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

BUILDING STRONG®
How it Works

Slurry pumped to separator

Return flow

Sediment flows into the hopper in bed load
How it Works
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

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Collector (pumps, controllers, pipe, etc.)</td>
<td>$319,000.00</td>
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<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>
</tr>
<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>
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*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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