# Automated labelling of remotely sensed disturbances: Framework and example

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**Abstract**

Canadian forests are managed to meet a myriad of aims, including ecological, biological, social, and economic. Forest disturbances can be planned, through urbanization, harvesting or other development activities, or unplanned through insect infestations or fire. As such, it is imperative that forest managers have complete and current information to aid with decision making. Detection of disturbances and identification of disturbance type are equally important, as different disturbances lead to different managerial responses and / or ecological effects. Further, for habitat specific applications, insights on animal response may be gained by correlating land cover disturbances and animal activity data. In this study, we are developing a methodology for automatically labelling change classes derived from Landsat-based disturbance products, based upon a spectral differencing method (from two dates of Tasselled Cap wetness), and labelled through manual interpretation of imagery and field data. By incorporating available spectral information with derived composite band values (including Tasselled Cap transformations), spatial and contextual information, and secondary datasets, we have developed a framework for automatically labelling disturbance features. Preliminary results show successful differentiation of changes, using classification tree analysis (CTA) and general linear models (GLM). For areal changes (cut-blocks, well-sites, mines and fire-scars), CTA successfully identified 81% of the features, while GLM increased that to 91%. Linear features (roads and pipelines) showed an even greater success rate, with 92% of the features being properly identified using a classification tree analysis. For both types of changes, differentiation occurred without any manual intervention. By incorporating automatic disturbance labelling with automatic change detection, it may be possible to update land-cover databases with only minimal human intervention; leading to quicker integration of data, and better managerial responses.