SEDIMENT CORE CHEMISTRY IN THE ESCALANTE AND SAN JUAN RIVER DELTAS IN LAKE POWELL, UT, IN 2010-2011

POSTER PRESENTATION

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Recent studies by the U.S. Geological Survey, have documented the presence of trace elements, organic compounds including polycyclic aromatic hydrocarbons, and radionuclides in sediment from the Colorado River delta in Lake Powell, UT and from sediment in some side canyons in Lake Powell, Utah and Arizona (Hart and others, 2004 and 2005). The fate of many of these contaminants is of significant concern to the resource managers of the National Park Service at Glen Canyon National Recreation Area because of potential health impacts to humans and aquatic and terrestrial species. The U.S. Geological Survey completed sediment-core sampling in 2010, in the San Juan River and Escalante River deltas in Lake Powell, Utah, to help the National Park Service further document the presence or absence of contaminants in deltaic sediment (Hornewer, 2014).

Three sediment cores were collected from the San Juan River delta in August 2010 and three sediment cores were collected from the Escalante River delta in September 2011. Sediment from the cores was subsampled and composited for analysis of major and trace elements. Fifty-five major and trace elements were analyzed in 116 subsamples and 7 composited samples for the San Juan River delta cores, and in 75 subsamples and 9 composited samples for the Escalante River delta cores. Six composited sediment samples from the San Juan River delta cores and eight from the Escalante River delta cores also were analyzed for 55 low-level organochlorine pesticides and polychlorinated biphenyls, 61 polycyclic aromatic hydrocarbon compounds, gross alpha and gross beta radionuclides, and sediment-particle size. Additionally, water samples were collected from the sediment-water interface overlying each of the three cores collected from the San Juan River and Escalante River deltas. Each water sample was analyzed for 57 major and trace elements.

Most of the major and trace elements analyzed were detected at concentrations greater than reporting levels for the sediment-core subsamples and composited samples. For the San Juan River delta, all elements were detected in each subsample except for rhenium, sulphur, selenium, and tellurium; and all elements were detected in each composited sample except for copper, rhenium, selenium, and tellurium. For the Escalante River delta, all elements were detected in each subsample except for boron, bismuth, molybdenum, rhenium, sulphur, selenium, tin, tellurium, and zinc; and all elements were detected in each composited sample except for rhenium, selenium, and tellurium.

Low-level organochlorine pesticides and polychlorinated biphenyls were not detected in any of the samples. Low-level concentrations of several polycyclic aromatic hydrocarbons were detected in the San Juan and Escalante River deltas but were below reporting levels.

Gross alpha and gross beta radionuclides were detected in both river deltas at concentrations greater than reporting levels for all samples ranging from 8 to 32 pCi/g for gross alpha radioactivity and from 17.1 to 34 pCi/g for gross beta radioactivity. Most of the major and trace elements analyzed were detected at concentrations greater than reporting levels for water samples.

For the water samples, most of the 57 major and trace elements analyzed were detected at concentrations greater than reporting levels in the San Juan and Escalante Rivers. For the San Juan, however, cobalt, cesium, europium, nickel, and thorium were not detected in any of the samples and cadmium, phosphorus, and tin were not detected in 67 percent of the samples. For the Escalante, cobalt, chromium, phosphorus, and tin were not detected in any of the samples and tellurium was not detected in
67 percent of the samples.

REFERENCES CITED

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