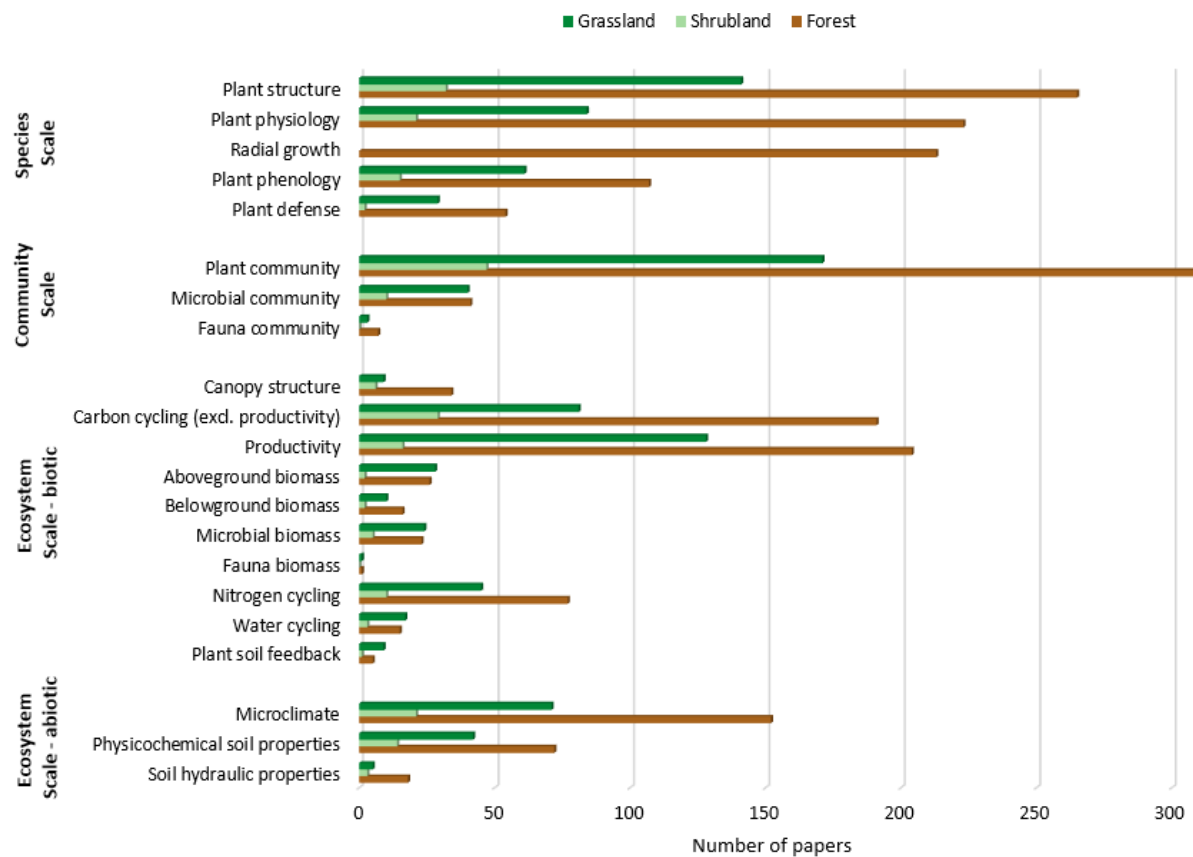


# Supporting Information

Fig. S1 gives a summary of peer-reviewed publications that studied drought legacies on species-, community- and ecosystem scale. This overview is based on a literature search in the Web of Science performed in April 2022, using all databases and searching the following keywords: ‘drought\*’ in title AND ‘legac\*’, ‘lag\*’, ‘memory’, ‘resilience’, and ‘recovery’ in the title and the abstract. Given the focus of this review on natural and semi-natural systems we excluded the term ‘cropland\*’ in the title. We also excluded papers using the terms ‘warming’ and ‘elevated CO<sub>2</sub>’ in the title. Within the 3504 papers obtained we searched for the terms listed in the caption of Fig. S1, allocated to the different scales shown in Fig. 2 and to different ecosystem types/plant functional types (grassland/grass\*/forb\*/herb\*; shrubland/shrub\*; forest/tree\*). Of the 3292 entries displayed across the topics, 30.3 % were allocated to the category grassland (including grass\*, forb\* and herb\*), 7.3 % of the papers to shrubland (including shrub\*), and 62.4 % of the papers were allocated to the category forest (including tree\*).



**Fig. S1:** Number of papers reporting on drought legacies on species, community, and ecosystem scale presented for grasslands (dark green), shrublands (light green), and forests (brown) and the respective species / communities. The following terms were searched within all fields (terms were combined with OR unless mentioned otherwise):

19 **Species Scale:** **Plant structure:** leaf N, leaf nitrogen, leaf trait\*, root N, root nitrogen, root trait\*,  
20 stolon\*, structure, tiller\*; **Plant physiology:** epigenetic\*, growth rate, physiology, signal\*  
21 metabolite\*, transcription, water uptake; **Radial growth for forest/tree\*:** basal increment growth,  
22 radial growth, tree ring\*; **Plant phenology:** flowering date, flowering length, growing season, growth  
23 onset, phenology; **Plant defense:** herbivory, pathogen\*, pest\*, plant defence, plant defense

24 **Community Scale:** **Plant Community:** plant\* AND abundance, community, composition, diversity,  
25 hydraulic trait\*, invasive, mortality, richness, seedbank; **Microbial community:** archaea, bacteria\*,  
26 fung\*, microb\* AND abundance, community, composition, diversity, invasive, mortality, richness;  
27 **Fauna:** fauna\* AND abundance, composition, diversity, invasive, mortality, richness

28 **Ecosystem scale – Biotic:** **Canopy structure:** canopy structure, LAI; **Carbon cycling (excl.**  
29 **productivity):** C cycling, carbon cycling, C dynamics, carbon dynamics; **Productivity:** GPP, gross  
30 primary productivity, productivity; **Aboveground biomass:** aboveground biomass, ANPP;  
31 **Belowground biomass:** belowground biomass, root\* mass, BNPP; **Microbial biomass:** bacterial  
32 biomass, fung\* biomass, microbial biomass; **Fauna biomass:** fauna biomass; **Nitrogen cycling:** N  
33 cycling, nitrogen cycling, N dynamics, nitrogen dynamics; **Water cycling:** water cycling; **Plant soil**  
34 **feedback:** plant soil feedback, PSF

35 **Ecosystem Scale – Abiotic:** **Microclimate:** light availability, microclimate, radiation, soil moisture;  
36 **Physicochemical soil properties:** aggregate stability, soil propert\*, soil structure; **Soil hydraulic**  
37 **properties:** hydrophob\*, soil hydraulic propert\*, water repellency, water retention