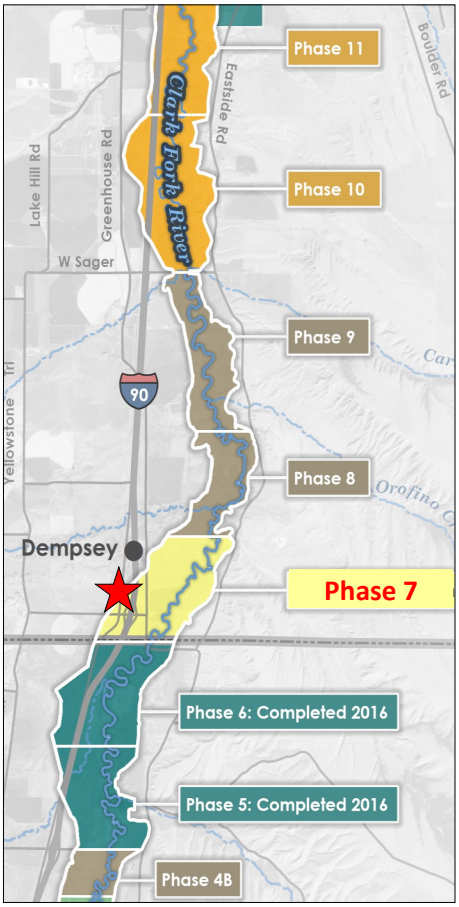
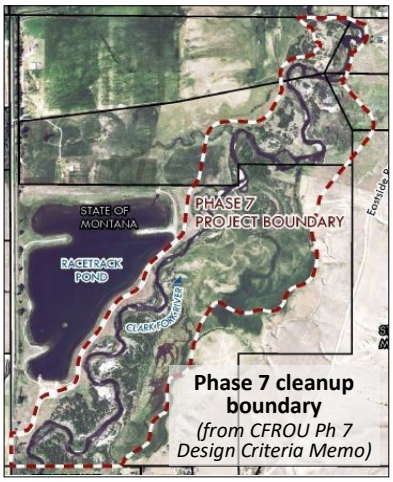
CFRTAC
Clark Fork River
Technical Assistance Committee

February 2025



Background

Cleanup of mine waste contamination and restoration of "Reach A" in the Upper Clark Fork River corridor began in 2010. Reach A is a 45-mile stretch of river between Warm Springs and Garrison that Montana's lead cleanup agency, the Dept. of Environmental Quality (DEQ), has divided into 22 phases. Of these, seven have been completed as of early 2025 (phases 1-3; 5-6; and 15-16), plus half of another phase (4A). Work is now underway on Phase 7, a 40-acre site 10 miles south of Deer Lodge beginning at Gemback Road east of Racetrack Pond and running 2.2 river miles north. Construction is expected to run from January through October 2025.



Phase 7 cleanup boundary
(from CFROU Ph 7 Design Criteria Memo)

If you have floated or visited this stretch you have probably seen some of the floodplain and bank conditions that have made this phase a relatively high priority in the strategic plan released by the State in October 2023. Among the top concerns are the relatively high levels of contaminated soils adjacent to a popular public fishing access (Racetrack Pond), and the risk of contaminated sediments eroding into the river. Within this reach, which includes both private and state-owned lands, the State will remove ~136,000 cubic yards of sediments contaminated with arsenic, copper, lead, zinc, and cadmium and haul them to the Opportunity Ponds repository site.

The Plan

- Contaminated soils will be removed from the river corridor within the boundaries of the river's estimated average movement over the next 100 years (the 100-year mean "Channel Migration Zone" - see page 4), as well as from high contamination areas outside of this boundary. This is a narrower boundary than was used in previous phases. Areas with desirable vegetation and/or habitat will not be treated.
- Banks will be constructed from native materials and will be designed to withstand a 10-year flood event. Bank height will be set to allow the river to reach the floodplain every 1.5 years. These design elements are intended to mimic the function and stability of native stream banks during high-water conditions.
- New wetland features will be built on the east side of the site (not yet designed).
- Current estimated cost (including monitoring & maintenance): $5 million.

Clark Fork River Technical Assistance Committee

Helping local communities learn about and engage in Superfund remediation and restoration of the Clark Fork River

CFRTAC Board

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Amanda Cooley, Megan Olson
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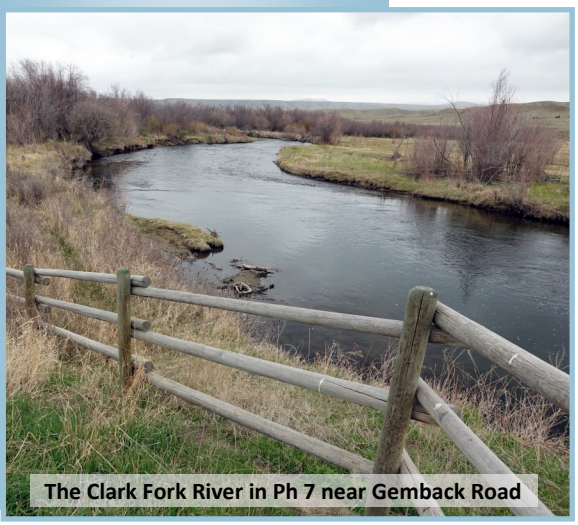


The Clark Fork River in Ph 7 near Gemback Road

Phase 7: What we'll be tracking

CFRTAC board members and technical advisor, Mike Sanctuary (Confluence Consulting), serve on the Design Review Team (DRT) with State agencies and their consultants. The DRT determines how cleanup and restoration will be carried out in each phase. Below are the primary concerns we raised about the Phase 7 design and the State's responses.

1. Extent and location of contamination removal: DEQ's initial determination of the removal boundary for Ph. 7 entailed estimating the 100-year CMZ (see page 4) by mapping historic channel alignments, determining active channel migration rates, and multiplying this mean annual migration rate by 100. This was used to create a buffer that was applied uniformly across Ph. 7, and then modified to: 1) exclude areas with high quality vegetation so it can be preserved; and 2) add severely impacted areas (those with slickens). In our comments we noted that rivers do not move or erode uniformly over time, so applying an *averaged* (mean) channel migration rate is concerning. We believe a more nuanced approach would be more protective. For example: focus on areas where the risk of the river re-capturing contamination is higher, such as historic channels, potential avulsion pathways (see p. 4), and highly erosive areas. The State is open to modifying their approach in future phases, including in the upcoming Phase 10, but will use the 100-year CMZ as the initial basis for removing contaminated soils in Ph. 7 .

2. Response of river channel to lowered floodplain: Previous phases (especially 5/6 near Galen Road) were designed to have a higher bank elevation and stability, which means more water is contained in the river channel before it escapes into the adjacent floodplain. This approach decreased the connectivity between the river and its floodplain, impacting the delivery of water and nutrients to riparian vegetation. In Ph. 7, the design approach has been revised with a slightly lower floodplain elevation that allows the river to more frequently activate its floodplain. While this approach will undoubtedly benefit the establishment of riparian and wetland vegetation and accelerate vegetative recovery, we're concerned that it will reduce water velocity in the river during high water events, as well and the river's ability to scour its bed, create complex pool habitat, transport incoming sediment, and maintain trout spawning habitat. In response to our concerns, the State performed a sediment transport and hydraulic analysis, and concluded that long-term loss of habitat complexity or spawning areas will not be an issue.

While the floodplain design will not be altered in Ph. 7, we want to be sure the aquatic habitat response to the remediation and restoration effort is monitored. DEQ, NRDP, and FWP are currently developing a comprehensive, pre-and post-construction fish habitat and geomorphic assessment (referring to pools, backwaters, water depth, areas of root wads, cover, undercut banks, etc.) to document the channel's response to a lowered floodplain elevation. They intend to use the data to help inform future designs. While we support the agency's monitoring intent, **we believe it is essential to define what constitutes "success"** for this large-scale restoration. What is

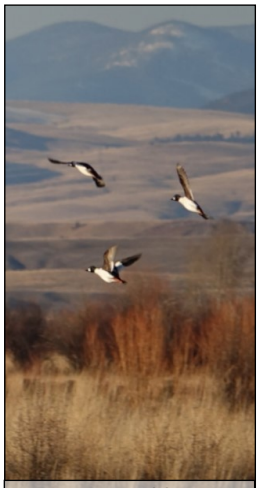
Slickens in the floodplain in Phase 7

CFRTAC board members tour the Ph. 7 site with State agencies and their consultants (June 2024)

an appropriate amount of pool and riffle habitat, overhanging cover, undercut banks, braiding channels, and bank erosion? What conditions trigger maintenance or corrections? We have requested a review of the data collection plan and performance metrics. The State anticipates releasing a report in March 2025.

3. Large wood: To improve fish habitat, we would like to see more wood, such as junipers and cottonwoods, incorporated into the active channel as in-stream or bank structures ("LW jams"). This would benefit brown trout, which use large wood as escape cover in pool tail-outs when they are feeding and spawning in shallower water. LW jams are not currently included in the Ph. 7 design. However some of the proposed brush matrix bank treatments include log structures with root wads that are designed to improve overhanging cover, which is a step in the right direction. The State is open to adding more robust wood structures or jams if additional funding can be secured and the design engineer approves of their inclusion. We are currently investigating funding opportunities in hopes of benefiting the habitat in this, as well as future, phases.

4. Wetland restoration design: The Ph. 7 plan includes creating new, and enhancing existing, wetland features. Specific designs have not yet been completed, beyond plans to remove contamination from within the future wetland footprint. The State has agreed that CFRTAC can review and provide input on the designs when they become available. Some of the features we'd like to see include: 1) Both emergent and submerged aquatic vegetation to benefit waterfowl productivity; 2) An appropriate amount of deeper, open water in addition to shallow habitat where vegetative growth will occur; 3) Grading that provides a variety of depths to promote seasonal, fluctuating water levels, resilience, and germination of aquatic emergent vegetation; and 4) Preservation of pathways for cold water to reach the river (such as routing springs directly to the river).



Common Goldeneye take flight from wetlands in Ph. 5/6

5. Contamination outside of the CMZ: Some of the deepest tailings in Ph. 7 are found at depth below several preferential flow paths (now oxbow sloughs) formed by the river long ago, but these remain outside of the removal boundary. In our comments we noted these oxbows have relatively low elevations compared to the adjacent floodplain and will be inundated during high flows, making these areas susceptible to future reoccupation by the river. The State felt this risk is low, as these areas "are not frequently activated by the channel," and are "more likely to trap sediment because of their low elevation shallow slope, and dense sedge and willow vegetation." While we agree the current risk is low, we are concerned this risk may increase over time as river alignment adjusts and avulsion paths emerge, increasing the chance of historic channel reoccupation and contaminant exposure.

What's Happening at Arrowstone Park?

Cleanup at Arrowstone has been a long time coming. Sadly, the wait isn't over. After some promising news that the site was bumped up the cleanup priority list and work could begin in 2025, progress has stalled. Why the delay?

- Arsenic levels: Given the park's popularity and frequent use by children, the arsenic threshold, which was determined 20 years ago, is likely too high to adequately protect public health. The arsenic threshold is a major driver of cleanup design, and cleaning to a safer standard will cost more and take longer. The State is currently grappling with finding a balance between more delays, greater expense, and completing a safer cleanup at this key site .
- Budget woes: To date, more than half of the Clark Fork cleanup budget has been spent, but only 7.5 of 22 phases have been completed. Cost-cutting measures at Arrowstone shifted funds away from park restoration to prioritize cleanup -- creating a gap that could widen further if the State pursues a more protective arsenic standard. Powell Co., which maintains Arrowstone, is seeking outside funding to ensure much-needed restoration work can still be completed.

With work delayed, the State plans to visit the park this spring to address any new arsenic hot spots (with soil caps), as it did in 2023. Look for an update on Arrowstone Park from the State at the **February 25 public mtg** (see p. 4).

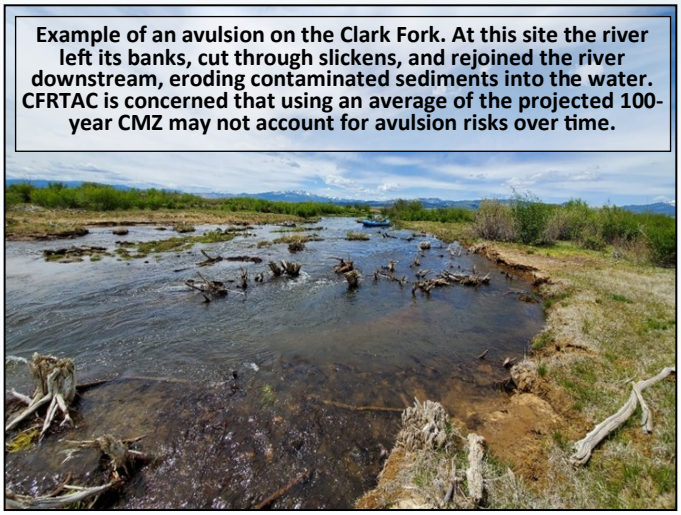
What is the CMZ and why is it important?

Rivers move and shift over time, changing suddenly or subtly, depending on weather events, bank stability, natural or created obstacles, and more. The area in which a river roams is called the Channel Migration Zone, or CMZ. In the Upper Clark Fork (UCF) the CMZ has been relatively static in many places over the last 100+ years because of constraints from built elements like riprap, irrigation structures, road/rail embankments, and development; and due to hardened banks created by contaminated sediments.

In some places, however, the river has shifted to form new channels or reclaim old ones. This can sometimes occur very suddenly (such as during floods), an event known as an avulsion. Avulsions in the UCF can be extremely problematic, as the river may cut through highly contaminated soils, releasing toxic sediments that can kill fish and aquatic insects.

Determining the future CMZ and identifying potential avulsion risks are key factors in cleanup plans. But *how* the CMZ is determined and applied can have major impacts on long-term cleanup results. In its **2023 Strategic Plan** the State used the *average* of the projected 100-year CMZ to determine cleanup boundaries (called the removal boundary). This results in a more narrow cleanup margin compared to the method used previously. (The State's approach also allows for remediation of some high-risk avulsion areas outside of the CMZ.)

This approach saves dwindling cleanup dollars, but is also cause for concern. The historical measurements used to project the 100-year CMZ (and removal boundary) represent the UCF as it has been. But cleanup and restoration activities change channel migration and avulsion dynamics by removing much of the existing riparian vegetation around the river. Subsequent replanting with native vegetation, including willows and cottonwoods, directly impacts migration and avulsion processes, as deep, healthy roots increase the strength of river banks. Yet tree trunks and rootwads in the channel or bank can also drive channel avulsion. This interplay between short-term disturbance and long-term floodplain and riparian recovery has the potential to alter the rates of incremental channel migration, increasing the likelihood of channel avulsion beyond the current removal boundary.



Example of an avulsion on the Clark Fork. At this site the river left its banks, cut through slickens, and rejoined the river downstream, eroding contaminated sediments into the water. CFRTAC is concerned that using an average of the projected 100-year CMZ may not account for avulsion risks over time.

CFRTAC raised this issue in its **Phase 7 design comments**. While the Phase 7 design will not change, the State is open to using a more nuanced approach to determine removal boundaries in future phases.

Resources and Opportunities:

Superfund Cleanup Info

- **CFRTAC website**: *www.clarkforkrivercleanup.org*
  - ⇒ Superfund background & history, status of cleanup phases, CFRTAC comments on cleanup designs, document archive, river facts, cleanup-related research & reports, and more
- **2023 Strategic Plan**: *tinyurl.com/2023UCFStratPlan*
  - ⇒ DEQ and NRDP strategic plan with goals, objectives, and parameters guiding the Clark Fork River cleanup
- **Ph. 7 Design docs & comments**: *tinyurl.com/Ph7Info*
  - ⇒ Design plan and drawings; comments on the design & State responses; data/results from pre-design site sampling

Ways to Get Involved

- **Ph. 7 & Arrowstone Public Mtg**:
  - ⇒ **Tuesday, Feb 25, 6 pm**, Powell County Community Center
- **Join CFRTAC's mailing list**:
  - ⇒ Just email us to get signed up! *info@clarkforkrivercleanup.org*
- **Support our work!**
  - ⇒ We can now accept tax-deductible donations! Make checks payable to CFRTAC, and mail to the address below. *(Sorry - we cannot accept credit cards at this time.)*

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