

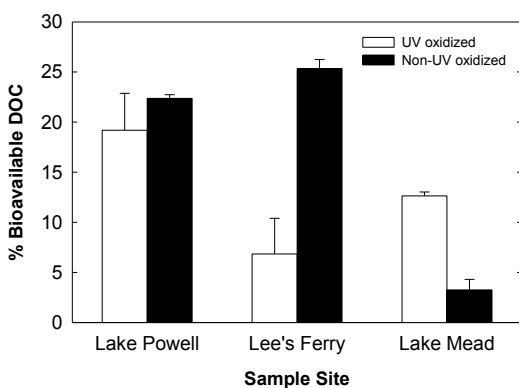
# Photochemical and microbial degradation of DOC in the Colorado River system

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Riverine dissolved organic carbon (DOC) is a complex mixture derived from terrestrial and aquatic sources. The detailed molecular composition of DOC depends not only on source but also on the nature and extent of the biogeochemical processes that alter and remove carbon. To explore the combined effects of photochemical (UV oxidation) and microbial degradation on DOC composition we conducted photo-oxidation experiments followed by microbial carbon degradation studies. We used samples from two reservoirs (Lks Powell and Mead) and one river site (Lee's Ferry) on the Colorado River to explore differences in residence time, prior UV exposure history, and carbon source. DOC bioavailability over two-weeks ranged from 5 to 25%. Results from 2D fluorescence spectroscopy revealed that photo-oxidation by natural sunlight primarily removed the terrestrial humic fraction of the riverine DOC; this loss of humic carbon generally left the residual DOC less bioavailable than the non-photo-oxidized material (Fig. 1). These results suggest changes in DOC composition along the river may be due primarily to photochemical alteration, while changes in DOC concentration reflect differences in biological carbon degradation.



**Fig 1.** DOC bioavailability in UV oxidized (white) and non-oxidized (black) samples from three sites on the Colorado River. Photooxidation generally reduced DOC bioavailability.