

## **Cloud Computing and Satellite Data Streams Are Transforming Large-Area Mapping Programs**

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### **Project Summary**

Large-area mapping and monitoring projects – those requiring data from multiple satellite scenes – have always been challenging on account of data-volume and computing requirements. However, three recent technology advancements are transforming the field: (i) cloud computing services such as Google Earth Engine, (ii) open-access satellite data streams, and (iii) machine learning. These advancements allow users to compile, process, and analyze the hundreds or thousands of images needed for mapping at very large scales. These trends are at the heart of Alberta Biodiversity Monitoring Institute's (ABMI's) Alberta Landcover Prediction and Habitat Assessment (ALPHA) program and have been used by ABMI and BERA researchers to map wetlands, harvest-area regeneration, and other key targets at provincial scales.

### **Management Implications and Lessons Learned**

Google Earth Engine, satellite data streams, and machine-learning approaches to analysis have opened the door to large-scale mapping, modeling, and monitoring projects that were not previously feasible. It is nevertheless important to note that the need for high quality training and validation information remains as significant as ever, in order to evaluate and ensure the accuracy and reliability of such products.

### **Publication(s)**

Hird, J.N., DeLancey, E., McDermid, G.J. and Kariyeva, J. 2017. Google Earth Engine, open-access satellite data, and machine learning in support of large-area probabilistic wetland mapping. *Remote Sensing*, 9(12): 1315.

DeLancey, E.R., Kariyeva, J., Bried, J.T. and Hird, J.N. 2019. Large-scale probabilistic identification of boreal peatlands using Google Earth Engine, open-access satellite data, and machine learning. *PLoS ONE*, 14(6): e0218165.