*Wildfire and Water Quality: Processes, Impacts and Challenges*
(Proceedings of a conference held in Banff, 11–14 June 2012) (IAHS Publ. 354, 2012).

# The effects of wildfire on sediment-associated phosphorus forms in the Crowsnest River basin, Alberta, Canada

**DON ALLIN[1], MICHEAL STONE[1], ULDIS SILINS[2], MONICA B. EMELKO[3] & ADRIAN L. COLLINS[4]**

1 *Department. of Geography and Environmental Management, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada*

2 *Department of Renewable Resources, University of Alberta, Edmonton, Alberta T6G 2H1, Canada*

3 *Department of Civil and Environmental Engineering, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada*

4 *Soils, Crops and Water, ADAS, Woodthorne, Wergs Road, Wolverhampton WV6 8TQ, UK*

**Abstract** The impacts of large-scale land disturbance by wildfire on a wide range of water and related ecological services are increasingly being recognized worldwide. This study explores the long-term impact (6–7 years) of the 2003 Lost Creek wildfire on particulate phosphorus forms (NAIP, AP, OP) of suspended river sediment at a large regional scale (554 $km^2$) in the Crowsnest River basin, Alberta, Canada. While total P concentrations were similar among burned and unburned river sediments, the mean bioavailable NAIP fraction remained approximately 70% greater and the organic P over 2-fold higher in sediments from five burned tributary watersheds compared to the reference site in the Crowsnest River study catchment. Because of the key role of phosphorus in regulating aquatic productivity in oligotrophic mountain rivers, these findings highlight the risk of a large scale and long-term legacy of wildfire in some mountain river systems.

**Key words** wildfire; phosphorus speciation; bioavailability; propagation