

**EPA Grant to Utah DWQ
Farmington Bay Wetlands**

SUMMARY

Project Title:

Salinity, Selenium and Nutrients in Farmington Bay and Associated Wetlands

Environmental Setting/Problems:

Trace amounts of Selenium occur in the sediments and water of Farmington Bay wetlands and a gradient of salinity naturally occurs downslope to the GSL shoreline. Existing management of the Jordan River delta includes a series of water control structures that disperse water across 75,000 – 100,000 acres of natural and impounded wetlands and associated upland open space. Subsequent evaporation concentrates total dissolved solids and preliminary sampling suggests that selenium exhibits similar concentrating characteristics with values actually approaching EPA's proposed chronic standard of 4.6 ug L^{-1} . The concentrating factors were estimated at 1.7x for TDS and 1.6x for selenium between inflow and outflow of a series of three impounded wetlands.

However, an additional variable that was recently discovered is that Cl and SO_4 interfere with the Se signal when using ICP-MS. This interference amplifies the signal and exaggerates actual results to an unknown magnitude. Through discussions with various analytical chemists, it has been suggested that TDS interference begins in the range of 2000 – 3000 mg L^{-1} . Therefore, the true value for Se concentrations in Farmington Bay wetlands is unknown and the question remains: Is Se being assimilated by the ecosystem or concentrated by evaporation?

Extensive research has identified fish and birds as the most sensitive animals to Se. Further, reproductive impairment (i.e. teratogenesis) and egg hatchability are the greatest concern. Recent data from USFWS suggest that measurable impairment ($\text{EC}_1 - \text{EC}_{10}$ values) range from 4 to 8 mg kg^{-1} in adult tissue. Related ranges for EC concentrations in various environmental media are:

Ecological Risk Thresholds (USFWS)

	<u>Negligible Risk</u>	<u>Substantive Risk</u>
Freshwater, ppb	<2	>5
Sediment, ppm	<1	>4
Diet, ppm	<3	>7
Avian eggs, ppm	<6	>10

Proposed Plan

We plan to measure Se in each of these media as an initial screening tool to determine the potential risk of the Farmington Bay wetland ecosystem to Se. These values will then be used to determine whether the need exists and what type of studies would be appropriate to establish and verify an appropriate Se criterion for Farmington Bay wetlands.