Developing Regional and Basin Monitoring Schedules for FY 2011

Basin monitoring schedules serve to coordinate the monitoring resources of participating entities by maximizing regional efforts while minimizing the potential for duplicative efforts. Monitoring will be conducted by Texas Commission on Environmental Quality (TCEQ) staff, Clean Rivers Program (CRP) contractors, and other participating entities. The TCEQ has developed the following guidance for site selection and sampling requirements for routine, special study, and targeted monitoring.

The primary source of information (documents) used for monitoring planning is the 305(b)/303(d) reports in .pdf format available on the TCEQ's Surface Water Quality Monitoring website, http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/wqm/305_303.html.The *Draft 2010 Texas Water Quality Integrated Report* will be the most recent report to guide monitoring planning, but the information included in the 2008 report should also still be considered. Spreadsheets with this same information in Excel format will be provided by each basin assessor at the coordinated monitoring meetings, if needed.

Water Quality Categories and Management Strategy

The Integrated Report assigns one of five categories to each water body and area of a water body, known as an assessment unit (AU), to provide information about water quality status, management plans, and management activities. Further, these categories must be applied to each combination of designated use and criteria (or parameter, such as depressed dissolved oxygen) for determining support. When an assessment unit has multiple parameters, the highest category (level of impairment) is assigned to the assessment unit. When a water body has multiple assessment units, an overall category is assigned to the entire water body.

TCEQ has developed a specific water quality management strategy for each of these categories which include routine water quality data collection, water quality standards review projects, projects to characterize non-support of water quality standards, and water quality remediation projects including those known as total maximum daily loads (TMDLs). These categories are described in detail below:

Category 1 - Attaining the water quality standard and no use is threatened.

Category 2 - Attaining some of the designated uses; no use is threatened; and insufficient or no data and information are available to determine if the remaining uses are attained or threatened.

Category 3 - Insufficient or no data and information to determine if any designated use is attained.

Category 4 - Standard is not supported or is threatened for one or more designated uses but does not require the development if a Total Maximum Daily Load (TMDL).

Category 4a - TMDL has been completed and approved by EPA.

Category 4b - Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.

Category 4c - Nonsupport of the water quality standard is not caused by a pollutant.

Category 5 - The water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants. **Category 5 is the 303(d) list**.

Category 5a - A TMDL is underway, scheduled, or will be scheduled.

Category 5b - A review of the water quality standards will be conducted before a TMDL is scheduled.

Category 5c - Additional data and information will be collected before a TMDL is scheduled.

Monitoring Planning for Categories 1, 2, and 3 Water Bodies

Routine monitoring is conducted on Category 1, 2, and 3 water bodies or AUs. Priorities for routine monitoring based on the Texas Water Quality Integrated Report are described in the Routine Monitoring Objectives to Address Concerns table on page 7.

Monitoring Planning for Parameters Assigned to Categories 4a, 4b, 4c and 5a, 5b and 5c

Water bodies with parameters causing nonsupport of the standards are listed in Categories 4 and 5. Each impaired AU/parameter combination is also assigned a category.

Monitoring for each Category 4 and 5 parameters can be addressed with a special project. Many are already underway and being implemented by a program responsible for water quality management. SWQM will provide a report detailing existing projects and project needs for impairments in Category 5.

Routine monitoring is also scheduled for Category 4 and 5 water bodies and AUs to describe water quality for parameters other than those which do not meet water quality standards.

Minimum Data Requirements for Assessment

Monitoring Sites: Each station represents a particular geographic coverage for determining designated use support and water quality concerns. General guidance for typical coverage includes the following:

- A single stream and river station represents no more than 25 miles of stream reach
- A single reservoir station represents 25% of the total reservoir acres, but not more than 5,120 acres
- A single estuary station represents 25% of the total estuary square miles, but not more than eight square miles
- Sites should characterize the water quality for a water body or portion of a water body. For example, to characterize an arm of a reservoir, the site should be located in the center of that arm; or for a perennial stream, where the stream is generally flowing and in the centroid of flow.

Assessment Period and Distribution in Time:

- The assessment is conducted over the most recent seven-year period. The date range for the next (2012) assessment will be December 1, 2003 through November 30, 2010; and for the 2014 assessment, December 1, 2005 through November 30, 2012.
- Data should be collected over at least two years to reflect inter-year variation with no more than two-thirds of the data in any one year.
- At least two seasons must be represented in each annual data set to reflect inter-seasonal variation with some samples representing warm-weather conditions (March 15 to October 15). No more than two-thirds of the samples should be from either one of these two distinct times of the year.
- DO conditions are important to aquatic life in all seasons and TCEQ recommends evaluation of 24-hour DO data year-round. Requirements for the period of record and the balance between years are the same as those for other methods. At least one half of the 24-hour DO monitoring events should be spaced over an index period representing warm-weather seasons of the year (March 15-October 15). One-fourth to one-third of the measurements should be made during the critical period (July 1-September 30). No more than two-thirds of the samples should be taken in the same year. A total of ten 24-hour measurements within a two to seven year period are recommended to assess the aquatic life use. A period of about one

month or more should separate each 24-hour sampling event. Because future assessments may require samples collected throughout the year, when possible, a year round sampling schedule is recommended for 24-hour DO.

- Biological and habitat assessment data may be collected in only one year, provided at least two complete data sets are collected during the index period (March 15 - October 15) with one data set collected during the critical period (July 1 - September 30), and one from outside the critical period. The efforts should be about one month apart. If more than two bioassessments are conducted, sampling should occur over at least two index periods, with at least one-half, but no more than two-thirds of the samples from the critical period.

- Water samples from an assessed water body should be temporally representative (preferably at monthly to quarterly intervals.)

- Data from special studies such as storm water monitoring projects or data sets targeting nonambient conditions (i.e. agricultural run-off, BMP effectiveness, etc.) are not typically included in the development of the Integrated Report. Routine data collected under all weather and flow conditions will be included in the assessment and those conditions should not be avoided in the routine monitoring data set.

- Samples should be collected during a scheduled routine monitoring event regardless of the low flow (7Q2) conditions in the stream. Flow measurements and flow severity should be reported for streams. Data collected at flows below the 7Q2 may not be useful for the 305(b) assessment, but this determination will be made during the assessment. If the objective is to support the assessment process and the flow is below the 7Q2, it is strongly advised the monitoring event be repeated, if possible.

Minimum Number of Samples: As a general rule, 10 or more samples or measurements are required at each site in order to determine support of designated uses and identification of water quality concerns.

- Data sets should represent a defined recurrence frequency (monthly, quarterly or biannually) that will generate enough samples and measurements to meet at least the minimum requirements for the assessment. For example, a site monitored at a quarterly frequency for seven years would generate 28 samples.

- For the purpose of generating a statistical water quality trend, 20 to 60 samples collected over a period of five to 20 years are required.

♦ **Designated Use Assessments.** 10 or more samples are required to assess the following designated uses:

  - Aquatic life (grab DO/minimum criterion, 24-hour DO/24-hour average criterion, 24-hour DO/minimum criterion, toxics in water, water and sediment toxicity tests)

Bioassessments will also be used to determine designated aquatic life use attainment. A minimum of two bioassessment data sets (data collection events) are required.

- Contact and noncontact recreation (*E. coli*, and Enterococci)
- Fish consumption (toxics in water, see Table 3 in the 2000 Texas Surface Water Quality Standards)
- General uses [water temp, pH, chloride, sulfate, TDS, and Enterococci (for segments 1006 and 1007 only) in surface water]

♦ **Identification of Water Quality Concerns.** When designated uses cannot be assessed due to an insufficient number of samples or exceedance of a screening level, the identification of water quality concerns proceeds as follows:

- Concerns for aquatic life, contact and noncontact recreation, fish consumption, public water supply (surface water samples only), and general uses are identified when as few as four samples are available.

- Concerns for aquatic life use, based on biological and habitat assessments, are identified when only one set of measurements is available in a year.

- Concerns for aquatic life use, based on a comparison of grab sample dissolved oxygen concentrations to the 24-hour average criteria, must meet a ten sample minimum requirement

- Concerns for nutrients, chlorophyll *a* in ambient surface water require 10 or more samples.

- Since fish tissue and sediments tend to accumulate contaminants slowly, the samples are spatially composited, and concentrations in the samples generally do not vary greatly over time; only four samples are required as a minimum.

- Multi-year sampling of sediment or fish tissue for two or three years (including those for sediment toxicity tests) is preferred to yield a minimum of four samples. However samples for fish tissue and sediment which are collected during a one-time special monitoring event may be used in the assessment to meet the minimum sample requirement. For example, 5 fish or sediment samples collected throughout a reservoir or over a river segment on one day would meet the minimum sample requirement, providing environmental conditions are relatively homogeneous.

MONITORING TYPE

Program Code	Definition
RT	"Routine" -- Monitoring not intentionally targeted toward any environmental condition or event.
BS	"Biased Season" -- Monitoring targeted toward a certain time of year (e.g., season or index period).
BF	"Biased Flow" -- Monitoring targeted toward certain flow conditions (e.g., runoff event).

Tips on use of monitoring type codes on coordinated monitoring schedule:

- Use RT for 24-hour deployment monitoring conducted outside the index or critical period
- Use BS for biological and 24-hour deployment monitoring conducted during the index or critical periods
- Use BF when the monitoring is planned around a certain flow condition. These data are not typically used in the assessment.

Routine Monitoring Objectives to Address Water Quality Priorities			
Level of Support for Parameter	**General Monitoring Objective**	**Routine Monitoring Priority**	
Concern for standard support (**CN**) or not supporting (**NS**) with a limited data set (**LD or ID**) (small data set; < 10 samples)	Sample until an adequate data set is available for assessment. The few samples collected in these AUs show problems.	1st	
Concern near nonattainment of standard support (**CN**) with adequate data (**AD**) for water quality criteria. Concerns (**CS**) for DO grab samples	Continue routine monitoring to establish that near nonattainment is ongoing. When DO grab samples identify a concern, schedule 24-hour sampling to determine if the mean criterion is supported.	2nd	
Concern for support (**CS**) with adequate data (**AD**) for narrative screening criteria, i.e., nutrients and sediment	Continue monitoring to establish that concern is ongoing. Monitor other water quality causes and sources related to the parameter of concern.	3rd	
For water bodies where uses are fully supported (**FS**) with adequate data (**AD**), or no concern (**NC**) with limited data (**LD**)	Continue monitoring to establish that the designated uses are supported. Include conventional parameters on high use water bodies and water bodies of local interest. Monitor at least one station in each classified segment and important water body. Monitor toxics and biological monitoring in areas where this monitoring has not been conducted.	4th	
For water bodies that have not been monitored previously (or recently) **(NA)**	Implement monitoring to develop an adequate data set to assess uses and concerns.	no specific priority	
For Water Bodies Where Uses Are Not Supported	Rather than routine monitoring, for impaired parameters, specialized monitoring, UAA/ALA or TMDL should be planned. Routine monitoring can be conducted to assess the condition for other parameters. Use the scheme at right to determine the priority for addressing the impaired parameter(s).	4a	5th
		4b	3rd
		4c	4th
		5a	6th
		5b	2nd
		5c	1st

Some Things to Keep in Mind in Developing the FY 2011 Schedule

Date range for 2012 305(b) assessment is:
December 1, 2003 through November 30, 2010

Date range for 2014 305(b) assessment is:
December 1, 2005 through November 30, 2012

- You may be able to justify dropping a station that has shown no problems for several assessments
- Do historical data indicate that changes need to be made to current monitoring efforts?
- Does the schedule include sampling by all participants willing to comply with TCEQ guidance for QA?
- Are the TCEQ SWQM Program's core set of parameters being analyzed?
- Does the schedule minimize duplication of effort?
- Do stations provide representative data that meet assessment needs?
- Have all preparation materials been considered (e.g., 2010 assessment status, priority tables, fact sheets, regional assignments)?
- Do monitoring sites and/or parameters consider basin priorities as identified by the steering committee?
- Is an adequate set of parameters being analyzed at stations which will allow for identification of the cause if an impairment is identified?