

## AGENDA

Eau Claire County

• **Committee on Parks & Forest** •

Monday, February 20, 2023

5:00 p.m.

*Room AG 103 and 104*

<https://eauclairecounty.webex.com/eauclairecounty/j.php?MTID=m5af37a0c315d203a95640077c9bda8ed>

Meeting number (access code): 2597 757 7494

Meeting password: ZikyugUc649

For those wishing to make public comment, you must e-mail Winnie Parker at [Winnie.parker@eauclairecounty.gov](mailto:Winnie.parker@eauclairecounty.gov) at least 60 minutes prior to the start of the meeting. Comments are limited to 3 minutes per person and 30 minutes maximum for the public comment period.

1. Call to Order and Confirmation of Meeting Notice
2. Roll Call
3. Review/Approval of Committee Minutes - **Discussion/Action**
  - a. February 13, 2023
4. Public Comment
5. Placement of Lake Altoona Bedload Machinery - **Discussion/Action**
6. Request from Beaver Creek for Free Parks week during Earth Week - **Discussion/Action**
7. Director's Report
8. Future Committee Meetings and Items for Discussion

*Next Meeting – March 13, 2023, at 5 p.m.*

9. Adjourn

Prepared by Winnie Parker, Parks & Forest

Please note: Upon reasonable notice, efforts will be made to accommodate the needs of disabled individuals through sign language, interpreters or other auxiliary aids. For additional information or to request the service, contact the County ADA Coordinator at 839-4710 (FAX) 8391669 or (TDD) 8394735 or by writing to the ADA Coordinator, Human Resources Department, Eau Claire County Courthouse, 721 Oxford Ave., Eau Claire, Wisconsin 54703.

## MINUTES

Eau Claire County

### • Committee on Parks & Forest •

Monday, February 13, 2023, at 3:00 p.m.

Tower Ridge Recreational Area

955 82<sup>nd</sup> Avenue, Eau Claire, WI 54703

Members Present: Joe Knight, Missy Christopherson, Tami Schraufnagel, Jodi Lepsch, Dane Zook

Others Present: Josh Pedersen – Director, Jody Gindt – Supervisor, Winnie Parker – Administrative Specialist III (Committee Clerk), Erika Gullerud – Finance Analyst, Kyle Johnson – DNR County Forest Liaison, Jacob Tumm – EC County Forester, Tom Mayer – Lake Eau Claire Park Ranger, Todd Johnson – Maintenance Technician, Corey Henrich – Maintenance Technician, Sarah Christensen – Lake Altoona Park Ranger, members of the public: Jeff Thielen, Kathy Michels, Robert Burch, Arlyn Stertz, Sue Lindstedt, Jan Otterholt, Fred Boetcher, Deb Rachl, Peg, Murray, Charity Zich, Disa Wahlstrand, Richard Johnston, Rick Merryfield

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### Call to Order Committee on Parks & Forest and confirmation of meeting notice.

Chairman Knight called the meeting to order at 3:00 p.m. and confirmed public posting of the meeting.

### Public Comment

Kathryn Schauf commented in writing as a user of the Tower Ridge trail system, “I want it known that the team out there does an excellent job!”. Supervisor Knight informed that a citizen stated a concern regarding the activity at LL Phillips Park. Bob Burch expressed concerns regarding a Lowes Creek Park trail as a user fell resulting in a broken bone. Ski Striders expressed their appreciation to the team for providing good trail maintenance, especially after the uncooperative weather and unexpected machinery breakdowns during the start of the season.

### Review of January 9, 2023, Committee Meeting Minutes

Supervisor Schraufnagel motions to approve the minutes as amended from January 9, 2023. All in favor.

### Discussion with Tower Ridge user groups

Kathy Michels from the Chippewa Valley Trail Riders user group announced and welcomed participation on March 18 to help clean up the trails, weather permitting, at Tower Ridge. She also suggested creating a joint calendar that all user groups can use and reference.

### Presentation of volunteer awards

Awards were presented in recognition of their service to Eau Claire County Parks and park users. Chris Gorzek, Sue Lindstedt, Arlyn Stertz, and Karen Possley founded Kicking Kids some 29 years ago and Fred Boetcher has been instrumental in the completion of the lighting project at Tower Ridge.

### Tower Ridge winter trail maintenance

Concerns were raised about having directional signage on the Big Falls trail. After a brief discussion, it was decided that the direction of the trail would be two way and the one-way sign will be taken down. The challenges of winter trail maintenance were explained and discussed. A suggestion was made to add a part-time employee dedicated to winter trail maintenance. Jeff Thielen is working on a grant and Go Fund Me to raise funds to acquire a groomer for the county.

### Forest Management at Tower Ridge

The best time to manage Oak leaves and Oak Wilt is during the winter months, which presents a conflict of interest for the winter user groups. Forest management during the winter months is best for trail maintenance because the cost to

rehab a trail is exorbitant. Once the Black and White Oak are deforested, the stand would naturally regenerate to mostly Red Maple and White Pine.

#### **Airport Tree Planting Project**

Charity Zich from the Chippewa Valley Airport presented an Airport Tree Planting Project. After a 10-year wildlife hazard assessment, wildlife abatement is necessary by removing habitat and adding fencing. To mitigate the environmental impact, a reforestation project has been proposed. The airport would like to donate funds to the Parks and Forest Department for this project knowing the funds would be used at a future date. Supervisor Zook made a motion for the committee to investigate creating a carry forward account designated for the segregated purpose of reforestation. All in favor.

#### **Stoney Lonesome Project with Ruffed Grouse Society**

This project is on schedule to finish this summer and includes the replacement of several gates and culverts and upgraded trails that provide year-round access and usage. The project was funded by the Ruffed Grouse Society with the Parks and Forest matching in-kind with machinery and manpower.

#### **Lake Altoona Park Bedload Machinery**

After some discussion regarding the delivery and storage of bedload equipment for Lake Altoona Park, the Committee decided to reconvene for further discussion on February 20, 2023, at 5 p.m. at the Ag Building. In addition, the Master Park Plan may be discussed as time permits.

#### **Director's Report**

Director Pedersen provided an update on the repairs of the grooming and tracking equipment, which cost some 10k this season, and highlighted the team's dedication to trail maintenance. In addition, Tom Mayer, after having worked for the Parks and Forest Department for 34 years, is planning on retiring this spring.

#### **Future Parks & Forest Committee Meetings and Items for Discussion**


Special Committee on Parks and Forest Meeting - February 20, 2023, at 5:00 p.m.

Regular Committee on Parks and Forest Meeting - March 13, 2023, at 5:00 p.m.

#### **Committee on Parks & Forest Adjournment**

The Committee on Parks & Forest adjourned at 5:00 p.m.

Respectfully Submitted by,



Winnie Parker

Committee Clerk

Administrative Specialist III



## Sediment Management Methods to Reduce Dredging: Part 2, Sediment Collector Technology

by Robert Thomas, John McArthur, Dave Braatz, and Tim Welp

**PURPOSE:** This Dredging Operations and Environmental Research (DOER) Program technical note (TN) is the second in a series evaluating sediment management methods to reduce dredging through a research task (RT) in the DOER Program.<sup>1</sup> This TN presents an evaluation of sediment collector technology, one promising new device that may help better manage sediments to reduce traditional dredging requirements.

**INTRODUCTION:** The first of two technologies being evaluated under this RT is a sediment collector currently installed in Fountain Creek, Pueblo, CO, (location shown in Figure 1) intended to demonstrate technology to alleviate the need for dredging by lowering the downstream grade to reduce flooding and ultimately reduce sediment deposition as far downstream as John Martin Reservoir, a U.S. Army Corps of Engineers (USACE)-managed lake. The system operates on the principle that sediment in bedload can be trapped by gravity and removed at the natural rate of transport, instead of episodically. This DOER TN describes the technology and installation at Fountain Creek, other possible applications, lessons learned, cost, and provides some general guidance for applying collector technology at other sites.



Figure 1. Location of sediment collector.

**COLLECTOR INSTALLATION IN FOUNTAIN CREEK:** A 30 ft wide, high-capacity sediment collector was installed in Fountain Creek, Pueblo, CO, upstream of the confluence with the Arkansas River in July 2011 (Figures 1, 2, 3, and 4) to demonstrate the viability of this new technology.

<sup>1</sup> Thomas, R. C., and T. Welp. In preparation. Sediment management methods to reduce dredging: Part 1, sediment minimization concept and demonstration project introduction and overview. DOER Technical Notes Collection. Vicksburg, MS: U.S. Army Engineer Research and Development Center. [www.wes.army.mil/el/dots/doer](http://www.wes.army.mil/el/dots/doer)



Figure 2. Sediment collector installed in Fountain Creek.



Figure 3. Archimedes screw separator (left) and stacker (right).



Figure 4. Electronic control panel and Archimedes screw separator.

The sediment collector system, as installed in Fountain Creek, consists of six main parts:

1. collector: 30 ft wide bedload collector
2. pump: 50 HP, submersible variable frequency drive (VFD) pump
3. controller: electronic controls with internet access and remote interface
4. 6 in. discharge and 8 in. water return DR 11 (160 pounds per square inch [psi]) high-density polyethylene (HDPE) pipelines
5. sediment separator: 100 tons/hour (hr)
6. stacker: capable of storing approximately 1,000 cubic yards (yd<sup>3</sup>).

The primary component of the collector is a steel hopper (Figures 2 and 5) placed on the bottom along a sediment transport pathway. A manifold system inside the hopper focuses flow across a small region within the hopper, providing high velocities needed to entrain sediment. A dredge pump housed in the hull with the hopper pumps water and sediment through the manifold to the placement area. The pump can also be mounted remotely on land, the preferred configuration for maintenance. Booster pumps can be added to increase the pumping distance, as required.



Figure 5. Installation of 30 ft long collector.

The system can be operated in an open or closed cycle. In the open cycle, water is drawn into the collector manifold from across the screen. Since the area of the screen openings is much greater than the area of the manifold orifices, velocity across the screen is very small (<1 feet per second [ft/sec]), even though velocity at the manifold is large enough to transport sediment. In the closed cycle, the slurry is discharged into a holding tank and separated from the water, and then the water is returned to the opposite side of the manifold so that water is drawn from the holding tank instead of across the screen. Advantages of the closed cycle include minimal impingement velocity (reducing potential for clogging) on the hopper screen, reduced risk of entrainment of aquatic organisms, and greatly reduced consumptive water loss. Sediment is discharged into a bin at the

base of the screw separator (Figures 3 and 4), which separates and drops the coarse sediment onto the stacker (Figure 3). Sediment is stockpiled at the stacker until it can be trucked away.

Electronic controls enable automatic or remote operation, reducing or eliminating the cost of labor to supervise operation. The system can be set to run at specified times, as a function of stream gage data or as a function of hopper capacity (still in development). Dredge pumps, piping, separators, and stackers are off-the-shelf technology used in dredging and other industries with documented performance metrics.

**OTHER POTENTIAL APPLICATIONS:** Collector technology adds two key improvements over other installed dredging systems:

**Selective capture.** Both the size and quantity of sediment removed can be selected. Since the system operates with very low or no head across the screen into the hopper, only sediments coarse enough to be transported in bedload are trapped (fine sands to gravels), while finer sediments (silts and clays) remain in suspension. The top size of the sediment is limited by screen opening size. The total volume captured can be modified by controlling the duration of system operation and by varying the width of the collector installed.

**Removal at the natural transport rate.** At maximum production, the system is only capable of removing sediment at the total maximum natural transport rate. The collector is only capable of trapping sediments when they are supplied by natural forcing (currents or waves). Therefore, the system (when installed at grade) can never exceed natural transport processes. Removing sediment at the natural rate more closely mimics nature, reducing known and potential unforeseen environmental impacts. A permanent collector serves as a grade-control structure. When installed above grade on a complete cross section, the collector will cause aggradation upstream to the desired new elevation. When installed below grade, the collector will initiate a controlled-depth headcut upstream.

The selective capture of bed load at the natural transport rate leads to some specific new capabilities. Although not exhaustive, some potential applications for collector technology are discussed below:

- **Watershed management.** By actively managing sediments at the watershed level, it is possible to drastically reduce sediment load to the area or channel of interest. Managing sediments at many locations throughout the watershed may optimize habitat restoration and protection and also be more cost effective and environmentally friendly than the traditional practice of dredging at the problem site. This also presents an opportunity to take advantage of flexibility in siting, by helping to address issues with property ownership, road access, material handling and transportation, power availability, etc. Collectors are scalable to any stream width and can be readily retrofitted to existing cross-vane or other structures. They also allow users to actively manage grades in the vicinity of the collector.
- **Reduce quantity of contaminated sediment dredging.** Coarse sediments can be removed before being deposited in an area known to be contaminated, by reducing the total volume of sediment that must be dredged and placed under more stringent requirements typical for removing contaminated sediments.

- **Sediment bypassing.** At inlets in tidal systems, or other locations where there is a clearly defined sediment pathway crossing a navigation channel, a collector could be installed as a sediment bypassing system, allowing sediment to be removed and pumped past the navigation channel, and preventing deposition. The system would be installed at reaches where deposition is typical and the discharge located in an area with potential for scour or transport away from the channel.

Reservoir sedimentation can be reduced by capturing and removing bedload at tributary mouths and either removing the material or reintroducing the sediment below the dam (at the natural transport rate, to offset channel and habitat degradation due to a sediment deficit caused by reservoir trap efficiency). Using collectors to design or retrofit sustainable reservoirs will not only reduce dredging requirements but will help maintain reservoir storage capacity and related hydroelectric generating capacity and reduce flood risks that would otherwise increase with a loss of storage.

- **Sediment backpassing.** On beach locations that experience accretion, the collector could be installed as a sediment backpassing system, allowing sediment to be removed from the accretion area and pumped back to beach erosional *hotspots* within practical pumping distance.
- **Application in remote locations.** Since a collector system can be installed with standard truckable equipment, it offers the potential for application in remote locations where there is a need to control grade in streams, to prevent downstream migration of excess or contaminated sediments, to maintain a navigable channel, or to supply coarse sediment with lower impact than traditional mining practices. In many headwater locations (e.g., first- or second-order streams impacted by logging, agriculture, or road construction), stream gradient may allow for collector clearing on a siphon basis for continuous operation with no pump or power requirement.

In addition to the potential applications listed above, implementation of this new technology could result in other benefits not yet fully investigated. Since there is essentially no flow into the hopper (with a closed water cycle), there is little risk of ingesting wildlife or foreign material that might clog the pump. This may help to meet permit requirements or avoid the need for some permits. Closed-cycle operations may also be used to address water rights issues by returning water to the hopper. Aesthetic impacts of dredging and operational limits (e.g., due to Threatened and Endangered species (T&E) or spawning seasons) could be avoided since there is very low or no flow into the system.

**DEMONSTRATION PROJECT COST:** Component, installation, and total cost of the system installed at Fountain Creek are listed in Table 1. The project was championed by the City of Pueblo and funded through the U.S. Environmental Protection Agency; Colorado Department of Public Health and Environment, Non-Point Source Office; Pueblo County; U.S. Department of Agriculture, Natural Resources Conservation Service; and Colorado Water Conservation Board (CWCB) in collaboration with the equipment developer Streamside Systems, LLC. Since the initiation of the project, the Fountain Creek Watershed, Flood Control, and Greenway District was created.



Costs shown in Table 1 approximate the actual system cost. Others have reported the cost to range from \$500,000 to \$1,000,000, although details associated with the higher estimates of cost are unavailable.

<b>Table 1. Sediment collector cost.</b>	
Collector (pumps, controllers, pipe, etc.)	\$419,000.00
Sediment Stacker	\$39,000.00
Installation	\$110,000.00
Approximate Cost of Contract Documents	\$50,000.00
Upgrades/Repairs	\$10,000.00
<b>Total</b>	<b>\$628,000.00</b>

Cost of operating the system has been minimal since it has been operated for short periods of time only and because Streamside Systems personnel donated time to operate the system to collect needed data. The system is capable of being operated remotely; however, because of potential risk to human safety associated with the separator and stacker, the system was only operated under direct supervision. The system uses approximately 1,000 Watts per hour (1kWh) per minute of operation. If the system were run continuously for 1 year, electricity cost would be approximately \$52,560 (based on cost of \$0.10/kWh).

Minor repairs were required after the flood of September 2011. Record-breaking rainfall resulted in extreme flooding and record creek flows but did not damage the collector. Damage to an exposed junction box required repairs totaling \$1,765. The remaining cost for upgrades/repairs included a return flow pump and minor modification to the initial layout of the piping. An 1,800 gallon (gal) tank was added at the separator along with a pneumatically actuated valve that provides return prime water for the dredge pump at startup to ensure that the specific gravity of the slurry is managed.

**PERFORMANCE:** Monitoring of the demonstration project has been underway since installation. Parameters that were planned for measurement included stream bed elevation within one-half mile of the collector, water level, sediment removed, electricity usage, maintenance required, and hours in operation. Specific performance data were collected at various flow rates over approximately 500 hrs. Since the system was not operated continuously over many months and with the bedload transport continuing when the system was not in operation, short term stream bed elevation and coarsening impacts were overwhelmed. Therefore, stream bed elevation was not resurveyed at the end of the project.

Record breaking rainfall in September 2011 resulted in extreme flooding and record creek flows of 13,800 cubic feet per second (ft<sup>3</sup>/sec). High water damaged the junction box, causing total down time of approximately 2.5 months while the City of Pueblo worked to get a repair contract executed. This flood demonstrated survivability of the system in an extreme event. Repair time was less than 1 day, once the repair contract was executed. Winterization (heat tracing and freeze protection) was not specified, and the system was not operated for approximately 2 months during the winter season.

Production rate was the key performance parameter measured. Prior to installation of the 30 ft bedload collector, a 2 ft bedload collector (Figure 6) was temporarily installed in Fountain Creek to estimate bedload transport extraction rates and assess optimal elevation for collector operation. The 2 ft collector pumped sediment into a drop box (Figure 6) that, in turn, allowed a 3 ft<sup>3</sup> container to be filled with the subsequent fill time noted to calculate a production rate. Sediment was collected over a 3-day duration with extraction rates at respective stream flows listed in Table 2. Assuming a linear extraction rate function for a longer collector, respective production rates were estimated for a 30 ft long collector and listed in Table 2 as well.



Figure 6. 2 ft collector and drop box used to estimate production rates.

<b>Table 2. Measured 2 ft collector and estimated 30 ft collector extraction rates.</b>		
<b>Stream Flow (ft<sup>3</sup>/sec)</b>	<b>2 ft Collector Bedload Extraction Rates</b>	<b>Estimated 30 ft Collector Bedload Extraction Rate (yd<sup>3</sup>/hr)</b>
100	3 ft <sup>3</sup> /26 min	2.6
120	3 ft <sup>3</sup> /38 min	3.8
600	3 ft <sup>3</sup> /6 min	16.7

Figure 7 plots maximum production rate vs. creek discharge for all data collected, with a second-order polynomial trend line fit to the data. These production rate values were not independently verified by the USACE. Excluding the September 2011 flood, the range of discharge rates captured represents the typical range expected at this site during any year. The figure shows the dependence of bed load on discharge. The estimated production rates in Table 2 (based on the 2 ft collector extraction rates) agree well with the production curve in Figure 7 at the lower flow rates of 100 and 120 ft<sup>3</sup>/sec, but less so for the 600 ft<sup>3</sup>/sec flow rate condition. Peak measured production rate for the 30 ft collector was 100 yd<sup>3</sup>/hour. At this rate, if sufficient bed load were available, the single 30 ft collector would move 876,000 yd<sup>3</sup>/year. The high capacity of a single unit makes it possible to use structures in conjunction with collectors to maximize total capture with fewer collectors.

Visual inspection of the hopper and other system components were made at least monthly over the course of the year. No significant wear or corrosion was shown on any parts although the urethane coating on the mild steel hull did sustain scouring and erosion. No repairs have been required other than those associated with initial system configuration as a result of the flood in

September 2011 and vandalism that damaged the power and control conduit leading to the dredge pump. Additional automation and instrumentation was added with the return water tank that included a variable level control and high-level switch that assists with balancing the system.

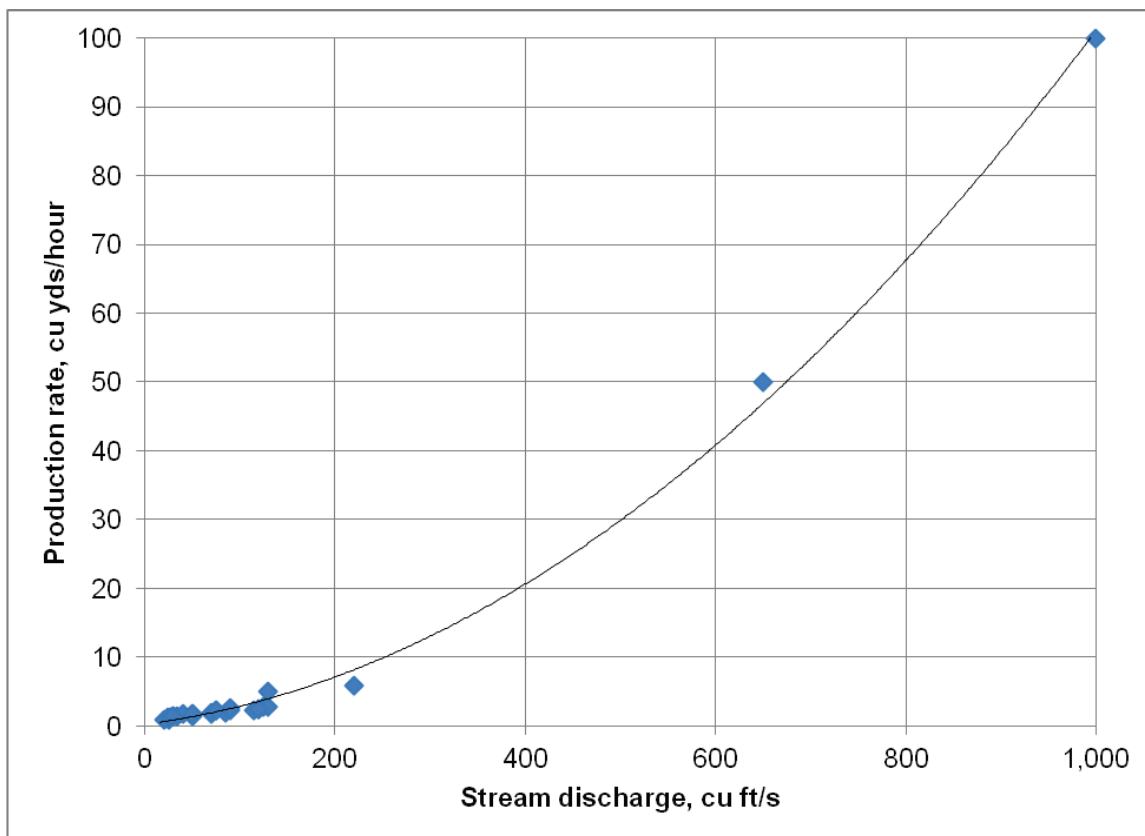


Figure 7. Sediment collector production curve.

**LESSONS LEARNED:** Initial deployment of new systems is an opportunity to inform design and improve installation procedures. The following list describes lessons learned during the demonstration project:

- All electrical components should be well above potential flood water levels.
- Pipelines should be as straight as possible, with no sharp turns, limiting the potential for air to be trapped in the lines.
- When operating the system with return flow, a sufficiently large water storage container should be available at the discharge point to prevent air intrusion during pump start-up and to ensure that an acceptable slurry specific gravity is maintained.
- Experience at Fountain Creek suggests that the return flow pump is a worthwhile investment, reducing risk associated with grade control, and that the return flow also prevented the collector from being clogged from surges of sediment that accumulated in the hopper (i.e., the return flow refluidizes these sediment *slugs* in the hopper and meters it into the suction ports).
- Accurate survey for grade control during installation is essential both at the discharge point and hopper.

- Elevation of the hopper directly controls elevation of the bed during operation.
- Elevation of the pipeline discharge point (relative to the hopper) controls the size of the return flow pump, or required head difference if attempting to run without a return flow pump.
- As with any industrial operation, measures must be taken to ensure that unauthorized personnel do not gain access to the material management equipment (separator and stacker). The 6 ft tall fence around the demonstration project site was insufficient to prevent the curious from gaining access to the dangerous electrical and mechanical equipment. Yard lighting is recommended for night operations.
- Screen configuration and size should be based on the aggregate particle sizes in bedload. This demonstration project selected the standard coarse sand, stainless steel, round bar stock with a 3/8 in. spacing in lieu of recommended vibratory screens. During periods of low flow, larger aggregate can align in the screen apertures, resulting in bridging. Vibrating screens or jet systems could be added to offset this requirement.
- To ensure that stream flow and bedload are delivered across the collector screens, appropriate permanent or temporary cross-vane structures are recommended. Tangential interception of the stream flow by the collector screens can exacerbate the aforementioned screen-bridging issues that were identified.
- Careful collaboration between the technology vendor (or other expert), engineer responsible for system/site design, and construction contractor is essential to avoid additional cost associated with field modifications during installation and initial testing. Design-build may be the best procurement mechanism for initial full-scale applications.

**RECOMMENDED GENERAL APPROACH FOR COLLECTOR PROJECTS:** Sediment collector technology should be considered when substantial quantities of sediment selected for removal are being transported as bedload. Recommended key steps in scoping, design, construction, and operation of a sediment collector project are identified below:

**Predesign analysis.** Appropriate analyses should be conducted to determine sediment transport processes, and expert advice should be solicited to determine if a collector is feasible for each site. Key parameters that should be investigated to determine if a collector project is feasible include the following:

- Sediment transport (size and rate): Typically measured through deployment of a 2 to 6 ft collector emplaced and operated during varying stream flow conditions (Lipscomb et al. 2005).
- Transport processes and pathways: Typically assessed through combination of expertise, field data and inspection, and application of numerical models.
- Sediment management: Identify potential placement locations and methods of conveyance.
- Operations plan: Identify who will be responsible for operating and maintaining the system after construction.
- Benefits analysis: Compare cost, both financial and environmental, to alternative methods to identify the least-cost method of removal.

**Design.** After the decision to install a collector has been made, design of the plant should be conducted by an experienced engineer consulting with the system developer or other expert in collector installation. Major components of design analyses include the following:

- Collector design: Based on data collected and analyses conducted in the predesign phase, consult with the system developer to determine the appropriate configuration of the full-scale collector system.
- Placement area design/plan: Design the placement area and plan operations to manage the sediment load anticipated. Contingencies for minimal oversight should be considered.
  - If not conducted during the redesign phase, it may be necessary to collect more data or conduct additional analyses to determine the rate of sediment that must be handled.
  - Placement area options range from direct discharge to a complete mechanical separation plant like the one used at Fountain Creek.
- Pump and pipeline design: Pipeline layout should minimize head loss, prevent air from being trapped, and follow the shortest possible route. Pump size will be a function of sediments, collector size and configuration, placement area design, and pipeline configuration.
- Electronic control and electrical design: Electronic controls and electrical wiring for the collector system must be designed. The control system should be designed with the collaboration of the system vendor.
- Final site design: Other design features typical of a civil project such as grading, drainage, roads, utilities, lighting, site safety, etc. should be considered.

**Construction.** The system should be installed by a qualified construction contractor with an expert in collector installation on staff. The demonstration project identified some issues to consider during construction, listed below:

- Construction quality control (QC): Lessons learned during the pilot highlighted the importance of QC during construction. Elevation tolerances, pipeline layout, and electrical wiring all had issues at Fountain Creek that could have been eliminated through QC during construction.
- Initial testing: Like any new system, initial testing should be conducted to determine if the system is operating as intended.

**Operations and maintenance.** After construction, the system should be monitored to ensure that it is functioning as designed. Some topics for consideration after construction include the following:

- Monitoring: System components (collectors, pumps, electronics, etc.) and environmental factors (sediment size and transport rate, flow rate, etc.) should be monitored to assess performance and to inform system maintenance or tuning.
- System tuning: Because of the uncertainty associated with modeling and measuring sediment transport, it is likely that actual production will be different than predicted. It may be possible to modify system configuration to optimize performance. Plan to re-evaluate system layout after monitoring data have been gathered and analyzed.

Length of monitoring duration necessary to make system tuning decisions will, of course, depend on which system design aspects are being evaluated. The decision to relocate certain Fountain Creek electrical components well above potential flood water levels happened immediately after the components were flooded. Something like a system reconfiguration may take longer to more accurately reassess site specific conditions (e.g., optimum sediment transport volumes and patterns).

**CONCLUSIONS:** This DOER TN is Part 2 of a series demonstrating innovative methods to enable sustainable sediment management to reduce dredging requirements. This TN presents application of sediment collector technology in Fountain Creek, Pueblo, CO, and discusses how it might be applied to reduce USACE navigation dredging. The installation successfully demonstrated the technology, specifically that collector technology

- works with coarse sediments in a shallow unidirectional flow environment
- has minimal maintenance costs over a 1 yr deployment
- survives record floods with minimal damage
- is capable of producing up to 100 yd<sup>3</sup> per hour with a single 30 ft collector
- is relatively inexpensive and easy to deploy without specialized equipment.

Further investigation of collector technology through a larger-scale demonstration at a navigation project is recommended. Future demonstrations should consider testing application in areas with wave dominated transport, application with finer sediments, application in deeper water, and different placement options.

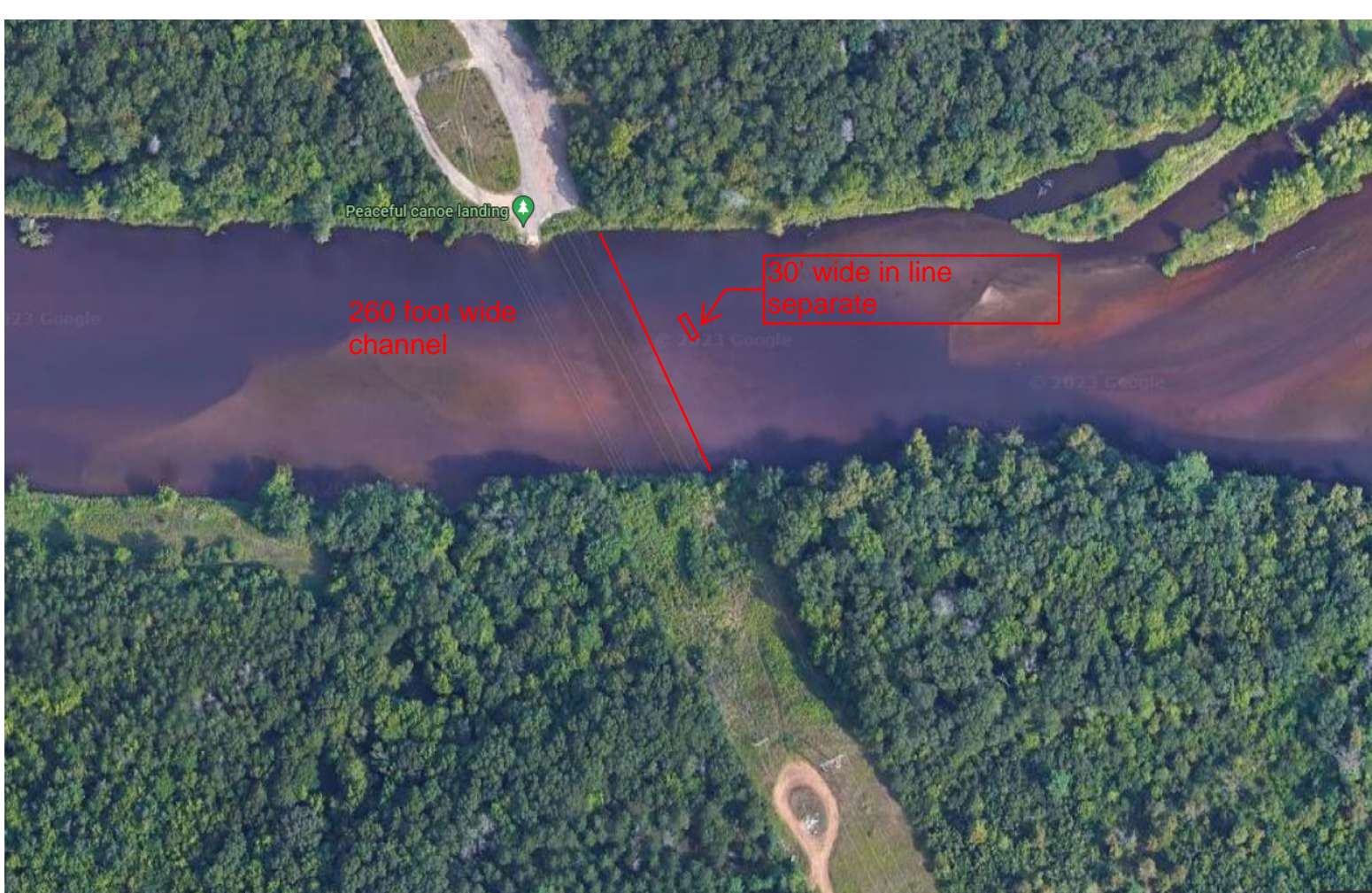
**POINTS OF CONTACT:** For additional information on sediment minimization to reduce dredging, contact Robert Thomas (409-766-3179), [Robert.C.Thomas@usace.army.mil](mailto:Robert.C.Thomas@usace.army.mil); Timothy Welp (601-634-2083), [Timothy.L.Welp@usace.army.mil](mailto:Timothy.L.Welp@usace.army.mil); and/or the DOER Program Manager, Dr. Todd Bridges (601-634-3626), [Todd.S.Bridges@usace.army.mil](mailto:Todd.S.Bridges@usace.army.mil) . This technical note should be cited as follows:

Thomas, R., J. McArthur, D. Braatz, and T. Welp. 2017. *Sediment management methods to reduce dredging: Part 2, sediment collector technology*. DOER Technical Notes Collection. ERDC TN-DOER-T13. Vicksburg, MS: U.S. Army Engineer Research and Development Center. [www.wes.army.mil/el/dots/doer](http://www.wes.army.mil/el/dots/doer)

## REFERENCES

Lipscomb, C. M., A. Darrow, and C. I. Thornton. 2005. *Removal efficiency testing of streamside systems bedload monitoring collector*. Ft. Collins, CO: Colorado State University Engineering Research Center.

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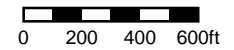


# Tax Parcel

## Legend

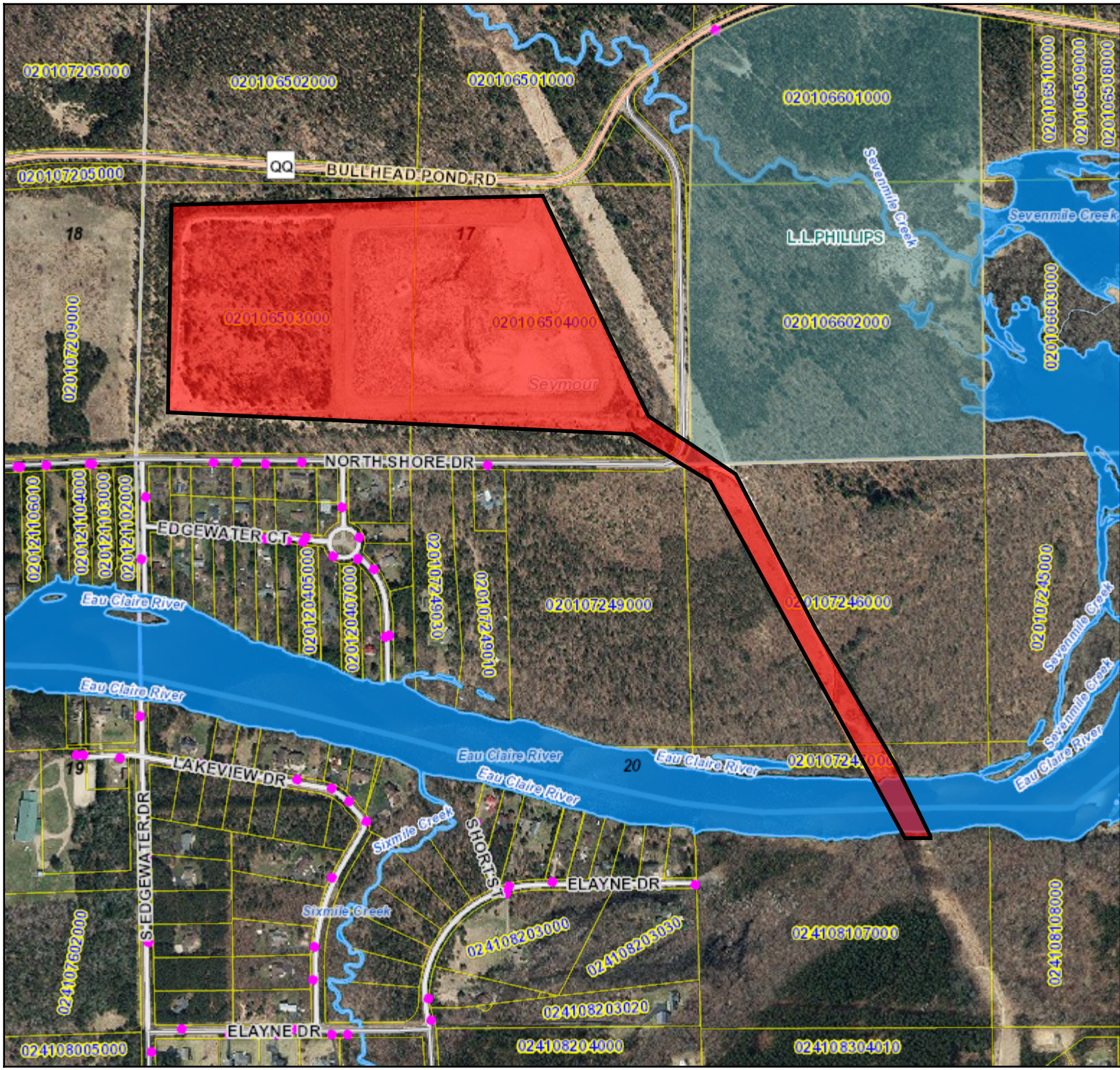
- Addresses
- Parcels
- Parcel Labels
- Parks
- Sections
- Villages (Scale below 35K)
- Cities (Scale below 35K)
- Towns
- Surrounding Counties
- Rivers and Streams
- Lakes and Rivers
- Interstate
- US Highway
- State Highway
- Ramp
- Major Arterial
- Minor Arterial
- Collector
- Local
- Private Drive
- Recreation
- Service
- Other

Ortho 6 Inch 2018 (Color)  
 Ortho 6 Inch 2020 (Color)



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# Beaver Creek Reserve's "Earth Day Every Day"

*Celebrating all April long!*

**Earth Week:** April 17-23, 2023

**Earth Day:** April 22, 2023

## **Event Summary**

Earth Week Challenge was created back in 2019 as a way to encourage green and sustainable initiatives among citizens of the Chippewa Valley during a week in April. Teams earned points for completed tasks, and were then entered into drawings to win prizes. We had over 90 challenge tasks that included "carpooling to work or school," "picking up garbage in your neighborhood," or "visiting a local county or state park." These tasks were designed to be easily integrated into most lifestyles even after the challenge was over.

During the COVID-19 pandemic, we moved the Challenge to be completely online and saw an increase in participation as families stayed home. Over the last four years, we have had over 400 teams participate in the Challenge, but we still wanted to do more and make it a community-wide effort. After further consideration, we reevaluated this event to encourage individuals and families to step outside of their home and participate in hands-on activities within their community. There is no better way to learn about sustainability and creating a greener environment, than to experience it first-hand!

To include more community events, we decided to expand Earth Week and celebrate Earth Day the entire month of April! Beaver Creek Reserve's Earth Week Challenge is now a campaign called "Earth Day Every Day" to promote more community events, Beaver Creek programs, and long-term sustainability in the Chippewa Valley. Participants no longer have to sign up as teams or submit completed challenge tasks for points, but instead attend events for raffle prizes! We will still be hosting Earth Week as a designated week leading up to Earth Day to encourage visiting local county and state parks, and to participate in our countdown to Earth Day photo contest. Then we'll finish the week with our Earth Day Walk!

Last year, we hosted our first ever "Pollinator Fun Run/Walk" on Earth Day. Teams ran or walked the trails at Beaver Creek and spread native plant seeds along designated planting stations. The goal was to increase native plant and pollinator awareness, and we ended up having over 100 people attend! Because this event was so successful, we decided to grow it even further and host this year's "Earth Day Walk!" Instead of promoting just pollinators, we'll be promoting all things sustainability. From a guided walk along our trails to learn about plants, wildlife, and pollinators, to making sustainable seed starters, learning about composting and recycling, and ending the day with a dirt cup and butterfly nectar (Oreo pudding with gummy worms, and pink lemonade). We'll be spending Earth Day with fellow "eco-champions" to learn more about what we can do to support our planet.

If you have further questions about our month of activities or Earth Week, please contact me at [outreach@beavercreekreserve.org](mailto:outreach@beavercreekreserve.org) or (715)877-2212. Thank you, again, for your continued support of Beaver Creek Reserve. We look forward to working with you again in the future!



Kristen Giefer  
 Outreach and Development Coordinator, Beaver Creek Reserve

## April Event Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01
02	03	04	05 *Sustainable Living for Beginners	06	07	08 Spring GPS Hike at Beaver Creek
09	10	11	12 *Birding Wisconsin: Sparrows *Organisms in Trade	13	14	15 Annual Midwest Crane Count Hobbs Observatory Public Viewing
16	17 <b>Earth Week</b>	18 *Preparing for your Pollinators	19 *Sustainable Living for Eco-Champions	20 Bird School - Day 1 Earth Week Open House @ Brewing Projekt (w/ JONAH & Eau Claire County Office of Recycling and Sustainability)	21 Bird School - Day 2 *Changes in the Land	22 <b>Earth Day!</b> Earth Day Walk Bird School - Day 3
23 Natural Paints for Kids	24	25 *Who is that Singing?	26 *Birding Wisconsin: Warblers Adult Wildflower/ Phenology Hike	27 *Clean Boats, Clean Waters Training	28	29 Foraging for Wild Edibles
30				<b>Beaver Creek Reserve Event</b>	<b>Community Event</b>	<b>*Virtual Program</b>