

Chapter 12 – Biological Data Recording and Reporting

Introduction

This chapter describes the methods used to report biological data to the SWQMIS database. Prior to sampling for biological data, a Quality Assurance Project Plan (QAPP) or Quality Assurance Plan (QAP) must be in place. The QAPP or QAP must include specific details about scheduled biological monitoring. The QAPP or QAP must include language that communicates that the data deliverable will be submitted only in an electronic format (no paper packets can be submitted). SWQMIS uses the Sample Event and Sample Set structure. This structure is a one-to-many relationship with one Sample Event (the entire biological monitoring event) containing multiple Sample Sets. Each Sample Set represents an individual biological Sampling Category, such as Nekton Electrofishing, Nekton Seining, or Benthic Macroinvertebrates Rapid Bioassessment Qualitative. The sample trip, made up of these individual Sample Sets, is the Sample Event. The following sections provide detail on reporting biological data through manual data entry (TCEQ Regional and Central Office Staff) or through flat file loading (TCEQ Partner Agencies and Contractors).

Biological Data Specifics – All Providers

Each biological Sample Event is composed of Sample Sets. Some of these Sample Sets are biological (Nekton Electrofishing, Nekton Seining, etc) and some are non-biological (24 Hour Data and Routine Chemistry), but all are included in the Sample Event. Each biological Sample Set must include the Parameter Code 89888 which identifies that Sample Set as containing biological data. The value selected for Parameter Code 89888 will be determined by the Sampling Category (see Table 12.1).

To see how parameters are grouped under each sampling category, refer to [Chapter 6 of the DMRG Commonly Reported Parameter Codes for Biological Data](#).

Table 12.1 Values for Sampling Category Parameter Code 89888

Biological Data Reporting	
Values for Sampling Category Parameter Code 89888	
Value	Value Description
1011	Nekton Summary and Metadata
1012	Nekton Electrofishing
1013	Nekton Seining
1014	Nekton Observation
1015	Nekton Hoop Net
1016	Nekton Hook and Line
1017	Nekton Castnet
1018	Nekton Trawl
1019	Nekton Water Intake Screen
10111	Nekton Gill Net
2011	Benthic Macroinvertebrates Rapid Bioassessment Qualitative
2012	Benthic Macroinvertebrates Quantitative Protocol
2013	Benthic Macroinvertebrates Other Protocol
3011	Habitat TCEQ Parts 1, 2, and 3 Protocol
3012	Habitat EPA EMAP Protocol
4011	Algae Diatoms
4012	Algae Soft Benthic Not Diatoms
4013	Algae Phytoplankton
4014	Algae Visual Algal Assessment
501	Zooplankton
601	Macrophytes
6011	Macrophytes Seagrass
6012	Macrophytes Freshwater
6013	Macrophytes Other

Data providers must record and report biological data in adherence to the QAPP/QAP under which the data was collected.

Careful attention must be given to the reporting of each data type or sampling category, and the list of parameters expected for each data type and sampling category. See [Chapter 6 for the Commonly Reported Parameter Codes and Table 12.1 for specific values used to report for Parameter Code 89888 for each sampling category.](#)

Biological data must be reported by the end of the fiscal year following the year it was collected, or as specified in the data provider's contract. Data providers must record and report biological data in a specific manner, as described in this chapter.

TCEQ Regional and Central Office Staff

TCEQ staff report their biological data via manual data entry into SWQMIS and select the data type and sampling category on the Sample Set metadata screen.

TCEQ staff is required to create Sample Events and Sample Sets, and report biological data electronically through SWQMIS within the fiscal year following the year that the data were

collected. When TCEQ staff enters and publishes data, SWQMIS assigns the data the status of pre-production data management (PREDM).

Note that when reporting biological data via manual data entry, data are reported with a Sample Type of ‘C’ for Composite, a Composite Category of ‘B’ for both Time and Space, and a Composite Type of ‘CN’ for Continuous. All of these fields are required when submitting biological data to SWQMIS (see Chapter 7).

BLOB Files

Reporting biological monitoring data also requires attaching Binary Large Object (BLOB) files to the SWQMIS Sample Event and/or Sample Sets. BLOB files reported with the biological data include site maps, the [Stream Physical Characteristics Worksheet](#) with the transect data, fish

voucher photos, or other biological data-related images. The BLOB file attachment must be named in a format that includes the station ID, water body name, sample end date, and type of file (e.g., 13486-GreensCreek-24May2013-HabitatTransectWorksheets).

BLOB files can be attached at the Sample Event and Sample Set levels in SWQMIS by all TCEQ staff permitted to enter field data into SWQMIS. The maximum size for each attachment is 15 MB and a maximum of 5 attachments can be added to each Sample Event and/or Sample Set. The maximum allowed length of the required attachment description is 250 characters.

TCEQ data validators typically expect five BLOB files for each Sample Event for biological data. These are shown in Table 12.2 below.

Table 12.2 Typical BLOB Files

BLOB	Form/Description	Attached To
ALM checklist*	Aquatic Life Monitoring and Habitat Assessment Checklist	Sample Event
Site map*	A map of the area where biological data collection has occurred; samples were collected	Sample Event
Voucher photos	See SWQM Procedures Manual, Volume 2, for guidance on vouchering that applies to the entire biological Sample Event	Nekton Summary and Metadata Sample Set
Habitat transect photos	File that contains photos	TCEQ Habitat Protocol Sample Set
Habitat transect worksheet	Stream Physical Characteristics Worksheet with the transect data	TCEQ Habitat Protocol Sample Set
Other	Any other file discussed between the collector and the TCEQ project manager and specified in the QA document	Sample Event or Sample Set as discussed with TCEQ project manager

*The ALM Checklist and Site Map are often combined into a single BLOB.

For individual Sample Sets, there can be more than one attachment. Each attachment, when open, should display the Monitoring Station ID, Collection Date and where possible, the Station Short Description. All voucher photos for a single SWQMIS Sample Event should be combined into one document whether or not several different collection methods were used (shocking, seining, etc.); please include species names next to voucher photos. Likewise, all habitats transect photos for a single Sample Set should be combined into one document; please include the view orientation next to these photos. These attachments may be in a PDF format, Microsoft Word format, or PowerPoint format. BLOB examples are provided at the end of this chapter.

Laboratory Information Management System (LIMS)

If a Sample Event involves TCEQ staff collecting biological data as well as water samples for analysis, a Request for Analysis (RFA) form is required. In addition, staff must create a Sample Set within the biological Sample Event for the lab data (one Sample Set per RFA). See [Chapter 14](#) for details on RFAs. The laboratory then reports these data to DM&A, and they are loaded into SWQMIS by a TCEQ data manager.

TCEQ Partner Agencies and Contractors

Biological Data Contractor Deliverables

Partners and contracted monitoring entities report biological data via pipe delimited flat files. A separate Tag ID should be assigned for each type of data collected during a biological sampling event. Each Tag ID represents a SWQMIS Sample Set and must include a record for parameter code 89888 if the Sample Set is reporting one of the Sampling Categories listed in Table 12.1.

There is no difference in format between biological data flat files and routine surface water quality monitoring data flat files that are delivered by a TCEQ partner agency or contractor (see [Chapter 7 of the DMRG](#) for the flat file format). [Chapter 6 of the DMRG](#) references biological data Sampling Categories and indicates the Sampling Category value, Composite Type and Category, and parameter descriptions with codes the TCEQ project managers anticipate to be reported. Each record should be assigned a Tag ID such that related parameters are grouped together into Sample Sets based on the value that is entered for parameter code 89888. The preferred method of delivery of biological data is in an electronic format as data deliverables; TCEQ project managers will accept hard-copies of biological data forms in addition to, rather than in lieu of, electronically formatted data. The electronic files submitted should consist of the ASCII pipe-delimited flat files, plus any additional files specified by the project manager or contract. BLOB files would be included as additional files. The additional files will be loaded as attachments to the electronic data in SWQMIS at the SWQMIS Sample Event and Sample Set levels by TCEQ. Electronic data provided by partner or contract entities should include a README.txt file that lists each BLOB submitted. Each line or record in this list includes three elements: 1) the BLOB file name, 2) a description of the BLOB, and 3) the Sample Event or Sample Set ID to which the BLOB should be attached. Providing this information helps the TCEQ staff attach BLOB files to the correct Sample Event or Sample Set in the Production environment of SWQMIS.

The partner or contractor-collected data is provided to the TCEQ following a test upload by the partner or contractor into the Test environment of SWQMIS. If the test upload is successful, the data deliverable will then be provided to the TCEQ Project Manager.

Required Files for Biological Data Submissions:

- **ASCII Pipe-Delimited EVENT Text File**
- **ASCII Pipe-Delimited RESULT Text File**

- **README.txt File**
- **BLOB Files**

Event File Format

The generic format of the Sample/Event file is shown below:

```
TagID|StationID|EndDate|EndTime|EndDepth|StartDate|StartTime|StartDepth|
Category|Type|Comment|SubmittingEntity|CollectingEntity|
MonitoringType
```

Results File Format

The generic format of the Results file is shown below:

```
TagID|EndDate|ParameterCode|GT/LT|Value|LOD|LOQ|QualifierCode|VerifyFlag
```

The Results file will have one or more records associated with each Event record. Please remember to include one record for parameter 89888 in each biological Sample Set.

README File Format

The generic format of the README file is shown below:

```
File|Description|Tag ID
```

If the file will be attached to a Sample Event, please enter 'Sample Event Level' in the Tag ID field.

Examples

The following examples are provided:

1. README file
2. ALM Summary Report and Site Map
3. Voucher Photos
4. Habitat Photos
5. Habitat Worksheet

EXAMPLE 1: README File

File|Description|Tag ID

17471-LlanoRiver-2013-ALMSummaryReport.pdf|Summary, ALM checklist, site map, precipitation and flow graph for the Llano River sampling event.|Sample Event Level

17471-LlanoRiver-21May2013-FishVoucherPhotos.pdf|Voucher photos for May 21, 2013 Llano River fish collection.|L109655

17471-LlanoRiver-21May2013-HabitatTransectPhotos.pdf|Habitat transect photos for the May 21, 2013 Llano River sampling event.|L109644

17471-LlanoRiver-21May2013-HabitatTransectWorksheets.pdf|Habitat transect data and map for the May 21, 2013 Llano River sampling event.|L109644

17471-LlanoRiver-2013-ALMSummaryReport.pdf|Summary, ALM checklist, site map, precipitation and flow graph for the Llano River sampling event.|Sample Event Level

17471-LlanoRiver-10Jul2013-FishVoucherPhotos.pdf|Voucher photos for the July 10, 2013 Llano River fish collection.|L109623

17471-LlanoRiver-10Jul2013-HabitatTransectPhotos.pdf|Habitat transect photos for the July 10, 2013 Llano River sampling event.|L109669

17471-LlanoRiver-10Jul2013-HabitatTransectWorksheets.pdf|Habitat transect data and map for the July 10, 2013 Llano River sampling event.|L109669

17472-PedernalesRiver-2013-ALMSummaryReport.pdf|Summary, ALM checklist, site map, precipitation and flow graph for the Pedernales River sampling event.|Sample Event Level

17472-PedernalesRiver-30Mar2013-FishVoucherPhotos.pdf|Voucher photos for the March 30, 2013 Pedernales River fish collection.|L109629

17472-PedernalesRiver-30Mar2013-HabitatTransectPhotos.pdf|Habitat transect photos for the March 30, 2013 Pedernales River sampling event.|L109628

17472-PedernalesRiver-30Mar2013-HabitatTransectWorksheets.pdf|Habitat transect data and map for the March 30, 2013 Pedernales River sampling event.|L109628

17472-PedernalesRiver-2013-ALMSummaryReport.pdf|Summary, ALM checklist, site map, precipitation and flow graph for the Pedernales River sampling event.|Sample Event Level

17472-PedernalesRiver-09Jul2013-FishVoucherPhotos.pdf|Voucher photos for the July 9, 2013 Pedernales River fish collection.|L109636

17472-PedernalesRiver-09Jul2013-HabitatTransectPhotos.pdf|Habitat transect photos the for the July 9, 2013 Pedernales River sampling event.|L109635

17472-PedernalesRiver-09Jul2013-HabitatTransectWorksheets.pdf|Habitat transect data and map for the July 9, 2013 Pedernales River sampling event.|L109635

20641-ColoradoRiver-2013-ALMSummaryReport.pdf|Summary, ALM checklist, site map, precipitation and flow graph for the Colorado River sampling event.|Sample Event Level

20641-ColoradoRiver-26Mar2013-FishVoucherPhotos.pdf|Voucher photos for the March 26, 2013 Colorado River fish collection.|L109656

20641-ColoradoRiver-26Mar2013-HabitatTransectPhotos.pdf|Habitat transect photos for the March 26, 2013 Colorado River sampling event.|L109654

20641-ColoradoRiver-26Mar2013-HabitatTransectWorksheets.pdf|Habitat transect data and map for the March 26, 2013 Colorado River sampling event.|L109654

20641-ColoradoRiver-2013-ALMSummaryReport.pdf|Summary, ALM checklist, site map, precipitation and flow graph for the Colorado River sampling event.|Sample Event Level

20641-ColoradoRiver-31Jul2013-FishVoucherPhotos.pdf|Voucher photos for the July 31, 2013 Colorado River fish collection.|L109662

20641-ColoradoRiver-31Jul2013-HabitatTransectPhotos.pdf|Habitat transect photos for the July 31, 2013 Colorado River sampling event.|L109653

20641-ColoradoRiver-31Jul2013-HabitatTransectWorksheets.pdf|Habitat transect data and map for the July 31, 2013 Colorado River sampling event.|L109653

20662-SanSabaRiver-2013-ALMSummaryReport.pdf|Summary, ALM checklist, site map, precipitation and flow graph for the San Saba River sampling event.|Sample Event Level

20662-SanSabaRiver-27Mar2013-FishVoucherPhotos.pdf|Voucher photos for the March 27, 2013 San Saba River fish collection.|L109642

Aquatic Life Monitoring and Habitat Assessment Checklist

Background Information

Name of water body: _____

Segment number: _____ Station ID: _____

On segment: Yes No

Permit number, if applicable: _____ Circle monitoring objective: ALM ALU UAA RWA

Historic stream characterization:

Intermittent	Intermittent with perennial pools sufficient to support significant aquatic life use	Perennial	Unknown
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Basis for historic stream characterization (describe):

Current aquatic life use designation (if classified segment or site specific standard determined):
Exceptional High Intermediate Limited

Current assessment status on the (year) _____ Water Quality Inventory, 305(b) Report:
Supported Partially Supported Not Supported Concern Not Assessed

Field data entry (FDE) information: Date entered into FDE: _____ RTAG #:
(TCEQ regional biologists only)

Field data (CRP partners only): Tag #:

Objective for Aquatic Life Use Assessment

Is this water body supporting its designated uses? Yes No Reason:
Known or potential causes of aquatic life use concern or impairment:

Identify sources of pollution:

Point source: Yes No Identify:
Nonpoint source: Yes No Identify:

Ambient toxicity tests in water body? Yes No

Habitat assessment event 1:

TCEQ habitat protocols: Yes No

Stream flow measurement event 1:

Instantaneous measurement: Yes No

USGS gauge reading: Yes No

Nekton sampling event 2:

Minimum 15-minute (900 seconds) electrofishing: Yes No

Minimum 6 seine hauls (or equivalent effort to sample 60 meters): Yes No

Fish sampling conducted in all available habitat types: Yes No

If no, please describe why:

Benthic macroinvertebrate sampling event 2:

Indicate method(s) Used:

Rapid bioassessment (5-minute kicknet or snags):

Quantitative (Surber, snags or dredge):

Habitat assessment event 2:

TCEQ habitat protocols: Yes No

If no, flow, wetted channel width, photographs, description of bank conditions relative to first event, and description of canopy cover conditions relative to first event must be provided in this packet.

Stream flow measurement event 2:

Instantaneous measurement: Yes No

USGS gauge reading: Yes No

Assessment Results (Optional)

Fish community index event 1:

Exceptional High Intermediate Limited

Fish community index event 2:

Exceptional High Intermediate Limited

Benthic macroinvertebrate community index event 1:

Exceptional High Intermediate Limited

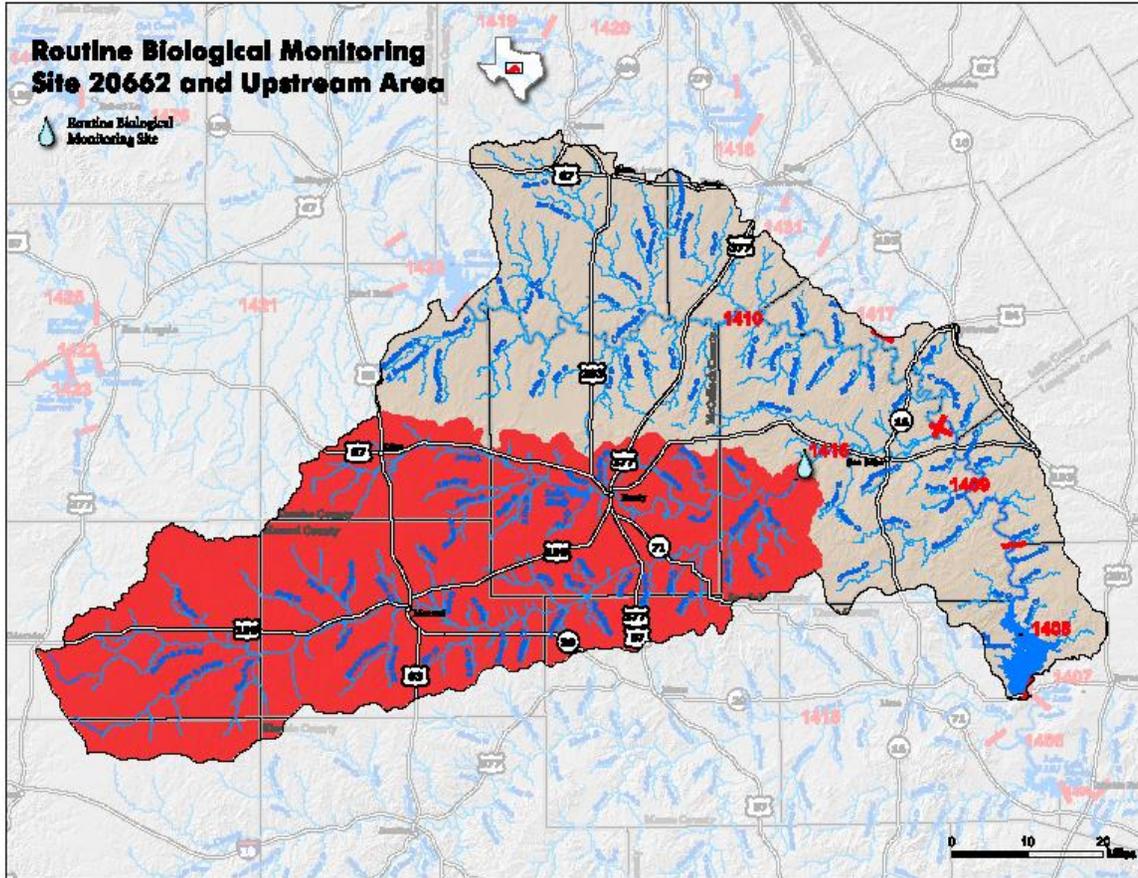
Benthic macroinvertebrate community index event 2:

Exceptional High Intermediate Limited

Habitat index event 1:

Exceptional High Intermediate Limited
Habitat index event 2:
Exceptional High Intermediate Limited

EXAMPLE 2: ALM Summary Report and Site Map – page 3 of 3



Example 3: Voucher Photos – page 1 of 2

San Saba River at San Saba CR 340

TCEQ ID 20662

fish voucher photos

03/27/2013

Aplodinotus grunniens



Astyanax mexicanus



Example 3: Voucher Photos – page 2 of 2

San Saba River at San Saba CR 340
TCEQ ID 20662

fish voucher photos
03/27/2013

Carpoides carpio



Cyprinella lutrensis



Example 4: Habitat Photos – page 1 of 2

San Saba River at San Saba CR 340
TCEQ ID 20662

Habitat Transect Photos
03/27/2013



Upstream View



Left Bank View



Right Bank View

Transect 1



Downstream View

Example 4: Habitat Photos – page 2 of 2

San Saba River at San Saba CR 340
TCEQ ID 20662

Habitat Transect Photos
03/27/2013



Upstream View



Left Bank View



Right Bank View

Transect 2



Downstream View

Example 5: Habitat Worksheet – page 1 of 2

Stream Physical Characteristics Worksheet							
Observers:	Djurecka, Dcowan, Jwoods, CPetri, FM		Date:	3/27/2013	Time:	11:00	
Weather Conditions:	Partly Cloudy, 45 deg F, N wind at 15 mph						
Stream:			Site ID:	20662	Segment:		
Location of site:	San Saba River at San Saba CR 340			Reach:	500 m		
Obs Stream Uses:	Recreation, Agriculture						
Stream Type:	<input checked="" type="radio"/> Perennial <input type="radio"/> intermittent with perennial pools						
Stream Bends:	4	Well Defined:	2	Mod Defined:	2	Poor Defined:	0
Aesthetics	wilderness	<input checked="" type="radio"/> natural		common	offensive		
Channel Obstr/Mods:	0		Number of Riffles:			1	
Channel Flow Status:	high	<input checked="" type="radio"/> moderate		low	no flow		
Riparian Vegetation	Left	Right	Stream	31 cfs	Max Pool Depth:	3.5 m	
% Trees	15	8	Flow:		Max Pool Width:	57 m	
% Shrubs	10	3	Transect placement relative to a fixed point:				
% Grasses&Forbs	27	36					
% Cult. Fields	0	0					
% Other	48	53					
Notes:							
Site Map:							

Example 5: Habitat Worksheet – page 2 of 2

Habitat Transect Data						
Date	3/27/2013					
Site	San Saba River at San Saba CR 341					
TCEQ ID	20662					
	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Transect 6
Stream Type (Riffle, Run, Glide, or Pool)	RI	G	RU	P	P	P
Stream Width	23.8	12.4	24	57	57	50.5
Left Bank Slope	90	60	15	125	125	90
% Left Bank Erosion	15	25	40	75	80	80
Left Bank Width of Natural Buffer Vegetation	>20	>20	>20	>20	>20	>20
Right Bank Slope	75	25	3	35	90	25
% Right Bank Erosion	70	70	5	80	70	70
Right Bank Width of Natural Buffer Vegetation	>20	>20	>20	>20	>20	>20
% Tree Canopy	32.4	39.7	0.0	47.1	50.0	50.0
Dominant Substrate Type						
(1=Gravel, 2=Sand, 3=Gravel, 4=Gravel, 5=Gravel, 6=Gravel, 7=Bedrock, 8=Other)	5	2	3	2	7	2
Stream Depth at Point 1	0.10	0.02	0.03	0.28	0.10	0.50
Stream Depth at Point 2	0.03	0.18	0.25	1.00	1.28	1.45
Stream Depth at Point 3	0.04	0.36	0.43	0.90	1.90	2.60
Stream Depth at Point 4	0.00	0.55	0.22	0.70	1.04	3.22
Stream Depth at Point 5	0.12	0.75	0.53	0.72	1.88	3.50
Stream Depth at Point 6	0.15	0.80	0.22	0.88	2.00	3.44
Stream Depth at Point 7	0.23	0.76	0.16	0.93	2.00	3.38
Stream Depth at Point 8	0.13	0.72	0.18	1.12	1.90	3.30
Stream Depth at Point 9	0.14	0.45	0.20	1.35	1.94	3.20
Stream Depth at Point 10	0.07	0.31	0.15	1.03	1.63	2.01
Stream Depth at Point 11	0.03	0.03	0.12	0.30	0.30	0.65
% Substrate Gravel or Larger	98	30	5	40	50	0
Maximum Thalweg Depth	0.23	0.8	0.53	2	2	3.5
% Instream Cover	85	15	30	25	10	10
Macrophyte Abundance						
(1=Abundant, 2=Common, 3=Rare, 4=Absent)	2	2	1	1	4	3
Algae Abundance						
(1=Abundant, 2=Common, 3=Rare, 4=Absent)	2	3	3	3	3	3
Left Bank % Trees	20	10	0	20	25	15
Left Bank % Shrubs	40	0	15	0	0	5
Left Bank % Grasses, Forbs	20	60	45	20	5	10
Left Bank % Cult Fields	0	0	0	0	0	0
Left Bank % Other	20	30	40	60	70	70
Right Bank % Trees	10	10	0	10	5	10
Right Bank % Shrubs	20	0	0	0	0	0
Right Bank % Grasses, Forbs	20	30	80	20	30	35
Right Bank % Cult Fields	0	0	0	0	0	0
Right Bank % Other	50	60	20	70	65	55
Transect Latitude	31.19072	31.19003	31.18950	31.18908	31.18872	31.18794
Transect Longitude	-98.90272	-98.90322	-98.90381	-98.90467	-98.90558	-98.90600