

Colorado's Water Quality Standard for Temperature

Water temperature is a critical aspect of the freshwater habitat for fish. These fish, including those listed as threatened or endangered under the Endangered Species Act (ESA), need cold water to survive. Human-caused increases in river water temperatures have been identified as a factor in the decline of some species of fish. Temperature water quality standards can play an important role in helping to maintain and restore water temperatures to protect the aquatic life uses.



I. HISTORY

The previous temperature standards were adopted in the late 1970s; the scientific basis is unknown. The Division has encountered difficulty implementing the current standards both in the context of discharge permits and in the context of determining impairment.

The Water Quality Control Division (Division) convened a workgroup in the fall of 2001 to discuss the interpretation of the current temperature standard for the purpose of assessing attainment and its implementation in Colorado Discharge Permit System (CDPS) permits. This workgroup did not reach closure on the issue. Efforts towards understanding the standard were re-started in preparation for the 2005 Regulation No. 31 Basic Standards rulemaking hearing. This time the workgroup focused on developing new criteria and to develop a Temperature Guidance (“the Guidance”).

The intent of Colorado's temperature standard is to protect aquatic life from adverse warming and cooling caused by anthropogenic (human) activities, both point source and nonpoint source.

II. REVIEW OF TEMPERATURE EFFECTS ON AQUATIC LIFE

Temperature is a water quality characteristic that is influenced by numerous factors including solar radiation, air temperature, surface area, depth and width of the waterbody, elevation, and shade coverage.

Temperature regimes vary in location, as well as throughout the day and throughout the year.



Flathead Chub

Temperature effects on fish populations vary based on species, life stage, and acclimation. Temperature influences behaviors in fish, including migration, feeding, metabolism, and spawning. The temperature criteria are designed to protect against both the chronic (30 day) and acute (daily) effects of elevated temperatures on aquatic life uses.

III. DEVELOPMENT OF TEMPERATURE CRITERIA

In developing the methodology, the Division primarily relied upon EPA Criteria Documents, EPA Region 10 guidance documents for temperature, and documents from the Oregon Department of Environmental Quality. The EPA criteria documents from 1972 (Blue book; EPA, 1973), 1976 (Red book; EPA, 1976) and 1986 (Gold book; EPA, 1986) provided recommendations for types of temperature standards.

The Daily Maximum temperature criterion is an acute (1day) standard for protection against lethal effects. There have been many studies on what temperatures are expected to have lethal effects. These are maximum temperatures, which species can withstand for short exposures. The DM protects against short-term lethal exposure.

The maximum weekly average temperature (MWAT) is the mathematical mean of multiple, equally spaced, daily temperatures over a 7-day consecutive period and was recommended by EPA to determine chronic effect.

V. THE TEMPERATURE CRITERIA

The Basic Standards and Methodologies for Surface Waters (Regulation No. 31, 5 CCR 1002-31) provides a framework for implementing water quality standards throughout the State of Colorado. Temperature standards provide protection for the aquatic community from both lethal and sublethal effects. The temperature standards also provide protection against abrupt changes in water temperatures which may lead to thermal shock, a condition that can have lethal effects.

This framework has been used to adopt standards in each basin as that basin hearing has occurred since its adoption in the Basic Standards and Methodologies for Surface Waters (Regulation No, 31). The temperature standards were adopted to each segment, as appropriate during Arkansas River Basin Rulemaking Hearing held June 2013.

Lower Arkansas River, Segment 1a Temperature Standards	
	WARM WATER BIOTA
Temperature Standards	Mar-Nov = Maximum Weekly Average 27.5°C Daily Maximum 28.6°C December = Maximum Weekly Average 20.7°C Daily Maximum 21.5°C Jan-Feb = Maximum Weekly Average 13.8°C Daily Maximum 14.3°C

VI. IMPACT ON ARKANSAS RIVER BASIN

Currently the City of Pueblo Water Reclamation Facility is required to monitor the stream and effluent temperatures to determine if the City of Pueblo's CDPS discharge is impacting the aquatic life in the Arkansas River. Based on the monitoring it will be determined if the City of Pueblo will have to construct treatment to meet the new standards. The cost of compliance is not known yet but will have to be paid for with rate increases.

