

# **APPENDIX D**

## **BIOLOGICAL FACT SHEETS**

---

Use the information and forms in this appendix to support the biological-monitoring program in addition to the forms included in the biological-monitoring packets.

# Biological-Monitoring Fact Sheets

## Aquatic-Life Monitoring

ALM events are typically scheduled as part of the cooperative monitoring schedule and are conducted to derive baseline data on environmental conditions and to determine if criteria for aquatic-life uses and dissolved oxygen are being attained. ALM samples can contribute to the establishment of an appropriate aquatic-life use, if the optional diel event is included in the data gathering. An ALM is appropriate for routine monitoring sites, and should be representative of the water body being assessed. Data are gathered over a year of sampling period with at least one month between each monitoring event.

Biological Events	Number of Index-Period Events	Number of Critical-Period Events
Characterization of the fish assemblage	1	1
Characterization of the benthic macroinvertebrate community		
Assessment of the stream's physical habitat		
Instantaneous field measurements		
Measurement of flow discharge		
24-hour DO monitoring		
Conventional water-chemistry sample*		

**\*Conventional water chemistry is optional, but strongly recommended for the evaluation of the biological event.**

**Two biological events** are required over **one year**. One event is to be conducted during the critical period (July 1–September 30) and the other event during the non-critical portion of the index period (March 15–June 30 or October 1–15) with at least one month between events.

When the ALM is conducted and the samples indicate that the presumed use is supported, this will be adequate information to confirm the aquatic-life use. However, if the ALM is conducted on a water body not listed in either Appendix A or D of the Texas Surface Water Quality Standards and the samples indicate that the presumed use is not supported, an ALA or UAA (detailed in the following sections) may be necessary to determine the appropriate aquatic-life use and the **optional diel events** (detailed below) must be included in the data gathering. The WQSG must be notified and consulted with to determine the appropriateness of an ALA or UAA.

When the ALM is conducted on a water body listed in either Appendix A or D of the TSWQS and the samples indicate that the adopted use is not supported, the water body will be placed on the 303(d) List. A UAA may be necessary to determine the appropriate aquatic-life use and the **optional diel events** (detailed below) must be included in the data gathering. You must notify and consult with the WQSG to determine the appropriateness of a UAA.

### Optional Diel Events

Biological Events	Number of Index-Period Events	Number of Critical-Period Events
24-hour DO monitoring	1	2
Measurement of flow discharge		

Besides the two monitoring events described above, a minimum of **three additional diel events coupled with flow discharge measurements** must be conducted. Two events must be conducted during the critical period and one event must be conducted during the non-critical portion of the index period.

## Aquatic-Life Assessment

An ALA is conducted on an unclassified water body not already included in Appendix D of the TSWQS that has previously been assessed and determined not to attain the presumed aquatic-life use or the associated dissolved-oxygen criterion (i.e., listed in Category 5c). The purpose is to determine the appropriate aquatic-life use and the associated dissolved-oxygen criterion.

Biological Events	Number of Index-Period Events	Number of Critical-Period Events
Characterization of the fish assemblage	1st year 1; 2nd year 1	1st year 1; 2nd year 1
Characterization of the benthic macroinvertebrate community		
Assessment of the stream's physical habitat assessment		
Instantaneous field measurements		
Measurement of flow discharge		
24-hour DO monitoring		
Conventional water-chemistry sample		

**Four biological events** are required over **two years**. For each year, one event is to be conducted during the critical period (July 1–September 30) and the other event during the non-critical portion of the index period (March 15–June 30 or October 1–15) with at least one month between monitoring events.

Site and reach selection must ensure that adequate data are generated to accurately characterize biotic integrity through the entire study area. This may involve more than one site, depending on the size of the water body. **Sites and reaches must be selected in consultation with the WQSG.**

**Exceptions to the number of biological events required as determined by the WQSG.** If an ALA was required based on the results of ALM and the first year's samples from the ALA *agree* with the results of the ALM, then the second year's biological events for the ALA are not required. If an ALA was required based on the results of ALM and the first year's samples from the ALA *do not agree* with the results of the ALM, then the second year's biological events for the ALA are required. The aquatic-life use indicated by the combined results of the ALA and ALM will be considered for Appendix D in the next TSWQS revision.

### Additional Diel Events

Biological Events	Number of Index-Period Events	Number of Critical-Period Events
24-hour DO monitoring	1st year 1; 2nd year 1	1st year 2; 2nd year 2
Measurement of flow discharge		

Besides the four monitoring events described above, a minimum of **six additional diel events coupled with flow-discharge measurements** must be conducted. Four of the events should be conducted during the critical period with two during year 1, and two during year 2. The remaining two events should be conducted during the index period with one during year 1, and one during year 2.

Try to collect all samples when flows are at or above critical low flow. Discuss any deviations from the above procedure with the WQSG.

**Exceptions to the number of additional diel events required as determined by the WQSG.** If an ALA was required based on the results of ALM and the first year's samples from the ALA *agree* with the results of the ALM, then the second year's additional diel events for the ALA are not required. If an ALA was required based on the results of ALM and the first year's samples from the ALA *do not agree* with the results of the ALM, then the second year's additional diel events for the ALA are required.

## Use-Attainability Analysis

A UAA is conducted to establish or change an assigned aquatic-life use or dissolved-oxygen criteria. The purpose is to determine the appropriate aquatic-life use and the associated dissolved-oxygen criteria. All activities should be coordinated through the WQSG to determine the appropriateness of the UAA study plan.

Biological Events	Number of Index-Period Events	Number of Critical-Period Events
Characterization of the fish assemblage	1	1st year 1; 2nd year 1
Characterization of the benthic macroinvertebrate community		
Assessment of the stream's physical habitat		
Instantaneous field measurements		
Measurement of flow discharge		
24-hour DO monitoring		
Conventional water-chemistry sample		

**Three biological events** are required over **two years**. Two of the events are to be conducted during the critical period (July 1–September 30) with one during year 1 and the second during year 2. The third event should be conducted during the non-critical portion of the index period (March 15–June 30 or October 1–15) in either year 1 or year 2. There should be at least one month between monitoring events.

Site and reach selection must ensure that adequate data are generated to accurately characterize biotic integrity through the entire study area. To accomplish this, sampling of multiple sites or reaches will be required for most water bodies. **Sites and reaches should be selected in consultation with the WQSG.**

### Additional Diel Events

Biological Events	Number of Index-Period Events	Number of Critical-Period Events
24-hour DO monitoring	3	1st year 2; 2nd year 2
Measurement of flow discharge		

Besides the three monitoring events described above, a minimum of **seven additional diel events coupled with flow-discharge measurements** must be conducted. Three of the events should be conducted during the critical period with two during year 1, and two during year 2. The remaining three events should be conducted during the index period with no more than six events from both the critical and index periods in any one year.

Try to collect all samples when flows are at or above critical low flow. Discuss any deviations from the above procedure with the WQSG.

## Receiving-Water Assessment

An RWA is conducted on unclassified water bodies that are the subject of a permitted activity involving wastewater. The purpose is to generate physical, chemical, and biological data to be used in identifying the appropriate aquatic-life use and the associated dissolved-oxygen criteria.

Biological Events	Number of Index-Period Events	Number of Critical-Period Events
Characterization of the fish assemblage		1
Characterization of the benthic macroinvertebrate community		
Assessment of the stream physical habitat		
Instantaneous field measurements		
Measurement of flow discharge		
24-hour DO monitoring*		
Conventional water-chemistry sample*		

**One biological event is required, but two are strongly recommended** for determining the appropriate aquatic-life use. Try to ensure that data are collected during the index period (March 15–October 15) and preferably within the critical period (July 1–Sept. 30).

**\*Conventional water-chemistry and 24-hour DO monitoring are optional, but strongly recommended, for the evaluation of the biological event.**

The RWA typically involves a single site upstream of an existing discharge or downstream of a proposed new discharge. Additional sites may be required depending on the size of the discharge. Study sites and reaches should be representative of the water bodies being evaluated and should be selected in consultation with the WQSIT.

The aquatic-life use indicated by the RWA will be considered for Appendix D in the next TSWQS revision.

