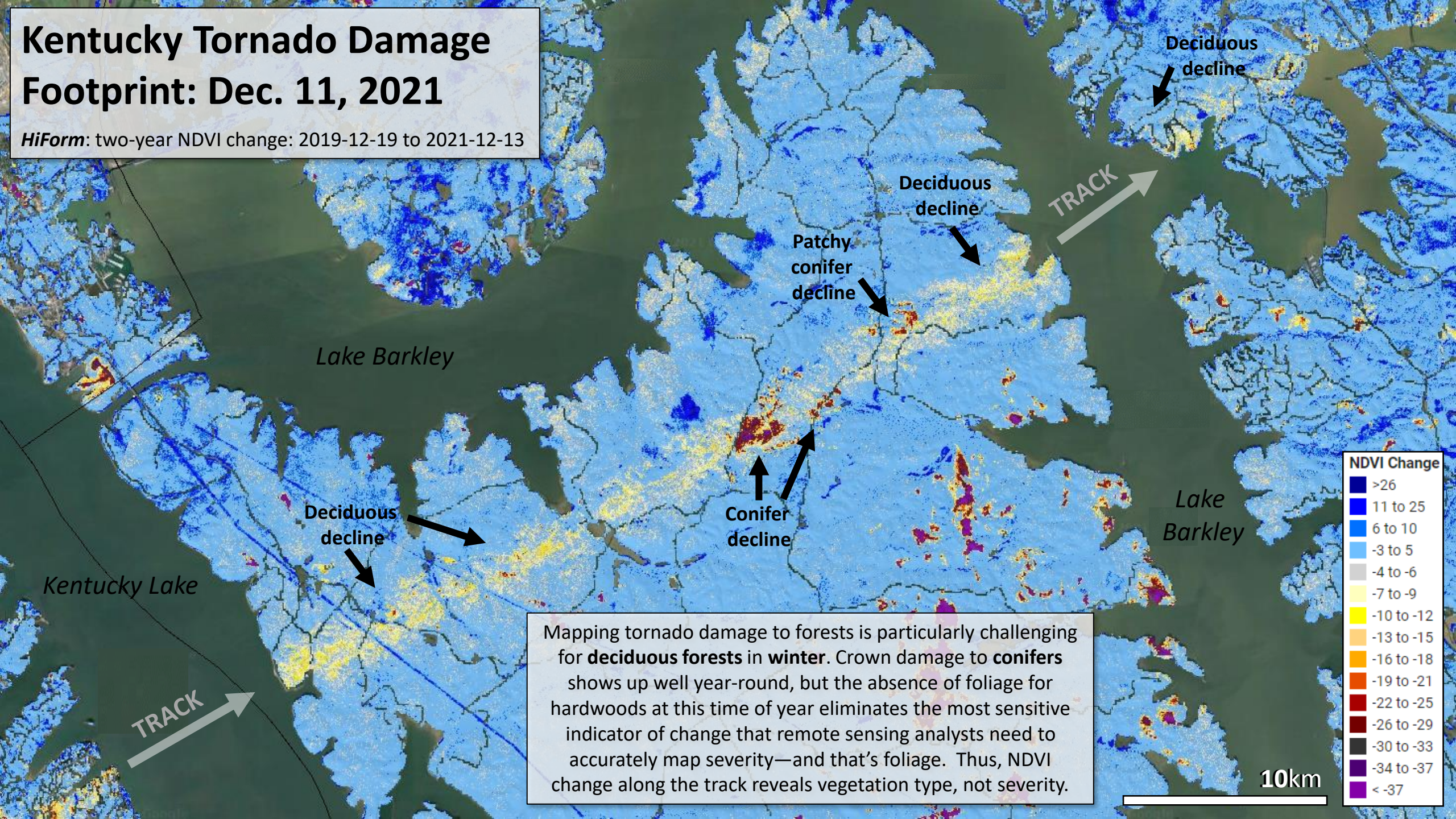


# Kentucky Tornado Damage Footprint: Dec. 11, 2021

HiForm: two-year NDVI change: 2019-12-19 to 2021-12-13



Lake Barkley

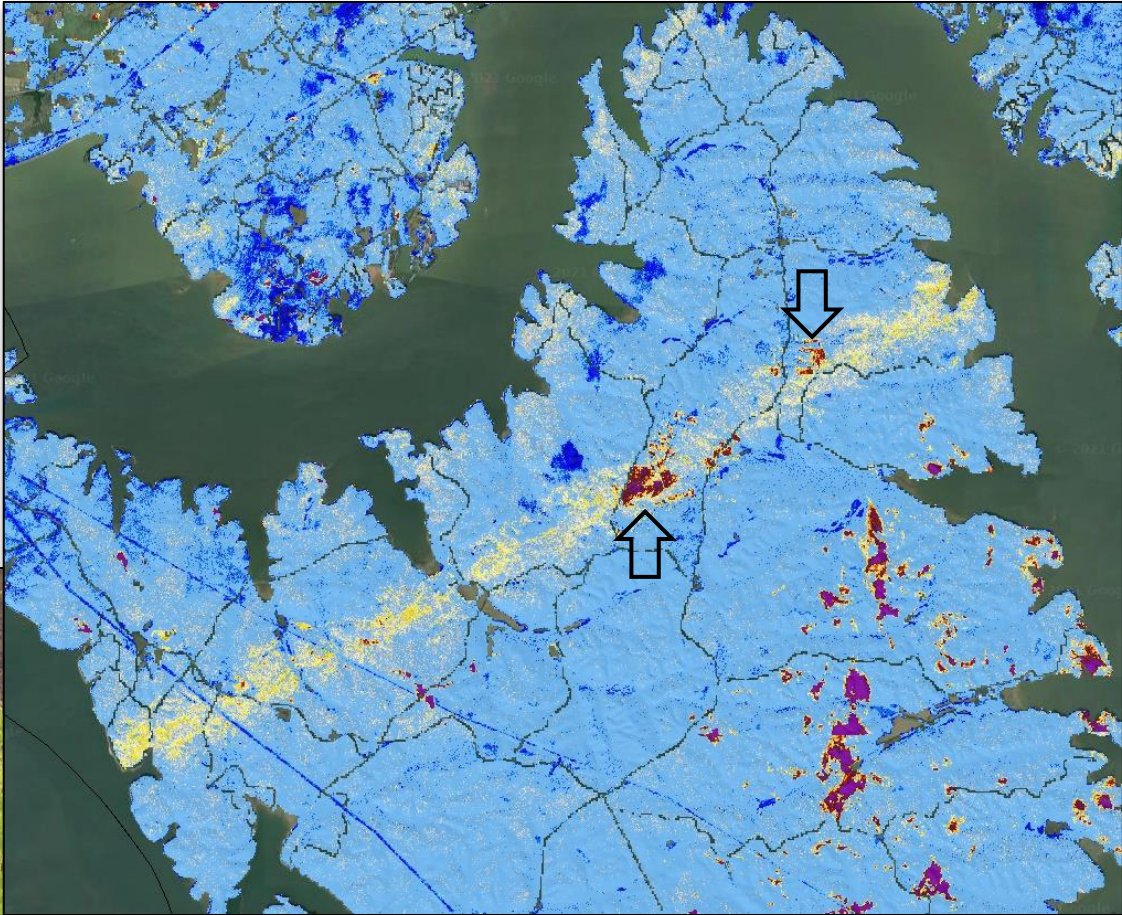
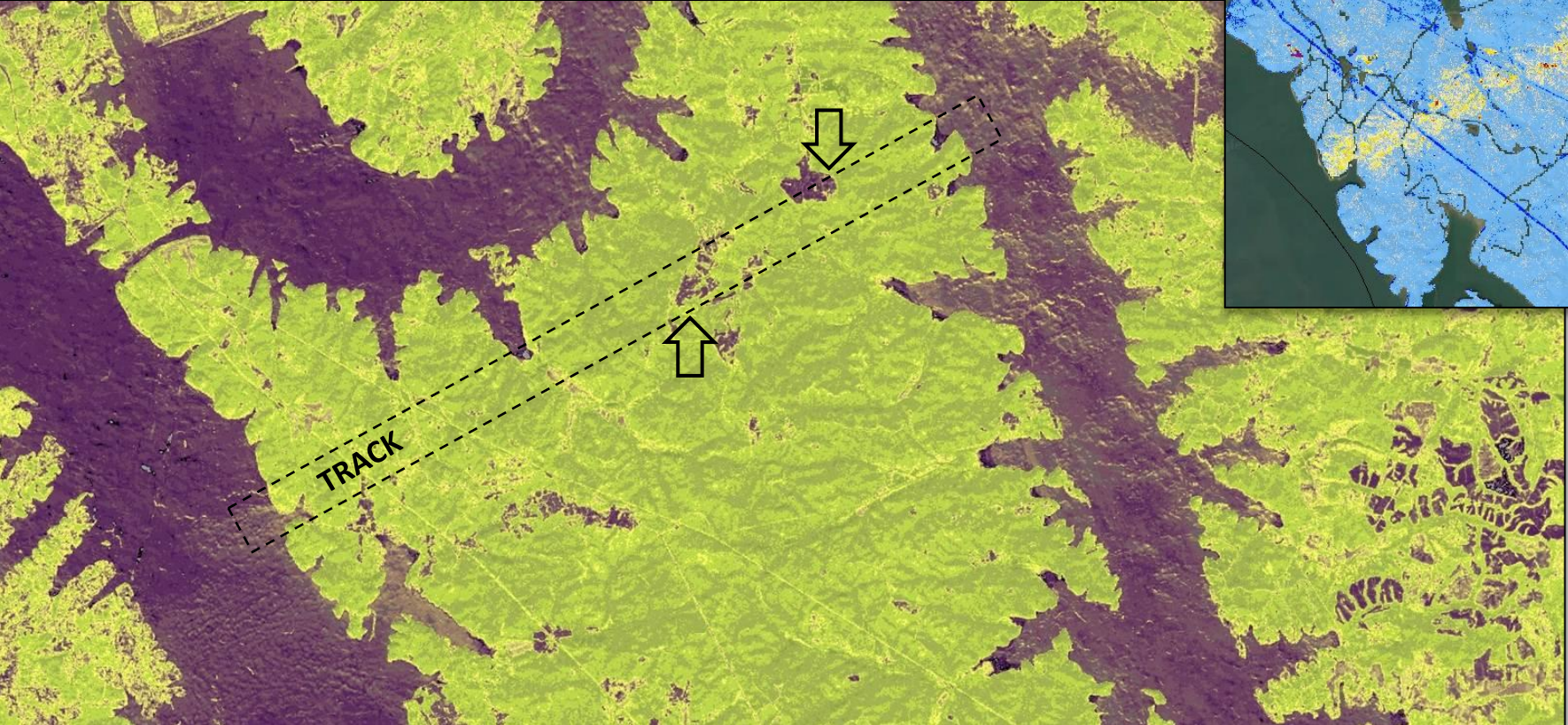
Kentucky Lake

Lake Barkley

Mapping tornado damage to forests is particularly challenging for **deciduous forests** in **winter**. Crown damage to **conifers** shows up well year-round, but the absence of foliage for hardwoods at this time of year eliminates the most sensitive indicator of change that remote sensing analysts need to accurately map severity—and that's foliage. Thus, NDVI change along the track reveals vegetation type, not severity.



(Below) **Cross-seasonal evergreenness** from 10m *HiForm* Sentinel-2 imagery. This map isolates deciduous forest having high summer to winter variation in NDVI (in lime green) from low-variation conifer forest (in purple, as are lakes and fields or cropland). Note that conifer areas in purple within the track correspond to areas of greatest change (right). However structural damage may be near uniform across the track, given the seasonal absence of deciduous canopy foliage. Damaged conifers preferentially show up because they are sensitive to loss, given their evergreen status.



(Above) **Tornado track** through Land Between The Lakes, KY. *HiForm* Sentinel-2, Dec. 11, 2021  
Within season % change NDVI

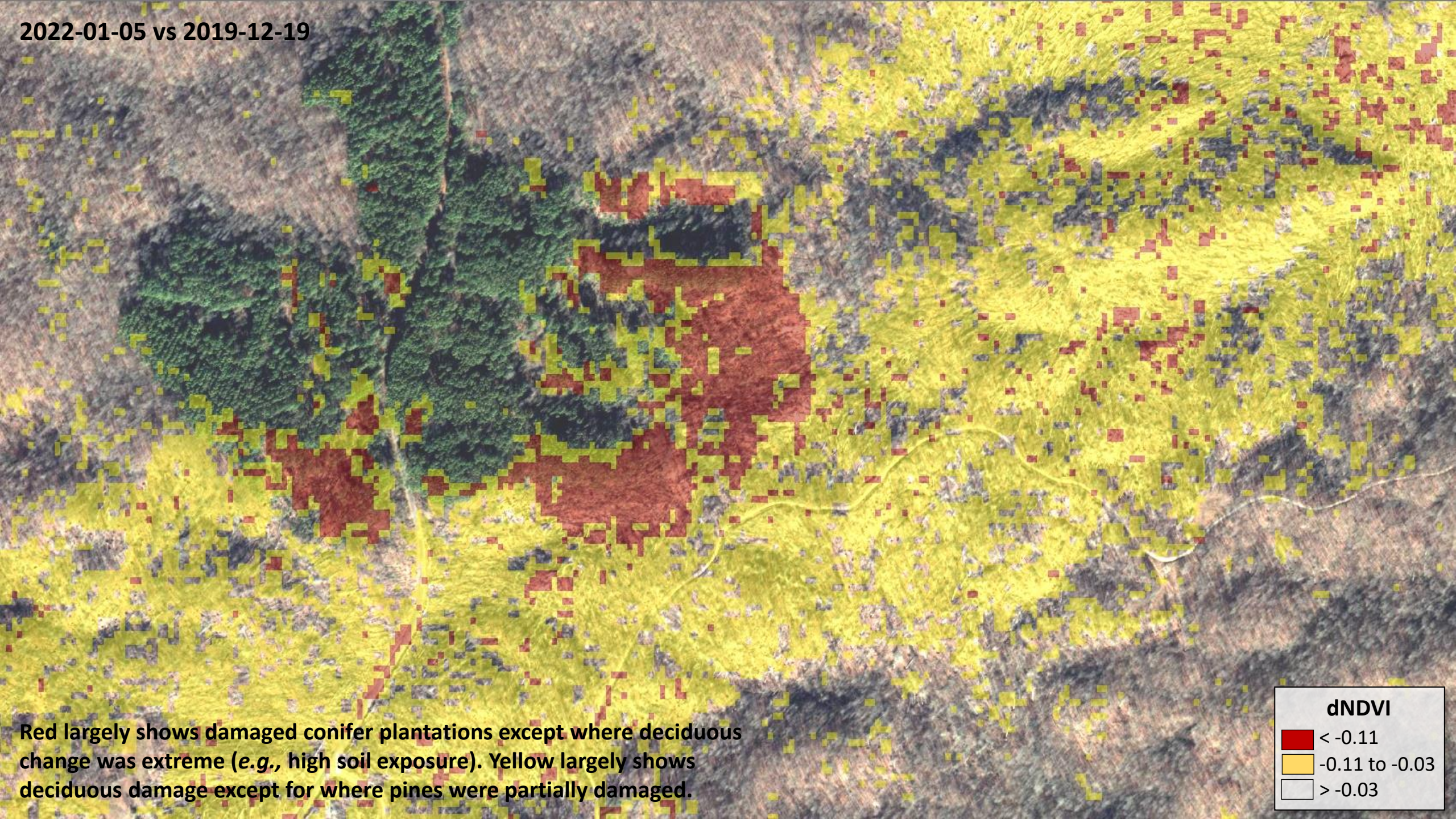


**Land-Between-The-Lakes tornado damage compared to 50cm Worldview Imagery**

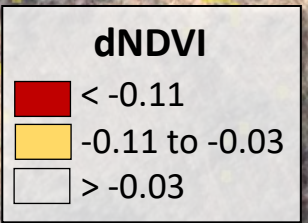




2022-01-05 vs 2019-12-19



Red largely shows damaged conifer plantations except where deciduous change was extreme (*e.g.*, high soil exposure). Yellow largely shows deciduous damage except for where pines were partially damaged.



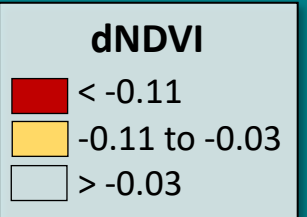




*Lake*

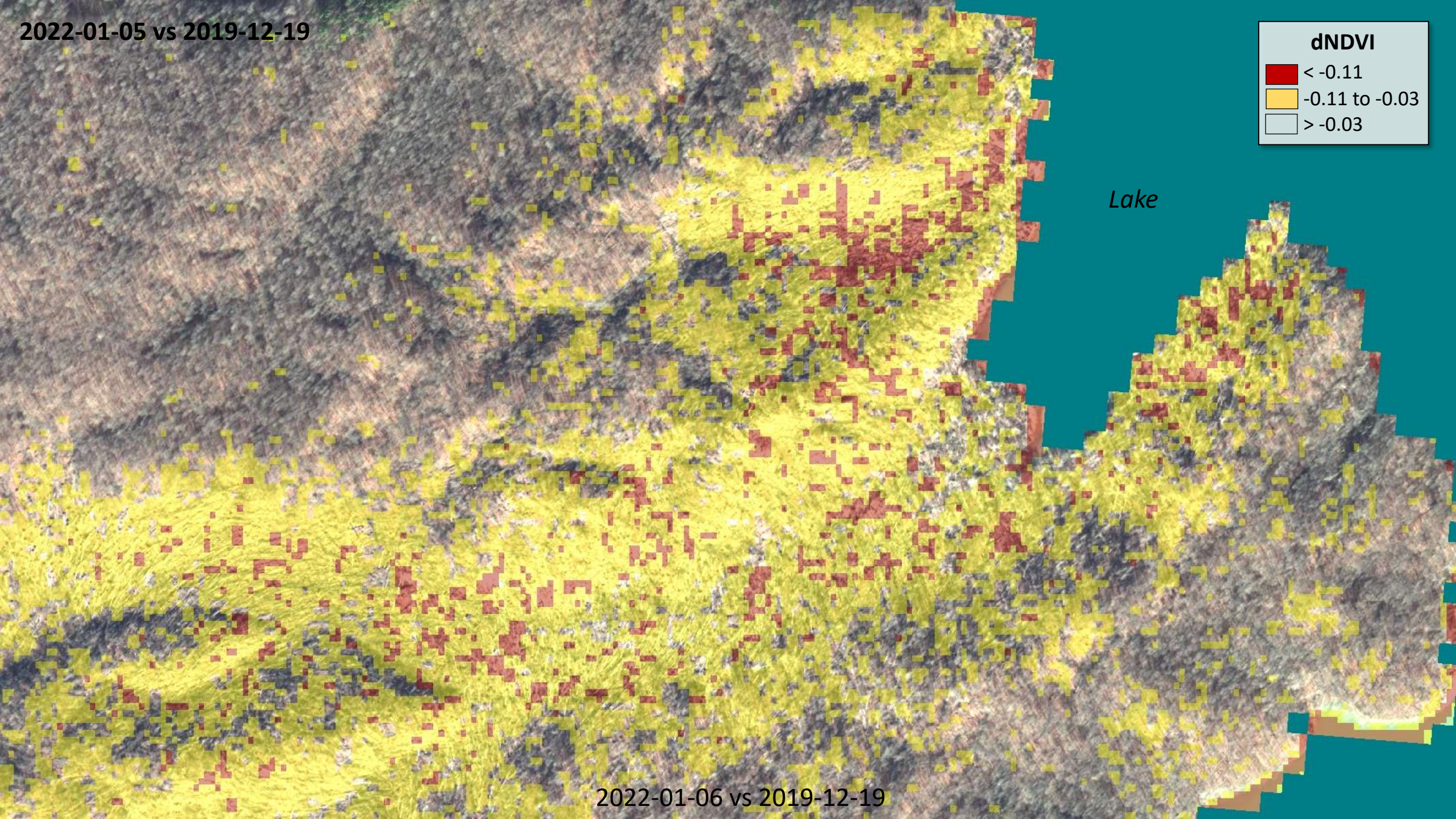


2022-01-05 vs 2019-12-19



*Lake*

2022-01-06 vs 2019-12-19

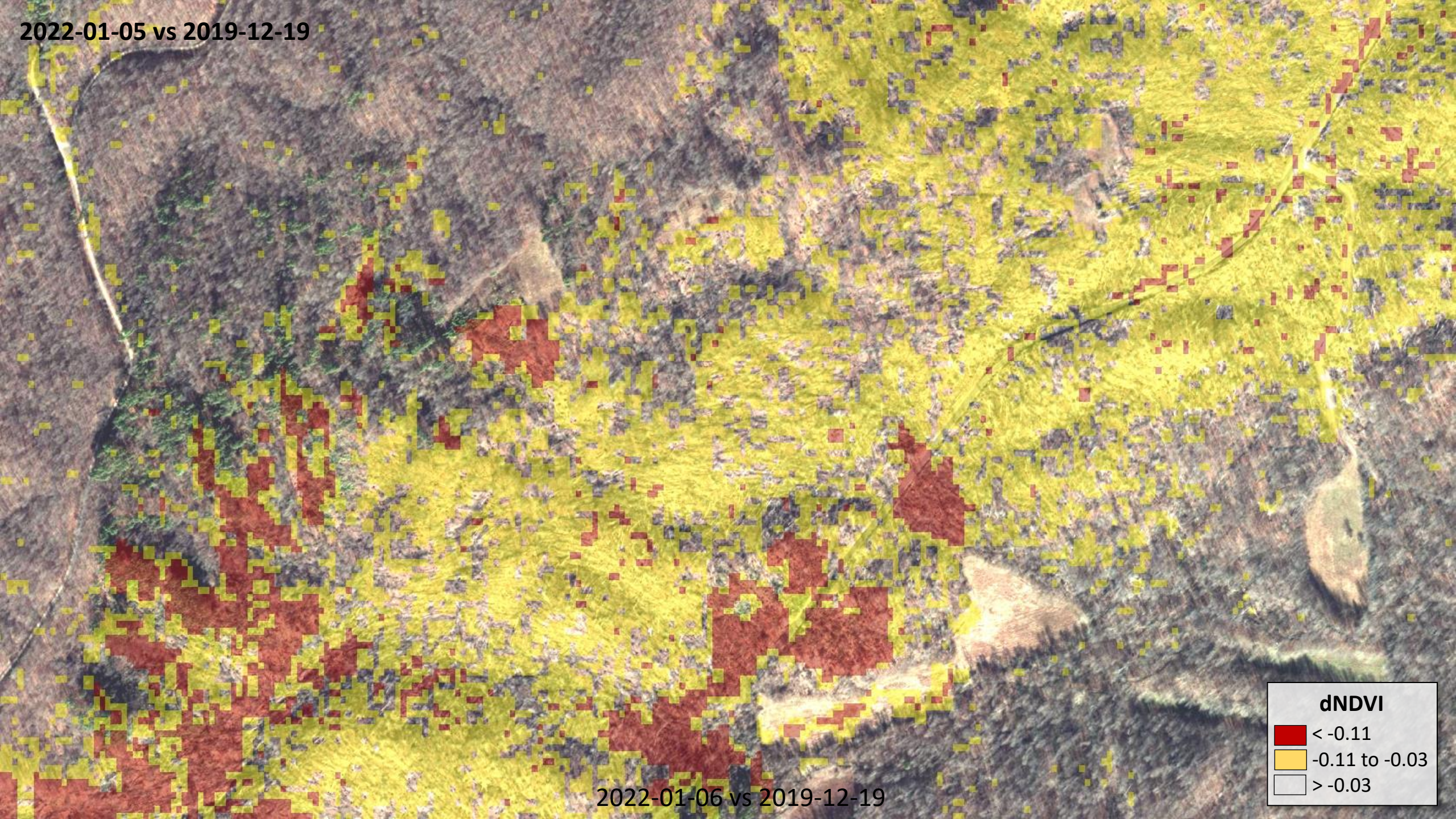




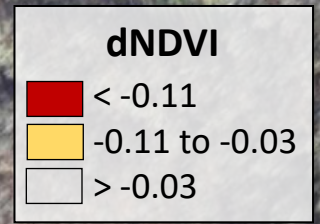




2022-01-05 vs 2019-12-19



2022-01-06 vs 2019-12-19

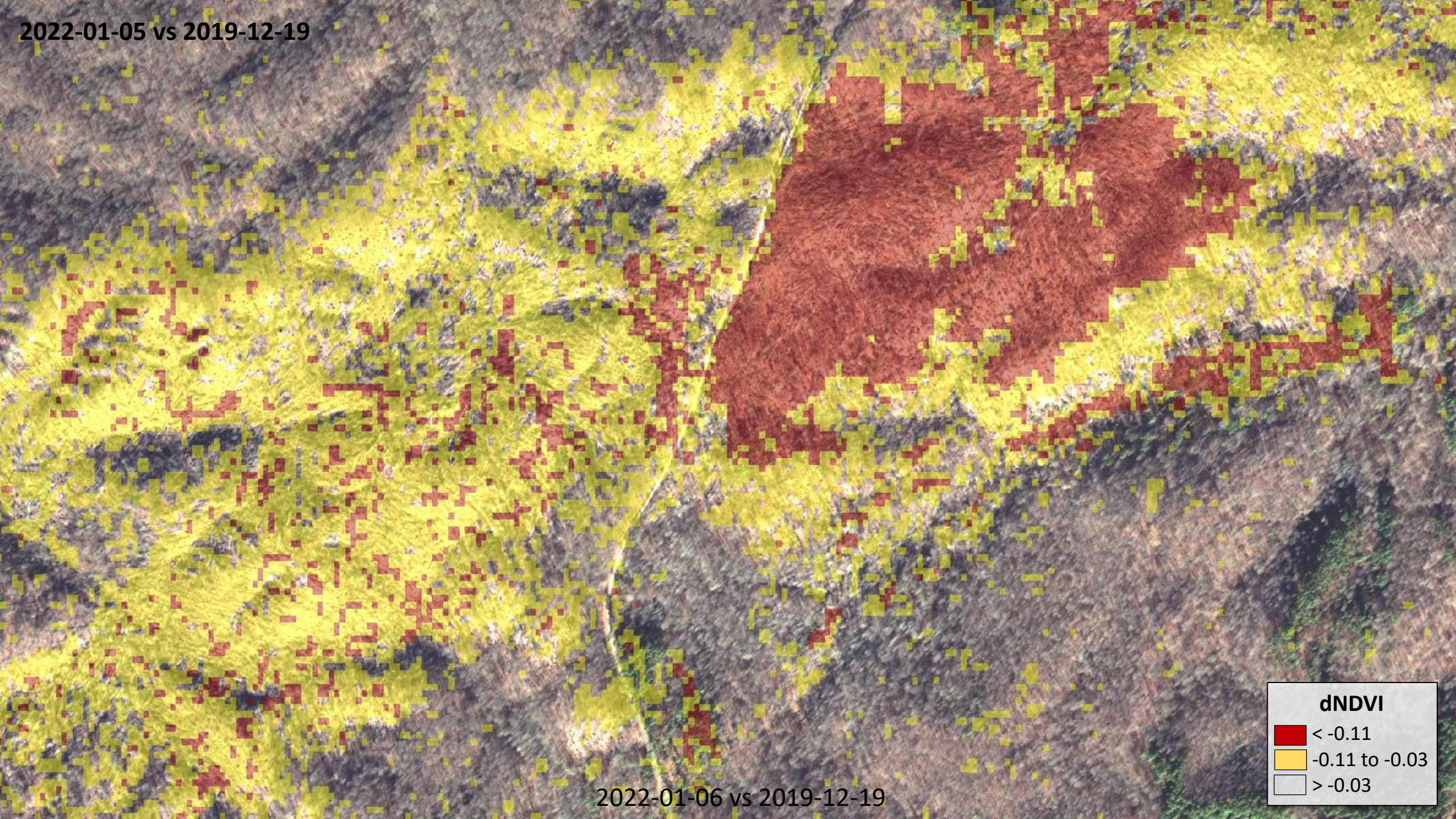




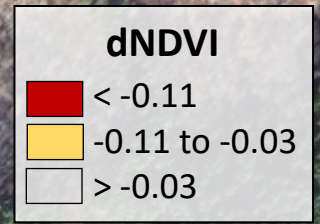




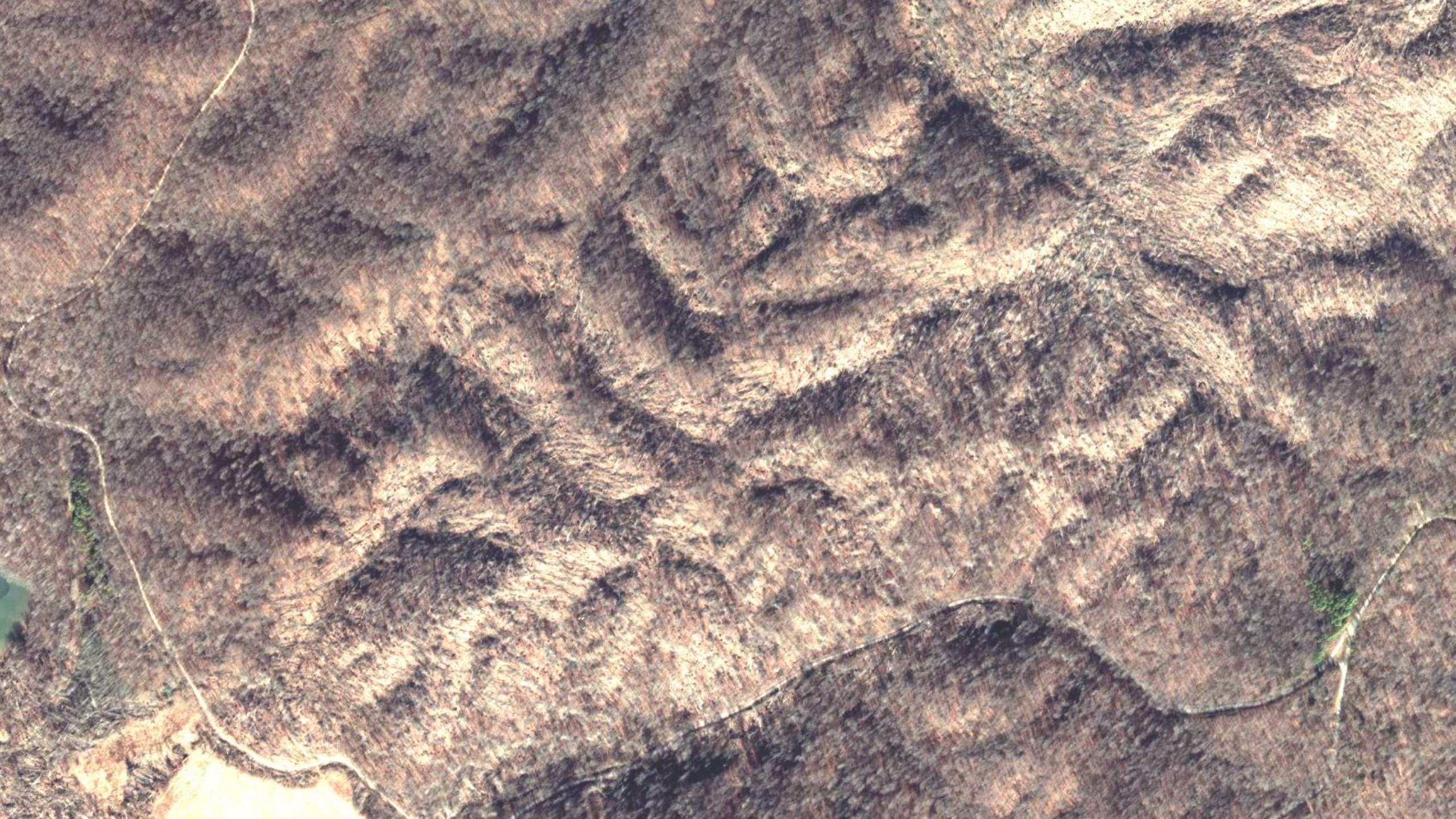
2022-01-05 vs 2019-12-19



2022-01-06 vs 2019-12-19

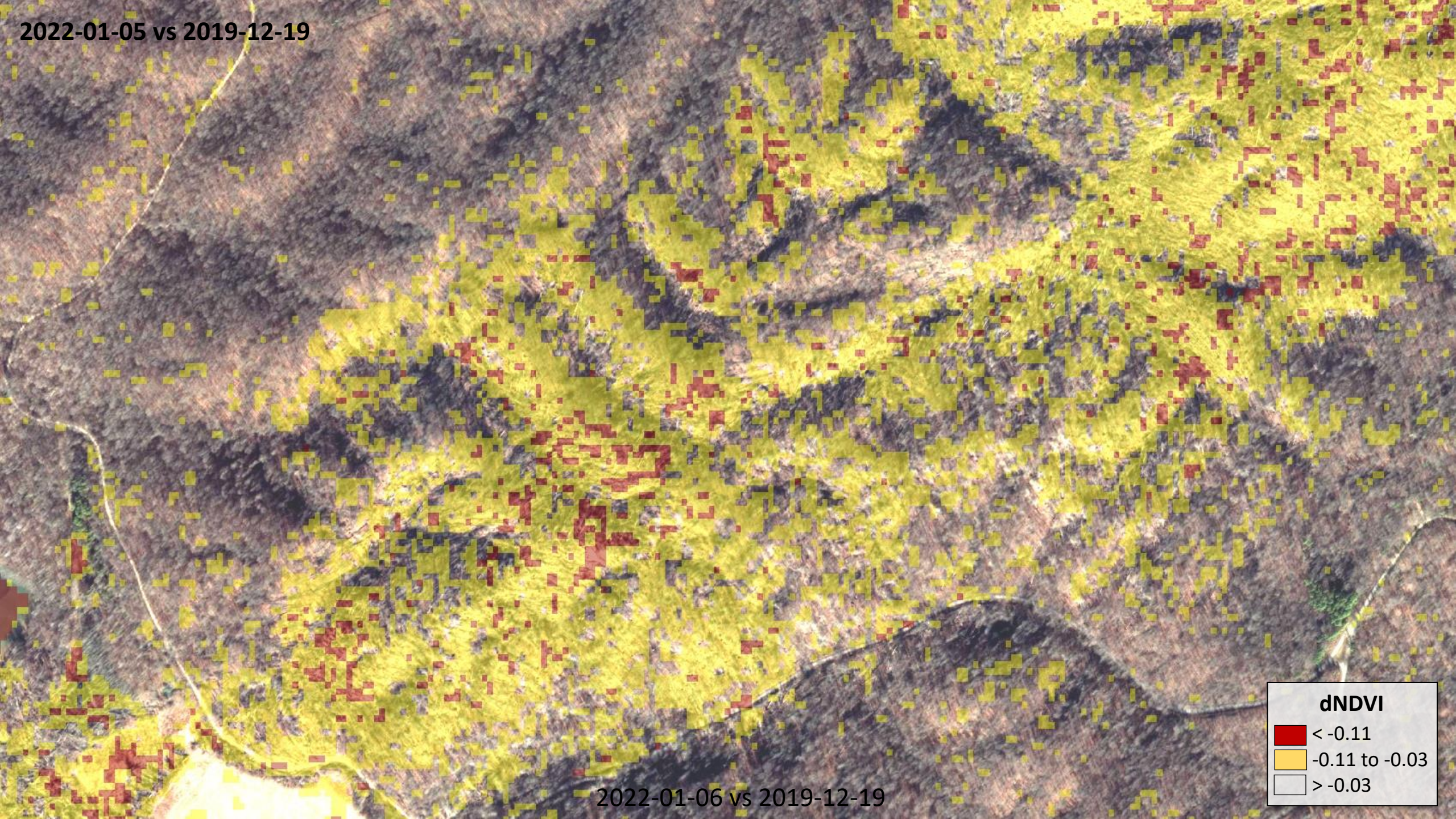




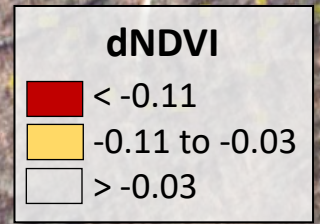




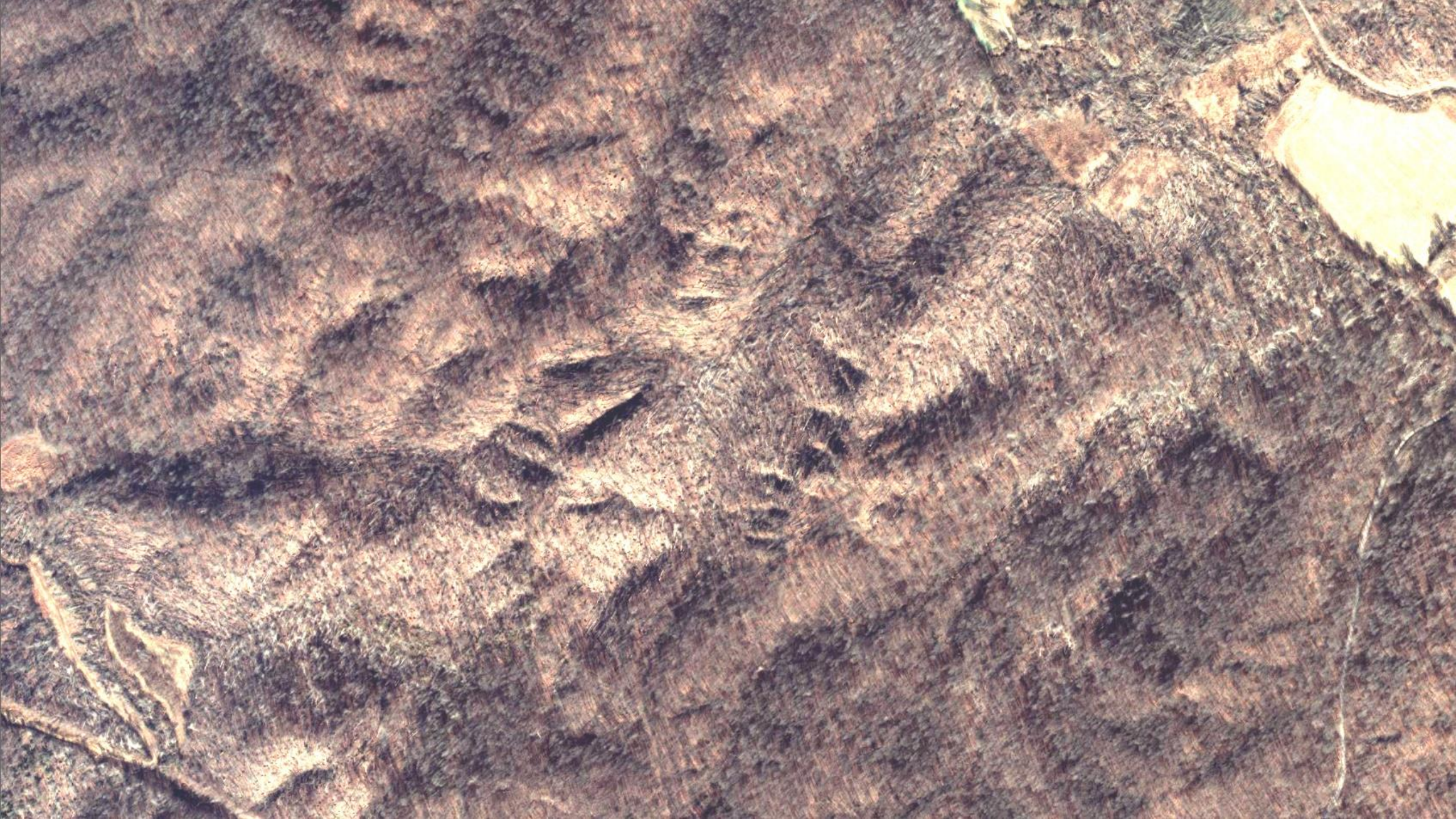
2022-01-05 vs 2019-12-19



2022-01-06 vs 2019-12-19

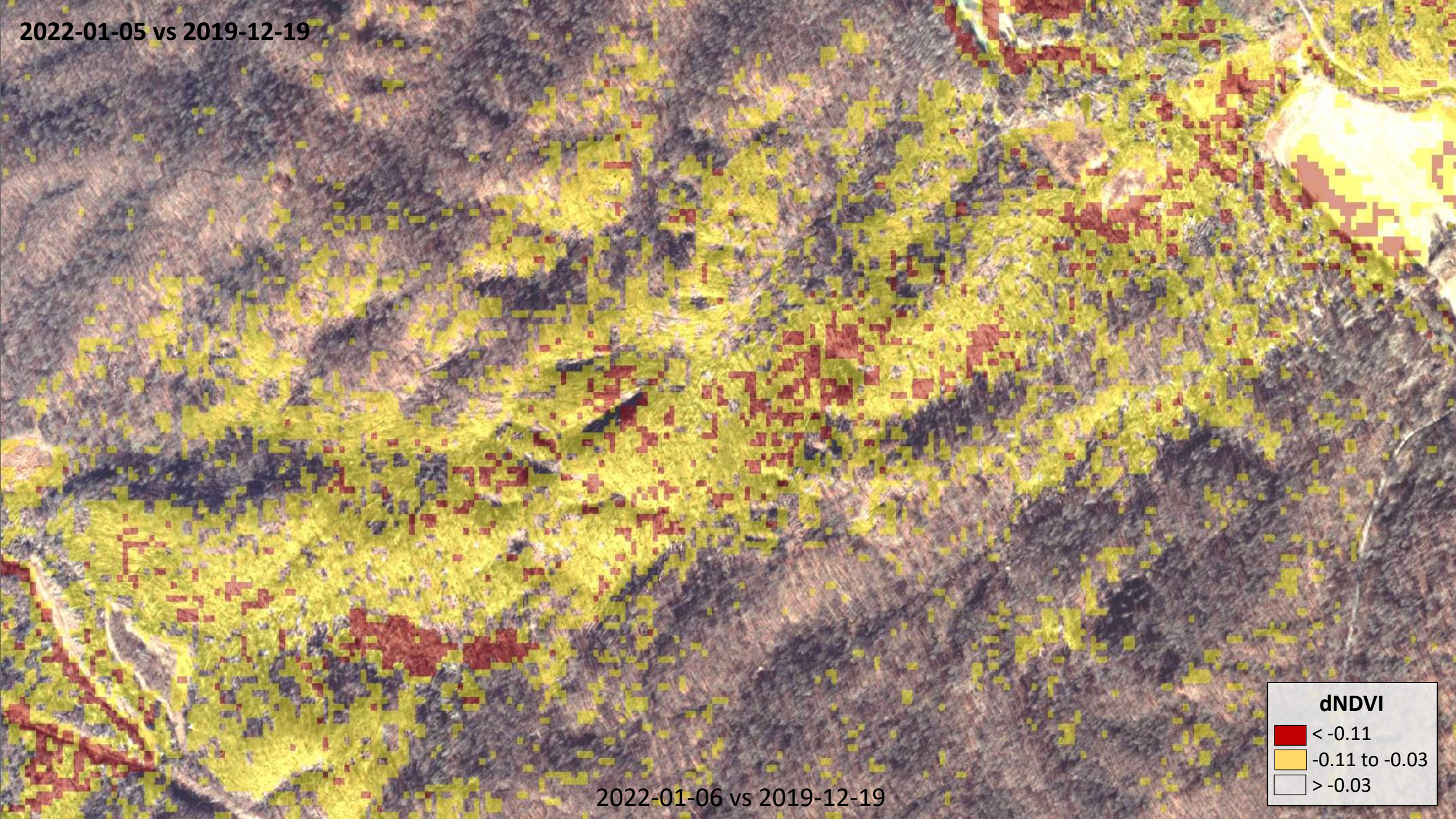




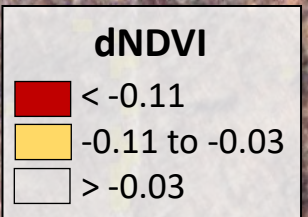




2022-01-05 vs 2019-12-19



2022-01-06 vs 2019-12-19







Lake



2022-01-05 vs 2019-12-19



Lake

2022-01-06 vs 2019-12-19

