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Reclamation of an urban limestone barrens
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Ijams Nature Center (a 501(c)(3) organization) provides education and recreational opportunities on 127 ha within the city of Knoxville, Tennessee. Pockets of former industrial land are found within the forested natural area, including the site of a former agricultural lime packing facility that includes a 1 ha basin with heavily compacted alkaline soils (pH 8.0-8.4) and widespread disturbance from recreational use. The sparse vegetation included native plant species characteristic of the relatively uncommon limestone barrens ecosystem. A reference site with similar soil chemistry (pH 7.6) and limestone barrens indicator species was located within 2.5 km. Compared to the reference site, the reclamation site was lower in soil organic matter and bryophyte cover, had a greater percentage of bare ground and invasive species cover, lower overstory basal area and diversity, and a very slow infiltration rate. Soil compaction could not be alleviated due to a cave system below the site. Objectives were to increase soil organic matter and vegetative cover to slow water flow, monitor recovery of the native plant community, and provide a working classroom. Fencing was placed to discourage bicycle and foot traffic, brush wattles were placed on steep slopes to slow water movement, and invasive species were removed. Vegetative cover was assessed in 2018, 2020, and 2023. Over the first two years bare ground had dropped from 36 to 23%, and bryophyte cover increased from 12 to 21%, compared to 47% on the reference site. In late summer of 2020 herbaceous cover was similar to that of the reference site and the average number of species per $1m^2$ plot increased from 5 to 8, compared to 13 species per $1m^2$ on the reference site. Natural recovery of vegetation is occurring relatively quickly.
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