

Changes in functional cover of rangeland vegetation in response to modified cool- and warm-season precipitation regimes.



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OVERVIEW

- Seasonal precipitation in the Sonoran Desert is changing in distinct ways:
- COOL SEASON:** decreasing seasonal totals
- WARM SEASON:** fewer / larger storms, longer dry intervals between rainfall events
- How these changes in seasonal P will influence the functional composition of rangeland vegetation is poorly understood.

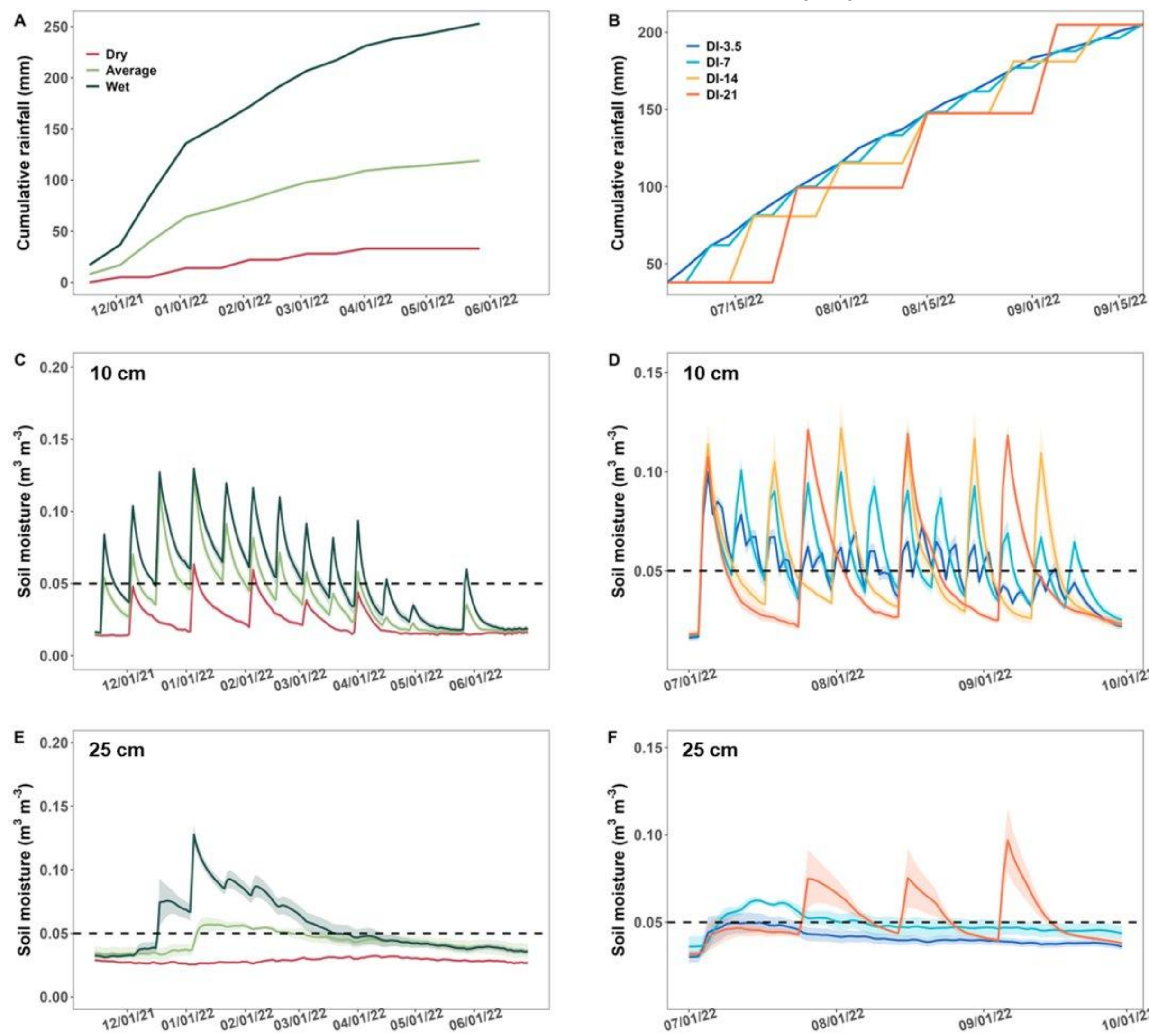
APPROACH: RainManSR

- 100% rainfall interception shelters (5)
- 12 hydrologically isolated plots per shelter (3 cool-season tmts x 4 warm season tmts)
- Plots irrigated with harvested rainfall
- Soil moisture (VWC/SWP) at 3 depths
- Plant functional cover estimated in spring and early-, mid- and late-summer.



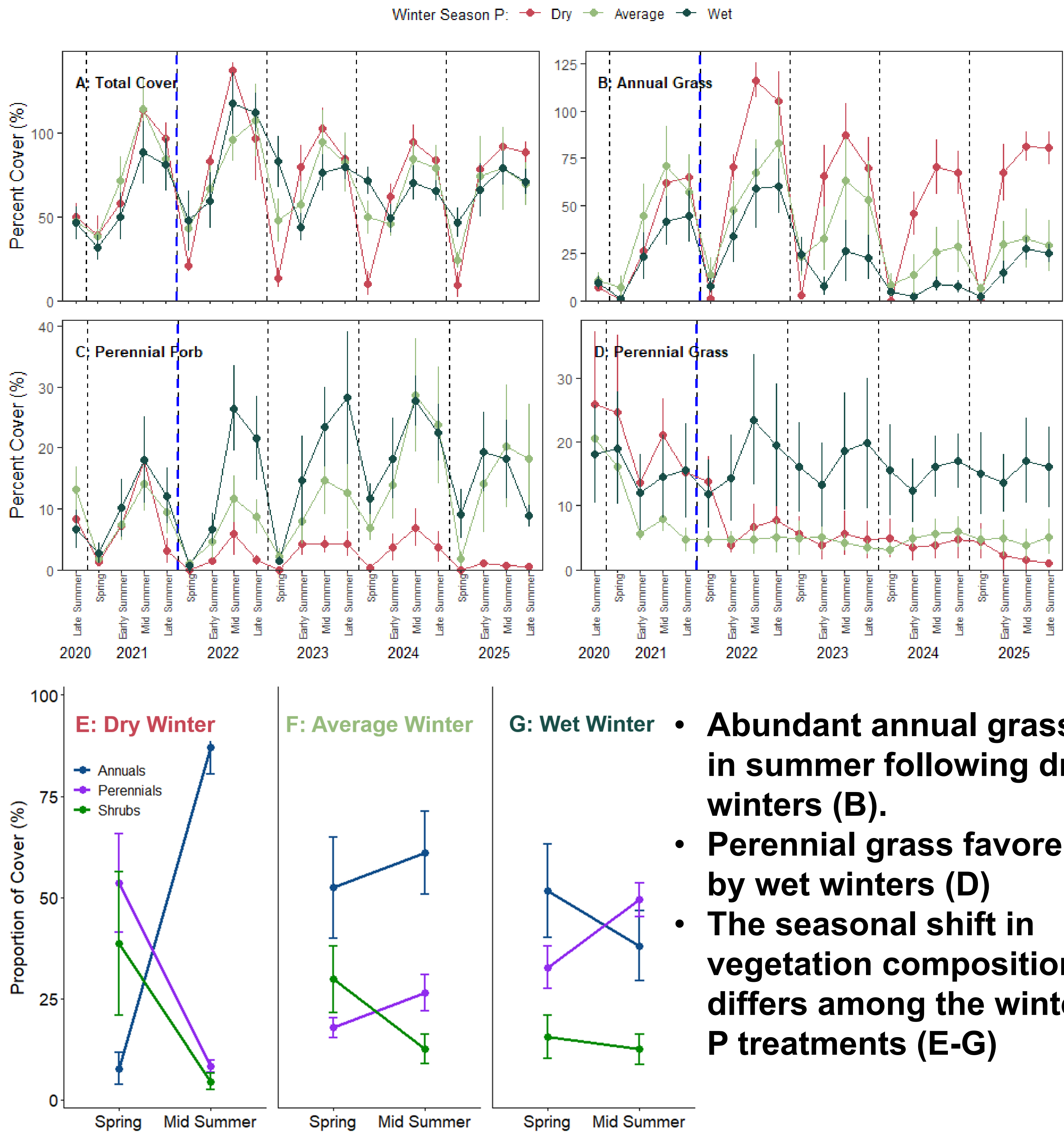
COOL SEASON TMTS: Different cumulative totals

WARM SEASON TMTS: Temporal repackaging of seasonal total

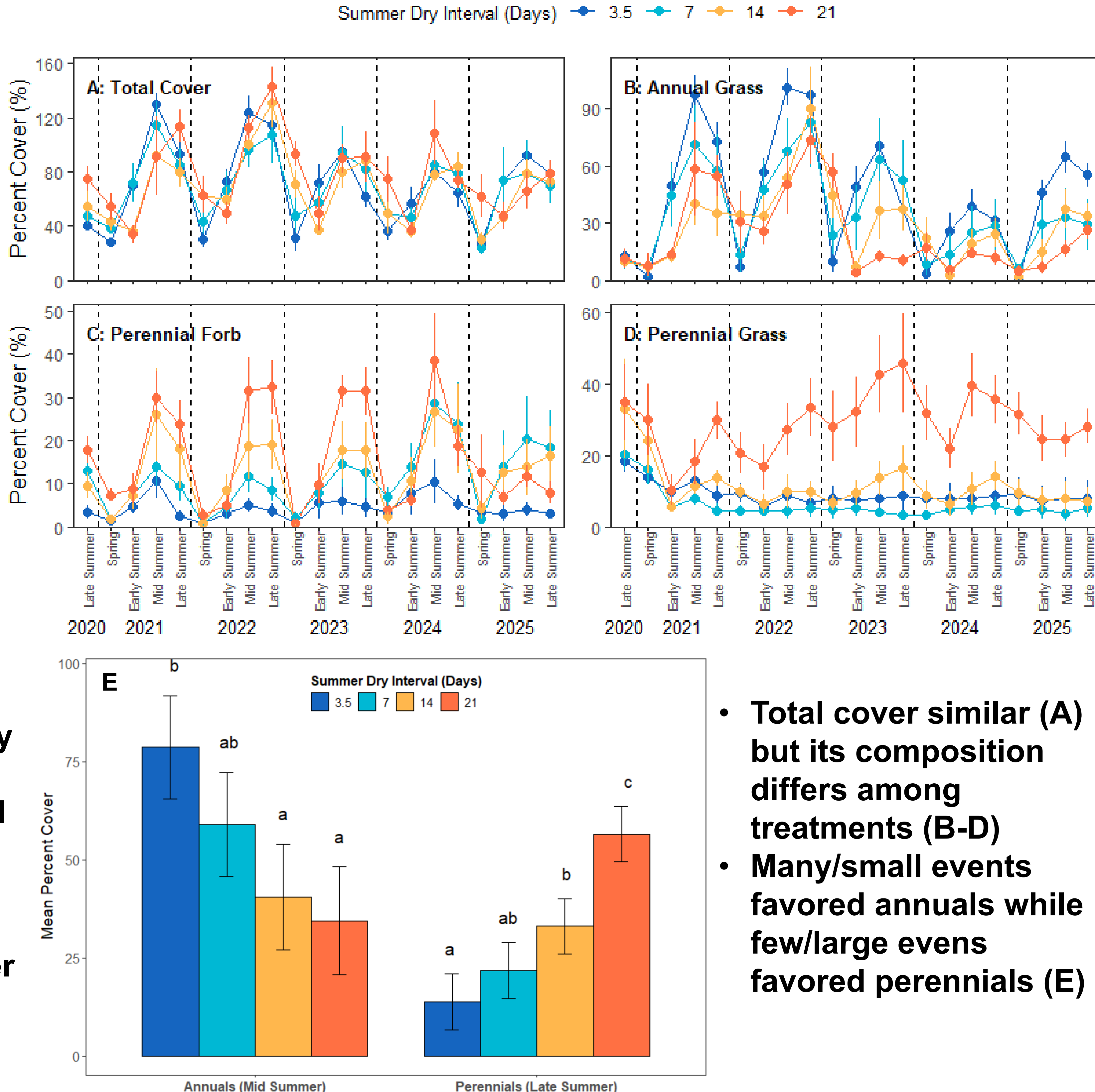


RESULTS

Cool Season Treatments



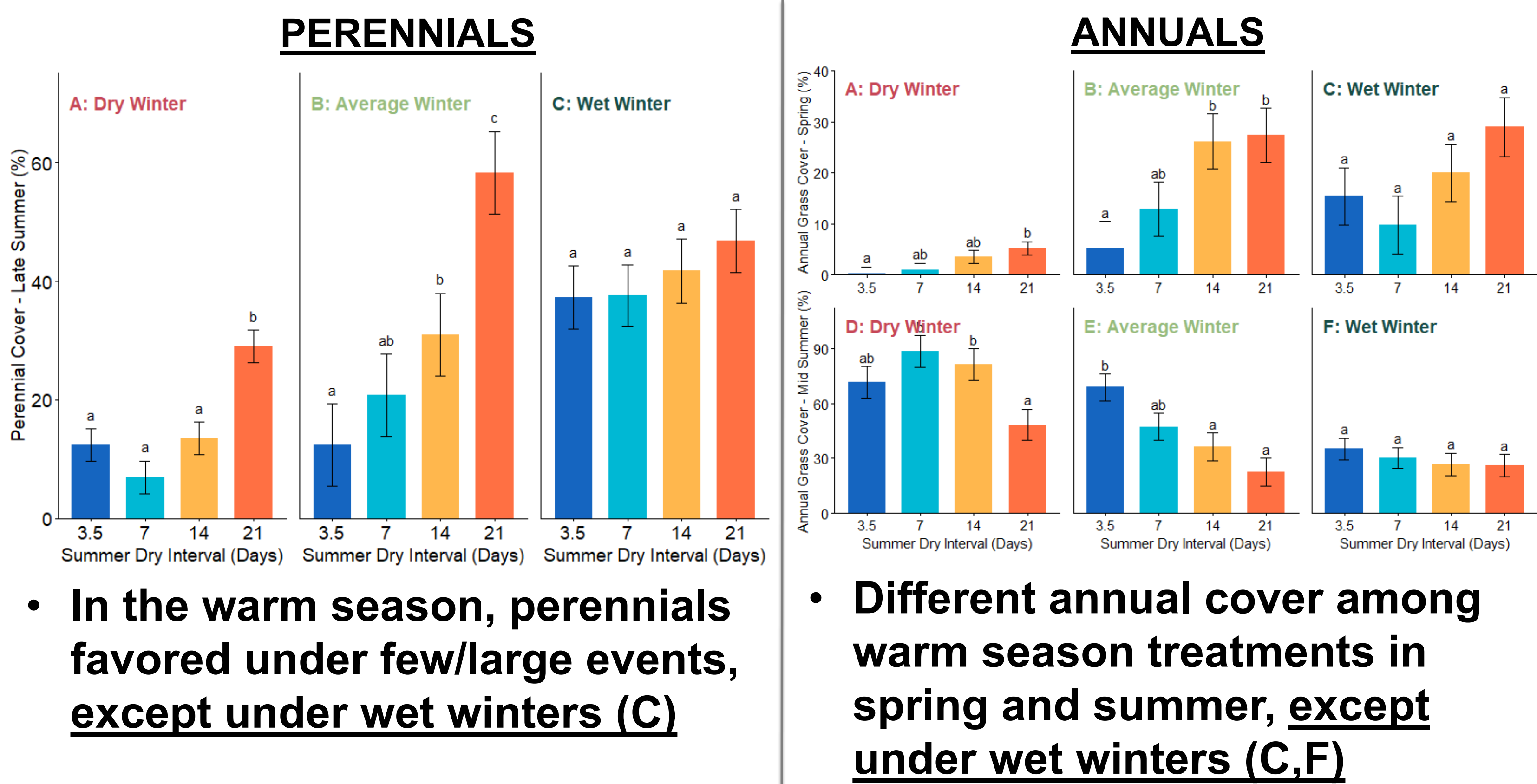
Warm Season Treatments



- Abundant annual grass in summer following dry winters (B).
- Perennial grass favored by wet winters (D)
- The seasonal shift in vegetation composition differs among the winter P treatments (E-G)

- Total cover similar (A) but its composition differs among treatments (B-D)
- Many/small events favored annuals while few/large events favored perennials (E)

Cool x Warm Season Interactions



- In the warm season, perennials favored under few/large events, except under wet winters (C)

- Different annual cover among warm season treatments in spring and summer, except under wet winters (C,F)

SUMMARY

- Cool-season precipitation amounts had legacy effects on vegetation composition – dry winters lead to an abundance of annual grass in the summer, and wet winters maintained perennial grass cover year-round.
- Warm-season temporal repackaging of precipitation into fewer, larger events with longer dry intervals favored perennial grasses with relatively deep roots. Shallowly-rooted annual grasses were favored under frequent, small events.
- Wet winters masked the influence of summer P treatments for both perennial and annual functional types.
- These results emphasize the need for management strategies that account for cross-season precipitation interactions.