

# TCEQ Regional Water Monitoring Strategy for FY11 for Metals and Organics in Water, Sediment and Fish Tissue

*The following is a summary guideline for use by the TCEQ Regional staff in planning the FY2011 monitoring schedule.*

## **ORGANICS IN WATER**

### **Approach**

Organics in water samples have been collected for many years by Regional staff and by Central Office Surface Water Quality Monitoring (SWQM) personnel in order to determine contamination of surface water by pesticides, herbicides, and specific compounds such as methyl tertiary-butyl ether (MTBE), a gasoline additive. These tests are extremely costly and to date, the analyses have shown almost no water quality impairments from these constituents.

In order to more efficiently utilize existing resources, the SWQM staff needs to prioritize water bodies for organics analysis. ***Each Region has the option to choose one or two sites to monitor each year; however Regions with a greater need for sampling will be evaluated on a case-by-case basis.*** Selected sites should be monitored twice a year for at least three years. The following criteria should be used to select water bodies for monitoring:

- Water bodies with concern for specific contaminants
- Water bodies identified as concerns in the 305(b) for organics in sediment if the contaminant is also a potential contaminant in water
- Water bodies that are on the 303(d) list for organic compounds in water
- Water bodies where contamination is suspected, e.g., large urban areas, areas of major petro-chemical refining, major agricultural regions

The following criteria should be used to exclude water bodies from organics in water analysis:

- Water bodies with a Total Maximum Daily Load (TMDL) or other project underway to address an organics in water impairment parameter
- Water bodies where other agencies are sampling for organics in water and providing data to the TCEQ, e.g., United States Geological Survey (USGS)

### **Sampling Considerations**

#### **Sampling Period and Time of Year**

Samples should be collected twice per year for at least three years in order to produce enough data to assess each water body for concerns. Samples for pesticides, herbicides, volatiles (VOAs), and semi-volatiles may be collected at any time of the year during a routine sampling event. A suggested sampling schedule would be alternating seasons, such as winter-summer or fall-spring. All four types of samples may not be needed. If volatiles only are collected for MTBE analysis, collection should be during the boating season when boat motors may release MTBE.

## **Lab Considerations**

All organics samples for SWQM must be sent to the LCRA Lab for analysis.

## **METALS IN WATER**

### **Approach**

As experienced in FY10, the total number of metals in water samples will be limited based on costs associated with sampling kits and metals analyses. Each Region is allocated a certain portion of the statewide total of available metals in water samples. This document provides guidance for determining sample collection priorities, locations, frequency, and the allocation of samples.

The following guidelines should assist in the development of the FY 2011 SWQM monitoring schedule for each Region.

### **Selecting Sites**

When selecting a sampling site, consider placement in the downstream portion of the segment, or use an existing TCEQ site. When sampling water bodies where concerns have been previously identified or where there is nonsupport of the water quality standards, priority should be given to the sites where concerns have been identified.

### **Number of Stations**

Each Region is allocated a *minimum* number of stations at which *metals in water* samples should be collected (see Table 1)—*Minimum Column*. Each Region should monitor the minimum number assigned but each Region has the flexibility to monitor more. Regions should first allocate stations to areas with identified concerns, then second allocate stations to water bodies where there is nonsupport of the water quality standards, and finally allocate stations to sites with a perceived risk of contamination.

Additional samples: Currently, there is a baseline maximum of 200 samples per month (both water and sediment combined). TCEQ staff are encouraged to collect additional metals in water and/or metals in sediment. Refer to Table 1 for the allocation of additional metals in water and sediment stations—*Max Column*.

***Table 1. Allocation of Metals in Water and Metals in Sediment Monitoring Stations***

Region	# of Stations		Region	# of Stations	
	Min *	Max **		Min *	Max **
1	2	10	9	4	20
2	-		10	5	40
3	7	60	11	4	20
4	5	40	12	11	90
5	7	60	13	7	60
6	2	10	14	11	90
7	2	10	15	3	15
8	2	10	16	3	15

Region	# of Stations		Region	# of Stations	
	Min *	Max **		Min *	Max **
* Minimum number of routine metals in water stations. ** Maximum number of stations that may be used for additional metals in water, metals in sediment samples, or a combination of both (TCEQ Houston Lab only).					

### Frequency of Sample Collection

Metals in water samples should be collected **quarterly**. However, if a site is scheduled to be visited only twice a year, then metals can also be collected at that frequency. Sampling should continue for three years.

**Note for FY 2011 monitoring** - Regions may increase the number of metals in water samples collected at sites currently on the FY 10 Coordinated Monitoring Schedule.

### Sample Kits

All metals sampling requires the use of a low-level metals kit. The TCEQ Houston Lab provides clean metals kits for the SWQM Program that can be used in either fresh or salt water.

Order kits from the TCEQ Houston Lab only. Use the “Clean Metals Sampling Kit Request Form”, located on FODWEB accessed by following the links - Programs / Water / SWQM. Questions should be directed to Shirley Best at the TCEQ Houston Lab at 281-457-5229.

### Lab Considerations

Send metals in water samples to the TCEQ Houston Lab only.

### Total Mercury

Total mercury analysis is run on all metals samples submitted to the TCEQ Houston Lab. The kits produced by the Houston Lab will include supplies for collecting mercury in water samples. Please be sure to circle “total mercury” on the Request for Analysis (RFA) form.

## **ORGANICS AND METALS IN SEDIMENT**

### **Approach**

Sampling plans should generate a minimum of four samples *in 1 to 2 years*. At a minimum, samples should be collected twice a year for two years. Regions may opt to collect all four sediment samples within one year. Details for sampling sediment can be found in the SWQM Procedures Manual.

The analysis data will be screened to identify concerns. If no concerns are identified after four samples are collected, no additional sampling is to be conducted at the site and a new site should be selected the following year. If concerns are identified at a site, sediment sampling should be continued until a minimum of 10 samples are collected. Additional sampling may trigger monitoring of other sediment sampling triad (toxicity testing and benthic macroinvertebrate sampling) components to determine if the aquatic life use is impaired by contaminated sediment.

### **Number of Stations**

**Organics:** Each Region is allocated a minimum number of sediment stations for sampling organics in sediment (see Table 2). The allocation assumes that organic substances will be requested for each sample collected, which allows the Regions to collect the minimum number and provides flexibility to collect more, if necessary. In order to control high costs associated primarily with organic substance analysis, contact Andrew Sullivan with any requests above the minimum allocated per Region. The allocation assumes that metals in sediment and sediment conventional samples will also be collected.

**Metals:** Currently, there is a baseline maximum of 200 samples per month (both water and sediment combined). TCEQ staff are encouraged to collect metals in sediment and sediment conventionals. Additional metals only sites may be considered. Refer to Table 1 for the allocation of additional metals in sediment samples.

***Table 2. Allocation of Sediment Sampling Stations for Organic Substances***

Region	Sediment Stations	Region	Sediment Stations
1	1	9	2
2	-	10	2
3	3	11	2
4	2	12	5
5	3	13	3
6	1	14	5
7	1	15	1
8	1	16	2

## Selecting Sites

Sites with concerns due to exceedances of acute/chronic criteria, human health criteria, or biological impairment should be a priority in site selection. When selecting a sampling site consider placement where there is a perceived risk of metals/organic substances contamination. Sites located downstream of domestic or industrial discharges, hazardous waste sites, metropolitan areas, or areas experiencing high nonpoint source loads may also be considered.

## Sampling Considerations

Follow the guidance provided in the SWQM Procedures Manual, Volume 1, Chapter 6.

Consider collecting sediment and tissue samples on the same water bodies as part of a special study designed to address pollution by toxic contaminants.

## Lab Considerations

Metals and organic substances (pesticides and semi volatiles) in sediment should be requested for each sample, unless there is a specific reason to exclude one or the other. Volatile organic substances are no longer routinely requested, but can be specifically requested if there is a perceived risk.

**For metals only**—send two jars of sediment to the TCEQ Houston Lab (metals and sediment conventional parameters analysis). **For organics only**— send one jar to the LCRA Lab and a second to the TCEQ Houston Lab for conventionals. **For metals, conventionals, and organics**—send two jars to the TCEQ Houston Lab and one to the LCRA Lab.

**Note:** Only the LCRA lab is prepared to analyze organics in sediment for the SWQM Program.

## Sites with Concerns

Table 3 identifies water bodies with sediment concerns for metals and/or organic substances from the 2006 305b assessment. Sediments were not reassessed in 2008. Consideration should be given to sampling toxicity or biological communities and habitat at these sites to determine if the contaminated sediments are impacting the aquatic life use.

## Quality Assurance Plans (QAP)

A Quality Assurance Plan (QAP; previously referred to as an MPDF) is no longer required for routine sediment sampling. This change applies to all samples collected at a routine monitoring station during a routine monitoring event. However, if the sediment sampling is part of an independent project, a QAP is required. Please allow several weeks for the QAP review and approval process.

**Note:** Work must not begin until the QAP is signed. For details and questions contact Robin Cypher at 512-239-5256 or Christine Kolbe at 512-239-5831.

**Table 3. Water Bodies with Concerns for Contaminants in Sediment in Draft 2010 305b Integrated Report**

Segment Number	Water Body	Water Type	Sediment Contaminant
0209	Pat Mayse Lake	Reservoir	manganese in sediment
304	Days Creek	Freshwater Stream	acenaphthene in sediment, benz(a)anthracene in sediment, benzo(a)pyrene in sediment, chrysene in sediment, fluoranthene in sediment, naphthalene in sediment, phenanthrene in sediment, pyrene in sediment
0401	Caddo Lake	Reservoir	iron in sediment, manganese in sediment
0404A	Ellison Creek Reservoir (unclassified water body)	Reservoir	cadmium in sediment, iron in sediment, lead in sediment, manganese in sediment, nickel in sediment, toxicity in sediment, zinc in sediment
0501B	Little Cypress Bayou (unclassified water body)	Tidal Stream	toxicity in water
0601	Neches River Tidal	Tidal Stream	iron in sediment
0605	Lake Palestine	Reservoir	manganese in sediment
0610	Sam Rayburn Reservoir	Reservoir	arsenic in sediment, iron in sediment, manganese in sediment
0702A	Alligator Bayou and Main Canals A, B, C, and D (unclassified water body)	Freshwater Stream	chrysene in sediment, lead in sediment, toxicity in sediment
1005	Houston Ship Channel/San Jacinto River Tidal	Tidal Stream	iron in sediment
1006	Houston Ship Channel Tidal	Tidal Stream	DDD in sediment, DDT in sediment, iron in sediment, PCBs in sediment, pyrene in sediment, toxicity in sediment
1007	Houston Ship Channel/Buffalo Bayou Tidal	Tidal Stream	iron in sediment, toxicity in sediment
1111	Old Brazos River Channel Tidal	Estuary	iron in sediment
1209A	Country Club Lake (unclassified water body)	Reservoir	toxicity in sediment
1209B	Fin Feather Lake (unclassified water body)	Reservoir	arsenic in sediment, chromium in sediment, copper in sediment, DDD in sediment, DDE in sediment, toxicity in sediment, zinc in sediment
1254	Aquilla Reservoir	Reservoir	arsenic in sediment, nickel in sediment
1403	Lake Austin	Reservoir	manganese in sediment
1407	Inks Lake	Reservoir	manganese in sediment
1418	Lake Brownwood	Reservoir	manganese in sediment
1429C	Waller Creek (unclassified water body)	Freshwater Stream	benz(a)anthracene in sediment, benzo(a)pyrene in sediment, chrysene in sediment, dibenz(a,h)anthracene in sediment, fluoranthene in sediment, lead in sediment, phenanthrene in sediment, pyrene in sediment
1429D	East Bouldin Creek (unclassified water body)	Freshwater Stream	benz(a)anthracene in sediment, cadmium in sediment, chrysene in sediment, dibenz(a,h)anthracene in sediment, fluoranthene in sediment, lead in sediment, phenanthrene in sediment, pyrene in sediment

Segment Number	Water Body	Water Type	Sediment Contaminant
1430	Barton Creek	Freshwater Stream	toxicity in sediment
1430A	Barton Springs (unclassified water body)	Freshwater Stream	toxicity in sediment
1906	Lower Leon Creek	Freshwater Stream	cadmium in sediment, silver in sediment
2412	Sabine Lake	Estuary	iron in sediment
2421	Upper Galveston Bay	Estuary	iron in sediment
2422	Trinity Bay	Estuary	iron in sediment
2423	East Bay	Estuary	iron in sediment
2424	West Bay	Estuary	iron in sediment
2425	Clear Lake	Estuary	iron in sediment
2437	Texas City Ship Channel	Estuary	iron in sediment
2438	Bayport Channel	Estuary	iron in sediment
2439	Lower Galveston Bay	Estuary	iron in sediment
2451	Matagorda Bay/Powderhorn Lake	Estuary	iron in sediment
2453	Lavaca Bay/Chocolate Bay	Estuary	iron in sediment
2454	Cox Bay	Estuary	iron in sediment
2463	Mesquite Bay/Carlos Bay/Ayres Bay	Estuary	iron in sediment
2471	Aransas Bay	Estuary	iron in sediment
2472	Copano Bay/Port Bay/Mission Bay	Estuary	iron in sediment
2481	Corpus Christi Bay	Estuary	iron in sediment
2482	Nueces Bay	Estuary	iron in sediment
2484	Corpus Christi Inner Harbor	Estuary	iron in sediment
2491	Laguna Madre	Estuary	iron in sediment
2492	Baffin Bay/Alazan Bay/Cayo del Grullo/Laguna Salada	Estuary	iron in sediment
2494	Brownsville Ship Channel	Estuary	iron in sediment

## **FISH TISSUE**

For FY11, fish tissue sampling is requested for Regions equipped with backpack or boat-mounted electrofishers or Regions capable of obtaining fish through other means. The total number of samples is allocated to control high costs associated with analytical analysis.

### **Approach**

All fish tissue sampling should be conducted as part of a special project and requires a QAP outlining the purpose for sampling and providing for the appropriate type and number of samples. Guidance provided in the SWQM Procedures Manual, Volume 1 should be used to determine the details for sampling fish tissue. Samples may be submitted as either fillet or whole body specimens. Individual samples yield more information but are more costly, therefore composite samples are most often used for screening purposes. Fish tissue data will be compared to established human health-based screening levels and may be included in the Clean Water Act (CWA) Sections 305(b) and 303(d) Integrated Report. If a contaminant concentration exceeds screening criteria, the affected water body may be considered for a Texas Department of State Health Services (DSHS) human health risk assessment which could result in the issuance of a fish tissue consumption advisory or aquatic life closure.

### **Number of Stations**

Each Region with fish tissue collection capability is allocated a *maximum* number of stations. If additional tissue sample collection is needed in FY11, contact Pat Bohannon (512-239-5255; jbohanno) to coordinate sampling.

**Table 4. Recommended Allocation of Fish Tissue Sampling Stations**

Region	Fish Tissue Stations	Region	Fish Tissue Stations
1	0	9	3
2	0	10	3
3	0	11	0
4	0	12	3
5	3	13	3
6	0	14	0
7	0	15	0
8	0	16	0

## Selecting Sites

Sites which have shown exceedances of acute/chronic criteria, human health criteria, or biological impairment should be a priority in site selection. Additionally, water bodies which have never been sampled, or water bodies with sampling data older than the current water quality assessment date range should be considered. When selecting a sampling site consider placement where there is a perceived risk of metals/organic substances contamination. Sites located downstream of domestic or industrial discharges, hazardous waste sites, metropolitan areas, or areas experiencing high nonpoint source loads may also be considered.

Samples should not be collected in areas where the DSHS has issued consumption advisories or aquatic life closures or where DSHS has previously sampled and determined the fish no longer pose an apparent public health hazard (<http://www.dshs.state.tx.us/seafood/survey.shtm>).

Additionally, Regional staff should contact Pat Bohannon (512-239-5255; jbohanno) to confirm that a proposed site has not been recently sampled or is scheduled to be sampled as part of another sampling project. If existing fish tissue data were collected outside the current assessment date range and there have been changes in the watershed which may significantly affect contaminant concentrations, new sampling may be warranted.

Consider collecting sediment and tissue samples on the same water bodies as part of a special study designed to address pollution by toxic contaminants.

## Sampling Considerations

Field sampling with a backpack or boat-mounted electrofisher, gill nets or trawls should normally be conducted in the summer to early fall when lipid content is generally highest in fish and water levels are low. The time period should be adjusted if the target species is most often harvested, or is only legally harvested at another time of year, or if its spawning period is late summer.

## Lab Considerations

***All tissue samples must be sent to the LCRA Lab.*** Metals and organic substances (pesticides and semi volatiles) for each sample should be requested unless a specific reason exists to exclude one or the other. Volatile organic substances are no longer routinely run, but can be specifically requested if there is a perceived risk.

There is no requirement to fillet fish samples in the field. Upon request, the LCRA Lab will fillet the sample when a whole body specimen is submitted. The LCRA Lab prefers to receive tissue samples frozen; however, this does not preclude Regions from shipping tissue samples on the same day they are collected, provided they are shipped overnight. If shipping will be delayed, the samples must be frozen.

## **Additional Requests**

Regions without electrofishing gear may have other means of collecting fish or may work closely with regional Texas Parks and Wildlife personnel to obtain fish when conducting sampling. Alternately, any Region that prefers to conduct fish tissue sampling but has not been allocated sampling events due to lack of equipment, may contact an adjacent Region or SWQM central office for assistance. Flexibility exists in the lab budget to accommodate some additional samples from Regions that wish to collect more than their allotment.

## **Quality Assurance Plan (QAP)**

A Quality Assurance Plan (QAP; previously referred to as an MPDF) is required for routine or special study tissue sampling. This requirement applies to all fish collected at a routine monitoring station during a routine monitoring event, or as part of an independent project. Please allow several weeks for the QAP review and approval process.

**Note:** Work must not begin until the QAP is signed. For details and questions contact Robin Cypher at 512-239-5256 or Pat Bohannon at 512-239-5255.