

## **Mapping Alaska's Land: Using Landsat with Field Data to create Mid-resolution Earth Cover Maps for Alaska**

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The Alaska office of the Bureau of Land Management (BLM) and Ducks Unlimited Inc. (DU) began mapping wetlands and associated uplands in Alaska using field reconnaissance, remote sensing, and GIS technologies in 1988; they have cooperatively mapped over 151 million acres, which includes over 98 percent of BLM land in Alaska. This earth cover mapping effort provides an inventory of Alaska's land base that can be used for regional management of land and wildlife.

Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper (ETM) satellite imagery was chosen as the primary source for the earth cover mapping effort. When combined with other GIS data sets, (e.g., elevation, slope, aspect, shaded relief, and hydrology), and field-collected land cover type data, Landsat TM/ETM data produces highly accurate classifications with a moderately detailed classification scheme. The Alaska Earth Cover Classification, based on the Viereck 1992 vegetation classification and revised by BLM-Alaska and DU, was used to classify earth cover types for each project area. Field data collection has been an integral part of the BLM/DU mapping projects to assess, measure, and document the on-the-ground vegetation variation within the project area. The DU/BLM procedures for collecting field data have evolved into a very efficient and effective means of data collection. A four-person helicopter crew, consisting of a pilot, biologist, recorder, and navigator, performs the field assessment. A custom field data collection form and digital database system were developed and used to record field information.

As of 2004, the BLM/DU earth cover maps covered only a small portion of the area of Alaska that burned in 2004. Accurate cover maps are essential to evaluate the impact of fires and the appropriate emergency response by the Alaska Burned Area Emergency Response (BAER) Team. In early 2005, analysts at the Altarum Institute and Spatial Solutions mapped most of the unmapped land in the Alaskan Interior to provide the Alaska BAER Assessment Team with earth cover maps of the 2004 fire-disturbed areas. However, due to time constraints, field training data was not collected for this mapping project. Altarum and Spatial Solutions used portions of 20 Landsat TM and ETM

satellite scenes to classify the project area into a generalized set of earth cover categories. An unsupervised clustering technique was used to define spectral classes representing earth cover types. The assignment of spectral clusters to earth cover classes was performed by analyzing the spectral separability of clusters, their position in the landscape, existing earth cover classifications and field training sites from adjacent mapping projects.

This paper describes the general mapping approach developed by Alaska BLM and DU, explains the progress of the mapping efforts by BLM, DU, Altarum, and Spatial Solutions, and the presents the map products that have resulted from these efforts.