

**Conceptual Wetland Mitigation Plan**  
**Wedge Expansion**  
**of**  
**Page Repository Area**  
**Smelterville, Idaho**

Prepared for:  
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**DRAFT FOR DISCUSSION**

## 1.0 Introduction

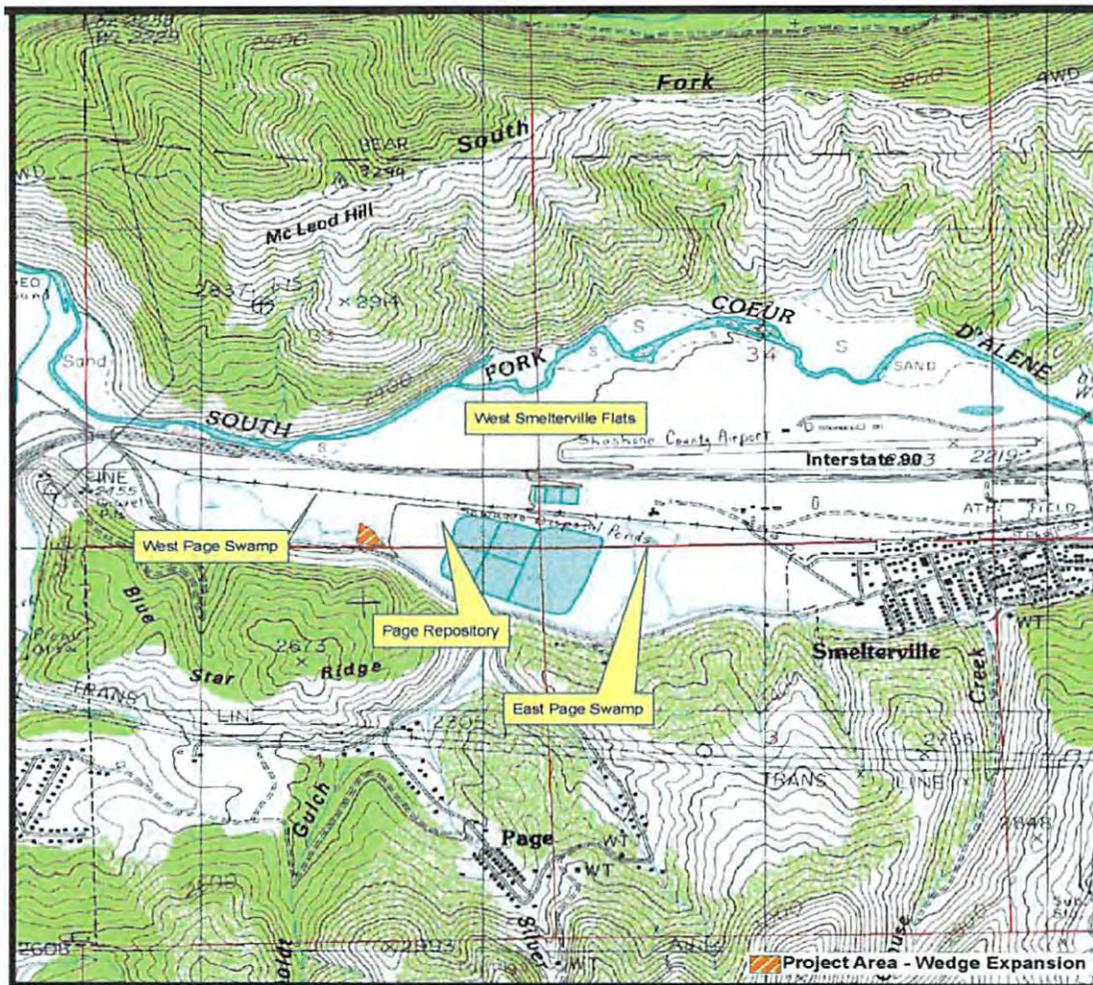
The Page Repository has been used for the permanent disposal of yard remediation waste from the Area 1 (populated), within the Bunker Hill Superfund Site (BHSS), since 1989. The yard remediation program within Area 1 has been completed and certified. The Consent Decree requires the Settling Defendants to make a soils repository available for all projects within Area 1 requiring the disposal of contaminated ROD material. In 1995, Page Repository began accepting contaminated material from Area 1 under the auspices of the Institutional Controls Program (ICP). In 1997, Page Repository also began accepting contaminated material from Area 2 (non-populated) under the auspices of the Institutional Controls Program (ICP). Page Repository, in its existing design from elevation 2200 to 2230 above mean sea level (AMSL), is approaching its capacity. In order to provide additional capacity the Wedge Expansion of the Page Repository has been proposed. The proposed Wedge Expansion will expand the existing repository footprint westward into the adjacent wetlands complex known as West Page Swamp. The expansion is as small as necessary and will square off the west face of the existing Page Repository. Disposal fill would cover a wetland area less than two acres within the complex. The wetland complex would be reduced by five percent in area with a reduction of about eleven percent in area of palustrine emergent wetland type. The location of Page Repository and Wedge Expansion is illustrated below in Figure 1.

The proponent has documented the analysis to explore avoidance and mitigation of impacts to the wetland and adjacent stream in a Clean Water Act 404 Analysis Report (UMG 2009). The result of the analysis is to conduct project mitigation on site to minimize impacts to the aquatic ecosystem as well as to conduct compensatory mitigation elsewhere for unavoidable impacts. Within this document is a conceptual plan with optional mitigation areas proposed for compensatory mitigation. It is intended to facilitate coordination between the project proponent and the regulatory agency and other stakeholders with the goal of reaching agreement on an acceptable approach for compensatory mitigation.

Described within this document are details of the project proposal, wetlands characterization and delineation, impact analysis (including mitigation sequencing), four alternative proposals for compensatory mitigation. A wetland function assessment was conducted for the impacted wetland area and the proposal areas for mitigation using the Montana Department of Transportation' Montana Wetland Assessment Method (MWAM). MWAM is a well tested assessment method and provides an objective and "measurable" approach to evaluating wetland loss and replacement (Berglund, J. and R. McEldowney 2008).

The Upstream Mining Group's (UMG) deliverable "Clean water Act Section 404 Analysis – Wedge Expansion of Page Repository" dated January 28, 2009 proposed a mitigation of "approximately two acres or more of existing wetlands would be improved or enhanced". The agencies response dated March 31, 2009 states; "EPA and DEQ have discounted the UMG's proposed wetlands enhancement project in the West Page swamp as insufficient mitigation for values lost through expansion." Therefore, UMG is not including enhancement in the West Page swamp as one of the four alternative proposals for compensatory mitigation.

Figure 1. Project Location - Section 4, Township 48 North, Range 2 East, Shoshone County



## 2.0 Background on Regulatory Environment and Requirements

Section 404 of the Clean Water Act (CWA) regulates discharges of dredged or fill material into waters of the U.S., including wetlands. The Army Corps of Engineers (COE) and Environmental Protection Agency (EPA) jointly implement and enforce the Section 404 program. Under Superfund authorities stated in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, (CERCLA, or Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA has broad authority over cleanup and enforcement activities and reserves ultimate authority over jurisdictional determinations (EPA 1994). CERCLA and EPA policy directs that Superfund's determination to discharged or fill material into waters of the U.S. should be based upon whether the discharge complies with CWA Section 404 (b)(1) and regulations as stated in 40 CFR 230.10. Under the regulation guidelines, no discharge of dredged or fill material shall be permitted if a practicable alternative exists that would have less adverse impact on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences (40 CFR 230.10(a)). If there are no practicable alternatives to the discharge, compliance can be achieved generally through the use of appropriate and practicable mitigation

measures to minimize or compensate for potential adverse impacts (40 CFR 230.10(d). "Practicable" is defined in 40 CFR 230.3 (q) to mean "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

Region 10 EPA has documented policy guidance in "Decision Framework for Determining CWA Section 404 Compliance at Superfund Sites" as documented in memos dated November 24, 1997, June 26, 2000 and March 6, 2000. The policy is that EPA's Office of Environmental Cleanup (ECL) assumes lead responsibility for assuring compliance with Section 404 (b)(1) CWA for Superfund sites. Determination of compliance is to be conducted in consultation with the Aquatic Resources Unit (ARU) in the Office of Ecosystems and Communities (EPA memo dated March 6, 2000).

### **3.0 Project Proponent**

Upstream Mining Group (UMG)  
6500 Mineral Drive, Suite 200  
Coeur d'Alene, ID 83815

Point of Contact: Paul L. Glader

### **4.0 Project Proposal**

The Wedge Expansion proposes to "square off" the west side of the existing footprint of the Page Repository as shown below in Figure 3 by placing fill in a triangular area between the southwestern toe of the existing fill and the Silver Valley Road (old Highway 10). A stream flowing from the Humboldt Gulch area passes under the Silver Valley road and into West Page Swamp. There is a 50-foot channel width maintained between the existing repository fill slope and the road. The outer limit of the Wedge Expansion will be similarly located as such to provide for about a 50 foot wide floodplain area for the stream. This would meet the requirement to pass a 100 year stream flow event.

The work would begin with a starter berm at the limits of the planned expansion. Best management practices (BMPs) to control erosion and sediment transport to the stream channel will be maintained at all times. As further explained in the 404 Analysis Report (UMG 2009), fill slopes of the expansion would be constructed at a stable angle of repose or 3:1 slope ratio. The ultimate top elevation of the expansion would match the current elevation of the Page Repository, or approximately 2230 feet above mean sea level. The length of the expansion alongside the stream margin is estimated to about 500 feet in length. Upon completion of the expansion, the area would be capped with suitable soil material and revegetated with white clover and fescue grasses.

**Figure 2. Proposed Wedge Expansion of Page Repository into West Page Swamp**



## 5.0 Project Impact Analysis

### 5.1 Methods

Field reconnaissance of the proposed Impact Area and proposed mitigation areas (excluding the St. Joe River location) was conducted March 4 and April 7, 2009. The hydrologic regime was observed on these dates as well as vegetation species and distribution. A wetland characterization report by TerraGraphics Environmental Engineering, Inc. (2008) provided vegetation, soils, Cowardin (1979) wetland classification, and wetland delineation for this report.

An internet search was conducted to review available information on the area and in general, environmental conditions and reclamation associated with the legacy of Bunker Hill and as it relates to the project area or proposed compensatory mitigation areas. Fish and wildlife monitoring studies conducted in 2003, 2004, and 2006 by USFWS were used to confirm presence/absence/abundance of species using West Page Swamp or likely to use this area. Threatened, Endangered and/or Candidate Species likely to occur were identified through Idaho Fish and Game's listings by county and from USFWS websites. Hydrogeomorphic classification was derived using the interagency classification

scheme and validated through A Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Riverine Floodplains in the Northern Rocky Mountains (Hauer et al 2002). The Montana Wetland Assessment Method was used to evaluate function and value upon recommendation of John Olson, Wetland Specialist, EPA Region 10. Observations made for the assessment are based upon both aerial photo interpretation and field reconnaissance.

## **5.2 Mitigation Sequencing in Project Planning**

Summarized is the Clean Water Act 404 Analysis (UMG 2009) for the Wedge Expansion with regard to options considered to avoid and minimize impacts to wetlands.

### ***Alternative Explored to Avoid Impacts***

Raising the fill height of the footprint of the existing Page Repository to the currently approved elevation of 2260 AMSL was explored as an option to avoid impacts. The project proponent believes expansion to 2260 AMSL is an available alternative. However, the landowner of the repository site, South Fork Coeur d'Alene Sewer District (Sewer District), has requested that the repository be held to its current elevation in order to maximize Sewer District use of the property.

Establishing an alternative repository site has been reviewed, including a large-scale lateral expansion of the exiting Page Repository. The Silver Valley is a narrow mountain stream valley where most level ground has been developed or is within the influence of stream floodplains or other environmentally sensitive areas. The search for an alternate repository site acceptable to all parties has been unsuccessful to date.

As a result, the only short-term practicable alternative may be the Wedge Expansion of the Page Repository, even though this alternative involves covering two acres of wetlands. Implementation of this alternative would allow IDEQ, EPA, and UMG several years to plan for future repository needs.

### ***Proposal's Approach to Minimize Impacts***

The Wedge Expansion proposal encompasses a plan to minimize overall impact. The following actions support this intent to minimize overall impact:

- Several differing long range volume estimates have been calculated for future disposal needs. Some of the material currently disposed is construction debris and is not contaminated Area 1 or Area 2 soils. Restricting disposal to Area 1 waste as originally intended by the Consent Decree, plus similar Area 2 waste, would dramatically reduce future capacity needs. The Wedge Expansion provides for immediate near term needs while the most acceptable solution is worked out for long term needs.
- Erosion/sediment control devices will be used to limit accelerated sediment delivery to the adjacent stream and to West Page Swamp.
- A berm will be placed at the outer limit of the new footprint to define the fill slope boundary.
- The existing stream channel will not be disturbed. The base of the new fill footprint will allow for floodplain width adequate for 100 year storm event.

- Location of the fill expansion is to impact about 2 acres of the most abundant wetland type in the complex. The expansion avoids impacting the more rare, Forest Wetland component.
- West Page Swamp contains contaminated sediments. USFWS (2007) finds that the Page complex is a significant and continuing source of waterfowl exposure to metals. This suggests that the loss of wetland habitat value at West Page Swamp may be less of a biological impact than for a similar wetland outside the Bunker Hill Superfund Site.

### 5.3 Impacted Wetland Area Evaluation

#### *Wetland Characterization and Watershed Scale Context*

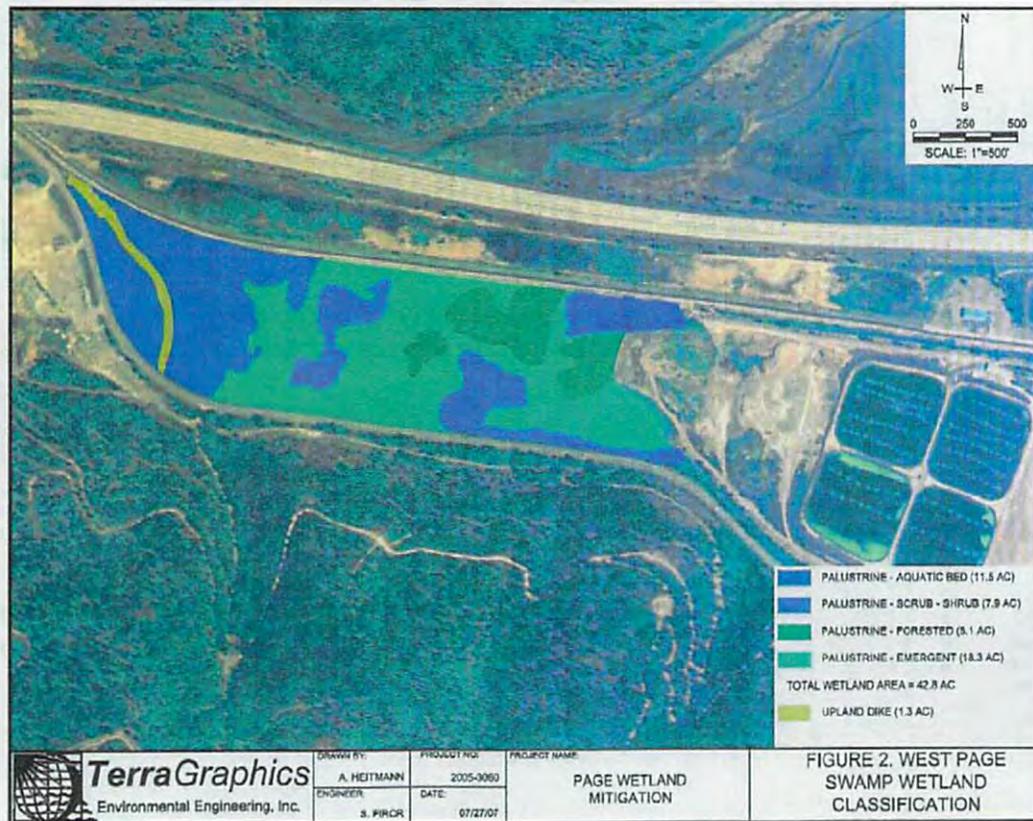
West Page Swamp is a legacy from a past mine tailings pond that supported the nearby Page Mines. The current hydrology for West Page Swamp is created by flow restriction at the mouth of the Swamp. Slope seepage and a stream flowing from Humboldt Gulch and Silver Creek watersheds are routed through concrete culverts under the Silver Valley Road to the Swamp area. These culverts appear to be "inlet controlled" as they were submerged at the time of field reconnaissance, April 7, 2009. The outlet is controlled by a weir at the west end of the wetland. Further alteration downstream of the weir cuts off any current and likely future surface flow connection to the South Fork of the Coeur d'Alene River (SFCDR). A small channel flows from the weir and then is dammed by the road fill of old Highway 10, subsurface flow reappears on the other side of this fill and then is dammed by another road fill from the new access road to the Coeur d'Alene Trailhead at Pine Creek. Subsurface flow reappears west of the Trailhead access road forming a surface channel that merges with Pine Creek. A relief channel constructed under the Pinehurst I-90 interchange and in the general area of the mouth of the Swamp directs runoff to the SFCDR but shows no evidence of flow nor appears to have the potential to do so with the existing situation.

Discounting this hydrologic alteration, the Hydrogeomorphic Classification (HGM) most closely aligns with the HGM classification, Riverine, as described in *A Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Riverine Floodplains in the Northern Rocky Mountains* (Hauer, et al 2002). The hydrology supporting the West Page Swamp area is a tributary to SFCDR and pre-alteration would have created a low gradient meandering channel across the SFCDR valley entering Pine Creek or flowing directing into the SFCDR. This scenario would have had the potential for small areas of palustrine emergent and aquatic bed wetlands but would have supported mostly scrub-shrub wetlands and forest wetlands created from abandoned channels and slope seepage. The potential for large expansive aquatic and emergent bed wetlands would have been low considering current valley gradient.

Wetland delineation of the West Page Swamp complex was completed by USFWS in 2005 and updated by TerraGraphics Environmental Engineering, Inc. in 2006 (TerraGraphics 2008). The entire wetland complex was measured at 42.8 acres with four distinct wetland types identified. Wetland types were classified using Cowardin et al. (1979) and delineated. The results are mapped and illustrated in Figure 3. Four wetland types were described; Palustrine Forested (5.1 acres), Palustrine Scrub-shrub (7.9 acres), Palustrine Aquatic Bed (11.5 acres), and Palustrine Emergent (18.3 acres). Soils were described as developed from river sediments and mine tailings overlain by organic material accumulated since inundation and that hydric soil indicators were present occasionally in the sediments.

The TerraGraphics (2008) study concluded that the West Page Swamp was unique and that the Forested wetland type was rare to the Silver Valley area.

Figure 3. The Wetland Delineation in 2006 as mapped by TerraGraphics, Inc. (TerraGraphics 2008)



Vegetation species diversity within the wetland types range from low to moderate. Diversity within the wetland complex is moderate to high. Dominant vegetation components were described in the study conducted by TerraGraphics (2008). Scrub-shrub wetland areas support thinleaf alder (*Alnus incana*) and spirea (*Spirea douglasii*). The emergent type is dominated by small-fruited bulrush (*Scirpus microcarpus*), common cattail (*Typha latifolia*), and creeping spikerush (*Eleocharis palustris*). The wetland classified as Aquatic bed is dominated by yellow pond-lily (*Nuphar lutea*) and pondweed (*Potamogetonacea spp.*). This area also contains stumps remnant of a previous western redcedar forest. The Forested wetland area is dominated by thinleaf alder (*Alnus incana*). The understory is composed of mostly spirea (*Spirea douglasii*) with small-fruited bulrush (*Scirpus microcarpus*) and common horsetail (*Equisetum arvense*). The forested wetland classification is atypical in that the forest is comprised of a species more typically thought of as a shrub, thin-leaf alder (*Alnus incana*) that has individuals exceeding 20 feet in height. Slope seepage areas adjacent to the Swamp support cottonwood (*Populus balsamifera var. trichocarpa*) and the old redcedar stumps within the Swamp suggests that the area has the potential to evolve toward a more typical forested wetland community.

Wetland characterization has in recent years recognized the importance of placing wetland characterization in a watershed context. Riverine valley bottoms are a complex of active floodplain, riparian wetland and small areas of transitory palustrine wetland evolving from aquatic to scrub-shrub type. Palustrine wetlands in this HGM are typically formed in abandoned stream channels with hydrology dependent upon access to recharge from floods, seepage from adjacent valley

sideslopes and/or perched groundwater flowing along stratified alluvial layers in the soil. The extent and type of wetlands is highly dependent upon confinement and gradient of the stream channel. Palustrine wetlands in the SFCDR watershed were likely very small and uncommon and only occurring in less confined areas behind stream valley niche points. Niche points cause changes in base level stream gradients and act as natural dams slowing the transport of sediments and broadening valleys. A niche point occurs near the mouth of Pine Creek causing a lower stream gradient upstream which has created the area known as Smeltonville Flats. It also made for a natural place for a dam to be constructed to utilize the area for mine tailings disposal in the early mining days of the Silver Valley. Alteration due to the history of the area has left few reference areas to predict the occurrence and extent of wetlands in the area. The Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Riverine Floodplains in the Northern Rock Mountains (Hauer, et al 2002) is a helpful reference as well as are nearby watersheds with less extensive alteration, such as the Upper St. Joe, North Fork of the Coeur d'Alene, and St. Regis Rivers. It seems reasonable to suggest that palustrine emergent wetlands in the SFCDR were uncommon and transitory. Downstream from Cataldo, the Coeur d'Alene River becomes lower gradient and unconfined and palustrine emergent wetlands are abundant. From a sub-watershed perspective, the project area palustrine emergent wetlands are unique and uncommon because they exist only locally near Smeltonville within the sub-watershed of the SFCDR but from a watershed and basin perspective they are not uncommon in the Coeur d'Alene Basin.

Between West Page Swamp and SFCDR, approximately 40 acres of palustrine wetlands, mostly aquatic bed and emergent type have been constructed on Smeltonville Flats as a result of a 200 acre SFCDR floodplain remediation effort in 1996 and 1997. Some of these wetlands appear to support evolution toward scrub-shrub type sometime in the future (White 2004) but currently this type is mostly re-establishing along the stream margins.

It is likely that wetlands in the position of the current West Page Swamp would have been temporal and transitional, much smaller in extent remnant from either tributary stream channel migration or at times when the SFCDR channel was on the south side of the valley. Today, the SFCDR is on the opposite side of the valley and its migration across the valley and its potential to provide flood hydrology to this location is remote due to development of major transportation infrastructure. Hydrology is primarily from slope seepage and the tributary stream from the Humboldt Gulch/Silver Creek area. The tributary stream would have supported a narrow riparian corridor of forested or scrub-shrub wetland type with areas with aquatic or emergent bed types forming in areas ponding slope seepage near steep valley sidewalls or along abandoned channels.

#### ***Functional Assessment***

Results of the Montana Wetland Assessment Method (MWAM) are in Table 1, Table 2. The Impact Area wetland functional unit score is 12.2 out of possible 22 prior to the Wedge Expansion. Post-Expansion the functional unit score is reduced by about half to 5.2 out of a possible 22.

The low score for pre-Expansion reflects the level of disturbance in the area, i.e., roads, the existing Page Repository, and soil contamination. The area does not support critical habitat for the federally listed Threatened & Endangered Species that may occur within the watershed. USFWS (2007) observed 308 songbirds from 44 species and 1944 individual waterfowl from 18 species within or near West Page Swamp, although waterfowl were observed less frequently in West Page Swamp than in the rest of the Page Complex. They appear to show a preference instead for the adjacent wastewater treatment ponds known as Page Ponds in 1999 (Audet et al., 1999 in USFWS 2007 and in 2006 (USFWS 2007). One of the waterfowl species is ranked S3 by Idaho Department of Fish and Game which increases the score for important species habitat. Less has been written regarding terrestrial wildlife but it is likely common game species such as deer, elk, and moose use the area. Some sign of their presence was noted during reconnaissance in the West Smeltonville Flat area. No

fish have been observed and the potential of restoring fish passage from the SFCDR is very low. The wildlife habitat scores were rated moderate to reflect existing uses. The fisheries habitat scores were rated low because of the limit to fish passage and because of sediment contamination by heavy metals.

Palustrine emergent wetlands are known as among the most productive wildlife habitats. They provide food, cover, and water for many species of birds, amphibians, mammals, and reptiles. In complex with other wetland types, the diversity of wetland plants provides structural diversity for many life requirements including reproduction and foraging. By appearances, the wetlands in West Page Swamp are some of the richest wildlife habitat per unit area in the Silver Valley. Essential to local context of wetland function and values is the environmental legacy associated with the historic mining practices in the Silver Valley. The Page Repository is unlined and is located at the margin of the West Page Swamp and the stream flowing from Humboldt Gulch. It is unknown whether water quality is influenced by drainage from the Repository. Sediment testing in West Swamp showed lead concentrations up to 26,800 mg/kg (McCulley et al 1994 in USFWS 2007). Burch et al. (1996) reported elevated metals in aquatic invertebrates and plants collected from West Page Swamp (USFWS 2007). Mean blood lead concentrations in mallard ducks collected nearby were suggestive of severe clinical poisoning in waterfowl (Pain 1996 in USFWS 2007). No decline in lead concentrations have been observed which caused USFWS (2007) to conclude that *"the Page complex appears to be a significant and continuing source of waterfowl exposure to metals of concern and we do not anticipate current conditions to improve unless further remedial or management actions are undertaken."*

Table 2, in Section 7.0, displays quantitatively MWAM scores for the Wedge Expansion prior to project implementation and as a result of impacts from the project. The results from the MWAM evaluation suggest that the greatest impact will be to waterfowl habitat, short and long term surface water storage, sediment/shoreline/toxicant removal and sediment/shoreline stabilization. The last three functions are more relative to Humboldt Creek and less so for the SFCDR because of restriction of flow at the mouth of the wetland. USFWS (2007) observed waterfowl using the created palustrine emergent and shrub-scrub wetlands in West Smelerville Flats which is suggestive that similar habitat is available nearby (within 1 1/2 miles) for displacement.

The MWAM scoring does not change between pre and post project for flood attenuation from Humboldt Gulch Creek. Although the Wedge Expansion will place additional fill about 500 feet in length paralleling the stream flowing to the Swamp, the design maintains adequate floodplain width to carry a 100 year storm flow event, or approximately 50 feet in width. This design will reduce risk of sedimentation delivered to the stream from the fill and reduce the potential for high flows eroding the toe of the fill.

Another measure of evaluation is the percentage of area to be impacted. The Impact Area comprises 5% of the West Page Swamp wetland complex and 11% of the palustrine emergent wetlands. Hence, wetland function attributed to the emergent wetland type is reduced by this amount. This approach assumes 100% loss of wetland function. Interesting that in the MWAM the reduction for Impact Area was only 31% when each function was evaluated separately. The standard approach to compensatory mitigation is no less than a 1:1 replacement for loss in area. The results of MBAM suggest that mitigation considering function would compensate for the 31% loss in function as a result of the impact. As state above, the largest losses revealed by the MWAM evaluation are waterfowl habitat, surface water storage, sediment management, and shoreline stabilization.

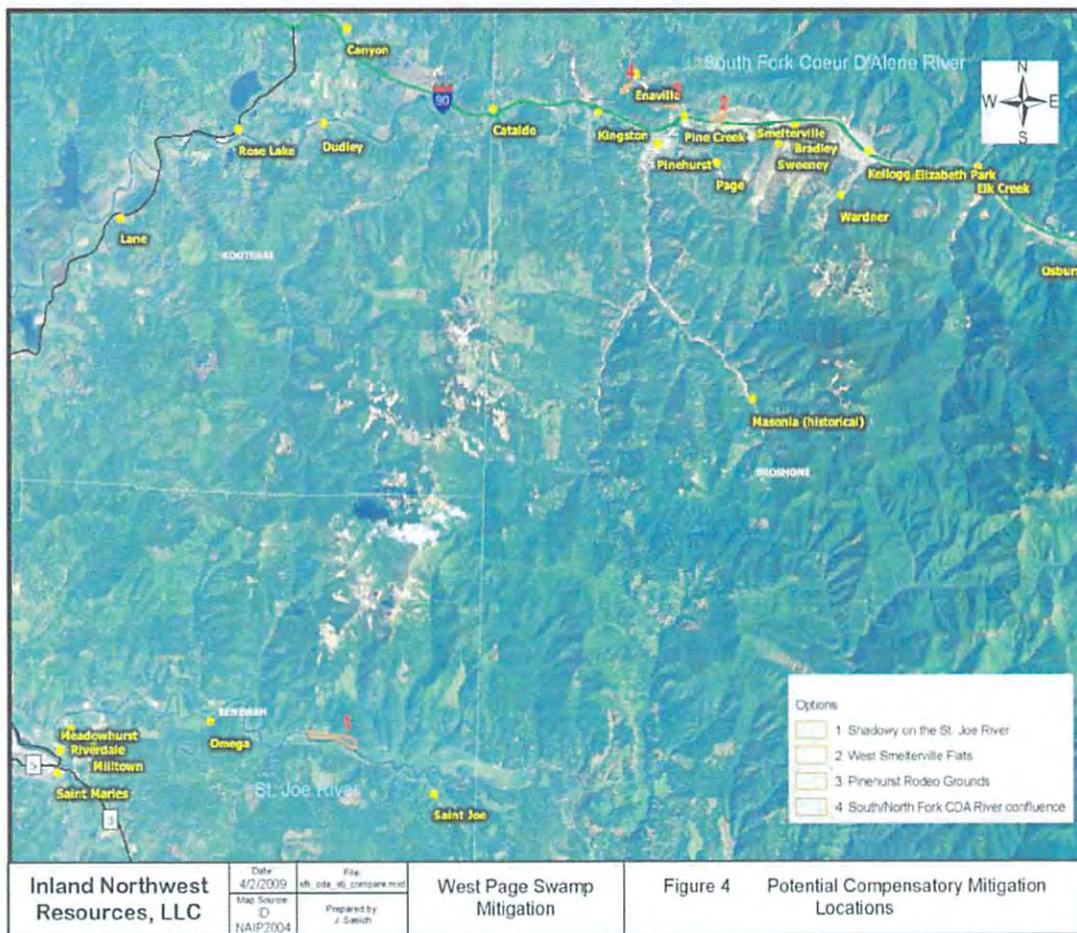
**Table 1. Project Area Wetland Function and Value Assessment Summary**

<b>Function &amp; Value Variables (MWAM 2008)</b>	<b>Rating (MWAM 2008)</b>	<b>Basis (MWAM 2008)/ Considerations</b>	<b>Project Impact on Function and/or Value</b>
A. Listed/Proposed T&E Species Habitat	Low	No T&E Species known to use the area for critical habitat.	No change
B. Listed Species in Idaho with S1, S2 or S3 Rank	Moderate	Hooded Merganser (S3) observed in adjacent wetlands. Potential for Tundra Swan (S1). Heavy metal contamination poses threat to reproduction and mortality. This threat is not factored in the rating.	7% reduction in available habitat within the wetland complex. Less than 3% reduction considering adjacent available habitat.
C. General Wildlife Habitat	Moderate	Secondary habitat. 44 species of migratory/songbirds observed (USFWS 2007). Perch/nesting habitat in adjacent upland forests, shrub-scrub and forested wetlands.	5% reduction in available secondary and incidental habitat for migratory birds within wetland complex. Abundant adjacent habitat.
D. General Fish Habitat	Low	Sediment and foodbase contamination is present;	No change.
E. Flood Attenuation	High	Low gradient tributary with large area available for flood attenuation.	Channel width will be maintained to pass 100 year flow. 5% reduction in surface area.
F. Surface Water Storage	High	No history indicated of surface overflow of wetland complex.	5% reduction in storage area.
G. Sediment/ Nutrient/Toxicant Removal	Moderate	Restricted outlet reduces outflow of contaminated sediments to SFCDR of Coeur d'Alene River.	No change.
H. Sediment/Shoreline Stabilization	High	Stream bank of Humboldt Creek is well vegetated and stable.	BMPs will control erosion and sedimentation.
I. Production Export/Food Chain Support (synthesis of aquatic/terrestrial)	Moderate	Conditions good for organic matter development/retention. Outlet restriction reduces transport. Diverse wetland complex creates horizontal and vertical structural diversity. Rating does not include heavy metal contamination hazard to food chain.	10% reduction of the emergent wetland type within the wetland complex. 5% reduction in overall wetland surface area.
J. Groundwater Discharge/Recharge	High	Ponding of Humboldt Creek potentially recharges valley aquifer.	No change.
K. Uniqueness	Low	The Impact Area is a single wetland type with low to moderate diversity. Man made emergent wetlands in the immediate area most likely exceed inherent potential for the geohydromorphology setting. Although unique within the sub-watershed, emergent wetlands are abundant downstream in the basin.	A 2 acre reduction in emergent wetland type. An overall 5% reduction in emergent wetland area in the Smeltonville area. This reduction is less than 1% for the Coeur d'Alene River Basin.

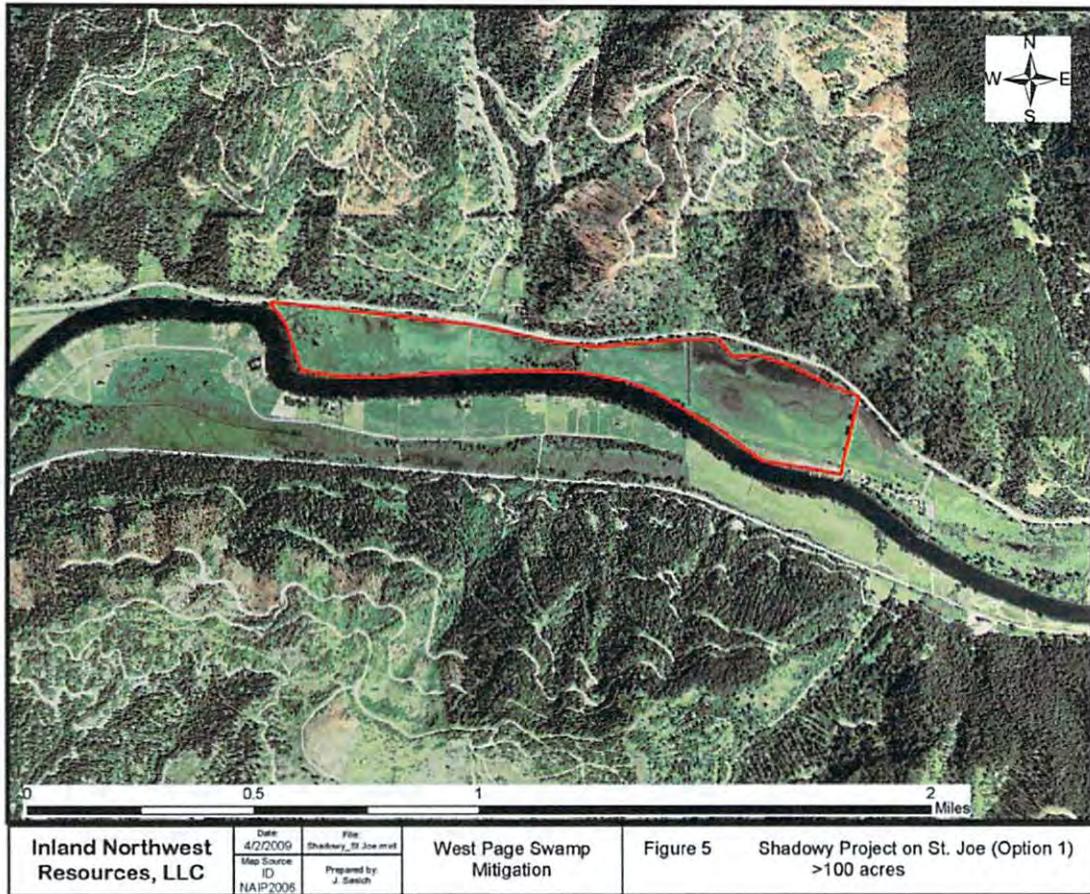
## 6.0 Proposed Alternatives for Compensatory Mitigation

The goal of compensatory mitigation is to assure that losses of wetland function/values are offset by gains in similar wetland function/value. It is desirable to replace "in-kind" a similar wetland type as near to the Impact Area as feasible. Selection of compensatory mitigation for this project requires consideration beyond "in-kind" and "nearby". Soils contaminated with heavy metals have been transported and deposited by floodwaters within and downstream of the Silver Valley. Creating or enhancing open water or emergent wetland habitat with remediation potentially attracts wildlife to new sources of contamination and may not be the best and highest use of compensatory mitigation. The following mitigation alternatives consider protection, restoration, and enhancement activities that will limit or avoid increases to biological exposure of contaminated sediments. Creation or restoration objectives are made within the context and interpretation of inherent hydrogeomorphic processes. Figure 4 displays locations of the four sites offered as selection alternatives for compensatory mitigation. Three sites are in the Coeur d'Alene Basin and one site is in the St. Joe River Basin.

Figure 4. Locations of Proposed Areas for Compensatory Mitigation



## 6.1 Option One - Shadowy Restoration Project - St. Joe River



**Size:** 100-160 acres and 1 1/2 miles of river frontage.

**Location:** Benewah County. St Joe River Basin. Approximately 10 miles upriver from St. Maries, Idaho.

**Description:** The site includes 1 1/3 miles of St. Joe River frontage and associated floodplain. Past agricultural land uses have altered hydrologic processes, fish and wildlife habitat, natural vegetation diversity, and nutrient cycling process. The floodplain has been drained, a tributary stream course has been channelized and straightened, and only a narrow stringer of riparian vegetation lacking of shade or habitat cover exist along the St. Joe River shoreline. Restoration planning is underway involving a collaborative effort with several partners with different motivations. Bonneville Power Administration (BPA) has purchased 62 acres for hydropower re-licensing mitigation; Avista Utilities Corporation (Avista) is looking to provide additional adjacent lands for re-licensing mitigation; US Forest Service, Idaho Department of Fish and Game (IDFG) and USFWS are involved under their specific governmental land management and regulatory mandates. The effort is being lead by IDFG. Other potential partners are Idaho Department of Environmental Quality and Environmental Protection Agency.

**Mitigation Objectives:** Restore surface and ground water processes of the floodplain by eliminating artificial drainage structures, creating and improving flood attenuation by constructing depressions, re-establishment of natural riparian vegetation, and restoring the floodplain and meandering stream channel of the tributary stream, Miesen Creek. Restore native riparian and wetland vegetation

including shrub-scrub, aquatic bed, and emergent types. Create cold water refugia habitat for fisheries including bull trout, a T&E listed species. Utilize the opportunity for community based education. Monitor progress and effectiveness of meeting restoration objectives. IDFG plans to provide their portion of lands for recreation use once restoration objectives are met.

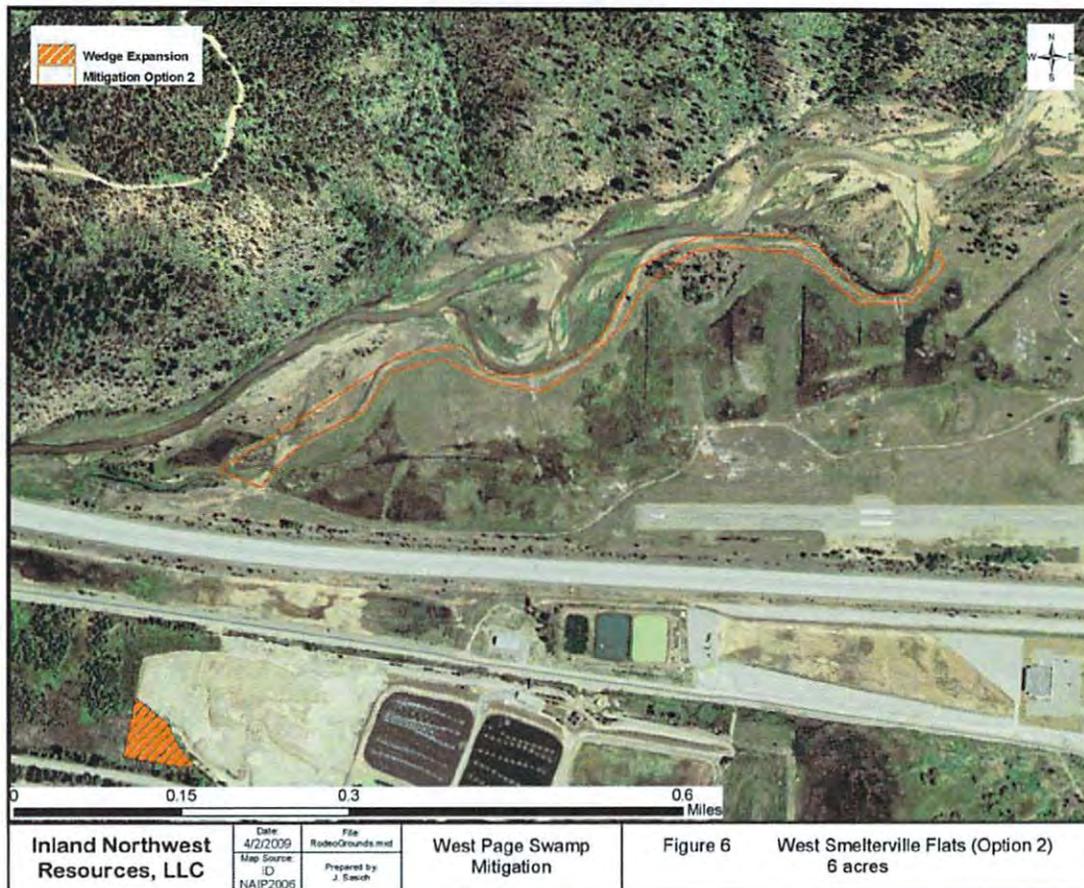
**Timeline:** A Memorandum of Understanding is to be drafted and signed by late Spring 2009. Survey and design is planned for completion by Fall 2009. Implementation is planned for Summer 2010.

**Upstream Mining Group's (UMG) Participation as Mitigation:** UMG would participate in signing the MOU agreement and committing monies over a specified period of time to assist with design, implementation, monitoring, and maintenance. Monies would be committed at a level commensurate with the 2 acre Wedge Expansion impact.

**Present and Future Administration:** Discussions to date indicate that technical expertise for the project will be partnered between US Forest Service, IDFG and USFWS. IDFG will administer restoration implementation, monitoring, public education, and long term maintenance of the area.

**Amenities of this Option for Compensatory Mitigation:** The size and physical attributes of this site offer exceptional potential to restore diverse, high quality palustrine emergent and scrub-shrub wetlands that exceed function and value of the wetlands impacted from the Wedge Expansion. Additional benefits are realized by restoring wetlands in a mosaic of other Riverine (HGM) habitats.

## 6.2 Option Two - West Smeltonville Flats - South Fork of Coeur d'Alene River



**Size:** 6 acres with an additional 20 acres of invasive weed control

**Location:** Shoshone County. South Fork of Coeur d'Alene River (SFCDR) watershed. Approximately 1/2 mile north of Page Repository and the proposed Wedge Expansion.

**Description:** The site includes about 1/2 mile of SFCDR floodplain and first level stream terrace. Remediation in 1996 and 1997 removed as much as 6 feet of contaminated soil and placed six inches of "clean" soil on the surface. The objectives were to reduce further human exposure to air and water borne soils contaminated with heavy metals. Flood attenuation ponds were constructed. Uplands were seeded to grasses. As described by T. White (2004), in 2000 and 2001, about 30,000 hardwood shrubs and conifer seedlings were planted, many of which have died from lack of follow up care. Cuttings of willows and cottonwood were placed on wetland perimeters some of which have survived. Over 40 acres of palustrine emergent wetlands exist with moderate diversity of vegetation. Reconnaissance for this project in 2009 observed that much of the floodplain and first level stream bank (the constructed flood attenuation berm) continues to lack woody, well rooted vegetation. Highly invasive plant species, Dalmation toadflax, knapweed and Canada thistle are increasing in the area.

**Mitigation Objectives:** Accelerate long term restoration of riparian floodplain wetland by restoring woody structure for stability and nutrient cycling. Native vegetation species known for providing

structural stability to stream banks would be established along the first level terrace riser and tread. Included in this objective is to accelerate restoration of the first succession of forested wetland community. Revegetation would incorporate "lessons learned" from the first revegetation effort in 2000 and 2001. The other objective would be to protect natural restoration processes already occurring in the emergent wetland and upland communities established in the first reclamation effort by controlling noxious and other invasive vegetation from competing with desired vegetation.

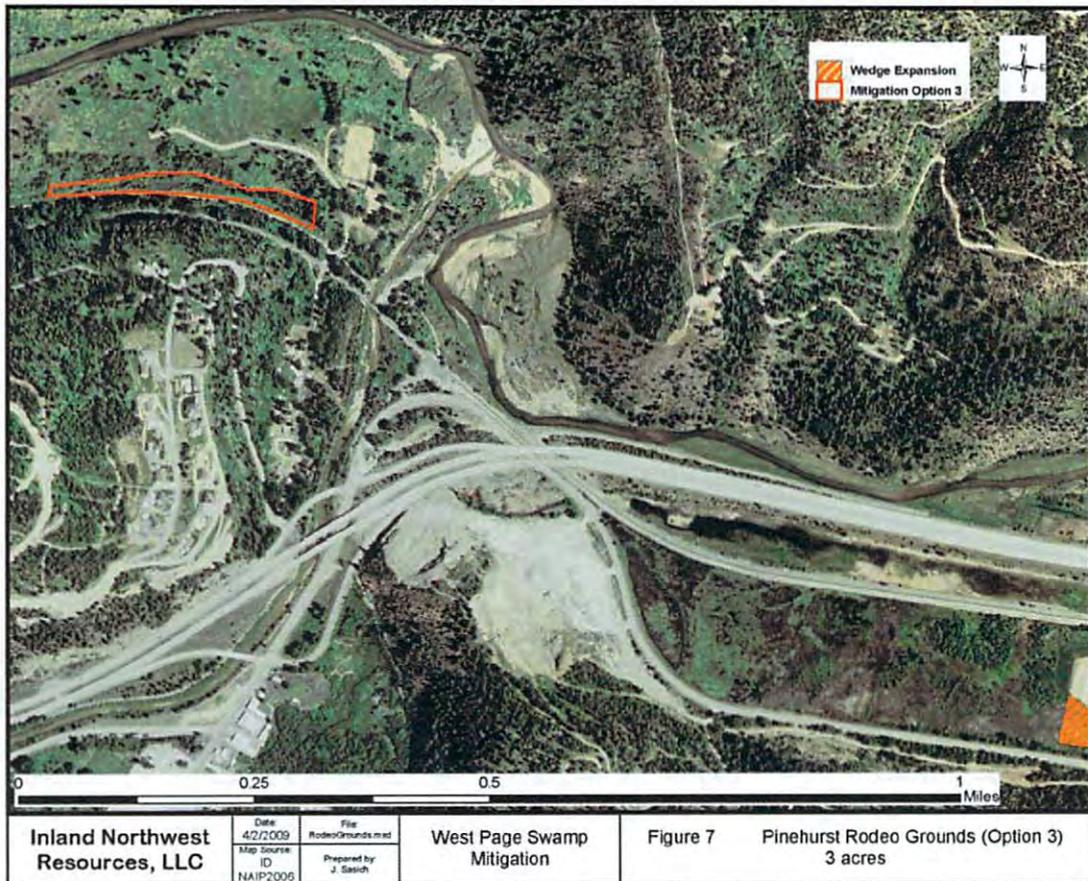
**Timeline:** Revegetation would take place in spring and Fall of 2009 and possibly Spring of 2010 depending on species availability. Weed control to take place in the Spring of 2009. Monitoring and repeated weed control will be conducted as necessary for five years. Monitoring and replacement depending on vegetation planting survival for five years or until establishment is confirmed.

**Upstream Mining Group's (UMG) Participation as Mitigation:** UMG would administer the project including monitoring and maintenance in coordination with the landowner, IDEQ.

**Present and Future Administration:** The area is managed by IDEQ for the long term for reclamation/restoration objectives as determined by Bunker Hill Superfund Record of Decision.

**Amenities of this Option for Compensatory Mitigation:** The site meets the requirement of being "nearby" the Impact Area. This proposal indirectly meets the "in kind" requirement by protecting emergent wetlands created for flood attenuation and upland communities from noxious weed competition. White (2004) found a 9 inch cap in some of the wetlands which is encouraging that some of these wetlands may be considered remediated and pose less hazard for waterfowl than the Page Complex. This proposal contributes to the restoration of Riverine processes that are lacking in the SFCDR, riparian scrub-shrub wetland and forest wetland type.

### 6.3 Option Three - Pinehurst Rodeo Grounds - South Fork of Coeur d'Alene River



**Size:** 3+ acres

**Location:** Shoshone County. South Fork of Coeur d'Alene River (SFCDR) watershed. Approximately 1 mile west of Page Repository and the proposed Wedge Expansion.

**Description:** This site offers a high amount of wetland complexity and hydrologic function. The site contains slope seepage and floodwater hydrology supporting a complex of small stringers of palustrine aquatic bed and emergent wetlands in mosaic with scrub-shrub wetland types. Mature cottonwood and mature conifers exists in the area. The site is downstream from the Silver Valley and has a layer of red-colored flood sediments along the SFCDR stream bank indicating heavy metal contamination. Open upland areas are densely vegetation with grass and shrubs. This reach of the SFCDR is known by local fisherman as a "great fishing hole". The Coeur d'Alene River Trail traverses through the northern edge of the property. The area was a 70-acre parcel that has changed ownership several times over the last 20 years or so, and has been recently subdivided and sold to three different landowners. A new access road and sewer line has been constructed and some of the parcels are for sale. Flood attenuation, water recharge, potential or existing fisheries rearing habitat, potential or existing waterfowl habitat, potential Bald Eagle nesting habitat and other general

wildlife habitat are functions of the area. Without sediment sampling, it is difficult to assess the degree to which sediments may be a hazard to waterfowl.

**Mitigation Objectives:** Protect existing emergent and aquatic bed wetlands from development impacts through establishing a conservation easement.

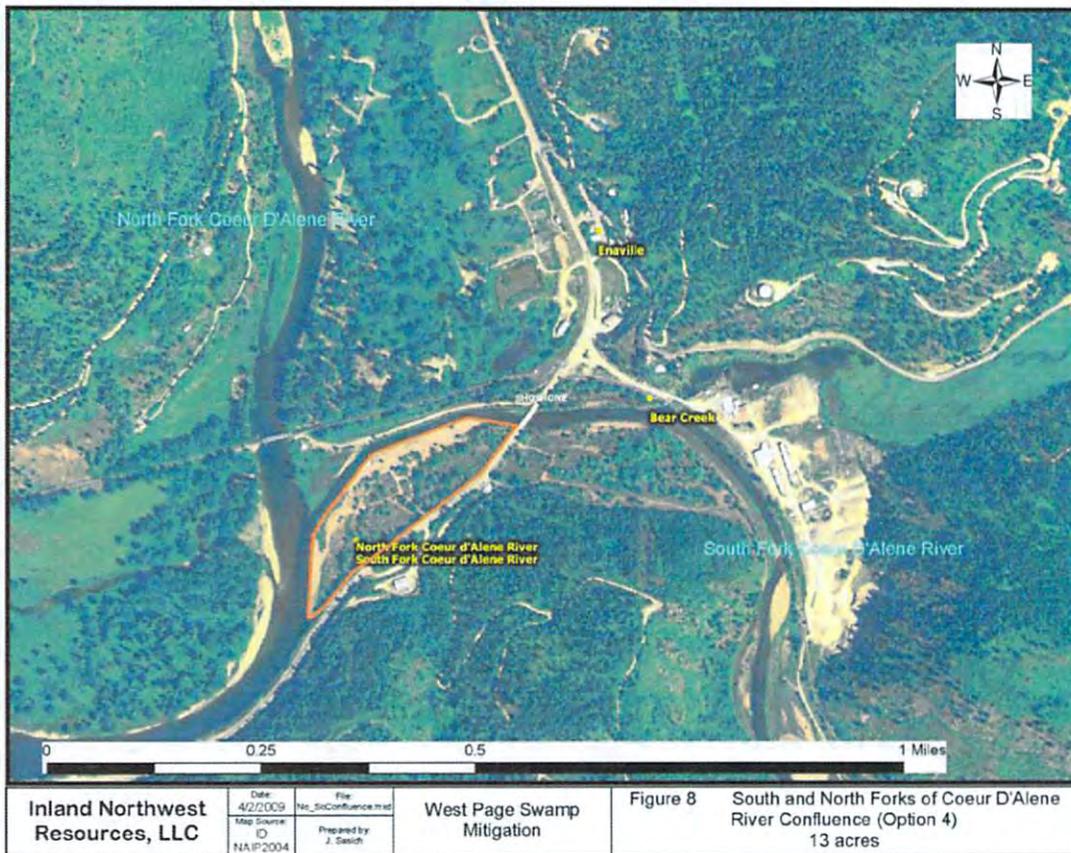
**Timeline:** The proposal of conservation easement has yet to be discussed with the landowners. The timeline would be contingent on their acceptance. If landowners are in agreement, conservation easements could be established by Fall 2009.

**Upstream Mining Group's (UMG) Participation as Mitigation:** UMG would finance processing of the conservation easement and any restitution to the landowners.

**Present and Future Administration:** The conservation easement establishes a permanent protection from other land uses in "perpetuity". Landowners retain land title.

**Amenities of this Option for Compensatory Mitigation:** The site meets the requirement of being "nearby" the Impact Area and "in kind". Its viability as a mitigation area is contingent on current landowner agreement to a Conservation Easement.

## 6.4 Option Four - Confluence of South and North Forks of Coeur d'Alene River



**Size:** 13 acres

**Location:** Shoshone County. Coeur d'Alene River Basin. Approximately 8 miles west of Page Repository and the proposed Wedge Expansion.

**Description:** The site is within the 100 year floodplain of the SFCDR between the mouth of Bear Creek and the mouth of North Fork Coeur d'Alene River. The area is currently ten percent sandbar and the remainder is a sandbar in a primary stage of succession toward deciduous forest and shrub. Trails and roads network the area and serves as a major access for fisherman. A small linear back water area forms an intermittently wet feature at the southern end of the parcel. The parcel is owned by Forest Capital Partners, LLC, a land trust marketing timber landholdings for recreational/residential development.

**Mitigation Objectives:** Protect existing natural floodplain processes including natural success of vegetation from alteration due to development by either purchasing property or by purchasing a lien on the property for conservation easement; controlling vehicular access through the property by constructing a fence and/or gate; and weed control if necessary.

**Timeline:** Purchase or conservation easement has yet to be negotiated with the landowner. Exploratory discussions suggest that the landowner would be in agreement to either conservation easement or purchase. It is estimated that transaction could take place by early Summer of 2009.

**Upstream Mining Group's (UMG) Participation as Mitigation:** UMG would finance processing of the conservation easement and any restitution to the landowners or purchase property. They would implement and maintain fencing and weed control as needed.

**Present and Future Administration:** The conservation easement establishes a permanent protection from other land uses in "perpetuity". Landowners retain land title. If purchased, UMG would seek a third party administrator. This property would likely be attractive to Ducks Unlimited.

**Amenities of this Option for Compensatory Mitigation:** Protects a relatively large area of floodplain within a Riverine complex where flood attenuation is critically important.

## 7.0 Discussion

The results of the MWAM show that all mitigation options satisfy, numerically, the replacement requirement of functions/values lost at the Wedge Expansion Impact Area.

Option One has the greatest overall functional score and offers the greatest diversity of wetland and riparian functions, associated with a tributary stream and a mainstem river. The area has components with similar hydrology, inflows and outflows of nutrients, and diversity of habitat as exists at West Page Swamp but at potentially a greater quality. This interpretation is support by the MWAM results.

The other three options are sites that have functions associated with a mainstem river without the inflows of a tributary stream. Options Two and Four have functions associated with riverine floodplains. Options Three and Four have seasonally ponded emergent wetland communities fed by flood waters and some shrub-scrub wetland type. Small areas within may be connected most years by river backwater offering the potential for rearing habitat. Option Two is the closest in proximity to the Impact Area and would provide displacement habitat for migratory birds. Restored riparian woody vegetation would improve nutrient cycling processes and provide structural habitat for shade, cover and longer term, creation of more in-stream diversity and pool habitat. Not an exact "in kind" match with the Impact Area, mitigation at Option Two restores basic riparian processes lost to Humboldt Creek and the SFCDR from development and historic mine waste impacts in the Silver Valley. Option Four is the greatest distance downstream from the Impact Area and is the least similar hydrologically to the Wedge Expansion Impact Area. This floodplain area is highly important for flood attenuation being located at the confluence of two large watersheds. The greatest gain from preservation through conservation easement or purchase would be from improved fish and wildlife habitat including for Bald Eagle and possibly Tundra Swan; species listed either federally and/or by the state of Idaho.

**Table 2. Comparison of Compensatory Mitigation Site Options using the Montana Wetland Assessment Method (MWAM) (Berglund, J. and McEldowney J. 2008) (Functional units = MWAM functional points x unit area (acres). A MWAM functional point is scored based on 1 being the highest value for function or value category. Existing condition represented by the left hand number in the column and the right hand number in parenthesis ( ) represents the change in condition either from impact of Wedge Expansion or mitigation, respectively.)**

<b>Function &amp; Value Variables (MWAM 2008)</b>	<b>Project Area Wedge Expansion Impact Area (Functional Point x 2 acres)</b>	<b>Option One Shadowy Project on the St Joe River (Functional Point x 4 acres) or 2:1 mitigation ratio</b>	<b>Option Two West Smeltonville (Functional Point x 6 acres) or 3: 1 mitigation ratio</b>	<b>Option Three Pinehurst Rodeo Grounds (Functional Point x 3 acres) or 1 1/2:1 mitigation ratio</b>	<b>Option Four-Confluence South and North Fork (Functional Point x 13 acres) or 6:1 mitigation ratio</b>
A. Listed/Proposed T&E Species Habitat	0 (0)	3.6 (3.6)	0 (.6)	0 (2.7)	9.1 (11.7)
B. Listed Species in Idaho with S1, S2 or S3 Rank	1.0 (0)	2.0 (2.0)	.6 (3.0)	1.5 (2.1)	6.5 (7.8)
C. General Wildlife Habitat	1.0 (.6)	2.0 (4.0)	4.2 (5.4)	.9 (1.5)	10.4 (13)
D. General Fish Habitat	.6 (.6)	2.8 (4.0)	1.8 (3.6)	1.2 (1.2)	7.8 (9.1)
E. Flood Attenuation	1.8 (1.8)	2.0 (2.0)	3.0 (4.8)	.6 (.6)	10.4 (10.4)
F. Surface Water Storage	1.6 (.2)	3.2 (4.0)	2.4 (2.4)	1.8 (1.8)	11.7 (11.7)
G. Sediment/Nutrient/Toxicant Removal	1.0 (.4)	2.4 (3.6)	1.2 (2.4)	1.2 (1.2)	2.6 (2.6)
H. Sediment/Shoreline Stabilization	2.0 (.2)	2.8 (4.0)	1.8 (6)	2.7 (2.7)	3.9 (3.9)
I. Production Export/Food Chain Support (synthesis of aquatic/terrestrial)	.8 (.8)	3.2 (4.0)	2.8 (3.2)	1.8 (1.8)	11.7 (11.7)
J. Groundwater Discharge/Recharge	2.0 (.2)	4.0 (4.0)	6 (6)	2.1 (2.1)	9.1 (9.1)
K. Uniqueness	.4 (.4)	.8 (2.4)	1.8 (1.8)	.9 (2.1)	5.2 (7.8)
L. Recreation/Education Potential	--	0 (.6)	--	--	1.3 (2.6)
<b>Total</b>	<b>12.2 (5.2)</b>	<b>28.8 (38.4)</b>	<b>25.6 (39.2)</b>	<b>14.7 (19.8)</b>	<b>89.7 (101.4)</b>
<b>Percent of Possible Score</b>	<b>55% (24%)</b>	<b>65% (87%)</b>	<b>39% (59%)</b>	<b>45% (60%)</b>	<b>63% (71%)</b>

## 8.0 Recommendation

Option One - Shadowy Project on the St. Joe River is the recommended option for compensatory mitigation for the following reasons:

- The overall increase in the MWAM rating from existing condition to potential is highest of the options suggesting that there will be the greatest benefit from a mitigation focus on this site.
- It is a large acreage with potential for high quality riverine, palustrine emergent wetlands within a mosaic of other wetland types similar to what inherently would have been at the site. This is suggestive of a highly successful restoration project. Palustrine emergent wetlands are created which meets the "in kind" criteria.
- Restoration at this site serves to increase several of the critical functions diminished from the Wedge Expansion as illustrated by the MWAM. One of the greatest benefits is restoration of wildlife and fisheries habitat including habitat for waterfowl without the attraction to an area with potentially high levels of heavy metals, such as is the case in much of the Coeur d'Alene Basin downstream from the Silver Valley.
- Leadership and technical expertise for planning, design, and implementation of the project are in place. A collaborative effort with regional experts from IDFG and USFWS provides quality assurance in the short and long term from implementation through monitoring and maintenance.

## 9.0 References

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