

## **CONTRIBUTION OF SEDIMENTS FROM AN INTERMEDIATE BASIN TOWARDS A RESERVOIR: CASE LUIS L. LEÓN DAM, CHIHUAHUA, MÉXICO**

*Guadalupe Estrada-Gutiérrez, Humberto Silva-Hidalgo, Astorga-Bustillos Fernando,  
Villalba María de Lourdes & Adán Pinales-Munguia*

*Universidad Autónoma de Chihuahua, Facultad de Ingeniería, Nuevo Campus Universitario,  
Circuito Universitario S/N, C.P, Chihuahua, Chih, México*

### **ABSTRACT**

*Sedimentation is one of the most important factors that affect the storage capacity of a reservoir. A proposed model has been developed to estimate the sediment load in the reservoir of the Luis L Leon (El Granero) dam, by integrating the Universal Soil Loss Equation (USLE); integrating the factors involved in the estimation through a Geographic Information System. The developed model was validated using both the topographic survey prior to the construction of the dam and the existing bathymetric studies for the reservoir. The estimated gross erosion of the basin was 8.65 T/ha/year, with a sediment contribution to the reservoir of 50.52 m<sup>3</sup>/km<sup>2</sup>-year; based on the analysis performed since the beginning of the operations (1986) until the last bathymetry, the settled volume during this period was 40,189 hm<sup>3</sup> equivalent to 12.08% of its capacity, which represents an average loss of 47,455 m<sup>3</sup>/km<sup>2</sup>-year. These values are considered low taking into account the size of the basin, being an intermediate basin and having several reservoirs located upstream that capture the sediments that occur in the upper basin. By comparing the estimated sediment production with the application of the model, the sediment delivery coefficient (SDC), and from the bathymetries, based on these it can be considered that the proposed model, once calibrated, can reasonably estimate well the sediment load in the studied portion of the Conchos River.*

**KEYWORDS:** Basin, Sedimentation, Universal Soil Loss Equation (USLE), Watershed, Water Erosion

---

### **Article History**

**Received: 03 May 2018 | Revised: 11 May 2018 | Accepted: 19 May 2018**

---