



Montane meadow restoration improves habitat for some meadow birds

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Healthy mountain meadows foster biodiversity, reduce downstream flooding, purify water, and store carbon. Unfortunately, a history of exploitation has caused stream channels in most meadows of the Mountain West to erode. The now over-sized stream channels severely compromise the ability of meadows to provide these multiple benefits. Hydrologic restoration of degraded riparian meadows aims to increase water storage in meadow soils during spring runoff. This water is then slowly released in summer months, maintaining streamflow and groundwater levels at or near the land surface in an otherwise seasonally dry landscape. Currently, there are major efforts to restore meadows across the Sierra Nevada.

In this study we evaluated the expectation that meadow birds would increase in abundance following restoration and identify modifications that may improve restoration outcomes. From 2009 to 2017 we sampled birds at 31 meadows previously restored using a common technique: partially filling the

over-sized stream channel with meadow soils. We then assessed how the abundance of 12 species of meadow-associated birds changed from 1 to 18 years after restoration, and whether the amount of deciduous shrubs and trees (an indicator of bird habitat quality) already present before restoration, affected bird response rates.

Six of the 12 species increased in abundance after restoration by 10–103% annually. One species with a marginally significant negative trend may have decreased. The amount of deciduous trees and shrubs at the restoration site before restoration was a strong predictor of initial bird abundance. For most species that responded to restoration, high amounts of deciduous shrubs and trees at the time of restoration did not slow their response rate after restoration, suggesting other elements of hydrologically functional meadows, not only deciduous shrubs and trees, are important for some bird species. Average rainfall, temperature, and stream flow also influenced

species abundance. Our results suggest increasing the number of deciduous shrubs and trees planted during restoration would likely accelerate and enhance outcomes for birds, as would prioritizing restoration in geographies where species tend to occur in higher abundance or are most likely to colonize.

Main Points

Restoring natural water levels in montane meadows with streams improves habitat for some bird species associated with meadows

Increased revegetation and management that protects the growth of deciduous shrubs and trees would likely accelerate and enhance meadow restoration outcomes for many bird species

Rainfall, temperature, and stream flow patterns strongly influenced abundance of some species and can inform where meadow restoration has the highest potential to benefit them

B.R. Campos, R.D. Burnett, H.L. Loffland, R.B. Siegel. 2020. [Bird response to hydrologic restoration of montane riparian meadows](#) Restoration Ecology 28:1262–1272.