Abstract

The Alaska LandCarbon Wetland Distribution Map was produced as part of the USGS LandCarbon Alaska assessment (Zhu and McGuire 2016). The methods used to produce this wetland map as well as its accuracy assessment are presented in (He et al. 2016). This data set was used in modeling of carbon and methane regional assessments.

This product was to provide regional estimates of specific wetland types (bog and fen) in Alaska, available wetland types mapped by the National Wetlands Inventory (NWI) program were re-classed into bog, fen, and other. NWI mapping of wetlands was only done for a portion of the area so a decision tree mapping algorithm was then developed to estimate bog, fen, and other across the state of Alaska using remote sensing and GIS spatial data sets as inputs.

The NWI mapped area only (30 m resolution) covers a small percentage of Alaska, but represents coastal and north to south gradients along the road systems. NWI wetland codes were recoded into classes representing bog, fen, and other. Bogs should be seasonally flooded during spring melt. We suspected they were called saturated shrub scrub because of the dwarf shrubs and mosses. The NWI codes of SS4B, SS1E,and SS7B were used to define bogs. Fens should be seasonally flooded or more usually semi permanently flooded. We assumed this should be persistent emergent wetlands, or the NWI codes of EM1F and EM1E. Marine wetlands in NWI were not estimated so predictions were for freshwater bogs and fens only.

Random NWI pixel locations (18,024) were used to build data base of spatial inputs and NWI Classes at each point. These pixel locations (30 m resolution) were constrained to areas not already mapped as water. Only 789 of these were picked manually. Most of the points were simple random selections but some random pixel searches were focused only on only two the wetland types. This was done to insure that the training data for model development both represented the frequency of wetlands in the population to be mapped as well as to insure there were adequate numbers of rare classes to insure they were predicted and not lumped in to the more prevalent upland/other wetland class. Attributes from each of the potential input layers were extracted at each of these pixel locations and a database constructed. Randomly 1,030 pixel locations were selected and withheld as test. The test pixels were constrained to be more that 90m from a training pixel to mitigate spatial autocorrelation impacts. This resulted in a model development data base which consisted of the remaining 16,994 pixel locations.

A Decision tree (C5 see www.rulequest.com) was trained to predict bog, fen, and other classes using Landsat Weld data, DEM, slope, NLCD land cover, various vegetation and moisture spectral indices, soil texture (from M.T. Jorgeson), surface water map, compound terrain index, and a previous wetland map (Whitcomb et al. 2009). Decision tree approaches of boosting, winnowing, and constraining the minimum number of observation needed for a rule.

The final map (1 km resolution) used a moving window approach to summarize the percent of each km pixel which was classified as either a bog or a fen (percent wetland). The units range from 0 to 106 percent.

REFERENCES

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