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| **Increasing fire resistance in needleleaf forests through mixing with broadleaved trees** |
| **Introduction/Aim:** Numerous factors can influence the frequency and intensity of forest fire. Among many, species composition is one of the key determinants of how forest fire can affect the damage of forest ecosystems and its recovery. This study evaluated the vulnerability of forest fire damage and forest fire resistance according to species composition of forest stands (i.e., proportions of needleleaf (NT) versus broadleaved trees (BT) within forest stands).**Methods:** After a forest fire event in South Korea, fire damage severity was assessed based on the comparison of the Normalized Burn Ratio before and after the event that was acquired from Sentinel-2 imagery. We further used 3 m of PlanetScope imagery to (1) quantify species composition between NT versus BT within 30 m of Sentinel-2 pixels and (2) analyze the degree of fire damage as well as recovery based on changes in the timing of phenological events and vegetation index.**Results:** The results show that the NT dominated forest stands suffered more damage from fire than the BT dominated stands, and the differences increased as the fire severity increased. In the NT dominated forest stands, increases in the proportion of BT led to decreases in fire damage, while there were no such correlations in the BT dominated forest stands. In addition, the NT dominated stands showed more delayed phenological events both at the start and end of growing seasons than those in the BT dominated stands, implying the slow recovery of forest stands after the fire in the NT dominated stands.**Conclusion:** Our results showed differences in the fire damage and recovery according to species composition and demonstrated that the higher fire resistance of BT could enhance the fire resistance of a forest stand. These findings suggest that considering tree species diversity is essential for restoring fire damage areas, especially in the context of climate change, where an increase in wildfire frequency is expected. |

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