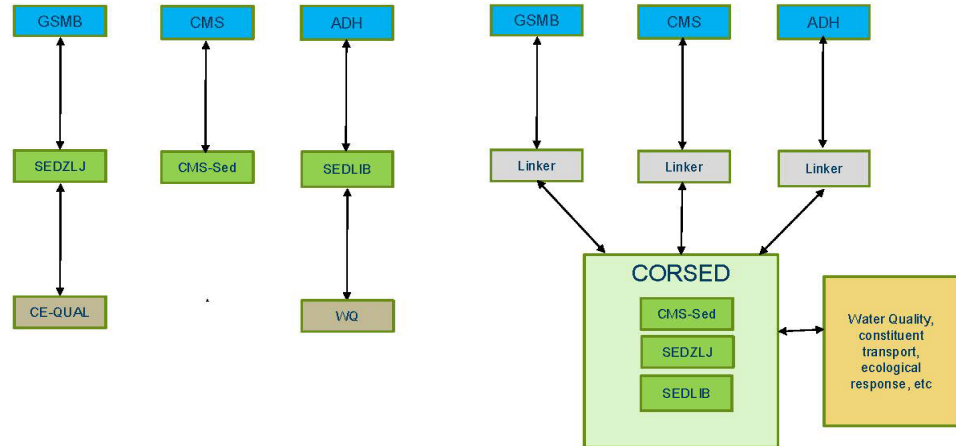




CORSED Consolidated Sediment Transport Code

Description

CORSED is an ongoing project to develop a consolidated sediment transport code (or library) (CORSED) by modularizing and integrating the three main ERDC sediment transport models and developing linker codes between commonly used hydrodynamic models and CORSED. FY2020 include: develop/validate linker codes, continued CORSED development, test case database, and system verification and validation (V&V).



Present sediment transport modeling practice (left) and new CORSED practice (right)

Issue/Challenge To Address

ERDC has developed and maintains multiple sediment transport codes (e.g., SEDZLJ, SEDLIB, CMS-SED, TABS) were developed by different teams for different purposes. Each transport model is coupled with a different hydrodynamic code. What is required is one sediment transport code which operates across multiple hydrodynamic platforms and permits user-selected features from the original transport models. This unitary library code will permit ERDC to compete efficiently with other models and provide the best transport predictions to clients in a cost effective manner. The objectives of this effort are to 1) develop CORSED, a transport library that includes all capabilities of existing ERDC transport models, 2) develop linker codes so all transport capabilities encapsulated in CORSED can be applied with any hydrodynamic model typically used by USACE, 3) demonstrate that the system works according to user needs, and 4) develop documentation and training materials.

Successes Lessons Learned

A detailed list of the lessons learned throughout this R&D project will be described in the TR scheduled for completion in FY21.

Projected Benefits Cost Savings Value Added

The advancements and benefits of this research include:

- a comprehensive CORSED library framework that includes all functional capabilities of present ERDC transport models,
- A sediment transport library that can be applied across multiple hydrodynamic models
- an adaptable framework for incorporating new sediment transport process algorithms into a documented sediment transport library,
- a framework in which sediment transport modelers from across USACE can incorporate new sediment process methods in a version-controlled environment, and
- a team of CORSED users within ERDC who are familiar with complexities associated with cohesive sediment transport model applications.



CORSED Consolidated Sediment Transport Code

Expected Products

- Linker codes for GSMB-CORSED (SEDZLJ), CMS-CORSED (SEDZLJ), and AdH-CORSED (SEDLIB), and V&V tests.
- Design of CORSED Framework (I/O GUI) and Unified library.
- TN for CORSED – Common Framework (submitted for review in Oct 2020)
- TN for “Linking Geophysical Scale Transport Multi-Block Modeling System (GSMB) to CORSED” (to be submitted for review in Dec 2020)
- TN for “Linking the SEDZLJ Library to CMS” (approved for publication in Oct 2020)
- TN for “Linking CORSED to AdH” (to be submitted for review in Nov 2020)
- TR for “Geophysical Scale Transport Multi-Block Modeling System (GSMB) – Three Dimensional Hydrodynamics and Sediment Transport with the SEDZLJ Library” (to be submitted for review in Nov 2020)
- TR for CORSED (to be submitted for review in Sep 2021)

Stakeholders/Users

Stakeholders include the modelers we have worked with in other Districts, e.g., SAJ, SAM, POA, NWS, NAO, and LRE.

Leveraging Opportunities

This project is being funded by multiple USACE R&D programs, including DOER, CIRP, RSM, and military programs. This project will provide USACE projects which require sediment transport modeling to utilize one flexible and adaptable sediment transport framework. The sediment transport library will operate across hydrodynamic frameworks typically used by ERDC for reimbursable projects and research, including ADH, GSMB, and CMS. Technologies will be transferred to key Districts (e.g., SPN, LRE, SAM, POA) through this collaboration. In addition, this project will develop a team of sediment transport modelers who understand the complexity of riverine, estuarine and coastal sediment transport and enable them to provide engineering solutions.

Points of Contact

Earl Hayter, CEERD-EPW
Engineer Research and Development Center, Environmental Laboratory
Water Quality and Contaminant Modeling Branch, Research Civil Engineer
864-656-5942 Earl.J.Hayter@erdc.dren.mil

Participating Partners

TBD