PANHANDLE SMELTING AND REFINING COMPANY
PRELIMINARY ASSESSMENT REPORT
BONNER COUNTY, IDAHO

STATE OF IDAHO

IDEPARTMENT OF ENVIRONMENTAL QUALITY

January 2006

Submitted To:
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706-1255 • (208) 373-0502

Dirk Kempthorne, Governor
Toni Hardesty, Director

January 18, 2006

Mr. Ken Marcie
Environmental Engineer (ECL 115)
U.S. Environmental Protection Agency – Region X
1200 Sixth Avenue
Seattle, Washington 98101

RE: Preliminary assessment report for Panhandle Smelting and Refining Company (aka Blackrock Site).

Dear Mr. Marcie;

Attached are copies of the Idaho Department of Environmental Quality (DEQ) Preliminary assessment report for Panhandle Smelting and Refining Company (aka Blackrock Site). This site and report should have some immediate attention by EPA and is contractors, as DEQ is recommending that additional investigation of the site is conducted. Furthermore, DEQ believes that discussions with the property owner and perhaps the U.S. Army Corps of Engineer is warranted in order to restrict access to the site until human health risks can be more properly evaluated, and if necessary, remedial actions taken.

The Panhandle Smelting and Refinery Company site consists of original smelter ruins, a small pile of unprocessed ore, several building depressions, and a slag dump. Because of the dense vegetation the volume and extent of these wastes is unknown. The site is on the northern shore of Lake Pend Oreille approximately 400 feet south of the community of Ponderay. Access to the site is via trails, boat (to a new dock) or along the Army Corps of Engineers stabilized bank which apparently acts as a roadway. Identified by local residents for decades as a favorite swimming location, the site is frequented by recreationists during warmer summer months. Samples collected from the site indicate elevated levels of lead in the soils associated with camp sites and elevated levels of lead and zinc in the slag dump. Additionally, ten metals were shown to be present at the site in levels exceeding the Idaho Default Target Levels as identified in the Idaho Risk Evaluation Manual. These target levels are only the conservative defaults and do not take into account site specific parameters. Water quality of Lake Pend Oreille does not appear to be affected by metals migration from the site. However, there may be leaching of lead and zinc from the slag dump as it erodes into the lake. Routine sampling at a surface water intake water 1.7 miles southwest of the site have shown no elevated levels of lead or zinc.

Because the site has been identified by many people as a recreational destination and due to the recent modifications to the bank resulting in an improved traffic conduit, it appears the site has become and attractive nuisance. With the elevated levels of lead and other metals in the soils, further characterization of the site would be warranted including performing a site specific risk

assessment. The elevated levels of the lead, zinc, and other metals in the slag may be a cause of concern. However, it is not currently known how much of these metals are leaching from the vitrified slag. This would warrant further investigation.

Immediate remedies would include fencing and other barriers to prevent access. Long term and more permanent remediation options would need further data from a more detailed site investigation.

If you have any questions or concerns, please do not hesitate to call.

Sincerely,

Bruce A. Schuld
Mine Waste Projects Coordinator

Attachments

cc: Brian Gaber – DEQ State Office
Robert Higdem – DEQ CdA Regional Office

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LIST OF ACRONYMS

Acronym	Definition
amsl	above mean sea level
ATV	All Terrain Vehicle (a.k.a. 4-wheeler)
bgs	below ground surface
BNSF	Burlington Northern Sante Fe
Corps	US Army Corps of Engineers
DEQ	Idaho Department of Environmental Quality
IDTL	Idaho Default Target Level
EA	environmental assessment
EPA	United States Environmental Protection Agency
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
MRL	Montana Rail Link
PA	Preliminary Assessment
PSRC	Panhandle Smelting and Refining Company
REM	Idaho Risk Evaluation Manual
TCLP	Toxicity Characteristic Leaching Procedure
TMDL	Total Maximum Daily Load
USBM	United States Bureau of Mines
USFS	United States Forest Service
303 (d)	Section of the Clean Water Act in Idaho

1. INTRODUCTION

The Idaho Department of Environmental Quality (DEQ) in cooperation with the United States Environmental Protection Agency (EPA) agreed to conduct and complete a preliminary assessment (PA) of potentially contaminated waste sites located on privately-owned lands in Idaho. The DEQ Coeur d'Alene Regional Office has been assigned the task of completing PAs for the five northern counties during the 2005 field season. During the 2005 filed season, two sites were assessed in Bonner County. These are the Panhandle Smelting and Refining Company (PSRC) located in Ponderay and the Whitedelph Mine and Mill located in Clark Fork. This report is specifically for the PSRC site.

The specific goals identified by the DEQ for the Panhandle Smelting and Refinery PA are:

- Determine the potential threat to public health or the environment posed by the site.
- Determine the potential for a release of hazardous constituents into the environment.
- Determine the potential for placement of the site on the National Priorities List.

Conducting the PA included reviewing existing site information, collecting receptor information within the site's range of influence, determining regional characteristics, and conducting a site visit. This document includes a discussion of site background information/data from the most recent inspection (Section 2), a discussion of migration/exposure pathways and potential targets (Section 3), and a list of pertinent references. Photographic documentation is included in Appendix A. Sample analyses and copies of supporting documentation are included in Appendix B.

2. SITE BACKGROUND

2.1 SITE LOCATION

Site Name:	Panhandle Smelting and Refinery
Location:	Ponderay, Idaho Bonner County
Latitude:	48° 18' 04.05" N
Longitude:	116° 31' 51.93" W (NAD27 datum)
Elevation (amsl):	2070 feet
Legal Description:	NW ¼, SE ¼, Section 11, Township 57N, Range 2W, Boise Meridian
Congressional District:	Idaho
Site Owner/Contact:	Dana Martin 206 N. 4th #123 Sandpoint, Idaho 83864 (208) 265-1574

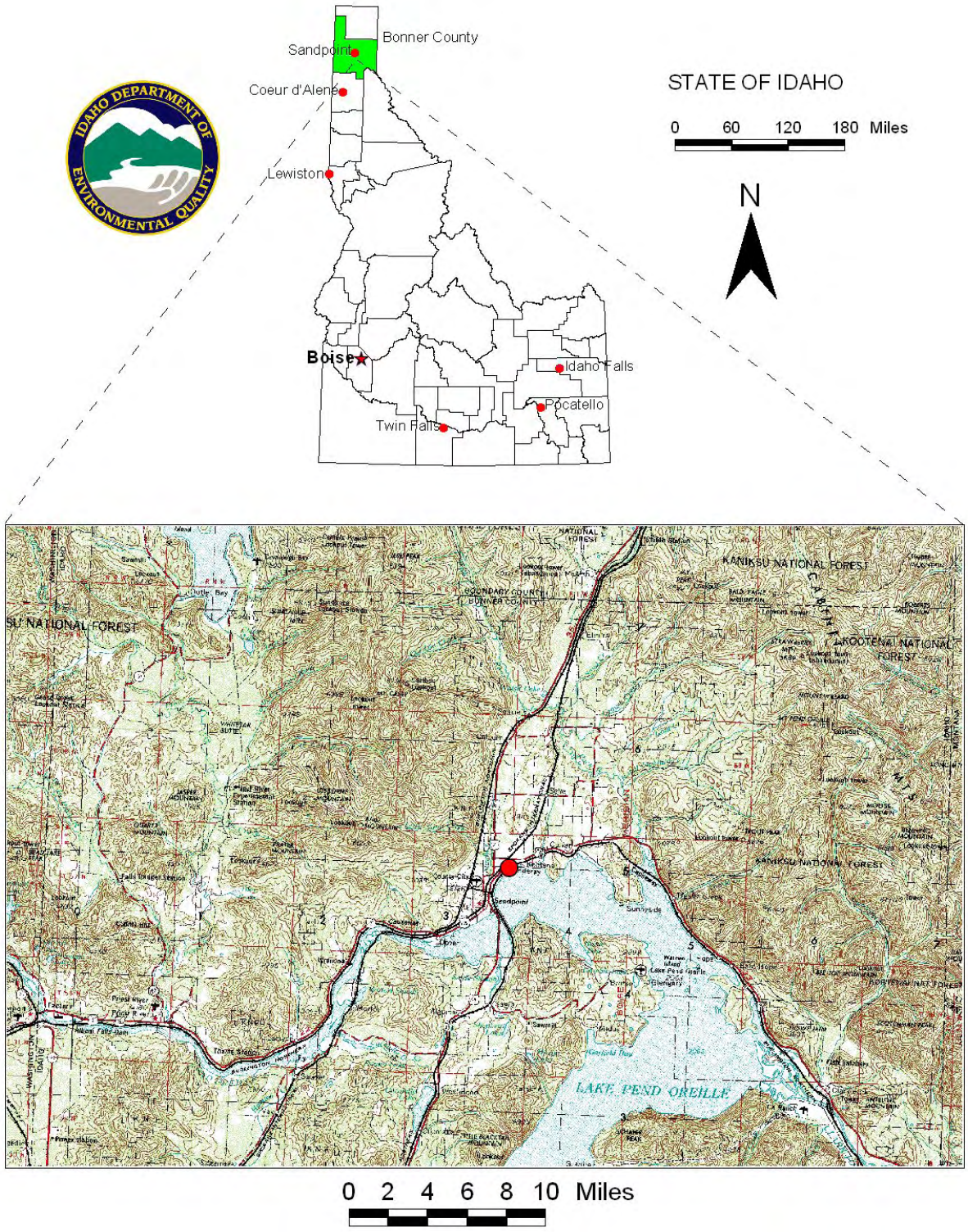


Figure 2-1 Site Vicinity Map of Panhandle Smelting and Refining Company

2.2 SITE DESCRIPTION, OWNERSHIP AND HISTORY

The Panhandle Smelting and Refinery Company (PSRC) site is an inactive facility located on the northern shoreline of Lake Pend Oreille due south from the town of Ponderay in Bonner County (Figure 2-1). The property where the PSRC site is located is privately owned by Dana Martin, resident of Bonner County. Access to the site is limited to foot or boat (though vehicle access appears to now exist via a newly installed bank stabilization structure). A well worn trailhead located east of the intersection of Birch and 1st Avenues (Ponderay, ID) is reached after crossing a set of Burlington Northern Santa Fe (BNSF) railroad tracks operated by Montana Rail Link (MRL) (Figure 2-2). This trail heads south through tall grasses and past willows and cottonwoods to the shores of Lake Pend Oreille. Because very little of the original structures remain, the trail literally ends at the lake's edge. A private dock is located here is owned by Mr. Martin. This would serve as the lake access point if desired. No motorized access is currently available due to railroad easement restrictions by BNSF and MRL. Partial remains of one rock wall, several building depressions and a large slag dump pile are all that remains identifying the site. The slag dump extends out into the lake and appears to have been weathering into the water. This has caused local residents to refer to the site as "Black Rock". The site appears to run approximately 200 feet along the shoreline and extends approximately 300 feet northwest towards Ponderay. The topography is mostly a glacial terrace with some localized flood plain. The soils are predominantly sand overlying silt and clay. There is no surface water on the site.

The history PSRC is one more of contentious management, accusations, and lawsuits than of actual smelting. Originally conceived in 1902 as a lea/silver smelter for local mines, construction didn't begin until 1904. After a rocky start, the first lead bars from concentrates (from the St. Eugene mine at Trail, British Columbia) were poured June 12, 1907. Lead production continued until more legal action stopped the smelter in July 1907. Peak lead smelting was in early July 1907 with a 24 hour run producing 168 bars each weighing 115 pounds. After a retrofit with larger furnaces and other equipment, the smelter started back up on October 20, 1908 and ran sporadically through March, 1909. Numerous lawsuits ceased operations again. It is unclear whether the plant ever operated again. Several attempts to upgrade the furnaces and obtain good ore were made through the 1910 but apparently no smelting occurred. A foreclosure sale was held on May 2, 1913 on the property and other assets belonging to the now defunct PSRC. This was followed by another judgment sale of property and assets in 1922. Plans were made then to re-open the smelter but this never happened. By December 1922, salvage crews had dismantled the plant and scrapped all salvageable materials. With the exception of the structures and other equipment, there does not appear to have been any other removal activities on this site. A detailed synopsis of the history is included in Attachment No. 1, "National Register of Historic Places Evaluation of the Panhandle Smelting and Refining Company Facility, Ponderay, Idaho", N.F. Renk, February 13, 2001. In 2003, the US Army Corps of Engineers conducted an environmental assessment (EA) on a portion of the PSRC site during a bank stabilization project proposal (Attachment No. 2). The EA included metals analysis of the slag dump. These are summarized in Table 2.

Figure 2-2 Panhandle Smelting and Refining Company Aerial Photograph. Note the proximity of the site to the town of Ponderay and the access trail crossing the railroad tracks.

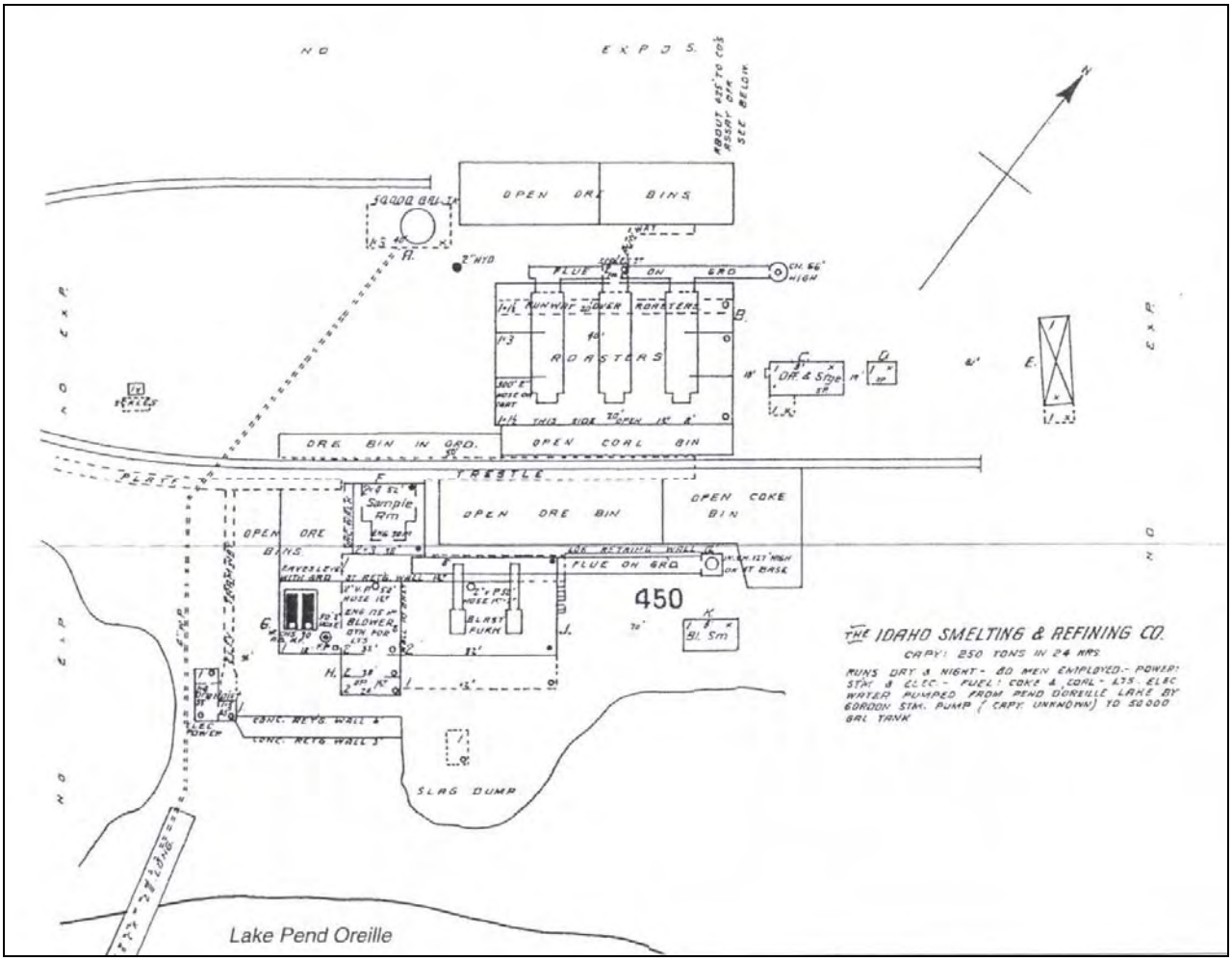


Figure 2-3: 1909 Sanborn Fire Map of the Panhandle Smelting and Refining Company.

2.3 SITE OPERATIONS AND WASTE CHARACTERISTICS

Because the PSRC smelter no longer exists and because there is no motorized access to the site, activities at the site are currently limited to recreation. The wastes associated with the past PSRC operations have been identified as the waste slag dump and the soils that have developed in and around the historic smelter's foundations. Because of the dense vegetation on the site the volume and extent of these wastes is unknown. Mr. Martin, current property owner, has expressed a willingness to work with the regulatory agencies and to come to an amicable resolution of any environmental issues which may arise. Table No. 1 identifies the metals and their concentrations in samples collected at the time of the 2005 DEQ inspections. Table No. 2 lists the results of a sample of the slag collected by the Corps for their 2003 EA of the site. Yellow highlights indicate exceedences of the Idaho Default Target Level (IDTL) as listed in the Idaho Risk Evaluation Manual (REM).

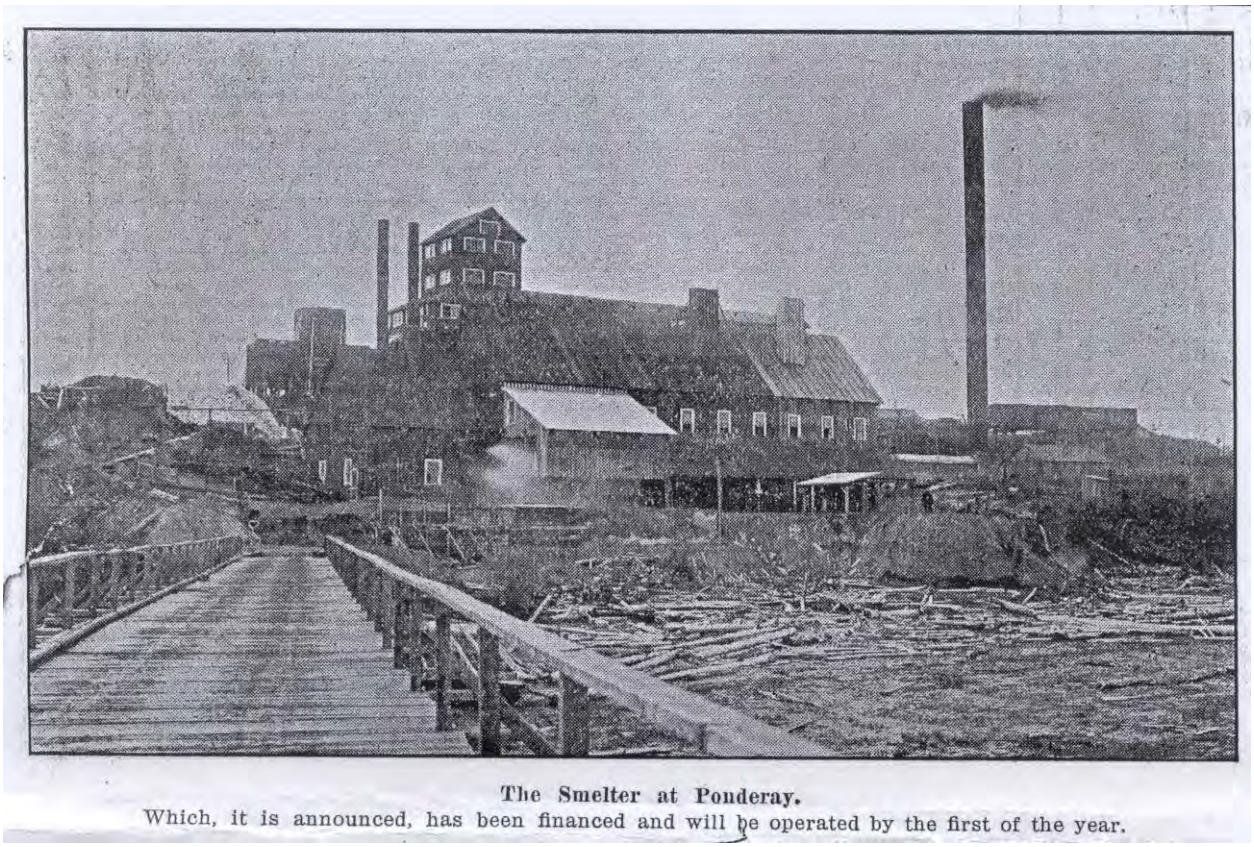
Table 1 Metals Analysis Results of DEQ PRSC Sampling (8/03/05). Results in mg/kg.

Location	Silver	Arsenic	Cadmium	Mercury	Lead	Zinc
Lake shore at base of slag dump	64.1	109	3.64	<0.0330	8910	1890
Raw ore stockpile	<0.5	<2.5	1.08	<0.0330	114	114
Upper bench – building depression	5.61	9.1	2.22	<0.0330	710	373
Upper bench – camp site	63.7	184	4.14	0.0516	6440	774
Idaho Initial Default Target Level	0.189	0.391	1.35	0.00509	49.6	886

Table 2 Metals Analysis Results of US Army Corps of Engineers Sampling (11/24/99). Results in mg/kg.

Analyte	Result	IDTL	Analyte	Result	IDTL	Analyte	Result	IDTL
Aluminum	13000	NA	Iron	130000	NA	Vanadium	40	NA
Barium	1800	896	Lead	5100	49.6	Zinc	18000	886
Beryllium	0.45	1.63	Magnesium	1900	NA	Arsenic	33	0.391
Calcium	79000	NA	Manganese	25000	223	Antimony	31	4.77
Chromum	16	2130	Nickel	ND	59.1	Cadmium	0.36	1.35
Cobalt	19	NA	Potassium	4400	NA	Selenium	0.86	2.03
Copper	930	921	Sodium	440	NA	Silver	42	0.189
Thallium	0.71	1.55	Mercury	0.095	0.00509			

Photograph 1: Early photograph of the smelter facility from the dock (circa 1907).



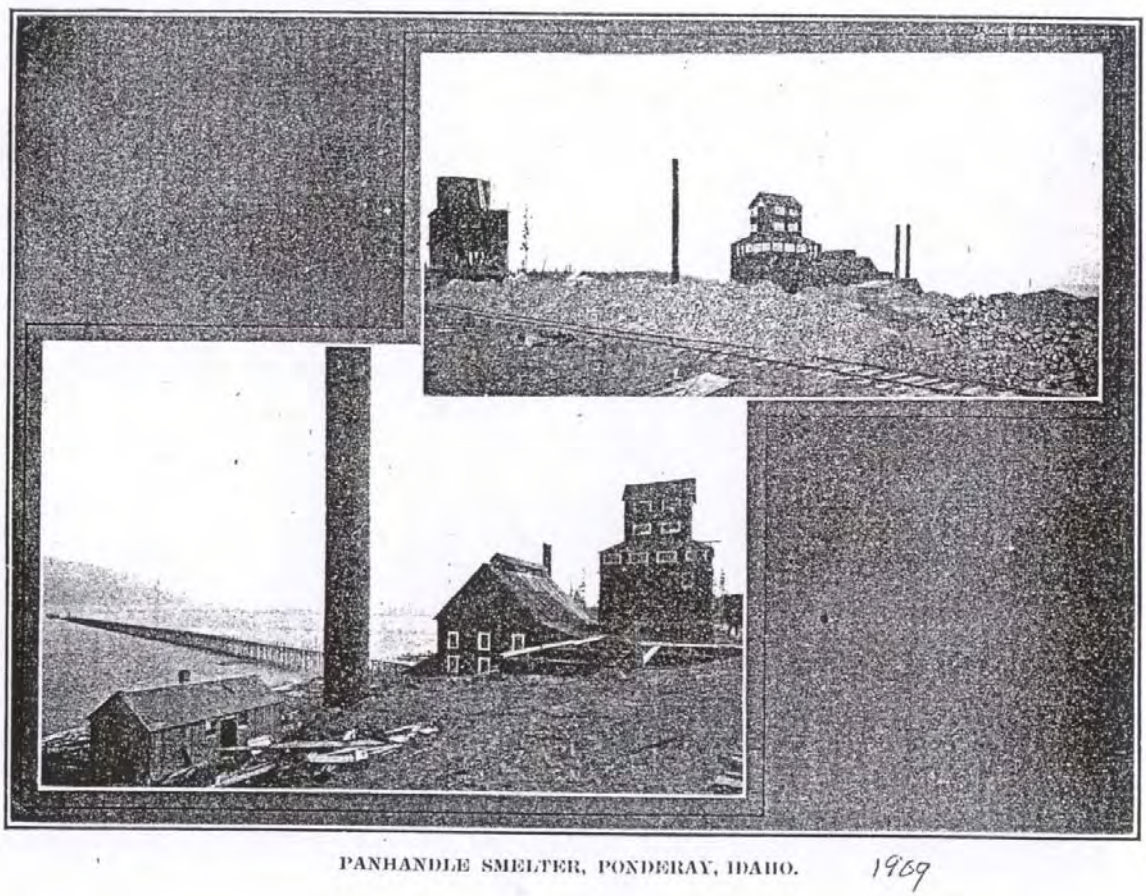
The Smelter at Ponderay.
Which, it is announced, has been financed and will be operated by the first of the year.

Photograph 2: Later photograph of the smelter showing and expanded building (1908).

2.4 DEQ ACTIONS

DEQ conducted a site visit on August 3, 2005 via an unmarked trailhead located south of Ponderay. The site consisted of several crumbling block and mortar walls, a pile of unprocessed ore, and a large slag dump. These were all that remain of the site and are the only visual clues to the past activities of the smelter. A sample was collected from the ore pile. A second sample was collected from the slag dump at the water's edge where the slag had eroded into smaller grains ranging in the size of peas to coarse sand. Two more samples were collected from a location approximately 75 feet inland from the slag dump. This was an area that appeared to be former building locations.

There was evidence of numerous ad hoc recreational activities at this location (i.e.: fire rings, discarded food packaging, graffiti on the remaining walls, small trails, etc.). Five people were seen swimming off the end of the dock at the time of the inspection. Two of these individuals, young boys, were also seen playing near the crumbling and eroded foot of the slag dump. Approximately 200 feet along the shore to the southwest, an Airstream camper was observed with several lawn chairs and other camping accoutrements. This indicated a recent and on-going human presence near the site.



Photograph 3: 1909 photographic mosaic of the smelter after cessation of activity. Note the long dock extending out into Lake Pend Oreille.

Photograph 4: A pile of what appears to be unprocessed ore located to the southwest of the slag dump and at the terminus of the Corps Bank Stabilization project.

Because very little ground cover was seen growing in an area that appeared to be frequented by visitors, samples were collected from the surface and to a depth of 4 inches. After collecting the samples and photographs, DEQ left the site.

3. MIGRATION/EXPOSURE PATHWAYS AND TARGETS

The following sections describe migration/exposure pathways and potential targets within the site's range of influence (Figures 3-1 and 3-2). Receptors in the area have been identified as local residents and limited recreationists including occasional tourists, hikers, fishermen, boaters, and swimmers. There is no commerce within the boundaries of the PSRC site. However, the BNSF and MRL railroad lines and the town of Ponderay are located approximately 400 feet north of the site. Three communities lie within a 4-mile radius of the site. Kootenai is to the northeast and has a population of 472. Ponderay is to the north and has a population of 686. Sandpoint is to the southwest and has a population of 7647. This area is within Bonner County which has a population of 39872. (All population statistics are 2004 estimates.) Average annual precipitation for Bonner County is 33.3 inches.

Photograph 5: View of the last remaining portion of the smelter's structure. Looking north from the slag dump.

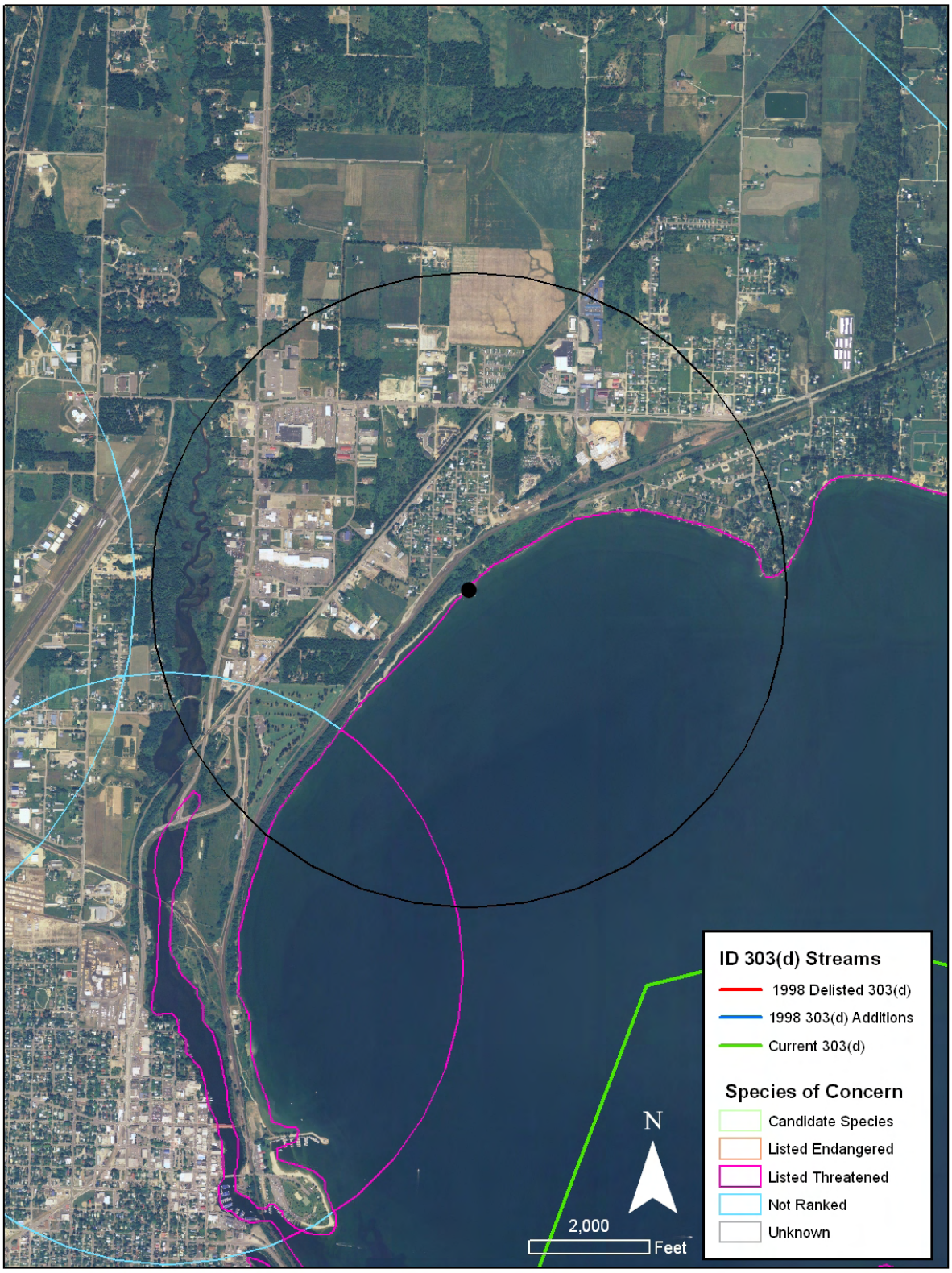


Figure 3-1: One Mile Radius Aerial Photograph.

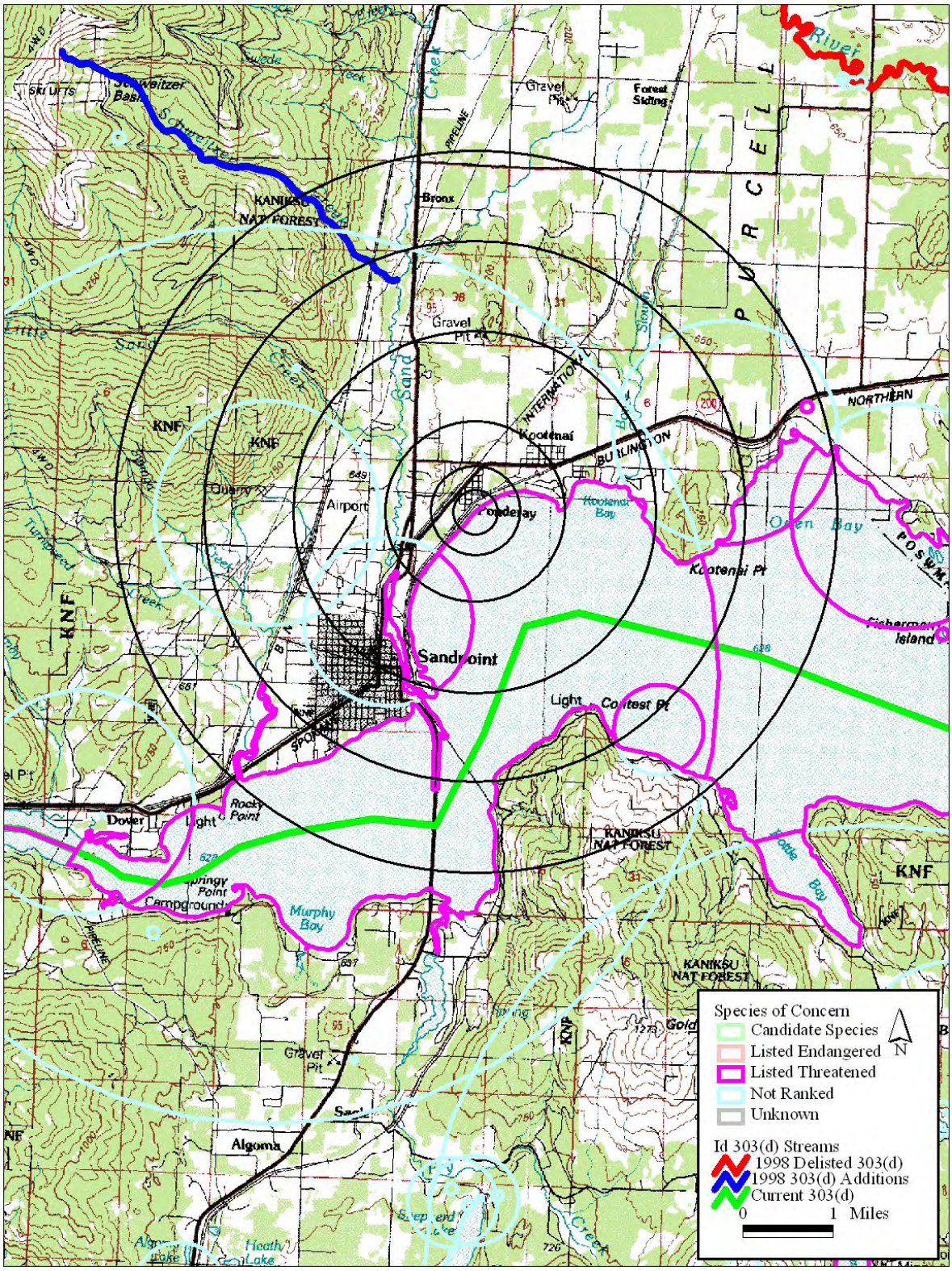


Figure 3-2: 4-Mile Radius Map Denoting Affected Species and 303(d) Listings.

3.1 GROUND WATER MIGRATION PATHWAY

The PSRC site is located on the northern shore of Lake Pend Oreille. The nearest well is a monitoring well located on the BNSF right of way approximately 1000 feet northeast of the PSRC site and approximately 100 feet upland from the lake. This well was installed in 1978 and shows an average depth to groundwater to be 13 feet or approximately 2057 feet amsl. This indicates that Lake Pend Oreille, with an elevation of 2062 feet amsl has a strong influence on groundwater levels along the northern lake shore. The soils consisted of silty gravels (2'), silty clay (5'), silty sand (2'), silty clay again (2') silty sand (17') and finally clay (100') (Attachment No. 3). With the large amount of clay beneath the site, subsurface migration of contaminants to the ground water appears to be unlikely.

Photograph 6: Slag dump looking north.

There are no known community drinking water wells within a 4-mile radius of the site. The communities of Sandpoint and Ponderay receive their primary drinking water from the Little Sand Creek. This surface water intake is located at the base of Schweitzer Mountain and is approximately two miles northwest (and up-gradient) of the PSRC site. This drinking water source does not appear to be influenced by any potential contamination at the PSRC site. A second surface water intake is located in Lake Pend Oreille approximately ½ mile north of Sandpoint's city beach. Used primarily as a peaking plant to satisfy increased demand during the summer months, this intake is 1500 feet into the lake from the beach and is at a depth of approximately 25 feet. The PSRC slag dump is approximately 1.7 miles due north of the secondary water intake. Routine testing of the water from this secondary peaking plant have not shown metals concentrations which

exceed the drinking water maximum contaminant levels (MCLs). Consequently there is no evidence that metals from the smelter site adversely impact this drinking water supply.

3.2 AIR MIGRATION PATHWAY

The PSRC site is situated in the bottom of a wide glacial valley and is directly adjacent to one of the largest freshwater lakes in the western United States. The site is surrounded by heavy overgrowth of broadleaf deciduous trees, willows, and grasses. On the site, the same large trees grow but ground cover is less thick with areas of exposed soils. A strong wind may be able to cause the soils to become airborne and travel off-site, but the heavy wall of trees appears to prevent this. It appears the only potential for an air migratory pathway would be a result of recreational activities on the site causing dusts to become mobile in the immediate vicinity. No air monitoring or sampling was conducted at the time of the 2005 inspection.

3.3 SOIL EXPOSURE PATHWAY

Currently, there are no persons living onsite or within 200 feet of the PSRC site. However, a temporary structure (an Airstream camper) was seen within 200 feet of the site. Additionally, there are no schools, churches, day care facilities, stores, residences, or any other frequently populated facilities within 200 feet which could provide a potential exposure pathway to children and/or adults. There are no residences or workers on the site. The nearest regularly occupied structure to the site is a private residence approximately 300 feet to the north (in the town of Ponderay). A 4-mile radius of the site would encompass the communities of Sandpoint, Ponderay and Kootenai (Figure 3-2).

Access to the PSRC site is uncontrolled. Vehicle access was impossible until the Corps built what appears to be a road-like structure along the shore during a 2004 bank stabilization project (Photograph 15). This road is accessed by crossing the BNSF and MRL railroad tracks 800 feet to the southwest of the PSRC site. Originally, these crossings were for temporary access for the railroads. However, the work of the Corps has apparently allowed vehicles to now cross the railroad tracks and then continue on to the PSRC site, terminating near the slag dump. This is evidenced by the presence of the Airstream camper and vehicle tracks along the stabilized bank structure. This appears to have caused an increase in pedestrian and vehicle traffic to the PSRC site resulting in an open conduit to an attractive nuisance. Boat access is unlimited via a newly installed dock located at the terminus of the Corps bank stabilization project and near the slag dump.

At the time of the 2005 site visit by DEQ, evidence of an ad hoc campground was noted. The site has been historically very popular with local residents as a swimming and fishing destination. As originally noted at the turn of the century when the PSRC site was being assessed, the lake's depth is very shallow along this portion of the shore. This and the fact the shallow waters extend out into the lake a fairly long distance has resulted in many people visiting the site as a good swimming locale. Because of its relative remoteness and lack of motorized access, the site has been seen by local residents as a popular and "secret" park-like destination relatively close to home. It is not uncommon to have young adults

camping or having social events around campfires on the site during warmer summer months.

Some of the areas had very little vegetation or ground cover (Photograph 7). These soils were sampled for metals and revealed elevated levels of lead and zinc (Table 1). It appears that due to uncontrolled access and a relatively high amount of ad hoc recreational use of the site, there is a high degree of potential for exposure to elevated levels of lead and zinc.

Photograph 7: Site of the upper bench soil samples collected by DEQ. Note the lack of vegetative cover and numerous trails. This location also had fire rings and other signs of human habitation.

3.4 SURFACE WATER MIRGRATION PATHWAY

Because the PSRC site is on the shore of Lake Pend Oreille, the nearest point of probable entry is the shoreline itself. This is further compounded by the fact the slag dump is located directly in the water. Decades of erosion have taken their toll on the slag dump resulting in a large amount of material sloughing off. Lake Pend Oreille flows into Pend Oreille River south of Sandpoint approximately 2 miles south of the PSRC site. One fish hatchery, the Sandpoint Hatchery, is approximately 6 miles south of the site on the south shoreline of the Pend Oreille River (2100 Lakeshore Dr., Sagle). This hatchery is a redistribution site for rainbow trout *(Oncorhynchus mykiss)* and Westslope cutthroat trout *(Onchorhynchus clarki)*. Management of a net pen rearing program and assisting in north Idaho egg-taking programs are additional duties of the hatchery. The Cabinet Gorge and Clark Fork Fish Hatcheries are associated with Lake Pend Oreille. However, they are both more than 20 miles upstream from the PSRC site. Though the slag dump and soils on the site are high in metals, there does not appear to be any significant impact on the quality of Lake Pend Oreille. This is supported by the regular testing conducted at the water intake located in the lake southwest of the site. However, localized effects may exist at the site itself.

Due to the easy and uncontrolled access to the site either from boat or by foot, local residents have utilized this site as a recreational destination. Because of this, it appears swimmers in the vicinity of the slag dump or fish caught in this same area may be exposed to elevated levels of metals. There does not appear to be any sensitive environments at or downstream of the PSRC site. This is further supported by the findings in the Corps 2003 EA of the site (Attachment No. 2 and Table 2). No surface water samples were collected from the lake at the time of the 2005 DEQ inspection. There is no surface water on the site proper.

Photograph 8: Looking south from the smelter site. Note new dock in center of picture.

Photograph 9: Looking southeast from the smelter towards Lake Pend Oreille. Slag dump in center of picture.

Photograph 10: Base of slag dump eroding into Lake Pend Oreille. This is the location of the slag dump sample.

Photograph 11: Base of slag dump showing erosion.

Photograph 12: Closeup of the slag dump surface.

Photograph 13: Closeup of the slag dump cross section.

Photograph 14: View of the smelter wall. Note the blue graffiti.

3.5 TARGET SPECIES

Known to populate the Lake Pend Oreille, the bull trout (*Salvelinus confluentus*) are listed as a threatened species (FWS, 2005). The lake is also designated "critical habitat" for the Columbia River distinct population segment for the bull trout.

Also known to inhabit the shores of Lake Pend Oreille, is the bald eagle (*Haliaeetus leucocephalus*), which is listed as a threatened species (FWS, 2005). At the time of the 2004 DEQ inspection, there were no known bald eagle nests present in the vicinity of the PSRC site.

The gray wolf (*Canis lupus*) and woodland caribou (*Rangifer tarandus caribou*) are listed as endangered species and have been identified in Bonner County. The Canada lynx (*Lynx canadensis*) and the grizzly bear (*Ursus arctos*) are listed as threatened species and have been identified in Bonner County. However, due to proximity to commercial, residential,

Photograph 15: Looking south along the shore from atop the slag dump. Note the new dock in the foreground and the partially hidden Airstream camper in the center of the picture. This view is of the Corps Bank Stabilization project after it was completed. The dark grey "sand" at the bottom of the picture is eroded slag.

and other populated areas, it is unlikely these species would enter the PSRC site. Additionally, these species have been identified in the more rural portions of northern Bonner County over 60 miles away (FWS, 2005).

The slender moonwort (*Botrychium linare*) is a candidate species (FWS, 2005) but is not known to exist in the area of the PSRC site.

The use of surface water for watering of livestock and irrigation is unknown within a 4-mile radius of the site. While this region historically saw a wide range of land use including agriculture and ranching, land use today is primarily industrial and residential. There does not appear to be any irrigation or livestock watering but this was not confirmed.

The Clark Fork River, the primary tributary of Lake Pend Oreille, is expected to have a total maximum daily load (TMDL) for metals pollution. There is an EPA approved TMDL for "near-shore" nutrients in Lake Pond Oreille. The Pend Oreille River, which begins at Sandpoint, has been 303(d) listed by DEQ as impaired due to sediment, temperature, and total dissolved gas. It does not appear the former smelting activities associated with the Panhandle Smelting and Refinery has any impact on these pollutants of concern.

4. SUMMARY AND CONCLUSION

The Panhandle Smelting and Refinery Company site consists of original smelter ruins, a small pile of unprocessed ore, several building depressions, and a slag dump. Because of the dense vegetation the volume and extent of these wastes is unknown. The site is on the northern shore of Lake Pend Oreille approximately 400 feet south of the community of Ponderay. Access to the site is via trails, boat (to a new dock) or along the Army Corps of Engineers stabilized bank which apparently acts as a roadway. Identified by local residents for decades as a favorite swimming location, the site is frequented by recreationists during warmer summer months. Samples collected from the site indicate elevated levels of lead in the soils associated with camp sites and elevated levels of lead and zinc in the slag dump. Additionally, ten metals were shown to be present at the site in levels exceeding the Idaho Default Target Levels as identified in the Idaho Risk Evaluation Manual. These target levels are only the conservative defaults and do not take into account site specific parameters. Water quality of Lake Pend Oreille does not appear to be affected by metals migration from the site. However, there may be leaching of lead and zinc from the slag dump as it erodes into the lake. Routine sampling at a surface water intake water 1.7 miles southwest of the site have shown no elevated levels of lead or zinc.

Because the site has been identified by many people as a recreational destination and due to the recent modifications to the bank resulting in an improved traffic conduit, it appears the site has become and attractive nuisance. With the elevated levels of lead and other metals in the soils, further characterization of the site would be warranted including performing a site specific risk assessment. The elevated levels of the lead, zinc, and other metals in the slag may be a cause of concern. However, it is not currently known how much of these metals are leaching from the vitrified slag. This would warrant further investigation.

REFERENCES

Renk, N.F., 2001, *National Register of Historic Places Evaluation of the Panhandle Smelting and Refining Company Facility, Ponderay, Idaho*, 17ppg.

US Army Corps of Engineers, Seattle District, 2003, *Black Rock Final Environmental Assessment, Ponderay, Idaho*, 26ppg.

DEQ, Idaho Department of Environmental Quality, 2005, Personal Communication from R. Lee, Technical Services Division.

FWS, United States Fish and Wildlife Service, 2005.
https://ecos.fws.gov/tess_public/E

WRCC (Western Regional Climate Center), 2005.
http://www.wrcc.dri.edu/htmlfiles/id/id.ppt.ext.html