



CGU HS Committee on River Ice Processes and the Environment
14th Workshop on the Hydraulics of Ice Covered Rivers
Quebec City, June 19 - 22, 2007

Remote Sensing of River Ice during the Winter of 2006-07

Steven F. Daly and Brian Tracy

ERDC Cold Regions Research and Engineering Laboratory
Hanover, NH 03755

Yves Gauthier

INRS-Eau, Terre et Environnement
Québec, Québec, CA G1K 9A9

Abstract :

Four RADARSAT images and two LANDSAT images of ice covered rivers were acquired during the winter of 2006 and 2007. The RADARSAT images were acquired for the Fox River in Wisconsin from Lake Winnebago to Green Bay on Lake Michigan on 5 February; the lower Platte River in Nebraska on 21 February; and Lake Pepin on the Mississippi River on 18 February and 7 March. LANDSAT images were acquired for the Fox River in Wisconsin on 8 February and for the Missouri River downstream of Gavins Point Dam on 17 February. River ice causes different and wide ranging problems at each of these sites. The Fox River has over 20 locks and dams over a distance of 64 km with a drop of approximately 50 meters. Scheduling operation of the dam gates in winter is complicated by the presence of ice. The lower Platte River is the site of many historical ice jams and ice jam flooding was recorded on 22 February. Lake Pepin on the Mississippi River between Red Wing and Wabasha, MN, is an important link for navigation on the upper Mississippi River as ice conditions on the lake control of start of the navigation season. In general, the river ice conditions included in the RADARSAT images were difficult to classify because the ice was often smooth and thermally formed; in contrast to the relative rough ice covers formed in many rivers that were previously used to develop the classification procedure. Distinguishing between smooth thermally grown ice and open water was found to be difficult. The LANDSAT image of the Missouri River on 17 February displayed the entire length of an ice jam that caused a “wave” of low discharge to propagate downstream. This low discharge wave caused interruption to a number of water intakes along the Missouri River as far downstream as the confluence with the Mississippi River.