

Using Water Isotope tracer to detect inter-annual variability of lakes a northern remote, hydrologically-dynamic, deltaic landscape, the Peace Athabasca Delta, Northern Alberta

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The Peace-Athabasca Delta (PAD), protected mainly within Wood Buffalo National Park and located in northern Alberta, is a designated Ramsar Wetland of International Importance, a UNESCO World Heritage Site and the world's largest inland boreal freshwater delta. Hundreds of shallow lakes provide important natural resources for nearby indigenous communities and habitat for a variety of flora and fauna. In response to a petition by the Mikisew Cree First Nations in June 2015, UNESCO acknowledged existing knowledge gaps and ongoing threats to the delta, highlighting the need to establish measures to track hydrological change in the delta. Water isotope samples were collected 4 times between late May and mid-September 2015 from 62 lakes and 9 river sites that span the hydrologic gradient of the PAD. Despite widespread flooding of the delta in 2014, the 2015 season was generally drier than comparable monthly values of previous years. Ongoing isotope-mass balance modelling will generate hydrological metrics for detecting status and trends useful to our agency partners including Parks Canada. Our results highlight the ability of water isotope tracers to detect spatial and temporal variability in lake water-balances and the applicability for efficient long-term monitoring in northern remote, hydrologically-dynamic, deltaic landscapes.