

Water Quality: Waste Water Management

Colorado Association of Ski Towns

Fraser, CO

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Renewal Permitting Surprises

- Waste Water Discharge Permits are only good for 5 years
- Effluent Limits are based on the regulations, water quality standards, and streamflow conditions “just before” the Permit is issued
- Renewal Permits take a fresh look using the most current regulations, water quality standards, and streamflow conditions



What can happen during a single permit cycle?

- Regulatory changes
- Changes to water quality standards
- Changes to streamflow conditions



Permit Limits

- Technology based effluent limits
- Water quality based effluent limits (WQBELs)

How are WQBELs calculated?

The mass-balance equation is expressed as:

$$M_2 = (M_3Q_3 - M_1Q_1)/Q_2$$

Where:

Q_1 = Upstream “**low flow**”

Q_2 = Treated discharge from plant

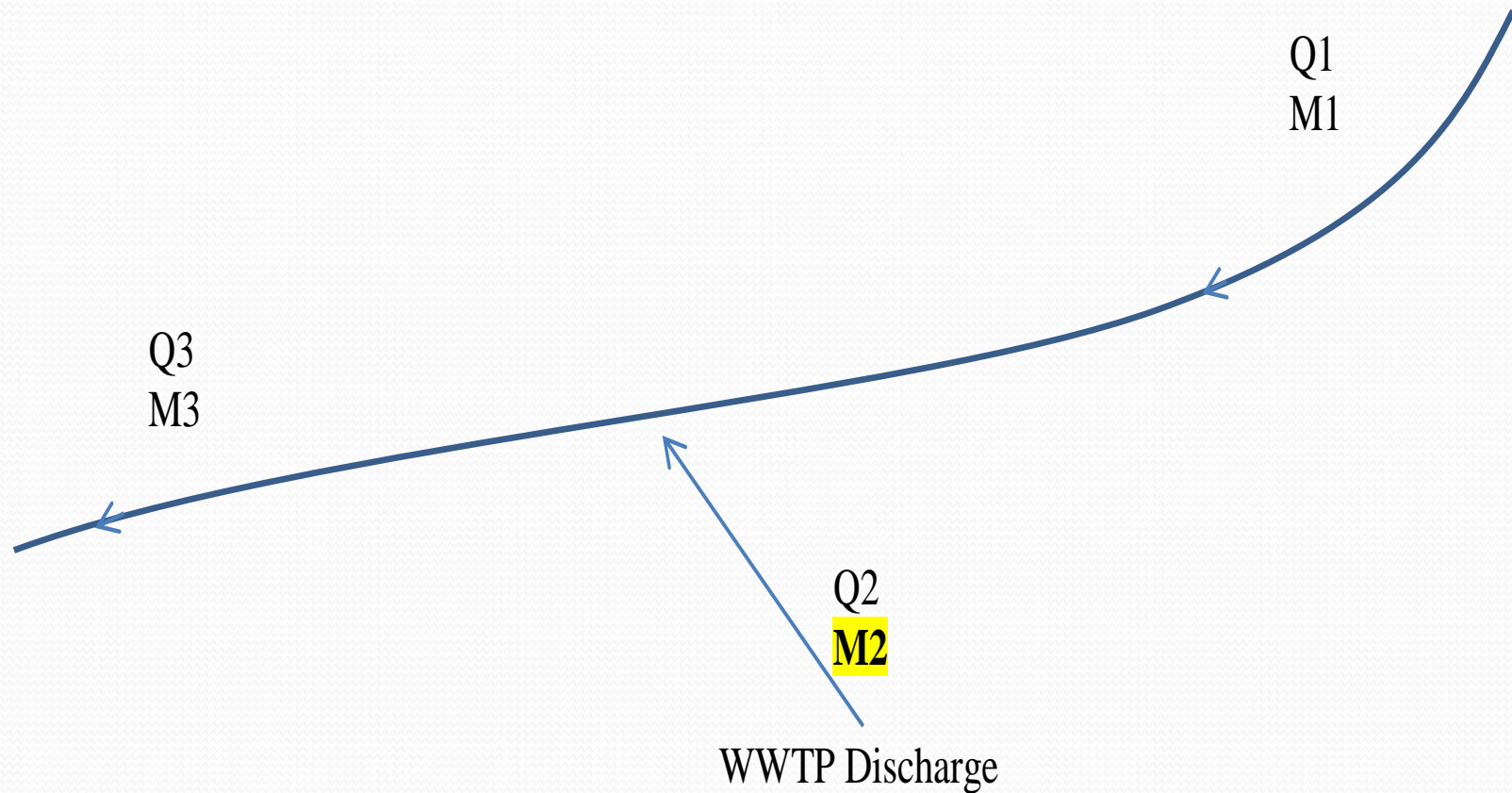
Q_3 = Downstream flow ($Q_1 + Q_2$)

M_1 = In-stream background copper concentration above discharge

M_2 = Calculated WQBEL

M_3 = Water Quality Standard

How are WQBELs calculated?

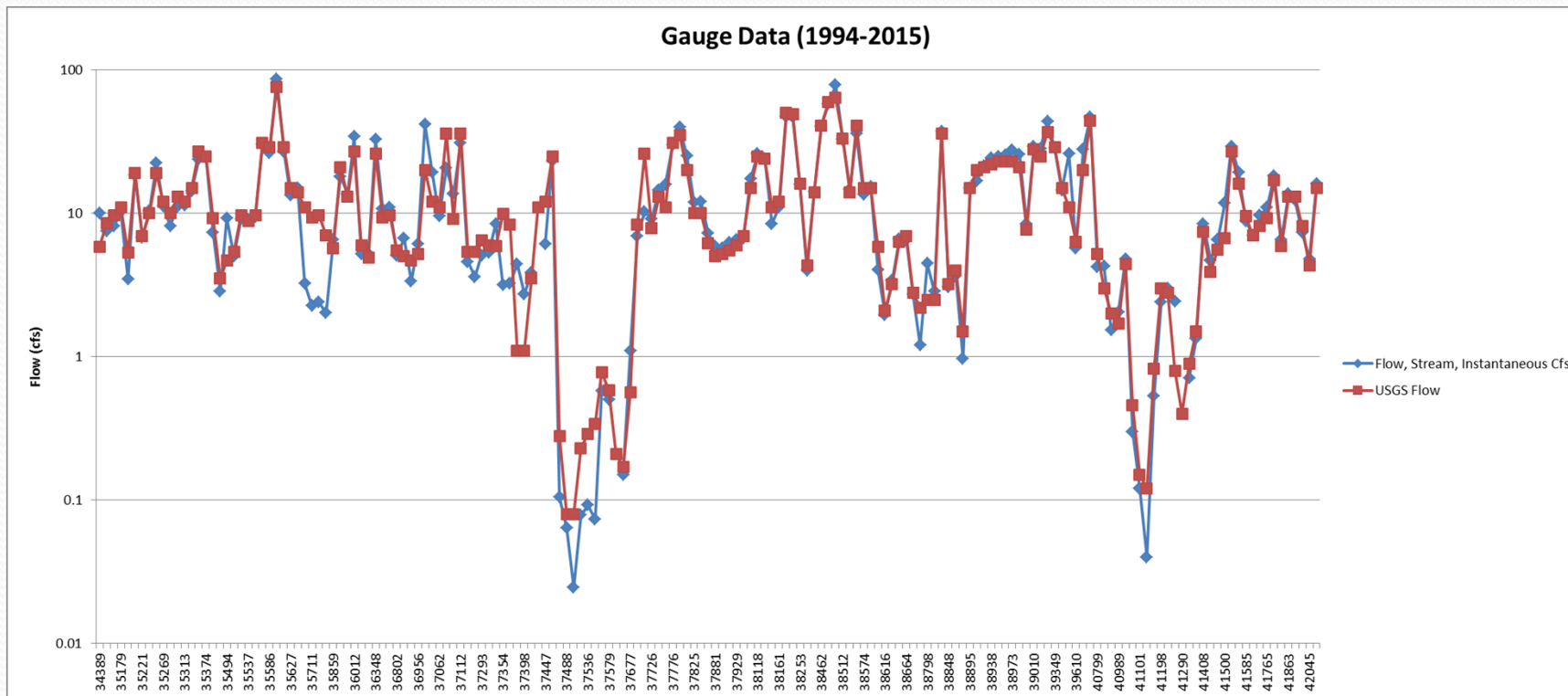




How is the low flow calculated?

- Regulation: “the empirically based 30-day average low flow with an average 1-in-3 year recurrence interval (30E3) for chronic standards and the empirically based 1-day low flow with an average 1-in-3 year recurrence interval (1E3) for acute standards, or the equivalent statistically-based flow.”
- Implemented with DFLOW

Example of drought-influenced calculation



	Current Permit	Draft Renewal Permit
Chronic (30E3)	3.7 cfs	0.1 cfs
Acute (1E3)	2.7 cfs	0.1 cfs



Is the reduction in low flow real?

- The water quality standard was being achieved
- The aquatic life use classification was being protected (“robust fish population downstream of the discharge”)



How is this possible?

- DFLOW problems?
- Conservative assumption: max discharge at lowest river flow

What can you do?

- Verify that the water quality standard is realistic?
- Verify that the low flow calculations are reflective of stream conditions over the long term
- Evaluate alternative ways to protect in-stream water quality
 - Monthly or seasonal tiered WQBELs
- Evaluate treatment options