Water Quality - Total Dissolved Gas

Total Dissolved Gas (TDG) Overview

The Corps implements a water quality program to manage TDG associated with spill operations at the lower Columbia and lower Snake River dams from April through August, consistent with the National Marine Fisheries Service's Biological Opinion to increase survival of ESA-listed juvenile salmon and steelhead as they pass the dams on their downstream migration to the ocean.

The Corps adjusts the amount of spill in real-time operations based on multiple spill guidance documents, reports, and computer models in order to attempt to maintain TDG within state TDG water quality standards.

What is TDG?

TDG is a measure of air dissolved into water. When water plunges into a pool, it takes air bubbles with it. The high pressure causes the bubbles to dissolve into the water and the water becomes supersaturated with gases, primarily nitrogen.

High spill levels at the dams can increase TDG in the water below the dam because as water flows over the spillway, air becomes trapped by the spill flow. When fish and other aquatic species are exposed to elevated TDG, the excess gas can build up in their bloodstream and tissues, causing a condition called gas bubble trauma, with symptoms ranging from minor injuries to death depending on the TDG concentration.

Why do Dams Spill?

High levels of spill and associated TDG supersaturation often happen in the spring when melting snowpack creates high river flows and/or flooding. Water that cannot be stored in the reservoir behind a dam or passed through turbines to generate electricity is sent over the spillway or through an outlet. From April through August, the Action Agencies also spill water to help juvenile salmon migrate downstream to the ocean. Sometimes spill also occurs because maintenance forces operators to send water over a spillway, or through another outlet. So while spill is most common in the spring time, it can happen during other seasons as well.