

Biogeochemistry of tungsten and release mechanisms within natural environments: A study in Fallon, Nevada

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Understanding the biogeochemistry of tungsten (W) in natural systems has been to some extent incomplete to date. W is very mobile in certain forms in sediments, having a complex behaviour (Bednar et al., 2006) [1]. This has prompted further work, as highlighted in this study, in high W bearing evaporite lakes, such as Soda Lake and similar lakes near Fallon, NV along with surficial sediment geochemistry study from the city of Fallon.

Preliminary lake water results from this study shows that the depth distribution (0 to 25 m) of W in Soda Lake varied from 642 to 673 $\mu\text{g/L}$; average pH being 9.6 and ORP 260 mV in Soda Lake; with mean average Mo concentrations at 825 $\mu\text{g/L}$; Fe and Mn at 20.4 $\mu\text{g/L}$ at 19.9 $\mu\text{g/L}$ respectively. Other lakes have W in the range of 3.4 to 4.3 $\mu\text{g/L}$. The Fallon town drinking waters are shown to contain 9.7 to 15.3 $\mu\text{g/L}$.

W in surficial sediments collected from the city of Fallon is primarily in the form of exchangeable WO_4^{2-} , as well as uninterpreted polytungstate species. In Fallon, available W decreases with soil depth (0-1 m) as W metal is oxidized and then dissolved releasing WO_4^{2-} , which is polymerized and adsorbed onto Fe/Mn oxides. Within these sediments, W tends to co-localize with other metals (Co, Zn, Ti) and is sometimes found associated with Mn in near surface soils. The study seeks at understanding W binding mechanisms with associated oxyanions and other anions like sulfides and sulfates in the lake water and in surficial soil samples.

[1] Bednar *et al.* (2006) *Talanta* **80**, 1257-1263.