

Recommendations for Monitoring East Grand Lake

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Public sentiment at all of the hearings for the 2012 Annual Plan identified sedimentation in the East Grand Lake Planning area as one of the greatest concerns surrounding the suite of construction features proposed in that Plan. A monitoring plan for 2011 is being designed to collect information to evaluate that concern and to supplement and support the pre-existing monitoring program that was outlined in the East Grand Lake Summary Planning document. Engineers and hydrologists will be evaluating water quality, suspended sediment, and discharge data collected during 2010 throughout the East Grand Lake planning area to characterize hydrology and sediment distribution patterns at a scale appropriate to outline the contribution of all major water and sediment inputs and drains along the perimeter of the study area. This monitoring plan will supplement those assessments at a finer scale to answer specific questions about the origin and distribution of sediment in the upper northeast portion of the study area in and around Grand Lake. Grand Lake has been identified as an important feature of the study area and it has experienced sediment accretion that threatens its continued function as a refuge to fish and other aquatic organisms. The source and pathways of sediment contributing to that accretion is likely variable depending on river stage, and a better understanding about the pathways and quantities of sediment entering the lake need to be answered in response to public concerns surrounding the proposed projects.

Bathymetry – Bathymetric survey data are available for Grand Lake for each of the past 5 decades from U. S. Army Corps of Engineers navigation charts. These data have been digitized and geo-referenced by ERDC as part of the NRIAS. Sediment deposition along the existing transects will be calculated and spatial products are being generated to provide and account of how the lake depth has changed since the 1960's. New information is needed to provide a recent bathymetric profile for the lake from which to generate recent accretion patterns. Deposition gradients will be important components in analyses that link accretion to patterns of remotely sensed turbidity patterns over the past 3 decades to produce an account of how the lake has filled over the past 30-50 years.

Sediment Distribution – Discharge and suspended sediment information collected during the 2010 monitoring effort provide detail on current water and sediment distribution patterns in the waterway leading to Grand Lake. Additional information collected on a finer scale in and around the lake will provide an assessment on which parts of the lake are currently experiencing sediment accretion and the source and pathway of that sediment over a more recent timeframe.

Water Quality – In order to evaluate the effectiveness of proposed construction features, some measure of change to environmental conditions is required. Water quality, specifically dissolved oxygen concentration, has been the primary parameter identified as the target for improvement in areas adjacent to the project features. Accordingly, some measure of change in dissolved oxygen related to project features is logical and would be the preferred measure of improvement. However, there are

considerable costs and logistical challenges associated with using traditional *in-situ* water quality measurements for assessing environmental changes attributable to individual construction features. Progress in developing remote sensing information offers a promising and cost effective mechanism to track changes in water movement, aquatic vegetation growth and distribution,