

# Water Quality Standards

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Honey Creek (WBID: 3245)  
McDonald County

*“...to restore and maintain the chemical, physical,  
and biological integrity of the Nation’s waters.”*

[33 U.S.C. § 1251 (a)]

# Receiving Waterbody Information

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- ◆ Waterbody Name
- ◆ Classification
  - Lakes (L1, L2, and L3)
  - Streams (P, P1, and C)
  - Wetlands (W)
  - Unclassified
- ◆ 7Q10 (cfs)
- ◆ Designated Beneficial Uses
  - IRR, LWW, AQL, CLF, CDF, WBC, BTG, DWS, IND
  - None; General Criteria apply - 10 CSR 20-7.031(3)
- ◆ Other Characteristics

## Low Flow Conditions (7Q10, 1Q10, 30Q10, etc)

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- ◆ 7Q10
  - The average minimum flow for seven (7) consecutive days that has a probable recurrence interval of once-in-ten (10) years
  - Critical low flow period for WWTF design
- ◆ 1Q10 and 30Q10
  - Critical low flow periods for acute and chronic criteria development, respectively
  - Ammonia wasteload allocations and WQBEL development

## Low Flow Conditions (7Q10, 1Q10, 30Q10, etc)

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- ◆ Obtain low flow conditions through statistical analysis of stream flow data
  - USGS stream flow data
  - USGS SWSTAT software
- ◆ Watershed Area Ratio
  - Low flow statistics from similar watershed
  - Use ratio of watershed areas to obtain estimate
- ◆ Waterbody Classification
  - Class P streams = 0.1 cfs
  - Class C and unclassified streams = 0.0 cfs

# Mixing Zones

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Mixing zones are areas of limited size near a facility outfall where numeric water quality criteria may be exceeded.

- ◆ General Criteria found in 10 CSR 20-7.031(3) must be met
- ◆ Zones of passage must be provided to avoid lethality to passing organisms
- ◆ Limited in size (volume, area, length) so that designated beneficial uses and aquatic communities are not adversely impacted

# Numeric Water Quality Criteria

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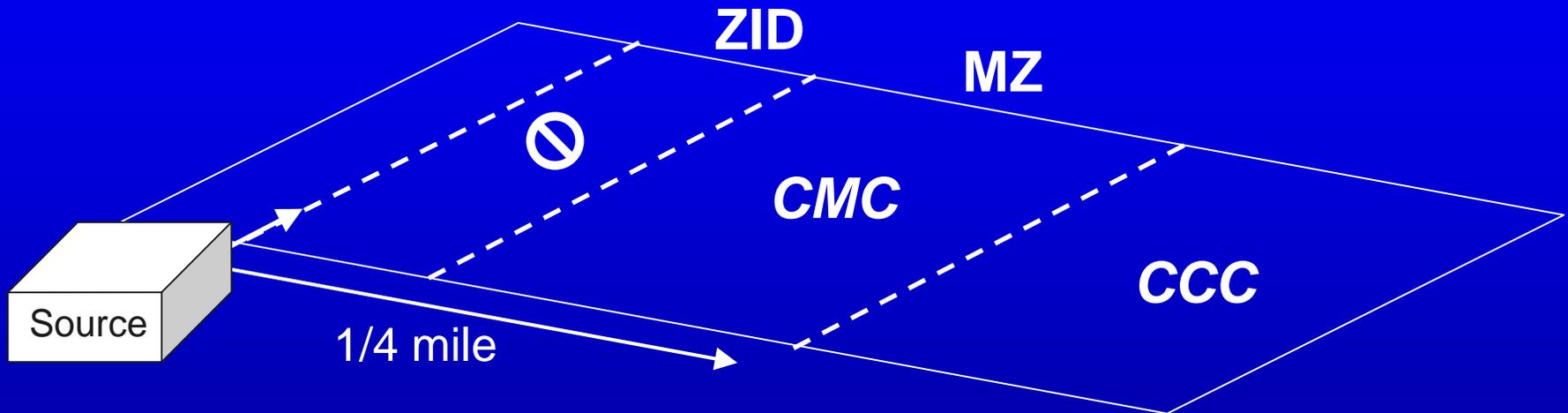
## ◆ Chronic Criteria

- CCC = Criteria Continuous Concentration
- Apply to classified waters only
- Apply at the edge of the mixing zone
- Effects evident after 4 days of exposure

## ◆ Acute Criteria

- CMC = Criteria Maximum Concentration
- Apply to classified and unclassified waters
- Apply at the edge of the zone of initial dilution
- Apply at all times in unclassified waters
- Effects evident after 1 hour of exposure

# Regulatory Mixing Zones

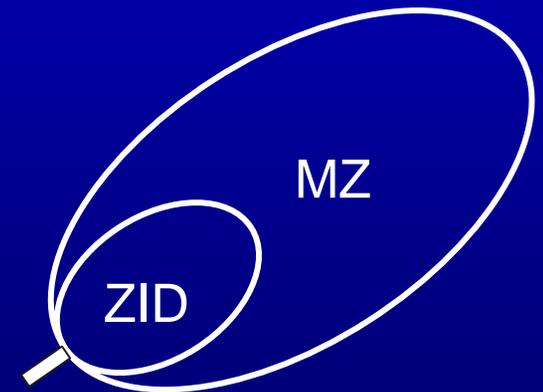


MZ = Mixing Zone

ZID = Zone of Initial Dilution

CCC = Criteria Continuous Concentration

CMC = Criteria Maximum Concentration



# Regulatory Mixing Zones

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- ◆ Unclassified streams
  - No mixing zone or ZID
  - Acute criteria must be met end-of-pipe
  - Chronic criteria must be met immediately downstream of confluence with classified water
  
- ◆ Class C and streams with  $7Q_{10} \leq 0.1$  cfs
  - Mixing zone length one-quarter (1/4) mile
  - Zone of initial dilution not allowed
  - Acute criteria must be met end-of-pipe

**10 CSR 20-7.031(4)(A)5.B.(I)**

# Regulatory Mixing Zones

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- ◆ Streams with 7Q10 flow 0.1 - 20 cfs
  - Mixing zone one-quarter ( $1/4$ ) stream width, cross-sectional area, or volume of flow; length one-quarter ( $1/4$ ) mile
  - Up to one-half ( $1/2$ ) stream width, cross-sectional area, or volume of flow if rapid and complete mixing is suspected
  - ZID one-tenth ( $0.1$ ) of the mixing zone width, cross-sectional area, or volume of flow

**10 CSR 20-7.031(4)(A)5.B.(II)**

# Regulatory Mixing Zones

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- ◆ Streams with 7Q10 flow > 20 cfs
  - Mixing zone one-quarter (1/4) stream width, cross-sectional area, or volume of flow; length one-quarter (1/4) mile
  - ZID one-tenth (0.1) of the mixing zone width, cross-sectional area, or volume of flow and no more than ten (10) times the effluent design flow volume unless the use of diffusers or specific mixing zone studies can justify more dilution
  - Modeling often needed to delineate

**10 CSR 20-7.031(4)(A)5.B.(III)**

# Regulatory Mixing Zones

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## ◆ Lakes and Reservoirs

- Mixing zone not to exceed one-quarter (1/4) of the lake width at the discharge point or one-hundred feet (100') from the discharge point, whichever is less.
- Obtain mixing zone volume using length = width and average depth of zone at low pool ( $l \times w \times d$ )
- Zone of initial dilution not allowed; acute criteria must be met end-of-pipe

**10 CSR 20-7.031(4)(A)5.B.(IV)**