

Characterizing the Montane Fens of Yosemite — Potential for Carbon Storage?

Mountain ranges in the western United States, including the Rocky Mountains, the Sierra Nevada, and the Cascades, are replete with meadows. Meadows that receive a steady supply of groundwater throughout the year are called fens. Fens are the only meadows that 1) remain wet throughout the dry summer season, providing critical refuge for birds, mammals, and amphibians and 2) accumulate highly organic “peat” soils.

Because saturation of the soils slows decomposition processes, montane fens can store carbon for thousands of years. This innate ability of peatlands has recently attracted considerable attention as land managers look for ways of reducing carbon pollution while also improving habitat quality.

Yet, little is known about rates of carbon storage in these systems within the past 50 to 100 years. In a study published in *Arctic, Antarctic, and Alpine Research*, scientists from three different U.S. Geological Survey research centers — the California Water Science Center, National Research Program, and the Western Ecological Research Center — estimated recent rates of carbon storage in three fens in Yosemite National Park, located in the Sierra Nevada of central California, U.S.A.

The mean rate of vertical accretion (vertical growth of peat) from 1960-2011 was 0.28 cm/year and from 1910-2011 was 0.18 cm/year. Mean carbon accumulation rates during the 50- and 100-year periods were 95 g carbon/m²/year and 75 g carbon/m²/year, respectively.

These data demonstrate that Yosemite fens provide the important ecosystem service of carbon storage at rates similar to those of boreal rich fens in western Canada. However, further research is needed to definitively establish both the similarities and differences in peat formation between boreal and montane fen systems. Greater understanding will aid in protecting these important wetlands, which support biodiversity, provide critical habitat for sensitive species, store carbon for long time periods, and contain an archive of past conditions in their peat soils.

This Brief Refers To:

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<http://www.werc.usgs.gov/ProductDetails.aspx?ID=5443>



Fens remain wet year round and can provide critical habitat for threatened species like the Yosemite toad. Photo: Peggy Moore/USGS.

MANAGEMENT IMPLICATIONS

- Research on the balance between all sources of carbon inputs and all avenues of carbon loss in montane fens could facilitate entry of fen restoration projects into emerging carbon markets.
- A role in carbon markets may be the catalyst needed to achieve better management of montane fens in the western United States, including improvement of habitat for sensitive species such as the federally threatened Yosemite toad (*Anaxyrus canorus*).

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