Abstract

Aircraft remote sensing of freshwater ecosystems offers federal and state monitoring agencies an ability to meet their assessment requirements by rapidly acquiring information on ecosystem responses to environmental change for water bodies that are below the resolution of space-based platforms. During this study, hyperspectral data were collected over a two day period from glacial lakes, ponds, and man-made reservoirs in New Hampshire, Massachusetts, Connecticut, and Rhode Island. These lakes ranged from five to greater than sixteen hundred hectares and oligotrophic-mesotrophic to eutrophic and hypereutrophic conditions. Water samples were collected by several New England state agencies coincident with the airborne remote-sensing flights to provide ground reference data for algorithm development and testing. Using an inverse modeling approach remotely sensed reflectances from the near infrared to red portion of the spectrum were used to develop an empirical model to estimate chlorophyll *a* concentrations. The accuracy of the algorithm was assessed from the RSM error of predicted and measured chlorophyll values for all lakes sampled. Results showed a strong statistical relationship between measured and predicted values. The predicted chlorophyll concentrations were used to assess the biological condition, trophic status, and recreational risk to human health for the New England lakes and ponds surveyed.