LANDFIRE Product Application Summary

Developing site-specific nutrient criteria from empirical models

Authors

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Application Location: Coordinate: 44 01 56.59N 122 49 25.99W (Near Eugene, OR)

Objectives

The primary objectives of this work were to
1) develop models to predict base-flow nutrient concentrations for individual stream reaches, and
2) identify site-specific nutrient criteria based on these model predictions.

Project description

The authors developed Random Forest models to predict how base-flow concentrations of total P (TP) and total N (TN) vary among western USA streams in response to continuous spatial variation in nutrient sources, sinks, or other processes affecting nutrient concentrations. To accomplish this task, the authors assembled a variety of data sets, such as nutrient measurements from streams across the Western US; chemical composition predictors from geologic sources; atmospheric deposition estimates; % cover from LEMMA; MODIS Enhanced Vegetation Index data; NLCD; soil organic C and organic matter; National Hydrography Dataset; US Soils Map; PRISM; stream and terrain variables, and others.

LANDFIRE products used

LANDFIRE BpS descriptions and the Version 1.0.5 BpS layer were part of the data suite used in this analysis. The authors used BpS descriptions to identify which particular BpS contain selected species, and then extracted those pixels from the BpS map. The rationale for selecting LANDFIRE data was not described in the report, but we postulate that the comprehensive coverage and unique nature of the pre-settlement vegetation products led to that decision.

Value of the work to the natural resource management/conservation community

Ecologically meaningful and scientifically defensible nutrient criteria are needed to effectively protect water quality and aquatic biota. Prior to this study the approach was to apply some form of landscape categorization to account for natural variability among water bodies. The high natural variation within

these regions is so great that the use of a single criterion may lead to the under-protection of naturally occurring low nutrient streams, and over-protection of naturally occurring high-nutrient steams.

Links to Supporting Information / Resources:

- http://www.conservationgateway.org/Files/Pages/LANDFIREOlsenHawkins.aspx
- http://www.bioone.org/toc/jnbs.1/32/3