Utility-scale solar energy (USSE) ranks among the renewable energy systems with the greatest potential to mitigate climate change. Although the contribution of solar energy to global power production is rapidly growing, our understanding of how land-based USSE arrays impact surface microclimatic features, biodiversity, and plant-soil interactions remains limited. Regular spacing between array panels creates a heterogeneous shading and precipitation regime that may support the formation of novel patchy landscape gradients within USSE array footprints. Quantifying the ecological consequences of USSE arrays will help to identify synergies and trade-offs between energy generation, terrestrial conservation goals, and ecosystem impacts. Scaled over space and time, the effects on ecosystem abiotic and biotic characteristics have implications for land management decision-making, such as the creation of ‘pollinator-friendly’ landscapes within the footprint of USSE arrays.

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