

Project Summary

The California Air Resources Board (CARB) creates a natural and working lands (NWL) carbon inventory that tracks the amount of carbon in vegetation biomass and soils in order to understand how much carbon is on the Californian landscape, where the carbon stocks are increasing/decreasing, and the reasons behind those stock changes. Stocks are quantified in 6 land cover categories: 1) Forestland, 2) Grassland, 3) Cropland, 4) Settlements, 5) Wetlands, and 6) Other Lands. Total carbon stocks in vegetative biomass and soils is quantified for each of these 6 land cover categories during a year, as well as the amount of carbon and land acreage that transitioned from one land cover category to another.

Identification of the urban forest extent (biomass carbon stocks within the Settlements category) was identified as an area needing improvement. The current methodology uses the US Census TIGER layer of Incorporated Places to identify the urban forest biomass carbon stocks. This leads to carbon accounting issues arising from the exclusion of unincorporated areas within the built environment (e.g. rural communities and ski resorts) being excluded from the urban forest inventory, even though those land cover types would fall within the Settlements category.

This project investigated two potential avenues for improving upon the current methods. The first is to use a supervised land cover classification to improve upon remote sensing of rural communities that are missed in the currently utilized spatial data product, and thus more thoroughly include rural communities and other currently excluded land cover areas. The second is to compare the known areas of excluded Settlements to the Defense Meteorological Program (DMSP) Operational Line-Scan System (OLS) (1992 – 2013) and Visible Infrared Imaging Radiometer Suite (VIIRS) Stray Light Corrected Nighttime Composite bands, Version 4 (2014 - present) datasets to determine whether nighttime lights would be an efficient improvement on determining boundaries of the built environment.

Santa Barbara County was chosen as the study area because it is completely within one ecoregion, has large areas of wildland urban interface (WUI) that are excluded as Settlements in the current NWL inventory, and because the analyst has extensive knowledge of the study area.

The results of the analysis show that the current execution of the supervised classification option was ineffective in improving upon current methods in a time-efficient manner; this method resulted in extensive confusion between land cover categories and did not improve on picking up known areas of rural development. The second method was determined to improve upon picking areas of rural development, but only when the older, DMSP OLS dataset was used. The newer VIIRS dataset didn't pick up additional developed areas when compared to the currently used LandfireC dataset.