

IDAHO MIXING ZONE IMPLEMENTATION GUIDANCE



DRAFT

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Idaho Department of Environmental Quality

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such activities or access points for such activities in the vicinity of the mixing zone. Using this and other information, DEQ staff will use best professional judgment in determining the appropriateness of a mixing zone for the chemical(s) of concern.

2.4 General Size and Location Principles to Consider

Mixing zones must not impact the integrity of the water body as a whole. DEQ's mixing zone policy lists specific principles that should be considered when evaluating the size and location of a mixing zone. However, it is important to note that these principles are not regulatory requirements, and DEQ has discretion to depart from these principles. The following subsections discuss each of the size and location principles.

2.4.1 Flowing Waters

Flow Principle

As described in IDAPA 58.01.02.060.01(e)(iv), DEQ is to consider the principle that a mixing zone should not include more than 25% of the volume of the stream flow. In implementing this principle, up to 25% of the critical flow may be initially considered for dilution, taking into account the minimum amount of dilution necessary to meet criteria; For example, if a discharge has no reasonable potential to exceed a criterion using 10% mixing, then DEQ will consider authorizing a mixing zone using 10% of the stream flow for that parameter. Furthermore, DEQ will consider authorizing a mixing zone that results in WQBELs that historic discharge records indicate a facility can meet. For example, DEQ may authorize a mixing zone that utilizes 10% of the stream flow when the facility has historically demonstrated compliance with the resultant WQBELs. DEQ may authorize a mixing zone that includes more than 25% of the volume of the critical flow provided the discharger demonstrates such dilution is needed and submits sufficient information illustrating that the increased mixing zone size will not unreasonably interfere with the beneficial uses of the receiving water body. Table 4 lists the critical flow values that apply to mixing zones, as described in IDAPA 58.01.02.210.03.

Table 4. Critical Flows to Use in Mixing Zone Evaluations

Criteria	Critical Flow
Aquatic Life – Toxics ¹	
Acute toxic criteria (CMC) ²	1Q10 or 1B3
Chronic toxic criteria (CCC) ³	7Q10 or 4B3
Aquatic Life – Non conventionals ⁴	
Temperature ⁵	7Q10 or 4B3
Ammonia	1Q10 / 30Q10
Phosphorus	⁶
Human Health – Toxics ¹	
Non-carcinogens	30Q5
Carcinogens	Harmonic mean flow
1Q10: lowest one-day flow with an average recurrence frequency of 10 years 1B3: biologically based low flow which indicates an allowable exceedance of once every 3 years 7Q10: lowest 7-day average flow with an average recurrence frequency of 10 years 4B3: biologically based low flow which indicates an allowable exceedance for 4 consecutive days once every 3 years 30Q5: lowest 30-day average flow with an average recurrence frequency of 5 years Harmonic mean flow: long-term mean flow value calculated by dividing the number of daily flows by the sum of the reciprocals of those daily flows.	

¹ These critical flows are specified in IDAPA 58.01.02.210.03.b.

² CMC: Criterion Maximum Concentration

³ CCC: Criterion Continuous Concentration

⁴ These critical flows are not specified in Idaho WQS, and alternative flows may be used with DEQ approval

⁵ Critical flows for the salmonid spawning beneficial use should be determined for the time period during which spawning and egg incubation occurs.

⁶ DEQ will evaluate critical flows for nutrients on a case-by-case basis. In TMDLs, DEQ has used various estimates of critical flows, including a seasonal average flow representative of the growing season (e.g. May to September) or an annual average flow.

DEQ will consider other stream flow estimates (of which a proportion can be allocated to the mixing zone) where requested by dischargers. Such requests, however, must be accompanied by supporting information to demonstrate that the mixing zones will not affect the designated uses of the water body. For example, mixing zones could be based on tiered stream flows or seasonal flows. Appropriate ranges (tiers) of stream flows can be established that range from minimum stream flows such as the 7Q10 (the 7-day, 10-year minimum statistical flow value) to normal spring runoff levels. The allowable mixing volume would be based on either the lowest level of the range of flows for that tier or season or the critical flow for that tier or season. For example, if DEQ establishes a tier between 100 and 150 cubic feet per second (cfs), then the allowable mixing volume could be based on a proportion of 100 cfs.

Width Principle

The concentration of the constituent(s) being discharged to a mixing zone should meet or be less than the applicable chronic criteria before the width of the effluent plume becomes wider than 25% of the total width of the stream or 300 meters plus the horizontal length of the diffuser, whichever is less (IDAPA 58.01.02.060.01.e.ii). In addition, the cumulative width of adjacent mixing zones should not exceed 50% of the total width of the receiving water (IDAPA 58.01.02.060.01.e.i). The relevant width of the stream is the wetted width of the water flowing in the channel. Wetted width is a dynamic parameter that varies with flow. Additionally, at any given stream flow, channel widths and wetted widths also naturally change as one goes upstream