Recreational Criteria Background Information

Below is some background information relative to recreational criteria with key words highlighted.

Federal Clean Water Act (CWA) (33 U.S.C. §§ 1251-1388)

The CWA's purpose is to maintain chemical, physical, and biological integrity of the Nation's waters through the elimination of discharges of pollutants to surface waters. The Clean Water Act (CWA) also has the goal of attaining water quality that (1) achieves protection and propagation of fish, shellfish, and wildlife, and (2) allows for recreation in and on the water where attainable.

What are Water Quality Standards (WQS)?

Water quality standards are provisions of state, territorial, authorized tribal or federal law approved by EPA that describe the desired condition of a water body and the means by which that condition will be protected or achieved. Water bodies can be used for purposes such as recreation (e.g. swimming and boating), scenic enjoyment, and fishing, and are the home to many aquatic organisms. To protect human health and aquatic life in these waters, states, territories and authorized tribes establish WQS. WQS form a legal basis for controlling pollutants entering the waters of the United States.

Core Components of WQS

Water quality standards consist of three core components. This includes designated uses of a water body, criteria to protect designated uses, and antidegradation requirements to protect existing uses and high quality/high value waters.

Criteria

States, territories and authorized tribes adopt water quality criteria to protect the designated uses of a water body. Water quality criteria can be numeric (e.g., the maximum pollutant concentration levels permitted in a water body) or narrative (e.g., a criterion that describes the desired conditions of a water body being "free from" certain negative conditions). States, territories and authorized tribes typically adopt both numeric and narrative criteria.

National Pollutant Discharge Elimination System (NPDES) permits

NPDES permits regulate, by the inclusion of discharge limitations, direct discharges from "point sources" to surface waters, including discharges from wastewater treatment plants, combined sewer systems, and stormwater run-off from a variety of sources. Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality (40 CFR 122.4(d)(1)(i)).

327 IAC 2-1-3 Surface water use designations; multiple uses
Sec. 3. (a) The following water uses are designated by the water pollution control board:

(1) Except as provided in subsection (c) *[wet weather limited use subcategory]* , surface waters of the state are designated for full body contact recreation as provided in section 6(d) of this rule.

327 IAC 2-1-6 Minimum surface water quality standards

(d) This subsection establishes bacteriological quality for recreational uses during the recreational season as follows:
(1) The recreational season is defined as the months of April through October, inclusive.
(2) In addition to subsection (a), the criteria in this subsection are to be used to do the following:
(A) Evaluate waters for full body contact recreational uses.
(B) Establish wastewater treatment requirements.
(C) Establish effluent limits during the recreational season.
(3) For full body contact recreational uses, E. coli bacteria shall not exceed the following:
(A) One hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period.
(B) Two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period, except that in cases where there are at least ten (10) samples at a given site, up to ten percent (10%) of the samples may exceed two hundred thirty-five (235) cfu or MPN per one hundred (100) milliliters where the:
(i) E. coli exceedances are incidental and attributable solely to E. coli resulting from the discharge of treated wastewater from a wastewater treatment plant as defined at IC 13-11-2-258; and
(ii) criterion in clause (A) is met.
However, a single sample shall be used for making beach notification and closure decisions.
If a geometric mean cannot be calculated because five (5) equally spaced samples are not available, then the criterion stated in clause (B) must be met.
(4) For demonstrating compliance with wastewater treatment requirements, sanitary wastewater dischargers shall ensure the following:
(A) The concentration of E. coli in the undiluted discharge does not exceed one hundred twenty-five (125) cfu or MPN per one hundred (100) milliliters as a geometric mean of the effluent samples taken in a calendar month.
(B) Not more than ten percent (10%) of all samples when not less than ten (10) samples are taken and analyzed for E. coli in a calendar month exceed two hundred thirty-five (235) cfu or MPN per one hundred (100) milliliters as a daily maximum. Under this clause, the calculation of ten percent (10%) of the samples taken shall be limited to the lowest whole number result.
(5) Effluent limits to implement the criteria in subdivision (3) during the recreational season shall be established in NPDES permits by incorporating the following that are to be applied to the undiluted discharge:
(A) The concentration of E. coli in the undiluted discharge shall not exceed one hundred twenty-five (125) cfu or MPN per one hundred (100) milliliters as a geometric mean of the effluent samples taken in a calendar month.
(B) Not more than ten percent (10%) of all samples in a calendar month exceed two hundred thirty-five (235) cfu or MPN per one hundred (100) milliliters as a daily maximum. Under this clause, the calculation of ten percent (10%) of the samples taken shall be limited to the lowest whole number result.

Key Excerpts from U.S. EPA's OFFICE OF WATER, Recreational Water Quality Criteria document (69 pp, 794 K, EPA 820-F-12-058)

1.2 EPA's Recommended §304(a) Water Quality Criteria

Table 1. Recommended 2012 RWQC.

Criteria Elements	Estimated Illness Rate (NGI): 36 per 1,000 primary contact recreators			Estimated Illness Rate (NGI): 32 per 1,000 primary contact recreators	
	Magnitude			Magnitude	
Indicator	GM (cfu/100 mL)[a]	STV (cfu/100 mL)[a]	OR	GM (cfu/100 mL)[a]	STV (cfu/100 mL)[a]
Enterococci – marine and fresh	35	130		30	110
OR					
E. coli – fresh	126	410		100	320
Duration and Frequency: The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.					

[a] EPA recommends using EPA Method 1600 (U.S. EPA, 2002a) to measure culturable enterococci, or another equivalent method that measures culturable enterococci and using EPA Method 1603 (U.S. EPA, 2002b) to measure culturable *E. coli*, or any other equivalent method that measures culturable *E. coli*.

3.6.2 The 2012 RWQC

For the STV, EPA selected the estimated 90th percentile of the water quality distribution to take into account the expected variability in water quality measurements, while limiting the number samples allowed to exceed the STV, before deciding water quality is impaired. In addition, the approach encourages monitoring because once an exceedance is observed, at least ten more samples need to be below the STV before water quality is considered unimpaired.

EPA now specifically recommends a duration period over which the GM of samples should be calculated and over which the STV should be compared against a recommended limit on the frequency of excursions. EPA is recommending that states use a duration for the GM and STV of 30 days. The duration and frequency of excursion should be explicitly included in the state's WQS as it is a component of the WQS.

EPA understands that a longer duration would typically allow for more samples to be collected and that including more samples in calculation of the GM and STV improves the accuracy of the characterization of water quality. However, because the designated use protected by this criterion is primary contact recreation, EPA believes that a shorter duration (i.e., 30 days), used in a static or rolling manner, coupled with limited excursions above the STV, allows for the detection of transient fluctuations in water quality in a timely manner. In the development of their monitoring program, EPA recommends that states consider the number of samples evaluated in order to minimize the possibility of incorrect use attainment decisions (see section 3.6.4).

3.6.3 Criteria Magnitude, Duration, and Frequency for CWA Purposes

EPA recommends that RWQC consist of a magnitude, duration and frequency. Magnitude is the numeric expression of the maximum amount of the pollutant that may be present in a waterbody that supports the designated use. Duration is the period of time over which the magnitude is calculated. Frequency of excursion describes the maximum number of times the pollutant may be present above the magnitude over the specified time period (duration). A criterion is set in a WQS such that the combination of magnitude, duration and frequency protect the designated use (such as primary contact recreation).

EPA's 2012 RWQC recommendations to protect primary contact recreation consist of a magnitude, duration and frequency of exceedance.

- Magnitude: GM and the STV (regardless of the sample size).

- Duration and Frequency: The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.

3.6.4 Application of State WQS based on EPA's 2012 RWQC for NPDES Permitting, 303(d) Listing, TMDL Development, and Beach Notification Programs

WQC in state WQS are used: to derive water quality-based effluent limits (WQBELs) for National Pollutant Discharge Elimination System (NPDES) permits; to identify impaired and threatened waters for waterbody assessments; to develop waste load allocations and load allocations for TMDLs; and for beach notification programs under §406 of the CWA.

NPDES permitting purposes

For non-continuous or episodic discharges, 40 CFR 122.45(e) requires WQBELs to reflect the frequency of discharge; total mass; maximum discharge rate; and prohibition or limitation of specified pollutants by mass, concentration, or other measure. Wet weather-related events influence episodic discharges such as combined sewer overflows (CSOs). The 1994 CSO Control Policy (reflected in §402(q) of the CWA) describes various approaches for addressing CSO discharges in NPDES permits and should be consulted when establishing WQBELs for intermittent dischargers. The CSO Policy also recommends WQS review and revision, as appropriate, to reflect the site-specific wet weather impacts of CSOs. In conjunction with an approved long-term CSO control plan, a WQS review could involve a use attainability analysis (40 CFR 131.10(g)) and subsequent modification of a designated use.

The number of samples, to be collected by a state in determining if WQS have been exceeded, is not an approvable element of a WQS package (Florida Public Interest Research Group vs. EPA, 2007). Therefore states should not include a minimum sample size as part of their criteria submission. When identifying sampling frequency as part of a state's monitoring plan, a state may consider that, typically, a larger dataset will more accurately characterize the water quality in a waterbody, which may result in more meaningful attainment determinations. Therefore, EPA is recommending that states conduct at least weekly sampling to evaluate the GM and STV over a 30-day period and encourages more frequent sampling at more densely populated beaches.

Key Excerpt from U.S. EPA's OFFICE OF WATER Fact Sheet: Revised: 2012 Recreational Water Quality Criteria (2 pp, 165 K, December 2012, EPA 820-F-12-061)

The RWQC consist of three components: magnitude, duration and frequency. The magnitude of the bacterial indicators are described by both a geometric mean (GM) and a statistical threshold value (STV) for the bacteria samples. The STV approximates the 90th percentile of the water quality distribution and is intended to be a value that should not be exceeded by more than 10 percent of the samples taken.