

# The effects of simulated irrigation induced changes in salinity on metabolism of lotic biota

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## Abstract

A series of manipulative field experiments were conducted in the Elbow River, Alberta, Canada, using a modified metabolic chamber to determine the net primary productivity of epilithic algae and community respiration and the drift of macroinvertebrates exposed to pulses of four simulated salinities (1.2, 2.4, 4.5 and 8.2 ppt). Treatment salinities represented ionic composition and ratios of irrigation effluent emptying into the South Saskatchewan River system in southern Alberta compared to ambient concentrations in the river (0.4 ppt). Net primary productivity of benthic algae and oxygen consumption of macroinvertebrates increased with increasing salinity from 1.2 to 4.5 ppt but declined in the highest salinity. A significant time dependent and time and salinity dependent (combined) variability in benthic drift occurred. However, effects of interaction and salinity were insignificant when exposed to pulses of different salinities. The drift biomasses in control chambers were always significantly greater than that of the treatment chambers except in the highest salinity.