Raster Version of the Circumpolar Arctic Vegetation Map (CAVM)
first draft of the Alaska portion

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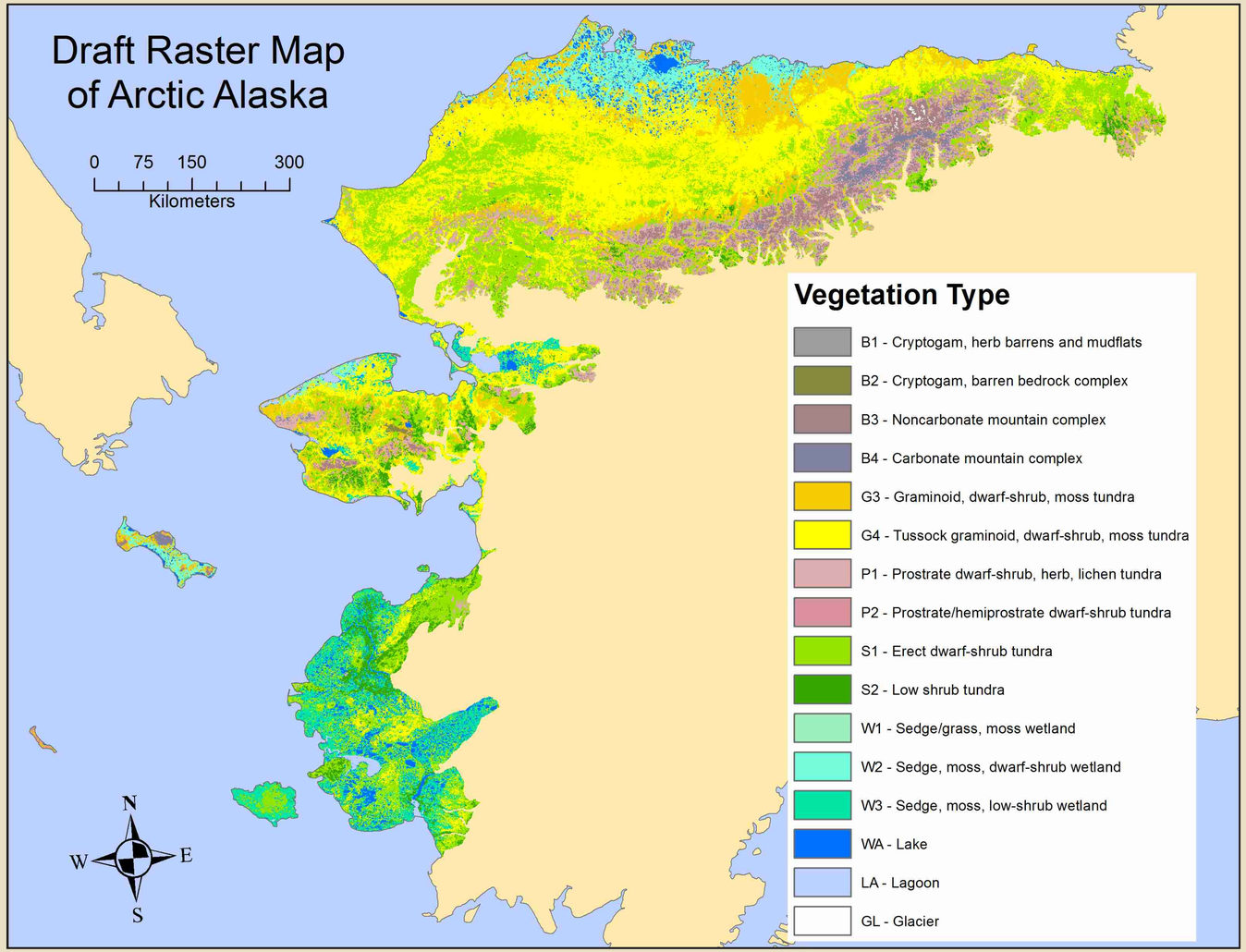
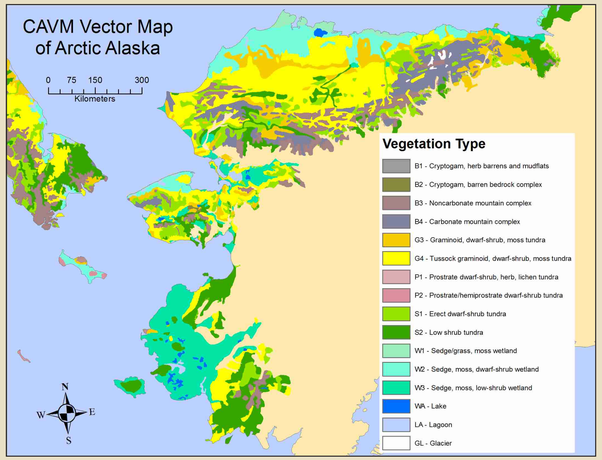


Methods

Treeline was updated to the Circumpolar Boreal Vegetation Map (Talbot & Meade 2011). Three regional unsupervised classifications (North Slope, Seward, and Y-K Delta) defined clusters within the data layers, using seven data layers (all at 1-km resolution): MODIS Band 1, Band 2 and NDVI from D.Selkowitz (Talbot & Meade 2011), AVHRR Band 1, Band 2 and NDVI (Markon 1995); elevation (ESRI 1993, Digital Map of the World).

Modeling: Ancillary data layers were used to assign, group, and split classes: temperature (Summer Warmth Index (SWI) (PRISM 2008), regional maps (Jorgenson et al 2003,Jorgenson 2012, Ducks Unlimited 2013, Fleming 2015, Swanson et al 1985, Swanson et al. 1986, Balser (2016 in review)). In addition, written reports of vegetation were consulted (Young 1971, Klein & Shulski 2011, Jorgenson et al. 2000)

Verification: The draft map is being reviewed by expert mappers with experience within the map area. The final version will include their suggestions.

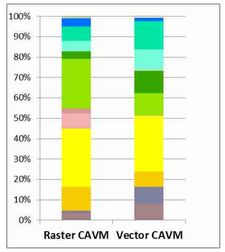


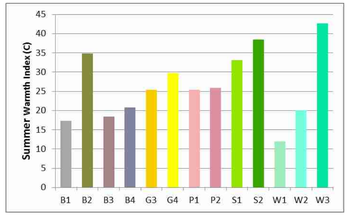
Introduction

A finer-resolution raster version of the CAVM is needed for modeling and other digital analyses. This project will use regional classifications of raster data. We retain the same legend as the CAVM, as it has proved to be effective for circumpolar analyses of vegetation.

Results

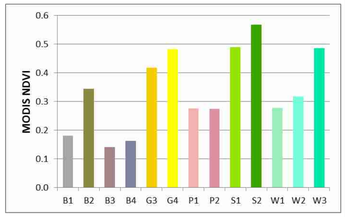
Comparison of proportion of vegetation types in raster vs. vector CAVM of Alaska. The largest units in the raster map are G4 - tussock sedge, dwarf-shrub, 127,267 km², 29%) and S1 - erect dwarf-shrub tundra (108,687 km², 24%) Raster resolution picks up more lakes (WA - dark blue bar at top), more prostrate shrub within mountainous areas (P1, P2 - pink), and more S1 dwarf shrub within moist and wet areas.

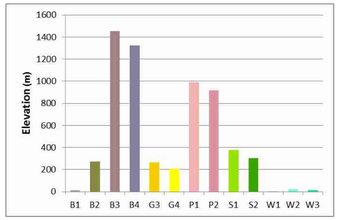




Average summer warmth index (SWI) of vegetation types in raster map.

Average NDVI of vegetation types in raster map.





Average elevation of vegetation types in raster map.

Conclusions

1. Successful mapping method - Unsupervised classification and modeling to assign, combine and divide classes created realistic map of vegetation distribution, using the same circumpolar legend developed for the CAVM.

2. Greater spatial resolution - The 1-km pixel raster map provides much finer resolution than was possible with the vector map, which had a 196 km² minimum mapping unit.

3. Greater cover of finely dispersed cover types - Land cover patches of 5 to 150 km² could not be mapped in the vector version. Lakes and erect shrubs in lowland areas, and prostrate dwarf shrubs in mountainous areas, show larger percentage cover in the raster than the vector map.

4. Temperature, elevation and NDVI characteristics of classes display expected patterns.

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