

Using remote sensing to track invasive trees

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A team of Agricultural Research Service (ARS) scientists has refined remote sensing tools for identifying invasive Ashe juniper shrubs and trees in central Texas and nearby regions. These findings can help rangeland managers determine the extent and severity of Ashe juniper infestations and boost mitigation efforts.

Over the past century, the expansion of Ashe juniper has reduced the production and diversity of other rangeland plant species. Because Ashe juniper has little nutritional value for [grazing animals](#), the vegetative shift has also reduced forage options for livestock and wildlife.

ARS agricultural engineer Chenghai Yang and rangeland scientist James Everitt evaluated remotely sensed data to pinpoint the most accurate "signal" for identifying Ashe juniper stands, which often grow within an assortment of other woodland plants. Yang and Everitt work at the ARS Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas.

Remotely sensed data were collected from two Texas sites that were populated with Ashe juniper and other associated plant communities. The data spanned 98 spectral bands--which are bands of light that are characterized by different wavelengths--that ranged from 475 to 845 nanometers.

Then the team used a [statistical technique](#) called minimum noise fraction (MNF) transformation to reduce interference. In comparison with the original imagery, MNF imagery takes less time to process and less data

space to store, especially when large amounts of remotely sensed data are being analyzed.

MNF transformation consolidated the spectral data into 50 distinct bands. Further analysis indicated that the first 10 bands from this group were the best for identifying Ashe juniper stands. Using these bands, the scientists were able to sufficiently distinguish Ashe juniper from other mixed woody species, other mixed herbaceous species bare [soil](#) and [water](#).

More information: Results from this work were published in the International Journal of Remote Sensing.

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