

The TMDL Paradigm: Evaluating Causal Factors Affecting Water Quality

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The Clean Water Act of 1972 requires states and tribes to develop a total maximum daily load (TMDL) for each pollutant impairing the nation's waters. A TMDL prescribes an upper limit (i.e., load capacity) on discharge of a pollutant from all sources to ensure water quality standards are met. It further allocates this load capacity among the various sources of the pollutant as summarized in the following equation:

$$\text{TMDL} = \text{LC} = \text{MOS} + \text{NB} + \text{LA} + \text{WLA}.$$

However, some conditions that impair water quality do not require TMDLs. The U.S. Environmental Protection Agency considers certain unnatural conditions—such as flow alteration or habitat alteration—that are not the result of discharging a specific pollutant as pollution. TMDLs are not required for waters impaired by pollution, rather than a specific pollutant. A TMDL is only required when a pollutant can be identified and in some way quantified.

Water quality data collected in the Snake River by Idaho Power over the past 20 years illustrates the challenges of a pollutant based approach rather than an ecosystem approach to addressing water quality. After years of efforts by watershed stakeholders to implement measures addressing an individual pollutant, data indicated that the desired response has not been achieved. This illustrates the challenges with the current TMDL paradigm of individual pollutant controls in managing water quality and supports evaluation and application of a new paradigm. Without also considering factors not considered under the current TMDL paradigm, which affect water quality, meaningful TMDL success stories are likely to remain few and far between.