

Conservation policies and management in the Ukrainian Emerald Network have maintained reforestation rate despite the war

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Science Question

- How has the military conflict, along with the separation of local institutions, influenced the conservation progress of ecologically significant natural forest areas?
- To what extent have the environmental protection policies under the Bern Convention and the practices of the Emerald Network been effective in conserving and restoring the areas of high ecological significance affected by war?

Analysis

- Land cover classification of the Luhansk region (Eastern Ukraine) for 1996, 2000, 2014, and 2020 based on Landsat-6, 7, 8, and Sentinel-2 satellite data.
- Stratification of land cover change and utilization of proportional random sampling unbiased estimator for the assessment of forest cover change areas in territories under and separated from Ukrainian policies.
- Analysis of the dynamics of land cover change over areas subject to Bern Convention policies and those affected by war-related partial occupation and warfare and occupation.

Results/Significance

- The implementation of Bern Convention conservation policies led to a shift from deforestation (−4% each) to reforestation (+8% and +10%) on both sides of the Emerald Network divided by the demarcation line in 2014. It also shows that despite the war, territories under Ukrainian control after 2014 continued reforestation (+9%), while sites under Russian control experienced dramatic forest loss (−25%).
- The occupation of the environment causes severe degradation of ecosystems not only through physical damage to sites but also due to the separation of local institutions. Meanwhile, the implementation of Bern Convention policies mitigates the impact of war on ecosystems and allows for an improvement in the reforestation rate and restoration of conservation areas.

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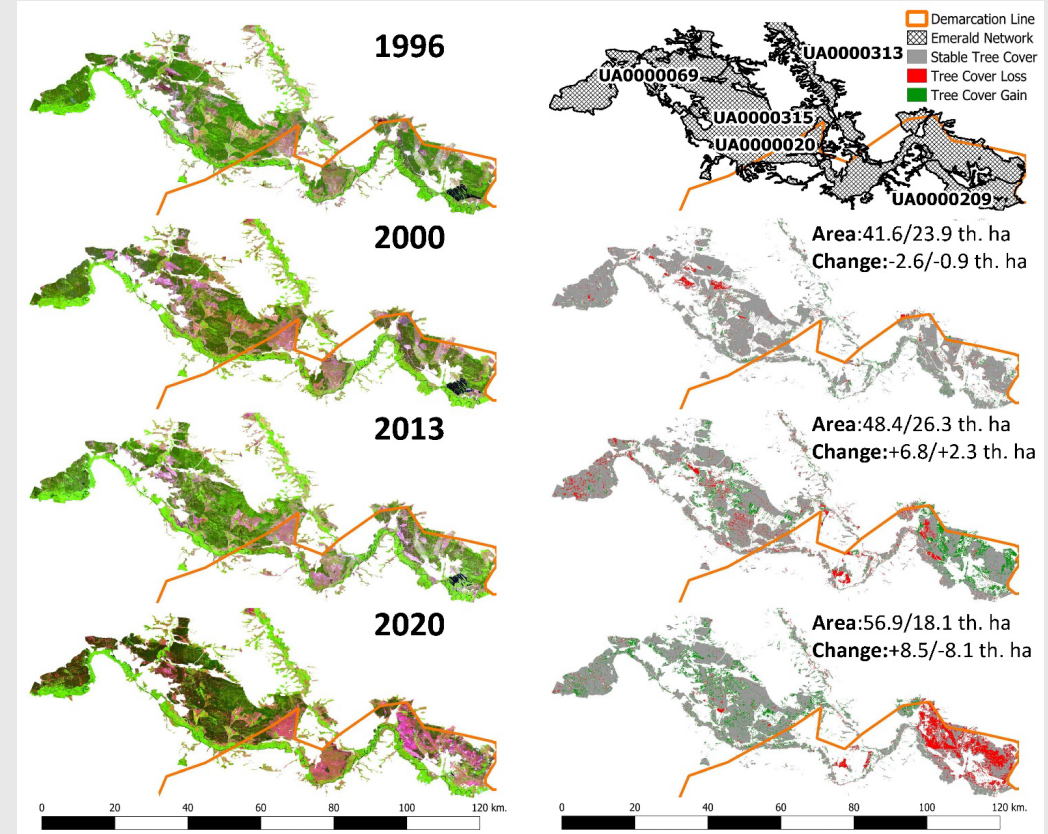


Figure 1: Emerald Network sites established on the banks of Siverskyi Donets river in Luhansk region. The left images show Landsat images for 1996 to 2013 and Sentinel-2 images for 2020 in false color with short wave infrared 1 (~1.6μm), near-infrared (~0.8μm), and blue (~0.4μm) band combinations. The right images show the stable, gained, and lost tree cover for respective years and time periods. Areas and changes represent tree cover changes and net gains for territories under and separated from Ukrainian policies, respectively.