



Urban Flood Demo Program & Southwest Demo Program

Impact of Flood and Sediment Control Activities on Nutrients and Metals in Las Vegas Wash, Nevada

Products

A conceptual model for the interaction of metalloids and nutrients with sediments in the Las Vegas Wash and surrounding areas and the determination whether flood and sediment control activities impact the migration of nutrients and potentially harmful metalloids.

Benefits

One of the main questions in any study is the extent of applicability of the results.



Clearly, a methodology that can only be applied to a small geographic area would be of relatively little use. This project is the first phase of data collection that will be used to test the transferability of our methodology related to the association of metals and nutrients with sediments in the arid and semi-arid Southwest. This methodology will enable managers to better anticipate, identify, and mitigate potential areas of concern with respect to water and sediment quality

Issue

Nutrients (e.g., phosphorus, nitrate, organic carbon) and metals and metalloids (e.g., selenium and arsenic) are common contaminants of concern for urban watersheds of the arid and semi-arid southwestern United States. These same watersheds are often heavily managed to mitigate flood events and sediment-related impacts including incision and aggradation. The overall objective of this research program is to determine whether flood and sediment control activities impact the migration of nutrients and potentially harmful metalloids. It should be kept in mind that sediment transport can have a profound effect on the water quality of affected bodies of water, not only by affecting water clarity, but also by facilitating the transport of chemical constituents, as well as microbiological components (e.g., bacteria and viruses). This project component will contribute to our continued understanding of sediment-facilitated nutrient and metal transport in urban watersheds. In this first phase, work focuses on the Las Vegas Wash site, while in subsequent phases, sites in Maricopa County near Phoenix on Rio Salado and Albuquerque on Rio Grande will be considered.

Description

The general objectives will be accomplished by completing the specific research tasks outlined below. Task 1 – Site selection. Appropriate sites, based on previous work and in consultation with Southern Nevada Water Authority (SNWA) will be selected. Selection criteria include availability of sediments that can be collected easily, accessibility, and potential loading of the sediments with nutrients and metals from nearby urban areas. Task 2 – Sediment sampling. Composite samples will be selected to assure that samples are representative. Task 3 – Sediment characterization. The sediments will undergo a complete

characterization, including particle size distribution performed by light scattering, specific surface area by nitrogen adsorption and the BET method, particle mineralogy, as determined by x-ray diffraction (XRD), and particle morphology, based on scanning electron microscopy (SEM). Task 4 – Sediment analysis. The sediments will be analyzed for phosphorus, arsenic, selenium, and boron. Additional information will be obtained by sequential extractions of the metalloids to determine the distribution of the metalloids across individual sediment components.

Sponsor Urban Flood Damage Reduction and Channel Restoration Development and Demonstration Program for Arid and Semi-Arid Regions (UFDP).

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