0.88		0.22
*				

Record: [Navigation icons] 1 of 2

Figure 4. Primary field data entry form, displaying the gage height and observers subforms.

fsub_FlowMeasurements

The stream depth and flow measurements data entry form (Figure 5). The control source is tbl_FlowData.

fsub_FlowOutput

A subform that displays all measured field values along with calculated flow values (Figure 6). The control source for the subform is the query qfrm_FlowOutput. The four calculated values - [Width(ft)], [AvgCorrVi(ft/s)], [Qi(cfs)], and [%_Q] - are not written to tbl_FlowData, but are instead dynamic values resulting from measured values stored in tbl_FlowData.

	L/R	Angle_Coeff	Dist(ft)	Depth(ft)	#V_Points	Revol#	Time(s)	AvgVi(ft/s)
▶	lew	1	5.7	0.00	1			0.00
		1	6.2	0.30	1			1.14
		1	7.2	0.25	1			1.87
		1	8.2	0.20	1			1.56
		1	9.2	0.30	1			1.67
		1	10.2	0.20	1			2.26
		1	11.2	0.20	1			1.82
		1	12.2	0.20	1			1.64
		1	13.2	0.20	1			1.75
		1	14.2	0.20	1			1.82
		1	15.2	0.30	1			1.56
		1	16.2	0.30	1			1.94
		1	17.2	0.30	1			1.94
		1	18.2	0.20	1			0.25

Record: 1 of 15

Figure 5. Subform for entering field stream flow measurements associated with sampling events.

	L/R	Angle_Coeff	Dist(ft)	Width(ft)	Depth(ft)	#V_Points	Revol#	Time(s)	AvgVi(ft/s)	AvgCorrVi(ft/s)	Qi(cfs)	%_Q
▶	lew	1	5.7	0.00	0.00	1			0.00	0.00	0.000	0.0
		1	6.2	0.75	0.30	1			1.14	1.16	0.261	5.1
		1	7.2	1.00	0.25	1			1.87	1.86	0.466	9.2
		1	8.2	1.00	0.20	1			1.56	1.57	0.313	6.2
		1	9.2	1.00	0.30	1			1.67	1.67	0.502	9.9
		1	10.2	1.00	0.20	1			2.26	2.24	0.448	8.8
		1	11.2	1.00	0.20	1			1.82	1.82	0.363	7.2
		1	12.2	1.00	0.20	1			1.64	1.64	0.329	6.5
		1	13.2	1.00	0.20	1			1.75	1.75	0.350	6.9
		1	14.2	1.00	0.20	1			1.82	1.82	0.363	7.2
		1	15.2	1.00	0.30	1			1.56	1.57	0.470	9.3
		1	16.2	1.00	0.30	1			1.94	1.93	0.580	11.4
		1	17.2	1.00	0.30	1			1.94	1.93	0.580	11.4
		1	18.2	0.75	0.20	1			0.25	0.30	0.045	0.9

Record: 1 of 15

Figure 6. Subform for viewing flow calculated values associated with sampling events.

The values are generated either through functions written in Visual Basic code or expressions written in SQL and are locked for editing in the subform. After entering field data in fsub_FlowMeasuremnts, the database user tabs to “Flow Output” and selects the command button “Calculate Flow”. The command button runs a macro (mcr_FinalFlow) that refreshes fsub_FlowOutput so that all of the measured and calculated values can be viewed. The command button also populates the cumulative flow values [Q(cfs)] and [Q(cms)] in tbl_Event_Details.

The calculated values in the subform are automatically re-calculated when the field measurements are edited, but the cumulative stream flow must be re-calculated by selecting “Calculate Flow” again. The discharge calculations are based on USGS mid-section method (Harrelson et al., 1994).

fsub_Photos

The photo subform, which displays the photo identified in PhotoName using VBA code (Figure 7). The control source is tbl_Photos.

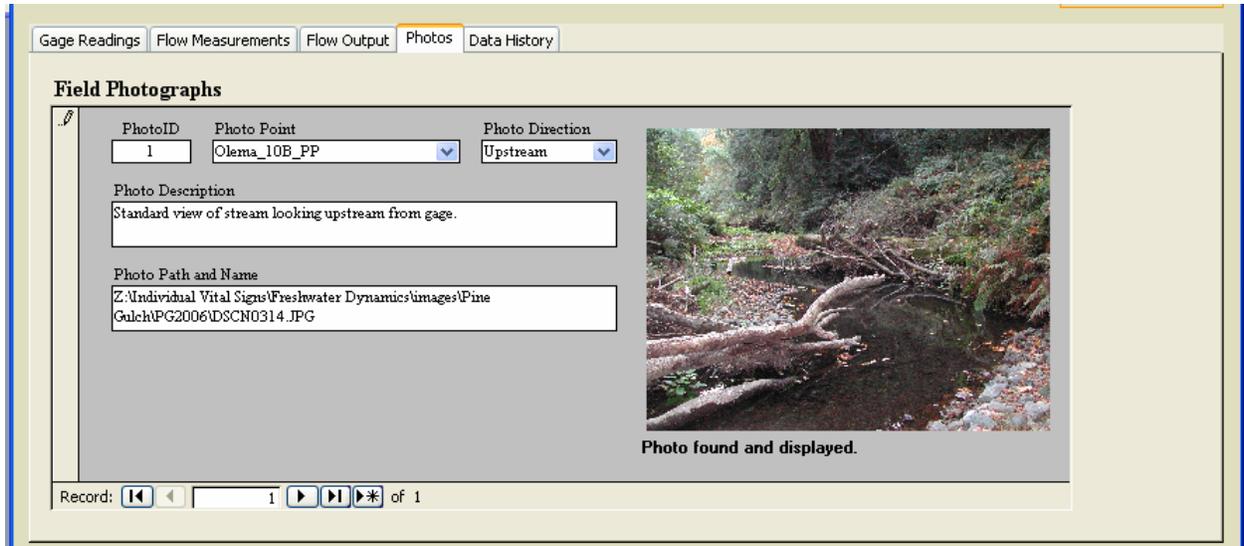


Figure 7. Subform for entering digital photo data associated with sampling events.

fsub_DataHistory

The data history subform (Figure 8). The control source is tbl_DataHistory.

fsub_Observers

Data entry subform for observers associated with sampling events (Figure 4). The control source is xref_Event_Contacts.

fsub_DischargeError

A form that allows the user to enter data regarding discharge method and field conditions. A look-up table will allow the user to choose a particular bed type from a standardized list. A command button runs VBA code and outputs number of sections with discharge greater than 5% of the total, discharge greater than 10%, estimated standard error, and USGS qualitative rating of discharge measurement. This subform is currently in development and will be available in a future version of the database.

The screenshot shows a web-based application window with a tabbed interface. The 'Data History' tab is active. At the top right, there are fields for 'Entered By' (Carson_Rob) and 'Entered Date' (4/11/2007 3:42:01 PM). Below this is a table with the following data:

Date	Contact	Notes
4/13/2007 11:48:17 AM	Carson, Rob	data verified against paper datasheet
4/16/2007 11:02:43 AM		

At the bottom of the window, there are navigation controls: 'Record: 1 of 1' with arrows for navigation.

Figure 8. Subform for entering data verification or editing events associated with sampling events.

frm_Locations

A form that allows the user to enter or edit information, including geographic UTM coordinates, for project sampling locations (Figure 9). The control source is tbl_Locations. Frm_Locations can be accessed from frm_Data_Gateway and frm_Data_Entry.

The screenshot shows a web-based application window titled 'Locations'. The form contains the following fields and values:

- Location ID: {0C1DF748-6A43-4881-945E-5E14D5058EAD}
- NPS Unit: PORE (dropdown)
- Location Type: WQ Station (dropdown)
- Location Name: PNG 2
- Watershed: Pine Gulch Creek
- Stream Name: Pine Gulch Creek Mainstem
- X Coord.: 524985
- Coord. Units: meters
- UTM Zone: 10
- Est. H. Error: (empty)
- Y Coord.: 4199638
- Coord. System: UTM
- Datum: NAD83
- Accuracy Notes: (empty)
- GIS Location ID: (empty)
- Meta MID: (empty)
- Location Notes: (empty text area)
- Updated Date: 4/6/2007 1:54:53 PM

At the bottom, there are 'Close' and 'Delete' buttons, and a record count: 'Record: 3 of 58'.

Figure 9. Form for entering and editing project location information.

frm_QueryFlow

A form that allows the user to open a flow data query (qry_FlowQuery) based on a location and range of dates (Figure 10). For each record that matches the entered criteria, the query displays the location, date, time, discharge in cubic feet per second, discharge in cubic meters per second, and mean stage height. Data from these queries can then be exported to develop stream flow rating curves (see SOP 7). Frm_QueryFlow is accessed from frm_Switchboard. Controls for the form are set in the macro mcr_QueryFlow.

frm_Contacts

A form that allows the user to enter or edit project personnel names, status, and contact information (Figure 11). The control source is tlu_Contacts. Frm_Contacts can be accessed from frm_Switchboard, frm_Set_Defaults, and frm_Data_Entry.

frm_Meters

A form that allows the user to enter or edit metadata pertaining to the flow meters used in the field (Figure 12). The control source is tlu_Meters. Two subforms are embedded within frmMeters, fsub_MaintLog and fsub_RatingEquations. Flow meter maintenance data is entered in fsub_MaintLog, for which the control source is tbl_MaintLog. Tbl_MaintLog also

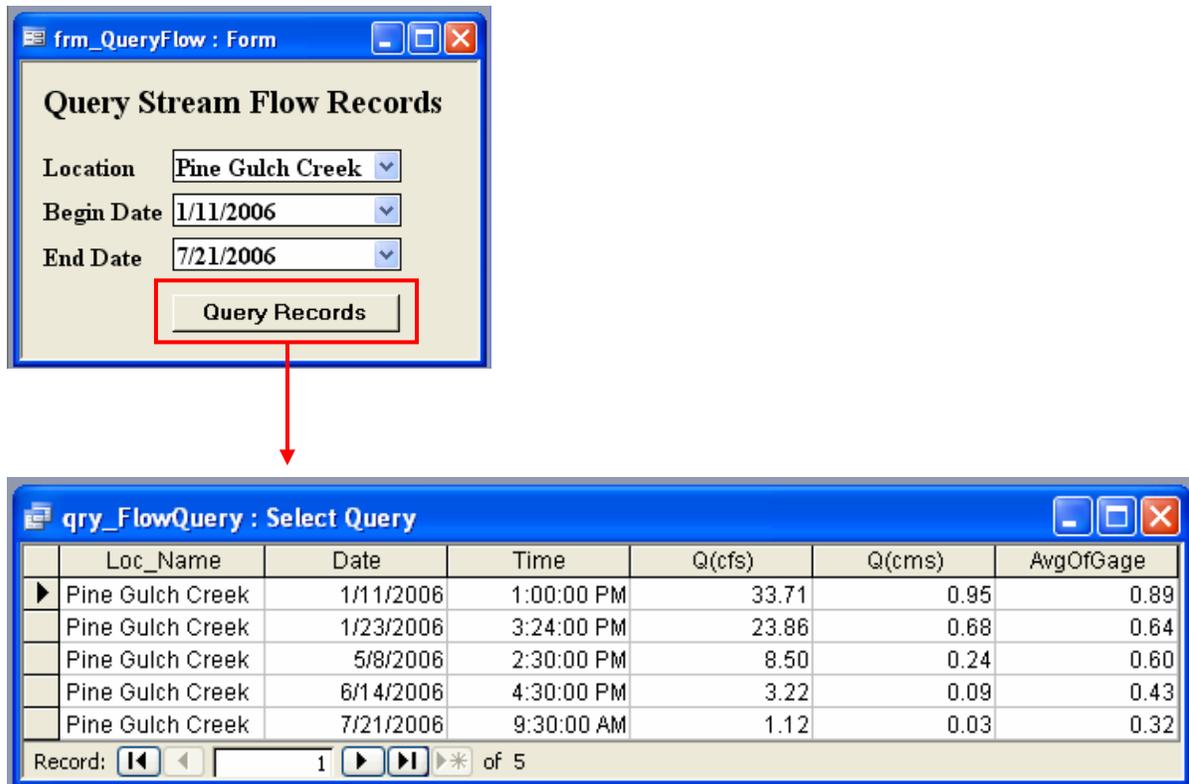


Figure 10. Form for selecting criteria and generating summary flow queries.

View and edit contact information

Filter: View all contacts Filter by search Search: Carson, Rob Close

First name Rob **Work phone** (415) 464-5122 ext.
 Middle initial **Email** rob_carson@nps.gov
Last name Carson **Address Type** Mailing and Physical
Organization NPS **Address 1** 1 Bear Valley Rd.
Position/title Hydrologic Technician **Address 2**
Station PORE **City** Point Reyes Station
Status Active **State Code** CA **Zip Code** 94937
Country USA

Comments

Contact ID {36774CDA-4168-4065-9B7D-6F9D41E186DF}

Record: 1 of 6

Figure 11. Form to view and edit contact information.

frm_Meters : Form

Stream Flow Meter Metadata

MeterID Swoffer
 Make Swoffer Serial Number 1797
 Model 2100 Spin Threshold

Rating Equations

	StartDate	EndDate	Equation
▶	10/1/1999	4/6/2005	$V = 0.939R + 0.064$
*	4/7/2005		$V = 0.9651R + 0.0602$

Record: 1 of 2

Maintenance Log

Date Contact
 Problem Solution

Record: 1 of 1

Record: 5 of 5

Figure 12. Form for entering flow meter descriptions and metadata, including rating equations and maintenance logs.

provides information regarding equipment checks such as spin-tests for mechanical meters. Flow meter rating equations are entered in fsub_RatingEquations, for which the control source is tbl_RatingEq. Frm_Meters can be accessed from frm_Switchboard.

frm_PhotoPoints

A form that allows users to enter or edit photo point data, including photo point descriptions and locations (Figure 13). The control source is tlu_PhotoPoints. Frm_PhotoPoints can be accessed from frm_Switchboard. Controls for the form are set in the macro mcr_PhotoPoints.

The screenshot shows a software form titled "Photo Monitoring Form" with a yellow header section "Photo Monitoring Points". The form includes several input fields and buttons. At the top left, there is a button "Enter A New Record" and a dropdown menu "Select an Existing Photo Point:". Below this, the "Photo Point Name" field contains "PineGulch1". The "Location" dropdown is set to "Pine Gulch Creek", and the "Contact" dropdown is set to "Carson, Rob". The "Photo Points Establishment Date" is "1/1/2005" and the "Latest Revision Date" is also "1/1/2005". The "Photo Point Location Detail" field contains the text: "Photo point is located at Hwy 1 bridge southern piling. At base on downstream side." The "Photo Point Description" field contains: "Photo point location provides clear view across creek to left bank and downstream for approximately 75 meters." At the bottom of the form, there are five buttons: "Add New Photo Point", "Go To Next Photo Point", "Go To Previous Photo Point", "Go To First Photo Point", and "Go To Last Photo Point". A record indicator at the very bottom shows "Record: 4 of 5" with navigation arrows.

Figure 13. Form for entering or editing photo point locations and descriptions.

2.0. Data entry, review, verification and validation

Individual discharge measurements will be entered into the database by the field technician who collected the measurements as soon as possible from the field. This should reduce transcription errors associated with having different personnel enter field collected data. Details on data entry procedures are described in Water Quality SOP 9 (Field methods for stream flow measurements).

There are a few important data entry items described in more detail here . These items include the following:

1) Replicate Discharge Measurements

As part of this program's data precision objective and verification procedures, replicate discharge measurements are obtained for 10% of all discharge measurements. Both original and replicate discharge measurements are entered into the database separately. For replicate measurements, the entire event and discharge measurement information is entered. The 'Replicate Measurement?' check box is selected, denoting that the data is a replicate (Figure 4).

2) Number of Vertical Measurements

Standard velocity measurements are taken at 0.6 ft depth from the surface, and the number of vertical measurements therefore defaults to 1 in the field '#V_Points'. The '#V_Points' field will also accept a value of 2, when measurements are taken at 0.2 and 0.8 ft depths, or S for surface measurements.

3) Uncorrected, Mean Velocity

The discharge database requires the database user to input the uncorrected velocity per vertical into the field 'AvgVi'. When there are two measurement depths in the vertical, the database user should use a calculator or other means to calculate the uncorrected, mean velocity and enter this value into the 'AvgVi' field. The database will correct the entered data using the appropriate meter rating equation.

4) Flume Data

The discharge database for flume measurements requires the user to select the appropriate flume in the 'Meter/Flume' field (Figure 4). The gage height readings subform is also used to enter water heights for flume measurements (Figure 4). The 'Other' field is used to record water heights for flume measurements (in feet). Multiple flume and gage height readings can and should be recorded in this subform.

Review and verification of data entries are required. Upon completion of the initial data entry, the field technician should check all of his/her entered records in the database. Once this is done, the field technician should signify that the data was checked by entering his/her name in the *Completed by* and *Checked by* fields on the *Discharge and Water Quality Measurement Form*. Furthermore, the program manager should verify discharge measurement data entries by field technicians. For new field technicians, 100 percent of discharge data entries would be done for the first month. Thereafter, the project manager will verify a random selection of 10% of the data entered. If greater than a 5% error rate is detected, then 100% of the discharge data records will be reviewed.

Data validation is the final step in assuring the accuracy of data transfer from raw to digital form. Questionable data are identified, reviewed, and corrected if necessary. Automatic validation procedures that check the data as it is entered is built into the Stream Discharge Database and will be modified, as needed, to improve error checking abilities. These automatic validations are programming elements that "censor" the data based on known ranges. Examples of common errors are missed decimal places, numerical data placed in the wrong field (e.g., for date and times out of normal limits)

Prior discharge calculations using spreadsheets by individual parks have resulted in many erroneous discharge calculations caused by copy-and-paste errors associated with meter rating equations and calculation of mid-section widths (D.Fong, GOGA, pers. comm., 2007). Through the use of combo boxes and VBA code driven fields, the new database will significantly reduce the amount of data entry and calculation errors.

Despite final data verification and validation procedures, the stream discharge data set should not be considered static in that future additions, corrections, and improvements to the data may occur. Any changes made to the data set following final certification will be documented in tbl_DataHistory. Prior to editing a data set, a back-up copy of the database should be created so that a record of the unedited data is kept and so that you can recover from any mistakes that may occur while editing.

3.0. File Naming Convention and File Structure

The SFAN Stream Discharge Database is currently in Version 1.00 and is named IM_Flow_Dbase_v1_00.mdb. The database is stored in the Network I&M directory on the Marin Headlands server at the Golden Gate National Recreation Area in the freshwater dynamics data directory under the folder “Flow_Dbase” (Figure 14). Within this folder are additional “Back-Up” and “Archive” folders, which will respectively store back-up copies of the active database and archives of previous database versions. Back-up copies of the active database can be made from the “Main Menu” tab on frm_Switchboard. Alternatively, if the back-up option is checked

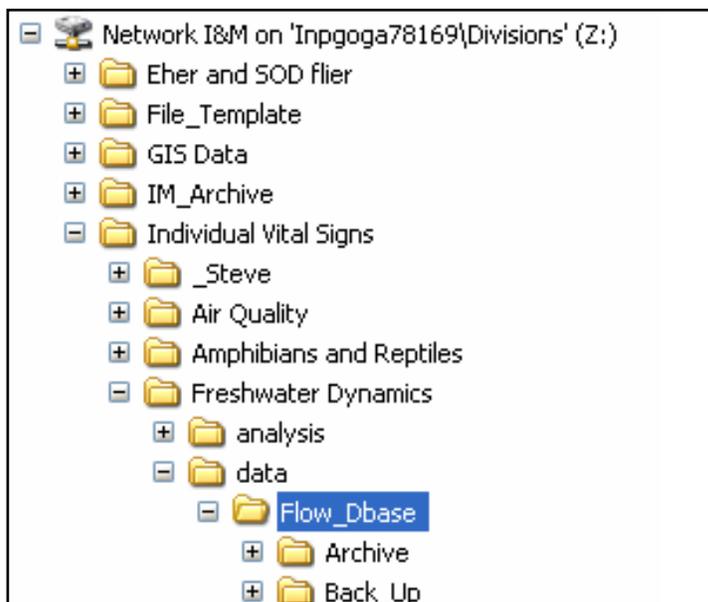


Figure 14. File directory structure for the SFAN Stream Discharge Database.

under the “Defaults” tab, the database will prompt the user to back-up the database on exit. The back-up feature of the database stores a copy of the database in the “Flow_Dbase” folder with a

default name based on the original file name and the date/time that the back-up was made. The format for the file name is *[Original file name]_yyyymmdd_hhmmss.mdb*, such as IM_Flow_Dbbase_v1_00_20070323_133107. Back-up copies of the database can then be moved to the “Back-Up” folder.

4.0. Database Metadata, Version Control Guidelines, Release and Revision Documentation

Several elements within the SFAN Stream Discharge Database help to document database metadata, release and revision history. First, the database retains two tables (tbl_Db_Meta and tbl_Db_Revisions) from the NRDT Version 3.1 for capturing metadata (Figure 1) that are maintained by the SFAN Data Manager. The table tbl_Db_Meta is designed to facilitate metadata creation and integration with I&M metadata systems. At the time of this documentation, elements of this table are under review by the NPS I&M Program. The field Db_Meta_ID is the primary key for tbl_Db_Meta and provides the link to revision history records in tbl_Db_Revisions. The Db_Desc field is a memo field for describing the purpose of the database application. When metadata for the NRDT database is uploaded to the NPS Data Store, the Meta_MID field stores the metadata master ID generated upon upload. When metadata for the database is created using the I&M Dataset Catalog desktop metadata application, the globally unique record ID generated by the Dataset Catalog should be copied to the DSC_GUID field. The table tbl_Db_Revisions stores the application revision history. Linking tbl_Db_Revisions to tbl_Db_Meta using Db_Meta_ID facilitates accessing the revision history for inclusion in each metadata record.

Adopted from the NRDT FAB, the hidden systems table tsys_App_Releases is used to document release information for all versions of the database application. It is filled in by the SFAN Data Manager before the application is distributed. Included in tsys_App_Releases are the title, version, release date, and information about the author of the application. Associated with tsys_App_Releases is tsys_Bug_Reports, where the SFAN Data Manager can report any known bugs, such as non-working or dysfunctional features of the database. The table includes details of the problem and when / how it was fixed. The form frm_App_Releases (Figure 15) allows the database user to view the release history and known bug information in a read-only format. The form can be accessed from frm_Switchboard’s “About” tab.

Significant database re-design may require approval by the project manager and review by other data management staff. Following completion of a new database version, metadata records and online postings will be updated.

Application Releases

Release ID: 20070309134113-289562463.760376

Database title: SFAN Stream Discharge Database

Version number: 1.00 Release date: 3/26/2007

File name: IM_Flow_Dbase_v1_00 Release by: David Press

Author phone: (415) 331-0168 Author email: dave_press@nps.gov

Author org code: SFAN Author org. name: San Francisco Bay Area I

Release notes: Initial release.

Known bugs

Bug ID: {B670FFA9-B962-4928-B660-29671} Report date: 3/26/2007

Found by: Press, David Reported by: Press, David

Report details: The "compact on close" option does not work. The VBA code driving the compact on close option is written for a split database model, but this is an unsplit database. Under the Defaults tab on the Switchboard, the compact on close option has been hidden from view. The database has instead been set to compact through the database options window.

Fix date: Fixed by:

Fix details:

Record: 1 of 1

Figure 15. Form for viewing and entering release information with a subform for known bug descriptions.

Version control guidelines for the MS Access freshwater dynamics monitoring database will follow those presented in the SFAN’s Data Management Plan (Press 2005). Prior to any major changes to the database design, a back-up copy of the database should be made. Once the database design changes are complete, the database should be assigned the next incremental version number. The final copy of the previous database version should be archived with the version closing date incorporated into the database title. Version numbers should increase incrementally by hundredths (e.g. version 1_01, version 1_02, ...etc) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2_0, 3_0, 4_0 ...). With proper controls and communication, versioning ensures that only the most current database version is used for queries and analyses.

APPENDIX 1

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_DataHistory	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Data verification log.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	5	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Ver_Data_ID	dbLong	4	Unique number ID. Autonumber.
Event_ID	dbText	50	EventID GUID. Link to tbl_Events.
Updated_Date	dbText	50	Date of data verification, validation, or last change.
Contact_ID	dbText	50	Link to tlu_Contacts.
Notes	dbText	250	Notes or comments related to data verification.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME: tbl_Db_Meta SPATIAL THEME: N/A
FILENAME: IM_Flow_Dbase_v1_00.mdb SPATIAL THEME DESCR:
DESCRIPTION: Database description and links to I&M metadata tools.
FORMAT: Microsoft Access
NO. OF FIELDS: 4

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Db_Meta_ID	dbGUID	16	Local primary key.
Db_Desc	dbMemo	0	Description of the database purpose.
Meta_MID	dbText	50	Link to NR-GIS Metadata Database.
DSC_GUID	dbText	50	Link to I&M Dataset Catalog desktop metadata tool.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME: tbl_Db_Revisions SPATIAL THEME: N/A
FILENAME: IM_Flow_Dbase_v1_00.mdb SPATIAL THEME DESCR:
DESCRIPTION: Database revision history data.
FORMAT: Microsoft Access
NO. OF FIELDS: 6

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Revision_ID	dbText	50	Database revision (version) number or code.
Revision_Contact_ID	dbDouble	8	Link to tlu_Contacts.
Db_Meta_ID	dbGUID	16	Link to tbl_DB_Meta.
Revision_Date	dbDate	8	Database revision date.
Revision_Reason	dbMemo	0	Reason for the database revision.
Revision_Desc	dbMemo	0	Revision description.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME: tbl_Event_Details

SPATIAL THEME: N/A

FILENAME: IM_Flow_Dbase_v1_00.mdb

SPATIAL THEME DESCR:

DESCRIPTION: Sampling event details.

FORMAT: Microsoft Access

NO. OF FIELDS: 24

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Event_ID	dbText	50	Event ID.
MeasType	dbText	50	Type of stream flow measurement.
UpDown_Gauge	dbText	50	Flow taken upstream or downstream of gage.
GageDist	dbDouble	8	Distance (ft) stream flow taken from gage.
MeterID	dbText	255	Flow meter used for measurements. Link to tlu_Meters.
SpinBefore	dbDouble	8	Meter spin prior to measurements.
SpinAfter	dbDouble	8	Meter spin after measurements.
LastRain	dbDouble	8	Days since last rainfall.
AirTemp	dbText	50	Air temperature category.
Precip	dbText	50	Precipitation category.
Wind	dbText	50	Wind category.
Cloud	dbText	50	Cloud cover category.
Q(cms)	dbDouble	8	Final stream flow (Q) in cubic meters per second. Calculated field.
Q(cfs)	dbDouble	8	Final stream flow (Q) in cubic feet per second. Calculated field.
HWM	dbText	50	High water mark description.
GageHeight	dbDouble	8	Gage height (ft.) reading at zero flow.
CrestHeight	dbDouble	8	Crest gage height (ft.) reading from staff plate.
FlowSeverity	dbText	50	Flow severity category.
WeightHt	dbDouble	8	Height (ft) above bottom of weight to the center-line of the meter cups or probe.
FlowDescrip	dbText	250	Brief description of flow regime.
CrossDescrip	dbText	250	Cross section description including substrate and any obstructions.
ControlDescrip	dbText	250	Description of any features controlling flow.
Rep_Measure	dbBoolean	1	Check for replicate measurement data.
Comments	dbText	250	Additional field comments or notes.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_Events	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Sampling events.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	7	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Event_ID	dbText	50	Event identifier.
Location_ID	dbText	50	Link to tbl_Locations.
Protocol_Name	dbText	100	The name or code of the protocol governing the event.
Start_Date	dbDate	8	Starting date for the event.
Start_Time	dbDate	8	Starting time for the event.
Entered_By	dbText	50	Database user at data entry.
Entered_Date	dbText	50	Date of data entry.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_Flow_Data	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Field stream flow measurements.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	11	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Flow_Data_ID	dbLong	4	Unique number ID. Autonumber.
Event_ID	dbText	50	EventID GUID. Link to tbl_Events.
Angle_Coeff	dbDouble	8	Angle coefficient.
Distance(ft)	dbDouble	8	Distance (ft) from start point.
LEW_REW	dbText	255	Left edge water or right edge water, if applicable.
Depth(ft)	dbDouble	8	Stream depth (ft).
Revol#	dbText	255	Number of revolutions, if applicable.
Time(s)	dbText	255	Time (s) in which revolutions are counted, if applicable.
#V_Points	dbText	50	Vertical flow measurement points.
AvgVi(ft/s)	dbDouble	8	Average flow (ft/s).
Notes	dbText	50	Additional notes or comments.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_Gage_Height	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Stage height readings table.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	6	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Gage_Data_ID	dbLong	4	Unique number ID. Autonumber.
Event_ID	dbText	50	EventID GUID. Link to tb_Events.
Time(PST)	dbDate	8	Time of gage height reading.
Gage	dbDouble	8	Gage height (ft) reading.
Depth	dbDouble	8	Depth (ft) reading, flume or weir only.
BedLevel	dbDouble	8	Height (ft) at which gage meets the stream bed.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_Locations	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Sampling unit locations.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	22	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Location_ID	dbText	50	Location identifier.
GIS_Location_ID	dbText	50	Link to GIS feature, equivalent to NPS_Location_ID.
Meta_MID	dbText	50	Link to NR-GIS Metadata Database.
X_Coord	dbDouble	8	X coordinate.
Y_Coord	dbDouble	8	Y coordinate.
Coord_Units	dbText	50	Coordinate distance units.
Coord_System	dbText	50	Coordinate system.
UTM_Zone	dbText	50	UTM Zone.
Datum	dbText	5	Datum of mapping ellipsoid.
Longitude_DMS	dbText	255	Longitude (degrees-minutes-seconds).
Latitude_DMS	dbText	255	Latitude (degrees-minutes-seconds).
Longitude_DD	dbDouble	8	Longitude (decimal degrees).
Latitude_DD	dbDouble	8	Latitude (decimal degrees).
Est_H_Error	dbSingle	4	Estimated horizontal accuracy.
Accuracy_Notes	dbText	255	Positional accuracy notes.
Unit_Code	dbText	12	Park, Monument or Network code.
Watershed	dbText	50	Name of sampling station watershed.
StreamName	dbText	50	Name of sampling station stream.
Loc_Name	dbText	100	Name of the location.
Loc_Type	dbText	25	Location type category.
Updated_Date	dbText	50	Date of entry or last change.
Loc_Notes	dbMemo	0	General notes on the location.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_MaintLog	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Flow meter maintenance log.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	5	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
MeterID	dbText	50	Flow meter name. Link to tlu_Meters.
Contact_ID	dbText	50	Link to tlu_Contacts.
Date	dbDate	8	Date of flow meter maintenance.
Problem	dbText	255	Problem with flow meter.
Solution	dbText	255	Solution to fixing problem with flow meter.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_Photos	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Digital field photos table.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	6	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Photo_Data_ID	dbLong	4	Unique number ID. Autonumber.
Event_ID	dbText	50	EventID GUID. Link to tbl_Events.
PhotoPointID	dbText	50	Photo point name, if applicable. Link to tlu_PhotoPoints.
PhotoName	dbText	255	Path and photo name (ie. C:\My Documents\Photos\photo1.jpg).
PhotoDirection	dbText	50	Direction that photo was taken (upstream, downstream, left bank, right bank).
PhotoDescription	dbText	250	Description of photo.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tbl_RatingEq	SPATIAL THEME:	N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:	
DESCRIPTION:	Flow meter rating equations.		
FORMAT:	Microsoft Access		
NO. OF FIELDS:	4		

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
MeterID	dbText	50	Flow meter name. Link to tlu_Meters.
StartDate	dbDate	8	Start date that rating equation is applicable.
EndDate	dbDate	8	End date that rating equation is applicable.
Equation	dbText	50	Flow meter rating equation.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME: tlu_Contacts
FILENAME: IM_Flow_Dbase_v1_00.mdb
DESCRIPTION: Contact data for project-related personnel.
FORMAT: Microsoft Access
NO. OF FIELDS: 19

SPATIAL THEME: N/A
SPATIAL THEME DESCR:

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Contact_ID	dbText	50	Contact identifier.
Last_Name	dbText	50	Last name.
First_Name	dbText	50	First name.
Middle_Init	dbText	4	Middle initial.
Organization	dbText	50	Organization or employer.
Station	dbText	50	Duty station (if applicable).
Position_Title	dbText	50	Title or position description.
Status	dbText	20	Status (active or inactive).
Address_Type	dbText	50	Address (mailing, physical, both) type.
Address	dbText	50	Street address.
Address2	dbText	50	Address line 2, suite, apartment number.
City	dbText	50	City or town.
State_Code	dbText	8	State or province.
Zip_Code	dbText	50	Zip code.
Country	dbText	50	Country.
Email_Address	dbText	50	E-mail address.
Work_Phone	dbText	50	Phone number.
Work_Extension	dbText	50	Phone extension.
Contact_Notes	dbMemo	0	Contact notes.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	tlu_Meters	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Flow meter identification table.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	5	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
MeterID	dbText	50	Unique flow meter name. Primary key.
Make	dbText	50	Make of flow meter.
Model	dbText	50	Model of flow meter.
SerialNumber	dbText	50	Serial number of flow meter.
SpinThresh	dbDouble	8	Spin threshold of flow meter.

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME: tlu_PhotoPoints
FILENAME: IM_Flow_Dbase_v1_00.mdb
DESCRIPTION: Photo point location and description table.
FORMAT: Microsoft Access
NO. OF FIELDS: 11

SPATIAL THEME: N/A
SPATIAL THEME DESCR:

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
PhotoPointID	dbText	60	Unique photo point name. Primary key.
Location_ID	dbText	50	Link to tbl_Locations.
Contact_ID	dbText	50	Link to tlu_Contacts.
EstabDate	dbDate	8	Establishment date.
RevDate	dbDate	8	Revision date.
PointLocation	dbMemo	0	Description of photo point location and directions to find it.
PointDescription	dbMemo	0	Description of what is pictured from the photo point.
UTME	dbText	50	UTM easting coordinate.
UTMN	dbText	50	UTM northing coordinate.
Datum	dbText	5	Datum of mapping ellipsoid.
UTM_Zone	dbText	50	UTM Zone (only for UTM Coordinates).

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME: tsys_App_Defaults
FILENAME: IM_Flow_Dbase_v1_00.mdb
DESCRIPTION: Application table - Manages the application defaults.
FORMAT: Microsoft Access
NO. OF FIELDS: 12

SPATIAL THEME: N/A
SPATIAL THEME DESCR:

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Project	dbText	50	Default project code
Park	dbText	10	Default park
User_name	dbText	50	Current user
Activity	dbText	50	Activity of current user
UTM_Zone	dbText	2	Default UTM zone
Datum	dbText	5	Default datum
Release_ID	dbText	50	Database release version of the report
Link_file_path	dbText	255	Complete filename and directory that contains backend tables
Backup_prompt_startup	dbBoolean	1	Whether or not the application prompts for backups upon startup
Backup_prompt_exit	dbBoolean	1	Whether or not the application prompts for backups upon exiting
Compact_be_exit	dbBoolean	1	Whether or not the application compacts the back-end db upon exiting
Verify_links_startup	dbBoolean	1	Whether or not the application verifies table connections upon startup

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME: **tsys_App_Releases** SPATIAL THEME: N/A
FILENAME: IM_Flow_Dbase_v1_00.mdb SPATIAL THEME DESCR:
DESCRIPTION: Application table - Application release history.
FORMAT: Microsoft Access
NO. OF FIELDS: 11

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Release_ID	dbText	50	Unique identifier for the release
Release_date	dbDate	8	Date of the release
Database_title	dbText	100	Title of the database
Version_number	dbText	20	Version control number
File_name	dbText	50	Filename, used to identify older versions of the database
Release_by	dbText	50	Person who made the release
Release_notes	dbMemo	0	Release notes, which may include a summary of revisions
Author_phone	dbText	50	Phone number of application author
Author_email	dbText	50	Email address of application author
Author_org	dbText	10	Organization (NPS Unit code) for the author's place of work
Author_org_name	dbText	100	Name of organization for author's place of work

Data Dictionary Report

19-Apr-07

Data Dictionary for: SFAN Stream Discharge Database

TABLE NAME:	xref_Event_Contacts	SPATIAL THEME: N/A
FILENAME:	IM_Flow_Dbase_v1_00.mdb	SPATIAL THEME DESCR:
DESCRIPTION:	Cross-reference table between events and contacts.	
FORMAT:	Microsoft Access	
NO. OF FIELDS:	3	

FIELD NAME	FIELD TYPE	FIELD WIDT	FIELD DESCRIPTION
Event_ID	dbText	50	Link to tbl_Events.
Contact_ID	dbText	50	Link to tlu_Contacts.
Contact_Role	dbText	50	The contact's role in the protocol.