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ADVANCING YUROK TRIBE CLIMATE IMPACT MITIGATION ACTIONS THROUGH THE COLLABORATIVE DEVELOPMENT AND EVALUATION OF A SATELLITE REMOTE SENSING DECISION SUPPORT SYSTEM

Abstract

The Yurok Tribe in northern California faces natural resource management challenges due to climate change-related drought and forest fires. Conversely, the Tribe is mitigating climate change impacts through forest carbon sequestration projects. The revenue from these carbon sequestration projects has promoted investments in natural resource management, facilitated reacquisition of over 50,000 acres of their ancestral territory, and increased acquisition of cultural resources. Satellite remote sensing (SRS) analyses can aid in further understanding negative climate impacts and forest carbon project management within the Yurok Ancestral Territory. Integrating SRS analyses into decision support systems (DSS) can promote natural resource management insights. However, externally-developed DSS often fall into disuse due to a lack of interaction between DSS developers and end-users. Relatedly, SRS data is often inaccessible to local leaders due to lack of awareness regarding how to obtain and utilize the data. These issues inhibit the transfer of the benefits of satellite remote sensing (broad spatial coverage and consistent temporal records) to local efforts to mitigate climate impacts. A multi-stage project entailing collaborative SRS analysis development and DSS end-user evaluation is being conducted in collaboration with the Yurok Tribe. This effort seeks to address these gaps in DSS development and SRS data accessibility while meeting Yurok Tribe objectives. Using inputs from interviews of local stakeholders to determine analysis objectives, a targeted SRS analysis of tree cover change is conducted using Sentinel-2 data for classification of tree cover and Landsat data to identify forest trends. Tree cover classification was highly accurate (overall accuracy of 99%) and Landsat-based tree cover trends show strong agreement with high resolution aerial imagery. SRS analyses are integrated into a DSS alongside Yurok Tribe socioeconomic information and analyses from government efforts. This data integration facilitates insights for drought and fire risk mitigation, as well current forest carbon project management and the planning of future carbon projects. User studies are then conducted to gather end-user feedback. Initial user study results show the majority of respondents

rating 100% of DSS information as relevant, and indicating that this information was "mostly" or "totally" sufficient. End-users also expressed a desire to institutionalize DSS use in natural resource management. User studies identified new datasets and functionality for the DSS towards maximizing utility to end-users. This project engaged with the Yurok Tribe at every stage to co-design a DSS that leverages the benefits of SRS data to advance Yurok Tribe efforts to mitigate climate change impacts.