

## **Regional Sediment Management Research Program**

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**Title:** Measuring and Monitoring at Local Scales

**Topic Area:** C8.2 - Measuring and Monitoring Sediment Processes

**Objective:** Provide improved local scale ground-based and water-borne measuring technology to support Regional Sediment Management.

**Benefits:** The benefits of this work unit are the identifications of local scale measuring and monitoring tools necessary to assess existing field conditions pertinent to Regional Sediment Management (RSM), and provide data to calibrate and validate numerical models for RSM (Topic Areas A1.3, A2.1, A2.2, B1.1, B2.3, B3.1, B3.2, and B3.3). These local scale measuring and monitoring tools address RSM field needs 8, 9, 15, 16, 53, 70, 75, 80-85, 87-89, and 105. They also address the ground truth needs of satellite and airborne measuring technologies. By addressing the measurement needs of the RSM program in a holistic way, the best existing measurement technology can be identified and inserted throughout the Corps; existing technology gaps can be identified and prioritized according to the districts needs; and the technology gaps can be filled through research and development in a prioritized fashion. These new technologies will result in more efficient and more accurate methods of regional sediment management.

This work produces new tools and methods for the USACE and nation. It is an integral part of the Regional Sediment Management Research Program, and thus contributes primarily to support of the USACE's navigation, flood/storm damage reduction, and environmental protection and quality missions. It supports all 8 Civil Works strategic goals and 7 of 9 Listening Session objectives identified by HQUSACE as R&D priorities. With companion work units, it employs active technology transfer and insertion.

**Work Description:** Part of the work unit's effort will involve collaboration and participation in workshops with related work units to identify and define RSM measurement needs and existing local scale measuring technologies that best support RSM. This will be done by reviewing, evaluating, and screening measuring systems currently in use by the districts and other government agencies, and measuring systems available through commercial off-the-shelf. In particular, a collaborative effort will be established with the Federal Interagency Sedimentation Project to identify and evaluate emerging technologies. Optimum sensors, recording, and transmission systems will be selected and configured into recommended standard measuring systems. Results and recommendations from the collected data will be distributed through technical notes, web pages, workshops, and visits to districts. These interchanges will provide early products to the field, will develop momentum in the program, and will develop a customer base. Technology gaps will be identified and prioritized during the first year, with a review of the prioritization performed by field groups and RSMP PIs.

Technology gaps will be addressed during the course of the work unit in the priority order developed in the first year. Emphases will be placed on innovative and emerging

technologies that will bridge these gaps and enhance the capabilities of the RSM effort. Where possible, commercial vendors will be encouraged to perform R&D to meet the Corps measuring needs using their internal funds. Technologies not addressed by the commercial sector will be developed in-house. Some examples of in-house development may include adapting impulsive type transducers and surface acoustic wave transducers to monitor turbidity and sedimentation rates. Other examples of existing and emerging technologies may include using Phase Profilometry Imaging Systems, fluorescent tracer particles, drifting buoys instrumented with acoustic and radio tags, and high-resolution water-borne sonar and acoustic imaging systems to study sediment dynamics.

The above are given only as example technologies. While these and other technologies may look promising for filling technology gaps, a holistic view of the measuring needs of Regional Sediment Management is needed in order to prioritize technology development and make optimum use of available funds and time. During the development of promising new technology, whether in house or by commercially funded vendors, use will be made of demonstration projects when appropriate to both help the development process and provide early field feedback on the technology. In addition to the development of new technologies during the course of the work unit, the standard systems defined during the first year will continue to be refined and improved as new technologies emerge.

All measuring technologies produced by this effort will undergo appropriate acceptance testing and verification using the processes developed under Task Area E3. Technology transfer and insertion will be emphasized throughout the duration of the program. The technology insertion efforts will leverage the services provided under Task Area E4 and will employ technical notes, web-based products, site visits and briefings to districts, workshops, and the above-mentioned demonstration programs.

The final year of the program will be used to finalize technical report, journal paper, documentation of the measurement technologies, incorporate last minute improvements into the technologies, and continue to insert these technologies into the field. Remaining needs will be identified and prioritized, and emerging measurement technology that have significant promise for regional sediment management will be identified for use by later programs. Finally, the impact of this research on the measurement system technology applicable to regional sediment management will be evaluated.

### **Products and Schedule:**

The primary products of this work will be improved measurement equipment and methods which will support assessment of regional sediment processes and project effects.

Product

Schedule

1. Workshop with related work units to identify, assess, and prioritize existing and new technologies based on their needs. Q2/02
2. TN: Prioritized technologies. Q/02
3. TR: "Field Measurement Techniques and Methodologies for Analysis and Visualization." Q4/02
4. Technical notes, briefing materials, and web pages describing results of the evaluations and recommendations for development and demonstration of promising technologies. Q1/03
5. Workshop to exchange and update information. Identify, assess, and prioritize new technologies. Q/03
6. TN: New technologies. Q3/03
7. Update technical notes, briefing materials, and web pages. Recommend development and demonstration of promising technologies. Q4/03
8. Workshop to update current information and technologies. Q/03
9. TN: Update on new technologies Q/04
10. Update final technical notes, briefing materials, and web pages. Recommend development and demonstration of promising technologies. Q3/04
11. Final workshop to exchange and update information. Q4/04
12. TR: (title) Q3/04
13. JP: (title) Q4/04