SUMMARY OF CHANGES IN METHODS IMPLEMENTED FOR 2006

Changes in Requirements for Data and Information

- To ensure that minimum sample size requirements for assessing a water body can be met, the period of record will be extended to include data from up to ten years ago, going only as far back as necessary until the minimum number of samples are identified. However, at least half of the samples (five samples) must be collected within the last five years, or the parameter will not be assessed. This will increase the number of water bodies and parameters that may be assessed, and will enable reporting of more recent water quality conditions than did our previous practice of using water quality data only if the data collected during the previous five-year period met the requirements for the minimum number of samples.

- A minimum of 10 samples from the last five years *or*, the most recently collected 10 samples for up to ten years, are used to determine use support for parameters determined by the binomial method. Note that impairments may be identified when the threshold number of exceedances for impairment is already met in samples sets as small as four samples. Concerns will be identified using the binomial method with as few as four samples.

- Ten samples will also be required for listing and delisting water bodies for which the assessment method is based on an average.

- Larger sample sizes increase the state's confidence that impairments are not missed. Although we will use more than 10 samples, if available, it is not reasonable at this time to require more than 10 samples for a minimum data set, given the monitoring resources and currently available data.

Changes in Assessment Method and Calculations

- The support status of *Partially Supporting* will no longer be used. Water bodies previously identified as *Partially Supporting* will now be identified as *Not Supporting*. Note that both PS and NS have always been considered impaired and included without this distinction on the 303(d) list.

- Levels of support and concerns will be renamed so that they are more understandable. For example, concerns will be identified as *Near Nonattainment* rather than as a *Tier 2 Concern* to indicate conditions where the number of exceedances of use attainment criteria is almost such that the water body would be nonattaining.

- We will continue the current practice of using the temperature and specific conductance measurements to define the mixed surface layer. However, when applying pH criteria to the "mixed surface layer" in reservoirs and estuaries, the median value for pH measurements from the mixed surface layer profile, rather than each individual measurement, will be evaluated for determining attainment of the minimum and maximum criteria. Use of the median avoids comparing the criterion to extreme values, occasionally observed during the summer near the surface, and caused by natural conditions.

- Multiple lines of evidence will be considered for assessing sediment toxicity.
  - Whole sediment toxicity tests
  - Sediment elutriate toxicity tests
  - Level of contaminants—use new screening levels from TCEQ's Ecological Risk Assessment Guidance which are based on observed ecological effects.
  - When indices and are available for biological assessment, the health of the biological community will be evaluated.
  - Each line of evidence is weighted, establishing how much strength it provides in indicating toxicity for a sample.
  - Best Professional Judgment will ensure the assessment decision has a scientific basis.

- For toxic parameters, the Type 2 error on listing (probability of missing an impairment) will be held lower than that for conventional parameters so that more protection is provided from toxic conditions.

- For ambient toxicity tests in water, the acceptable errors on listing (probability of missing an impairment) will be consistent with other parameters used to identify toxic conditions (two exceedances in ten samples will list). In previous assessments, the error rates used when evaluating ambient toxicity testing were the same as those used for conventional parameters (three in ten samples were used previously).

- The preferred indicators for assessing contact recreation use are *E. coli* (for freshwater) and Enterococci (for tidal waters). These indicators are used for impairment determination if there are adequate data, even if fecal coliform data are also available. When only fecal coliform data are available, this indicator will be used to establish use support.

- Category 4c is reserved for those water bodies where the impairment is caused by stressors other than specific pollutants that can be allocated under a TMDL. Category 4c is assigned to bay areas not supporting oyster water use and that have all three of these characteristics: 1) the area is identified as not supporting the use, and 2) shellfishing is restricted or prohibited, and 3) there is no water quality restoration solution that would be acceptable under the National Shellfish Sanitation Program. Category 4c is also assigned to one bay segment that is not supporting the oyster water use due to bacterial contamination. The source of bacteria for this water body is natural - waterfowl. Note, these Category 4c areas are not on the 303(d) list because a TMDL would not be a useful water quality planning strategy.

- Platinum cobalt units will be used to quantify color. Where changes in color are reported by field inspectors below wastewater discharges, visual conditions and other factors will be used to determine support of the narrative criteria. No water bodies have been identified with a concern or impairment for color on the 2006 assessment.

Underlying Assumptions and Objectives for the Level of Confidence in Listing and Delisting Decisions

Currently, we are employing two methods for determining criteria compliance. For criteria expressed as an average, the average of the sample set is compared directly to the criterion. For those expressed as a minimum or maximum criterion, the binomial method, adopted originally for the 2002 assessment, is applied for exceedances in a sample set.

The binomial procedure, as it was applied in past assessments, controlled only the error of incorrectly listing a water body, and did not deliberately control or describe the probability of missing an impairment or any of the errors when delisting. The guidance that was used for the most recent assessment inaccurately described the probability of missing an impairment and this, in part, prompted a review of acceptable errors and the revised description of the binomial method. The error rates proposed below consider realistic numbers for available monitoring samples, risks to human health and the environment, and the unnecessary costs from actions taken on water bodies that should not be on the 303(d) list.

To identify and consider levels of confidence when listing, the binomial method allows us to identify errors of either incorrectly identifying waters as impaired, or of missing impairments. For conventional parameters, we propose to keep the current probability of error at less than 20 percent for falsely listing water bodies when their level of impairment is near the threshold for listing (10% of the samples exceed the criterion). By maintaining this error for falsely listing at less than 20%, the probability of missing an impairment just above the threshold of 11% exceedance rate is quite high. Because criteria are conservative and set to protect for the best water quality conditions when developing permits, exceedance rates of two to three times the threshold frequency can occur without the need for listing and additional water quality controls through the TMDL process. When the impairment is at a 30% exceedance rate, considerably above the threshold, the probability of missing the impairment is 40%. Listing as we do with three exceedances, the probability of missing an impairment continues to decrease as available samples increase, down to an error rate of about 13% at 15 samples. Error rates for evaluation of toxic conditions are more protective.

For the 2006 assessment, water bodies will be delisted from Category 5 when there are two fewer exceedances than the threshold number required for listing, and if there is no concern for near-nonattainment for use attainment parameters. This change in delisting methodology from previous assessments (only one fewer exceedance than would be required for listing resulted in delisting) was implemented to increase confidence that previously impaired waters are attaining their use before they are delisted. Note that for Category 4 impairments, because there are water quality controls in place, or the non-support is not amenable to TMDL processes, impairments are removed from this category when water quality standards are attained without this additional level of assurance.

The 2004 303(d) list includes historical listings established with instantaneous measurements of dissolved oxygen screened against the 24-hour average criterion. These exceedances require "impairment verification" based on 24-hour measurements. When sufficient 24-hour dissolved oxygen samples have been collected, criteria attainment can be determined. If the 24-hour criteria are not supported, the impairment remains on the list; if the 24-hour criteria are supported the impairment can be removed from the list based on judgement of the assessor.

As it does for listing decisions, the binomial method allows us to describe the level of confidence when delisting. For conventional parameters, this proposal maintains the probability of error of 50 to 76% for delisting a water body that is marginally impaired (11% of the samples exceed the criterion) and an error of 17 to 38% in delisting an impairment when the exceedance rate is 20%). Error rates for evaluation of toxic conditions are more protective.

Other Changes Considered for 2006

The agency is considering deferring the listing of nonsupport for aquatic life use and dissolved oxygen criteria when standards are presumed based on flow-type for streams. Support status would be reported for biological, habitat and dissolved oxygen methods, however, no category would be assigned for the integrated report. In effect, new listings that would have been included on the 2006 303(d) List would be deferred until a site-specific aquatic life use has been developed from biological and physicochemical data. Impairments currently on the 2004 303(d) list would be carried forward until data are collected to establish site-specific aquatic life use and dissolved oxygen criteria, and to reassess the water body.