STANDARD OPERATING PROCEDURE

Process for Reporting Ambient Monitoring Data and for Uploading Data into the Surface Water Database

KEY WORDS

Microsoft EXCEL, Microsoft ACCESS, short-term projects, long-term projects, field datasheet, analytical data, data template, data quality, report template

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1.0 INTRODUCTION

1.1 Purpose

This document describes the process for reporting ambient surface water monitoring data, from data entry, to report writing, to data preparation for uploading into the Surface Water Database, and for ensuring data quality. This process is driven by the need to make DPR's monitoring data available for public use in a timely manner. There are eight steps in this process; six steps are completed by a monitoring team (project lead + field data coordinator or scientific aide) and the final two steps are completed by the SURF database administrator.

1.2 Definitions

1.2.1	SURF	Surface Water Monitoring database
1.2.2	SWPP	Surface Water Protection Program
1.2.3	loc_cd	unique number assigned by the SURF database administrator to a SURF sampling site
1.2.4	Agency code	unique number assigned by the SURF database administrator to an organization from whom the monitoring data are obtained
1.2.5	CDFA	California Department of Food and Agriculture
1.2.6	CDFW	California Department of Fish and Wildlife
1.2.7	ppb	parts per billion (µg L^{-1} for water samples; µg kg^{-1} dry weight for sediment samples)
1.2.8	TOC	total organic carbon
1.29	MDL	method detection limit
1.2.10	RL	reporting limit
1.2.11	nd	not detected above the RL
1.2.12	trace	trace detection (between the MDL and the RL)

1.2.13	QA	quality assurance
1.2.14	QC	quality control
1.2.15	BM	benchmark
1.2.16	EC_{50}	median lethal concentration
1.2.17	TU	toxicity unit
1.2.18	US EPA	United States Environmental Protection Agency

2.0 MATERIALS

2.1. Field datasheets for the project

2.2. EXCEL workbook from the analytical chemistry lab containing analytical chemistry results

2.3. The following files:

2.3.1. EXCEL Data Reporting Template.xltx

2.3.2. Template for prepare DPR monitoring data for SURF.xls

2.3.3. ACCESS Surface Water Template.accdb

2.3.4. Template to Upload EXCEL data to ACCESS.xlsx

2.3.5. Ambient Monitoring Template.dotx

2.3.6. Supporting Information Template.dotx

2.3.7. Flow Calculator.xls

2.3.8. Supporting Information Study 269 FY12-13.pdf

3.0 PROCEDURES

3.1 Step 1 Reporting Cycle and Initial Preparation

3.1.1 Determine the reporting period and timelines. Report surface water ambient monitoring data on an annual or fiscal year basis to coincide with the monitoring period stated in the protocol. Report the monitoring data to management within six months after the last

sampling date and submit data to SURF within nine months (Figure 1).

3.1.2 Obtain unique SURF sampling site codes if needed. Check the SURF website (CDPR 2013) for existing sites and corresponding codes. If new codes are required, contact the SURF database administrator for new codes. Provide the SURF database administrator with the geographic coordinates, water body type and land use associated with the new sampling sites (Appendix 1).

3.1.3 Obtain the data required for SURF upload and for the management report (Figure 2). Most of this information is contained in the field datasheets and in the analytical data from the chemistry lab.

3.2 Step 2 Enter the field datasheet and analytical chemistry data

For data entry, use EXCEL or ACCESS for storing and manipulating surface water monitoring data. ACCESS is preferred for all ambient monitoring programs because it is a database and queries make for accurate conversion of ACCESS data to SURF format. But for short-term projects (less than one year in length), EXCEL is an adequate program for data entry. Always use ACCESS to house data for long-term ambient monitoring projects (projects greater than one year). If using EXCEL, go to section 3.2.1. If using ACCESS, go to section 3.2.2.

3.2.1 Short-term projects using EXCEL

Use the SWPP EXCEL template file for data entry (“EXCEL Data Reporting Template.xltx”). This template will help transition data to the format required by SURF.

3.2.1.1 Field Datasheets. After a sampling trip is completed, enter data from field datasheets into EXCEL using the “Field Data Sheet” worksheet of the template (Figure 3). Follow the columns of the worksheet as listed below (Table 1). For more detailed instructions, peruse the “Instructions” worksheet in the template or EXCEL file “Template for prepare DPR monitoring data for SURF.xls”.

Table 1. Field datasheet information to enter into the "Field Data Sheet" worksheet of file "EXCEL Data Reporting Template.xltx"

Column Heading	Description
Project	Study number as assigned by the DPR - laboratory liaison for the specific study
Agency code	Code for the agency that conducted the monitoring. DPR code is 4323. For other agencies, contact the SURF database administrator
County	Enter the name of the county (as text) where the sampling occurred
SURF loc_cd	SURF sampling site. This is up to a 4 digit number (numeric value). Note that on the map of the sampling sites, the site code will be listed with the county underscore site location (e.g., 31_26; CDPR 2013). The loc_cd is a numeric value and does not include the county designation (e.g., site code = 31_26; loc_cd = 26)
Study Site ID	The local study site name; this is a free text field. The project lead usually names the Site ID
Sample date	Enter the date sampling (DD-MM-YYYY)
Sample type	Sample type is "normal". Do not enter any data for field blanks or field duplicates or lab QC; this data will not be entered into SURF
DPR Sample Number	Sample number is a numerical value, as chosen by the project lead
Analyte Name	Common analyte names, collection methods, and sampling methods are found in the worksheet "SURF LOOKUP tables" (cells A63, A3, D3, respectively) or see EXCEL file "Template for prepare DPR monitoring data for SURF.xls"
Collection Method	
Sampling Method	
Event Type	Enter "Storm" or "Nonstorm". Not case sensitive.
Sample Time	Enter the time sampling (24 hour clock)
Comments	Pertinent comments on sampling or analysis

3.2.1.2 Analytical Data. Using the "EXCEL Data Reporting Template.xltx" workbook, enter analytical data into the "Chemistry" worksheet (Figure 4). Copy the data from the analytical data provided by the analytical chemistry lab; do not enter the data anew. Following the columns of the worksheet, enter the data as indicated in Table 2. For more detailed instructions, peruse the "Instructions" worksheet in the template or EXCEL file "Template for prepare DPR monitoring data for SURF.xls".

3.2.1.3 SURF Upload worksheet. In the "EXCEL Data Reporting Template.xltx" workbook, after the "Field Data Sheet" or "Chemistry" worksheets have been populated, the worksheet "Data Tmplt SURF Upload" will self-populate. Some additional entry is required, as described in Table 3.

3.2.2 Long-term projects using ACCESS

Use the SWPP ACCESS monitoring template file for data entry ("ACCESS Surface Water Template.accdb"). This ACCESS database can be modified for specific projects.

3.2.2.1 Field Datasheets. After a sampling trip is completed, enter data from field datasheets into ACCESS. Use a form as "frmMajorEvent" found in the ACCESS database template to enter pertinent field data (Figure 7). This form contains drop down menu boxes that allow the user to select valid SURF terms. This form can be modified for individual projects but should include all the fields required for SURF upload and as required for the report to management (Figure 2). Any changes to the selections in the drop down boxes (via look-up tables) need to contain SURF approved terms as found in EXCEL file "Template for prepare DPR monitoring data for SURF.xls". If a new term is needed, contact the SURF database administrator. Following the fields of the form, enter field datasheet information as indicated listed in Table 4.

Table 2. Analytical data information to enter into the "Chemistry" worksheet of file "EXCEL Data Reporting Template.xltx"

Column Heading	**Description**
Chem lab	Enter CDFA, CDFW, or other analytical lab. SURF codes for CDFA and CDFW are cross-referenced in the workbook; see SURF database administrator for codes for other analytical labs.
Extraction date	Enter date analytes were extracted and analyzed (DD-MM-YYYY)
Analysis date	
Results	Enter results and RL in ppb (µg L^{-1} for water; µg kg^{-1} dry weight for sediments). Water and sediment data will be submitted separately (in separate files) for upload into SURF. In this worksheet, record non-detections and trace detections as "nd" and "trace", respectively.
RL	
Analytical Method	Analytical methods and sample type are found in the worksheet "SURF LOOKUP tables" (cells A599 and D46, respectively), or see EXCEL file "Template for prepare DPR monitoring data for SURF.xls". For CDFW and CDFA analytical data, sample type is usually "Whole water" or "Sediment").
Sample Type	
% TOC	Enter for sediment samples only. For water samples, leave blank.
% moisture	
MDL	Enter the method detection limit

Table 3. Additional information to enter into the "Data Tmplt SURF Upload" worksheet of file "EXCEL Data Reporting Template.xltx"

Column Heading	**Description**
Source	Enter the study number and protocol web address, separated by a semi-colon (Figure 5).
conc	Replace "nd" and "trace" with zero ("0"). Ensure that the trace_flag field is marked with "t" for all trace detections
remarks	If zero ("0") appears in the column, delete the zeros
lab_cd	If CDFW or CDFA did not conduct the chemical analysis, enter the correct code for the analytical lab
TOC_perc	If water samples, delete the zeros ("0")
moisture_per	
To finalize the data, follow the instructions in the "Instructions" worksheet to format the data correctly for SURF. See Figure 6 for an example of data formatted correctly. Additional help is available in the EXCEL file "Template for prepare DPR monitoring data for SURF.xls"	

Table 4. Description of parameters in "frmMajorEvent" in ACCESS

Field	**Description**
SECTION: Sample Info	
Event ID	Unique ID assigned by ACCESS
Project ID	Study number as assigned by the DPR - laboratory liaison for the specific study
Project Name	A project name can be added to the database (optional)
Site ID	The local study site name; this is a free text field. The project lead usually names the Site IDs. Site IDs are cross-referenced in the table "Site Description" with valid SURF codes (loc_cd). This table will need to be updated for individual projects (example, Figure 8)

Table 4 (continued). Description of parameters in "frmMajorEvent" in ACCESS

Field	**Description**
Sample Date	Enter date of monitoring (DD-MM-YYYY)
Sample Time	Enter time of monitoring (military time [24 hour clock])
Event Type	Enter "Storm" or "Nonstorm". Not case sensitive.
Sample Type	Enter a normal sample ("Norm"), field duplicate sample ("Fdup"), or field blank sample ("Fblk")
QC Sample	Enter QC sample type, or "none" if the sample is a normal sample
Media Type	Usually, "Whole water" or "Sediment" for data for analysis by CDFA or CDFW
Sampler Type	Select how the sample was collected, as "Hand", "Autosampler", etc.
Collection Method	Select sampling method
SECTION: Field Staff	Enter all field staff who conducted the monitoring. Modify the names of the staff in look-up table "lutStaff" for specific projects.
SECTION: Flow	Enter pertinent data into flow section. Calculate flow rate can from field data using the EXCEL file "Flow Calculator.xls".
SECTION: Water Quality	Enter water quality data as appropriate
SECTION: Samples Collected	Enter sample number, analyte group, and sample matrix
Comments	Enter pertinent comments on sampling or analysis

3.2.2.2 Analytical Data. To enter analytical data into ACCESS, use the data template file to transfer the chemistry data from the analytical chemistry lab to the ACCESS database (EXCEL file "Template to Upload EXCEL data to ACCESS.xlsx"). Note that there are separate template worksheets in this file for water and sediment data. Use appropriate worksheet. Water and sediment data is uploaded separately into SURF.

3.2.2.2.1 Use the Move or Copy command in EXCEL (Home ribbon, Format, Move or Copy Sheet…) to copy the appropriate "Data Template" worksheet into the EXCEL file containing the chemistry results. Place "Data Template" as the first worksheet in the chemistry workbook (Figure 9).

3.2.2.2.2 The "Data Template" worksheet aligns with the table "Analytical Data" in the ACCESS database. For any change in the format of the "Analytical Data" table in ACCESS, make the appropriate change in the columns of the "Data Template" file to maintain the alignment.

3.2.2.2.3 From the analytical data provided by the analytical chemistry lab, copy and paste the analytical data into the "Data Template" worksheet. To avoid transcription and transposition errors, do not enter the data anew.

3.2.2.2.4 When data is ready for upload into ACCESS, open ACCESS and under the External Data tab, click on EXCEL. Follow the steps to upload the data. Attach the data to the "Analytical Data" table (Figure 10).

3.3 Step 3 Ensuring data quality for data entered in EXCEL or ACCESS

3.3.1 QC Method. Accuracy of data entry is critical. QC for data entry will consist of the two-person method (Figure 2), with analytical data copied from the EXCEL file received from the analytical chemistry lab.

1) Person 1 enters the data (usually the project assistant);

2) Person 2 will check the data entry for accuracy (usually the project lead).

3.3.2 Initial Inspection. Initial QC begins by checking the data received by the analytical chemistry lab. The project lead will check the analytical lab data to ensure laboratory assigned numbers for the matrix spikes, lab blanks, and blind spikes, etc., are correct and have not been previously used and check for acceptable recovery results. The project lead should contact the DPR - laboratory liaison if anything looks amiss.

3.3.3 QC for EXCEL when using template file "EXCEL Data Reporting Template.xltx". The EXCEL template converts common use terms entered into the "Field Data Sheet" and "Chemistry" worksheets into codes for SURF in the "Data Tmplt SURF Upload" worksheet if the rows in the worksheets align. However, there are no built in queries or checks to prevent errors when referencing the worksheets if the rows and columns become misaligned. It will be necessary for the second person (Person 2) to confirm that:

a) Person 1copied the analytical data from the results file sent from the analytical chemistry lab and did not enter the data anew;

b) Person 1entered the data correctly in both the "Field Data Sheet" and "Chemistry" worksheets;

c) codes have been converted correctly via the "SURF LOOKUP table" worksheet, especially for the parameters listed below, and;

county_cd	coll_meth_cd	sampler_cd	loc_cd
anly_meth_cd	chem_cd	sample_type_cd	

d) the worksheet "Data Tmplt SURF Upload" populated accurately.

3.3.4 QC for ACCESS when using template "ACCESS Surface Water Template.accdb". For checking the data entered into ACCESS, Person 2 will:

a) review the completed "Data Template" worksheet and make any corrections in EXCEL, prior to ACCESS upload;

b) upload the data into ACCESS (Figure 10);

c) inspect the added data in ACCESS using the form "frmMajorEvent" or an ACCESS query as

"qryQC_FieldDataSheetCheck**"**. Using the query will prevent the user from accidently changing data in the form; and

d) run a query as "SURF QCqry_Analytical Data Table Totals" pre- and post-upload to ensure that the upload procedure added the correct number of rows to the table "Analytical Data". This query will give the row count, minimum result/date, maximum result/date, count of non-detects, trace detections, and detections > RL, among other QC checks.

3.3.5 QC confirmation. After the second person (Person 2) approves that the data has been entered correctly, Person 2 will initial and date the field datasheets to indicate that the data has been correctly entered (any electronically gathered field data will be transmitted directly into EXCEL and may not have this requirement). For QC purposes, Person 1 should also initial and date field datasheets after data entry.

3.4 Step 4 Completing the report template for management

Data will be reported to management with Surface Water's data reporting template (Appendix 2). With the template, specific fields are entered, summary tables are created, and supplementary information (as a pdf file) is submitted to support the report. Use files "Ambient Monitoring Report Template.dotx" and "Supporting Information Template.dotx" to complete the report.

3.4.1 The guide to the report template gives detailed instruction to complete the template (Appendix 3).

3.4.2 Complete all aspects of the template and submit to the appropriate supervisor for approval. See Appendix 4 for an example of a completed template.

3.5 Step 5 Preparation for uploading the data to SURF

The data needs to be formatted into an acceptable format for SURF. This will only differ slightly for data entered in EXCEL or ACCESS. With either program complete Step 3.5.1 and 3.5.2; if using EXCEL, then use 3.5.3. If using ACCESS, use 3.5.4. Correct formatting is then checked (3.5.5).

3.5.1 Preparing the data. The guide for preparing data for SURF gives detailed information of the correct formatting. Steps for formatting are listed in Appendix 5. Peruse the complete file "Template for prepare DPR monitoring for SURF.xls" for further help in formatting the data for SURF.

3.5.2 Formatting time and date. Format dates and sampling times to text for SURF upload into Oracle. Steps for converting EXCEL date and time data into text are listed in Appendix 6.

3.5.3 QAQC checklist if EXCEL was used for data entry. Complete the checklist in Appendix 7 to ensure the data is formatted correctly.

3.5.4 QAQC checklist if ACCESS was used for data entry. In ACCESS, run the appropriate query to obtain data correctly formatted for SURF upload:

a) For water data, run the query "SURF qry_Water Data for SURF upload"
b) For sediment data, run the query "SURF qry_Sediment Data for SURF upload"

For both queries, in the SampleDate column, enter the dates (between first, last) for the monitoring period in the criteria row to obtain the correct time period (Figure 11). After the query has been run, complete the checklist in Appendix 7 to ensure the data is formatted correctly.

3.5.5 Example. See Figure 6 for an example of correctly formatted water monitoring data for SURF.

3.6 Step 6 Submitting data for SURF

Create a comma delimited (csv) file from the EXCEL spreadsheet containing the correctly formatted monitoring data. Save the file and send to SURF database administrator attached to an email.

3.7 Step 7 QAQC by SURF database administrator

The SURF database administrator will conduct the following steps before after new data is uploaded to the SURF database to ensure that the data uploaded correctly.

3.7.1 Add a new field of “study_cd” to the data obtained from the project leads of the monitoring studies;
3.7.2 Check to ensure site_code(s) are correct;
3.7.3 Update metadata file to include the new study;
3.7.4 Update the location table to include new sites (verify no duplicate site_codes);
3.7.5 Convert all missing values into blank spaces (remove NA or negative numbers);
3.7.6 Generate a summary table to count total number of records and number of records by chemical;
3.7.7 Use R scripts to convert the *.csv file into a fixed format text file;
3.7.8 Before uploading, check the numbers of existing records in SURF (total records and number of records by chemical); and
3.7.9 After uploading, query the database to determine data uploaded correctly. Verify number of records in text file match those in Oracle database.

3.8 Step 8 Sending SWPP data to US EPA

Uploading data to SURF allows for public use of the data; this includes the US EPA registration review needs. The US EPA has been proactive in contacting Surface Water Programs for required monitoring data. Therefore, as Surface Water scientists annually submit data to SURF, any requested data can be submitted to the US EPA in a timely manner. The following process will allow the US EPA to obtain SWPP data in a timely manner:

3.8.1 US EPA contacts the Environmental Monitoring SWPP Environmental Program Manager I or chosen delegate via email for data call in of specific data;
3.8.2 Email is forwarded to the SURF database administrator;

3.8.3 SURF data administrator queries SURF database only for data from DPR studies;
3.8.4 SURF data is downloaded into an EXCEL file;
3.8.5 SURF data administrator emails the data to US EPA, copying the SWPP Manager and Project Leads.

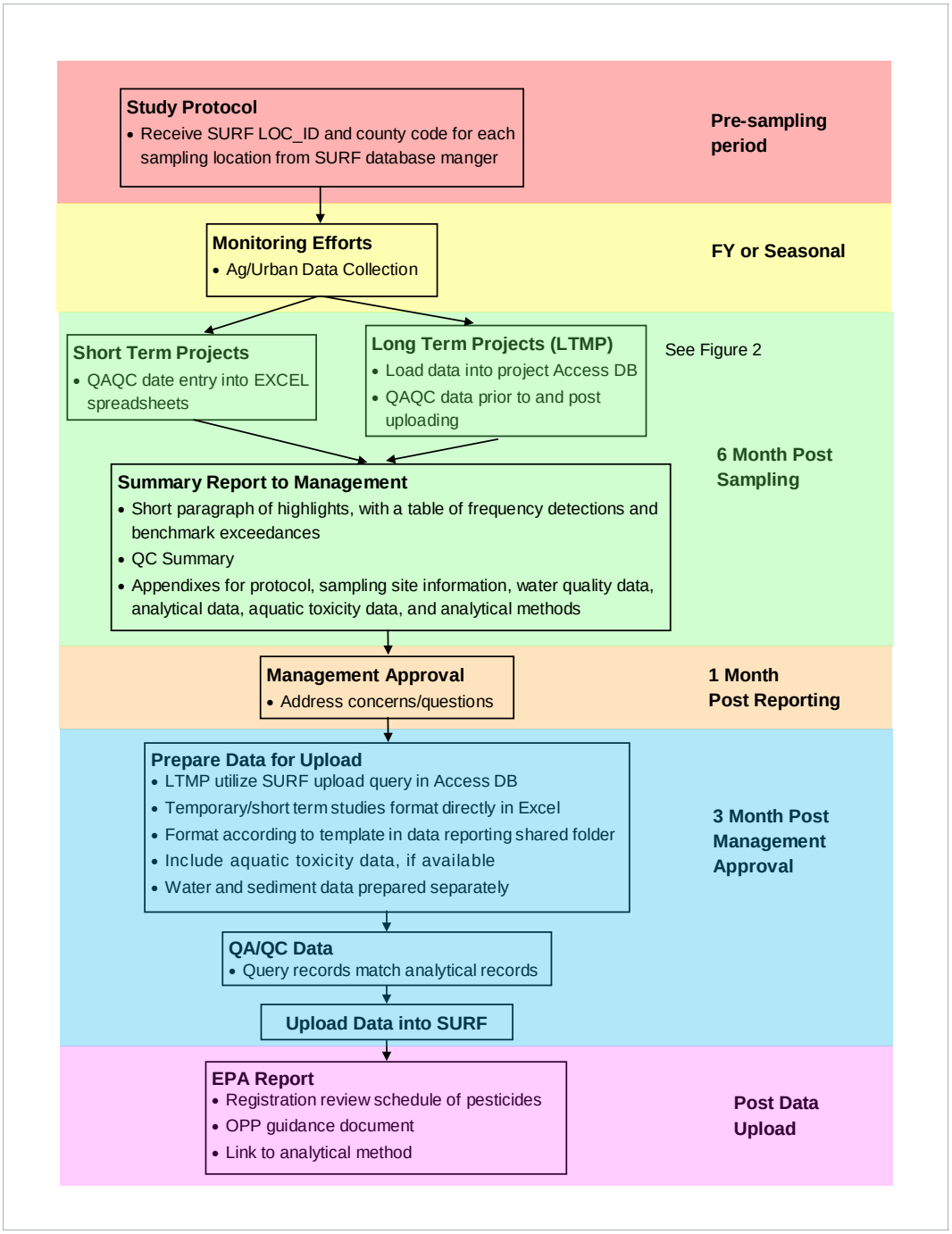


FIGURE 1. Process and schedule for completing the monitoring report and for uploading data into the Surface Water Database

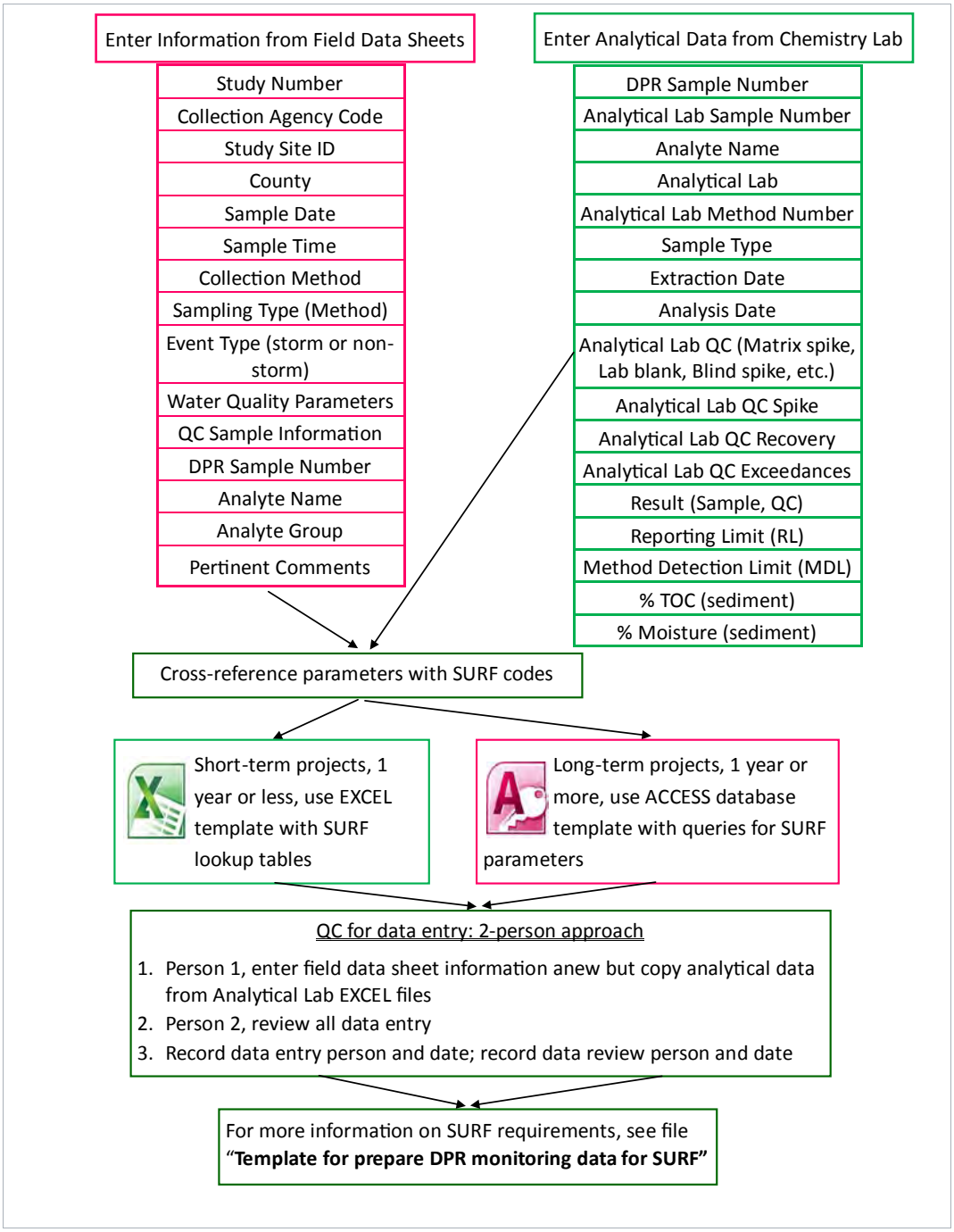


FIGURE 2. Data entry requirements and process for reporting monitoring data for SURF upload

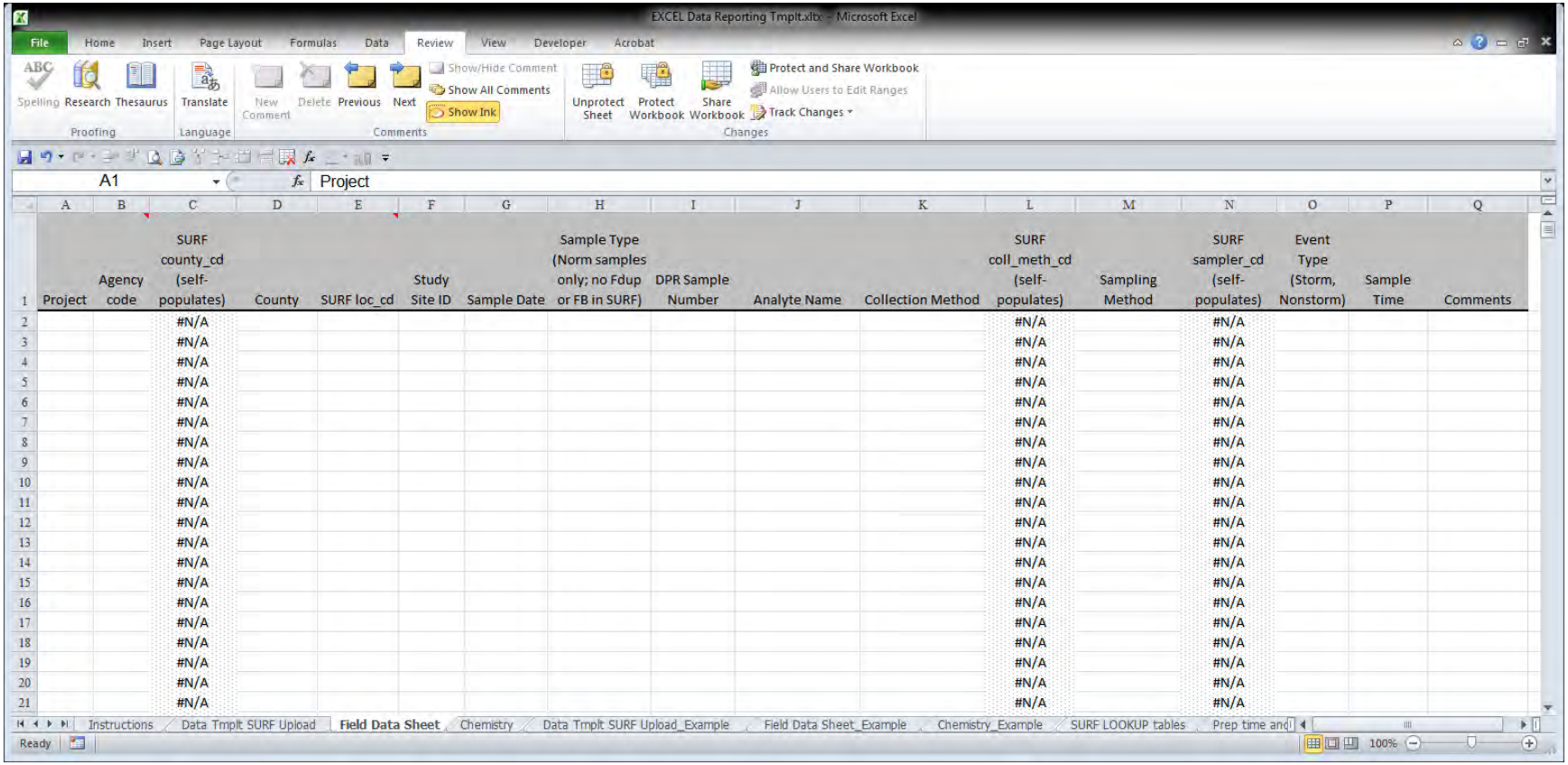


FIGURE 3. **“**Field Data Sheet” worksheet in the Data Reporting Template workbook

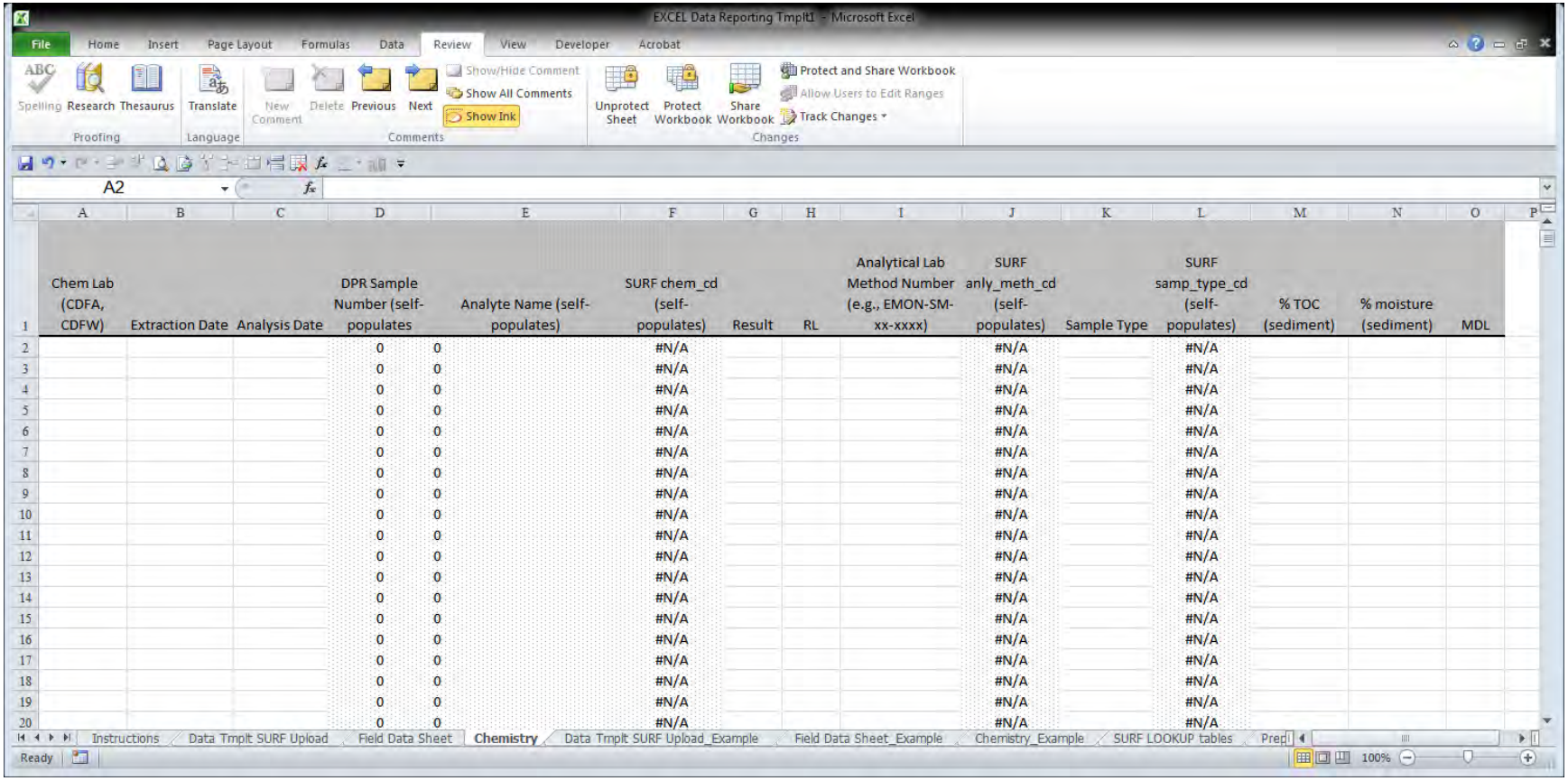
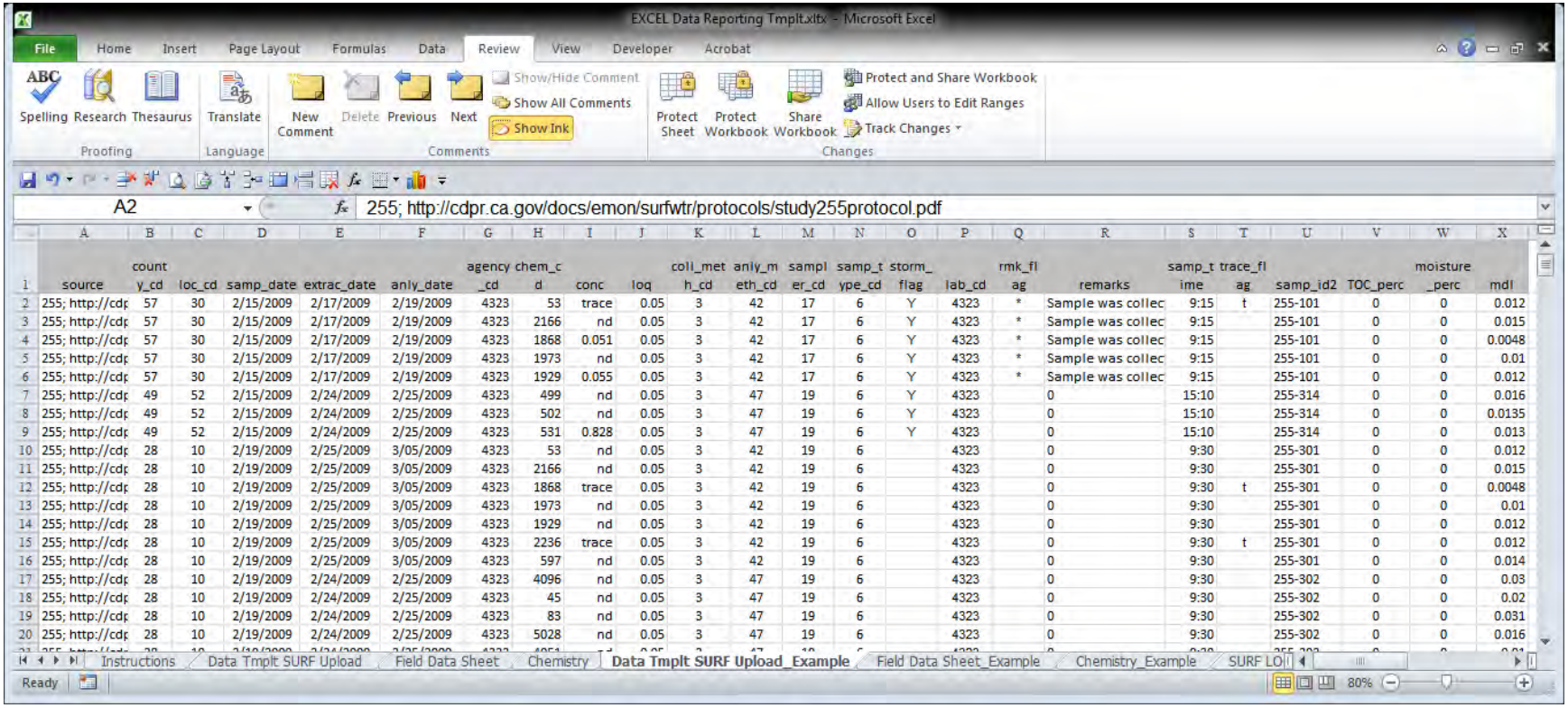


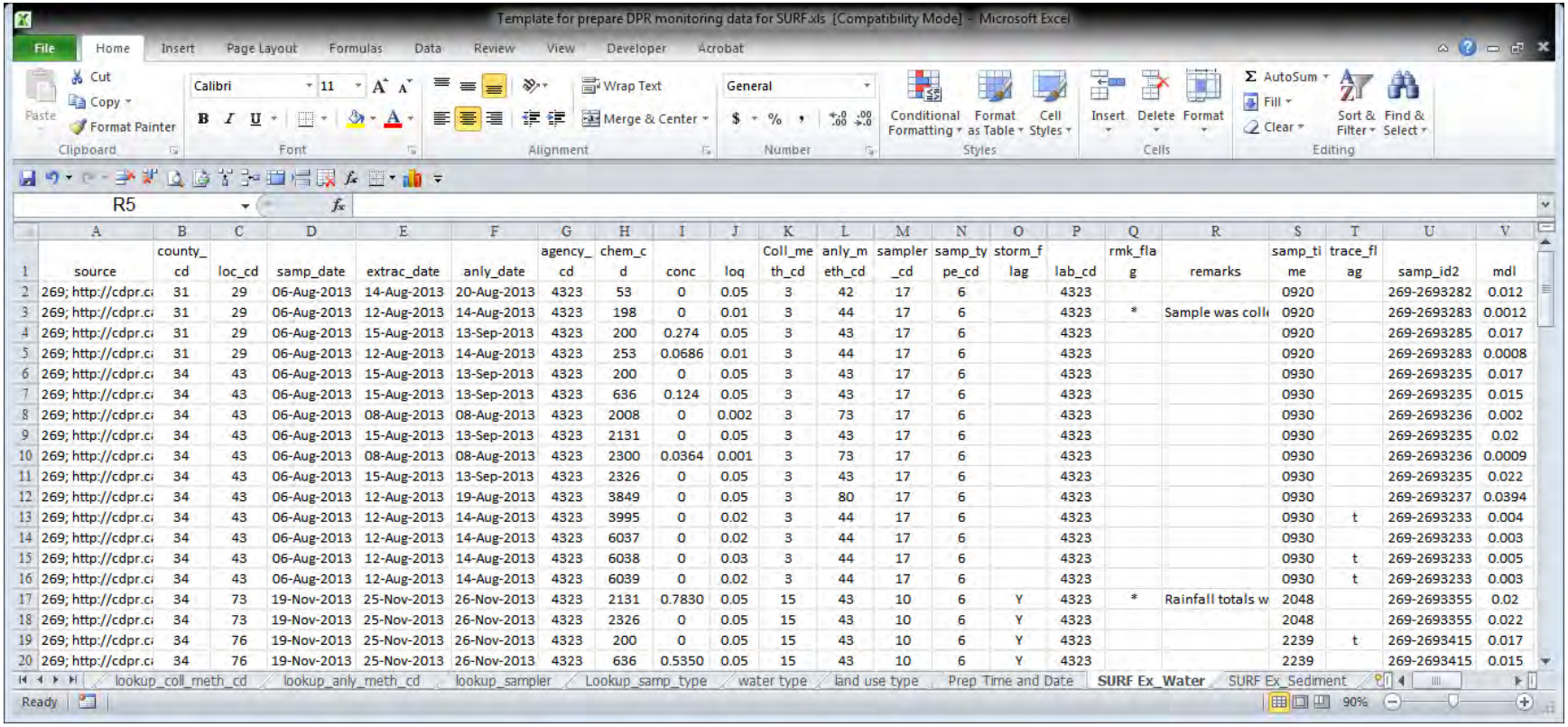
FIGURE 4**.** “Chemistry” worksheet in the data reporting template workbook

STANDARD OPERATING PROCEDURE
Process for Reporting Ambient Monitoring Data and for Uploading Data into the Surface Water Database



	source	county_cd	loc_cd	samp_date	extrac_date	anly_date	agency_cd	chem_cd	conc	loq	coll_meth_cd	anly_meth_cd	sampler_cd	samp_type_cd	storm_flag	lab_cd	rmk_flag	remarks	samp_time	trace_flag	samp_id2	TOC_perc	moisture_perc	mdl
2	255; http://cdp	57	30	2/15/2009	2/17/2009	2/19/2009	4323	53	trace	0.05	3	42	17	6	Y	4323	*	Sample was collec	9:15	t	255-101	0	0	0.012
3	255; http://cdp	57	30	2/15/2009	2/17/2009	2/19/2009	4323	2166	nd	0.05	3	42	17	6	Y	4323	*	Sample was collec	9:15		255-101	0	0	0.015
4	255; http://cdp	57	30	2/15/2009	2/17/2009	2/19/2009	4323	1868	0.051	0.05	3	42	17	6	Y	4323	*	Sample was collec	9:15		255-101	0	0	0.0048
5	255; http://cdp	57	30	2/15/2009	2/17/2009	2/19/2009	4323	1973	nd	0.05	3	42	17	6	Y	4323	*	Sample was collec	9:15		255-101	0	0	0.01
6	255; http://cdp	57	30	2/15/2009	2/17/2009	2/19/2009	4323	1929	0.055	0.05	3	42	17	6	Y	4323	*	Sample was collec	9:15		255-101	0	0	0.012
7	255; http://cdp	49	52	2/15/2009	2/24/2009	2/25/2009	4323	499	nd	0.05	3	47	19	6	Y	4323		0	15:10		255-314	0	0	0.016
8	255; http://cdp	49	52	2/15/2009	2/24/2009	2/25/2009	4323	502	nd	0.05	3	47	19	6	Y	4323		0	15:10		255-314	0	0	0.0135
9	255; http://cdp	49	52	2/15/2009	2/24/2009	2/25/2009	4323	531	0.828	0.05	3	47	19	6	Y	4323		0	15:10		255-314	0	0	0.013
10	255; http://cdp	28	10	2/19/2009	2/25/2009	3/05/2009	4323	53	nd	0.05	3	42	19	6		4323		0	9:30		255-301	0	0	0.012
11	255; http://cdp	28	10	2/19/2009	2/25/2009	3/05/2009	4323	2166	nd	0.05	3	42	19	6		4323		0	9:30		255-301	0	0	0.015
12	255; http://cdp	28	10	2/19/2009	2/25/2009	3/05/2009	4323	1868	trace	0.05	3	42	19	6		4323		0	9:30	t	255-301	0	0	0.0048
13	255; http://cdp	28	10	2/19/2009	2/25/2009	3/05/2009	4323	1973	nd	0.05	3	42	19	6		4323		0	9:30		255-301	0	0	0.01
14	255; http://cdp	28	10	2/19/2009	2/25/2009	3/05/2009	4323	1929	nd	0.05	3	42	19	6		4323		0	9:30		255-301	0	0	0.012
15	255; http://cdp	28	10	2/19/2009	2/25/2009	3/05/2009	4323	2236	trace	0.05	3	42	19	6		4323		0	9:30	t	255-301	0	0	0.012
16	255; http://cdp	28	10	2/19/2009	2/25/2009	3/05/2009	4323	597	nd	0.05	3	42	19	6		4323		0	9:30		255-301	0	0	0.014
17	255; http://cdp	28	10	2/19/2009	2/24/2009	2/25/2009	4323	4096	nd	0.05	3	47	19	6		4323		0	9:30		255-302	0	0	0.03
18	255; http://cdp	28	10	2/19/2009	2/24/2009	2/25/2009	4323	45	nd	0.05	3	47	19	6		4323		0	9:30		255-302	0	0	0.02
19	255; http://cdp	28	10	2/19/2009	2/24/2009	2/25/2009	4323	83	nd	0.05	3	47	19	6		4323		0	9:30		255-302	0	0	0.031
20	255; http://cdp	28	10	2/19/2009	2/24/2009	2/25/2009	4323	5028	nd	0.05	3	47	19	6		4323		0	9:30		255-302	0	0	0.016

FIGURE 5. Example of the “Data Tmplt Surf Upload” worksheet in data reporting template workbook, prior to formatting for upload into surf



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	source	county_cd	loc_cd	samp_date	extrac_date	anly_date	agency_cd	chem_cd	conc	loq	Coll_meth_cd	anly_meth_cd	sampler_cd	samp_type_cd	storm_flag	lab_cd	rmk_flag	remarks	samp_time	trace_flag	samp_id2	mdl
2	269; http://cdpr.ci	31	29	06-Aug-2013	14-Aug-2013	20-Aug-2013	4323	53	0	0.05	3	42	17	6		4323			0920		269-2693282	0.012
3	269; http://cdpr.ci	31	29	06-Aug-2013	12-Aug-2013	14-Aug-2013	4323	198	0	0.01	3	44	17	6		4323	*	Sample was coll	0920		269-2693283	0.0012
4	269; http://cdpr.ci	31	29	06-Aug-2013	15-Aug-2013	13-Sep-2013	4323	200	0.274	0.05	3	43	17	6		4323			0920		269-2693285	0.017
5	269; http://cdpr.ci	31	29	06-Aug-2013	12-Aug-2013	14-Aug-2013	4323	253	0.0686	0.01	3	44	17	6		4323			0920		269-2693283	0.0008
6	269; http://cdpr.ci	34	43	06-Aug-2013	15-Aug-2013	13-Sep-2013	4323	200	0	0.05	3	43	17	6		4323			0930		269-2693235	0.017
7	269; http://cdpr.ci	34	43	06-Aug-2013	15-Aug-2013	13-Sep-2013	4323	636	0.124	0.05	3	43	17	6		4323			0930		269-2693235	0.015
8	269; http://cdpr.ci	34	43	06-Aug-2013	08-Aug-2013	08-Aug-2013	4323	2008	0	0.002	3	73	17	6		4323			0930		269-2693236	0.002
9	269; http://cdpr.ci	34	43	06-Aug-2013	15-Aug-2013	13-Sep-2013	4323	2131	0	0.05	3	43	17	6		4323			0930		269-2693235	0.02
10	269; http://cdpr.ci	34	43	06-Aug-2013	08-Aug-2013	08-Aug-2013	4323	2300	0.0364	0.001	3	73	17	6		4323			0930		269-2693236	0.0009
11	269; http://cdpr.ci	34	43	06-Aug-2013	15-Aug-2013	13-Sep-2013	4323	2326	0	0.05	3	43	17	6		4323			0930		269-2693235	0.022
12	269; http://cdpr.ci	34	43	06-Aug-2013	12-Aug-2013	19-Aug-2013	4323	3849	0	0.05	3	80	17	6		4323			0930		269-2693237	0.0394
13	269; http://cdpr.ci	34	43	06-Aug-2013	12-Aug-2013	14-Aug-2013	4323	3995	0	0.02	3	44	17	6		4323			0930	t	269-2693233	0.004
14	269; http://cdpr.ci	34	43	06-Aug-2013	12-Aug-2013	14-Aug-2013	4323	6037	0	0.02	3	44	17	6		4323			0930		269-2693233	0.003
15	269; http://cdpr.ci	34	43	06-Aug-2013	12-Aug-2013	14-Aug-2013	4323	6038	0	0.03	3	44	17	6		4323			0930	t	269-2693233	0.005
16	269; http://cdpr.ci	34	43	06-Aug-2013	12-Aug-2013	14-Aug-2013	4323	6039	0	0.02	3	44	17	6		4323			0930	t	269-2693233	0.003
17	269; http://cdpr.ci	34	73	19-Nov-2013	25-Nov-2013	26-Nov-2013	4323	2131	0.7830	0.05	15	43	10	6	Y	4323	*	Rainfall totals w	2048		269-2693355	0.02
18	269; http://cdpr.ci	34	73	19-Nov-2013	25-Nov-2013	26-Nov-2013	4323	2326	0	0.05	15	43	10	6	Y	4323			2048		269-2693355	0.022
19	269; http://cdpr.ci	34	76	19-Nov-2013	25-Nov-2013	26-Nov-2013	4323	200	0	0.05	15	43	10	6	Y	4323			2239	t	269-2693415	0.017
20	269; http://cdpr.ci	34	76	19-Nov-2013	25-Nov-2013	26-Nov-2013	4323	636	0.5350	0.05	15	43	10	6	Y	4323			2239		269-2693415	0.015

FIGURE 6. Example of water monitoring data formatted correctly for SURF upload

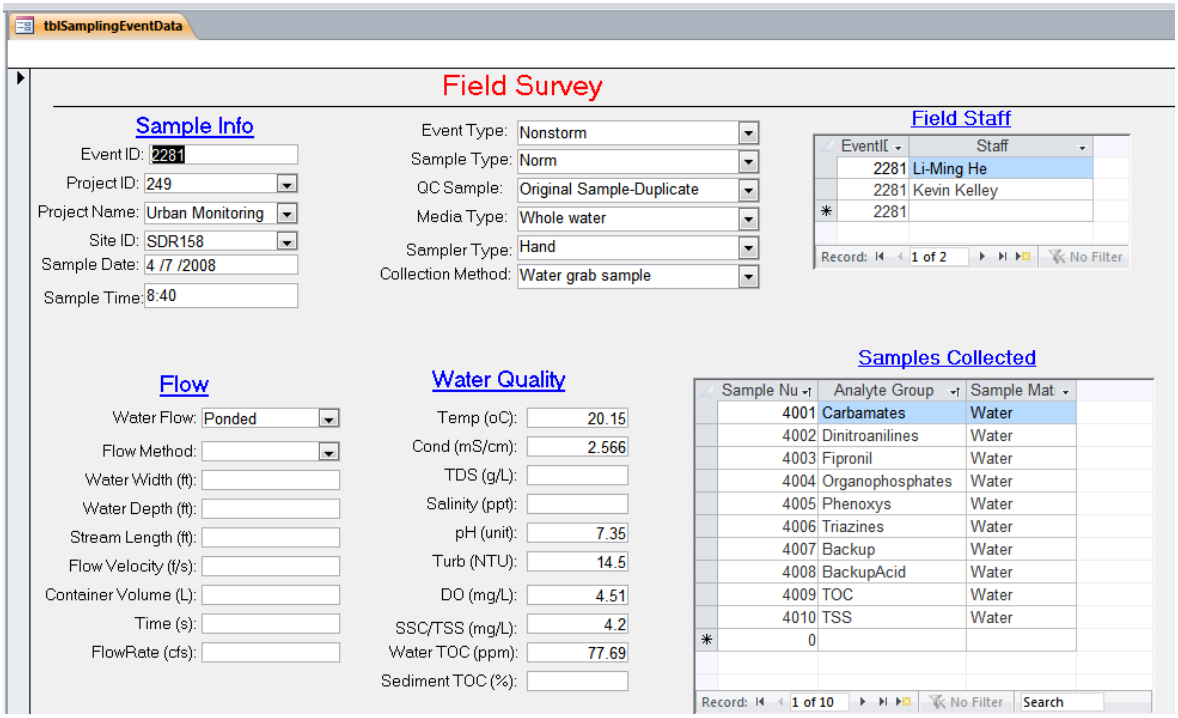
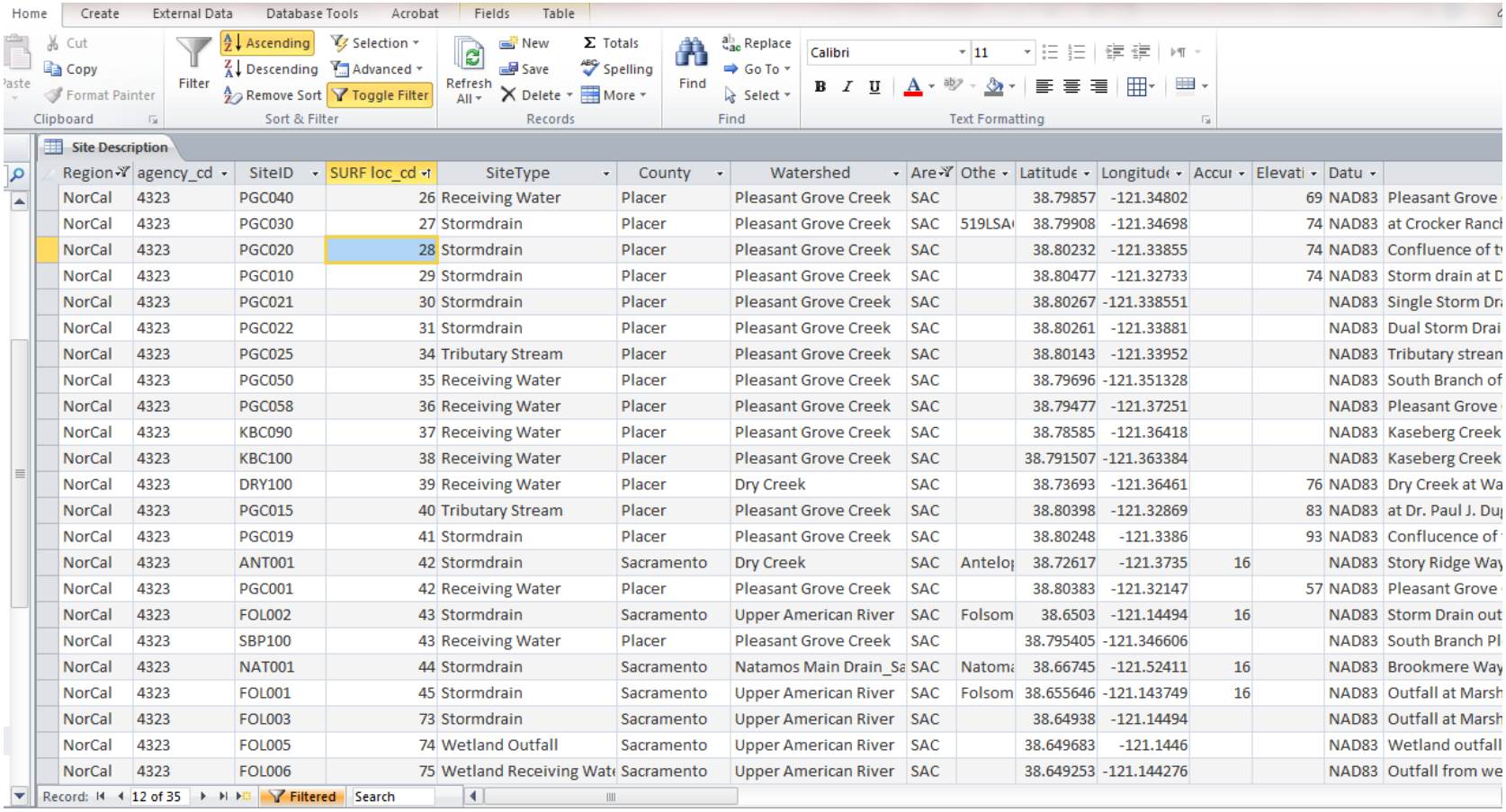


FIGURE 7. “frmMajorEvent” in the ACCESS database template used to enter pertinent field datasheet information

STANDARD OPERATING PROCEDURE
Process for Reporting Ambient Monitoring Data and for Uploading Data into the Surface Water Database

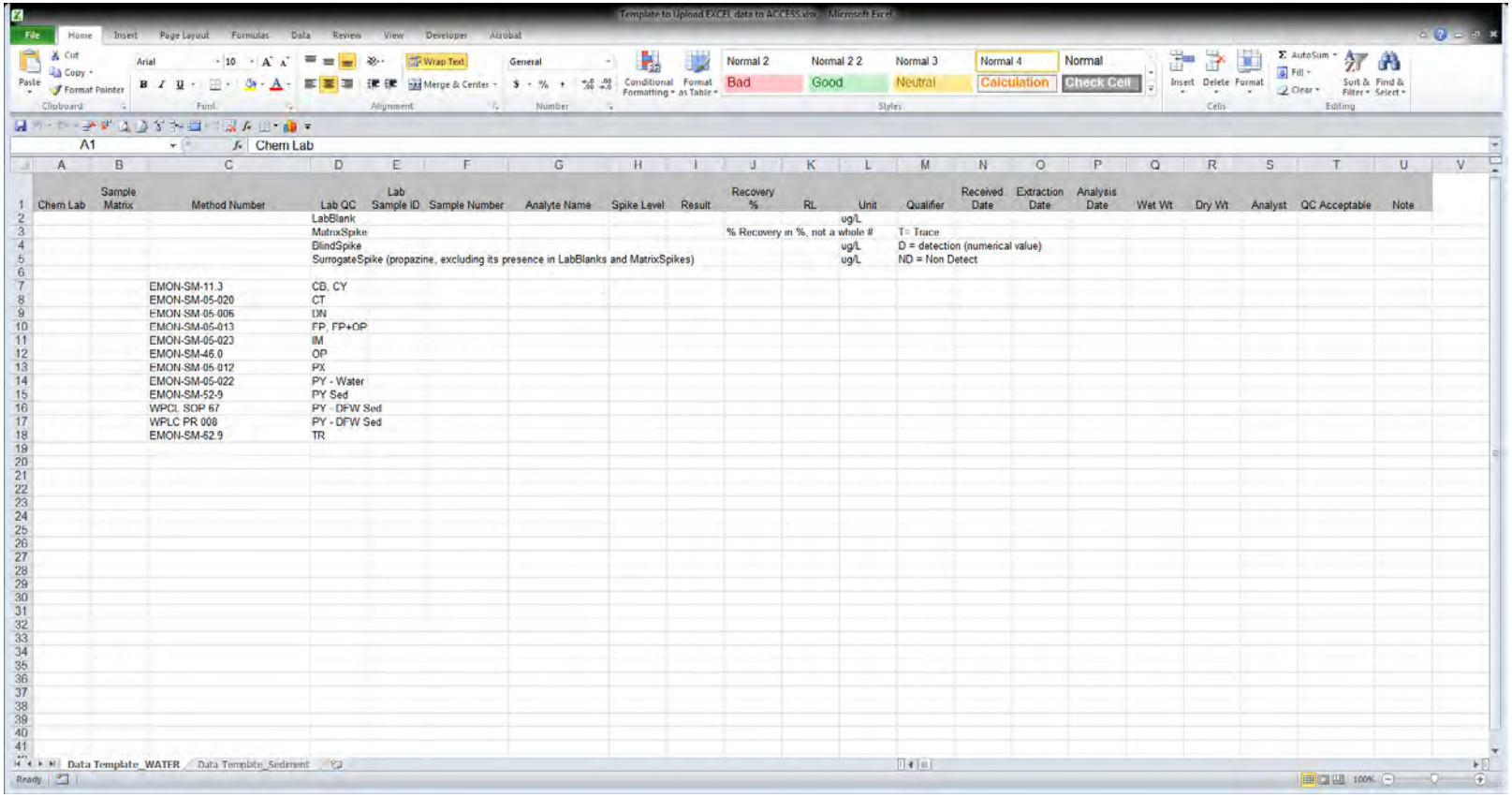


Site Description

Region	agency_cd	SiteID	SURF loc_cd	SiteType	County	Watershed	Are	Othe	Latitude	Longitude	Accur	Elevati	Datu	
NorCal	4323	PGC040	26	Receiving Water	Placer	Pleasant Grove Creek	SAC		38.79857	-121.34802		69	NAD83	Pleasant Grove
NorCal	4323	PGC030	27	Stormdrain	Placer	Pleasant Grove Creek	SAC	519LSA(	38.79908	-121.34698		74	NAD83	at Crocker Ranch
NorCal	4323	PGC020	28	Stormdrain	Placer	Pleasant Grove Creek	SAC		38.80232	-121.33855		74	NAD83	Confluence of t
NorCal	4323	PGC010	29	Stormdrain	Placer	Pleasant Grove Creek	SAC		38.80477	-121.32733		74	NAD83	Storm drain at D
NorCal	4323	PGC021	30	Stormdrain	Placer	Pleasant Grove Creek	SAC		38.80267	-121.338551			NAD83	Single Storm Dra
NorCal	4323	PGC022	31	Stormdrain	Placer	Pleasant Grove Creek	SAC		38.80261	-121.33881			NAD83	Dual Storm Drai
NorCal	4323	PGC025	34	Tributary Stream	Placer	Pleasant Grove Creek	SAC		38.80143	-121.33952			NAD83	Tributary strean
NorCal	4323	PGC050	35	Receiving Water	Placer	Pleasant Grove Creek	SAC		38.79696	-121.351328			NAD83	South Branch of
NorCal	4323	PGC058	36	Receiving Water	Placer	Pleasant Grove Creek	SAC		38.79477	-121.37251			NAD83	Pleasant Grove
NorCal	4323	KBC090	37	Receiving Water	Placer	Pleasant Grove Creek	SAC		38.78585	-121.36418			NAD83	Kaseberg Creek
NorCal	4323	KBC100	38	Receiving Water	Placer	Pleasant Grove Creek	SAC		38.791507	-121.363384			NAD83	Kaseberg Creek
NorCal	4323	DRY100	39	Receiving Water	Placer	Dry Creek	SAC		38.73693	-121.36461		76	NAD83	Dry Creek at Wa
NorCal	4323	PGC015	40	Tributary Stream	Placer	Pleasant Grove Creek	SAC		38.80398	-121.32869		83	NAD83	at Dr. Paul J. Du
NorCal	4323	PGC019	41	Stormdrain	Placer	Pleasant Grove Creek	SAC		38.80248	-121.3386		93	NAD83	Confluence of
NorCal	4323	ANT001	42	Stormdrain	Sacramento	Dry Creek	SAC	Antelop	38.72617	-121.3735	16		NAD83	Story Ridge Way
NorCal	4323	PGC001	42	Receiving Water	Placer	Pleasant Grove Creek	SAC		38.80383	-121.32147		57	NAD83	Pleasant Grove
NorCal	4323	FOL002	43	Stormdrain	Sacramento	Upper American River	SAC	Folsom	38.6503	-121.14494	16		NAD83	Storm Drain out
NorCal	4323	SBP100	43	Receiving Water	Placer	Pleasant Grove Creek	SAC		38.795405	-121.346606			NAD83	South Branch Pl
NorCal	4323	NAT001	44	Stormdrain	Sacramento	Natamos Main Drain_Sa	SAC	Natoma	38.66745	-121.52411	16		NAD83	Brookmere Way
NorCal	4323	FOL001	45	Stormdrain	Sacramento	Upper American River	SAC	Folsom	38.655646	-121.143749	16		NAD83	Outfall at Marsh
NorCal	4323	FOL003	73	Stormdrain	Sacramento	Upper American River	SAC		38.64938	-121.14494			NAD83	Outfall at Marsh
NorCal	4323	FOL005	74	Wetland Outfall	Sacramento	Upper American River	SAC		38.649683	-121.1446			NAD83	Wetland outfall
NorCal	4323	FOL006	75	Wetland Receiving Wate	Sacramento	Upper American River	SAC		38.649253	-121.144276			NAD83	Outfall from we

Record: 12 of 35 Filtered Search

FIGURE 8. Example of “Site Description” table in ACCESS showing local SiteID and SURF loc_cd



Chem Lab	Sample Matrix	Method Number	Lab QC	Lab Sample ID	Sample Number	Analyte Name	Spike Level	Result	Recovery %	RL	Unit	Qualifier	Received Date	Extraction Date	Analysis Date	Wet Wt	Dry Wt	Analyst	QC Acceptable	Note
			LabBlank								ug/L									
			MatrixSpike						% Recovery in %, not a whole #			T= Trace								
			BlindSpike								ug/L	D = detection (numerical value)								
			SurrogateSpike (propazine, excluding its presence in LabBlanks and MatrixSpikes)								ug/L	ND = Non Detect								
		EMON-SM-11.3	CD, CY																	
		EMON-SM-05-020	CT																	
		EMON-SM-05-006	DN																	
		EMON-SM-05-013	FP, FP+OP																	
		EMON-SM-05-023	IM																	
		EMON-SM-46.0	OP																	
		EMON-SM-05-012	PX																	
		EMON-SM-05-022	PY - Water																	
		EMON-SM-52-9	PY Sed																	
		WPCL SOP 67	PY - DFW Sed																	
		WPLC PR 008	PY - DFW Sed																	
		EMON-SM-62.9	TR																	

FIGURE 9. Layout of the **“**Data Template” file used to upload analytical chemistry data into ACCESS. Select template for water or sediment data

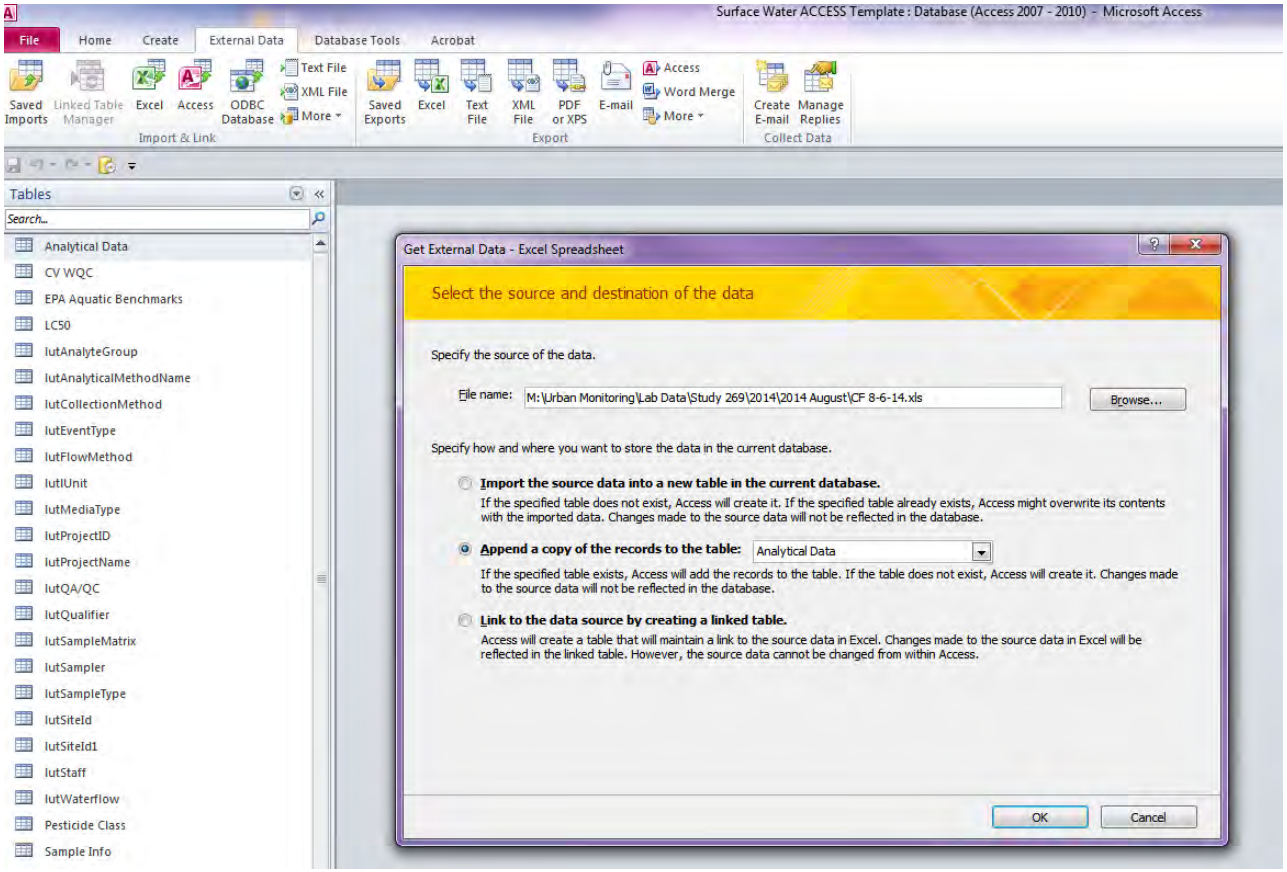


FIGURE 10. Example of importing EXCEL data into ACCESS

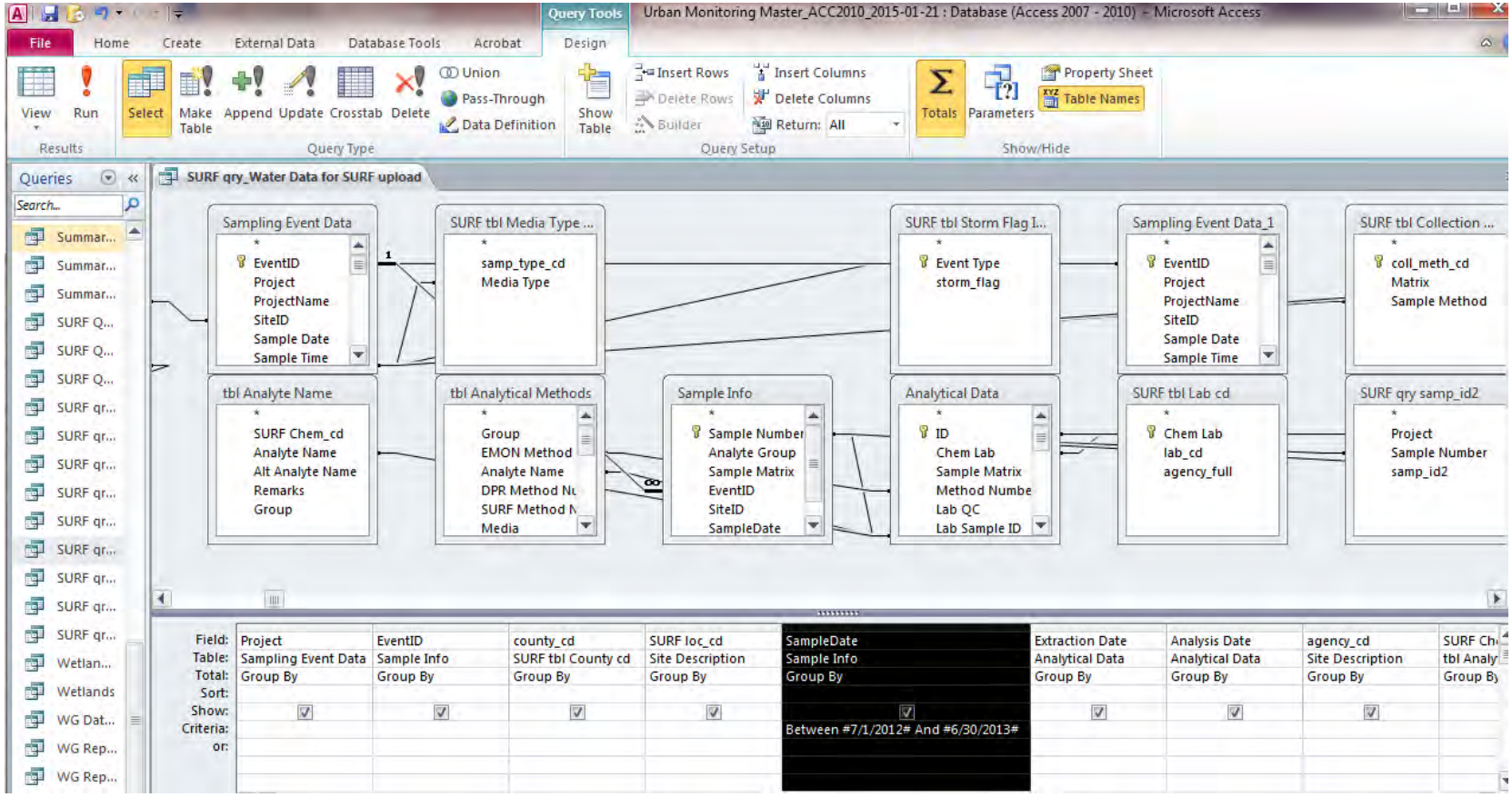


FIGURE 11. Selecting the correct time period in ACCESS, in the SampleDate column, for the monitoring period

4.0 REFERENCES

Amweg, E.L., D.P. Weston, and N.M. Ureda. 2005. Use and toxicity of pyrethroid pesticides in the Central Valley, California, U.S.A. Environ. Toxicol. Chem. 24:966-972 (*erratum* 24, 1300-1301).

Amweg and D.P. Weston 2007. Whole-sediment toxicity identification evaluation tools for pyrethroid insecticides: I. Piperonyl butoxide addition. Environ. Toxicol. Chem. 26:2389-2396.

CDPR. 2013. Surface Water Database. http://cdpr.ca.gov/docs/emon/surfwtr/surfcont.htm. Accessed 17 February 2013.

Maund, S. J., Hammer, M. J., Lane, M. C. G., Farrelly, E., Rapley, J. H., Goggin, U. M., Gentle, W. E. (2002). Partitioning, bioavailability, and toxicity of the pyrethroid insecticide cypermethrin in sediments. Environ. Toxicol. Chem., 21:9-15.

U.S. Environmental Protection Agency 2014. Office of Pesticide Programs. Aquatic life benchmarks. http://www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm. Accessed 17 February 2015.

5.0 APPENDICES

5.1 Appendix 1. Water body type and land use associated with new sampling sites

Water Type

Code	Type
1	river
2	type of water body unknown
3	ag tail water ditch
4	slough
5	creek
9	bay
7	estuarine
6	delta
10	storm drain outfall
11	canal
12	sump
13	lagoon

Land Use Type

Code	Type
u	urban use
m	mixed use (urban, ag, forest)
f	forest
A	agricultural use

5.2 Appendix 2. Data Reporting Template

DEPARTMENT OF PESTICIDE REGULATION

AMBIENT MONITORING REPORT

Date: Enter date

1. Study highlights:

- Study Number: Enter No.
- Title: Click here to enter study title
- Author Click here to enter author
- Study area: County: Click here to enter county name(s)
  Waterbody/ Watershed: Click here to enter waterbody/watershed name(s)
- Land Use Type: ☐ Ag ☐ Urban ☐ Forested ☐ Mixed ☐ Other
- Water body type: ☐ Storm drain outfall ☐ Creek ☐ River ☐ Pond ☐ Lake ☐ Drainage ditch ☐ Other: Click here to enter describe other
- Objectives: Click here to enter main objectives
- Sampling period: Click here to enter sampling period
- Pesticides monitored: Click here to enter pesticides monitored
- Major findings: Click here to enter major findings from Tables 1 and 2

2. Pesticide detection frequency

Table 1. Pesticides detected in water. Complete data set in Appendix.

Pesticide	Number of samples	Number of detections	Reporting Limit (µg/L)	Detection frequency (%)	Lowest USEPA benchmark (BM) (µg/L)*	Number of BM exceed-ances	BM exceedance frequency (%)

*FA, fish acute; FC, fish chronic; IA, invertebrate acute; IC, invertebrate chronic; NA, non-vascular acute; VA, vascular acute

Table 2. Pesticides detected in sediment. Complete data set in Appendix.

Pesticide	Number of samples	Number of detections	Detection frequency (%)	LC_{50} (µg/g OC)*	Detection frequency of sediments $\geq$ 1 TU*	Median TUs*

*Sediment Toxicity Units (TUs) are calculated using the formula, use TU = C/LC_{50} * % TOC * 10, where C = concentration (µg/kg dry weight), LC_{50} is derived from accepted published values (from Amweg et al. 2005, Toxicol. Chem. 24:966-972; Amweg and D.P. Weston 2007, Environ. Toxicol. Chem. 26:2389-2396; Maund et al. 2002, Environ. Toxicol. Chem., 21:9-15), % TOC is stated in the sediment results Appendix IV, Supplementary Data, and 10 is a conversion factor. One TU is equal to the LC_{50}. If using other LC_{50} values, list value and reference.

3. Laboratory QC summary

QC Type		Water Samples		Sediment Samples	
		Total Number	**Number of QC out of contro1**	**Total Number**	**Number of QC out of control**
Lab Blanks		Enter No.	Enter No.	Enter No.	Enter No.
Matrix Spikes/Duplicates		Enter No.	Enter No.	Enter No.	Enter No.
Laboratory Control Spikes/Duplicates		Enter No.	Enter No.	Enter No.	Enter No.
Blind Spikes		Enter No.	Enter No.	Enter No.	Enter No.
Surrogate Spikes		Enter No.	Enter No.	Enter No.	Enter No.
Other QC:	Describe	Enter No.	Enter No.	Enter No.	Enter No.
Other QC:	Describe	Enter No.	Enter No.	Enter No.	Enter No.
Explain out of control QC and interpretation of data:	Click here to enter other QC information or comments				

4. Supporting Information

Submit the following Supporting Information combined into one PDF file with your report:

Index of Supporting Information
Appendix I. Study protocol
Appendix II. Sampling site information and site pictures (recommended)
Appendix III. Water quality data
Appendix IV. Water or sediment monitoring data
Appendix V. Aquatic toxicity data
Appendix VI. Analytical methods

5.3 Appendix 3. Guide for using the Ambient Monitoring Report Template

This guide provides instructions on how to use the Ambient Monitoring Report template to prepare reports for the monitoring studies in the Surface Water Protection Program. This template shall be used for all ambient surface water monitoring projects. Special field studies, such as measuring field runoff, mitigation efficacy, and method development are exempt from using this template.

Title section	
Date	Current date of final report writing
1. Study highlights	
Study Number	Enter the DPR study number as shown in the protocol
Title	Title of the study on the protocol
Author	Enter project lead name
Study Area	County: name the county of the study area, if the study occurred across multiple counties, list all counties Waterbody: name the waterbody or major watershed where the monitoring took place
Land Use Type	Specify the land use type for the monitoring study. Select multiple land use types if applicable. If other land use type, check “OTHER” and briefly describe the land use type
Waterbody Type	Check the waterbody type. Select multiple if applicable. If OTHER, briefly describe
Objectives	Briefly describe the primary objectives of the study
Sampling period	Specify the month and year of the sampling period. e.g. July 2012 to June 2013
Pesticides	List the common DPR names of the pesticides monitored

monitored	
Major findings	Briefly summarize the study findings for the results shown in Tables 1 and 2

2. Pesticide detection frequency (pesticides not detected are not listed in the following tables)

Table 1. Pesticides detected in water (table can be copied from EXCEL or other source). Delete table if no water samples were collected.

Pesticide	Common name of the pesticide; one pesticide per row
Number of samples	Total number of samples collected
Number of detections	Number of samples with concentrations above the reporting limit
Reporting limit (RL)	List reporting limit for the analyte
Detection frequency (%)	Number of detections divided by number of samples and multiplied by 100; e.g. 15.0, 20.3
Lowest USEPA OPP benchmark (BM) (ppb)	The lowest USEPA OPP aquatic life benchmark value for each pesticide; the numbers can be found at the USEPA website (US EPA 2014). After listing the lowest benchmark, describe benchmark type (FA, fish acute; FC, fish chronic; IA, invertebrate acute; IC, invertebrate chronic; NA, non-vascular acute; VA, vascular acute)
Number of BM exceedances	Total number of samples with concentrations greater than the Lowest USEPA OPP aquatic life benchmark
BM exceedance frequency (%)	Number of BM exceedances divided by total number of samples and multiplied by 100; e.g. 10.2; 7.8

Table 2. Pesticides detected in sediment (table can be copied from EXCEL or other source). Delete table if no sediment samples were taken.	
Pesticide	Same as Table 1
Number of samples	
Number of detections	
Detection frequency (%)	
LC_{50} (µg g^{-1} OC)	TUs interpret the potential toxicity of sediment. LC_{50}'s, normalized to organic carbon, are needed to calculate TUs. The following are suggested values for 10-day *Hyalella azteca* LC_{50} (µg g^{-1} OC) based on current literature: bifenthrin: 0.52, cyfluthrin: 1.08, deltamethrin: 0.79, esfenvalerate: 1.54, lambda-cyhalothrin: 0.45, permethrin: 10.83 (Amweg et al., 2005); chlorpyrifos, 1.77 (Amweg and Weston, 2007); cypermethrin, 0.38 (Maund, 2002)
Detection frequency of sediments > 1 TU	Use the following formula to generate sediment TUs: $TU = \frac{C}{LC_{50} * \%TOC * 10}$ (1 TU is equal to the LC_{50}) Where: C = Concentration of pesticide, µg kg^{-1} dry weight, in the sediment LC_{50} = the LC_{50}, µg g^{-1} OC TOC = % total organic carbon, calculated from sediment using TOC analyzer 10 = conversion factor for the change in units
Median TUs	List the median TUs for each pesticide detected in sediment

3. Laboratory QA/QC: Summary	
Lab blanks	Enter number of lab blanks and number out of control limits
Matrix spikes and duplicates	Enter number of matrix spikes and matrix spike duplicates and number of spikes out of control limits
Laboratory control spikes and duplicates	Enter number of laboratory control spikes and laboratory control duplicates and number of spikes out of control limits
Blind spikes	Enter number of blind spikes and number of spikes out of control limits
Surrogate spikes	Enter number of surrogate spikes and number of spikes out of control limits
Other QC	Enter any other laboratory QC with the associated data
Explanation	Explain how out of control QC affected results, and if results are valid

4. Supporting information	
Submit the following supporting information combined into one PDF file with your report, in this order: Index of Supporting Information	
Appendix I	Study protocol, copied from http://cdpr.ca.gov/docs/emon/pubs/protocol.htm?filter=surfwater
Appendix II	Sampling site information and site pictures (recommended)
Appendix III	Water quality data
Appendix IV	Water or sediment monitoring data
Appendix V	Aquatic toxicity data, if applicable

Appendix VI	Analytical methods. Many methods can be found on the surface water shared drive, subdirectory Data Reporting (2013)\Analytical Methods

Use the WORD template file: “Supporting Information Template.dotx” as a template for the supporting information index. Modify as appropriate for the project.

Combine index and all appendices into a pdf file using Adobe Acrobat X Pro. Use command “Combine Files into PDF”

5.4 Appendix 4. An Example using the Data Reporting Template

DEPARTMENT OF PESTICIDE REGULATION

AMBIENT MONITORING REPORT

Date: December 5, 2014

1. Study highlights:

- Study Number: 269
- Title: Surface Water and Sediment Monitoring in a Constructed Water Quality Pond in Folsom, CA 2012-2013
- Author: Mike Ensminger
- Study area:
  - County: Placer, Sacramento
  - Waterbody/ Watershed: Pleasant Grove Creek, Alder Creek
- Land Use Type: ☐ Ag ☒ Urban ☐ Forested ☐ Mixed ☐ Other
- Water body type: ☒ Storm drain outfall ☒ Creek ☐ River ☐ Pond ☐ Lake ☐ Drainage ditch ☐ Other: Click here to enter describe other
- Objectives: Determine the number of pesticide detections, the detection frequency, and compare pesticide concentrations to US EPA benchmarks at monitoring sites in northern California
- Sampling period: July 1, 2012 – June 30, 2013
- Pesticides monitored: Fipronil, fipronil sulfide, fipronil sulfone, desulfinyl fipronil, desulfinyl fipronil amide, fipronil amide, diazinon, chlorpyrifos, malathion, chlorothalonil, imidacloprid, pendimethalin, 2,4-D, dicamba, MCPA, triclopyr, bifenthrin, lambda-cyhalothrin, permethrin, cyfluthrin, cypermethrin, fenvalerate/esfenvalerate, deltamethrin, fenpropathrin

- Major findings:

Bifenthrin and 2,4-D had the highest detection frequencies (DF) in the study. However, bifenthrin and fipronil had the highest percentage of benchmark (BM) exceedances. Almost all of bifenthrin's detections and all of fipronil detections were above the BM. Imidacloprid had the 3rd highest DF but there were no detections above its BM. Malathion (1 detection), lambda-cyhalothrin (4 detections), and permethrin (11 detections), and fipronil sulfone (8 detections) were detected above their respective BMs. No herbicides, which were frequently detected, were detected above their BMs.

Of sediments, bifenthrin was most frequently detected, gave the highest number of toxicity units (TUs), and accounted for 62% of the potential sediment toxicity (based on TUs). Cyfluthrin was the second most frequently detected pyrethroid but accounted for much less potential toxicity (7% of potential sediment toxicity, based on TUs). Cypermethrin was detected almost as frequently as cyfluthrin but accounted for 19% of the toxicity. Other pyrethroids were detected frequently in sediments but based on LC50 values, did not account for much potential sediment toxicity.

Limited water toxicity testing with Hyalella azteca was conducted in July and October 2012, and in June 2013. Water samples taken from FOL003 were significantly more toxic than the controls in the July (nonstorm sample) and in the October (storm samples) water samples. Samples from FOL002 were significantly more toxic than the controls at all three dates.

2. Pesticide detection frequency

Table 1. Pesticides detected in water. Complete data set in Appendix.

Pesticide	Number of samples	Number of detections	Reporting Limit (µg/L)	Detection frequency (%)	Lowest USEPA OPP benchmark (BM) (µg/L)*		Number of BM exceed-ances	BM exceed-ance frequency (%)
2,4-D	15	13	0.05	86.7	13.1	VA	0	0
Bifenthrin	30	29	0.001	96.7	0.0013	IC	27	90
Carbaryl	15	1	0.05	6.7	0.5	IC	0	0
Chlorothalonil	6	0	0.05	0	0.6	IC	0	0.
Chlorpyrifos	24	0	0.01	0	0.04	IC	0	0
Cyfluthrin	30	7	0.002	23.3	0.007	IC	1	3.3
Cypermethrin	30	2	0.005	6.7	0.069	IC	0	0
Desulfinyl fipronil	36	11	0.002	30.6	None		NA	NA
Desulfinyl fipronil amide	36	0	0.003	0	None		NA	NA
Diazinon	24	2	0.01	8.3	0.11	IA	0	0
Dicamba	15	6	0.05	40	61	NA	0	0

Pesticide	Number of samples	Number of detections	Reporting Limit (µg/L)	Detection frequency (%)	Lowest USEPA OPP benchmark (BM) (µg/L)*		Number of BM exceed-ances	BM exceed-ance frequency (%)
Esfenvalerate	30	0	0.005	0	0.017	IC	0	0
Fipronil	36	17	0.02	47.2	0.011	IC	17	47.2
Fipronil amide	36	1	0.03	2.8	0.59	FC	0	0
Fipronil sulfide	36	0	0.02	0	0.11	IC	0	0
Fipronil sulfone	36	14	0.03	38.9	0.037	IC	9	25
Imidacloprid	30	18	0.05	60	1.05	IC	0	0
Lambda-cyhalothrin	30	4	0.002	13.3	0.002	IC	4	13.3
Malathion	24	1	0.05	4.2	0.035	IC	1	4.2
MCPA	15	2	0.05	13.3	170	VA	0	0
Pendimethalin	3	0	0.05	0	5.2	NA	0	0
Permethrin	30	10	0.002	33.3	0.0014	IC	10	33.3
Triclopyr	15	4	0.05	26.7	100	NA	0	0

*FA, fish acute; FC, fish chronic; IA, invertebrate acute; IC, invertebrate chronic; NA, non-vascular acute; VA, vascular acute

Table 2. Pesticides detected in sediment. Complete data set in Appendix.

Pesticide	Number of samples	Number of detections	Detection frequency (%)	LC_{50} (µg/g OC)*	Detection frequency (%) of sediments ≥ 1 TU	Median TUs*
Bifenthrin	17	17	100	0.52	100	6.4
Cyfluthrin	17	15	88.2	1.08	29.4	0.5
Cypermethrin	17	12	70.6	0.38	41.2	0.58
Deltamethrin/Tralomethrin	17	11	64.7	0.79	11.8	0.1
Fenpropathrin	17	1	5.9	(None)	NA	NA
Fenvalerate/Esfenvalerate	17	11	64.7	1.54	0	0.04
Lambda-cyhalothrin	17	13	76.5	0.45	29.4	0.5
Permethrin	17	13	76.5	10.83	0	0.03

*Sediment Toxicity Units (TUs) are calculated using the formula, use TU = C/LC_{50} * % TOC * 10, where C = concentration (µg/kg dry weight), LC_{50} is derived from accepted published values (from Amweg et al. 2005, Toxicol. Chem. 24:966-972; Amweg and D.P. Weston 2007, Environ. Toxicol. Chem. 26:2389-2396; Maund et al. 2002, Environ. Toxicol. Chem., 21:9-15), % TOC is stated in the sediment results Appendix IV, Supplementary Data, and 10 is a conversion factor. One TU is equal to the LC_{50}. If using other LC_{50} values, list value and reference.

3. Laboratory QC summary

QC Type		Water Samples		Sediment Samples	
		Total Number	Number of QC out of control	Total Number	Number of QC out of control
	Lab Blanks	242	0	16	0
	Matrix Spikes/Duplicates	230	0	34	14
	Laboratory Control Spikes/Duplicates	22	0	32	2
	Blind Spikes	14	0	0	na
	Surrogate Spikes	0	na	53	0
Other QC:	Laboratory Duplicates	0	na	17	8
Other QC:	Describe	Enter No.	Enter No.	Enter No.	Enter No.
Explain out of control QC and interpretation of data:	All water QC was within control limits. With sediment QC, one lab control spike/duplicate was low (24%, 29% recovery, respectively) for deltamethrin. Deltamethrin was detected in all associated sediment samples, but amounts could have been greater than reported. In northern California monitoring, deltamethrin only contributes 4% of the total sediment TUs (toxicity units), so this is not an issue. In one batch, the lab duplicates were out of control due to sample non-homogeneity of the sample used for the duplicate analysis; other associated QC was acceptable. Several matrix spikes/duplicates were also out of control. For matrix spikes the analytical lab did not have a clean source of sediment and they used a submitted sediment sample for the matrix QC sample. With the high background of pyrethroids in the sediment (2-4x the spiked amount), the recoveries were much greater than the spiked amount. Therefore, the analytical lab used laboratory control spikes/duplicates to confirm QC.				

Index for the Supporting Information

Appendix I. Protocol Study 269

Appendix II. Sampling Site Information and site pictures (recommended)

Appendix III. Water Quality Data

Appendix IV. Water and Sediment Monitoring Data

Appendix V. Aquatic Toxicity Data

Appendix VI. Analytical Methods

See the Supporting Data in file: “Supporting Information Study 269 FY12-13.pdf”.

5.5 Appendix 5. Guide for formatting excel data for surf. From file "template for prepare DPR monitoring data for surf.xls**"**

Steps for formatting water samples for surf upload			
Step	Field name	Type (length)	Description
1	source	Character (100)	DPR study number and the web link to the study protocol. Example: Study 269; http://cdpr.ca.gov/docs/emon/pubs/protocol/.....
2	county_cd	Character (2)	County code established by numbering an alphabetized list of California's 58 counties. For example, '01' = Alameda; '58' = Yuba. See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "county"
3	loc_cd	Number (4)	Unique number assigned to each sampling site. Check the site map online for an existing loc_cd (CDPR 2013). If a new loc_cd is needed, contact SURF database administrator.
4	samp_date	Date	Date of sampling. Format as DD-MMM-YYYY (See Appendix 6, Formatting Date and Time for upload into SURF)
5	extrac_date	Date	Date of sample extraction. Format as DD-MMM-YYYY (See Appendix 6, Formatting Date and Time for upload into SURF)
6	anly_date	Date	Date of analysis. Format as DD-MMM-YYYY (See Appendix 6, Formatting Date and Time for upload into SURF)
7	agency_cd	Number (4)	Enter "4323" for DPR. See database administrator for other codes.

Step	Field name	Type (length)	Description
8	chem_cd	Number (5)	DPR code for pesticide active ingredients and breakdown products. See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "chem"
9	conc	Number (14,7)	Concentration of the analyte in µg L^{-1} (parts per billion [ppb]). Report non-detects and trace detections (concentrations between the reporting limit [RL] and method detection limit [MDL]) in the database as zero. Mark "t" in the field named trace_flag. Do not include field duplicate or field blank samples. Highlight the conc column, and use "Find and Replace" command (Ctrl H) to replace all nd and trace with "0".
10	loq	Number (14,7)	Limit of quantitation (RL) reported for the analytical method in µg L^{-1} (parts per billion)
11	coll_meth_cd	Number (2)	Code assigned for each sample collection method (e.g. grab). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "coll_method"
12	anly_meth_cd	Number (2)	Code assigned for each method of analysis (e.g. GC/MS). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "anly_methd_cd"
13	sampler_cd	Number (2)	Code assigned for the type of sampler used to collect sample (e.g. individual collection by hand, autosampler). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "sampler"
14	samp_type_cd	Number (2)	Code assigned for each type of sample media (e.g., filtered or whole water). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "sample_type"

Step	Field name	Type (length)	Description
15	storm_flag	Character (1)	Enter a “Y” to indicate the sample was taken during a storm
16	lab_cd	Number (4)	Code assigned to each analytical laboratory; enter “4323” for CDFA, “9989” for CDFW. Contact SURF database administrator for codes for other labs.
17	rmk_flag	Character (1)	Indicates information in remarks field. “*” = other; “E” = estimated concentration; leave blank if no remarks.
18	remarks	Character (100)	Remarks for the record. e.g., if the concentration value is not reliable, please note here. For trace records, write “quantitation uncertain; reported as x.xx µg L^{-1}”.
19	samp_time	Character (4)	Time of day for sample collection ; format as HHMM (24 hour clock; see Appendix 6, Formatting Date and Time data for upload into SURF)
20	trace_flag	Character (1)	Enter “t” to indicate a trace detection (analyte was detected, but at concentration too low for accurate quantification [below the RL])
21	samp_id2	Character (45)	Original ID. For DPR samples, samp_id2 is the study code followed by the field-assigned sample number. e.g. 252-2521138
22	mdl	Number (14,7)	Method detection limit reported for the analytical method in µg L^{-1} (parts per billion).

Steps for formatting sediment samples for SURF upload			
Step	Field name	Type (length)	Description
1	source	Character (100)	DPR study number, and the web link to the study protocol. Example: Study 269; http://cdpr.ca.gov/docs/emon/pubs/protocol/.....
2	county_cd	Character (2)	County code established by numbering an alphabetized list of California's 58 counties. For example, '01' = Alameda; '58' = Yuba. See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "county"
3	loc_cd	Number (4)	Unique number assigned to each sampling site. Check the site map online for an existing loc_cd (CDPR 2014). If a new loc_cd is needed, contact SURF database administrator.
4	samp_date	Date	Date of sampling. Format as DD-MMM-YYYY (See Appendix 6, Formatting Date and Time for upload into SURF)
5	extrac_date	Date	Date of sample extraction. Format as DD-MMM-YYYY (See Appendix 6, Formatting Date and Time for upload into SURF)
6	anly_date	Date	Date of analysis. Format as DD-MMM-YYYY (See Appendix 6, Formatting Date and Time for upload into SURF)
7	agency_cd	Number (4)	Enter "4323" for DPR. See database administrator for other codes.
8	chem_cd	Number (5)	DPR code for pesticide active ingredients and breakdown products. See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "chem"

Step	Field name	Type (length)	Description
9	conc	Number (14,7)	Concentration of the analyte in µg kg^{-1} dry weight (parts per billion [ppb]). Report non-detects and trace detections (concentrations between the reporting limit [RL] and method detection limit [MDL]) in the database as zero. Mark "t" in the field named trace_flag. Do not include field duplicate or field blank samples.
10	loq	Number (14,7)	Limit of quantitation (RL) reported for the analytical method in µg kg^{-1} (parts per billion).
11	coll_meth_cd	Number (2)	Code assigned for each sample collection method (e.g. grab). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "coll_method"
12	anly_meth_cd	Number (2)	Code assigned for each method of analysis (e.g. GC/MS). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "anly_methd_cd"
13	sampler_cd	Number (2)	Code assigned for the type of sampler used to collect sample (e.g. scoop, stainless steel; Sediment trap). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "sampler"
14	samp_type_cd	Number (2)	Code assigned for each type of sample (e.g., filtered or whole water). See lookup table in "Template for prepare DPR monitoring data for SURF.xls" named "sample_type"
15	storm_flag	Character (1)	Enter a "Y" to indicate the sample was taken during a storm
16	lab_cd	Number (4)	Code assigned to each analytical laboratory; enter "4323" for CDFA, "9989" for CDFW. Contact SURF database administrator for codes for other labs

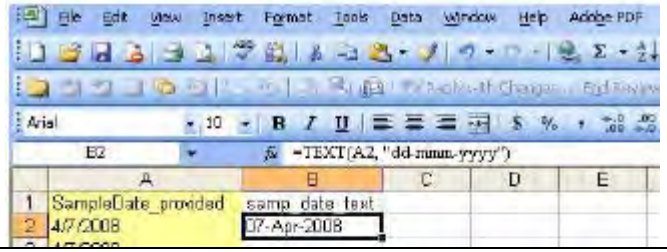
Step	Field name	Type (length)	Description
17	rmk_flag	Character (1)	Indicates information in remarks field. "*" = other; "E" = estimated; leave blank if no remarks
18	remarks	Character (100)	Remarks for the record. e.g., if the concentration value is not reliable, please note here. For trace records, write "quantitation uncertain; reported as x.xx µg kg^{-1}"
19	samp_time	Character (4)	Time of day for sample collection; format as HHMM (24 hour clock; see Appendix 6, Formatting Date and Time for upload into SURF)
20	trace_flag	Character (1)	Enter "t" to indicate a trace detection (analyte was detected, but at concentration too low for accurate quantification [below the RL])
21	samp_id2	Character (45)	Original ID. For DPR samples, samp_id2 is the study code followed by the field-assigned sample number. e.g. 252-2521138
22	TOC_perc	Number (6,3)	Percent total organic carbon; e.g. 8.15, 0.26
23	moisture_perc	Number (6,3)	Percent moisture; e.g. 70.2, 6.5
24	mdl	Number (14,7)	Method detection limit reported for the analytical method in µg kg^{-1} (parts per billion)

5.6 Appendix 6. Formatting Date and Time for Upload into Surf

Introduction. There are issues with date and time formats when transferring data between Excel and Oracle (SURF). For upload into the Oracle database, dates and times must be changed to text. This process is described below in this appendix.

Formatting for Dates

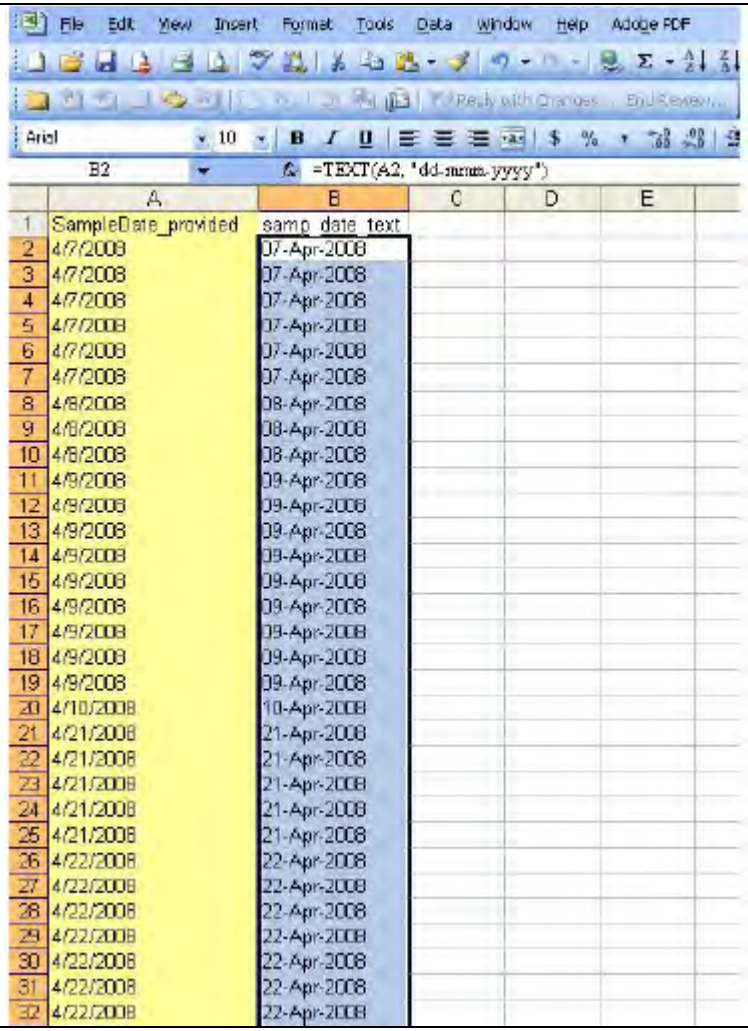
Step 1. The column of dates shown below is in normal date format in Excel, as provided by the data provider. Name a new, empty column (column B in this example) adjacent to date column something appropriate such as samp_date_text.



Step 2. Use the "=text" function to copy the date from column A into column B, as text In cell B2, type: =TEXT(a2, "DD-MMM-YYYY") including the quotation marks (you can click the cell A2 rather than type that part). This changes the date data in cell A2 into text of format 'day-month-year'. Then hit enter. The data should appear as below. Note how the formula (=TEXT(A2,"dd-mmm-yyyy") appears in the function (fx) box.	

Step 3. Apply the TEXT function to all rows in Column B:

Select and copy cell B2. Paste down the column to apply the formula to all cells in the column. All cells in column B now have the date in the new format, as a formula. The formula is still displayed in the function (fx) box.



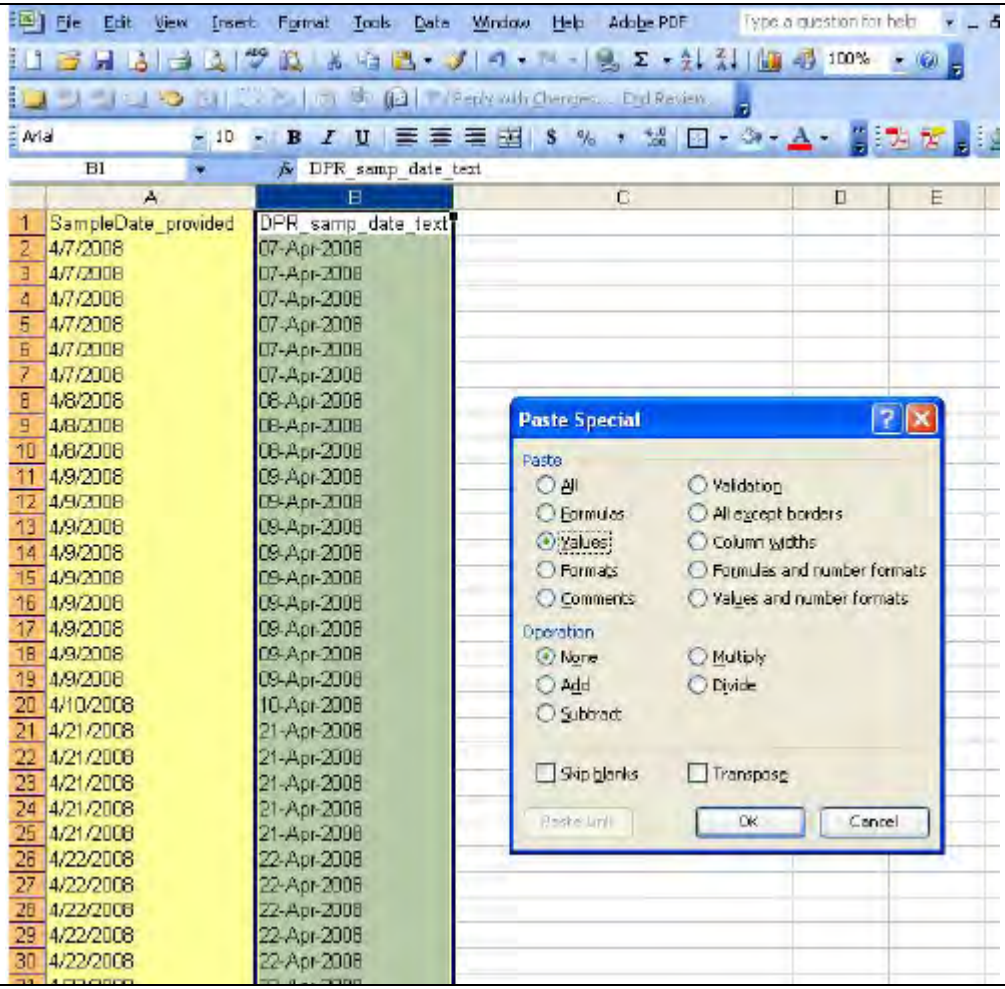
	A	B	C	D	E
1	SampleDate_provided	samp_date_text			
2	4/7/2008	07-Apr-2008			
3	4/7/2008	07-Apr-2008			
4	4/7/2008	07-Apr-2008			
5	4/7/2008	07-Apr-2008			
6	4/7/2008	07-Apr-2008			
7	4/7/2008	07-Apr-2008			
8	4/8/2008	08-Apr-2008			
9	4/8/2008	08-Apr-2008			
10	4/8/2008	08-Apr-2008			
11	4/9/2008	09-Apr-2008			
12	4/9/2008	09-Apr-2008			
13	4/9/2008	09-Apr-2008			
14	4/9/2008	09-Apr-2008			
15	4/9/2008	09-Apr-2008			
16	4/9/2008	09-Apr-2008			
17	4/9/2008	09-Apr-2008			
18	4/9/2008	09-Apr-2008			
19	4/9/2008	09-Apr-2008			
20	4/10/2008	10-Apr-2008			
21	4/21/2008	21-Apr-2008			
22	4/21/2008	21-Apr-2008			
23	4/21/2008	21-Apr-2008			
24	4/21/2008	21-Apr-2008			
25	4/21/2008	21-Apr-2008			
26	4/22/2008	22-Apr-2008			
27	4/22/2008	22-Apr-2008			
28	4/22/2008	22-Apr-2008			
29	4/22/2008	22-Apr-2008			
30	4/22/2008	22-Apr-2008			
31	4/22/2008	22-Apr-2008			
32	4/22/2008	22-Apr-2008			

Step 4. With the copy/paste function, remove the formula and replace with the actual values from the formula:

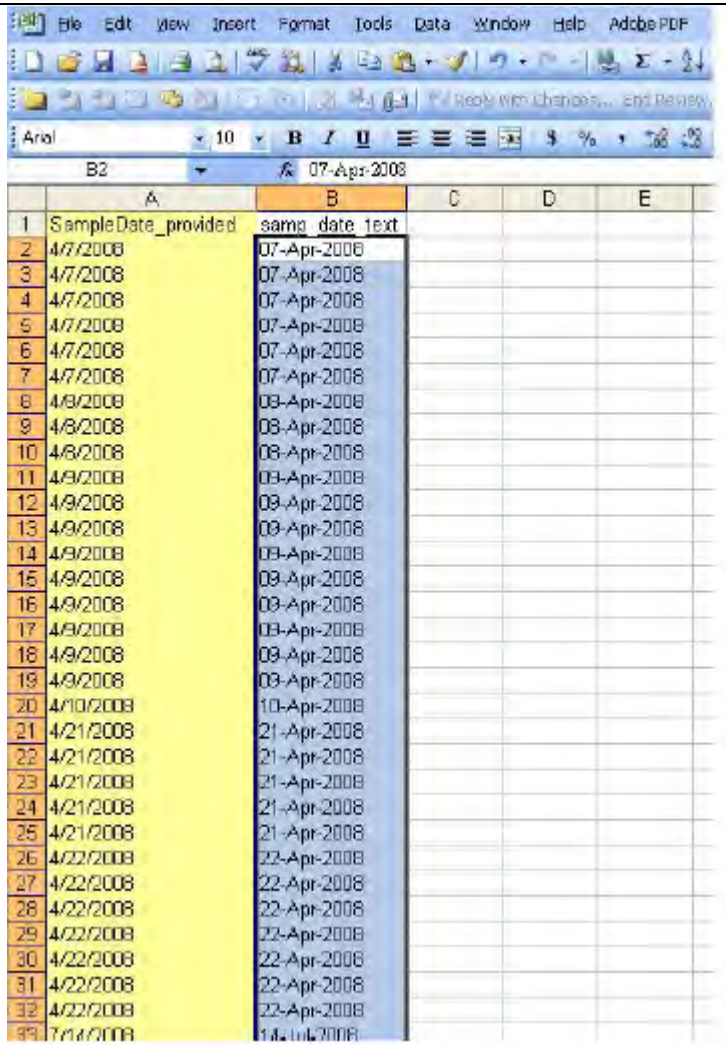
Select/copy the entire column (column B)

With the entire column still selected, click Edit/paste special/values

Click OK.



This effectively replaces the formula with the values calculated by the formula, so that the values will not change. Note how the formula no longer appears in the function (fx) box in figure below; rather, the date appears (as text).



	A	B	C	D	E
1	SampleDate_provided	samp_date_text			
2	4/7/2008	07-Apr-2008			
3	4/7/2008	07-Apr-2008			
4	4/7/2008	07-Apr-2008			
5	4/7/2008	07-Apr-2008			
6	4/7/2008	07-Apr-2008			
7	4/7/2008	07-Apr-2008			
8	4/8/2008	08-Apr-2008			
9	4/8/2008	08-Apr-2008			
10	4/8/2008	08-Apr-2008			
11	4/9/2008	09-Apr-2008			
12	4/9/2008	09-Apr-2008			
13	4/9/2008	09-Apr-2008			
14	4/9/2008	09-Apr-2008			
15	4/9/2008	09-Apr-2008			
16	4/9/2008	09-Apr-2008			
17	4/9/2008	09-Apr-2008			
18	4/9/2008	09-Apr-2008			
19	4/9/2008	09-Apr-2008			
20	4/10/2008	10-Apr-2008			
21	4/21/2008	21-Apr-2008			
22	4/21/2008	21-Apr-2008			
23	4/21/2008	21-Apr-2008			
24	4/21/2008	21-Apr-2008			
25	4/21/2008	21-Apr-2008			
26	4/22/2008	22-Apr-2008			
27	4/22/2008	22-Apr-2008			
28	4/22/2008	22-Apr-2008			
29	4/22/2008	22-Apr-2008			
30	4/22/2008	22-Apr-2008			
31	4/22/2008	22-Apr-2008			
32	4/22/2008	22-Apr-2008			
33	7/14/2008	14-Jul-2008			

Step 5. Format new column as text:

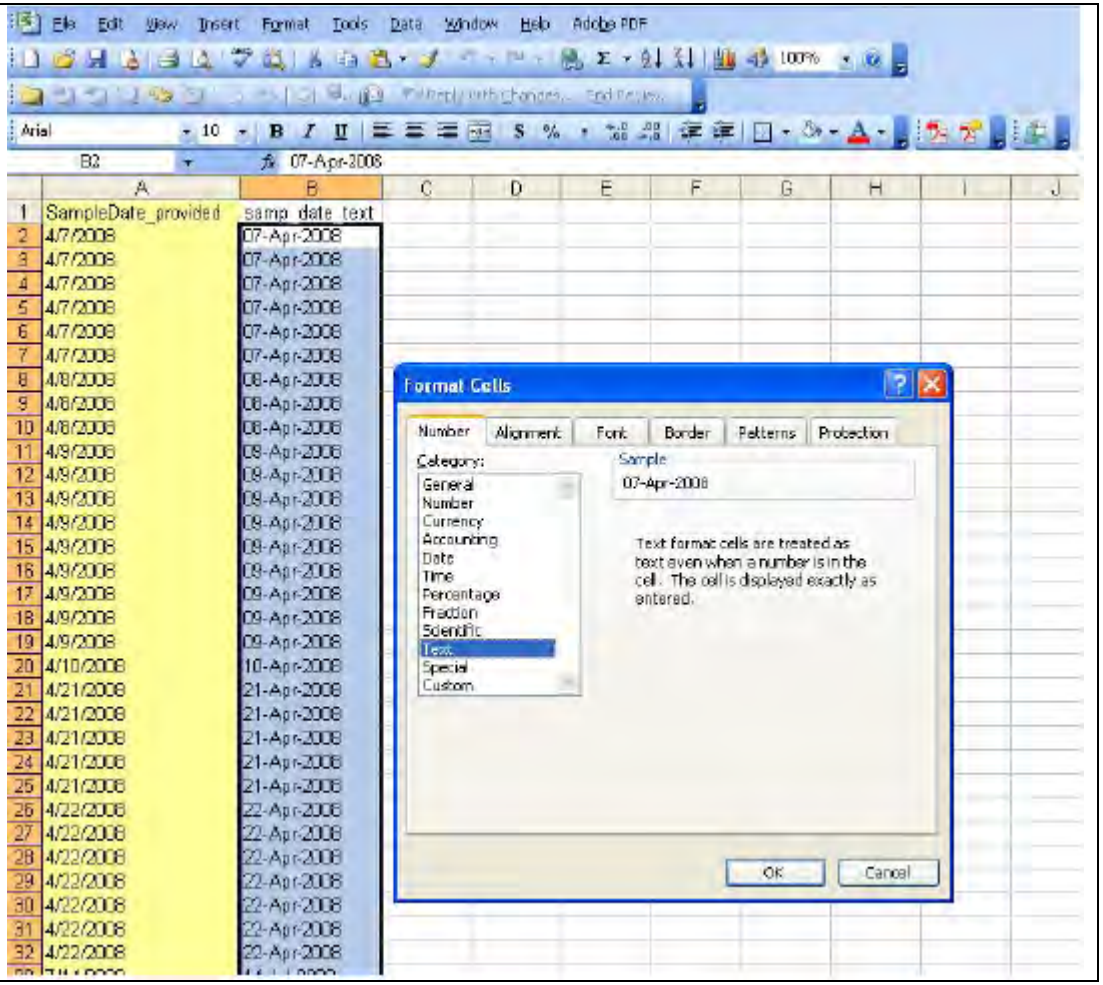
With the entire column selected, right click the column

Select “Format cells”

Click “text”

Select “OK”

All dates in column B should now be in the appropriate format, as text.



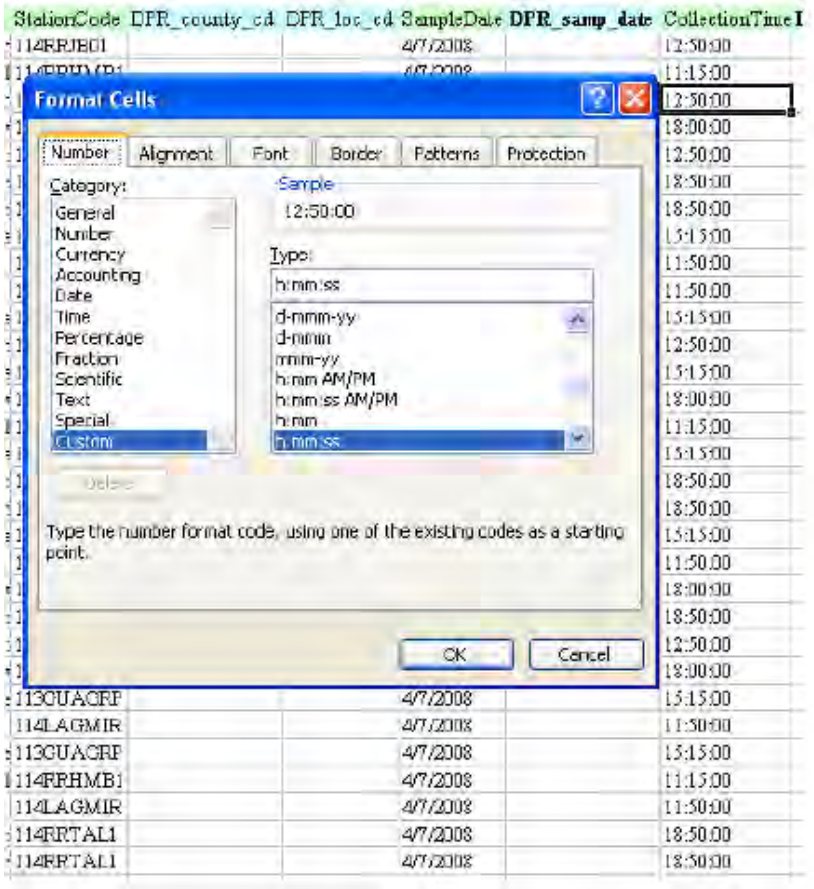
Formatting Time

The sample time in most data is normally formatted as time (i.e., appears as 12:50:00, etc. and "cell format" is similar to that shown below). The time must also be formatted as text. The process is the same except use: =TEXT(A2, "HHMM").

Be sure to copy/paste values and set the cell format as text as shown above for dates. Above: Sample time formatted as time, must be changed to text format prior to loading into SURF.

Examples:

Typical sample time	Time formatted for SURF
9:35 am	0935
10:09 am	1009
1:26 pm	1326
10:02 pm	2202



5.7 Appendix 7. QAQC Check prior to Sending Monitoring Data to the SURF Database Administrator

This appendix contains a checklist for the project lead to review prior to sending data to the SURF database administrator to ensure that the monitoring data if formatted correctly for SURF. Prior to using this checklist, follow the instructions in file "Template for prepare DPR monitoring data for SURF.xls" or in Appendix 5. Sediment data (if available) will be entered in a separate file from the water data. Perform the following QC checks listed below prior to forwarding the EXCEL (csv) file to the SURF administrator.

Approved?	QC Check
☐	Check data for overall correct data entry – look for transcription and transposition errors (field datasheets and chemical analysis data)
☐	Counties have the correct SURF county code (county_cd)
☐	Sampling sites (loc_cd) have the correct SURF 2 – 4 digit numerical code
☐	Collection methods (coll_meth_cd) have the correct SURF code
☐	Analytical methods (anly_meth_cd) have the correct SURF code
☐	Sampling methods (sampler_cd) have the correct SURF code
☐	Sample type (samp_type_cd) have the correct SURF code
☐	Header column contains correct SURF data field names. Columns are in the correct order.
☐	Link to protocol is accurate.
☐	Sample, extraction, and analysis dates, and sampling time (samp_time) are formatted as text DD-MMM-YY (date) and HHMM (time). See Appendix 6, Formatting Date and Time for Upload into Surf

Approved?	QC Check
☐	Agency_cd is 4323 for DPR. Analytical lab (lab_cd) is either 4323 for CDFA or 9989 for CDFW.
☐	Data does not contain field blanks, field duplicates, lab blanks, matrix spikes, laboratory control spikes, surrogate spikes, or blind spikes.
☐	In the concentration column, non-detects and trace detections are represented by the number “0”
☐	Trace detects (trace_flag) contain the letter “t” (lower case).
☐	Storm event is correctly marked as “Y” (upper case) in storm_flag column.
☐	If there is an entry in “remarks”, there is an asterisk (*****) in the rmk_flg column. Otherwise, the column is blank. Remarks do not have to be included in the data.
☐	Samp_id2 is correctly labeled as the study number followed by the field assigned sample number (study number-sample number).
☐	Sediment data is in a separate file from water data
☐	For sediment data only, include % TOC (total organic carbon) (TOC_perc).
☐	For sediment data only, include percent moisture (moisture_perc). Percent moisture = 1-(dry wt/wet wt).

Save the data file for upload into SURF as a csv file and forward to the SURF database administrator. See worksheets “SURF Ex_Water” and “SURF Ex_Sediment” in the “Template for prepare DPR monitoring data for SURF.xls” file for examples of how the data needs to be formatted just prior to upload into SURF.