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Original Article

Using Random Forest to Classify Vegetation Communities in the Southern Area of Ikh Nart Nature Reserve in Mongolia

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Abstract

Remote sensing has grown exponentially in the last 20 years, enabling scientists to study ecological phenomena with methods previously unavailable. Freely available satellite imagery in finer resolutions has increased, making it possible and more economical to analyze and monitor the Earth's ecosystems. Software and on-line platforms make it easier to investigate conservation areas of concern. Yet, remote areas such as Mongolia do not have freely available data, such as land cover and climate variables, at a fine scale in a Geographic Information System (GIS). Scientists depend on individual efforts and products produced for remote areas and the sharing of these data. In this paper, we report our findings in using Random Forest, a machine learning tree classifier, to categorize vegetative communities in the southern portion of Ikh Nart Nature Reserve in Mongolia. Our results produced 6 different vegetation community classes from a Landsat 8 image using 7 bands and collected on September 13, 2013. The vegetation communities are: ephemeral water, dense rock, low-density shrub/short grasses and forbs, short grasses and forbs, semi-shrub, and tall grasses. Our results provide a foundation for ecological studies in the region, such as those focusing on habitat selection by wildlife, and can inform broader-scale landscape planning.

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Introduction

Remote sensing increasingly contributes to nature conservation by offering tools to analyze animal movement, resource selection, land cover changes, climate change, and human disturbance, and for mitigating the loss of resilience in ecosystems (Yamada *et al*., 2003; Boyle *et al*., 2014). Yet, finding data in remote areas such as Mongolia, at a fine scale can be difficult.

Researchers may depend on efforts produced by other colleagues to address their need for fine scale data. Jackson *et al*. (2006) created a GIS vegetation map for the northern area of Ikh Nart Nature Reserve (INNR). This effort has been valuable for many studies. For example, Lkhagvasuren *et al*. (2016) studied habitat loss on corsac fox occupancy in Mongolia using