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Research Brief for Resource Managers

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Monitoring techniques: Using citizen science to gather fuels data

Ferster CJ, Coops NC (2014) ***Assessing the quality of forest fuel loading data collected using public participation using smartphones.*** *International Jounral of Wildland Fire (23) 585-590.*

Click here for original journal article.

Establishing and maintaining forest fuel monitoring plots can aid in pinpointing areas of high wildfire risk in need of fuel reduction treatments. Many modern organizations struggle to find enough time, money, and expertise to gather forest fuels data from the field.

In this month's brief, researchers Colin Ferster and Nicholas Coops of the University of British Columbia explain that there are two main challenges to gathering fuels data: (1) fuels are ever changing from storms, insects damage, and growth; and (2) it is difficult to measure surface, ground, and ladder fuels using aerial remote sensing in areas with dense canopy cover. Typically, dedicated field crews are needed to keep fuel load measurements current.

Citizen science is rapidly becoming a viable way to collect data over wide areas and to increase local community knowledge and engagement. Examples of widely used citizen science smartphone applications include eBird and iNaturalist. For this study, the authors designed an iPhone application (app) to be used by general citizens and non-specialists (e.g. park or city staff), then compared the accuracy of fuel loading estimates of professional and non-professional users.

Management Implications

- Modern smartphones provide the opportunity to utilize ordinary citizens for gathering forest fuels data
- Professionals were more accurate in estimating forest fuels than non-professionals
- Targeted training and better instructions would help non-professionals improve fuel loading assessments

This app provides easy to follow instructions and guides users in recording plot locations, as well as slope and aspect, and provides photo-matching techniques to estimate different types of fuels (Figure 1). Additionally, the app provides organized tables of observations and corroborating photographs without the need for data entry from field notes.

In evaluating professional and non-professional users, the authors found that for most measurements, the professionals were closer to reference measurements than non-professionals. These measurements included

slope, aspect, and fine woody debris. Surprisingly, non-professionals were more consistent at estimating the "height to live conifer crown" measurements than were the professionals. This was attributed to differing working definitions by professionals and a closer reading of instructions by non-professionals. In general, all participants underestimated fine woody debris.

The authors discuss the fact that other studies have shown that professional and non-professional data are comparable. Although this study showed professionals' measurements to be more similar to reference measurements, the authors conclude that consistent differences between the groups show that targeted training and better instructions would most likely close this gap.

In conclusion, this study shows that fuel assessments by citizens have the potential to engage the public in forest management while also providing valuable information to fire managers for fuels management decisions. At this time, the application is not publicly available, but further development is underway.

Examples of attribute collection:

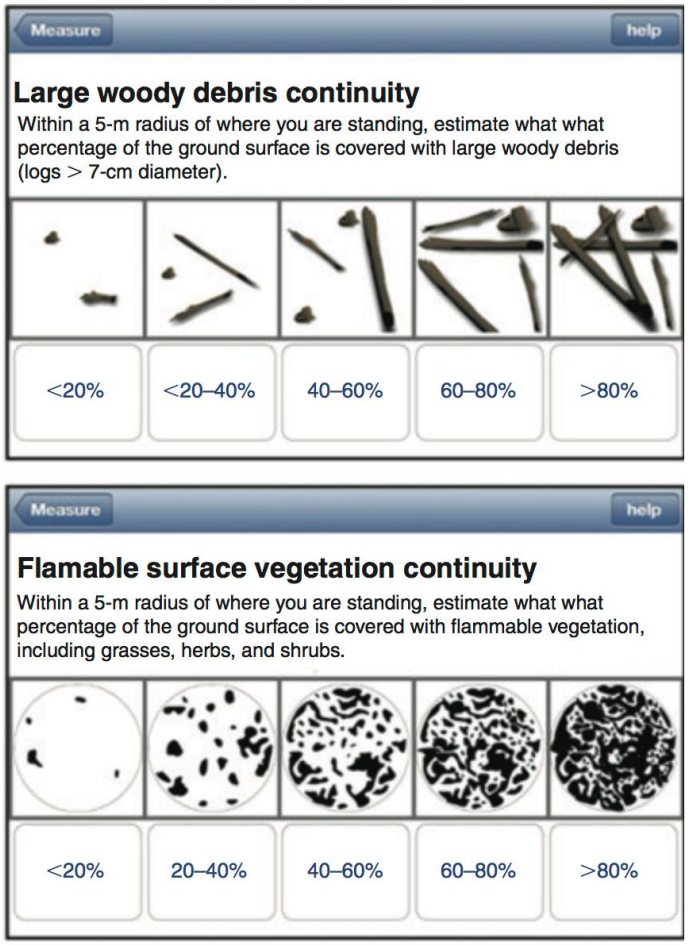

Figure 1. Photoload images used to guide fuels estimations.