



Applicability of Coarse-Grained Black Carbon as a Sediment-Lag Tracer: Au Sable River, MI

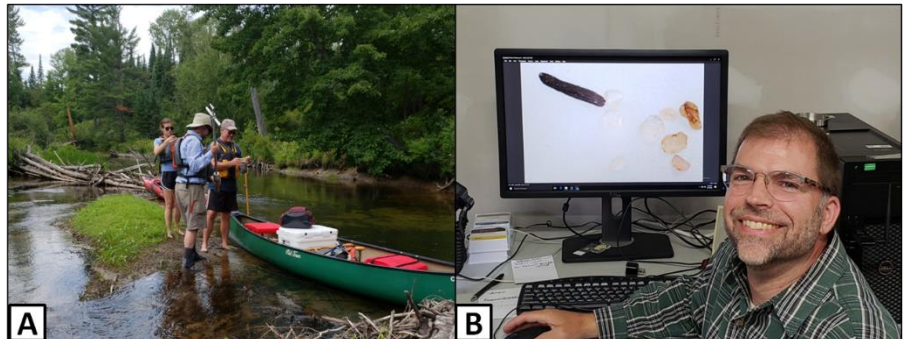
ERDC Dredging Operations Technical Support Program (DOTS)

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Response Summary:

The Detroit District has an ongoing study examining the lag-time associated with changes to the upstream sediment supply in rivers that drain to federal navigation channels. Vibracore samples were collected in depositional areas to analyze sediment for a variety of physical and chemical parameters to indicate a chronology and evaluate the sediment accumulation rate. Through the preliminary sample evaluation, it became apparent that a better tracer is needed to meet the study objectives in quantifying sediment delivery lag-time from source to sink and predicting the timeline for observed reduction in dredging need. ERDC has identified using black carbon resulting from regional forest fires as an independent tracer to complement the preliminary sample analysis. CHL researchers Heidi Wadman and Jesse McNinch have extensive experience in black carbon sampling procedures and analysis techniques, and their assistance was sought both for sample collection along the Au Sable River, as well as in quantification of the coarse-grained black carbon percentage of the sample. Approximately 24 samples were collected in the active bed of the North Branch and Main Branch of the Au Sable, downstream of the site of the 2010 Roscommon Fire. Once collected, samples were processed to preserve the coarse-grained black-carbon fraction, sieved, and the volume of black carbon was quantified using standard point counting techniques (Figures A and B, respectively).



Period of Performance:

Sampling commenced on 30 July, 2018. Sediment analysis is on-going by LRE & CHL.

Benefits of the Response to the USACE Dredging/Navigation Program:

Quantifying the sources and transport processes by which sediment is transported from upland regions to depositional sinks in navigation channels and/or harbors is critical for developing effective management strategies in mitigating this sediment before it accumulates. A recent regional forest fire in the Au Sable River catchment in central Michigan provided an excellent opportunity to test the applicability of fire-generated, coarse-grained black carbon as a chronological tracer of sediment transport post-fire. Additionally, this sedimentary geochemical marker potentially provides a preliminary estimate of transit time for sediment to move through the Au Sable River system to the de facto sediment sink located in the navigation channel and harbor at Oscoda, MI.

Deliverable:

These data will be integrated into an ongoing study quantifying the sources, transport pathways, and transport rate of sediment moving from the upland catchment into federally maintained harbors and channels in the Au Sable and Cheboygan, River catchments, Michigan.

***The fact sheet will appear on the DOTS website once satisfactorily completed.



Providing environmental and engineering technical support to the U.S. Army Corps of Engineers
Operations and Maintenance navigation and dredging missions

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