
FINAL REPORT

BUNKER HILL FACILITY NON-POPULATED AREAS OPERABLE UNIT 2 BIOLOGICAL MONITORING, 2009



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April 2010

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1.0 Background and Objectives

This report summarizes activities and results of U.S. Fish and Wildlife Service (Service) Northern Idaho Field Office (NIFO) 2009 biological resource monitoring conducted at the Bunker Hill Mining and Metallurgical Complex Operable Unit 2 (OU-2). The Service is responsible for conducting biological resource monitoring to assist the U.S. Environmental Protection Agency (USEPA) in evaluating the progress of remedial actions designed to improve ecological conditions. Consistent with the requirements outlined in the Record of Decision (ROD) for OU-2 (USEPA, 1992) and as stated in the recommendations and required actions outlined by USEPA (2000), monitoring activities were designed to evaluate the status of biological resources and their habitat at the site, thereby monitoring the effectiveness of remedial actions. This work is supported through an Interagency Agreement with USEPA and follows the framework of the Environmental Monitoring Plan (EMP) (USEPA, 2006).

As identified in the EMP for OU-2 (USEPA, 2006), the Service conducted studies designed to evaluate two components of remedy with respect to biological resources: the status of aquatic and terrestrial wildlife populations and habitat quality in remediated areas, and exposure of biological resources to contaminants of concern, including arsenic (As), cadmium (Cd), lead (Pb), and zinc (Zn). Biological resource monitoring projects completed in 2009 include waterfowl use surveys on Page Ponds wetland complex and Smeltonville Flats. Projects methods and results are presented below.

2.0 Page Ponds Wetland Complex and Smeltonville Flats Waterfowl Surveys

Thousands of waterfowl utilize lower Coeur d'Alene Basin (Basin) wetland habitats during spring migration (Audet et al., 1999; USFWS, 2009). However, waterfowl habitat in the upper Basin is primarily limited to the Page Ponds and Smeltonville Flats wetland complexes. Assessment of waterfowl use and exposure to mining-related metals of concern at these sites is crucial in evaluating OU-2 Phase I remedial activities as they pertain to protection of the environment.

The Page Ponds wetland complex is comprised of two wetlands occurring on the east and west sides of the Page tailings impoundment (East Swamp and West Swamp). The tailings impoundment consists of inactive flotation tailings produced by the Page Mill (USEPA, 1992). Located on top of the tailings impoundment is the Page Ponds Waste Water Treatment Plant (WWTP), consisting of four aeration lagoons and a stabilization pond (Figure 2-1)

Smeltonville Flats is located in the west end of OU-2 within the floodplain of the South Fork Coeur d'Alene River (Figure 2-1). Uncontrolled discharges of jig and flotation tailings into the river, as well as the construction of a plank and pile dam to retain tailings within the floodplain, have led to heavy metal contamination of soil, sediments and surface waters (USEPA, 2005). Water inputs to the floodplain include the river, effluent from the Page Ponds and Smeltonville wastewater treatment plants, and groundwater. These water inputs, combined with tailings removal activities, have led to the development of several ponds and wetlands in the Smeltonville Flats area.

The OU-2 EMP identifies ecological risks to plants and animals associated with mining-related hazardous substances in OU-2 within four habitat types including riverine, palustrine, riparian, and upland habitats. Focusing on the goals for the OU-2 remedy identified in the 1992 ROD, the EMP recognizes waterfowl in palustrine environments as key indicators of change (USEPA, 2006). Exposure pathways of waterfowl to contaminants of concern within OU-2 include ingestion of soil-sediment, surface water, and food resources. We conducted waterfowl use surveys at the Page Ponds wetland complex and Smeltonville Flats within OU-2 to quantify continued waterfowl use and types of use (i.e., feeding, loafing, and resting), and provide a measure of relative waterfowl abundance within OU-2 during the spring migration. Information will be used in conjunction with other monitoring activities (i.e., waterfowl blood lead concentrations) to help evaluate the success of Phase I remedial actions.

2.1 Methods

We conducted 12 waterfowl surveys, one per week, at the Page Ponds WWTP and associated wetlands (wetland complex) and Smeltonville Flats area between February 10 and April 28, 2009. Surveys at the Page Ponds wetland complex included observations at the 4 active WWTP aeration lagoons, the lower sewage ponds north of the Trail of the Coeur d'Alene's, and the 2 wetlands occurring on the east and west side of the WWTP (East and West Swamps)(Figure 2-1). Survey locations at Smeltonville Flats included Emerald Pond at the east end of Smeltonville Flats, and 5 observation points adjacent to ponds and wetlands located north and west of the Shoshone County Airport (Figure 2-1). We conducted all surveys following Upper Columbia Fish and Wildlife Office (UCFWO) SOP# 1020.1013 (Waterfowl Survey in the Coeur d'Alene River Basin). Data collected included species identification, numbers of individual species and waterfowl behavior (i.e., feeding, loafing, and resting).

An analysis of between year waterfowl observations is presented in Section 2.4. Data presented reflects waterfowl observations conducted at the Page Ponds wetland complex 2005-2007 and 2009, and those conducted at Smeltonville Flats wetlands 2006, 2007, and 2009. Waterfowl use surveys were not conducted in 2008, therefore, no data is presented for that year.

2.2 Results

We observed 6,663 individual waterfowl and 19 species using the Page Ponds wetland complex (Table 2-1). Individual waterfowl averaged 555 per survey (Table 2-1). The most common species included common goldeneye (*Bucephala clangula*), mallard (*Anas platyrhynchos*) and Barrow's goldeneye (*Bucephala islandica*) (Table 2-2).

We observed 51 individual waterfowl and 8 species using Smeltonville Flats wetlands. Individual waterfowl averaged four per survey (Table 2-1). The most common species included mallard and Canada goose (*Branta canadensis*) (Table 2-3).

Waterfowl densities were highest in mid-March and early April at the Page Ponds wetland complex and Smeltonville Flats (Figures 2-2 and 2-3).

2.3 Discussion

Waterfowl continue to use the Page Ponds wetland complex and developing wetlands on Smelterville Flats. Fluctuation in this use at the Page Ponds wetland complex is well documented. Data from previous surveys show average waterfowl use was 448 and 147, in 2001 and 2003, respectively (USFWS, 2005). The average number of waterfowl observed using Page Ponds wetland complex between 2005- 2007 ranged from 129 to 229 (USFWS, 2008), and 555 in 2009. The fluctuations in waterfowl use between years can be attributed to various factors, such as flyway population trends, weather conditions, and activities at or near wetlands.

The continued use by migratory waterfowl of the Page Ponds wetland complex is of concern regardless of fluctuations in use. The Page Ponds wetland complex provides some of the only available wetlands to waterfowl within OU-2. Sediment within the wetland complex has not been remediated. Sampling conducted in 2007 (USFWS, 2008) documented sediment in the East Swamp contained lead concentrations up to 73,200 mg/kg, far exceeding cleanup levels established in the ROD (530 mg/kg; USEPA, 2002), levels known to cause waterfowl injury and death (Beyer et al., 2000). Examination of waterfowl blood lead concentrations were conducted 1993-2003, to evaluate effects of lead contaminated sediment on waterfowl utilizing the wetland complex (Mullins and Burch, 1993; Burch et. al., 1996; Audet et. al. 1999; USFWS, 2005). These studies show mean blood lead concentrations in mallards collected from the East swamp were all within clinical to severe clinical toxic poisoning levels in waterfowl (>0.2 mg/kg) (Pain, 1996). No downward trends in waterfowl blood lead concentrations were apparent. Given the consistently high lead concentrations in sediment at the site, reductions in waterfowl blood lead concentrations at the Page Ponds wetland complex are not expected to improve without further remedial or management actions, such as limiting bird access to the site.

Data from 2009 constitute the third year of waterfowl population monitoring at Smelterville Flats. Total number of waterfowl using the wetlands in 2006, 2007, and 2009 was 133, 79 and 51, respectively (USFWS, 2007; USFWS, 2008; this study). The decrease in waterfowl use can potentially be attributed to weather conditions and construction activities near wetlands. In 2007 and 2009, wetland areas on Smelterville Flat remained ice covered until March, with the first waterfowl observed March 13 and 16, respectively (USFWS, unpublished data). The extension and improvement of Shoshone County Airport runway began early spring 2009 and continued throughout the year. Site conditions (deep snow) may have resulted in lower waterfowl counts. In 2007 and 2009, Service personnel were unable to access the site until April. Surveys were taken from the side of I-90, and may have contributed to the lower waterfowl numbers observed.

Mean waterfowl blood lead concentrations collected from Smelterville Flats in 2008 were higher than those collected from remediated areas within OU-3 (Schlepp conservation easement), and above the toxicity threshold suggested to cause severe clinical poisoning in waterfowl (USFWS, 2009; Paine, 1996). This suggests that metals within the Smelterville Flats area continue to be bioavailable at levels shown to cause injury to waterfowl. Since remediation at Smelterville Flats, habitat structure of the area has increased, along with the formation of several wetlands, creating an attractive area for wildlife. High mean waterfowl blood lead concentrations suggest that improvements in habitat may be increasing wildlife injury due to increased use. This should be taken into consideration when evaluating the need for future remedial actions within OU-2.

3.0 References

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USFWS. 2009. Annual report, 2008 biological resource monitoring, Coeur d'Alene Basin Operable Unit 3. Final Draft. U.S. Fish and Wildlife Service, Spokane, Washington

Figure 2-1. EMP waterfowl survey points, 2009, Smeltonville, Idaho.

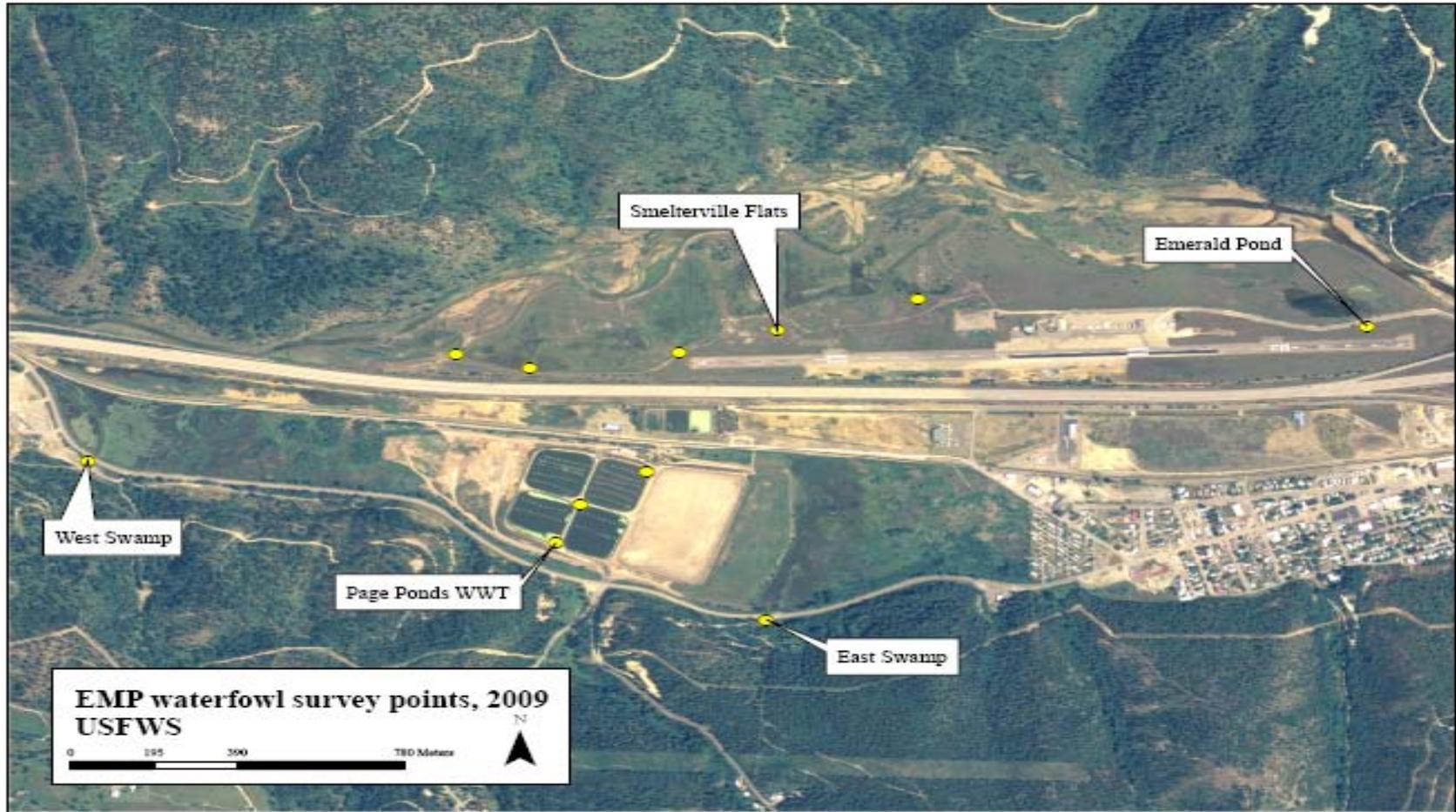


Table 2-1. Total number of waterfowl, average number of waterfowl per survey and number of species observed, Page Ponds wetland complex and Smelterville Flats, 2009, Smelterville, Idaho.

Wetland	Total Number of Waterfowl Observed	Average Number of Waterfowl Observed / Survey	Number of Species Observed / Wetland
Smelterville Flats	51	4	8
Page Ponds	6663	555	17

Table 2-2. Species and number of waterfowl observed, Page Ponds wetland complex, 2005-2007 and 2009, Smeltonville, Idaho.

2005		2006		2007		2009	
Species	Number	Species	Number	Species	Number	Species	Number
American coot	43	American coot	30	American coot	36	American coot	18
American wigeon	50	American wigeon	39	American wigeon	40	American crow	6
Barrow's goldeneye	107	Barrow's goldeneye	192	Barrow's goldeneye	260	American Wigeon	35
Blue-wing teal	3	Bufflehead	32	Bufflehead	14	Barrow's goldeneye	555
Bufflehead	6	Canada goose	44	Canada goose	30	Bufflehead	14
Canada goose	51	Common goldeneye	1087	Common goldeneye	1650	Canada goose	22
Canvasback	2	Common merganser	6	Common merganser	4	Cinnamon teal	4
Cinnamon teal	2	Crow	11	Gadwall	10	Common goldeneye	4902
Common goldeneye	708	Eurasian wigeon	1	Great blue heron	2	Common merganser	2
Common merganser	52	Gadwall	6	Green-wing teal	138	Gadwall	11
Gadwall	15	Green-wing teal	64	Killdeer	2	Great blue heron	1
Great blue heron	3	Lesser scaup	34	Lesser scaup	8	Green-winged teal	202
Green-wing teal	48	Mallard	247	Mallard	335	Lesser Scaup	26
Hooded merganser	1	Northern shoveler	34	Northern shoveler	39	Mallard	560
Lesser scaup	45	Redhead	52	Redhead	74	None	0
Mallard	182	Ring-necked duck	41	Ring-necked duck	37	Northern shoveler	103
Northern shoveler	60	Ruddy duck	1	Ruddy duck	1	Redhead	79
Pied-billed grebe	1	Wood duck	23	Wood duck	73	Ring-neck duck	56
Redhead	112					Tundra swan	2
Ring-neck duck	35					Wood duck	65
Ruddy duck	1						
Tundra swan	1						
Wood duck	20						

Table 2-3. Species and number of waterfowl observed, Smelterville Flats 2006, 2007, and 2009, Smelterville, Idaho.

2006		2007		2009	
Species	Number	Species	Number	Species	Number
American coot	2	Barrow's goldeneye	2	Canada goose	12
American wigeon	1	Canada goose	11	Common goldeneye	4
Barrow's goldeneye	5	Common merganser	5	Common merganser	7
Bufflehead	4	Mallard	52	Green-winged teal	2
Canada goose	21	Northern pintail	1	Hooded merganser	3
Common goldeneye	2	Redhead duck	6	Mallard	16
Common merganser	7	Wood duck	2	Ring-neck duck	4
Great blue heron	3			Wood duck	3
Green-wing teal	24				
Hooded merganser	2				
Mallard	52				
Northern pintail	6				
Redhead duck	4				

Figure 2-2. Number of waterfowl observed per survey 2005-2007 and 2009, Page Ponds wetland complex, Smelterville, Idaho.

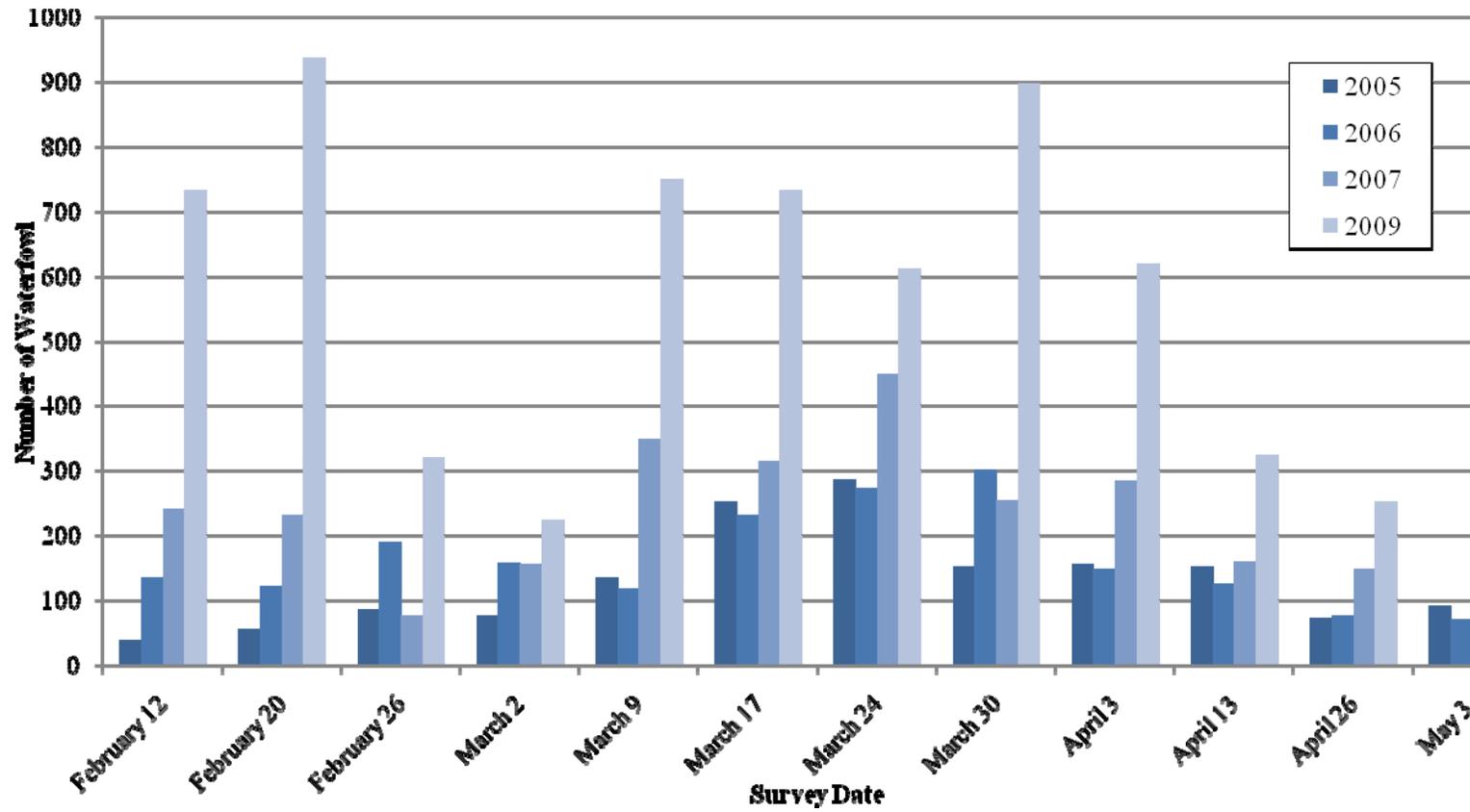


Figure 2-3. Number of waterfowl observed per survey, 2006, 2007, and 2009, Smelterville Flats, Smelterville, Idaho.

