

ERDC

Engineer Research and
Development Center

Sediment Collector Technology: Demonstration and USACE Application

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Research Goals

- Find and evaluate innovative ways to maintain USACE navigation channels
- Manage more sediment with less money



Sediment Collector Technology

- Demonstration project
 - ▶ Need to reduce dredging in Arkansas River
- Supported by:
 - ▶ EPA 319
 - ▶ City of Pueblo
 - ▶ Pueblo County
 - ▶ NRCS
 - ▶ Colorado Water Conservation Board (CWCB)
 - ▶ Streamside Systems, LLC



How it Works



1,000 CY spreader

100 ton/hr Separator

Controller

1,800 gallon tank

Supply

Return

Whats New About This?

- **Selective Capture**
 - ▶ **Low possibility of accidental entrainment**
 - ▶ **Bedload (coarse) sediment only**
 - ▶ **Control top size with grate opening**
- **Removal at the Natural Transport Rate**
 - ▶ **Maximum production cant exceed natural transport rates**



Construction and Maintenance Cost

- Upgrades/Repairs:
 - ▶ Flood damages
 - ▶ Return flow tank and pump

- Operations
 - ▶ Uses 1kwh/min
 - ▶ <\$53,000 per year if operated continuously

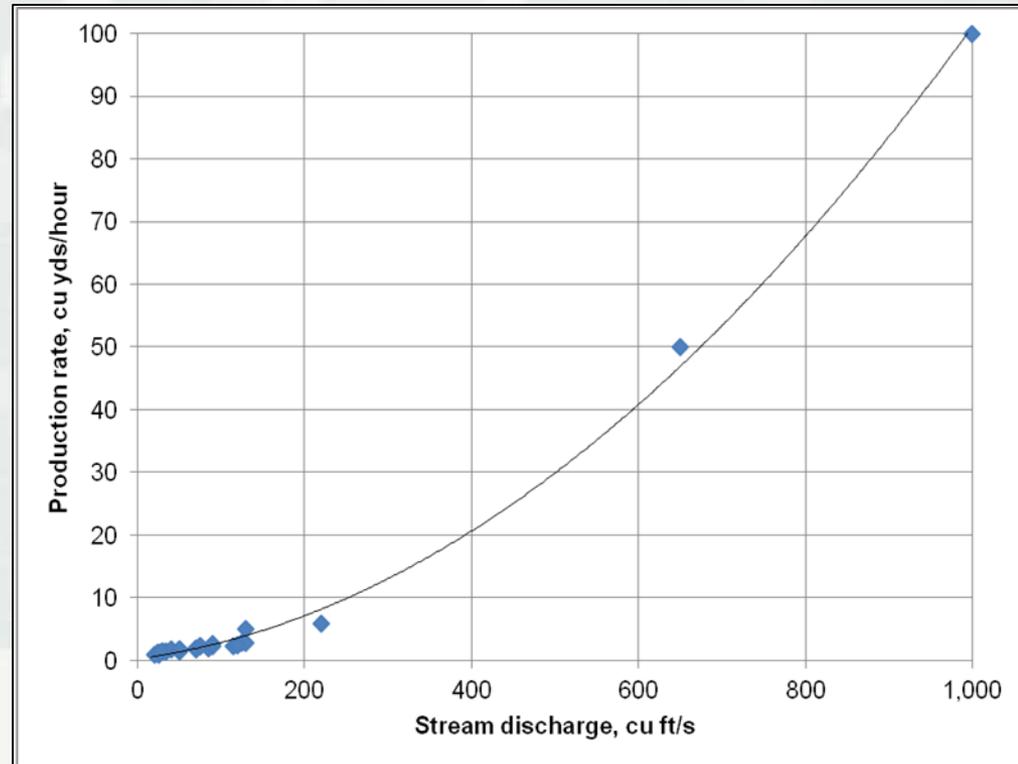
Collector (pumps, controllers, pipe, etc.)	\$319,000.00
Sediment Spreader	\$39,000.00
Installation	\$110,000.00
Approx. Cost of Contract Documents	\$50,000.00
Upgrades/Repairs	\$10,000.00
Total	\$528,000.00

**Costs are approximate*



Performance

- Average peak production:
 - ▶ 100 CY/hr
 - ▶ ~876,000 CY/year
- Survived extreme storm
- No wear or corrosion
- Operated about 500 hours so far



Lessons Learned

- Elevate electrical components.
- Pipelines should be as straight as possible.
- Accurate survey for grade control during installation is essential.
- Secure against vandals or unauthorized access.
- Consider vibrating grates or jet systems in less energetic flow.
- Return pump and holding tank.
- Experience is critical during design.



Potential USACE Applications

- Watershed management
- Selective capture of sediments to reduce total quantity of sediment in contaminated areas
- Sediment bypassing
 - ▶ Reservoirs
 - ▶ Inlets
 - ▶ Other
- Application in remote locations
- Others???



Summary and Conclusions

- Sediment Collector technology:
 - ▶ works in a large creek with coarse sediments
 - ▶ has minimal maintenance costs over a 1-year deployment
 - ▶ survives record floods with minimal damage
 - ▶ is capable of producing up to 100 cu yds per hour with a single 30-ft collector
 - ▶ is relatively inexpensive and easy to deploy without specialized equipment
- Next steps
 - ▶ Publish USACE technical note with design guidance
 - ▶ Try it out on a navigation project



Questions?

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