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
Innovative solutions for a safer, better world

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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

- Slurry pumped to separator
- Sediment flows into the hopper in bed load
- Return flow
How it Works

1,800 gallon tank

1,000 CY spreader

Controller

Supply

100 ton/hr Separator

Return
What's 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 can't 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

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector (pumps, controllers, pipe, etc.)</td>
<td>$319,000.00</td>
</tr>
<tr>
<td>Sediment Spreader</td>
<td>$39,000.00</td>
</tr>
<tr>
<td>Installation</td>
<td>$110,000.00</td>
</tr>
<tr>
<td>Approx. Cost of Contract Documents</td>
<td>$50,000.00</td>
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<tr>
<td>Upgrades/Repairs</td>
<td>$10,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$528,000.00</strong></td>
</tr>
</tbody>
</table>

*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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