



Sharon Bosley
Executive Director

BEIPC

Basin Environmental Improvement

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February 19th, 2025

To: BEIPC Commissioners, Alternates, Staff, TLG and CCC Chairs

From: BEIPC Executive Director

Subject: BEIPC March 5th, 2025, Quarterly Meeting

Enclosed is the meeting packet for the upcoming **BEIPC Meeting on Wednesday, March 5, 2025**. The meeting will take place at the **Kootenai County Administration Building** (451 Government Way, Room 1 A/B) and is scheduled to begin at **9:00 AM**, concluding around **3:00 PM**. **Caruso's** will be providing lunch for attendees.

This meeting will feature a comprehensive review of the past year's accomplishments and several key discussions, including:

- **Introduction of the New Trust Manager** – Learn about the new leadership and their vision for the Trust's future.
- **Repository Design Review** – An in-depth look at repository design.
- **Bunker Hill Website Review** – A walkthrough of the newly developed website and its features.
- **The Confluence Project Overview** – A review of this education program for high school students.
- **BEIPC Biennial Elections** – We will hold elections for BEIPC leadership positions.

Each presentation will be followed by time for public comments, ensuring opportunities for discussion and community input before the meeting adjourns.

This meeting promises to be highly informative, and we encourage your participation. If you have any questions, feel free to call me at **208-659-1715** or email sharon.bosley@deq.idaho.gov.

Best Regards,
Sharon Bosley

Executive Director
Enclosure

March 5, 2025 BEIPC Meeting Packet Items

- Meeting Guidelines
- Draft March 5, 2025 Meeting Agenda
- Abbreviations and Acronyms
- Draft November 22, 2024 meeting minutes
- Draft 2024 Annual Accomplishment Report

BEIPC MEETING GUIDELINES

- The Executive Director is directed to manage these guidelines.
- The agendas for BEIPC meetings are draft agendas and may be modified by the Commissioners by motion and majority vote at the beginning of the meeting to accommodate unanticipated program and scheduling changes.
- Parties requesting a scheduled time slot on BEIPC meeting agendas to present technical or other information shall discuss the request with the Executive Director a minimum of four (4) weeks prior to the meeting date. If the draft agenda can accommodate the subject matter and time needed for its presentation and at the request of the Executive Director, the requesting party shall forward an electronic copy of the proposal for the item to the Executive Director a minimum of three (3) weeks prior to the meeting date. If the item is of a technical nature, the Executive Director will present the technical proposal and or presentation to the TLG for information and review prior to the BEIPC meeting. TLG consideration of the proposal shall not prevent its presentation to the BEIPC.
- Parties making presentations needing overhead equipment, utilizing Power Point or other projection presentations shall furnish their own equipment or make arrangements with the Executive Director. Projection screens shall be provided by the BEIPC at meeting locations.
- At each BEIPC meeting, an open public comment and presentation period shall be set aside for any member of the public to make comments and presentations concerning the Basin or issues being discussed by the BEIPC and presenters on the meeting agenda. The Executive Director is responsible for adjusting the public comment periods on the agenda to ensure that the public is afforded the opportunity to comment concerning an issue of discussion at BEIPC meetings. Each presenter shall have a maximum of three (3) minutes to comment or make a presentation. These presentation times will be monitored by the Executive Director. Presenters shall be recognized by the Chair of the BEIPC meeting prior to speaking. If a presenter needs more time, they shall make arrangements with the Executive Director for a scheduled time slot on the agenda.
- Issues requiring BEIPC discussion and voting such as programs of work, five year work plans, annual work plans, and budget and funding issues shall be presented prior to the final vote on each such issue. The public comment time slot will be managed as outlined above.

Basin Environmental Improvement Project Commission

Meeting Agenda

March 5th, 2025, 9:00 AM – 3:00 PM

451 Government Way

Meeting Room 1A/B

Coeur d'Alene, ID 83814

<https://events.gcc.teams.microsoft.com/event/69c4fb36-9904-40c0-838f-57c5bf95ad32@c53b7a63-2d6e-4d96-87c9-9f583f6d1c81>

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| 9:00 AM | Call to Order
<i>Roll call</i> |
| 9:10 AM | Review and Approve Draft November 20, 2024, Meeting Minutes – Sharon Bosley
(Action Item) |
| 9:20 AM | BEIPC Elections – Sharon Bosley (Action Item)
<i>Election for Chair, Vice Chair, treasurer/secretary</i> |
| 9:40 AM | The Confluence Project presentation – Mike Wood, U of I |
| 10:10 AM | Break |
| 10:25 AM | Blood Lead Screening and Healthy Homes Update – Mary Rehnberg, PHD |
| 10:55 AM | Bunker Hill Superfund Site Website Introduction – Emily Hasz. PHD |
| 11:15 AM | Repository 101 with a highlight on Big Creek Repository/ Big Creek Repository Annex
- Jocelyn Carver, EPA |
| 12:00 PM | Lunch - Lunch provided for Commissioners, BEIPC Staff and CCC chair |
| 1:00 PM | CDA Trust Transition – Roberto Puga |
| 1:20 PM | Update on Lower Basin WCA – Jocelyn Carver |
| 1:35 PM | Restoration Partnership Annual Accomplishment Report – Rebecca Stevens, CDA
Tribe |
| 1:55 PM | Break |
| 2:05 PM | Review and Approve Annual Accomplishment Report – Sharon Bosley, BEIPC (Action
Item) |
| 2:45 PM | Discussion and Comments with CCC – Jerry Boyd, Chair |
| 3:00 PM | Public Comments & Discussion |
| 3:10 PM | Adjourn |

Note: Times indicated for presentations and discussions are tentative and may be adjusted to accommodate over and under runs of time used to accommodate presenters and Board and public discussions.

ABBREVIATIONS AND ACRONYMS

AMD: Acid Mine Drainage
ARAR: Applicable or relevant and appropriate requirement
ARRA: American Recovery and Reinvestment Act
ATV: All Terrain Vehicle
AWQA: Ambient water quality criterion/criteria
BCR: Big Creek Repository
BEIPC: Basin Environmental Improvement Project Commission
BEMP: Basin Environmental Monitoring Plan
BLM: Bureau of Land Management (US Department of the Interior)
BPRP: Basin Property Remediation Program
CCC: Citizens Coordinating Council
CDA: Coeur d'Alene
CDC: Center for Disease Control
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CIA: Central Impoundment Area
CICs: Community Involvement Coordinators
COC: Chemical of concern
CSM: Conceptual Site Model
CTP: Central Treatment Plant
CWA: Clean Water Act
DCIP: Drainage Control Infrastructure Revitalization Plan
ECSM: Enhanced Conceptual Site Model
EFN: East Fork Ninemile
EMFR: East Mission Flats Repository
EMP: Environmental Monitoring Program
EPA: Environmental Protection Agency
ERA: Ecological Risk Assessment
ESD: Explanation of Significant Differences
FFS: Focused Feasibility Study
FS: Feasibility Study
GPM: Gallons per Minute
HH PFT: Human Health Project Focus Team
I-90: Interstate 90
I-C: Interstate-Callahan
I & I: Inflow and Infiltration
ICP: Institutional Controls Program
IDAPA: Idaho Administrative Procedures Act
IDEQ: Idaho Department of Environmental Quality
IDFG: Idaho Department of Fish and Game
IDPR: Idaho Department of Parks and Recreation
ITD: Idaho Transportation Department
LLC: Limited Liability Company
IP: Implementation Plan
LBC: Lower Basin (Citizen's) Collaborative
LBCR: Lower Burke Canyon Repository
LMP: Lake Management Plan
MAU: Multi-attribute utility

MOA: Memorandum of Agreement
NCP: National Contingency Plan
NPL: National Priorities List
NRDA: Natural Resource Damage Assessment
NRRT: Natural Restoration Resources Trustees
OSWER: Office of Solid Waste and Emergency Response (EPA)
OTI: Osburn Tailings Impoundment
OU: Operable Unit
PFT: Project Focus Team
PHD: Panhandle Health District
PM: Project Managers
PRP: Potentially Responsible Parties
PRRACA: Paved Road Remedial Action Cooperative Agreement
QA/QC: Quality Assurance / Quality Control
RA: Remedial Action
RACA: Remedial Action Cooperative Agreement
RAO: Remedial Action Objectives
RD: Remedial Design
RI: Remedial Investigation
RI/FS: Remedial Investigation/Feasibility Study
RPM: Remedial Project Manager
RP: Remedy Protection
ROD: Record of Decision
RODA: Record of Decision Amendment
ROW: Right-of-Way
SARA: Superfund Amendments and Reauthorization Act
SCIP: Superfund Cleanup Implementation Plan
SFCDR: South Fork Coeur d'Alene River
SJTI: Superfund Job Training Initiative
SOP: Standard Operating Procedure
SSC: State Superfund Contract
SST: Superfund Straight Talk
STI: Star Tailings Impoundment
SVNRT: Silver Valley Natural Resource Trust
TCD: Typical Conceptual Design
TLG: Technical Leadership Group
Trust: Successor Coeur d'Alene Custodial and Work Trust
UMG: Upstream Mining Group
UPRR: United Pacific Railroad
USDA: United States Department of Agriculture
USFWS: United States Fish and Wildlife Service
USGS: United States Geological Survey
WAC: Waste Acceptance Criteria
WCA: Waste Consolidation Area
WMS: Waste Management Strategy
WENI: West End Natural Infiltration Area
WCX: Waste Quality Exchange
WY: Water Year

DRAFT

BASIN COMMISSION (BEIPC)

November 20, 2024

MEETING MINUTES

Basin Environmental Improvement Project Commission

Draft Summary Meeting Minutes

November 20, 2024, 9:00 AM – 3:00 PM

Center Place Regional Event Center

Room 109

2426 N. Discovery PL

Spokane Valley, WA 99216

These minutes are summary notes of the reports and presentations and are intended to capture key topics and issues, conclusions, and next steps and not every detail of discussion or individual quotes.

Attendees included the following:

Sharon Bosley (BEIPC Executive Director)

Commissioners and Alternates present:

Leslie Duncan (Kootenai County), Michael McCurdy (DEQ), Ed Moreen (EPA), Scott Fields (CDA Tribe), Brook Beeler (Washington State), Phil Lampert (Benewah County), Dave Dose (Shoshone County – attended virtually)

Staff present:

Gail Yost (BEIPC, Assistant to E.D., Note taker), Tamara Langton (EPA), Sandra Treccani (Washington State), Rebecca Stevens (CDA Tribe), Jerry Boyd (CCC), Andy Helkey (DEQ)

Call to Order

Leslie Duncan welcomed everyone to the BEIPC meeting and called it to order at 9:06 am. Roll Call was conducted for Commissioners in attendance.

Review and Approve Draft August 7, 2024, Meeting Minutes – Sharon Bosley (Action Item)

There were no corrections to the draft August 7th meeting minutes that were provided to each Commissioner prior to today's meeting. A motion was made by Brook Beeler to approve the minutes as provided; Scott Fields seconded the motion; all Commissioners approved the meeting notes. **M/S/C**

Bank Stabilization Presentation – Ryan Mitchell (Jacobs engineering)

Ryan is a River Engineer with Jacobs and has been with them for over 20 years. His presentation today will cover typical approaches for selecting riverbank treatments; define goals, constraints, and design criteria; selection of stable materials; stability evaluations; comparison of common treatment options; backwater design considerations; vegetation considerations; construction considerations – then he will be open to discussion and questions.

Typical Approach for Treatment Selection

1. Define Goals, Constraints, and Design Criteria - This process will reduce the list of available options and help define the metrics for treatment selection and the end result.
2. Alternatives Analysis at Conceptual-Level Design
 - Identify candidate treatments that are consistent with goals and design criteria.
 - Develop conceptual level design for each alternative.
 - Evaluate performance and compare performance metrics.
 - Develop ROM construction cost estimate.

- Identify remaining feasibility questions, if any remain – if more analysis is needed to verify compliance with some metrics – select one or multiple treatments to advance in design process.
3. Optional: Identify multiple treatment options for different areas
 - Requires delineation or riverbank segments based on hydraulic conditions and other Factors.
 - The various treatment options should utilize the same material.

Goals, Constraints and Design Criteria

1. Goals and measure of success
 - What is the success/performance criteria?
 - What constitutes failure?
2. Constraints
 - Physical limitations (i.e. property boundaries, infrastructure, available disposal space).
 - Cost
 - Available materials should be thought about early.
 - Permitting
3. Design criteria
 - Constraints are often adopted as design criteria.
 - Allowable or preferred design materials.
 - Habitat (aquatic and riparian) can be species-specific or broad.
 - Permitting requirements
 - A table format is useful way to summarize all design criteria.
 - Avoiding adverse impacts
 - Stability factor of safety

Ryan showed a table with examples of Riverbank Stabilization Design Criteria. The more time you put into these steps, the better result you will end up with. He covered a range of treatment options: riprap; vegetated riprap; rock toe with vegetated side-slope; fabric encapsulated soil lifts; and combinations of all these - joined with the banking geometry like uniform, benched, or variable slopes. A bank treatment is the combined geometry and materials. He showed various pictures of lateral stability treatments (protective treatments).

Selection of Stable Materials – there's a lot of guidelines out there. Most agencies have their own and are using source references pointing back to the same research and log cases, but some cover more specific areas so it's good to pick a design guidance to use for your project. One example given was Fischenich (2001) used by the Army Corps of Engineers, which is a great resource for selecting stability thresholds for stream restoration. It is cited in quite a few of the guidelines and is the most commonly used as it summarizes all the work completed. Ryan explained through a series of slides showing tables and examples of construction conditions. The most common guide for sizing riprap and establishing geometry is the HEC-23 (FHWA 2009) guide.

Comparison of Common Treatment Options

1. FESL (Fabric-Encapsulated Soil Lifts)
 - High strength alternative to riprap
 - Allows for steep slopes (1:1 or steeper)
 - High habitat value
 - Requires irrigation in first year for thrivability
 - Requires experienced contractor and oversite
 - Check stability of immediate post-construction stability (before vegetation establishes)

2. Vegetated Riprap Options - Vegetated riprap with willow bundles; vegetated riprap with bent poles; vegetated riprap with brush layering and pole planting; vegetated riprap with soil cover, grass and ground cover (aka buried riprap); and joint or live stake planted riprap.
 - High strength
 - Provide moderate habitat value
 - Max slope 1.5:1 – typical slope is 2:1
 - Irrigation required
 - Unnatural riverbank
 - Maintenance may be needed

For long reaches, it is common to not have the same hydraulic conditions everywhere, so you are not going to do the same treatment throughout the whole project. Multiple treatments can be done as long as you do not have radically different geometry.

Backwater Design Considerations

- Full-pool elevations will determine lower limit of vegetation.
- Boat wake energy dissipation over a range of lake levels.
- Design flood scenarios need to consider flashy flows with low-pool elevations where velocities are often the highest.
 - Peak velocities may occur during smaller, flashier floods compared to larger and longer duration floods with higher backwater conditions.
- Water management can be challenging because of high water levels during the summer construction season.

Vegetation Considerations

- Riparian vegetation provides high quality habitat value.
- Vegetation reduces water velocities which reduces erosive forces.
- Reduced velocities can lead to increases in water levels if conveyance isn't also increased as part of the design.
- Requires irrigation for the first two growing seasons to ensure survivability.
 - Contractor is typically responsible for irrigation and survivability via performance specifications.
- Live-stake Willows establish rapidly and perform well but require a near-by source for harvest.
- Consider partnering with non-profits or other community stakeholders to help with vegetation to lower project costs and increase community engagement.

Construction considerations

- Access and workspace:
 - Access roads, staging areas, and consolidation areas – can be a logistical challenge depending on the site constraints.
- Care and management of water specifications:
 - Cofferdam design and sequencing, dewatering, possible effluent treatment, seasonal considerations, etc.
 - Often one of the most challenging aspects of in-water work.
- Management of contaminated sediments:
 - Off-site disposal volumes and near-by access to disposal facilities
 - On-site handling of contaminated materials – consolidation areas, wash-stations and possible water treatment requirements.

Brook Beeler appreciated the technical considerations and perspectives, there's a lot of important steps in the planning process to identify goals. She is curious about more of a regulatory framework. In Washington, ecological function is a requirement when considering projects that forbade stabilization other than rip rap and bulkheads. Are there other regulations that pull into these types of projects? Ryan stated he is not a permitting expert but if you went back to the design criteria table you would know early in the project to identify all the permitting requirements at that stage. They are different by jurisdiction, state and county, and different levels – get all the project partners to agree on your list of criteria and establish what options are available.

Michael McCurdy wanted to know if there is a typical schedule or timeline for each stage of planning, design and construction. Ryan answered the most common approach would be a year of design and then building the next year, but they do change dramatically. There could be a shortened timeline for an emergency response action, but typically preliminary design at 30%, 60%, 90%, then final design and construction in the following year. Michael's next question pertains to the miles and miles of the CDA River and not being able to tackle the entire stretch at the same time, what kind of criteria characteristics does he look at to separate that into phases? What goes into determining how to go about something that is so lengthy? Ryan said it depends on which treatment you're constructing – something like FESL is more complicated than just placing rip rap, you are probably talking feet compared to miles at a time. It will be slower to construct something that is more complex and has more elements. It has a lot to do with how long your construction season lasts and the contractor's schedule. A lot also depends on how you will control the water during construction, water seepage, water quality and turbidity issues – so it is better to work on small manageable sections at a time.

Ed Moreen wanted to step back to the question about regulatory compliance and permitting. Because this is a Superfund activity when we're talking about the Lower Basin, we have a list of applicable or relevant and appropriate requirements (ARAR's) that are in our Records of Decision (RODs). So, the State of Idaho, the Coeur d'Alene Tribe, as well as other agencies, would have provided that list to us - so that is our guidance as to what we need to comply with. We would also be coordinating with Kootenai County's local flood authority. And because it is Superfund, the intent was the cleanup would not have to go through a permit process but still need to comply with the submitted requirements of those permits – this is what we would focus on in work in the Lower Basin. Ed mentioned the Kahnderosa project by Cataldo – that was completed in 300 ft links with attention to bull trout habitat as well.

Ed mentioned the part of Ryan's presentation where he was talking about velocities for design purposes and how typically the smaller flashy floods are the ones that come in and have a spike in velocity – where does that hit us on the table of things we need to be concerned about with siting riverbank stabilization activities? Does he remember what those velocities looked like? Ryan answered a lot of the things they were looking at for conceptual site models were designed for 100-year flood. Just the FESL and vegetative rip rap are totally appropriate in terms of their strength of material based on what kind of velocities you're looking at. Other treatments like fabric if used alone, would probably not hold up.

Jerry Boyd was wondering about the fish spawning, and how important some of those fish species are to people (like kokanee and sockeye salmon), is there a comparison between the vegetative bank stabilization and rip rap. No answer was available for fish spawning. Jerry asked how long they monitor the bank stabilization to determine how effective it might be, and what is the cost comparison between vegetation and rip rap. Ryan did not touch on monitoring in his presentation – but especially the first year, two years if there is any vegetation and several times these years to measure survivability. After that, it might be on a every other year program just to make sure you're not losing material on the bank. As far as cost, that would be site specific – how many layers, how big the rip rap, how thick – the FESL tends to be more expensive than the vegetative rip rap due to its labor-intensive construction.

On-line – Jocelyn Carver from EPA made a comment to Michael's question on timelines, she said as an example, the CDA Work Trust has about a 1 ½ year design schedule, say design from 2025 to 2026 then they would start construction in 2027. The Trust did two or three years of focused investigations for specific areas in the Cataldo Reach for this current plan and pilot project. EPA has been doing general monitoring since 2018 along all four reaches on a quarterly basis which helps us identify specific priority areas to target for pilot projects.

Kootenai County Workplan Request – David Brown (Kootenai County)

Sharon quickly explained that there are copies of the letter and information provided to the Basin Commission available if anyone would like a copy to follow along with Kootenai County's request.

Dave Brown is a member of the Kootenai County Commissioners National Resources Advisory Board (KC NRAB). They work in conjunction with the committee on a variety of natural resource issues. Over the last three or four months, this topic has been a part of their discussions. The letter highlights and commends the work that has started and been done in the Upper Basin and initial work in the Lower Basin. The heart of the letter is an encouragement from the Kootenai County Board of Commissioners to really get going on work in the Lower Basin. The most important part would be the approval and completion of the Lower Basin Waste Consolidation Area (WCA) that has been previously reviewed and in consultation for completion. Much of the work likely to occur in the Lower Basin depends on having that WCA available to handle waste streams that are potentially developed as part of other actions.

Implementation is the second point. The Natural Resource Conservation Service (NRCS) streambank stabilization methodology on eroding banks in the Dudley Reach area on the CDA River was implemented around the early 1990s. He was working for the NRCS at the time, and one of the first projects was on the Schlepp property. This methodology combined smaller rock and vegetation, placed three feet below the summer water line and up to three feet above depending on the slope of the bank. They were also able to work around existing vegetation. Other projects funded by the NRCS in the Lower Basin have held up and are mostly intact. This bank stabilization was mainly targeted at boat wake erosion.

The third point would be to carry this same methodology of bank stabilization to high priority eroding banks further down the river. These banks are a significant contributor of both sediment and metal loading and stabilizing them would go a long way in reducing that contamination stream.

The fourth point would be to initiate a pilot project in the Dudley Reach area to quantify the armory of the riverbed with coarse rock to control erosion. The riverbeds are another source of contamination, and this would be an opportunity to see if the methodology can help in the overall effort to control sediment movement.

The fifth point is a funding encouragement - to identify and develop plans for \$1 million a year of implementation effort for items 2 thru 4 over the next five years. Dave believes that NRCS has funding available and could possibly help landowners pay a part of the cost of doing this kind of work on their property if eligible. The NRCS works in cooperation with Kootenai County Commissioners as well as Kootenai County Soil and Water Conservation District to help bring conservation on private lands.

Ed Moreen asked if Dave's suggestion of starting in Dudley Reach, which is the most upstream reach in Kootenai County, is that why it was selected as opposed to going further upstream. Dave answered that working upstream to downstream is always a good idea, that way you are not recontaminating as you work your way downstream. Also identifying those reaches that have some of the highest concentrations of metals in their bank materials.

Rebecca Stevens had a question regarding the language in item #2 – it says implementing the NRCS bank stabilization methodology on all eroding banks. We know that the technology works, but she is a little worried given Ryan's presentation to adopt one methodology as carte blanche, she feels there are other techniques that can be utilized. Have there been discussions on this? Dave replied that the encouragement is if there is eroding banks out there, we need to treat them. We know the NRCS method is both effective and cost effective, but certainly as we go through this process of identifying site specific situations where there could be different approaches and techniques that would be more appropriate. A lot of these banks are similar up and down the river and this treatment would work for many of them.

Lower Basin Waste Consolidation Area siting request- David Leptich

Dave thanked everyone for giving him a few minutes to talk about the Lower Basin WCA siting process and progress, and to make a request. He gave a brief introduction – he is a 35-year resident of Kootenai County; professional wildlife biologist employed by US Fish and Game; manager of the CDA River WMA which comprises over 40% of the wetlands in the Lower Basin and over 26 miles of riverbanks in the lower river; served on Restoration Partnership technical staff since its inception in 2011 and helped co-author the 2018 CDA Basin Restoration plan; member of the BEIPC Technical Leadership Group (TLG); member of EPAs Lower Basin Technical Work Group working on identifying and prioritizing remediation work; member CDA Basin Recreational Sites Team; restoration lead on collaborative remediation and restoration at Gray's Meadow Wetland Project; active CDA Basin collaborator working with county, state, tribal and federal government partners; and invited to participate in EPAs Lower Basin WCA Project Focus Team (PFT) to evaluate potential WCA locations for EPA decision on selecting a WCA. His hope is that this background provides the degree of standing and personal credibility for his presentation today.

Kootenai County Board of County Commissioners (BOCC) sent a letter that said in part, "The lack of approval of a Lower Basin WCA for the past 5 years prevents moving forward with implementation of pilot studies, demonstration projects or selection of meaningful remediation, stabilization, or human health protection efforts along the Lower CDA River Basin. Wetlands remediation and restoration work is also stymied pending

WCA identification.” The BOCC encourages EPA to move ahead with meaningful remediation work in the Lower Basin and requests the approval of a Lower Basin WCA be included in the BEIPC 2025 Annual and Five-Year Work Plans. Dave is here today to support this request to ask for immediate action by the responsible parties finalizing the siting of the WCA at the Dredge Road site.

What has happened:

- Public outreach – there has been great public outreach. In 2020, EPA did seek public opinion for the WCA and initiated a robust public engagement process where community stakeholders were able to express their perspectives, identify suitable WCA sites, and have a voice in the development of the WCA siting criteria used to identify a suitable site.
- Technical outreach – In 2022 and early 2023, EPA convened a WCA PFT comprised of a broad spectrum of agency and government stakeholders. WCA siting criteria developed by community stakeholders was reviewed and EPA presented two proposed sites including the Dredge Road site which met all the siting criteria. A viable WCA site alternative was also solicited for consideration.
- Unanimous consensus – the PFT vigorously discussed all the identified alternatives and met for the last time in January of 2023 to assess the level of support for the best WCA site meeting all the criteria. The PFT consensus was unanimous, and no member opposed or strongly opposed the siting.
- Deferential pause – those on the PFT who indicated they can live with the Dredge Road site noted that there were few other options, the location is needed, other sites are not available at this time, and the existing contamination on this site was a plus. However, they did ask for a more robust evaluation of existing repositories, the potential to use capacity at existing sites, consideration of adjacent land ownership, and the ability to show due diligence on these topics. Costs to build compared to using the CIA in Kellogg were also taken into consideration. We respected this request, which was fully addressed in the next several weeks and completed late in 2023. The results of this due diligence showed no viable siting alternative was identified and has not been under consideration. Dave commended this pause – there should be no steam rolling of any partner which speaks highly to the open, balance, and fair process to this point.
- Inaction and unacceptable delay – subsequently in the Spring of 2023, a single stakeholder that had representation on the PFT and was part of the consensus, requested and entered close discussions with EPA. What has happened since that time is a standstill in the process and failure of EPA to finalize the siting of the Lower Basin WCA.

What has not happened:

- Transparency – what has to happen is a transparent EPA process under the full body of stakeholders gathered here today, communicate the specific issues and their relevance to the delayed decision, explain the prolonged public and natural resources harm, frustrated the efforts of all basin stakeholders, and impeded the BEIPC progress on several fronts as noted in the Kootenai County letter. Instead of transparency, we’ve had a year and a half of silence.
- New findings – no new findings since the application of new information that refutes the PFTs consensus on siting the Lower Basin WCA. After nearly two years, the Dredge Road remains the best available site based on siting criteria and technical merits. This is not a decision about the suitability of the site, we have identified a suitable site through a public and technical process.
- Identification of viable alternatives – neither EPA nor any other base of partners have identified a more suitable alternative to the Dredge Road site. That means this is not a decision about alternative sites, it is a decision about advancing the statutory remediation restoration initiative of this Commission for allowing it to be unjustifiably impeded or stopped.

- Identification of demonstrable harm – no demonstrations that siting and development of a Lower Basin WCA at Dredge Road results in the unfair, disproportionate or any other harm to the rights, lands, assets, resources, interest of any stakeholder and constitutes a failure of EPA to meet its responsibilities to any one or several partners. To the contrary, further delay harms all stakeholders and constitutes an ongoing failure of EPA to meet its responsibilities to all the people that live, work and play in the CDA Basin.
- Trust responsibility balance – there must be a balance of the stakeholders in the basin and the unanimous consensus of the PFT. We rightly took a differential pause to ensure that all perspectives were heard, considered and respected. No single small group of stakeholders were steamrolled. In the absence of any new information or alternatives, the perspective of the overwhelming majority of stakeholders to site the WCA should also be honored and respected.

Technical decision - this is a type of decision of limited scope, it is based on relative merits of alternative sites that we collaboratively develop public and technical siting criteria. Although there can be debate on those merits, it is not a negotiation. This decision is not a matter of individual stakeholder preferences nor an opportunity to discuss or seek consensus, it should be limited to a synthesis of relevant facts and finding the best balance of multiple targets for siting the WCA. Anything beyond this is outside the decision frame and has no legitimate bearing on this decision.

Good Faith decision – this Commission represents a wide variety of CDA Basin private citizen residents, public agencies, and multiple governments. We can rarely ensure that our decisions will make everyone happy. Finding the most beneficial and least harmful path forward in this decision ensuring there is equitability of opportunity for input, that the results are beneficial to our mission, and that no party suffers unfair or disproportionate judgments.

Limited decision – this is a very limited decision and after all the things talked about today, we have a limited decision space. The decision makes itself and our task is embarrassingly simple. We have one viable WCA site and that is the Dredge Road site. We aren't deciding about where to place the WCA as everyone already knows where it has to go. It is long past time to end the site selection process and start the work. We have a fair understanding of the consequences that result from inaction. The WCA site is critical to support Lower Basin remedial and restoration efforts by EPA and other collaborators. Not only does this delay EPA's remedial objectives but also the work of other remediation and restoration partners that must coordinate their work and timelines. EPA's continued failure to act is wasting time, money, and opportunity.

What needs to happen:

- EPA as lead partner reflect on adequacy of process, trust responsibility balance and act – Dave's request is for EPA to promptly act and fully announce selection of the Dredge Rd site for the Lower Basin WCA. EPA has a unique leadership role in the work of the Basin. Please demonstrate your technical, good faith partnership, and objective decision-making leadership for all stakeholders in the Basin.
- BEIPC as statutory overseer provide direction – Dave's second request that the BEIPC reflect on the adequacy of the siting process, benefits of finalized Dredge Rd WCA decision, the detrimental consequences, and the statutory purpose and mission of the Commission. The BEIPC has a unique oversight role in the work of the Basin. He referred to the BEIPC website and their purpose as established by state law to implement, correct and/or coordinate environmental remediation, natural resources, and restoration related measures. In the absence of immediate action by EPA to formally site the Lower Basin WCA, he requests the BEIPC exercise this oversight responsibility to help resolve the Dredge Rd siting delay and its negative consequences. As part of today's meeting

packet, there is a draft text amendment for the 2025 Annual Work Plan to direct the siting of the WCA and for design work to begin in 2025. A former director once said, “The Basin Commission is a fine example of government serving the public. There is 7 governments and 20 agencies who work together to coordinate efforts for the good of the people, especially when they have different positions on issues, different ideas about how to avoid problems, different responsibilities, but still work together in an appropriate manner to get things done.”

- End current standstill and renew progress in the Lower Basin – Dave’s last request is that the Commission and EPA end the standstill and renew progress in the Lower Basin.

Parting thoughts – ask and answer these 5 questions:

- Was the process to site a Lower Basin WCA open, thorough and fair to all parties.
- Does new information disqualify the Dredge Rd site or contramand the PFT consensus support.
- Is there any viable alternative site identified and under consideration.
- Is continued delay beneficial or detrimental to mission.
- Why not resolve this today.

The answer to one is yes, to two and three is no, to four is none – so it seems to him that the decision has already been made. Dave did not come today as a critic but as an advocate. He works professionally with all the people, agencies, and governments in the room. We are all good people who want to do good things in the Lower Basin.

Brook Beeler really appreciates Dave’s passion, skills, expertise and experience. She disagrees with one statement he made about one stakeholder seen as steamrolling the process. The CDA Tribe is a sovereign nation with different rights than the federal government and has a responsibility for them. Dave wasn’t suggesting that they’re steamrolling anything but that we need to balance that trust responsibility for the entire Basin. Brook understands the urgency for getting the WCA sited but thinks we need to have patience and do it right and not have problems down the road. Now that we have been through the PFT process, the TLG process, and the public process - she believes we are in the next phase of how EPA decides which is the Consultation process, which is where we are at the last step, and that we need to trust that process. She has faith and respect for the conversation that the Tribe and EPA are having, and Dave agrees. She thinks they are going to get to a decision where the Tribes input is heard and its EPAs responsibility to hear that. It is inappropriate for her as a representative of the State of Washington or as a member of the BEIPC to prevent that process. Dave restated that a year and a half is a long time.

Ed Moreen also thanked Dave for sharing his perspective and passion. He appreciates all his great work and contributions to major improvements that have been accomplished. This has been a difficult situation. They have been as transparent as they can be, but it does not discount how frustrating it is from all perspectives. We are in the consultation process, so this will remain untransparent to everybody who is not involved. We are doing everything we can because moving forward in the Lower Basin is the next big thing. Our actions will be to reduce lead loads, improve health, and reduce risk to people and wildlife. There is going to be some harm when we do it, but we want to get there. This is a priority and something we talk about often. Right now, we are focusing on setting a target for selection of a Lower Basin WCA and moving forward with the pilot project. You will see in the 2025 Work Plan - riverbank stabilizations are planned to start designs in 2025. Lower Basin work is going on and we’re going to try to move as slow and as quickly as we can.

Scott Fields agreed that we are all passionate about these issues and he appreciates Ed and Brook’s comments. The government-to-government process is not transparent and is that way for a reason. He understands the frustrations of not being a part of those conversations. He also reminded everyone in this

room the reason we are here is the CDA Tribe brought these lawsuits and rung the bell first. He has been doing this for 25 years and takes a little offense that if anyone is reading between the lines that the Tribe is not serious about cleaning up this Basin – there isn't anyone more serious about this. We hope at the end of this Consultation process that all parties have been made whole, better solutions are made, and none of them will proceed at a faster rate than when we're all done. Please have patience. Dave wanted to make it clear that his intentions were not to bash the government, in fact, he tried very hard not to do that. He wanted to have a very factual layout of the process and frustrations involved in the harm that continues to be done.

Waterfowl Research Overview – Jennifer Crawford/Mark Jankowski (EPA)

The presentation today will be a more detailed update from the one given before on waterfall research in the Basin. Jennifer has 20 years of experience and has been on the Bunker Hill team now for 5 years. Mark is a toxicologist whose research has been on birds over many years and now works in Region 10. They will discuss their file monitoring tool they are developing for use in the Lower Basin specifically and including it in the Basin Environmental Monitoring Program (BEMP). This project has been a very large collaboration effort across a multitude of organizations, agencies and CDA Tribe. The work we are doing today is a result of the early work done by the trustees, Tribe and USGS under the Natural Resource Damage Assessment process. Using this as a starting point really gave us a leg up to look at how we can best monitor site processes moving forward.

Every year approximately 10,000 swans feed as they pass through the Lower Basin on their way to the tundra and back where they nest and reproduce in Alaska. There are many other susceptible waterfowl, such as wood ducks, that also migrate through the Basin. We all know the history of the CDA Basin where a century of mining, milling and smelting left 100 million tons of waste, and 2.4 million tons of lead spread over thousand of acres. Jennifer displayed a map of the concentrations we see in the Lower Basin showing 95% of the available habitat is above the 530 milligrams per kilogram, which is the lowest level for lead on waterfowl. The cleanup criteria we use for OU-3 (for the Upper and Lower Basin outside the Box) is based on risk to and effects to waterfowl. 80% of the sediments in the Lower Basin also contain lethal doses of lead to waterfowl which is set at 1800. With our partners and going through the many processes (i.e. Interim ROD, Lower Basin Prioritization Plan), there has been a subset of the contaminated water wetlands and water lakes that have been identified for remediation. There is a very large area to be considered and cleaned up, so we are focusing on a small amount which factors into how we monitor progress as clean-ups happen and when we might see some impacts to waterfowl. Gray's Meadow Ag to wetland conversion will be finished up soon with future clean-ups in the Gleason and Lane Marsh areas.

Tundra swans are extremely susceptible to lead poisoning. When they come in, they feed on approximately the top 12 inches of contaminated sediment, digging down for tubers, fruit and water potatoes where their incidental exposure happens. The neurological signs of a lead poisoned bird include wing droop, inability to fly, gut impaction, emaciation from starvation and bile-stained feces. A study was conducted in the early 2000s looking at almost 250 waterfowl, the majority of which were tundra swans. It concluded that 93% of the swan contamination was coming from the sediment directly. During the course of our most recent work, they looked at single isotopes with their partners at the Office of Research and Development (ORT) and documented that by comparing feces, sediments and blood samples collected in the Basin, 90% of the lead within those swans was from Bunker Hill. The challenge is large - we have nearly 20,000 acres of contaminated wetlands with lead several feet deep into the sediments; there is a great need to demonstrate progress and to identify ways to optimize and have efficiency with the work we're doing moving forward; and we obviously want to show reduction in lead exposure in waterfowl. The tundra swans are of the highest public interest as they are very visible but very difficult to capture. We are not looking for long-term

capturing of swans or other waterfowl but need a tool that we can use as part of our normal process for biomonitoring that is efficient, cost effective and sustainable.

The current surveying for biomonitoring under the BEMP program has been conducted by the US Fish and Wildlife Service. Since 2005, they've been completing surveys every migration on a weekly basis to track the swans and other waterfowl species, wetlands and lateral lakes. This helps us figure out exactly where we are seeing the most impact and helps with prioritization as we move forward. This is our largest and longest data set in the Lower Basin for biological monitoring. The mortality feature also has many variables -are they coming from California where they come from drought; how much ice in the Basin so they can only go to Harrison where it's very contaminated and they can't access the other areas; how long were they there and how long did they stay in the Basin. All of this metadata is very important to understand the implications.

Why do we need biological samples long-term?

- Birds sample the sediment that matters to THEM.
- They indicate remedy progress that directly relates to public concerns and cleanup criteria.
- They identify which remedy strategies yield results.
- Differences in bioavailability are accounted for specifically.
- Provide data on exposure differences due to vegetation food sources.
- They leave behind non-invasive samples (i.e. feces & shells) for easy, low-cost biomonitoring tools.

Mark continued – there are two different exposure pathways, swans go deep into the mud to consume vegetation and wood ducks are more surficial to the top couple of centimeters for exposure to potentially newer deposits of lead and other metals. Ducks also reproduce on site in nest boxes, making it easier to track them, collect eggshells and monitor effectiveness over time. One of the questions right off the bat is spatial resolution. Even though the swans fly from wetland to wetland, we can assume any samples we get are going to be broad based, but not the case with their feces. With the tracking of wood ducks, it is more likely to be focused on the wetland itself, so it's probably the difference between exposure pathways and abilities to monitor them differently.

As stated, we are learning about swans' exposure through their fecal samples - measuring for lead levels, co-factors of exposure risk and local from distal exposure. DNA sequencing will tell us that the feces sample is from a swan, the RubisCO enzyme will help us figure out what plants they have been eating, and the CHD marker will specify sex ratio which is really important for wildlife management. Mass spectrometry is where we get both lead concentration information as well as some isotope signatures; and XAS is looking at bioavailability differences between sediments and feces, what the lead situation was in the swans, and a way to figure out where the swans are consuming the lead in the sediment and vegetation.

Fecal samples versus blood samples: space, time, & logistics:

- Integration period and thus exposure window is different for each media
 - Blood reflects a turnover rate of 35 days.
 - Feces reflect a gut transit time of 3-6 hours.
- Sampling logistics
 - Blood sampling requires capture.

Four Phases for Swan Research:

1. 2021: **Pilot** season to work through sampling and analytical method challenges. Sediment and fecal samples collected. No birds trapped.
2. 2022 – 2024: **Empirical**: Swan trapping, sampling, and tracking.
3. 2024 – 2025: **Transition to Modeling**: Swan trapping, sampling, tracking, and model development.
4. 2025 onward: **Integration** of findings into monitoring recommendations.

Phase 2 Research Questions:

- Sampling conducted every March since 2022
- Primary Question
 - What is the environmental and biological meaning of a given Pb concentration in feces?
- Approaches
 - **Environmental** meaning of fecal Pb concentrations
 - Sediment Use: Relationships between sediment and fecal sample chemistry.
 - Vegetation Use: Relationship between vegetation consumed and Pb in fecal samples.
 - Site Use: GPS tracking of locations and behavioral activity.
 - **Biological** meaning of fecal Pb concentrations
 - Relationships between fecal and blood Pb levels.
 - Future: modeling impacts of Pb on life cycle.
 - Future: determination of a fecal Pb monitoring benchmark.

Environmental - Mark showed a slide that correlated sediment ingestion with lead in the feces. It passes through but has lead that can be absorbed. At Bunker Hill, 4.6 to 41% (or 20% averaged) of swans' diet is incidental sediment uptake which gives us the correlation between sediment lead and feces lead. He also showed a graph of sediment and feces samples taken from different wetlands and lateral lakes displaying the difference between the two - about four times more lead in the sediment than in the feces. This will also help with developing the monitoring benchmark. Next, he explained the significant diet differences between wetlands with fecal samples taken from Hepton, Schlepp and Thompson. With DNA sequencing, they tried to resolve the different types of plants at each site.

- Hepton dominated by Sparganium (bur-reed)
- Schlepp more diverse, but dominated by Hydrocharitaceae (Elodea)
- Thompson dominated by Equisetum diffusum (Himalayan horsetail)
- Sagittaria (water potato) was <1% of detected DNA, but correlated with higher Pb in feces

As we go forward, we can look at the vegetation types to help us understand if there is any correlation between what they're eating and what their lead concentration is to help guide restoration or remediation.

Summary of Vegetation Analyses:

- Plant consumption similar within, but different across wetlands.
- The five most common plants consumed by swans were Equisetum (horsetail), Hydrocharitaceae (elodea), Sparganium (bur-reed), Persicaria (knot weed), and Poaceae (rice).
- Based on 33 fecal samples from two wetlands, DNA read counts for Sagittaria negatively (-0.35, P=0.09) and Equisetum positively (0.34, P=0.11) correlated with Pb concentration.
- Pb not detected inside plant tissues (Luxton et al.)

The GPS collars that have been successfully positioned on the swans interact with satellites as well as cell phone towers. As the swan's pass, they download the data so that we can obtain their information. As Jennifer mentioned, their data tracks them going from California through our area and then up to Alaska and back. This data also tells us how long the swan typically spends in the wetlands, if they're feeding, flying, low feeding and the potential lead exposure which can guide us where to focus our remediation efforts. We are learning how all these factors form our sampling protocol.

Biological – To actually gather these birds and collect their blood has been expensive, but this research phase of the work has been really informative to know what their blood levels are. Mark showed a graph showing the relationship between fecal and blood lead concentrations for several lateral lakes. For the five or six samples they were able to gather, there was a nice correlation between the amount of lead in their feces with the amount of lead in their blood. As it stands now, there is not a high confidence that we can interpret biological effect in the fecal sample. We may have to use a different approach for developing our benchmark, but we have another year of data to verify.

Next Steps to Integrate Effectiveness Monitoring Program and Guide Remedy Implementation:

- Fecal deposition platforms
 - Looking into it for some wetlands soon.
- Activity budget analysis
 - How long do birds feed at each location?
- Modeling
 - Simulate how remedy implementation strategies affect swan behaviors at the site (and vice versa), and thus Pb exposure potential.
 - Couple with a model to estimate fitness costs of elevated Pb in feces.
- Integrate into long-term monitoring strategy after next year?

Next project: Wood duck eggshells

- Why Wood Ducks?
 - Wood ducks consume shallow benthic invertebrates during nesting season; swans forage deep into sediments.
 - Likely wetland specific use during pre-laying (TBD).
 - Eggshells are easy to find and collect in nest boxes; part of IDFG's regular work to clean WODU boxes.
 - Nesting success and other attributes could be monitored at nests.

Goal: Determine if wood ducks are a reliable ecological receptor for remediation efforts

- 1) Radio telemetry – wetland spatial use
- 2) Nest ecology – egg Pb conc
- 3) Invertebrates – Pb in diet
- 4) Sediment/Porewater/Surface water – connects to biological exposure
- 5) Plant sampling – Pb in potential diet

Wood Duck Capture:

- Trapped between April 2 - 16
- Captured & processed 37 wood ducks (31 females, 6 males)
- 11 days trapped, 2.8/d

Wood Duck Pb:

- Pb ranged from 1 – 604 µg/dL
- Geometric mean = 18 g/dL
- 65 % exceeded subclinical poisoning for sensitive species
- 46% exceeded subclinical poisoning
- 38% exceeded clinical poisoning
- 34% exceeded severe clinical poisoning

Wood Duck Telemetry:

- 31 transmitters deployed on female wood ducks
- 494 total relocations across 31 marked females
- Average 16 locations/bird
 - (range 3 – 35)
 - Home ranges – 24 females

Conclusions & Next Steps:

- TUSW
 - Rocket netting where swans normally go is path forward for capture.
 - Most Pb is of Bunker Hill origin in blood and feces.
 - Sediment Pb was generally higher than fecal Pb (~4x).
 - Pb in feces and blood don't necessarily correlate.
 - More work on vegetation and activity budgets to come followed by model development and implementation.
- WODU
 - 32 telemetered birds at locations ranging from low to high sediment Pb.
 - Water, sediment, invertebrates, and egg components are being analyzed now.
 - One more year of work to determine the best matrix for monitoring.
- Both
 - Likely: Feces and eggshells are wetland specific metrics that can be pooled for broader trends.
 - Likely: Represent different but complementary environmental exposure pathways.

Scott Fields really likes the diversity and DNA analysis; he wanted to know if they were going back to those feeding areas and looking at the overall plant availability or are they just consuming a general population of plants or targeting specific things? Mark answered that they are thinking about it, an important thing would be to verify the conclusions. The data they are hoping to address is to actually sample gut content, but that would mean you would have to kill the bird. So instead, looking at the DNA and fecal samples is an indicator of what they consumed. The biomass coming in for the type of plant they ate versus the DNA going out, we need to make sure that it is a solid connection. We have some partners potentially lined up in Wyoming who have captive Trumpeter swans that may be able to help with validation. The other point is we will watch where the birds go, collect fecal samples from those areas, collect sediment samples and if those areas contain the vegetation that was found in the fecal samples, then that's a nice connection.

Dave Leptich commented that it was an excellent question, but you have to assess availability versus use. At what scale do you measure availability and where you are going to collect that sample – it would be excellent information to have but very hard to collect. Mark stated it depends on the complexity of the relationship but like at Thompson Lake where what was available to eat matched the sample then that would make it easier to guide our work.

Rebecca just wanted to let everyone know that the Restoration Partnership public affairs officers met last week, and they will be putting together a collective messaging for this coming migratory season so that we all have the same message.

Sediment Research Overview – Jennifer Crawford/Chris Eckley (EPA)

Jennifer introduced Chris Eckley – he works for EPA in the Seattle office as a geochemist. As part of the Bunker Hill team, they have had the privilege of working on the research studies listed below. Today, they will be talking about some of this sediment research that has been going on in the Lower Basin and looking at ways to handle all the contamination in place and alter those soils, so we don't necessarily have to remove it.

Studies included in overview:

- FY20 Superfund Technical Liaison Research (STLR) Grant: Metal bioavailability in sediments experiencing wetting and drying cycles—the impact of sulfur and iron chemistry
 - Study time frame: field: 2021; mesocosm: 2023-2024
- CH2MHill: Incremental Thin-Layer Capping Pilot Study
 - Study time frame: 2017 to 2019
- FY18 Regional Applied Research (RARE) grant: Soil amendments to reduce bioavailability of toxic metals in contaminated soils and sediments
 - Study time frame: field: 2019; laboratory: 2020
- FY22 Regional-ORD Applied Research Program (ROAR) grant: Application of jarosite-based remediation technologies to significantly decrease lead (Pb) bioavailability in contaminated soils
 - Study time frame: 2023-ongoing

Chris restated the broad scale lead contamination within the Lower Basin, both within the river system as well as the lateral lakes and wetlands. Not all metal contamination is created equal in terms of its form and speciation. He explains – are the metals bound to the solid phase of the sediment or are they in the dissolved phase in the porewater; how tightly are they bound to the sediment; and how easily would they dissolve within the gut if they were ingested. All these variables are dependent on the speciation of the metals that is impacted by the ambient redox – the oxidation reduction conditions within the sediment – and the redox conditions will change the speciation of sulfur and iron compounds. This can be really important in terms of that balance in determining how locked up those metals are to a solid particulate phase where it may be less bio-available versus more easily dissolved. Those redox conditions are heavily dependent on hydrological conditions when subjected to wetting/drying cycles.

Metal bioavailability in sediments experiencing wetting and drying cycles—the impact of sulfur and iron chemistry

In the first study, we had the objective of looking at how hydrological variations within those wetland environments along the CDA River impact the sediment redox conditions and how those redox conditions influence the availability of metals. We measured this by looking at how much of it partitions from the solid phase of sediment into the porewater of sediment. In the spring, we often have higher water conditions within the wetlands, then during the fall we have drier conditions with some drying out completely. You also have lateral lakes along the river that stay wet permanently. Our sample sites included all these conditions at several locations. Our methods used for the field component was to go out and collect the sediment cores, section the cores so that we're just sampling a consistent top 4 centimeters, centrifuging that sediment then filtering out the porewater. There's another component to this study where we wanted to control variables more than we can in the environment. So, the sediment collected from the site was subjected to treatments of wetting and drying cycles under lab control.

Chris presented the results from the field experiments showing several slides explaining how the samples were handled. The results show very clearly for cadmium, zinc and mercury that you have significantly higher values of those constituents in the porewater in the wetlands that are seasonally inundated compared to the ones that are permanently inundated. You also have higher values for lead but with the variability between the samples, those differences were not significant. Another way to look at this data is by looking at the porewater coefficient which is the ratio of the concentration in the sediment to the concentration in the porewater. So, for the cadmium, zinc and mercury you have more of that metal partitioning into the porewater phase and it would be more mobile compared to the permanently inundated wetland. We also see a lowering for lead, but again the differences were not significant. This was one of the reasons why we wanted to do these controlled laboratory experiments. Here we had two different treatments – some were permanently wet, and some were subjected to the wet, dry, wet, dry conditions. The samples that were subjected to wet/dry have significantly higher lead concentration in the porewater compared to the permanently wet samples.

Conclusions - Seasonal water level fluctuations influence sediment metal cycling:

- Increased partitioning of metals into the porewater.
- Changes in water levels impact redox conditions such as iron and sulfate cycling.
- Enhanced MeHg production
- Provide a remediation tool that may reduce Hg availability on a landscape-scale.
- Help predict the impacts of changing climatic/hydrological conditions on metal mobility.

Incremental Thin-Layer Capping Pilot Study

Incremental thin-layer capping (ITLC) is a remediation approach involving the incremental placement of clean material over time, simulating natural sedimentation processes and allowing native vegetation to recover after each application. This study was conducted in Lane Marsh and completed in two parts. The first was small-scale test plots with frames and the second was a larger scale plot which was 0.4 acres. Both looked at different sediment capping of 2-, 4-, and 6-inch depths with sand and clean soil. The study was monitored over 2 years showing the vegetation recovered nicely and continued to grow even though it had been capped with up to 6 inches of clean soil.

Results & Conclusions - Incremental Thin-Layer Capping Pilot Study:

- Vegetation regrowth was robust after applying up to 6 inches of capping material.
- Colonization of capped areas by noxious weeds was barely observed.
- Benthic monitoring showed macroinvertebrate recolonization in the soil cap test areas.
- The thin layer cap may be effective in decreasing lead (Pb) concentrations; however, they are susceptible to recontamination either through bioturbation or fresh sedimentation.

Soil amendments to reduce bioavailability of toxic metals in contaminated soils and sediments

- Soil and sediment amendments are a type of in situ remediation option that can reduce the solubility of contaminants and decrease their uptake into biota following ingestion.
- The benefit of amendments is that they can be applied over large areas with minimal landscape disturbance.
- Biochar is a commonly used soil/sediment amendment that can absorb contaminants and promote soil health.

- Biochar is created through pyrolysis (i.e., heating) of organic matter in low or no oxygen environments. Differences in feedstocks and pyrolysis temperatures impact on the characteristics of the resulting biochar (e.g., pH, surface area, functional group density, total and water-soluble phosphorus content) and subsequent interaction with soil/sediment contaminants.

Project Objective:

- Determine the effectiveness of different types of biochar amendments at reducing lead (Pb) bioaccessibility in Pb-contaminated soils/sediments with differences in soil/sediment type and contaminant source.

Methods:

- Biochars tested: blends of 30% manure (poultry litter or dairy manure) and 70% lignocellulosic material (wheat straw or grand fir shavings) and pyrolyzed at 300, 500, 700, and 900 °C.
- Soils were amended with 2% biochar and incubated for 6 months.
- A suite of standard (e.g., EPA Method 1340) and experimental soil Pb bioaccessibility assays were used to assess the impact of the treatments.

Results - Soil amendments to reduce bioavailability of toxic metals in contaminated soils and sediments

- Differences in analytical methods can have a large impact on the assessment of Pb bioaccessibility.
- In unamended sediments using a pH 1.5 extraction showed that 85 to 92% of the Pb was bioaccessible; but a pH 2.5 solution was used bioaccessible Pb decreased to 54 to 74%.
- There was a larger difference observed when the anoxic sediment samples were air-dried prior to analysis, which resulted in a 4-fold increase in Pb bioaccessibility.
- Using the Avian Ohio State University Gastrointestinal Method which is designed to reflect an avian digestive system where soil is ingested along with food there was a 6-fold decrease in bioaccessibility, likely due to enhanced Pb sorption in the presence of food (e.g., protein, phosphorous, calcium, etc).
- Sediments were amended with 17 different types of biochar with roughly half of them resulting in significant decreases in Pb bioaccessibility.
- The magnitude of the decrease in bioaccessibility was relatively low, with none of the biochar additions decreasing bioaccessibility by more than 10% at any of the contaminated soils/sediments in this study.
- There did not appear to be any significant differences in effectiveness based on feedstock material (i.e., wheat straw, grand fir, manure); however, it was observed that biochars that were pyrolyzed at 700 °C were more effective than those pyrolyzed at the other temperatures (300, 500 and 900 °C).

Application of jarosite-based remediation technologies to significantly decrease lead (Pb) bioavailability in contaminated soils

- Chemical remediation techniques may allow for in situ conversion of soil contaminants to phases that are not easily mobilized upon ingestion.
- Jarosite is a mineral that is a combination of potassium, ferric iron, and sulfate.
- Study Goal: develop a remediation strategy to induce jarosite formation in Pb contaminated soils to reduce lead bioavailability.

34 soils in the study from EPA Regions 4, 7, 8, and 10 (2 from Bunker Hill)

The process involves:

- Soil hydration
- Mixing with Potassium Jarosite
- Addition of Ferric Sulfate with H₂SO₄
- Moderate Heating (22 and 40 °C)

Soil pre- and post-treatment were analyzed for total Pb concentration and extracted via EPA Method 1340 in vitro lead Bioaccessibility.

Results - Application of jarosite-based remediation technologies to significantly decrease lead (Pb) bioavailability in contaminated soil.

- Two soil samples were collected from Bunker Hill for the Jarosite Treatment.
- Initial total lead in the soils was 746 and 1073 mg kg⁻¹
- After treatment the amount of lead extracted (IVBA) from each soil was less than 200 mg kg⁻¹ • 55 to 75% reduction in bioaccessibility of Pb after treatment.
- Difference in the initial IVBA and the reduced IVBA post remedy related to the initial lead chemical speciation.

Conclusions:

For the entire study (multi-Region samples): Room temperature treatments resulted in average Pb %IVBA decreases of 58% Heated conditions (≥40°C), resulted in an average decrease of 74%.

Phil Lampert asked if there was any research finding soil amendments with the thin layer capping. Chris replied that there had definitely been studies on that, but none that he was aware of in the Bunker Hill area. Other studies have mixed in soil amendments as part of a cap to have enhanced sequestration of the metals and reduce mobilization, so there is other research.

Felicia from Alta wanted to know if Chris had an idea of the volume of amendment required compared to the treated soil, and his answer was yes. What was done in terms of the volume of amendments were applied at a 2% by weight of biochar first for soil, and often you don't get to higher ratios than that because the biochar is light and airy. Once you start mixing it in, it's quite a large quantity. The 2% range was feasible for being able to mix it in and get good coverage in the top 8 inches or so of the sediment.

Jerry Boyd asked at what temperature did he treat the Jarosite – and Chris answered 40 degrees Celsius. Jerry also asked about the pH – and did they try it wet with the material – what were they looking for? Chris did not know the answer – Jen said they could look into that. Jerry mentioned it because he knows of a source of material that has ash from burning wood waste that would be relatively high pH and could be mixed in. Chris stated they probably know what the pH is, and he suspects it to be quite low during the process, but he didn't know the details.

Craig Cooper wanted to know if they tried phosphate materials for amendments. Jen said that there were concerns about using phosphate, but other studies have used it. Originally, they were going to use it at Bunker Hill, so they can definitely do that. Chris added that it exists in literature and other people and sites that are using phosphorus as a mechanism to reduce bioavailability.

Sandra Treccani stated this has been great collaboration in working in all these different lines of research, is there anything else out there – we've got some great results with biochar and thin layer capping – is there anything else that is potentially applicable based on the results of what they have found in these studies.

Chris replied that water manipulation could be another factor in keeping areas of high contamination from wet or permanently dry. Even though biochar didn't really pan out in this study, there are other types of amendments that are more activated carbon-based materials, and on other sites he and Jen work on, they are looking at a host of different types of soil amendments, biochar just being one, and seeing which are most effective. Jen added that at the other sites one of the amendments is more mercury based but could potentially have implications for other metals as well.

Dave Leptich commented on thin layer capping and what you are essentially doing is building a wetland. As you build, you change the water depth across that wetland. Emerging plant communities are tied into water depth, so changing the plant community also changes the wildlife community that depend on it. It's not to say that it is an inappropriate technique, but keep in mind if you raise the bottom, you'll also have water control so you can raise the top. You could maintain that plant community with water control and also target sites that have perhaps more levels that were deeper than optimal for waterfowl and improve your plant community for your target species. The wet/dry cycles are another kind of conundrum because to maintain wetland productivity it needs to actually cycle wet/dry. The depth of wetlands is stable water levels where nutrients get locked into the soil particles during anoxic conditions, in order to oxidize those nutrients and release them, it needs the wet/dry cycle. Like everything in the Basin, nothing is easy. It's not to say we can't apply these techniques; we just need to think of the consequences and how to apply them.

Dan McCracken thinks EPA should take into consideration the liability of some of these, recognizing how contaminated some of the areas we're dealing with. He understands a lot of the places in the Lower Basin were as much as 10 times higher lead concentration than what we're really trying to get to for a remediation goal. So, 50% reduction is great, but it seems like what we actually need to achieve is maybe 90% reduction.

Lunch and Executive Session under Idaho Code 74-206 (1) b to Discuss Performance of Executive Director. Separate lunch for BEIPC Staff, TLG and CCC chairs. Phil Lampert made a motion to go into Executive Session; Ed Moreen seconded the motion, all approved. **M/S/C**

Blood-lead screening event update – Emily Hasz (PHD)

Emily from PHD gave today's update on blood lead screening. This year's data is still being reviewed for final numbers, full data should be available for a presentation at the next Basin Commission meeting in March. Testing event numbers indicate that we tested 16 adults at our June event and 14 adults in October in conjunction with Vitalant at their blood drives in Kellogg – 383 participants of adults and children attended our annual event in August. Participation did not increase compared to last year due to what they believe to be attributed to a new online scheduling tool for making appointments. They did, however, try to make this year's event more fun for the kids by incorporating a carnival theme with fun prizes and games available.

Leslie asked about the adults who gave blood, is that problem for the recipient. Emily wasn't sure but was told by Vitalant that it is not something they use as a screening tool. She believes it is not an issue because when it comes to blood, they mostly worry about plasma. Dave Leptich stated that it is not part of the processing as it is deluded in there.

Leading Idaho Update – Jamie Brunner (DEQ)

Jamie will give a quick update on the Leading Idaho projects that they have been working on for the past couple of years. They have received an increase in total funding since they were last presented.

- Total of \$35 million for projects
- Ranked through the Coeur d'Alene Lake Advisory Committee (CLAC) appointed by Governor Brad Little.

- Projects include:
 - Nonpoint source
 - Wastewater upgrades
 - Stormwater treatment
 - NAS recommendations

Funding changes from last update

- Previously \$600k unallocated as of the last update.
- New NAS project funded from previously ranked list (\$200k).
- Leaving Coeur d'Alene Lake projects with \$400k unallocated funds. All Leading Idaho funds need to be allocated by the end of this calendar year.

South Fork Sewer District changes:

- Davis-Bacon wage requirements (+ \$1.2 million).
- Smeltonville tie-in (\$4.8-6.3 million) – further enhance the amount of wastewater treatment and made sense to join the two systems together.
- SFSD groundbreaking September 20, 2024.

Active projects - On-the-ground projects, Wastewater Treatment Upgrades, and National Academy of Science Recommendations

City of Kellogg:

- Phase 1&2 Complete. Bunker Creek, Hill Street, North Kellogg, & Vactor Truck.
- Phase 3- Mapping/assessing remaining drainages and setting priorities.

City of Coeur d'Alene:

- Sanders Beach, Mullan, and Independence Point complete.
- 3rd Street outfall Spring 2025 – Two stormwater signs planned near Sanders Beach and Tubbs Hill Trailhead to educate people about what the stormwater treatment system looks like as this is a highly visible location.

Santa-Fernwood Wastewater Reuse:

- Land purchased
- Reuse permit process initiated

NAS Recommendations:

Science Coordination Team

- Working on priorities document

St. Joe Watershed Assessment

- Monitoring in progress

Evaluation of Recreational Areas in Coeur d'Alene Lake and Spokane River

- Samples collected this summer
- Final report 2026

Comprehensive Coring Plan

- Sponsored by the Coeur d'Alene Tribe
- Lakebed sediment coring to view historic lake conditions
- \$200k Leading Idaho allocated
- Additional funding:
 - Avista, \$200k
 - Restoration Partnership 100k

Other completed projects:

- Riverside Track
- Schlagel Draw
- Sunnyside Road
- Marmot Trail Road
- Mica Creek Stabilization
- Kellogg School District
- Wolf Lodge Creek
- Mica Creek Floodplain Access

All of these projects have individual pages on the Leading Idaho website showing their funding overview, project details, and pictures.

Scott Fields asked about the Fernwood reuse permit, will they keep the permit for emergencies. Dan McCracken answered at this point they plan to convert to recycled water.

Rebecca wanted to know about the \$400k unallocated funds, are they going back to the state coffer- and Jaime answered that it was going towards the money needed for the South Fork Sewer District.

Review and Approve Draft 2025 BEIPC Work Plan – Sharon Bosley (Action Item)

The Bunker Hill Superfund Site (BHSS) goes from the Montana Border into Washington, consisting of two different geographic areas – the Upper and Lower Basin - as well as the Box. We utilize the 2002 Record of Decision (ROD) and the 2012 ROD Amendment when we are looking at putting forth our work plans.

Human Health Remedies

RESIDENTIAL AND COMMERCIAL PROPERTY REMEDIATION

Remediations to date:

- 3,236 properties in “Box”
- 3,935 properties in “Basin”

2024:

- No properties have been remediated.
- 1 property including ROW & drinking water source was sampled.
- 2 Properties private drinking water source were sampled.

2025 Goals:

- Complete sampling and remediation if sampling above action levels & access is granted.
- 9 properties in the “Box” need remediation.
- 201 properties in the “Basin” require sampling.
- 38 properties in the “Basin” need remediation.

UPDATED RESIDENTIAL SOIL LEAD GUIDANCE

- Residential soil lead screening levels reduced from 400 PPM to 200 PPM or 100 PPM when multiple sources of lead exposure are present.
- Clean up levels are developed after investigations, assessments, site specific risks & other relevant information.

2025 Goals:

- Assess need for changes in current clean-up levels.
- Review assumptions used to develop current clean up levels.
- Review site specific data to determine progress toward meeting screening level goals.
- If it is determined updated cleanup levels are needed, work will begin in late 2025/early 2026.
- Changes to current approach will require amending decision documents & obtaining public input.

LEAD HEALTH INTERVENTION PROGRAM

LHIP Services:

- Year-round blood lead screening and free follow-ups.
- HEPA vacuum loan program for cleaning residences.
- Education, outreach, and awareness for parents, children, community members, recreationalists, and visitors.
- Education and outreach at community events local schools for grades K-12.
- Sampling of soil, dust, paint, water, and other media as appropriate.
- Provide healthy homes items including dust cloths, surface cleaner, door mats, and replacement furnace filters.

2025 GOALS:

- Free blood lead screening for residents living within the Bunker Hill Superfund Site boundaries.
- Continue annual summer screening with \$50 incentive for children between ages 6 months and 6 years.
- If an individual is found to have elevated blood lead levels: Free in - home consultation to identify sources of exposure Help identify potential exposure pathways the cleanup can address.

RECREATIONAL USE ACTIVITIES

2025 GOALS:

- Box recreational site strategy and implementation plan to be completed.
- Monitor completed remediation projects & install/update signs in the Basin.
- Evaluate sample results & potential clean up options at informal recreational sites east of Thompson Lake.
- Characterize activities at other Lower Basin recreational areas.
- In the Box, update signs and evaluate access controls at mine and recreation sites.

Waste Area Development & Management

REPOSITORIES:

- PAGE Operated by IDEQ receives waste from the Box and from the ICP 384,174 cy remaining capacity.
- BIG CREEK Operated by CDA Trust receives waste from the Upper Basin 81,500 cy remaining capacity.
- BIG CREEK ANNEX Operated by CDA Trust receives waste from the Upper Basin 168,871 cy remaining capacity.
- LOWER BURKE CANYON Operated by CDA Trust receives waste from the Upper Basin 1,028,025 cy remaining capacity.

- EAST MISSION FLATS Operated by CDA Trust receives waste from the Lower Basin 146,000 cy remaining capacity.

WASTE CONSOLIDATION AREAS:

- EAST FORK NINEMILE
 - Received waste from Tamarack and Dayrock Complex.
 - All priority cleanups were completed in 2024.
 - Final cover expected to be completed in 2026.
- CANYON COMPLEX
 - Repository and WCA
 - Accepting waste from Canyon Creek remedial actions.
 - In 2025, waste from Hecla Star and Tamarack No. 7.
- A DECISION HAS NOT BEEN MADE YET ON THE FINAL LOCATION OF A LOWER BASIN WCA

Remedial Actions

UPPER BASIN REMEDIAL ACTIONS

- 2012 UPPER BASIN RODA GOALS
 - Clean up to improve water quality and address human health and environmental risks.
 - Clean up in the Box to improve water quality of the SFCDR.
 - Treat additional contaminated water.
 - Focus on source control actions to address particulate lead Protect remedies from flooding.

BOX REMEDIAL ACTIONS

- CIA SLUDGE POND CLOSURE
 - Old sludge pond will be capped, covered and tied into existing CIA cover system.
- PINEHURST ELEMENTARY
 - Removal of deteriorated sections, regrading to promote drainage, and re-surfacing playground area.
- AIRPORT RIVERWALK TRAILS
 - Placement of barrier at one or two Oasis pads along previously completed trail.
- EAST SMELTERVILLE FLATS
 - 16-acre contaminated site will be excavated and capped including removal along floodway on the north bank of the SFCDR.
- RIGHTS OF WAY, SIDEWALKS, AND PARKING AREAS
 - Deteriorated barriers will be remediated: 33% of Uptown Kellogg’s sidewalks will be replaced & 100% of the Galena Ridge overview ROW capped.

UPPER BASIN REMEDIAL ACTIONS

- NINEMILE CREEK BASIN
 - CDA Trust completed priority cleanup in 2024. In 2025, O & M will continue at cleanup sites as well as remedial action effectiveness monitoring.
- CANYON CREEK BASIN
 - In 2025, CDA Trust will continue to investigate, design and implement clean-up projects.

INVESTIGATIONS AND DESIGNS

- Investigation at Lower Canyon Creek Riparian area. Initiate design of Frisco Reach and complete the design for Standard Mammoth Reach.
- HECLA STAR
 - Continue remediation of the 22-acre site including removal of mine waste, placement of backfill, road & creek reconstruction.
- TAMARACK #7
 - Start remediation of the 23-acre site near Black Bear by removal of mine waste, re-grading and capping of mine waste, placement of clean backfill and reconstruction of Canyon Creek.
- PINECREEK DOUGLAS COMPLEX
 - Located on Pine Creek 6 miles south of Pinehurst, cleanup will include re-grading and capping mine waste and placement of clean backfill.
- SOUTH FORK OF THE CDA RIVER
 - CDA Trust will start to investigate contamination sources within the floodplain from Mullan to the “Box” prioritizing future design and cleanup work.

LOWER BASIN REMEDIAL ACTIONS

- 2002 INTERIM ROD GOALS
 - Reduce human exposure to lead contaminated soil.
 - Improve water quality.
 - Reduce particulate lead and other heavy metals in Basin ecosystem.
- 2002 INTERIM ROD FOCUS
 - Lower Basin Riverbeds and banks
 - Lower Basin Floodplains
 - Recreational area cleanup

LOWER BASIN RIVERBEDS AND BANKS PROJECTS

- DUDLEY REACH
 - Design for pilot cap & dredge project is at 30% but project is on hold until LB WCA sited.
- CATALDO REACH RIVERBANK DESIGN
 - Design for a riverbank pilot project at river mile 166-167 to address eroding banks.
- CATALDO REACH RIVERBANK INVESTIGATIONS
 - Characterization of additional riverbanks at Cataldo Reach to prioritize design for pilot projects to address sediment transport.

LOWER BASIN FLOODPLAIN PROJECTS

- GRAYS MEADOW
 - 695-acre agriculture to wetland conversion will be completed in the spring of 2025 with O & M starting shortly after completion.
- GLEASON WETLAND REMEDIATION & RESTORATION
 - 250-acre easement property will be characterized in 2025 for a potential agriculture to wetland conversion.

Basin Environmental Monitoring

BASIN ENVIRONMENTAL MONITORING PROGRAM GOALS

- ASSESS LONG-TERM TRENDS
 - Surface water
 - Sediment
 - Groundwater
 - Biological resource conditions
- EVALUATE
 - Remedial Action Objectives
 - Applicable or Relevant and Appropriate Requirements
 - Preliminary Remediation Goals
- UNDERSTAND EFFECTIVENESS AND EFFICIENCY OF REMEDIAL ACTIONS
- DATA FOR CERCLA FIVE-YEAR REVIEW

ENVIRONMENTAL MONITORING UPPER BASIN

- THE BOX
 - Four stations monitored **twice** per year **upstream and downstream** of the GCS
 - Biological monitoring of **benthic macroinvertebrates at two stations** upstream and downstream of the CTP.
- UPPER BASIN - NINEMILE CREEK & CANYON CREEK
 - Surface water **quality** samples **two times** per year during **peak spring runoff** and **late summer base flow conditions**.
 - Additional surface water **quality** samples by USGS **four times** per year during **winter storm, peak spring runoff, late summer base flow, and late fall storm conditions**.
- SOUTH FORK COEUR D'ALENE RIVER
 - Surface water **quality** samples **upstream of the box two times** per year during **peak spring runoff** and **late summer base flow conditions**.
 - Additional surface water **quality** samples by USGS at **seven locations** in the South Fork Coeur d'Alene River ranging from Mullan to Pinehurst.

ENVIRONMENTAL MONITORING LOWER BASIN

- LOWER BASIN
 - The Lower Basin Area-wide Remedial Action Effectiveness Monitoring Plan is in progress and will continue to be drafted in 2025.
 - Surface water **quality** samples **twelve times** per year at **seven locations** in the Lower Basin targeted for high flow events and a fixed frequency approximately **every 6 weeks**.
- CDA LAKE
 - Initiated in 2024, continuous monitoring of surrogate technologies to estimate concentrations of suspended sediment, lead, and phosphorus at three USGS monitoring locations in the Lower Basin: Cataldo, Rose Lake, and Harrison.
- BIOLOGICAL MONITORING
 - Non-invasive biomonitoring waterfowl research of wood duck eggshells and tundra swan fecal samples to observe changes in lead exposure over time is anticipated to be completed in 2025.

Operations and Maintenance

- Private properties remediated under BPRP
 - Individual property owners
- Public gravel and paved remediated roads
 - Local governments with jurisdiction over roads
- Remedy protection program
 - Governmental jurisdictions or property owner
 - Environmental covenants filed as riders to deeds of remediated property
- CDA Work Trust is responsible for their own work
 - Except: road and remedy protection projects, gray's meadow after five years, and others
- CTP and Ground Water Collection System
 - DEQ
- Other remedies under CERCLA
 - DEQ
- Remedies on BLM and NFS administered lands within the site and North Fork of CDA River
 - BLM, USDA FS

Part 2 – Other Activities

DEQ LAKE MANAGEMENT - LMP goals

- Improve Scientific Understand of Lake Conditions through monitoring, modeling, and special studies
 - Water quality monitoring & coordination of science coordination team to implement NAS suggestions.
- Establish and strengthen partnerships to maximize benefits of actions under existing regulatory framework.
- Finalize and implement a Nutrient Reduction Action Plan
 - Work with funding recipients (10)+ under the LI initiative to implement phosphorus reduction projects in Coeur d'Alene basin.
 - Analyze tributary data
 - Share data gap monitoring
 - Coordinate with CDA Tribe on nutrient loading in southern end of the lake.
 - Collaborate on WQ improvements in CDA basin.
 - Find opportunities to align nutrient reduction and remediation in lower basin.
- Aquatic plant surveys
- Increase Public Awareness of Lake Conditions and Influences on Water Quality
 - Our Gem Collaborative, TCP, Bay Watchers, local gems & outreach about Alta's risk-based evaluation of CDA lake.
- Establish funding mechanisms to support LMP goals, objectives and strategies

CDA TRIBE LAKE ACTIVITIES

- Monitor Water Quality for metals, nutrients & physical parameters.
- Model data collected from the Lake, Meteorological stations and USGS stations.
- Monitor and treat invasive aquatics.
- Work with EPA to identify opportunities to align nutrient reduction and remedial efforts in the lower basin.
- Support TCP/YWS & The Our gem collaborative.
- Work with DEQ to implement nutrient and water assessment of the St. Joe.
- Continue to request that EPA reviews/evaluates their decision to "defer" a remedy for the lake.

OTHER ACTIVITIES & RESPONSIBILITIES

Flood control and infrastructure

- BEIPC will work with local flood group to update flood maps for Kellogg & Pinehurst.

Communication and public involvement

- BEIPC will continue to work with community involvement coordinators and citizens coordinating council to carry out public involvement, outreach, and education regarding basin activities.
- BEIPC will participate in regional outreach and educational committees.

State of Washington Activities

- Ecology will continue to monitor previous clean-up along the Spokane River.

RESTORATION PARTNERSHIP - USDA, USFS, USFWS, BLM, CDA TRIBE, IDFG AND DEQ

- Restoration Partnership was awarded largest settlement for natural resource restoration in US history at 79.4 million dollars.
- 16 projects have been completed to date.
- 17 projects are ongoing.
- Returning natural resources back to a healthy condition.

Val Wade (online) has a two-part question – first, she wanted an update on the status of the closed beach at Rose Lake – second, are there plans to close any other heavily used beaches with high sample data. Jennifer answered about the closure, it was for a year with the Forest Service. During that time, there have been some cultural resource complications that are ongoing. It will be reassessed at the end of next summer at that location. And then a gate was installed at the west end of Blue Lake with Idaho Fish & Game, which was another high use area for long-term camping. We are assessing a couple of other locations as well.

Rebecca clarified that the Restoration Partnership settled for 140 million, not 79.4. It was incorrect on the slide presented, but it is not stated that way in the work plan.

Leslie stated we did receive a request to amend the one-year work plan, so we need to assess that there is a process of procedure to have items added. This request is to amend the 2025 Work Plan to include the Lower Basin WCA. Scott Fields answered that they are still in the Government-to-Government Consultation process and asked for more patience. They could possibly give an update at the next meeting of how that is going as the process is involved. Ed Moreen agreed that until they complete this process, it would be inappropriate to commit to moving forward on a Lower Basin WCA. Obviously, we want to do that, but we need to conclude the process so that we can move forward as quickly as possible. We will try to keep everyone apprized the best we can. Leslie asked if we will be able to have an agenda item in March to find out where the process is and an update, and the answer was yes. Leslie asked that the 2025 Work Plan be approved as it stands with the understanding that we'll get updates and hopefully look forward to the 2026 Lower Basin WCA. She asked for any other thoughts, questions or concerns before a motion is made to approve. There were no comments – a motion was made by Brook Beeler to approve the 2025 Work Plan; Phil Lampert seconded the motion; all Commissioners approved. **M/S/C**

Review and Approve Draft 2025-2029 Five Year BEIPC Work Plan – Sharon Bosley (**Action Item**)

Human Health Remedies BPRP & Recreation

Scope:

- Determine remediation needs of properties and drinking water sources.
- Assess human health risks associated with recreational activities.
- Provide fish advisories related to heavy metals.

Objective:

- Remediate properties
- Implement actions to reduce lead exposure at recreation sites in the Basin.

Lead:

- DEQ
- EPA
- CDA Tribe
- PHD

UPDATED RESIDENTIAL SOIL LEAD GUIDANCE:

Scope:

- Screening level reduced to 200/100 PPM Lead.
- Screening levels are not cleanup levels.
- Cleanup levels are developed after consideration of relevant site information.
- Assess if cleanup levels and actions used at Bunker Hill remain protective considering the recommendations.

Objective:

- Evaluate if changes to current residential soil clean up levels are necessary.

Lead

- EPA
- DEQ
- PHD

LEAD HEALTH INTERVENTION PROGRAM:

Scope:

- Prevent elevated blood lead levels in children and others within BHSS.
- Identify children with elevated blood lead levels and provide in-home follow-up services.
- Provide information on effectiveness of LHIP, clean-up programs and ICP.

Objective:

- PHD uses the 3.5 micrograms per deciliter as the trigger for follow up.
- Blood lead screening will continue during this 5- year period.

Lead:

- DEQ
- PHD

Waste Disposal Area Development & Management

Scope:

- Plan, develop, and manage engineered waste disposal areas.
- Two primary types of engineered waste disposal areas: Five repositories, and two Waste Consolidation Areas.
- Planning for a third WCA was initiated in 2020.

Objective:

- Continue implementation of the Waste Management Strategy.
- Evaluate repository and WCA cover design criteria.
- Consider the feasibility of future use options.
- Continue operations of repositories and WCAs.

- Continue to explore potential sites and development plans for WCA site(s) in the Lower Basin.

Lead:

- EPA
- CDA Trust
- DEQ
- PHD

Upper Basin Remedies

Scope:

- Implement source control and water treatment remedies, ecological cleanup projects, and related human health activities.
- Coordination on natural resource restoration actions.
- Operate the groundwater collection system and upgraded Central Treatment Plant (CTP).
- Source control actions in the Canyon Creek and Upper South Fork CDA watershed.

Objective:

- Source control remedial actions to address contaminated surface water, soil, sediments, and source materials.
- Remedies are prioritized to reduce human health exposures and the contribution of contaminants downstream.
- Coordinate Cleanup actions with natural resource restoration.
- Adaptive management will prioritize human health exposure and effectiveness of actions.

Lead:

- EPA
- CDA Trust
- DEQ
- Restoration Partnership

Lower Basin Remedies

Scope:

- Evaluate and prioritize ecological and source control remedies.
- Conduct pilot projects to address contaminated riverbed.
- Implement remedies that have low potential for recontamination and inform future remedy decisions.
- Characterize and prioritize riverbank segments for stabilization.
- Coordinate remedies with restoration activities.
- Identify recreation areas for remediation or development of clean areas.
- Educate recreation users regarding health risks.

Objective:

- Address risks to human health: property cleanups, remediate recreation sites, and education.
- Utilize information and recommendations for active remediation, evaluate remediation technologies, and areas for natural recovery.
- Utilize the Lower Basin PFT to evaluate source control, habitat cleanup and human health.
- Test supplemental actions to reduce downstream transport of lead. ROD amendment or ESD may be necessary.
- Plan and Implement habitat and riverbed pilot projects.

- Characterize wetlands, address mobilized contaminants in river system, and inventory recreation sites for remediation.

Lead:

- EPA
- CDA Trust
- CDA Tribe
- Restoration Partnership
- State and other federal agencies

Basin Environmental Monitoring

Scope:

- Implement remedy effectiveness and long-term monitoring.
- Data management for the Bunker Hill Site has largely transitioned to Scribe.net.

Objective:

- Utilize updated BEMP management plan.
- Evaluate the progress of cleanup actions and adjust monitoring programs to inform ongoing and upcoming cleanup actions.
- Utilize area-wide remedial action effectiveness monitoring plans for the Ninemile and Canyon Creek Basins.
- Draft area-wide remedial action effectiveness monitoring plan for the Lower Basin.

Lead:

- EPA
- DEQ
- CDA Tribe
- USFWS
- USGS

O & M

Private properties remediated under BPRP

- Individual property owners

Public gravel and paved remediated roads

- Local governments with jurisdiction over roads

Remedy protection program

- Governmental jurisdictions or property owner
- Environmental covenants filed as riders to deeds of remediated property

CDA Work Trust is responsible for their own work

- Except: road and remedy protection projects, gray's meadow after five years, and others

CTP and Ground Water Collection System

- DEQ

Other remedies under CERCLA

- DEQ

Remedies on BLM and NFS administered lands within the site and North Fork of CDA River

- BLM, USDA FS

Coeur d'Alene Lake Activities

INCREASE SCIENTIFIC UNDERSTANDING

Activity:

- Core Lake WQ monitoring
- Evaluate Third-Party Review
- Science Coordination Team

Scope:

- Monitor for metals, nutrients, physical parameters, and biological communities.
- Utilize the NAS third-party review of lake data, coordinate on future data collection priorities, and strategize on the path forward.
- SCT formed to guide lake management science priorities moving forward.

Lead:

- DEQ
- CDA Tribe
- EPA
- USGS
- U of I

DEVELOP AND IMPLEMENT A NUTRIENT REDUCTION ACTION PLAN

Activity:

- Basin-wide nutrient inventory
- Bank erosion inventory
- Implementation coordination
- Aquatic Invasive Species
- Remedy implementation support

Scope:

- Continue nutrient monitoring data in lake tributaries.
- Share results with stakeholders to inform decision-making.
- Update Bank erosion inventories.
- Continue to collaborate with lead participants to identify WQ improvement projects.
- Continue implementing aquatic plant surveys.
- Continue to participate in the Lower Basin PFT and TLG.

Lead:

- DEQ
- CDA Tribe
- Avista
- SWCDs
- NRCS
- RP
- ISDA
- Kootenai County
- BEIPC
- EPA

INCREASE PUBLIC AWARENESS OF LAKE CONDITIONS AND INFLUENCES ON WATER QUALITY

Activity:

- LakeASyst
- Demonstration sites
- Our Gem Coeur d'Alene Lake Collaborative
- K-12 Education
- General Outreach
- Local Gems

Scope:

- Continue to utilize materials.
- Utilize projects to demonstrate effective strategies and for public outreach.
- Share information and get feedback from the basin-wide community.
- Organize an Our Gem Coeur d'Alene Lake Symposium for early 2026.
- Incorporate water quality education into classroom: The Confluence Project.
- Participate in relevant education and outreach opportunities.
- Continue to support the Local Gems Recognition and Awards program.

Lead:

- DEQ
- CDA Tribe
- Stakeholders
- SWCDs
- U of I
- K-12 schools
- CDA Chamber
- BEIPC

Other Activities

FLOOD CONTROL AND INFRASTRUCTURE REVITALIZATION

- Continue to work on potential flooding issues on the SFCDR.
- Work with FEMA on new flood maps.

COMMUNICATIONS AND PUBLIC INVOLVEMENT

- Continue to address issues and facilitate public involvement and education in BEIPC activities.

RESTORATION PARTNERSHIP

- Continue to **implement** Restoration Plan working to restore injured natural resources.
- Coordinate restoration with remediation actions

Gail had one correction on page 12 of the work plan, it reads 2024—2028 so this will be changed to 2025—2029.

Phil Lampert asked if in the Annual and 5-year Work Plans there was any language that addressed emergency situations if they arise or if something is identified in the Basin. Ed Moreen answered that if there was an emergency situation, EPA or the State would address it. Phil also wondered about health issues, and Ed stated that we always have flexibility to handle that. Sharon added that PHD is there if they

find there is an issue or elevated blood level, they will try to determine the source and address contamination issues.

There were no other questions or comments – a motion was made by Phil to approve the 2025-20029 Five Year Work Plan; Brook seconded the motion; all Commissioners approved. **M/S/C**

Discussion and Comments with CCC – Jerry Boyd, Chair

Jerry addressed Phil's question, in the past when there was a particular issue identified by a number of people, it seemed important enough to hold a CCC meeting and invite the public. They were able to come in with comments and questions, and in some instances, provide important input to issues. We are always open and available. Jerry works with Sharon on behalf of the Basin Commission to hold meetings when the need arises.

Jerry hopes everyone is getting the periodic mailings and information from the BEIPC and EPA as they are helpful and contain useful information. He commented that there has been a lot of money spent in the Basin and believes there have been many improvements made. Water quality and changes over time would make a great story to share with the public to be presented in some form.

Sharon commented on the water quality information – Lauren from USGS will be presenting at Our Gem virtual speaker series in February and will have more up to date information from when she presented before. An email will be sent out to everyone with the date and time.

Public Comments & Discussion

Sandra Treccani wanted to call out the fact that we are done with EF Nine Mile. It was included in all the plans and is a huge milestone for many people in this room and those working in the Basin for the last 25-30 years or longer. A lot of research and investigation has gone into characterizing that basin. Congratulations and kudos to everyone that was involved.

Meeting Adjourned at 2:23 pm

DRAFT

BASIN COMMISSION (BEIPC)

2024 ANNUAL REPORT

2024 Draft ANNUAL REPORT



BEMP sampling. Images provided by EPA.



**Basin Environmental Improvement Project Commission
March 2025**

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To obtain a copy of this report or other information visit www.basincommission.com

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CDA River. Images provided by BEIPC.

Executive Summary

The Basin Environmental Improvement Project Commission (BEIPC) is responsible for coordinating environmental remediation to address heavy metal contamination, natural resource restoration and water quality in the Coeur d'Alene Basin (Basin). The BEIPC also participates in guiding and coordinating infrastructure upgrades and improvements to protect the environmental cleanup remedy and enhance living conditions in the communities of the Basin. The Basin is defined as the watersheds of the Coeur d'Alene River (CDA River), Coeur d'Alene Lake and the Spokane River within the Idaho Counties of Shoshone, Kootenai, and Benewah, as well as the Coeur d'Alene Tribal Reservation within Idaho.

In 2024, the BEIPC coordinated and monitored the efforts of various entities in environmental remediation and natural resource restoration, as outlined in the BEIPC 2024 Annual Work Plan and five-year operating plan. During this period, the 2025 Annual Work Plan and an updated five-year plan were also developed. The environmental remediation work was performed through the federal Comprehensive, Environmental Response, Compensation and Liability Act (CERCLA) Program, the State of Idaho environmental cleanup programs, and actions under the direction of the Environmental Protection Agency (EPA) by the Coeur d'Alene Work Trust (Trust) formed under the ASARCO Bankruptcy settlement. Natural resource damage restoration work was performed by the Coeur d'Alene Basin Natural Resource Trustees (Restoration Partnership) which includes the Coeur d'Alene Tribe (CDA Tribe), State of Idaho Department of Environmental Quality (DEQ), Idaho Department of Fish and Game (IDFG), U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). The Panhandle Health District (PHD) continued to manage the Institutional Controls Program (ICP) to control the release and migration of contamination remaining in place after remediation.

BEIPC Overview

The BEIPC was established by the Idaho State Legislature and implemented through a Memorandum of Agreement (MOA) among implementing parties. The BEIPC's primary purpose is to work with the EPA and DEQ to implement the Interim Record of Decision (ROD) for OU-3 throughout the Basin and implement the Interim Upper Basin ROD Amendment (RODA) for portions of OU-3 and OU-2 to advance the remediation of heavy metals contamination in the Upper Basin (confluence of the North and South Forks of the CDA River to the head waters of the South Fork above Mullan).

The Basin is considered to be Operable Unit 3 (OU-3) of the Bunker Hill Mining and Metallurgical Complex Superfund Site originally listed on the CERCLA National Priorities List in 1983. Operable Units 1 and 2 (OU-1&2) are the populated, industrial, and undeveloped areas in a 21 square mile area encompassing the communities of Pinehurst, Smelterville, Wardner, and

Kellogg and outlying Shoshone County lands known as the “Bunker Hill Box”. OU-3 includes the remainder of the site outside the Box in the Basin where contamination has come to be present.

In addition, the BEIPC is involved in:

- Assisting the EPA in developing and managing the Superfund Cleanup Implementation Plan (SCIP), a comprehensive cleanup plan for the Upper and Lower Basins based on remedies selected in the OU-3 ROD and Upper Basin RODA,
- Coeur d’Alene Lake management planning and implementation,
- Heavy metal contamination remediation efforts at mining sites in the North Fork of the CDA River (NFCDR),
- Assisting the Restoration Partnership in the implementation of their natural resource restoration program as provided for in the CDA Basin Restoration Plan; and
- Leading multi-agency coordination in addressing potential flooding in the South Fork CDA River (SFCDR) and Pine Creek drainages.

Legislation and the MOA creating the BEIPC authorized appointment of a seven-member board comprised of:

- Four members from Idaho, one representing the state, and one each representing the county commissions from Shoshone, Kootenai, and Benewah Counties, appointed by the Governor of Idaho,
- One representative of the state of Washington appointed by the Governor of Washington,
- One representative appointed by the Council of the Coeur d’Alene Tribe, and
- One federal representative of the United States appointed by the President.

Sharon Bosley is the Executive Director for the Basin Environmental Improvement Project Commission. The Executive Director supports the Board in implementing work plans and environmental activities.



Canyon Creek Repository. Picture provided by EPA.

BEIPC BOARD OF COMMISSIONERS:

Name	Title	Representing
Leslie Duncan Chair	Kootenai County Commissioner	Kootenai County
Brook Beeler Vice Chair	Regional Director, Washington Department of Ecology	State of Washington
Jess Byrne Secretary/Treasurer	Director, Idaho Department of Environmental Quality	State of Idaho
	Regional Administrator EPA, Region 10	Federal Government
Dave Dose	Shoshone County Commissioner	Shoshone County
Caj Matheson	Coeur d'Alene Tribal Council Member	Coeur d'Alene Tribe
Philip Lampert	Benewah County Commissioner	Benewah County

Program Management

The BEIPC operates in accordance with the Idaho statute and the MOA among the governing entities. It is responsible for coordinating the activities of federal, tribal, state and local government agencies implementing the ROD for OU-3 and the Upper Basin RODA for human health and ecological remediation activities. It is also involved in the efforts by the Restoration Partnership to restore natural resources in accordance with their CDA Basin Restoration Plan. Working through the implementation and management of Institutional Controls in the Box and Basin (ICP), the BEIPC coordinates efforts to protect the cleanup remedies, human health, and the environment from the release and migration of contaminants.

The Executive Director (ED) works with the seven governmental entities and their agencies to establish annual work plans, manages the activities and programs of the BEIPC, works to expand community involvement in the Basin work and assists governments and partners on various projects at their request. To assist the ED in program management, planning, and implementation, the states of Idaho and Washington, the EPA, the Coeur d'Alene Tribe and the Counties have provided volunteer staff "on loan" to coordinate with the ED and provide routine intergovernmental input on technical and policy issues. Other support groups include the Technical Leadership Group (TLG) and the Citizen Coordinating Council (CCC).

TECHNICAL LEADERSHIP GROUP (TLG)

The TLG is the BEIPC primary technical advisory group. It is comprised of federal, state, local and tribal representatives as well as interested private citizens serving on the Project Focus Teams (PFTs) who provide expertise in science, engineering, logistics, regulatory aspects, and land management in the Basin. The TLG advises the BEIPC on work planning and implementation while striving toward consensus-based recommendations. In 2024, the ED and TLG developed the 2025-2029 Five-Year and 2025 draft work plans to implement the remedy in OU-2 and 3.

In addition to providing technical assistance, practical knowledge, and to assure projects are coordinated with BEIPC activities, the TLG members schedule meetings to provide a forum for discussions on individual project effects, discuss opportunities to minimize impacts to affected stakeholders and exchange information.

CITIZEN COORDINATING COUNCIL (CCC)

The CCC serves as the main avenue for public input into the BEIPC activities. It is comprised of politically and geographically diverse members and was established to provide local citizen review and input on Basin related work to the BEIPC.

The CCC facilitated communications to its members and the public on an as-needed basis by e-mails, posting to the BEIPC website and EPA Facebook. Throughout 2024, the CCC relayed information to its members and the public regarding activities in the Basin.

In 2024, the Executive Director created a Google survey to assess CCC members' interests and preferred meeting locations. Of the 51 respondents, primarily from the CDA Basin, most were familiar with the Bunker Hill Superfund site and the Basin Environmental Improvement Project Commission. Over 35% reside in Coeur d'Alene, with others in Plummer, Worley, and Kellogg. The majority expressed interest in attending a CCC meeting, favoring Coeur d'Alene or Kellogg, with no strong preference for morning or evening sessions. Key topics of interest included Basin-wide projects, CDA Lake, the Lower Basin, bank stabilization, phosphorus reduction, and growth impact mitigation. However, most respondents were not interested in becoming CCC members.

In addition to receiving various reports for review and comments, CCC members were involved in the following BEIPC activities in 2024:

April 3, 2024

The CCC sponsored an in-person/virtual meeting in Coeur d'Alene in collaboration with EPA, DEQ and the CDA Tribe. Topics included an update on CDA Lake management which covered Leading Idaho, human health study, and the Science Coordination Team. EPA presented an

update on the Lower Basin discussing the background of the Lower Basin, Lower Basin Prioritization Plan, riverbank stabilization, riverbed pilot study, recreation sites, BEMP, and wetland projects. Summary meeting notes can be located on the BEIPC website at www.basincommission.com.

June 5, 2024

The CCC sponsored an in-person/virtual meeting in Kellogg in collaboration with EPA and PHD. The agenda items included an update on regional blood lead level results, new EPA lead guidance, and Lower Basin updates. The meeting was unattended by CCC or community members and therefore did not proceed according to the agenda.

Future CCC meetings will be scheduled to discuss specific issues needing community input. CCC members will remain informed of activities through the extensive mailing list maintained at the BEIPC office.

Public Outreach and Citizen Involvement

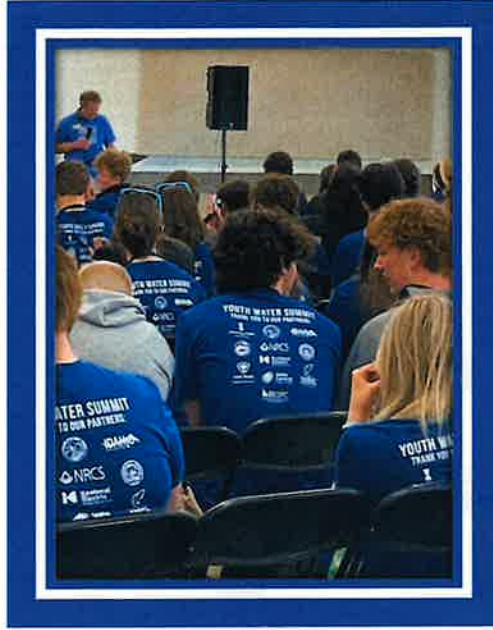
BEIPC COMMUNITY INVOLVEMENT ACTIVITIES

In 2024, the BEIPC actively engaged in community outreach and education initiatives. To enhance public awareness of contamination issues, promote health protection strategies, and keep the community informed about ongoing and future cleanup projects, the BEIPC launched *The Dirt*, a collaborative effort focused on these critical topics. Additionally, the BEIPC participated in the *Confluence Project*, a yearlong program that connects scientific experts with high schools across North Idaho. Through classroom instruction and multiple field excursions, teachers guided students in researching water resource issues and analyzing local water data. All BEIPC meetings were held in person with a virtual option, ensuring accessibility for participants. The BEIPC also maintained an up-to-date Basin website (www.basincommission.com), where meeting information was posted and announced at the BEIPC office in Kellogg, Idaho. Furthering its commitment to public education, the BEIPC took part in outreach efforts, including a joint information booth at the North Idaho Fair, staffed by representatives from various government agencies involved in the Basin.

In addition, the various governmental entities represented by the BEIPC continue to support the TLG and CCC by being involved in the activities of those groups. Their involvement includes meeting with citizen groups, giving technical presentations, participating in Basin events, holding tours of Basin project areas, updating information throughout the Basin, and publishing various documents to provide updates on Basin activities.

As part of the public outreach program, the Basin Commission continued to make numerous presentations to local business and community groups concerning activities of the BEIPC which include planned cleanup actions and activities required to protect the remedy, human health, and the environment. The following is a partial list of BEIPC community involvement activities throughout the year:

- Operated the booth on several occasions at the North Idaho Fair.
- Attended the Idaho Four Counties Natural Resource Committee meetings to update them on cleanup actions and discuss other topics of concern.
- Participated in The Confluence Project working with close to 300 high school students in a yearlong program educating them on their local watershed through on-site studies and classroom work.
- Participated in the Our Gem Collaborative working to preserve lake health and protect water quality by promoting community awareness of local water resources through education, outreach and stewardship.
- Created and formed The Dirt Collaborative providing informative articles focused on all aspects of cleanup efforts associated with the Bunker Hill Superfund Site. The Dirt is a group of committed and local experts from multiple agencies including the Basin Environmental Improvement Project Commission, Panhandle Health District, Shoshone County, Silver Valley Economic Development Corporation, and the Idaho Department of Environmental Quality.
- Regularly attended the Coeur d'Alene Chamber Natural Resource Committee. The ED was elected the board secretary for the committee in 2025.
- Posted BEIPC and CCC meeting dates and agendas to the BEIPC website, social media and informational flyers with assistance from EPA and DEQ.
- Shared reports and activities updates, meeting notices, and work plans to TLG and CCC members by email for review and comment.
- Shared BEIPC related information with the EPAs Community Involvement Coordinators (CICs), DEQ and the Lake Management Plan (LMP) staff for publication on their Facebook pages.
- Continued to update the BEIPC website. The website provides information to keep the public informed including how to become involved and participate in the process; and opportunities for the community to provide input. Updates, including agendas and summary minutes of quarterly meetings, are posted to the website at www.basincommission.com.



Youth Water Summit. Images from BEIPC.

EPA COMMUNITY INVOLVEMENT ACTIVITIES

EPA Region 10 prioritizes coordinating with local communities and residents. The cleanup team wants to give people meaningful opportunities to be involved in and informed about the cleanup. EPA's many community involvement activities are done in partnership with others, including the Idaho Department of Environmental Quality, the Basin Environmental Improvement Project Commission, and Panhandle Health District. We are glad to report that 2024 was another productive year of community involvement accomplishments in the Basin. Highlights include:

- EPA continued to follow its Community Involvement Plan for the cleanup: <https://semspub.epa.gov/src/document/10/100137919>. The plan describes how community members can get information and be involved in the cleanup and summarizes local concerns. It also outlines how EPA collaborates with its partners. Many local people helped develop this plan.
- EPA continued to partner with the CDA Trust, DEQ and PHD to increase public health messaging and education related to limiting exposures to heavy metals. New health signs continue to be posted around areas commonly used for recreation. About 72 signs have been placed to date.


Construction Activities

Canyon Complex Repository/Waste Consolidation Area
 Crews plan to haul about 26,000 cubic yards of mine waste from the Hecla Star Complex project to the Canyon Complex Repository/Waste Consolidation Area, near Woodland Park. The total capacity of the CCR/WCA is about 1.8 million cubic yards. Repositories and waste consolidation areas like this one reduce health risks from metals like lead and arsenic.


Canyon Creek Quarry
 The Coeur d'Alene Trust's contractors will process clean rock up the hill from the Canyon Complex Repository/Waste Consolidation Area at the Canyon Creek Quarry. As part of the cleanup work in Canyon Creek, the Trust purchased a 23-acre parcel that they started using in 2020 as a quarry. This property is 2.7 miles east of the CCR/WCA, and will supply clean construction materials, different sized gravel, and road surfacing materials to the CCR/WCA, as well as to other cleanup projects in the Canyon Creek Basin.

Hecla Star Complex
 This is the second of four years of construction at the Hecla Star Complex Project near the town of Burke. The 2024 construction season will include excavating and hauling mine waste to the Canyon Complex Repository/Waste Consolidation Area, near Woodland Park; diverting Canyon Creek around the site in a thick plastic pipe; installing cast-in-place concrete structures and a concrete box culvert beneath Burke Road to convey Canyon Creek; reconstructing a portion of Canyon Creek; and installing storm water controls.

Dayrock Complex and Lower East Fork Ninemile Creek
 In June, construction crews started the third and final year of cleanup at the Dayrock Complex/Lower East Fork Ninemile Creek Riparian project. Activities will focus on 3,000 linear feet of the Lower East Fork Ninemile



Construction continues at the Hecla Star Complex.



Construction Season Flier. Image provided by BEIPC.

- The agency produced the document *Coeur d'Alene Basin Cleanup: 2024 Construction Season Preview*. It gave an overview of investigations to design protective cleanups and cleanup activities for the year. EPA distributed it widely to partners and community members.
- In May, EPA and our partners the Basin Environmental Improvement Project Commission, Coeur d'Alene Tribe, Idaho Department of Environmental Quality and the Panhandle Health District held an event at the Silver Mountain Resort in Kellogg to commemorate 50 years of cleanup successes at the Bunker Hill Superfund Site. We invited the community. Over 80 people attended.
- Twelve people graduated this year from EPA's Superfund Job Training Initiative (SJTI) Program. This is the third time the program has been offered at the Bunker Hill/CDA Basin Superfund Site. SJTI offers free job training and marketable skills to local residents for cleanup and construction work. Graduates from this years and past programs have been employed by several local companies.
- The agency, in coordination with its partners, conducted outreach on several projects this year, distributing flyers locally: *Hecla Star Complex*, *Gray's Meadow Agriculture to Wetland Conversion Project*, and *Ninemile Basin seasonal cleanup activities*. Outreach was also conducted for lead health education, soil testing and property cleanups, recreation and health, repositories, and more. EPA also produced a handout for participants on the BEIPC August 2024 cleanup tour, and a fact sheet to inform the public about the annual study to monitor swan health, conducted in the Lower CDA River Basin.

In addition to the above, EPA continued the following activities in 2024:

- Maintained the **Coeur d'Alene Basin Facebook** page which provides site updates to the public. Find it at www.facebook.com/CDAbasin. The page offers site news, photos, and

resource information. EPA invites participation, suggestions, and postings, and shares partners' posts.

- Published the **Basin Bulletin** newsletter in March, July, and November. The Basin Bulletin provides news and updates about the Coeur d'Alene Basin Cleanup.
- Provided staff support and regular participation at meetings of the BEIPC, CCC, and TLG in keeping with EPA's commitment to the BEIPC process. In 2024, BEIPC quarterly meetings were held both in-person and virtually.
- EPA continued to maintain the website for the Basin Cleanup. It offers public access to updates, site documents, and background information. Suggestions for improvements are always welcome. (Website URL: www.epa.gov/superfund/bunker-hill)
- EPA maintained document collections related to the cleanup at several area libraries for public access: Wallace Public Library, Spokane Public Library, St. Maries Library, and Kellogg Public Library.
- Project managers met as requested with local officials, interest groups, and others to provide updates and answer questions in 2024.
- EPA continued to work with the media in 2024, arranging press availability sessions as needed, fielding questions from reporters about the site, running newspaper display ads, and issuing press releases on high-interest activities.

DEQ AND PANHANDLE HEALTH DISTRICT (PHD) COMMUNITY INVOLVEMENT ACTIVITIES

DEQ and PHD conduct education, public engagement, and health awareness activities related to the CDA Basin cleanup. Kellogg PHD is the primary partner for health messaging and outreach through the Lead Health Intervention Program. The aim is to raise awareness about lead intervention and to support the continuation of healthy trends for children, families, and visitors to the area.

The following are highlights of 2024 activities:

- ICP Contractor Licensing Course and ICP educational booth were provided at the North Idaho College's Annual Safety Fest.
- Educational materials were provided to Bunker Hill Mining Corporation's employees during a company blood-lead testing event.
- Guest lecture given at Gonzaga's School of Nursing.
- Brochures and other educational materials were provided to local laundromats and other public locations.
- Members attended Idaho's Lead Advisory Committee meetings, providing updates on Lead Health Intervention Program (LHIP) events and outreach activities and to discuss statewide activities.
- Presentations were provided to new Kootenai Health Resident Doctors.

- A presentation and site tour were provided to PHD Environmental Health District Directors from around the state.
- A presentation was provided for the University of Idaho representatives.
- A booth was provided for City of Coeur d'Alene's Earth Day event.
- Members collaborated with HUD and Idaho Housing and Finance Association (IHFA) to discuss HUD housing in the BHSS and provide lead awareness training.
- Historic Silver Valley Chamber of Commerce meetings were attended to give updates on 2024 remedial activities, site projects, and outreach activities.
- Historic Wallace Chamber of Commerce meetings were attended to give updates on 2024 remedial activities, site projects, and outreach activities.
- Silver Valley Economic Development Council meetings and member events were attended to give updates on 2024 remedial activities, site projects and outreach activities.
- Lead exposure education and educational giveaways were provided to attendees of the Coeur d'Alene Home and Garden Show by outreach staff. Staff worked alongside Idaho Health and Welfare staff to provide soil testing for lead, and information on radon exposure in our area.
- Outreach staff attended the Silver Valley Career/Transition Fair to educate students about careers opportunities related to work within the BHSS.
- Outreach staff gave presentations to Shoshone Benewah One-Call and the National Utilities Contractors Association regarding the need for licensure when working within the BHSS. An informational booth was provided during contractor training at Dozer Days with similar information.
- Outreach staff presented and provided breakout sessions at the North Idaho Green Summit on the BHSS and lead exposure.
- Lead health education was provided to pre-school through third grade classes at eight local schools and 679 educational giveaway bags were distributed.
- The Annual Blood Lead Screening Event (6-day event) was conducted utilizing a carnival theme and online scheduling tool. This year's event saw an increase of approximately 100 additional participants, bringing the total number of individuals screened to 461.
- A booth was provided at the North Idaho State Fair (10-day event) to educate attendees on the BHSS, lead exposure risks, and Leading Idaho Projects reducing phosphorous loading to area waterways.
- Lead awareness STEM lessons were provided by outreach staff during STEM Day at the North Idaho State Fair.
- Presentations were given at Basin Environmental Improvement Project Commission Meetings upon request.
- Pizza parties were hosted for residents at the Lincoln Building, the Pinehurst Plaza, Canyon Side, and Amy Lyn Apartments.

- A presentation was given to PHD's Board of Health on results of the annual lead screening event.
- A booth was provided at Shoshone Medical Center's Kid's Health Fair where each child received a bag of educational information, goodies and healthy snacks.
- Informational flyers for EPA's work projects were posted and distributed to local municipalities throughout the year.
- Basin Bulletins and EPA project updates were distributed throughout the Site. EPA released three Basin Bulletins in 2024: March, July, and November.
- Presented and provided site tour for area teachers for continuing education credits.
- Members attended Silver Valley Transportation Team meetings.
- Tours of the Central Treatment Plant were provided to multiple groups.
- Outreach staff participated in Silver Hills Elementary School's trunk-or-treat, Kelloween, and Silver Mountain's Halloween trunk-or-treat events providing 700 treat bags with lead safety messaging.
- Community Involvement Coordination meetings were attended to discuss community needs and outreach opportunities.
- Partnered with the Idaho Department of Health and Welfare's Childhood Lead Poisoning Prevention Program and Pediatric Environmental Health Specialty Units to provide a continuing education course for local health care professionals.
- Conducted 22 in-home follow-ups for individuals with high blood-lead levels or elevated house dust.
- Blood-lead testing was provided to 30 area residents at the June and October Kellogg Elks blood drives.
- A booth was provided at the Shoshone County Senior Health Fair where attendees received education and outreach on lead exposure and prevention.
- Outreach staff provided education, outreach materials, and giveaways to Mullan's Jeep Jamboree participants.
- New brochures were created and updated for use during 2024.
- A lead safety poster contest for area third through fifth grade students was hosted to celebrate Lead Poisoning Prevention Week. Posters submissions were displayed at PHD's Kellogg Office.



- Area schools were given posters and stickers to highlight National Handwashing Week.
- Attended South Fork Watershed Advisory Group meetings throughout the year.
- Outreach staff hosted a booth at the Silver Valley Care's Event at Kellogg Park, educating attendees on lead exposure.
- Provided presentations for Wallace Junior High history classes.
- Met with PHD Epidemiology Team to provide update on lead health education and follow ups.
- Outreach staff provided 355 gift bags to area food pantries containing lead education information, dust cloths, nailbrushes, soap, lip balm, pencils, toothbrushes, and toothpaste.
- Outreach staff attended multiple Music in the Park events, educating participants on the need for ICP permitting and lead exposure awareness.

2024 Work Accomplishments Part 1: Work Performed Through Federal Superfund or Other Cleanup Programs

LEAD HEALTH INTERVENTION PROGRAM (LHIP)

Screening of children for elevated blood lead levels has been occurring annually in the CDA Basin since 1996. For children with elevated blood lead levels, follow-up consultations from a public health professional are available through the Lead Health Intervention Program to assist families with identifying ways to reduce lead exposures. The screening program also informs the Basin cleanup efforts, although cleanup decisions are not based on annual blood lead testing results. The goal is to prevent lead exposures that could result in elevated blood lead levels.

The following table shows the Basin Blood Lead summary results from 2019 – 2024 for children residing in the Basin 6 months through 6 years of age.

Year	2019	2020*	2021**	2022**	2023	2024
Number of Children	84	4	19	40	94	129
Minimum (µg/dL)	<1.9	<1.9	<1	<1.0	1.0	<1.9
Maximum (µg/dL)	14	6	7	30	7	14.8
Average (µg/dL)	2.5	3.5	1.9	4.2	2.0	2.4
Geometric Mean (µg/dL)	1.9	3.1	1.5	2.2	1.8	2.0

*2020 screening event was cancelled due to the Covid-19 pandemic.

**Venous test results only. In 2021 and 2022 additional children had capillary test results. Historically PHD used the Lead Care Plus model of machines to analyze the capillary draws, which has a minimum detection limit of 1.9 µg/dL. A recall of test kits for the Lead Care Plus machines issued on May 7, 2021, made test kits unavailable by the time of our 2021 screening. As an alternative, two Lead Care II model machines, which have a minimum detection limit of 3.3 µg/dL, were used. Because of this higher detection limit, venous drawings were encouraged and are reported here. Test kits for the Lead Care Plus machines have since been replenished.

In 2024 the LHIP offered three blood lead testing events, providing area residents with even more access to blood lead screenings. The events included testing at the Kellogg Elk’s Club Blood drives on June 4th and on October 1st, plus our annual screening event held every August. A total of 461 individuals had their blood lead levels checked during screening events, with 34 more people participating at other times throughout the year. Out of those individuals, 206 Basin residents were tested. Of those event participants, 129 were children between the ages of 6 months and 6 years, 19 were children over 6 years of age, and 58 were adults. There were an additional 226 tests performed for residents of the Box at these events and 11 tests performed for people residing outside but working or recreating in the BHSS.

When an individual is identified with an elevated blood lead level, it is recommended their physician be notified and PHD offers appointments for in-home consultations to identify potential sources of exposure in and around the home¹. These in-home consultations help PHD, and families, identify ways to reduce exposure risks. In addition, PHD can help identify potential exposure pathways that the cleanup project can address to prevent future lead exposures.

PHD will continue to offer free blood lead screening for residents living within the Bunker Hill Superfund Site boundaries year-round. In addition, PHD is planning to conduct its annual

¹ The Panhandle Health District (PHD) offers a follow-up consultation if any child has a blood lead level greater than 3.5 µg/dL, the “reference value” established by the Centers for Disease Control & Prevention (CDC) in 2021.

summer screening in 2025 with a \$50 incentive for children between ages 6 months to 6 years of age.

In 2025, the LHIP will continue to offer these additional services:

- HEPA vacuum loan program for cleaning residences.
- Free supplies to aid homeowners in performing safe home renovations and/or dirt disturbance activities.
- Free cleaning supplies for inside the home.
- Free dust mats.
- Education, outreach, and awareness for parents, children, community members, recreationalists, and visitors.
- Education classes and hands-on activities in local schools for Pre-K thru 12th graders.
- Education and outreach at community events.
- Presentations and tours to community members, medical residents, and realtors, educating on the importance of lead exposure prevention.
- Sampling of soil, dust, paint, water, and other media as appropriate.

BASIN PROPERTY REMEDIATION PROGRAM (BPRP) INCLUDING PRIVATE DRINKING WATER SUPPLY

Sampling and cleanup of residential, commercial, common-use areas, and rights-of-way (ROWs) continued in 2024 as part of the Bunker Hill site's Basin Property Remediation Program (BPRP). DEQ implements this program in OU-1; the CDA Trust implements this program in OU-3.



Looking West. Completion of soil sampling. Image provided by CDA Trust.

BPRP in the Box

To date, a total of 3,236 properties have been remediated in the Box with no new BPRP properties being completed in 2024. As was reported in 2022, DEQ continued to track the remaining nine Box properties that require remediation in case the current owners grant access, or the property changes owners.

BPRP in the Basin

The CDA Trust completed the following BPRP activities in 2024:

- Maintained six reverse osmosis, under-sink water filtration systems to treat drinking water from private sources.
- Collected 33 soil samples from one residential property.
- Collected nine private drinking water samples from three properties.

At the conclusion of 2024, a total of 3,935 properties have been remediated in the Upper and Lower Basin of OU-3. 201 properties remain to be sampled whose owners have directly refused or have not responded to multiple requests for access. 38 properties remain to be remediated whose owners have refused remediation or have not responded to contact attempts.

CONTAMINATED WASTE DISPOSAL AND MANAGEMENT

Contaminated waste disposal and management is an ongoing process at the Bunker Hill site that must meet the demand for the disposal of historic mining related contamination generated under various remediation programs and under the Institutional Controls Program (ICP). Facilities to accommodate disposal of these wastes are engineered and constructed to reliably contain materials and prevent contaminants from being released to surface water, groundwater, or air in concentrations that will cause state and/or federal standards to be exceeded. Without the expansion of existing disposal facilities or the construction of new facilities, continued remediation and control of contamination could be compromised and potentially stopped.

Two Categories of Facilities utilized in 2024

Facilities in current use and development include the following:

- Repositories that are large, centrally located areas within the Upper and Lower Basin where contaminated soil and material excavated during remedial and ICP actions are transported to be managed and secured.
- Waste Consolidation Areas (WCAs) in the Upper Basin located adjacent to or near specified remedial action source areas.

Repositories

Six repositories received remedial action and ICP waste in the 2024 field season. The Page Repository, located near Smeltonville and operated by DEQ receives remedial action and ICP

wastes generated by the cleanup activities conducted in the “Box”. The Big Creek Repository (BCR) and the Big Creek Repository Annex (BCRA) near the community of Big Creek, the Lower Burke Canyon Repository (LBCR), and the Canyon Creek Repository (CCR) serve the Upper Basin, and the East Mission Flats Repository (EMFR) near Cataldo serves communities in the Lower Basin, all of which are operated by the CDA Trust.

ICP Management

The ICP areas are managed by the CDA Trust’s and DEQ’s Operations Contractor’s throughout the year, excluding LBCR. LBCR does not accept waste during winter months because of heavy snow accumulation in Burke Canyon. During the winter closure period ICP waste will instead be directed to BCR for disposal. ICP waste from winter operations are stockpiled within the repositories for processing and future placement and compaction when conditions are suitable.

Stormwater management

- Storm water management controls including shredded wood, silt fencing, and other measures are installed to protect against erosion.
- Slopes are stabilized by track walking as necessary.
- Crowned center of waste area to encourage drainage to runoff collection areas.
- Year-end repository shutdown activities are completed as necessary.
- BCR, EMF, and Page are inspected weekly throughout winter months and haul routes are maintained for snow removal as needed.

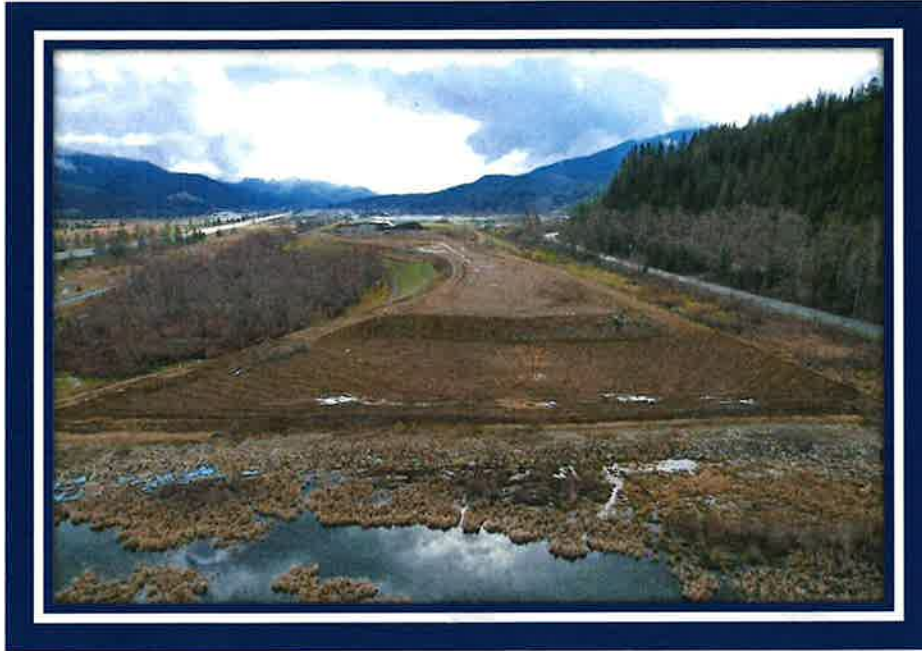
Water Quality monitoring

Semiannual groundwater monitoring was conducted at all repositories except LBCR. Visual surface water monitoring is conducted at LBCR throughout the year. Groundwater and surface water monitoring results indicate that disposal activities have not impacted water quality near the repositories.

A summary of activities completed in 2024 at each repository is described below:

Page Repository

- Page received 4,077 truckloads of ICP waste, 367 truckloads of remedial action waste, 1639 truckloads of concrete and 205 loads of woody debris.
- At the end of the 2024 construction season, the total estimated volume of material placed at Page was 23,000 cy of waste material and 9,000 cy of course durable foundation material.
- Page has approximately 445,000 cy of remaining waste capacity.
- Construction of cell #4 continued and initial work on cell #5 began.
- The Page Repository continues to use recycled construction materials extracted from Box and Basin waste streams, which helps to further reduce repository operating costs.



Aerial photo of Page repository. Photo courtesy of Northwind.

Big Creek Repository (BCR)/ Big Creek Repository Annex (BCRA)

- BCR received 498 truckloads from the ICP, for an estimated 2,000 cubic yards (cy) of waste placed and compacted.
- BCR currently has approximately 81,022 cy of remaining waste capacity.
- BCRA received 46 truckloads from the ICP for an estimated 350 cy of waste placed and compacted.
- BCRA has approximately 168,346 cy of remaining waste capacity.

Stormwater management

- Year-end repository shutdown activities were completed and included:
 - All road surfaces were graded and sloped inward to collect runoff to capture and prevent ponding.
 - Waste was graded and sloped inward to collect runoff to capture into roadside ditches.

ICP Management

The ICP area is managed by the CDA Trust's Operations Contractor during the winter closure period. Prior to spring runoff, all ICP waste resulting from winter operations will be transported and stockpiled on top of the BCRA repository for processing and future placement and compaction.

Water Quality monitoring

- Semiannual groundwater and surface water monitoring was conducted at seven monitoring wells and six surface water locations on or near BCR/BCRA. Groundwater and surface water monitoring results indicate that disposal activities have not impacted water quality near the site.

Lower Burke Canyon Repository (LBCR)

- LBCR received 1,365 truckloads from ICP for an estimated 8,500 cy of waste placed and compacted.
- LBCR currently has approximately 1,019,525 cy of remaining waste capacity.

Stormwater management

- Year-end repository shutdown activities were completed and included:
 - Stabilized slopes by track walking.
 - Maintained low area sump near decontamination pad to ensure that runoff from the asphalt area is contained on site.
 - Maintained drainage swale around south end of fill limits to collect any runoff during rain on snow events.
 - Crowned center of waste area to encourage drainage to runoff collection ditches.
 - Installed additional storm water management controls including shredded wood and silt fencing on steep slopes to further protect against erosion.

ICP Management

The ICP disposal area will not be available to receive ICP waste through the winter months because of heavy snow accumulation in Burke Canyon. ICP waste will instead be directed to BCR for disposal.



Lower Burke Canyon Repository waste grading. Image provided by the CDA Trust.

Canyon Complex Repository (CCR)

- CCR received waste materials from mine remediation sites in Canyon Creek and Ninemile Creek for an estimated 30,000 cy of waste placed and compacted.
- CCR has approximately 1,200,000 cy of remaining waste capacity.

Stormwater management

- Year-end repository shutdown activities were completed and included:
 - Stabilized slopes by track walking.
 - Sloped top waste surface to promote stormwater runoff to the base drainage system.
 - Cleaned and maintained existing stormwater controls such as culverts and check dams.

ICP Management

ICP wastes are directed to LBCR for disposal and are not currently placed at CCR.

Water Quality monitoring

Semiannual groundwater monitoring was conducted at ten monitoring wells located near CCR. Groundwater and surface water monitoring results indicate that disposal activities have not impacted water quality near the site.

East Mission Flats Repository (EMFR)

- EMFR received 279 truckloads from the ICP for an estimated 1,500 cy of waste placed and compacted.
- EMFR has approximately 147,360 cy of capacity waste remaining.

Stormwater management

- Year-end repository shutdown activities were completed and included:
 - All road surfaces were graded and sloped inward to collect runoff to capture and prevent ponding.
 - Waste was graded and sloped inward to collect runoff to capture into roadside ditches.

ICP Management

The ICP disposal area will be available at the east end of EMFR to receive ICP waste during the winter closure period and managed by the Trust's Operations Contractor. Prior to spring runoff, all ICP waste will be transported and stockpiled on top of the repository for processing and future placement and compaction.

Water Quality monitoring

Semiannual groundwater monitoring was conducted at six monitoring wells located on or near EMFR. Groundwater and surface water monitoring results indicate that disposal activities have not impacted water quality near the site.

Waste Consolidation Areas

Waste consolidation areas are located near, and accept waste from, specifically identified sources such as mine and mill site remedial actions implemented by EPA, the CDA Trust, and DEQ. Unlike repositories, footprints of WCAs are developed using current and near future waste estimates from nearby remedial action project areas and are constructed to be open for

a shorter period. WCAs are only expanded if additional waste is encountered during the selected remedial actions. The following Upper Basin WCA operated in 2024:

East Fork of Ninemile Creek Waste Consolidation Area (EFNM WCA)

- 2024 was the third and final year of construction of the Phase 2 Final Cover and Expansion effort primarily focusing on waste placement and compaction. The final expansion increased capacity at the EFNM WCA to allow placement of approximately 630,000 cy of contaminated waste rock and mine tailings from ongoing EFNM projects. Near the end of 2024, the EFNM WCA reached capacity and the Phase 3 Final Cover design was completed. It is anticipated that construction of the final cover system will be completed in 2025 and 2026.
 - EFNM WCA received approximately 200,000 cy of waste from remedial actions in EFNM drainage resulting in an approximate compacted volume of 177,000 cy.
 - The total volume of material placed in the WCA to date is approximately 1,305,000 cy.
 - Temporary cover materials were placed over the contaminated waste rock and mine tailings at the WCA prior to winter shutdown.
- To date, the EFNM WCA site has generated approximately 350,000 cy of rock and 375,000 cy of soil for EFNM remedial actions. Having the location of this waste disposal area near the source areas has saved the project upwards of approximately \$8.5 million in transportation costs and significantly minimized traffic through local communities.



East Fork Ninemile Waste Consolidation Area waste placement. Image provided by the CDA Trust.

Additional Disposal Locations

Mullan ICP Transfer Station

The CDA Trust operates the Mullan transfer station which provides the city of Mullan residents with a convenient place to dispose of their ICP waste which are then permanently disposed of in a locally engineered facility (e.g., the BCRA or LBCR).

In 2024, No waste was transported from the Mullan ICP Transfer Station to the LBCR.

New WCA

In 2023, a PFT evaluated potential locations proposed by EPA during a public comment period on, and to consider alternative locations for a new WCA to dispose of waste generated from Lower Basin remedial actions. EPA is giving full consideration to the analyses performed by the PFT before making a decision. The Lower Basin WCA site has not been approved by EPA.

UPPER BASIN & BOX REMEDIES

The 2012 Upper Basin RODA identified cleanup work in the Upper Basin. The goals of the 2012 Upper Basin RODA cleanup include prioritizing Upper Basin/Box source areas for cleanup to improve water quality and address risks to human health and the environment. It called for cleanup in the Box that would improve water quality in the South Fork Coeur d'Alene River. It also focused on source control actions that address particulate lead which poses a risk to human health and ecological receptors. The prioritized cleanups under the 2012 Upper Basin RODA will continue to reduce human and wildlife risks to lead and other heavy metal exposures

in the Upper Basin and are expected to significantly improve water quality. Upper Basin cleanups complement those in the Lower Basin by reducing the overall loading of contaminated materials to the Coeur d'Alene Basin watershed and the potential for recontamination in the Lower Basin.

Central Impoundment Area Sludge Pond Closure

The old sludge pond on top of the Central Impoundment Area (CIA) reached its storage capacity in June 2023. Since then, sludge from the Central Treatment Plant (CTP) has been stored in new lined ponds constructed to the east of the old sludge pond as part of the CTP upgrade project.

In 2024, the construction contract was awarded. The sludge pond cover system will tie into the existing CIA cover system, consist of compatible materials, and meet the same performance standards as the existing cover on the CIA. Construction is planned to begin summer of 2025.



Old Sludge Pond looking south. Photo courtesy of USACE Seattle District.

Pinehurst Elementary School

The Pinehurst Elementary School serves many of the children living within the Box and others residing in the Lower Basin. Large sections of the playground are deteriorated, leaving children exposed to underlying soil contamination. In 2024, design was initiated to remove and regrade these sections to promote proper drainage, repave the playground area, and add synthetic turf between playground areas. The remedial action will be completed during the summers of 2025 and 2026.

East Smelterville Flats

The 16-acre East Smelterville Flats site (site) is located east of the Shoshone Country Airport and north of I-90 in Kellogg, Idaho. The undeveloped site is owned by the City of

Kellogg and is used as a maintenance yard with the eastern portion zoned to be a public park. The area provides open space for the public to access the South Fork of the Coeur d' Alene River northeast of Smelterville, Idaho.

The site is contaminated with historical mine tailings and waste. Soil sampling indicates contaminated material is present from the surface down to depths ranging from five to eight feet. This project will protect the public from exposure to heavy metals contained in the underlying contaminated material, protect against recontamination of clean barriers, and will eliminate transport of fugitive dust and tracking of contaminated material off-site.

Work crews excavated and removed over 4,000 cubic yards of contaminated soil from the site from early November through the end of 2024. The excavated material, which contained high lead concentrations, was transported to the Page Repository for disposal. Fencing was successfully installed to restrict access and preserve the earthen cap.



Facing west showing excavation of top foot of contaminated soil along south edge of Theater Bridge Road. Photo courtesy of Idaho Department of Environmental Quality.

Government Gulch

In 2024, drillers installed four new monitoring wells in Government Gulch. The goal of the investigation is to fill in data gaps and refine our conceptual site model to evaluate if the selected groundwater remedy for Government Gulch would be cost effective or not.

Central Treatment Plant and Groundwater Collection System

Operations and maintenance were conducted throughout 2024 to continue water treatment at the Central Treatment Plant (CTP) by DEQ's contractor. During 2024 the CTP treated 1.085

billion gallons of water, 51.6% of this was mine water from BHMC and 48.4% was ground water from the GCS. A few large maintenance projects were completed in 2024, including the replacement of the impellor in Reactor B2. The efficiency of the CTP remained high throughout 2024, with removal efficiency for Zinc over 99% and Cadmium and Lead over 98%. During all of 2024 sludge produced from the CTP was sent to the new Sludge Impoundment Area targeting a sludge density of 25% solids. Water monitoring was completed during high and low flow and results will be available in the annual BEMP report.

East Fork Ninemile Creek Drainage (EFNM)

The following summarizes the 2024 construction activities conducted in EFNM:

- **Two, three-year cleanup projects completed:** Cleanup work has been on-going in the EFNM basin since 2013. In 2024, the remaining remedial action work was completed at the Dayrock Mine/Lower East Fork Ninemile Creek and Tamarack Complex sites. **This represents the completion of priority cleanup actions in the EFNM basin.**
- **Dayrock Mine/Lower East Fork Ninemile Creek:** Approximately 91,000 cy of contaminated waste rock and mine tailings were hauled from the Dayrock Mine/Lower East Fork Ninemile Creek remediation site and placed and compacted at the EFNM WCA. Approximately 7,000 cy of contaminated waste rock and mine tailings were hauled from the project to the Canyon Creek Repository after the EFNM Waste Consolidation Area reached full capacity. In addition, approximately 2,360 feet of EFNM Creek stream channel was re-constructed as part of the project.



Dayrock tributary reconstruction. Provided by the CDA Trust.

- **Tamarack Complex:** Approximately 108,000 cy of contaminated waste rock and mine tailings were hauled from the Tamarack Complex and placed in the EFNM WCA. In addition to the removal of mine waste rock and tailings approximately 1,780 feet of tributary channel was re-constructed within the Tamarack Complex.



Tamarack remediation and reconstruction. Provided by the CDA Trust.

Other activities conducted in 2024 included the following:

- **EFNM WCA:** Operation of the EFNM WCA (see separate section in this report titled “Contaminated Waste Disposal Areas and Management”).
- **Monitoring:** Continued surface water monitoring in the EFNM Basin.
- **Operations and maintenance (O&M):** O&M of the Interstate Callahan Mine Rock Dumps, the Success Mine Complex, Interstate Millsite and Rex Mine No. 2/ Sixteen-to-One.

Canyon Creek Drainage

In 2024, activities in the Canyon Creek drainage consisted of the following:

- **Star Complex:** Approximately 23,000 cy of mine waste rock and tailings were hauled from the Star Complex and placed and compacted at the CCR. In addition, approximately 1,100 feet of concrete box culvert was installed to convey Canyon Creek through the site and approximately 180 feet of Canyon Creek stream channel was re-constructed as part of the project.



Box culvert install in Canyon Creek. Images provided by the CDA Trust.

- **Gorge Gulch:** Conducted initial characterization and sampling activities in the Gorge Gulch area (5 sites) located in the upper reaches of Canyon Creek.

- **Canyon Silver (Formosa):** Conducted initial characterization and sampling activities at the Canyon Silver (Formosa) mine site located in the lower reaches of Canyon Creek.
- **Standard-Mammoth Millsite:** Conducted initial characterization and sampling activities at the Standard-Mammoth Millsite located in the lower reaches of Canyon Creek.
- **Standard-Mammoth Reach:** Conducted design activities at the Standard-Mammoth Reach (10 sites) located in the upper reaches of Canyon Creek.
- **Monitoring:** Continued surface water and groundwater monitoring in the Canyon Creek Basin.
- **Canyon Creek Quarry:** Continued development of the Canyon Creek Quarry (CCQ). The CCQ will supply clean aggregate materials to future Canyon Creek remedial action projects.

Other activities conducted in 2024 included the following:

- **Repository Operation:** Operation of the Canyon Complex Repository/WCA (see separate section in this report titled “Contaminated Waste Disposal Areas and Management”).

South Fork Coeur d’Alene River Drainage/Upstream of Wallace, ID

In 2024, activities in the South Fork Coeur d’Alene River drainage consisted of the following:

- Conducted initial characterization and sampling activities in the Upper South Fork Coeur d’Alene River area (18 sites) located upstream of Wallace.
- Conducted surface water monitoring in the South Fork Coeur d’Alene River upstream of Wallace.

LOWER BASIN REMEDIES

The cleanup described in the 2002 OU-3 ROD for the Lower Basin includes actions for the wetlands and lateral lakes, the riverbanks, splay areas, and riverbed. These remedial actions, envisioned primarily as pilot studies, are being evaluated for implementation. The remediation objectives in the Lower Basin include reducing risks to human health and wildlife by reducing exposure to particulate lead and improving habitat quality in the CDA River system. Remedies that address human health or ecological exposure, coupled with continued evolution of our understanding of sediment transport and recontamination in the Lower Basin, are interconnected with natural resource restoration actions.

In 2024, EPA and the CDA Trust finalized the Lower Basin Prioritization Plan which is published on EPA’s website (<https://semspub.epa.gov/src/document/10/100589579>). The Lower Basin Prioritization Plan provides an initial approach to the prioritization of remedial actions in the Lower Basin. EPA and the CDA Trust will reevaluate the prioritization of Lower Basin remedial actions annually in the prioritization and 10-year plan for both Upper and Lower Basins.

Gray's Meadow Remedial Action and Restoration

In 2024, EPA continued work on the Gray's Meadow (formerly Black Lake Ranch) project. Gray's Meadow is a collaborative effort between the EPA, the CDA Trust and the Restoration Partnership with Idaho Department of Fish and Game as the landowner, to remediate and restore approximately 700 acres of publicly owned contaminated agricultural land to clean, diverse, productive wetlands and riparian waterfowl/wildlife habitat.

In 2024, progress on the Gray's Meadow project included:

- Cultural resource monitoring activities for both the Cave Lake and Lamb Peak Wetlands.
- Localized dewatering of the Cave Lake and Lamb Peak Wetlands.
- Construction of ten water control structures in the wetlands to convey and control water surface elevations within the wetlands.
- Excavation and hauling of approximately 430,000 cubic yards of soil that were consolidated on site and used to build twenty-five loafing islands and five miles of water control berms to create the wetland basins.

For more information on restoration projects that were implemented (or initiated) in the Lower Basin, please refer to the Restoration Partnership section of this report.



Aerial view of Cave Lake Wetland. Photo Courtesy of CDA Trust.

Lead Bioaccessibility

In 2024, EPA continued studies related to lead bioaccessibility and amendments, as well as metrics for measuring lead exposure in waterfowl as discussed in the BEMP section of this report. Several studies were completed or are ongoing including:

- A bench-scale treatability study with EPA’s Office of Research and Development (ORD) to explore the application of jarosite-based remediation technologies to significantly decrease lead (Pb) bioavailability in contaminated soils. Bunker Hill soils were included among other Superfund site samples and treated using jarosite-based techniques via batch and soil column approaches, followed by subsequent speciation and X-ray mapping analyses at advanced synchrotron facilities. These data will be paired with in vitro bioaccessibility and mouse model in vitro bioavailability measurements to determine pre- and post-treatment efficacy. The research will enable continued development of PLJ-based remediation technologies as well as facilitate future field application. This is building off previous published work from ORD (DOI: 10.1021/acs.est.1c06067).
- Field studies measuring the effects of oxidizing and reducing conditions in seasonal wetland sediments on lead bioaccessibility were concluded and published (<https://www.sciencedirect.com/science/article/pii/S004896972408210X?dgcid=author>). The results show that both time of year and hydrology are important when considering metal exposure risks in contaminated floodplains.

River Channel Data Collection

In 2024, data collection efforts associated with the river channel included the following:

- Riverbank erosion pin monitoring at 63 locations in the Coeur d’Alene River. The number of monitoring stations per reach are below:
 - Cataldo Reach: 36
 - Dudley Reach: 12
 - Killarney Reach: 10
 - Springston: 5
- Completion of the 2024 Cataldo Riverbank 165.9 – 167.1 Pilot Project Design Investigation including the following:
 - Collection of soil and sediment samples for metals analysis and geotechnical testing from borings and test pits, collection of topographic survey information, evaluation of existing vegetation to aid future pilot project designs, and cultural resources monitoring during investigation work.



Cataldo Riverbank Pilot Project. Photo courtesy of CDA Trust.

STATE OF WASHINGTON PROJECTS

The Department of Ecology continued to monitor Spokane River beaches to ensure the continued protection of recreationalists and to track redeposition of contaminated material. Beaches were monitored using x-ray fluorescence equipment, and visually surveyed for evidence of usage or degradation of cap material. Results of 2023 comprehensive sampling were made available to the public and shared in BEIPC forums.

RECREATIONAL SITES PROGRAM

In 2024, work under the Recreational Sites Program included sampling, placement of access controls and installation of new signs, and public education/outreach activities for areas in both the Box and Basin.

Box Activities

EPA, DEQ, and PHD continued public outreach efforts to inform recreational users of ways to protect their health when recreating in areas where they may be exposed to contaminated soils and water. As part of the draft Box Human Health Recreational Exposure Management Strategy, information on more than 80 recreational sites in the Box were reviewed to determine whether site characterization or remedial action should occur. In addition, samples were collected from seven recreational sites during the summer of 2024. Remedial design and/or institutional control plans for certain sites will occur after results are reviewed.

Basin Activities

During 2024, work focused on recreational sites in the Lower Basin. EPA and the Coeur d'Alene Trust completed sampling at two recreational sites to determine if future cleanup or engineering controls are required. In addition, access controls were installed at two recreational sites to reduce exposure to contaminated soils and sediment, and seven signs were installed throughout the Lower Basin. Of these seven signs, six signs were installed at sites where signs were previously installed and had to be repaired, or additional signage was installed. One sign was installed at a recreational site for the first time. Installation locations included areas along the Coeur d'Alene River, informal river access points, and beach areas.

EPA and the CDA Trust continued to evaluate other recreational areas in the Upper and Lower Basin for future cleanup work.



Recreational signs at West of the Blue Lake and Rose Lake adjacent to the Coeur d'Alene River. Photos courtesy of CDA Trust.

BASIN ENVIRONMENTAL MONITORING PROGRAM

The Coeur d'Alene Basin Environmental Monitoring Program (BEMP) supports the Bunker Hill Site's OU2 and OU3 decision documents by establishing a site-wide environmental monitoring plan for the collection, analysis, and interpretation of environmental data. Environmental data includes surface water, sediments, groundwater, and biological resources. The goal of the BEMP is to provide a framework for how the environmental monitoring data will support management goals, guide and prioritize remedial actions, and document progress toward Remedial Action Objectives (RAOs).

Programmatic Plan

In 2021, the BEMP Programmatic Plan was updated to optimize how environmental monitoring requirements in OU2 and OU3 will be met. This environmental data is used to assess long-term trends of contaminants in site media, evaluate the effectiveness of pilot projects and remedial actions, evaluate progress toward meeting RAOs, and improve the understanding of

environmental processes in the Coeur d'Alene Basin. The BEMP Programmatic Plan incorporates adaptive management principles to provide flexibility and is anticipated to evolve over time during the cleanup and is structured into three geographically based tiers that range in size from the narrow focus of cleanup actions at specific sites to a Basin-wide focus to see the "bigger picture." These geographically based tiers include:

- Site-specific Remedial Action (RA) effectiveness and performance monitoring,
- Area-wide monitoring, and
- Basin-wide long-term monitoring.

Site-specific RA effectiveness and performance monitoring is geographically the smallest tier with a focus on sites with implemented RAs and waste consolidation areas/repositories and the effectiveness on groundwater, surface water, sediments, and biological resources. Area-wide monitoring focuses on geographical areas encompassing multiple source sites with a wider focus on changes in an area from cumulative remedial actions. Area-wide monitoring focuses on ecological and biological monitoring as applicable to the area (birds, fish, and/or benthic macroinvertebrates). Area-wide examples include watersheds, wetlands, lakes, and river reaches (e.g., Ninemile Basin, Canyon Creek Basin, and the Lower Basin). Site-wide monitoring is geographically the largest tier as it focuses on surface water throughout the entire BHSS. RA effectiveness monitoring plans are created for each monitoring tier as specified in the BEMP framework.

Multi-Agency Collaboration

An interagency workgroup consisting of technical staff from DEQ, USGS, USFWS, the Coeur d'Alene Tribe, the Coeur d'Alene Trust, and EPA meets annually to share and review basin-wide environmental monitoring results. This collaboration encourages all partners to stay updated on the wide variety of projects and research being conducted. The annual workgroup meeting also allows for the opportunity to discuss data trends and make recommendations for future actions. The workgroup assists with the development of environmental monitoring plans, such as the Canyon Creek Basin Area-Wide Remedial Action Effectiveness Monitoring Plan prepared in 2023 and the upcoming Lower Basin Area-Wide Remedial Action Effectiveness Monitoring Plan (anticipated in 2025).

Environmental Monitoring

Environmental monitoring conducted in 2024 is outlined below:

Surface Water

In 2024, the USGS collected water quality samples from 20 sites as part of the surface-water BEMP. Four sites in OU-2 were sampled twice. Sixteen sites in OU-3 were sampled under a variable frequency schedule ranging from four to twelve times per year. Sampling up to twelve times per year is expected to help better characterize conditions in the Lower Basin and inputs

to Coeur d'Alene Lake, which was recommended in the 2022 report from the National Academy of Sciences, Engineering, and Medicine (<https://nap.nationalacademies.org/catalog/26620/the-future-of-water-quality-in-coeur-dalene-lake>).

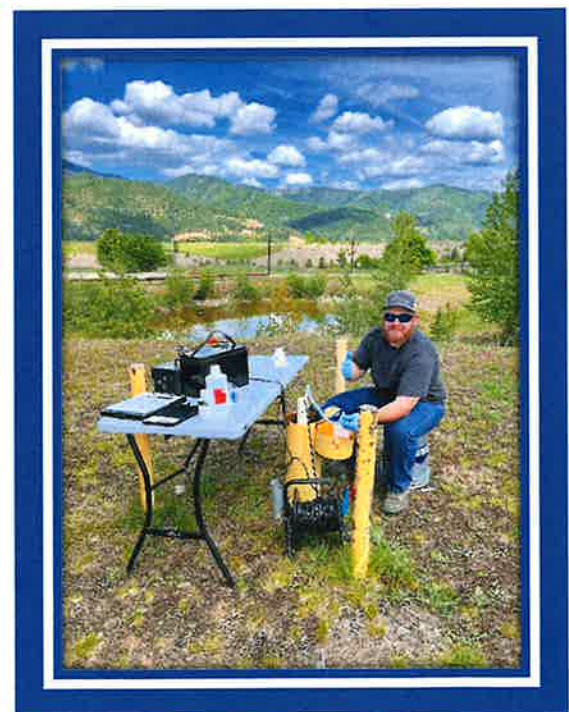
Samples were collected during a range of hydrologic events: peak runoff conditions in early May, baseflow conditions in September, and fall storm conditions in November. All samples were analyzed for nutrients, selected trace metals and major ions, and suspended sediment. In addition, 32 samples were analyzed for total and filtered mercury. Sixteen samples were analyzed for constituents (dissolved organic carbon and additional cations and anions) needed for the last year of evaluation for the biotic ligand model to calculate the state of Idaho copper criteria. Three OU-3 sites were also sampled two additional times (during winter low flows in January and runoff recession in July) to help evaluate efficacy of the groundwater collection system.

Twelve of the sixteen OU-3 sites are collecting continuous streamflow data and are telemetered with real-time streamflow access. Information can be viewed at <https://waterdata.usgs.gov/id/nwis/rt>. All gaging station stream discharge and water-quality records for the BEMP gages for water year 2024 are worked up, approved, and furnished electronically at <https://waterdata.usgs.gov/id/nwis/current/?type=BEMP>. The annual data summaries will be completed and delivered to EPA during the first quarter of calendar year 2025.

Groundwater

Groundwater monitoring continued for remedy effectiveness monitoring of the Groundwater Collection System (GCS) at the CIA. During high flow conditions in May, 91 groundwater sites were sampled including 59 monitoring wells, 3 piezometers, and 9 extraction wells. During base flow conditions in October, 95 sites were sampled including 72 monitoring wells, 3 piezometers, and 9 extraction wells. In 2024, additional groundwater and surface water samples were collected for Government Gulch to improve site characterization including groundwater and surface water interaction.

The laboratories analyzed samples for metals, phosphorus, and other parameters. Sampling was conducted to capture baseline data across the site that reflects the conditions of groundwater quality



BEMP sampling. Photo courtesy of EPA.

following stabilization of hydrogeologic conditions to full GCS pumping operations and to characterize groundwater quality at the A-4 Gypsum Impoundment. EPA and DEQ are currently reviewing preliminary data from the 2024 baseflow sampling event which will be evaluated in the 2024 Annual Groundwater Quality Report for OU 2. Water level monitoring continued through 2024 with approximately 72 in situ transducers installed across the site; water level data will also be incorporated into the Annual Report. The next water quality monitoring effort will be performed during high flow conditions around April/May 2025.

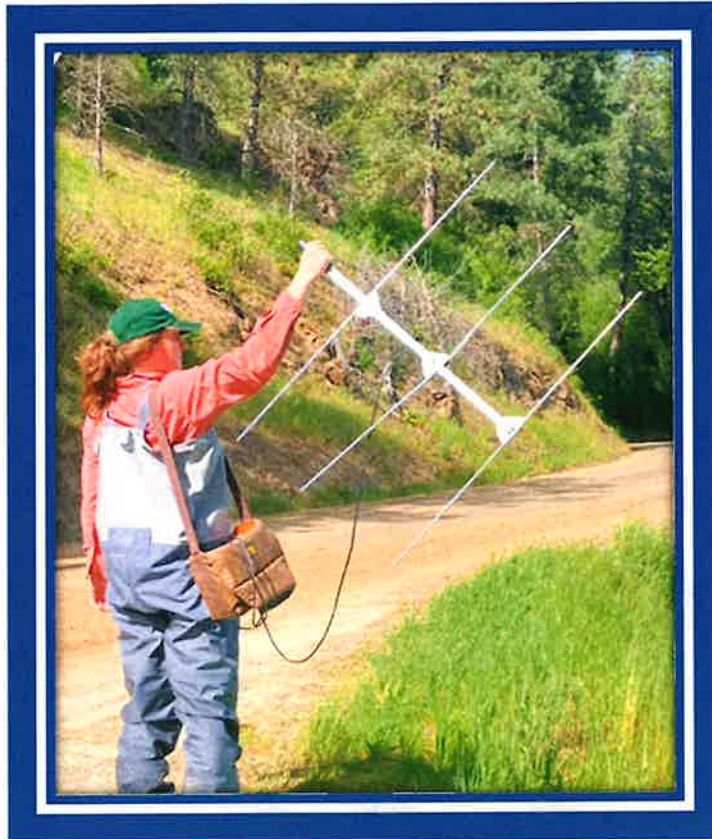
Suspended Sediment

Suspended sediment sampling is conducted to obtain information regarding the amount and characteristics of sediment being transported at specific times and locations in the river system. The CDA Trust currently collects suspended sediment samples opportunistically by boat during high-flow events only. The river flow threshold criterion for conducting opportunistic sampling of suspended sediment is approximately 8,000 cubic feet per second (cfs) at Cataldo (USGS station 12413500). The Water Year (WY) 2024 flow at Cataldo did not meet the flow threshold criterion for conducting boat-based sampling.

Biological Resources

The USFWS conducted annual waterfowl surveys from early February to late April in Lower Basin floodplain wetlands, recording observations of waterfowl use and tundra swan mortalities during the spring migration. In 2024, EPA scientists continued working with state, federal, and Tribal partners on a collaborative effort to monitor migratory birds that rely on Coeur d'Alene river basin resources for survival.

An EPA-lead waterfowl study expanded in 2024 to include both tundra swan and wood ducks monitoring. As swans forage deeply for rooted aquatic plants, they incidentally ingest contaminated sediment with lead concentrations that can be many times greater than the concentration considered safe for waterfowl, often leading to impairment and death. Wood ducks' nest throughout the Lower Coeur d'Alene river basin and forage on invertebrates in shallow sediment, providing the study with a different exposure indicator of Pb contamination compared to Tundra Swans. The objective of the study is to develop efficient and cost-effective surrogate monitoring tools for swans (feces) and wood ducks (eggshells) to allow for long term tracking of remedy effectiveness. It will also provide information for project remedial design to ensure waterfowl most susceptible to lead exposure access clean areas preferentially instead of unremediated wetlands with high lead concentrations.



USGS field technician conducts telemetry survey for radio-collared wood ducks in the Lower Basin. (photo credit: USGS)

Data Management

Data management is an ongoing process that requires utilization of an interagency workgroup for implementation to ensure consistency, completeness and consensus of data warehoused. Under the 2023 interagency Bunker Hill Site Data Management Plan (DMP), data and access platforms continue with ongoing development. Until these tasks are complete, stakeholders can make specific data requests to the EPA Remedial Project Manager (Jennifer Crawford) associated with the work being conducted.

2024 Work Accomplishments Part 2: Other BEIPC Activities and Responsibilities

LAKE MANAGEMENT ACTIVITIES

The Coeur d'Alene Lake Management Plan (LMP), developed by the CDA Tribe and DEQ, was finalized in 2009. Since then, the CDA Tribe and DEQ have been implementing core aspects of the LMP such as water quality monitoring, modeling, nutrient source inventory, and education/outreach.

In 2018, the CDA Tribe asserted that the LMP has been inadequate, as implemented, as an effective tool to protect water quality in the Lake. The CDA Tribe withdrew their support of the LMP, as an alternative to a CERCLA remedy, in 2019. DEQ continues to implement the LMP.

National Academy of Sciences & Coeur d'Alene Lake Advisory Committee

In 2019, at the Our Gem Coeur d'Alene Lake Symposium, Idaho Governor Brad Little called for a neutral third-party review of Coeur d'Alene Lake data to take a closer look at observed water quality trends to guide management decisions moving forward. In 2020, the State of Idaho, Kootenai County, and EPA sponsored a contract with the National Academy of Sciences, Engineering, and Medicine (NAS) to conduct this review of Coeur d'Alene Lake data. The final report was completed in 2022 (<https://www.nationalacademies.org/our-work/the-future-of-water-quality-in-coeur-dalene-lake>). Observations and recommendations from the NAS report will help inform an appropriate response to undesirable water quality trends.

One recommendation from the NAS was the need to better coordinate data collection, utilization, and reporting throughout the basin. DEQ convened a Science Coordination Team (SCT) in 2023, including representatives from DEQ, the CDA Tribe, EPA, USGS, and the University of Idaho. The SCT will be instrumental in guiding scientific efforts related to management of Coeur d'Alene Lake and in working through the other recommendations included in the NAS report. In the meantime, DEQ staff continues to operate under the 2009 LMP.

While the NAS review was underway, recognizing community concern that on-the-ground action needed to occur, Governor Little launched the Leading Idaho Initiative for Coeur d'Alene Lake. This initiative provided funding for projects throughout the Coeur d'Alene Basin intended to reduce phosphorus loading to the lake. Between 2020 and 2024, \$35 million dollars was allocated for this purpose. Governor Little appointed the Coeur d'Alene Lake Advisory Committee (CLAC) to prioritize projects proposed for this funding. Implementation of Leading Idaho projects is ongoing. The CLAC includes membership from the Coeur d'Alene Tribe, City of Coeur d'Alene, Kootenai County, Kootenai Environmental Alliance, Hagadone Marine, community business owners, a Coeur d'Alene lakeshore property owner, and members of the public at large.

Discussions among the CDA Tribe, IDEQ, and EPA related to NAS recommendations and future lake management activities are ongoing and may be shaped by deliberations of the SCT. The objectives outlined in the LMP and listed below continue while additional approaches to augment lake management work are being considered.

DEQ Lake Management Activities

IDEQ Lake management accomplishments in 2024 consisted of the following activities:

Science Core Program

- Filled three vacancies on the lake management team and commenced training.
- Routine CDA Lake core monitoring.
- Coordination with AVISTA, the Idaho State Department of Agriculture (ISDA), and CDA Tribe staff on aquatic plant surveys and responses to infestations of aquatic invasive species.
- Coordinated with the University of Idaho on a continued wave/wake study to better understand the impacts of waves on nutrient and metals entrainment into the water column in Coeur d'Alene Lake. This study is partially funded by Kootenai County.
- Conceptual model report editing continued, describing the lake's structure and mixing. The report incorporates river hydrography, DEQ electronic sonde data from 2014 – 2019, lake wind fields, preliminary AEM3D modeling, and data from a stable isotope study from 2015 into a physical description and analysis of the lake's structure and mixing. Staff at DEQ are incorporating edits from SCT review of the draft. A final report is expected in 2025.
- Participated in Science Coordination Team (SCT) discussions to develop SCT priorities. The SCT will eventually address the NAS recommendation for better coordination of basin science efforts. The team is also helping facilitate an EPA-led initiative to get better transparency/access to basin data by the public.
- Coordinated with Alta Science and Engineering to conduct a risk-based evaluation of recreational areas around Coeur d'Alene Lake and the Spokane River. Field work was completed in 2024, and a draft report is expected in 2025. This study was pursued in response to concerned citizens and a recommendation of the NAS review and is a more focused repeat of data collection and analyses performed in the late 1990s.
- Coordinated with the Tribe, via the SCT, to develop a study design and proposal and perform field work for the Comprehensive Coring Project (previously referred to as the paleolimnological study). The Tribe is sponsoring this study, which is funded through the Restoration Partnership, Leading Idaho, and Avista funding allocated to the State of Idaho for water quality monitoring through their FERC license requirements.

Education & Outreach Core Program Activities

- Provided updates on Coeur d'Alene Lake management activities for a variety of community groups and the public.
- Participated in The Confluence Project (TCP) steering committee, teacher workshops, classroom activities, and field trips for high school students (including the Youth Water Summit).
- Participated in the Our Gem Coeur d'Alene Lake Collaborative (OG Collab), providing regular articles to the CDA Press related to the lake, including Leading Idaho information and updates.

- Provided Leading Idaho updates to the CLAC.
- Participated in the Coeur d'Alene Regional Chamber of Commerce Natural Resource Committee and their Local Gems program.
- Coordinated with the Bay Watchers program, organized by the U of I through the Idaho Water Resource Research Institute, exploring ways to expand volunteer monitoring.
- Participated in the Panhandle Stormwater and Erosion Education Program (SEEP) steering committee and assisted in delivering educational programming related to water quality to the construction/development community.

Nutrient Inventory/Reduction

- Continued analyzing tributary data collected for 11 tributaries and 10 smaller drainages to CDA Lake to fill data gaps identified in the basin-wide nutrient inventory report.
- Coordinated with EPA staff to include phosphorus analysis in the Lower CDA River high river flow events study targeting suspended sediment sample collection.
- Coordinated with the CDA Tribe on their Leading Idaho award to fill data gaps in tributaries to the southern end of CDA Lake, including the St. Joe and St. Maries Rivers.
- Worked with recipients of Governor Little's Leading Idaho Initiative funding to implement projects throughout the basin to reduce phosphorus loading to CDA Lake. Project implementation began in 2021 and continued through 2024:
 - *South Fork Sewer District (SFSFD) tertiary wastewater treatment project*
A pilot test of the selected technology was completed and a groundbreaking took place at the site in Page in 2024. Construction for the necessary building and treatment area is expected to go out to bid in 2025.
 - *Santa-Fernwood wastewater treatment upgrade*
Land was purchased in 2024, and plans are under development for improvements and land application of treated wastewater.
 - *East Side Highway District roadway stormwater improvements*
Marmot Trail and Sunnyside Road work was completed in 2024.
 - *City of Coeur d'Alene Stormwater Outfall Volume reduction projects*
Three of four stormwater outfall capture/treatment projects are completed. The fourth outfall design is complete and was out for bid January 2025.
 - *City of Kellogg Stormwater Improvements*
Three outfall treatment projects are completed and a vac truck was purchased for stormwater system maintenance. Designs are complete for two more outfalls, which will go to bid in early 2025.
 - *Kellogg School District Stormwater Goes to School*
Construction of stormwater treatment improvements was completed 2024.

- *Kootenai-Shoshone Soil and Water Conservation District nonpoint source projects:*
 - Schlagel Draw – Beaver Dam Analogs were completed in 2023. Further erosion control/runoff improvements completed 2024.
 - Riverside Tracks (North Fork CDA River) bank stabilization project completed 2024.
 - Mica Creek Floodplain Restoration project – Final stabilization of floodplain reconnection was completed in fall 2024.
 - Wolf Lodge Creek erosion control/bank stabilization - on-the-ground work, including a culvert replacement and streambank willow plantings, was completed in 2024.

Partnerships with Other Entities

- Following recommendations of the NAS review report, worked with Alta Science and Engineering to convene a Coeur d’Alene Basin Science Coordination Team (SCT) to begin tackling basin-wide science questions related to CDA Lake. The SCT is comprised of scientists from DEQ, the CDA Tribe, USGS, the EPA, and the University of Idaho.
- Coordinated with AVISTA Corp to identify and prioritize projects to enhance wetland habitat, reduce stream/riverbank erosion, and improve fisheries throughout the Basin, in addition to monitoring aquatic invasive species in CDA Lake and tributary rivers.
- Participated in the Coeur d’Alene Regional Chamber of Commerce Natural Resource Committee, the OG Collab, Panhandle SEEP, the 4-County Natural Resource Committee, and other groups focused on water quality protection to facilitate communication and collaboration.
- Facilitated and participated in Panhandle Basin Advisory Group meetings.
- Organized/participated in Watershed Advisory Group meetings for the North and South Fork Coeur d’Alene River watersheds.
- Developed Leading Idaho project updates for the CDA Lake Advisory Committee (CLAC).
- Coordinated with EPA staff to include phosphorus analysis in the Lower CDA River high river flow events study targeting suspended sediment sample collection.
- Worked with the BEIPC Executive Director to provide Lake updates for the BEIPC.

This continued level of coordination with BEIPC forums maximizes opportunities for information exchange and advice, while recognizing that DEQ retains its respective decision-making authorities.

Coeur d'Alene Tribe Lake Activities

In 2022, Tribal staff worked with DEQ to assess the National Academy of Sciences priorities moving forward and worked with the CDA Lake Advisory Committee on ranking projects that were submitted from numerous stakeholders in the Basin. In 2023, the Tribe was awarded ARPA funding to initiate the implementation of the St. Joe Watershed Nutrient Assessment project through the end of 2025. In 2024, Tribal staff continued to participate in the Lake Science Coordination Team. The Tribe also began work on the Paleolimnological study of CDA Lake sediments in 2024 with DEQ, University of Oregon, Indiana State University, and other partners.

Discussions among the CDA Tribe, DEQ and EPA have continued in order to determine what additional mechanisms/actions are needed to manage the hazardous materials in the lakebed sediments. Therefore, although various aspects outlined in the LMP and listed below are essential to continue, additional approaches to augment work conducted under the auspices of the LMP are being reconsidered by the Tribe. These discussions are ongoing.

CDA Tribal Lake Activity accomplishments in 2024 consisted of the following staff activities:

Science Core Program

- Routine Lake water quality monitoring and modeling by the Tribe continued through 2024.
- Tribal staff continued their milfoil control program in southern waters during 2024, including bottom barrier and mechanical harvester treatments. The Tribe has also continued to monitor treatment efficacies and native plant community dynamics. Control efforts are focused at high-use public sites such as boat launches, swim areas, and boating lanes. Mechanical harvesting is used to remove nuisance aquatic vegetation from high-use sites at Benewah Lake, Chatcolet Lake, and Round Lake. Harvesting also helps remove an oversupply of nutrients from nearshore areas. The Tribe removed approximately 188,278 lbs. (wet mass) of aquatic vegetation in the summer of 2024, which translates to 74 lbs. (dry mass) of phosphorus and 373 lbs. (dry mass) of nitrogen.

Education & Outreach Core Program

- Throughout 2024, Tribal staff provided updates on Lake activities to a variety of community groups and made presentations to the public upon request.
- In 2024, Tribal staff worked with the Confluence Project (TCP) and Coeur d'Alene Basin high school science classes with hands on based research on water quality, groundwater, and snow water equivalency which included science field trips for high school students and teachers in North Idaho.

- The Our Gem CDA Lake Collaborative (Collaborative) worked throughout 2024 to provide regular articles in the CDA Press related to CDA Lake and water quality conditions to keep this subject present in the community. For more information on the articles visit: <https://www.uidaho.edu/research/entities/iwrri/outreach/our-gem/articles> . The Collaborative is made up of the Tribe, DEQ, U of I Community Water Resource Center (CWRC), Kootenai County, the BEIPC, and the Coeur d’Alene Regional Chamber of Commerce.
- Tribal staff continued to work with the CDA Regional Chamber of Commerce Natural Resource Committee to implement the “Local Gems” program.
- Tribal staff continued to collaborate with the U of I IWRRRI and agency partners to conduct Baywatchers workshops for CDA Lake Bay community involving volunteers/liaisons utilizing combined virtual and in-person meetings.

Lake and River Water Quality Sampling 2024

- Tribal staff continued to sample from the CDA River at Harrison, St. Joe River, Chatcolet Lake, and CDA Lake sampling locations.
- Tribal staff continued data analysis and writing the water quality reports for CDA Lake and the Tribe’s Limnologist continued calibration of the AEM3D CDA Lake model.

Partnerships with Other Entities

- Tribal staff continued to be involved in the Panhandle Basin North fork and South fork CDA River Advisory Group meetings as well as the Basin Advisory Group.
- Tribal staff worked with the BEIPC ED to provide Lake updates to the BEIPC during quarterly meetings upon request.
- Tribal staff continued coordination with local governmental entities and CDA Regional Chamber of Commerce Natural Resources Committee.

This continued level of coordination with BEIPC forums maximizes opportunities for information exchange and advice, while recognizing that the Coeur d’Alene Tribe retains their decision-making authorities.

RESTORATION PARTNERSHIP

The Restoration Partnership (Partnership) is a collaborative effort comprising the Coeur d’Alene Basin Natural Resource Trustees which are the U.S. Department of the Interior, represented by the U.S. Fish and Wildlife Service (USFWS) and Bureau of Land Management (BLM); the Coeur d’Alene Tribe (Tribe); the U.S. Department of Agriculture, represented by the U.S. Forest Service (USFS); and the State of Idaho, represented by the Idaho Department of Fish and Game (IDFG) and Idaho Department of Environmental Quality (DEQ). The Partnership’s primary mission is to implement a restoration plan to help restore the health, productivity, and diversity of injured natural resources from releases of mine waste contamination and the services they

provide in the Coeur d'Alene Basin for present and future generations. This includes compensation for lost human use services of those resources by developing and implementing projects under the framework of a Restoration Plan for the Coeur d'Alene Basin. The following Partnership activities occurred throughout the federal fiscal year 2024 (FY24):

The following RP activities occurred throughout 2024:

- The Partnership continued support for ongoing operations and maintenance by USFWS, Ducks Unlimited (D.U.), and private landowners for wetlands at the Schlepp Agriculture to Wetlands Conversion Project. The construction and implementation of this restoration project has been completed and Operations and Maintenance (O&M) is underway. For more information visit: <https://www.restorationpartnership.org/projects/schlepp.html>
- The Trustees coordinated quarterly reporting and site visits with the Project Sponsors and Project Leads as appropriate throughout FY24.
- Implementation of the following projects continued in FY24 and the expenditures are noted with a brief narrative of work that was completed.

Implementation of the following projects continued in 2023 and the expenditures for 2023 for each are noted with a brief narrative of work that was completed.

- **Wetland and stream enhancement at Cougar Bay on Coeur d'Alene Lake (BLM and USFWS sponsors)**
 - Funds Originally Allocated in 2018 and 2019 on Cougar and Johnson parcel jointly: \$407,000.
 - Amount Expended in FY24: \$3,267
 - FY24 Activities: 1) In the Spring and Fall of 2024 hand crews planted wetland nursery- stock spirea along the new channel. Wetland species included Nebraska sedge, Beaked sedge, Baltic rush, Small-fruited bullrush, Small-winged sedge, Creeping spike rush, Common rush, Dagger-leaf rush, Slender rush, Water birch, Geyer willow, and Douglas spirea. Upland species including snowberry were planted on the raised mounds, and 2) Noxious weed treatments targeting Canada thistle, common tansy, spotted knapweed and absinthe wormwood were conducted in May and June. Additional treatments to the reed canary grass on the edges of the floodplain. These treatments were intended to slow the invasion of reed canary grass into the floodplain and streamside areas.



Schelpp wetland after restoration. Photo courtesy of RP.

- **Guł Hnch'mchinmsh - Native Willow Nursery for Support of Restoration Actions throughout the Restoration Partnership Project Area (Tribe sponsor)**
 - Funds Originally Allocated in 2018: \$205,462
 - Amount Expended in FY24: \$1,872
 - FY24 Activities: 1) Coeur d'Alene Tribal staff provided survey information on potential harvest opportunities for the Tribe and the partnership, 2) Tribal staff provided up-to-date data on harvest opportunities, once the nursery is in second-generation growth and second-generation harvest opportunities, 3) Staff mowed reed canary grass to keep the rows of willows visible and accessible, 4) Allocations of willow harvest were determined and the numbers were shared with other RP sponsored projects and, 5) Coordination of harvest times was ongoing.
- **Culturally Significant Plants in the Hangman Creek (Tribe sponsor)**
 - Funds Originally Allocated in 2018: \$187,770
 - Amount Expended in FY24: \$154
 - FY24 Activities: 1) Camas seed and bulbs were harvested from the meadow within the Hangman Project Area that is most densely populated with camas and once the seeds and bulbs are harvested, they need to be used to the maximum benefit. Seeds will need to be germinated under controlled conditions in order to provide camas that can be successfully out planted, 2) the Coeur d'Alene Tribe's Ecology Program is looking to establish a horticultural program to focus on the propagation of native plants that should proliferate in the Hangman Watershed. Staff completed beaver surveys and dam reinforcements as well as installed plant protectors and, 3)

Partnerships with Bonneville Power Administration, AVISTA, and the USFS continue to be great efforts on this project.

- **Coeur d'Alene Lake Monitoring and Modeling (Tribe sponsor)**
 - Funds Originally Allocated in 2018: \$268,668 and FY24: \$75,000
 - Amount Expended in FY24: \$8,359
 - FY24 Activities: 1) Collected and analyzed water quality samples from 4 sites over an eight-month period as other Tribal budgets were used for the other sampling events, and 2) Continued data analysis and writing the synthesis report for Coeur d'Alene Lake.
- **Hepton Lake (Gul Hnch'mchinmsh) Wetland Restoration Planning and Implementation (Tribe sponsor)**
 - Funds Originally Allocated in FY18: \$ 210,900 and FY21: \$193,638
 - Amount Expended in FY24: \$55,137
 - FY24 Activities: 1) The Tribe, design engineers Alta Science and Engineering, and geotechnical engineering consultant STRATA, provided engineering and geotechnical support and construction oversight during the levee breach repair throughout this reporting period and, 2) The completion of major construction actions to repair the Hepton levee breach has allowed for management of local hydrology across 1,350 acres of wetland habitats to support a more diverse variety of native wildlife, waterfowl, and plant species. The project expands suitable habitat conditions for numerous waterfowl – most notably tundra swans, that use the area during critical spring and fall migration periods. Construction of the project is expected to increase optimal habitat for Sqigwts (*Sagittaria latifolia*), a high energy food (99 kcal/100g) that is also a significant source of minerals and vitamins in the traditional Coeur d'Alene diet, by more than fivefold. The project is well integrated with the Tribe's goal of recovering sustainable native fisheries – including threatened bull trout and westslope cutthroat trout, a species of special management concern – through management of habitats used by invasive species. The completion of construction has effectively precluded utilization of the site by northern pike, an invasive non-native predator, for spawning and early life stage rearing.
- **Wetlands restoration planning at Gray's Meadow (IDFG sponsor)**
 - Funds Originally Allocated in FY18, \$250,000 and FY22, \$5.25 M (remedial match provided by the Work Trust)
 - Amount Expended in FY24: \$4,012,830
 - FY24 Activities: 1) Nesting bird surveys continued weekly within the construction footprint through 8/1/24 to comply with the Migratory Bird Treaty Act and any located nests were marked and monitored through fledging or nest failure. Nest sites were marked as off limits to construction personnel/equipment, 2) Excavation, dike/access road construction, and island building continued including placement of wire mesh to block potential wildlife burrowing and placement of clean capping materials.

Placement of precast and construction of cast-in-place water control structures, backfilling and control gate installation started, and 3) Lamb's Peak water transfers were redirected from Lamb's Peak to the CDA River and a water management working group was formed to consult and recommend water management strategies that minimize water transfer effects on the CDA River/CDA Lake while still accommodating construction and wetland management needs.

- **Gene Day Pond Fishing Access (IDFG sponsor)**
 - Funds Originally Allocated in 2018: \$25,000
 - Amount Expended in FY24: \$3,211
 - FY24 Activities: 1) IDFG and BLM finalized the Right-of-Way agreement and, 2) If the weather allows, IDFG hopes to complete the project during the spring of 2025.
- **Conservation Easement, North Fork Coeur d'Alene River (IDFG sponsor)**
 - Funds Originally Allocated in 2021: \$600,000
 - Amount Expended in FY24: \$0
 - FY24 Activities: Palouse Land Trust had a near final CE document prepared for RP review which will provide permanent protection of the natural floodplain communities and cold water hyporheic flow.
- **Conservation of Agricultural to Wetlands Conversion Properties within Canyon Marsh (USFWS sponsor with the Inland Northwest Land Conservancy (INLC))**
 - Funds Originally Allocated in 2018 \$801,480 and in 2019 \$372,400
 - Amount Expended in FY24: \$8,695
 - FY24 Activities: 1) USFWS staff coordinated the development of the Scope of Work for the site with the collection of topographic, hydrologic, and soil agronomic data, 2) INLC resource reports for all three easements provided information on the baseline conditions of the properties prior to remedial and restoration actions that may be useful for future condition comparisons and, 3) the USFWS conducted annual waterfowl surveys at Canyon Marsh as part of EPA's Basin Environmental Monitoring Plan (BEMP); waterfowl use could be compared pre and post remedial/restoration to evaluate project success and inform adaptive management.
- **Conservation of Agricultural to Wetlands Conversion Property Gleason's Marsh (USFWS sponsor with INLC)**
 - Funds Originally Allocated in 2018: \$656,140
 - Amount Expended in FY24: \$16,528
 - FY24 Activities: 1) USFWS staff worked with the Inland Northwest Land Conservancy (INLC) to develop a baseline resource reports along with other administrative documents for the C.E and, 2) USFWS worked with EPA on remedial investigations with remediation planned for 2025 and 2026.
- **Lake Creek Watershed Restoration (CDA Tribe sponsor)**
 - Funds Originally Allocated in 2021: \$615,951
 - Amount Expended in FY24: \$76,980

- FY24Activities: 1) Tribal staff planted willow cuttings and native wetland grass mix was dispersed on site, 2) Restoration designs were finalized for treatment areas and staff developed specific measurable objectives and criteria for stream enhancement, taking into account the existing channel pattern, profile, dimension and the frequency and duration of floodplain engagement, and 3) The restoration treatments on West Fork Lake Creek and upper Lake Creek were implemented along with a rock grade control that was constructed at the downstream end of the project reach to raise the existing streambed within the incised channel, 3) The Tribe worked with the Worley Highway District (WHD) to finalize designs to replace the aging, undersized culverts located at WF Lake Creek at Idaho Rd and EF Bozard Creek at Weller Rd to improve fish passage and connectivity, and 4) All necessary permits were acquired.



In-channel and floodplain placements of large wood on upper Lake Creek. Photos courtesy of RP.

- **Prichard Creek Phase I: Conservation Easement and Restoration Planning (IDEQ sponsor with Idaho Forest Group and Trout Unlimited)**
 - Funds Originally Allocated in 2021: \$3,808,450
 - Amount Expended in FY24: \$1,602,348
 - FY24 Activities: 1) The Prichard Creek CE was signed by Idaho Forest Group which will protect 1,813 acres of upland forest, floodplain and Prichard Creek from future mining and development activities. This includes the entirety of the Prichard Creek Restoration Project, 2) The CE will contribute to the protection of wildlife corridors that provide connectivity along Prichard Creek, which is bordered on either side by federally administered forestlands and is known to serve a diverse array of wildlife species, 3) Project planning, invasive species management, and monitoring occurred and, 4) The

completion of Phase 1 construction has continued to make for more functional stream channel and floodplain wherein there was documented use in the project area by beaver and westslope cutthroat trout.

- **Upper Little North Fork Coeur d'Alene River (USFS sponsor)**
 - Funds Originally Allocated in FY23: \$400,000
 - Amount Expended in FY24: \$34,506
 - FY24 Activities: 1) Initial project work for Hudlow Meadows portion of the project area started in the summer of 2024 with sourcing of large woody debris to be used in meadow and stream restoration. The wood sourcing contract was awarded and is still active and will continue into FY25. The survey work for bridge design over Iron Creek (FSR 1532) has been completed and the design work was initiated using matching funds outside of the RP.
- **Upper St. Joe River Bull Trout Habitat Restoration (USFS sponsor)**
 - Funds Originally Allocated in FY23: \$8,000,000
 - Amount Expended in FY24: \$8,915
 - FY24 Activities: 1) Initial project work began in the summer of 2024 starting with initiating NEPA processes on two key components of the project and initiating survey and design work for replacing an undersized and deteriorating bridge that spans Red Ives Creek, 2) This Initial survey and design work is for replacing the undersized bridge that spans Red Ives Creek and removing the deteriorating bridge, and 3) Stream survey work and wood unit reconnaissance was ongoing to prioritize sections for restoration and to review potential units for large woody debris supply needs for restoration work.
- **Beaver Creek Watershed Enhancement (USFS sponsor)**
 - Funds Originally Allocated in FY23: \$2,430,000
 - Amount Expended in FY24: \$0
 - FY24 Activities: 1) Initial project work of this multi-phased and multi-year project began in the summer of 2024 starting in the headwaters of the tributaries utilizing funding sources other than Restoration Partnership funds this year.
- **Enhancing design to restore fish passage and ecosystem function in Miesen Creek (IDFG sponsor)**
 - Funds Originally Allocated in FY23: \$60,000
 - Amount Expended in FY24: \$23,946
 - FY24 Activities: 1) The engineer successfully completed hydraulic modeling, a key milestone for identifying and communicating the challenges facing Miesen Creek to potential grantors targeted for future implementation funding, 2) Planning meetings among IDFG, the USFS, Benewah County, and the landowner occurred, and 3) Section 106 of the NHPA was initiated.

- **Benewah Creek 'eltumish Stream and Wetland Restoration (Tribe sponsor)**
 - Funds Originally Allocated in FY23: \$455,316
 - Amount Expended in FY24: \$0
 - FY24 Activities: 1) No active field work was completed on this project during this FY however, monitoring infrastructure and survey/design work are anticipated occur during the first quarter of FY25.
- **Lake Creek Corridor Protection and Enhancement (Tribe sponsor)**
 - Funds Originally Allocated in FY23: \$83,750
 - Amount Expended in FY24: \$0
 - FY24 Activities: Tribal staff and Tribal leadership continued to meet with INLC and the landowner to finalize contract documents with INLC to advance the work needed for securing the Conservation Easement.
- **Big Creek Fish Passage Barrier Removal (Tribe sponsor)**
 - Funds Originally Allocated in FY23: \$214,400
 - Amount Expended in FY24: \$0
- FY24 Activities: Tribal staff along with BLM, USFS, Sunshine Mine, and the engineering contractor met to discuss project site survey results, draft designs, Section 7 NHPA Cultural Resource Investigation requirements, FEMA No-rise certification, 404 permitting timelines, NEPA Determination of No Effects requirements, and Right of Way permits previously secured with BLM.



Big Creek fish barrier. Photo courtesy of RP.

- **Assessing Fish Passage at Stream Crossings in the Coeur d'Alene Basin (IDFG sponsor)**
 - Funds Originally Allocated in FY23: \$50,000
 - Amount Expended in FY24: \$0
 - FY24 Activities: 1) IDFG contracted with Trout Unlimited to conduct field surveys under the previously approved Quality Assurance/Quality Control

(QA/QC) and this data will be uploaded into the national database for future RP and partners use in identifying fish passage barrier removal projects.

The paleolimnology of Coeur d'Alene Lake from pre-disturbance to mining impacts and present day- (CDA Tribe sponsor) was underway in FY24 utilizing other matching funds.

Total Funds Expended in FY24: \$5,856,748

- The full annual reports can be found on the website at www.restorationpartnership.org.

In FY24, the RP continued to update their Long Term Operation and Management plans for restoration projects as well as a Financial Strategic Plan. The Trustees plan to go out for future project solicitation in FY26.

Challenges Ahead

A great deal of work was accomplished across the Upper and Lower Basin in 2024. The cleanup and restoration efforts were focused on remediation of human health risks resulting from contaminated residential and commercial properties. This included extensive work by the CDA Trust in the EFNM Creek and Canyon Creek drainages and the Lower Basin that addressed ecological remedies and related human health issues. This year we reached a significant milestone by completing all of the prioritized remedial actions in EFNM. The EPA directed work to address the contaminated groundwater problems and mine discharges in OU-2 noted in the Upper Basin RODA. Human health related projects continue to be a priority with an additional focus on cleanup work in fish and wildlife habitat areas, and water quality improvements. The Restoration Partnership also continued moving forward with implementation of natural resource restoration actions in the Basin.

In addition to the work in the Upper Basin, the involved governments and agencies continue to develop project proposals to address Lower Basin human health and ecological issues. Because the CDA River system contains millions of tons of contaminated sediments, a portion of which is moving downstream every year, recontamination from annual flooding is a major concern for any project planned in the Lower Basin.

Major challenges ahead include:

- Development of any needed additional waste repositories and consolidation areas for disposal of remedial action and ICP wastes.
- Continued implementation of the RODA for the Upper Basin and OU-3 ROD for the Lower Basin.
- Development of a solution to major flooding issues in Lower Pine Creek, SFCDR and Main Stem of the CDA River.

- Continued coordination with the CDA Tribe and State's efforts to address CDA Lake management issues.

The ASARCO bankruptcy settlement continues to be the major source of funding for the environmental remediation actions in the Basin. Careful management will ensure that actions working to implement the Upper Basin RODA, Lower Basin OU-3 ROD, and any additional needed amendments will have funds available for the work that needs to be done. Additional funding will be needed to carry on remedial actions in the Box because funds from the ASARCO settlement cannot be used in the Box. Assuring sustainable funding intended to advance cleanup as planned continues to represent a significant challenge into the future.